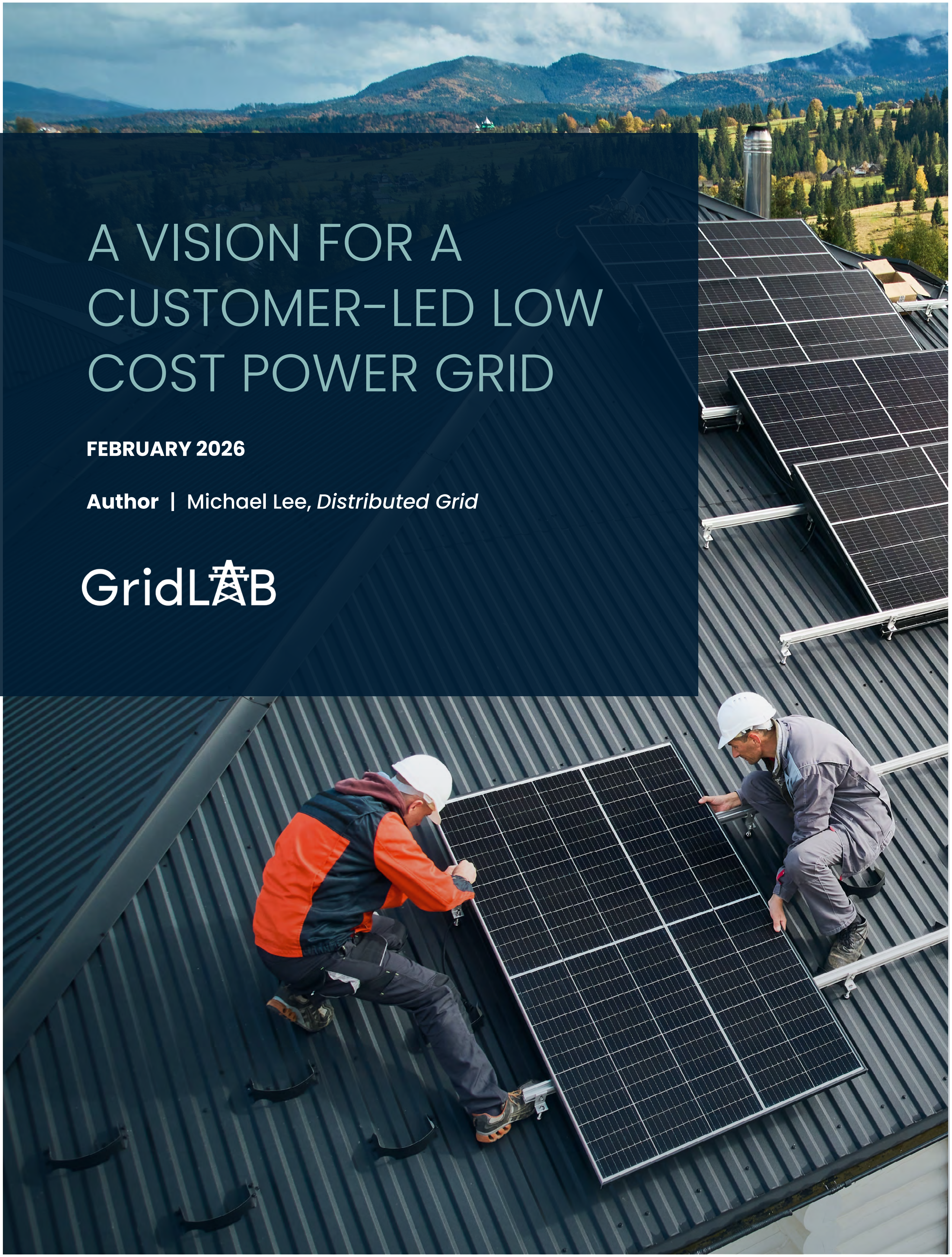

A VISION FOR A CUSTOMER-LED LOW COST POWER GRID

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GridLAB

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EXECUTIVE SUMMARY

The energy industry faces an urgent challenge: unprecedented demand growth from data centers, electrification, and re-shoring is colliding with multi-year delays in bringing new supply online. This creates a fundamental tension between the speed at which we need new capacity and the energy affordability customers demand. PJM's[1] recent capacity auction cleared at ceiling-level prices, and still 6.6 GW short of sufficient capacity for a 1-in-10 year event. This supply-demand imbalance has created political pressure and threatens political stability from rising power prices.

Restructured states such as PA, MD, OH, and NJ have a direct solution at their disposal. Consumers, traditionally viewed only as the source of demand growth, can become the primary source of new capacity through behind-the-meter (BTM) assets. These are customer sited assets such as batteries, EVs, heat pumps, and smart thermostats. By reforming a handful of retail market rules, states can unlock gigawatts of flexible capacity that deploy in months rather than years, simultaneously addressing speed, affordability, and customer experience.

This solution, termed “Retail 2.0”, transforms the legacy competitive retail market (plagued by deceptive marketing and price shocks) into competition on value-added services, particularly the flexibility of BTM assets which drive costs out of the system. In this model, retailers compete by co-optimizing customer load around both grid needs and consumer preferences, shifting consumption to times when wholesale energy prices are lowest (away from the superpeak hours). Software connectivity via APIs[2] into BTM assets unlocks gigawatts of flexible capacity, creating structural incentives that align retailer profit with system cost and customer satisfaction.

Core Benefits of Retail 2.0

Speed to Market

- BTM assets bypass the PJM interconnection queue entirely, deploying in weeks or months vs. years.
- Retailers can coordinate parallel deployment across thousands of homes simultaneously.
- No waiting for transmission upgrades or lengthy ISO interconnection studies.
- Assets are installed where needed: in load centers and without transmission buildout.

1 PJM Interconnection, L.L.C., the largest Regional Transmission Organization in North America, operates the wholesale electricity market and transmission grid across all or parts of 13 states (DE, IL, IN, KY, MD, MI, NC, NJ, OH, PA, TN, VA, WV) and the District of Columbia.

2 Application Programming Interface (API) is a set of rules and definitions that enables different software programs to communicate with each other and exchange data.

Reduction in Energy Prices

- Flexible demand reduces consumption during the highest-priced hours, shifting aggregate demand curves to the left, and lowering costs for all customers.
- Peak hour reductions create non-linear savings: the last few megawatts of demand reduction cause disproportionately large system-wide cost savings.
- Retailers who successfully shift load reduce their cost of goods sold, enabling them to offer genuinely lower prices without marketing gimmicks.

Reduction in Capacity Prices

- Customers with verified BTM capacity (batteries, home generators, VPP-enrolled[3] EVs) should have capacity tag obligations[4] reduced or eliminated.
- This reduces aggregate demand on PJM capacity market, lowering clearing prices for all customers, not just those participating in Retail 2.0.
- Shifts the incentive from paying centralized generators to stand by, to self-supplying capacity where it's needed most via BTM capacity.

Better Customer Experiences and Elimination of Retail 1.0 Issues

- Retail 2.0 companies compete on customer experience and trust, not marketing glitz.
- Supplier-consolidated billing creates brand accountability, eliminating the "hiding" of exploitative bait-and-switch pricing schemes that are branded under utility bills.
- Long-term value alignment replaces short-term extraction: retailers gain edge by shifting away from peak priced times; retailers who do not shift loads have deteriorating economics and financial pressure to exit to market.
- Competition shifts from who can trick customers to who can best serve them and the grid.

What Needs to Change

State Public Utility Commissions and legislatures control the levers needed to enable Retail 2.0. The essential reforms are:

1. **Accurate and Timely 15-Minute Settlements:** Utilities must use actual smart meter data for Settlement A (initial settlement), not generic load profiles corrected 60 days later. This enables immediate financial recognition of flexibility and rapid feedback loops, matching international best practices in Texas, UK, and Australia.

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3 A Virtual Power Plant (VPP) is a cloud-based distributed power plant that aggregates heterogeneous energy resources, such as rooftop solar, behind-the-meter batteries, and flexible demand-side loads, to provide peaking capacity and ancillary services to the grid.

4 Capacity Tag Obligations (Peak Load Contribution) In the PJM market, a customer's "capacity tag", formally known as Peak Load Contribution (PLC), represents their individual contribution to the grid's peak demand during the five highest coincident peak hours of the previous year. This value determines the specific amount of generation capacity a retailer must purchase and reserve on that customer's behalf for the following delivery year.

2. **Low-Latency, Granular Data Access:** IOUs must provide competitive suppliers with immediate, secure access to 15-minute interval smart meter data for opt-in customers within 24 hours of usage. And PUCs must mandate functional Green Button platforms so retailers can easily size batteries for new customers. This enables sophisticated load management and prevents utilities from using "data access difficulty" or “data security” as a barrier to competition.
3. **Capacity Cost Allocation Reform:** Establish mechanisms for (a) recognition of negative PLC values when customers reduce peak load below baseline (as ComEd does in Illinois), (b) pooling of negative PLC values (as ComEd does in Illinois), and (c) mid-year PLC adjustments rather than annual-only corrections.
4. **Supplier-Consolidated Billing (SCB):** Allow competitive retailers to send their own branded bills directly to customers, matching global best practices and enabling transparent cost unbundling. This is standard in every other restructured market globally (UK, Germany, France, Spain, Italy, Japan, Australia, NZ) and is essential for building the high-trust relationships that flexibility services require.

Each of these reforms directly addresses the failures of the current Retail 1.0 market while creating the conditions for Retail 2.0 to flourish.

Beyond addressing the immediate capacity crisis, Retail 2.0 creates a pathway to comprehensive grid optimization across all layers. BTM assets deployed to optimize wholesale markets can provide locational flexibility to address distribution constraints such as stabilizing feeder lines during localized peaks (such as overnight EV charging) that don't always coincide with macro grid peaks. This real-time optionality allows us to extract more value from existing distribution infrastructure, competing against costly distribution grid capital expenditures.

Further, states retain authority over transmission rate design even as FERC sets transmission revenue requirements. By establishing variable transmission rates that tie costs to peak-hour consumption (such as coincident peak pricing), states can enable BTM assets to co-optimize for transmission system peaks alongside energy, capacity, and distribution signals. When thousands of customers reduce consumption during transmission system peaks, aggregate demand shifts left, reducing the need for transmission expansion and lowering costs for all customers. This layered optimization across energy, capacity, distribution, and transmission represents the full potential of customer-led grid flexibility, achievable entirely through state-level regulatory action.

Unfortunately, utilities are not the best route to solving this. With in the current utility regulation of COSR[5], utilities are not incentivized to shift loads. And unless their earnings model evolves,

5 Cost-of-Service Regulation (COSR) is the traditional utility rate making framework where investor-owned utilities (IOUs) recover their operating costs plus a guaranteed rate of return of equity on capital expenditures. This model creates a "throughput incentive" where utilities maximize earnings through infrastructure expansion, such as transmission and distribution buildouts, rather than through system efficiency or the utilization of third-party flexible assets.

to where their investors lose money when their customers have undesirable load profiles (this is the mechanism for Retail 2.0), they cannot be the source of the load flexibility. Load flexibility cannot simply be an "upside" for utilities.

However, Retail 2.0 creates the foundation for a longer-term transformation of utility business models. As retailers deploy and coordinate millions of BTM assets for wholesale market optimization, these coordinated resources become available for distribution-level coordination. This enables utilities to transition to a Distribution System Operator (DSO) model, where they maintain poles and wires while running locational flexibility markets that pay customers to provide grid services at specific constrained points. Advanced European DSOs demonstrate this model increases utility profitability while lowering costs for all customers, as payments flow to customer-owners of distributed resources rather than to infrastructure contractors.

Importantly, Retail 2.0 is a no regrets solution: deploying flexible BTM assets improves grid economics regardless of what other policy changes materialize, providing value under any future scenario. It is also not mutually exclusive with other energy policy initiatives states are pursuing. It complements efforts such as transmission expansion, utility performance reforms, and capacity market improvements.

We have the opportunity to lean into retail choice, fix its structural problems, and have it be aligned to grid and customer outcomes. States that act decisively on these reforms will unlock a customer-led, flexible grid that delivers lower costs, faster capacity deployment, and better customer experiences: the trifecta that has eluded traditional regulatory approaches.

A BROKEN STATUS QUO
Speed vs. Affordability

PJM faces a confluence of unprecedented demand growth and multi-year supply bottlenecks. Governors across the region have expressed alarm over capacity prices, but the challenge runs deeper than market mechanics. We face fundamental friction between how quickly we need new capacity and how long traditional approaches take to deliver it.

The primary bottleneck is not entirely PJM's fault. Rather, it reflects the dominant influence of investor-owned utilities (IOUs) and incumbent generators in the stakeholder process. PJM's current interconnection model mandates that new generation projects wait for local utilities to complete transmission upgrades, a process that routinely stretches across multiple years. This model also happens to financially benefit utilities and existing generators, while creating delays and dysfunction for new generators.

Compare this to ERCOT's model in Texas, where generation interconnection is rapidly studied on purely technical merits, with transmission planning following market signals. Without interconnection rule reforms that incentivize speed, working through PJM will continue to lead to long lead times and failure to build.

Meanwhile, demand is surging. Data centers alone are projected to add 30 GW of load across PJM states by 2030[6]. Electrification is converting fossil fuel end-uses to electric load. Manufacturing re-shoring is bringing industrial demand back onshore. Each of these trends compounds the supply-demand imbalance, and each operates on timelines measured in months, not years.

The result is already shown in customer costs. Energy prices in 2025 were 50% higher than in 2024[7]. The most recent capacity auction cleared at ceiling-level prices while still short of 6.6GW for 1-in-10 year event[8]. We face a fundamental mismatch: states need capacity fast, but the current system is structurally incapable of delivering it quickly.

6 PJM Load Adjustment Requests Summary for 2026 Load Forecast, November 24, 2025
https://www.pjm.com/-/media/DotCom/committees-groups/subcommittees/las/2025/20251124/20251124-item-03---large-load-adjustment-requests-summary.pdf

7 PJM IMM Report, December 17, 2025
https://www.monitoringanalytics.com/reports/presentations/2025/IMM_MC_Market_Monitor_Report_20251217.pdf

8 https://insidelines.pjm.com/pjm-auction-procures-134479-mw-of-generation-resources/

FAILURE OF RETAIL 1.0
Understanding the Current Competitive Market's Problems

For the vision of Retail 2.0 to be credible, we must first acknowledge the legitimate criticisms of the current competitive retail market. Many customers in restructured states have had genuinely bad experiences with retail choice. Experiences that have created skepticism about competitive markets and fueled utility-backed campaigns to eliminate retail choice entirely.

These criticisms are not unfounded. The Retail 1.0 model, as it currently exists today, has significant structural problems.

"Bait and Switch" Exploitative Pricing Model

The defining characteristic of Retail 1.0 is the introductory rate scheme. Customers are attracted with a low, locked-in rate for an initial period (often 1-6 months), only to be automatically rolled onto a variable rate that can be 1.5-2x or even 3x the introductory price. The business model depends on customer inertia: retailers profit from customers who don't actively monitor their bills.[9]

Perverse incentives emerge from this structure. So much profit is realized in the first few months after the variable rate kicks in that companies systematically underinvest in long-term customer satisfaction. Retail 1.0 companies expect and plan for high churn rates, viewing customers as transactional rather than relationship-based. Competition becomes focused on the most attractive introductory rate, not the best long-term value: a race to the bottom.

Real examples abound. Variable rates spike to 15-20 cents/kWh while the utility default service sits at 7-10 cents/kWh. Aggressive door-to-door sales tactics targeting elderly or non-English speaking customers are a signature go-to-market strategy of bad actors. This short term thinking has poisoned the well of trust with customers.

9 Competing for (In)attention: Price Discrimination in Residential Electricity Markets, Jenya Kahn-Lang, March 10, 2024 https://drive.google.com/file/d/1ICIpnaf3gVy3X94YWhLtSSTMWKTzi16K/view

Utility-Consolidated Billing: Hiding Behind the Utility's Brand

The problems of Retail 1.0 are amplified by utility-consolidated billing (UCB). In PJM states, the investor-owned utility sends the branded bill, with the competitive supplier's charges appearing as a single line item. Customers see their trusted utility's logo and brand, not the competitive retailer's identity, misleading the customer to the source of the high prices.

Retail 1.0 companies have no incentive to build brand reputation when customers don't clearly associate the high charges with their Retail 1.0 brand. Further, since the Retail 1.0 company does not need to send the bill, their company can be just a few people, creating pathways for undercapitalized and under-resourced entities to become retailers. When customers complain, utilities point to the competitive supplier, but the customer doesn't remember how to get ahold of that supplier, and accountability dissolves in the confusion.

Contrast this with supplier-consolidated billing (SCB), which is standard in every other restructured market globally—UK, Germany, France, Spain, Italy, Japan, Australia, New Zealand. In these markets, the competitive retailer sends the bill directly to the customer, with utility delivery charges shown as a clear line item. The retailer's brand is front and center, creating direct accountability. Retailers in these markets need to staff call centers to manage customer touch points, ensuring a baseline operational capacity. Wait times and complaints are measured and published publicly. A retailer's brand directly suffers when they send bills with crazy fees attached to them.

A Low-Trust Market

These structural problems create a low-trust market. Customers are skeptical of competitive offers, viewing them as likely scams. Good actors struggle to differentiate themselves from bad actors. Good actors cannot create value in the energy markets to pass on lower costs to customers. Media coverage focuses on horror stories and price shocks. Regulators implement increasingly restrictive rules to protect consumers but have second order effects of creating complexities for new companies to enter the market. Utilities use these failures as evidence that retail choice doesn't work and should be eliminated in their quest to re-monopolize.

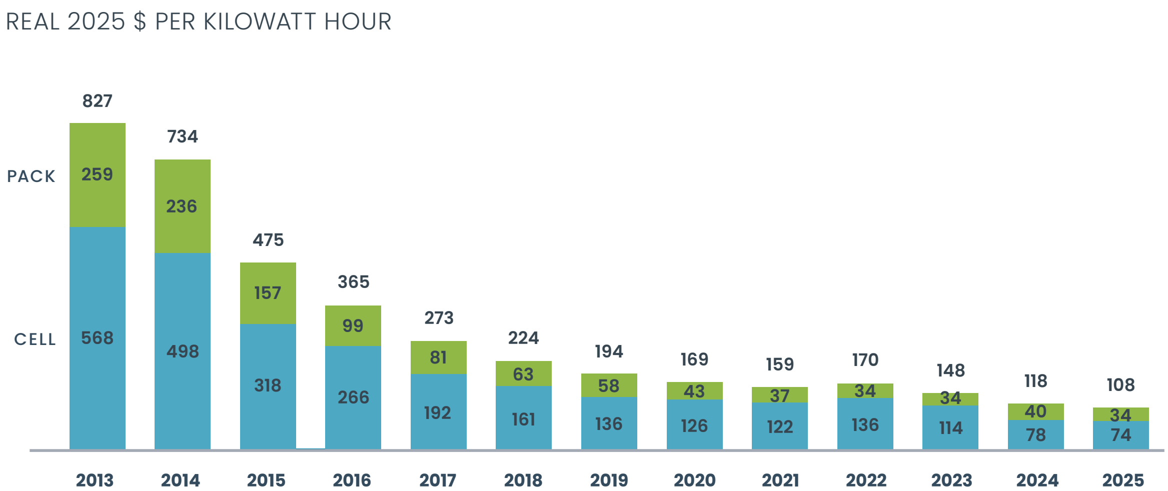
The low-trust environment makes it nearly impossible to build the high-trust relationships that Retail 2.0 requires. If a customer views their competitive supplier as a potential adversary trying to exploit them, they will never grant that supplier permission to manage their battery or thermostat. Trust is the foundational layer for flexibility, and Retail 1.0 systematically destroys it.

RETAIL 2.0
Competition on Value

The Retail 2.0 revolution is uniquely positioned to succeed now due to three converging factors:

1. **Major cost declines in customer-sited resources:** Battery costs have fallen dramatically over the past decade and continue to drop, making home energy storage economically viable[10]. EV adoption is accelerating, creating millions of mobile batteries. Heat pumps and smart thermostats are becoming standard in new construction and retrofits.

FIGURE 1. Volume-weighted average lithium-ion battery pack and cell price split, 2013-2025



Source: BloombergNEF 2025 lithium-ion battery price survey. Note: Historical prices have been updated to reflect real 2025 dollars. Weighted average survey value for 2025 includes 320 data points from passenger cars, buses, commercial vehicles, two- and three-wheelers and stationary storage. In EVs, the packs consist of cells, module housing, battery management system (BMS), wiring, pack housing and thermal management system. For stationary storage, we consider the battery rack, which holds stacked cells, modules, or packs, including the BMS, wiring and the rack housing.

Software connectivity via APIs: Modern BTM assets can be dynamically managed via software. Cloud-based platforms can coordinate thousands of devices simultaneously, optimizing each according to both grid needs and customer preferences.

High price volatility: The economic signal for flexibility has never been stronger. When wholesale prices swing from near-zero to extreme peaks in the same day, the values for supporting the grid have never been stronger. Retailers get rewarded for following these signals naturally by

10 https://about.bnef.com/insights/clean-transport/lithium-ion-battery-pack-prices-fall-to-108-per-kilowatt-hour-despite-rising-metal-prices-bloombergnef/.

the shape of their load curves: this means they do not need any “out of market payments” or government subsidies to create lower costs for the grid.

These factors create the conditions for a fundamentally different retail model: one where retailers compete not on misleading introductory rates, but on their ability to deliver long-term value through load optimization.

Core Retail 2.0 Mechanisms

In the Retail 2.0 model:

Retailers directly access wholesale markets: They purchase power in real-time or via forward contracts, bearing full financial exposure to their optimization decisions. Unlike utilities, Retail 2.0 companies cannot socialize their costs or mistakes: if they buy power at expensive hours, their shareholders pay the price.

Retailers coordinate BTM assets: Through customer-granted API access, retailers manage batteries, EV charging, smart thermostats, and other flexible loads. Critically, this is done with customer permission and within customer-specified constraints (e.g., "my EV must be 80% charged by 7am," or "never let my house go below 68ºF during these specific hours").

Optimization is continuous: Software platforms continuously solve for the optimal balance between:

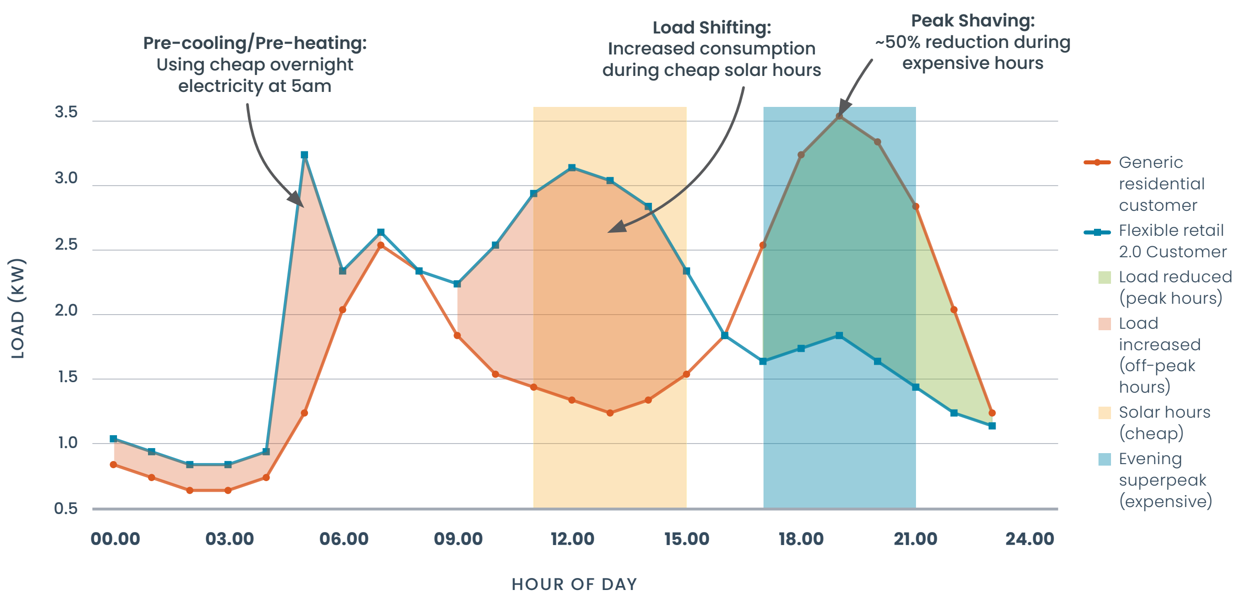
- Minimizing wholesale energy costs (buy during low-price hours)
- Meeting customer preferences and comfort requirements
- Maximizing battery cycle value without degradation

Value is shared: The cost savings from successful load optimization are split between retailer margin and customer bill reduction. Because Retail 2.0 companies can uniquely reduce their cost of goods sold through flexibility, they can offer the lowest prices on the market without playing marketing games.

Visualizing How Retail 2.0 Works

The following chart illustrates how a flexible Retail 2.0 customer's load profile (blue) differs from a generic residential customer (red). Through software-coordinated BTM assets, the Retail 2.0 customer pre-cools or pre-heats during cheap overnight hours (5am), increases consumption during midday solar hours when wholesale prices are lowest, and reduces peak demand by approximately 50% during expensive evening superpeak hours (5-9pm). The total energy consumed remains similar, but the timing shifts dramatically toward low-cost periods. If the retailer gets this coordination wrong, their shareholders take the loss - it's not socialized.

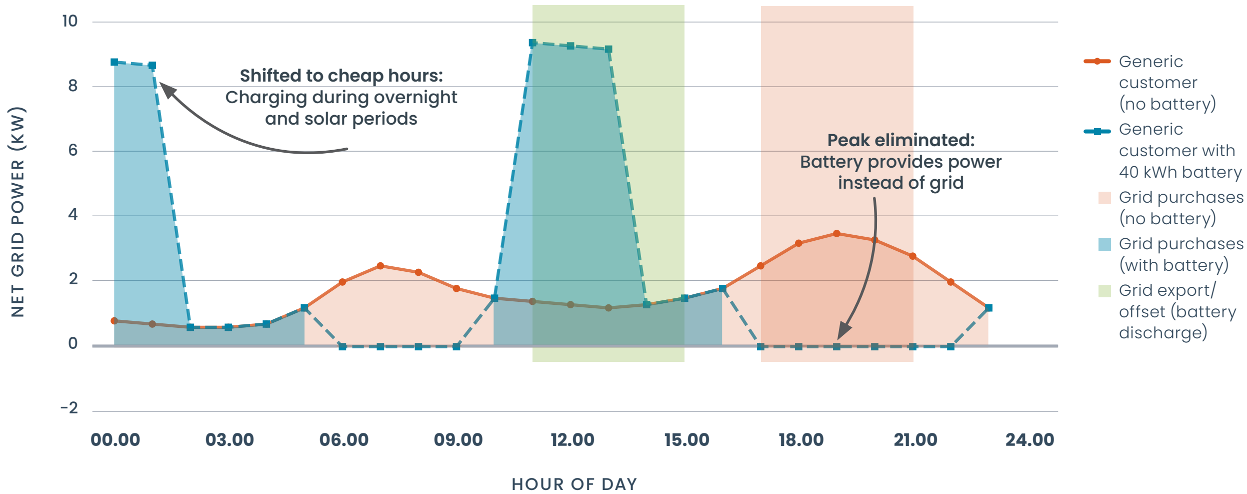
FIGURE 2. Daily Load Profile Comparison: Generic Residential vs. Flexible Retail 2.0 Customer



The next chart shows how a hypothetical 40 kWh battery system enables this optimization. The battery charges during cheap overnight and midday solar periods, then discharges during expensive evening peaks to offset grid purchases entirely. The result: the customer with a battery (blue dashed line) eliminates grid purchases during peak hours while shifting demand to periods when power is abundant and cheap. This load shape reduces wholesale energy costs, capacity obligations, and grid stress simultaneously, with savings shared between the retailer and customer.

In this example, the battery does not get negative values so it limits it's discharge to create a neutral position in the grid. Ideally PLC and settlements are reformed so that the battery is financially encouraged to maximally export during prices that are clear the grid is stressed.

FIGURE 3. Net grid purchases: generic customer vs. customer with battery (shows how battery eliminated peak-hour grid purchases)



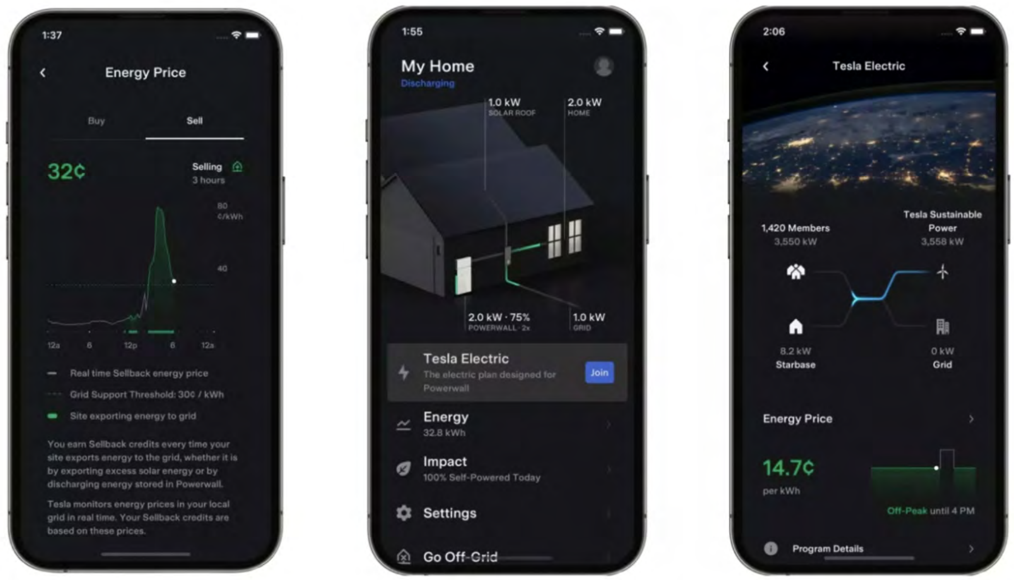
The Consumerization of Energy

Retail 2.0 companies, (such as Tesla, Tibber, Octopus, and Base Power), compete on user experience — ensure customers have a high quality experience knowing what their assets are doing and what is the value customers are getting in exchange. They invest in technology, user experience, and algorithms at their own expense — these costs are not socialized to the rate base.

FIGURE 4. Tibber app

Source: Tibber

FIGURE 5.



SELL HIGH, EARN MORE	FULLY INTEGRATED	100% SUSTAINABLE
Tesla tracks energy prices in real time and sells your excess electricity to the grid when prices are high, earning you credits on your bill	Manage your entire Tesla ecosystem in the Tesla app-review your usage, monitor your buying and selling rates and more	Tesla powers your home with 100 percent Texas-generated clean energy that you can monitor remotely 24/7

Source: Tesla

Why Retailers, Not Utilities

Competitive Retailers have natural structural advantages for this model that utilities do not share.

Retailer shareholders win or lose based on load optimization execution, creating intense focus on getting it right. Utilities socialize 100% of their costs and never lose money if they do not respect their customer's preferences or use power when wholesale markets are costly. A lack of flexibility is actually beneficial to utilities. It creates justification for building additional capacity and transmission infrastructure, which expands their rate base and guaranteed Return on Equity. The financial incentive structures are fundamentally opposite.

Modern Retail 2.0 companies are founded with technology and consumer products backgrounds, viewing exceptional customer experience as core to their differentiation, not as a regulatory compliance burden. Retail 2.0 retailers are built for customer-centricity from day one.

Retail 2.0 companies have the culture to launch new products, test features, and refine user interfaces on software timelines of days or weeks, not years. Responding to customer feedback and market conditions in real time translates directly to market share gains. This alignment of financial incentives is unique to Retail 2.0. Unless utility regulation fundamentally changes, utilities will never face the potential financial losses from inflexibility that Retail 2.0 companies do.

Second-Order Effects: System-Wide Cost Deflation

The effects of Retail 2.0 extend far beyond participating customers:

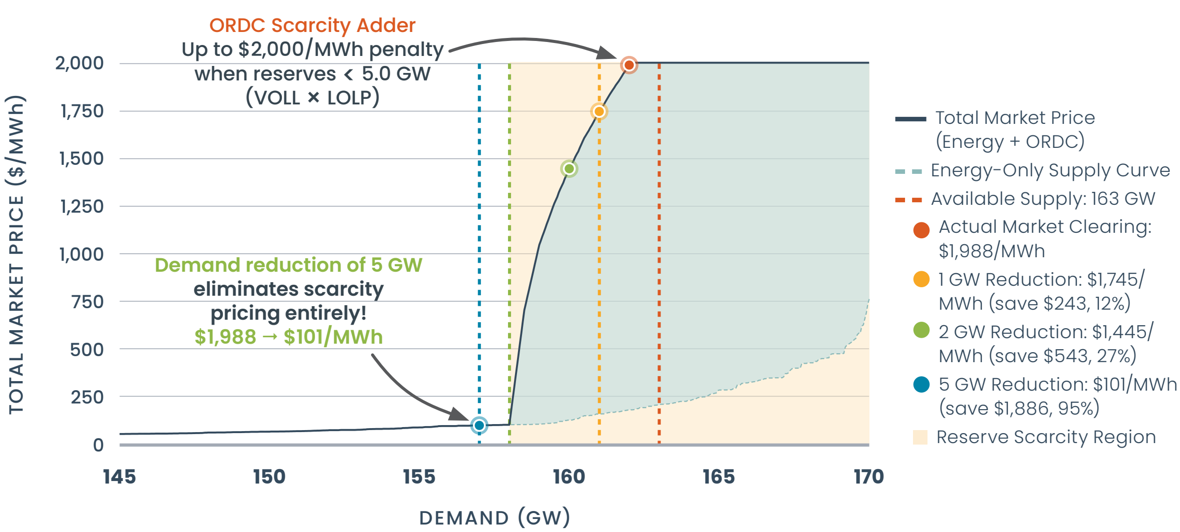
1 | Lower Energy Costs for All

When flexible demand reduces aggregate consumption during the highest-priced hours, power market prices fall for all customers, not just those with Retail 2.0 providers. This occurs because:

Non-linear pricing at the margin: During extreme hours, the supply curve becomes nearly vertical. The last few megawatts of demand can push prices from $100/MWh to $1000/MWh or even to the offer cap. Shifting the demand curve left by even a small amount, removing those last, most expensive megawatts of demand, creates disproportionately large system-wide savings.

Market-wide clearing prices: PJM operates on a uniform clearing price model. When the demand curve shifts left and intersects the supply curve at a lower price point, everyone pays that lower clearing price, including customers still on default utility service who aren't participating in any flexibility programs.

FIGURE 6. PJM Supply Curve with Scarcity Pricing — June 24, 2025 (HE 19 EPT)



2 | Deflation of Capacity Prices

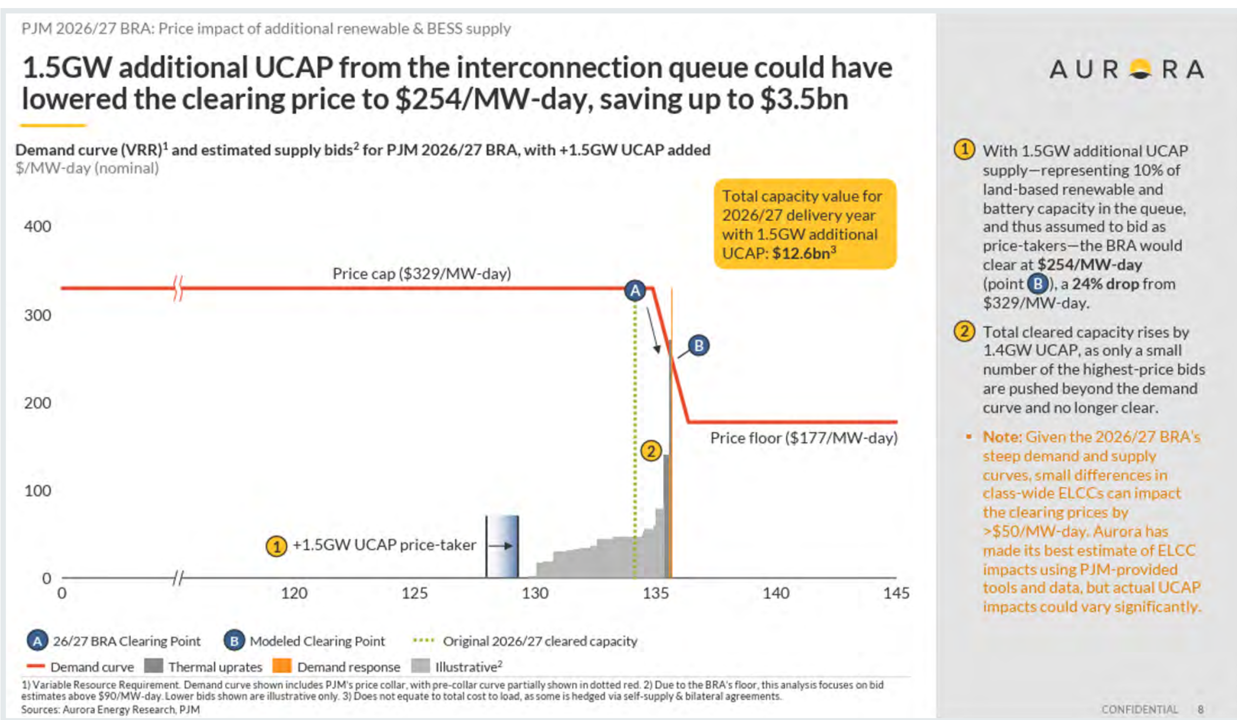
The capacity market exists to ensure sufficient generation stands ready to meet peak demand. When customers demonstrate verified BTM capacity (batteries, home generators, VPP-enrolled EVs), they, by definition, require less standby central station generation.

Allowing retailers to immediately forgo capacity tag obligations for these customers shifts the capacity demand curve to the left in PJM's annual capacity auction. This leftward shift will:

- Reduce aggregate demand in the PJM capacity auction
- Lower the capacity clearing price for all customers across the grid
- Create immediate, tangible financial incentives for BTM asset adoption
- Shift investment from centralized peaker plants to distributed resources located in load centers

The most recent PJM capacity auction cleared at ceiling levels. Reducing aggregate capacity demand by even a few gigawatts, achievable through widespread BTM deployment, could dramatically lower clearing prices.

FIGURE 7.



Source: Aurora

3 | Extinguishing Retail 1.0

Retail 2.0 creates a competitive dynamic where the best long-term value wins. Retailers compete on:

- Customer experience and brand trust
- Lowest total cost of service over time via flexibility and best load profiles
- Enabling technology and BTM asset subsidization
- Transparency and billing clarity

Traditional "bait-and-switch" Retail 1.0 companies cannot compete in this paradigm. Customers with BTM assets, once they experience the value of intelligent optimization, will not tolerate exploitative variable rates or hidden fees. Further, Retail 1.0 companies will incur financial losses if they don't flex their customer loads away from high priced times so long as the market reforms on load settlements are enacted.

This is already happening in markets that have enabled Retail 2.0 conditions. In the UK, Octopus Energy has grown to become the largest supplier in the country by competing on customer experience and flexibility programs, displacing legacy suppliers who relied on customer inertia. EON, EDF, and others are rapidly reinventing their businesses to compete on flexibility and service to stay competitive in the market. Nearly 600,000 customers in the UK are on Retail 2.0-style rates, nearly double from the year before[11].

4 | Speed to Capacity Deployment

The most immediate advantage of Retail 2.0 is deployment speed. While new central station generation projects wait years in PJM's interconnection queue, BTM assets follow an entirely different pathway that bypasses these bottlenecks completely.

Traditional generation faces compounding delays: interconnection studies take 12-24 months, transmission upgrade requirements add another 2-4 years, and construction timelines extend further still. A natural gas peaker plant proposed today may not deliver a single megawatt until 2029 or later. Meanwhile, demand growth from data centers, electrification, and manufacturing reshoring operates on timelines measured in months.

BTM assets invert this dynamic:

- **No interconnection queue:** Customer-sited batteries, EVs, and flexible loads connect behind the meter and require no PJM interconnection study or approval.
- **No transmission upgrades:** Assets install at the point of consumption, eliminating the need for new transmission infrastructure to deliver power from remote generation sites to load centers.

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11 Beyond Tariffs GB household flexibility market monitor, LCP Delta, December 2025 https://insights.lcp.com/rs/032-PAO-331/images/LCP-Delta-Beyond-Tariffs-GB-household-flexibility-propositions-Dec-2025.pdf

- **Parallel deployment:** A single Retail 2.0 company can coordinate installations across hundreds or thousands of homes simultaneously, rather than waiting for sequential approvals at a single centralized site.
- **Immediate capacity value:** Once installed and enrolled, assets provide capacity services within days, not years.

Consider the contrast: a 100 MW natural gas peaker requires a single large site, years of permitting and construction, transmission interconnection, and centralized operations. That same 100 MW of capacity can be assembled from 1,500 homes with battery systems, deployed across a metropolitan area in a matter of months, with each installation taking days rather than years. The distributed approach also provides inherent resilience, since capacity spread across thousands of locations cannot be taken offline by a single equipment failure or weather event.

This speed advantage directly addresses the supply-demand imbalance driving today's capacity crisis. States cannot wait 5-7 years for new central station generation to clear the interconnection queue. Retail 2.0 offers gigawatts of flexible capacity potential that can deploy at the speed the crisis demands. It also provides this potential via a no-regrets pathway.

WHAT NEEDS TO CHANGE
State Regulatory Mandates

The rules required to unlock Retail 2.0 are largely within the purview of state Public Utility Commissions (PUCs/PSCs), giving states direct control over their energy cost future. The necessary changes fall into "must haves" and "extremely helpful" categories.

Essential "Must Have" Changes

1 | Accurate 15-Minute Settlements in Initial Settlement (Settlement A)

The Change. Utilities must modernize their systems to use actual smart meter data for residential financial settlements with PJM in the initial settlement cycle within 1-2 days (Settlement A), abandoning generic load profiles. Currently, most utilities in PJM do use actual meter data, but only in Settlement B, which occurs approximately 60 days after the actual consumption. This means the power that a retailer is financially responsible for in the initial settlement reflects a generic assumption rather than what their customers actually consumed, hour by hour.

Current Challenge. The current two-settlement system creates significant friction for Retail 2.0 companies. In Settlement A (the initial settlement occurring days after consumption), utilities use generic load profiles which are essentially an average usage pattern for the entire customer class. When a Retail 2.0 company successfully shifts a customer's load from an expensive evening peak to a cheap midday solar hour, the utility reports to PJM that the customer consumed power according to the generic profile in Settlement A. The retailer receives no immediate financial benefit from the optimization and must front significant costs based on incorrect estimates.

Settlement B occurs approximately 60 days later and corrects to actual meter data, but this 60-day delay creates three critical problems: (1) Retailers must bridge the cash flow gap between paying inflated Settlement A charges and receiving Settlement B corrections, (2) The delayed feedback loop prevents retailers from quickly verifying that their optimization strategies are working, making iterative improvement extremely slow, and (3) The financial uncertainty discourages investment in sophisticated load optimization.

Compare this to ERCOT in Texas and most international retail markets (UK, Australia, New Zealand), where initial settlements use actual meter data, enabling immediate financial recognition of load optimization and rapid feedback loops.

How This Eliminates Retail 1.0 Problems:

- **Removes incentive for gaming:** Under profile-based settlement, Retail 1.0 companies have no reason to care about when customers use power, only about how much. This creates a pure commodity market where the only competitive lever is price manipulation.
- **Creates genuine cost-based pricing:** Retailers can offer time-of-use rates or flexibility-based pricing that accurately reflects their actual costs, incentivizing maximum flexibility.
- **Eliminates cash flow barriers:** Retail 2.0 companies don't need to bridge substantial 60-day financing gaps to cover the difference between generic profile charges and actual consumption.
- **Prevents estimated billing:** With real data, suppliers can provide accurate monthly costs, eliminating the surprise bill problem that plagues Retail 1.0.

Why This Enables Retail 2.0. This is the foundational reform. Without accurate initial settlement, retailers face two critical barriers: (1) they cannot get timely feedback on whether their optimization strategies are working, and (2) they must finance the gap between inflated initial charges and eventual corrections, creating significant working capital requirements that favor large incumbents over innovative new and flexible entrants.

2 | Low-Latency, Granular Data Access

The Change. IOUs must provide competitive suppliers with immediate, secure access to 15-minute interval usage data for customers who explicitly opt in. Data for existing retail customers must be delivered via API within 24 hours of usage (ideally real-time) through a centralized, secure platform similar to Smart Meter Texas. Data for prospective customers, needs to be delivered by a well functioning Green Button platform that is not plagued with artificial barriers.

Current Challenge. Smart meters were paid for with customer funds, yet many utilities refuse to share the data, provide it with delays (weeks or months), or offer only insufficient granularity (60-minute or daily intervals). Utilities claim technical difficulty or high cost, but these are often regulatory bluffs designed to prevent sophisticated competitors from entering the market. Utilities have degraded or eliminated access to data to millions of customers even though states have mandated customer access to this data[12.]

How This Eliminates Retail 1.0 Problems:

- **Enables sophisticated offers:** With granular data, Retail 2.0 companies can analyze a customer's actual usage patterns and provide accurate projections of savings eliminating the need for misleading introductory rates.

12 Mission Data, Fair and Open Markets for Virtual Power Plants, Michael Murray et al. https://static1.squarespace.com/static/5e449c8c3ef68d752f3e70dc/t/693ad11cfb85396ea75eb697/1765462300369/Mission-data-OMI+Report+v4.pdf

- **Creates transparency:** Customers can see their own usage data and independently verify supplier claims, reducing information asymmetry.
- **Allows for even quicker iteration:** While Settlement A occurs a couple of days after each day's delivery, getting an initial read of interval level data as soon as possible after the delivery interval allows for retailers to confirm the quality of their flexibility experiments. In the middle of a heat wave or polar vortex, every piece of information is vital, and the reduction in time to get initial reads creates an immense opportunity to enhance flexibility algorithms for the subsequent days during a weather challenge.

Why This Enables Retail 2.0. Flexibility optimization requires understanding baseline usage patterns and measuring the impact of load flex. Without timely and easy to access 15-minute data, retailers cannot accurately understand the impact of their load shifting or uniqueness of a customer.

3 | Capacity Cost Allocation Reform

The Change. Establish mechanisms allowing Retail 2.0 companies to: (1) purchase reduced or zero capacity tags for customers who self-declare and verify they have qualifying BTM assets (battery storage, bidirectional EV, onsite generator with auto-transfer switch), (2) receive credit for negative Peak Load Contribution (PLC) values when customers reduce load below their baseline during PJM's peak hours, and (3) allow for retailers to pool their negative PLC values, offsetting less flexible customers in their portfolio.

Understanding Capacity Tags and PLC. In PJM, each customer's capacity obligation is calculated based on their Peak Load Contribution (PLC): their contribution to the grid's peak demand during the five highest system-wide peak hours of the prior year (typically hot summer afternoons) and, going forward, the five peaks in winter as well. This PLC value determines how much capacity the retailer must purchase on behalf of that customer for the following year. Under current rules, once a PLC is set, it remains fixed for the entire year regardless of changes in customer behavior or installation of BTM assets.

Current Challenge. Three structural barriers prevent capacity markets from recognizing BTM flexibility:

1. **Annual PLC Lock-In Without a Mid-Year Review:** A customer who installs a battery in January still has their full capacity obligation for the entire first year based on pre-battery usage. The retailer is forced to pay centralized generators to stand by even though the customer now has self-supplied capacity. This forces customers to wait a full year before seeing capacity cost reductions, destroying the immediate financial incentive for adoption. A mid-year review process would allow retailers to right-size capacity obligations based on demonstrated performance, accelerating the customer's financial benefits of flexibility.

2. **No Credit for Negative PLC:** When a customer with BTM assets reduces their load below baseline during peak hours, current rules in most states set the minimum PLC at zero. Instead, Retail 2.0 companies should be able to create a "negative" contribution to peak demand. ComEd in Illinois allows for negative PLC credits.
3. **No Pooling of Negative PLC:** If retailers could pool negative PLC credits, the credits could be used to offset capacity obligations for less flexible customers in their portfolio, creating powerful incentives for BTM deployment for all customer-types. ComEd in Illinois allows for this pooling of negative credits and creates a framework forward.

Legislative Progress. Several states are actively pursuing reforms to address BTM barriers and the below are existing opportunities to consider amendments to unlock PLC barriers:

- **New Jersey: A6159 / S4023 (Swain/Murphy/Spearman):** Directs the BPU to establish a VPP program to reach a 500 MW peak demand reduction target by 2030.
- **New Jersey: S4876 (Smith/Burzichelli):** "Energy Reliability and Affordability Act" targeting 500 MW of demand optimization and battery storage by 2030.
- **Maryland:** HB 1256 (The DRIVE Act)- MD PSC implementation (Docket 9761): Enacted in 2024; mandates that IOUs file VPP pilot programs and utilizes AMI data to determine capacity performance.
- **Illinois:** ComEd already permits negative PLC values under its tariff structure, providing a model for other utilities (but does not yet permit mid-year PLC adjustments).

How This Eliminates Retail 1.0 Problems:

- **Enables hardware subsidization:** With immediate capacity tag relief, Retail 2.0 companies can subsidize BTM hardware costs (as Base Power does in Texas[13]), making adoption affordable for everyday customers rather than only the wealthy.
- **Creates differentiated offers:** Rather than competing on introductory rates, Retail 2.0 companies compete on "we'll install a battery at your home and your bill will be lower immediately". "Your rate will be high the first year and low the second year" (due to the current capacity tag structure) doesn't sound appealing for a customer in the status quo.
- **Enables portfolio optimization:** Negative PLC credits allow retailers to deploy BTM assets strategically across their customer base, using super-flexible customers to offset less flexible ones.

Why This Enables Retail 2.0. The business model for BTM asset deployment at scale depends on immediate value capture. Annual PLC lock-in forces a one-year wait, making economics unworkable. Mid-year adjustments and negative PLC recognition transform the economics by allowing retailers to monetize grid services as they're delivered rather than waiting 12-18 months for recognition.

13 Base Power Energy Retailer, "The Modern Power Company", https://youtu.be/arJVavpcqU0

4 | Supplier-Consolidated Billing (SCB) and not Utility-Consolidated Billing (UCB)

The Change. PUCs must mandate that IOUs allow competitive retailers to send their own branded bills directly to customers, with utility delivery charges shown as a clear, transparent line item. This could be optional: retailers could choose SCB or remain on UCB, but the option must exist.

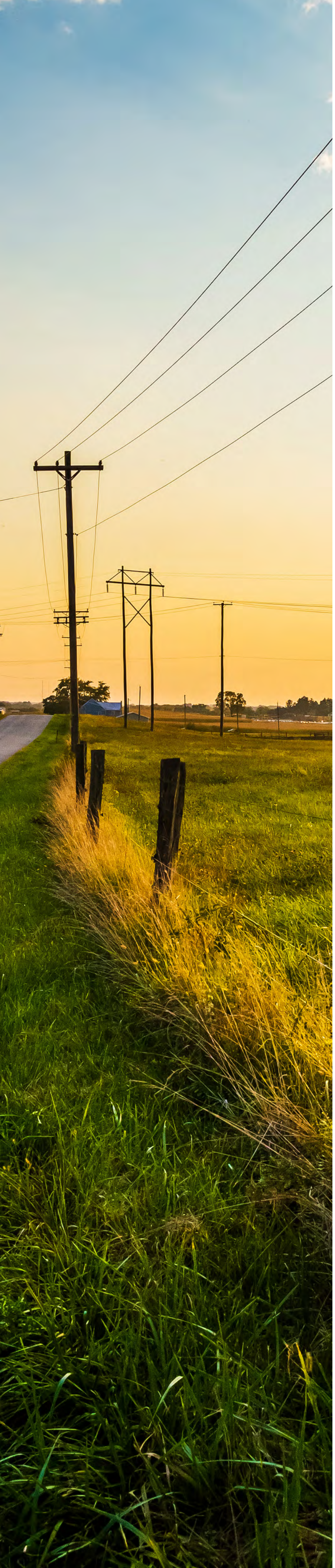
Current Challenge. UCB forces the retailer's charges onto the utility's branded bill, where they appear as a confusing single line item. This prevents brand recognition, obscures accountability, and enables Retail 1.0 bad actors to hide exploitative pricing.

How This Eliminates Retail 1.0 Problems:

- **Brand accountability:** When the retailer sends the bill, their brand is front and center. Exploitative pricing immediately becomes visible and attributable. Customers know exactly who to blame if rates spike.
- **Eliminates confusion:** With SCB, customers clearly understand that the retailer is providing energy service, the utility is providing delivery, and each charge is separated and labeled.
- **Enables premium experiences:** Retail 2.0 companies can design beautiful, intuitive bills that show flexibility savings, BTM asset status, and usage insights: all branded experiences that build trust.
- **Disincentivizes bad behavior:** A retailer who spikes rates will immediately see customer outrage directed at them, not diffused between utility and supplier and puts friction on the inertia-based business model of Retail 1.0.
- **Matches global best practice:** Every other restructured market pairs retail choice with SCB because it's the obvious accountability mechanism for retailers.
- **Enables elimination of POR:** Purchase of Receivable allows for uncollectible accounts to be socialized by all rate payers; elimination of POR means retailers risk collectability if the variable rates are too high.

Why This Enables Retail 2.0. Trust is the foundation of flexibility. Customers will not grant API access to manage their battery or thermostat to an entity whose brand they don't recognize and whose billing they don't understand. SCB creates the direct brand relationship that makes high-trust flexibility services possible.

This reform alone would do more to eliminate Retail 1.0 problems than any other single change. When bad actors are forced to put their name on the bill, they either reform or they exit the market.



"Extremely Helpful" Enablers

Streamlining Permitting and Interconnection

The Change. State-level reform to simplify BTM permitting for small systems (e.g., under 100 kWh batteries) that meet National Electric Code (NEC) and Underwriters Laboratory (UL) standards. Grant permits by-right rather than requiring months-long approval processes. Similarly, compel utilities to meet best-in-class interconnection timelines of under 7 days for standard BTM installations.[14]

Current Challenge. The typical customer journey today: purchase battery → wait 2-4 months for local permit → wait 1-2 months for utility interconnection approval → installation → wait for utility inspection → activation. This 4-6 month delay destroys trust and kills momentum in a world where consumers are used to instant feedback loops.

Impact. Faster deployment means customers experience value sooner, creating positive word-of-mouth. It also enables retailers to deploy assets at scale in parallel which is essential for achieving the gigawatts of flexible capacity needed to impact system prices.

Simplified Enrollment

The Change. Enable same-day competitive supplier enrollment for customers with active utility service. Use digital verification and electronic authorization to eliminate the current multi-week delays. Also enables new customers moving to the service territory to first get service directly from a competitive supplier and not the default utility.

Current Challenge. The current process is deliberately designed to be high-friction: customer signs up with utility → wait up to 30 days for utility service activation → wait [15] more days for first bill → only then can shop for competitive provider → wait for switching process. Total delay: 45+ days. Even if you are on a competitive

14 Texas SB 1252 and SB1202 streamlines the permitting process by stripping local jurisdictions of the power to regulate permitting beyond state-adopted codes (like the National Electrical Code). Specifically, local regulatory authorities must issue permits within two business days of receiving notice of inspection or document approval and allows for the use of qualified third-party inspectors to expedite the process. https://www.tdlr.texas.gov/news/2025/08/14/sb-1252-changes-to-residential-energy-backup-system-regulations/

supplier's rate, you cannot change in the same day to another rate, you must currently wait until the end of the billing cycle even though this is not standard in other restructured countries.

Impact. This removes artificial barriers to switching and creates a customer experience comparable to signing up for any other service (internet, mobile phone, etc.)[15]. The technology exists and same day switching is already the standard in every other country with retail choice. Utilities claim difficulty to preserve default service market share.

Transparent Cost Unbundling: Separating Fixed Capacity Costs from Variable Energy Charges

The Change. Enable and encourage retailers to offer pricing structures that separately disclose fixed capacity costs and variable energy charges on customer bills. This transparent cost structure allows customers to see exactly how their flexibility behaviors impact their bills: the "fixed" charges of capacity are now viewed as costs consumers can reduce by adopting flexibility.

Current Challenge. Retailers face two distinct cost structures from wholesale markets: fixed capacity costs (based on customers' peak load contributions) and variable energy costs (based on hourly consumption). However, under the status quo, retailers are forced to translate both into a single variable per-kWh charge on the customer's bill. This translation obscures where retailers create value. When a Retail 2.0 company reduces a customer's capacity costs through peak load management, that savings gets buried in a bundled rate rather than appearing as a clear line item. Similarly, when the retailer shifts consumption to low-cost hours to reduce energy costs, customers cannot distinguish this benefit from the capacity savings and cannot customize an offer customer-by-customer based on the flex potential.

Impact. Unbundled pricing creates powerful behavioral feedback loops. When customers can see their capacity costs (which reward low peak contribution over time) separately from their variable energy costs (which reward shifting consumption to low-price hours), they can make informed decisions about when to run appliances, when to charge EVs, and whether to invest in BTM assets. This transparency also enables retailers to offer innovative pricing structures such as "pay-as-you-peak" capacity charges that decline as customers demonstrate consistent flexibility and aligns customer outcomes to what the grid needs.

Connection to Supplier-Consolidated Billing. This reform works synergistically with SCB. When retailers send their own branded bills, they have full control over bill design and can present capacity and energy charges in intuitive, visual formats that educate customers about their flexibility value. Under the current UCB, this level of transparent communication is impossible because the utility's one-line-item format cannot accommodate the detailed breakdown needed to drive customer behavior change.

15 Who's the Buyer?, March 2020, Rob Gramlich and Frank Lacey https://gridstrategiesllc.com/wp-content/uploads/2024/05/whos-the-buyer.pdf

THE UPSIDE SCENARIO
Retail 2.0 Enables Transmission and Distribution Optimization

The immediate opportunity for Retail 2.0 focuses on wholesale energy and capacity markets. Retailers optimize around real-time energy prices and reduce capacity obligations, directly lowering costs for all customers. However, the long-term potential extends further. BTM assets deployed for wholesale market optimization can become the foundation for both distribution and transmission system optimization, creating a fully optimized grid across all layers.

Distribution System Optimization: Real-Time Flexibility at the Feeder Level

Currently, utilities respond to distribution constraints by building more infrastructure. A distribution feeder experiencing peak loading triggers a multimillion-dollar upgrade, paid for by all ratepayers through regulated rates. Distribution infrastructure sized for peak demand sits underutilized most hours of the year, yet utilities earn guaranteed returns on this capital regardless of how efficiently it's deployed.

Retail 2.0 creates a competing resource for distribution system upgrades. The real-time optionality of a plethora of BTM devices such as batteries discharging during constraints, EVs delaying charge cycles, smart thermostats pre-cooling homes can stabilize distribution feeder lines during localized peaks. Importantly, these distribution-level peaks do not always coincide with macro grid peaks. Overnight EV charging, for example, can create localized transformer and feeder constraints even when the bulk power system has abundant capacity. A retailer managing 500 homes on a constrained feeder can reduce aggregate load during critical afternoon or evening hours (or overnight charging periods), eliminating or deferring the need for distribution system upgrades that would otherwise cost millions.

This localized, real-time optimization allows retailers to create significantly more value from the existing distribution infrastructure, and allows for customers to get paid to support the grid. This has a dual deflationary impact in that less capex is built and customers receive the money for the new form of grid stability: flexibility. Having this secondary financial signal creates more value streams for the Retail 2.0 company to harness and thus lowers rates for customers.

Transmission System Optimization: State Authority Over Rate Design

Beyond distribution, transmission system optimization represents an even larger opportunity. While transmission planning and pricing are primarily under federal jurisdiction through FERC, states do retain authority over how transmission costs are collected from retail customers. This state-level authority creates a direct pathway for enabling BTM assets to reduce transmission costs for all customers.

FERC recently clarified this jurisdictional boundary in its Order on Co-Location[16:]

"As the comments described above illustrate, the boundaries between federal and state jurisdiction are not hermetically sealed. The application of these principles to the issue of co-location will often depend heavily on the specific facts and circumstances presented in particular situations. Nevertheless, it is possible at this point to articulate our view of certain basic principles that will apply across those different situations. First and foremost, states retain exclusive jurisdiction over the terms of retail sales, generally including the rate designs that determine how the costs of the wholesale sale and transmission of electricity assigned to a wholesale customer are allocated among that wholesale customer's retail customers. Thus, while 'a State may not conclude in setting retail rates that the FERC-approved wholesale rates are unreasonable,' it is within a state's exclusive jurisdiction to determine how those FERC-approved rates are collected among the relevant retail consumers along with the rates for state-jurisdictional matters."

This clarification is critical: FERC sets the transmission revenue requirement (how much transmission owners can collect), but states determine the rate design (how those costs are allocated among retail customers). This state authority creates an immediate opportunity for transmission cost optimization through retail rate design reform.

States should establish variable transmission rates that tie customer costs to their consumption during transmission system peak hours rather than flat, volumetric charges. One example is 12 Coincident Peak (12CP) rates, where transmission costs are based on a customer's usage during monthly system peaks. When customers face variable transmission rates, their BTM assets can co-optimize across four distinct value streams simultaneously: energy arbitrage, capacity reduction, distribution optimization, and transmission peak avoidance. Of course, customers don't have to be fully exposed, so long as the retailer is financially responsible.

The aggregated effect of thousands of customers optimizing for variable transmission rates creates a leftward shift in the transmission demand curve during peak hours. This reduces the need for transmission system expansion, deferring or eliminating costly transmission projects. Because transmission costs are socialized across all customers in a zone, the benefits accrue to everyone—not just those with BTM assets.

16 FERC Order issued on December 18, 2025, Docket No. EL25-49-000, https://www.ferc.gov/media/e-1-el25-49-000-0

The economic signal is powerful: transmission costs can represent 15-30% of a customer's total bill in many regions. Providing transparent variable transmission pricing creates immediate, tangible incentives for flexibility during the hours when the transmission system is most constrained. Retailers can offer customers clear value propositions: "Install this battery and reduce your transmission costs while also reducing energy and capacity costs." Adding this additional financial signal for Retail 2.0 companies to co-optimize for allows for further reduction of costs offered to customers.

The Complete Optimization Stack

When combined with the distribution-level optimization described above, Retail 2.0 enables a fully optimized grid across all layers:

- **Wholesale energy markets** benefit from demand flexibility that shifts demand curves left during high-price hours
- **Capacity markets** benefit from reduced aggregate demand as customers self-supply
- **Distribution systems** benefit from locational flexibility that defers or eliminates infrastructure upgrades
- **Transmission systems** benefit from reduced peak loading through variable rate structures that defer transmission expansion

All customers benefit from lower total system costs, regardless of whether they participate directly in flexibility programs. The threat of competition from distributed resources disciplines both distribution and transmission utility spending, ensuring that new infrastructure is justified against flexible alternatives. And retailers are uniquely positioned to solve for these costs in an unconflicted manner.

State Implementation

States can implement variable transmission rates immediately through their existing regulatory authority over retail rate design. No federal action or PJM governance changes are required—state PUCs can direct utilities to offer variable transmission pricing structures (such as coincident peak rates) for retail customers. Several states have already implemented similar structures for large commercial and industrial customers; extending these options to all customers, including residential customers whose retailers want to opt-in, simply requires regulatory direction. Distribution regulation requires utilities who are ready for the future.

However, Retail 2.0 is the necessary foundation for this complete optimization. Without retailers deploying BTM assets for wholesale market optimization, there is no fleet of flexible resources available for distribution and transmission optimization. But once that foundation is built through the four essential reforms outlined in this paper, the pathway to full-grid optimization is clear and achievable through state-level action.

THE FUTURE OF UTILITIES
The Network Operator Model

Retail 2.0 deployment of BTM assets creates a pathway for fundamental utility transformation. As retailers coordinate millions of batteries, EVs, and flexible loads for wholesale market optimization, these resources become available for distribution-level coordination. The utility evolves from infrastructure owner to Distribution System Operator (DSO), maintaining poles and wires while coordinating distributed resources through locational flexibility markets.

The DSO Model: Coordinating Resources, Not Owning Them

The DSO does not own assets inside customer homes. Batteries, thermostats, and other BTM devices remain customer property, avoiding the "Ma Bell monopoly" where telephone companies owned in-home equipment and stifled innovation. Instead, the DSO runs real-time markets paying specific customers on constrained parts of the grid to provide stability. When a distribution feeder hits capacity limits, the DSO runs a locational flexibility market where retailers bid BTM capacity to resolve the constraint. The battery owner on the constrained feeder gets paid to discharge during peaks. The EV owner delays charging. Market coordination delivers reliability at a fraction of traditional infrastructure costs.

European DSO Markets: A Reference Point

UK Distribution Network Operators run "flexibility services" markets where retailers bid distributed resources to address local constraints. UK Power Network coordinates thousands of flexible assets for system-wide and locational services. Dutch DSO Stedin operates flexibility platforms integrating solar, batteries, and flexible demand to manage feeder congestion. Traditional distribution upgrades (substations, transformers, feeders) cost millions and take years. DSO flexibility markets resolve constraints faster and cheaper by paying customers directly.

Benefits for Customers and Shareholders

Under traditional COSR[17], utility earnings depend on growing the rate base (infrastructure value). The DSO model realigns the incentives. Rather than the incentivization for growing the system capex, DSOs earn from coordinating resources and producing outcomes aligned to higher utilization rates. Flexibility payments flow to customers providing grid stability, not to construction contractors. The network coordination model means the transmission and distribution portions

17 Cost-of-Service Regulation, defined previously

of customer bills should see deflation: less capital expenditure is built for the same kWh throughput, and the payments required to achieve this optimization flow directly to customers. This also creates a double benefit: lower infrastructure costs for the system as a whole, and direct compensation to participating customers who provide flexibility services.

For shareholders, the DSO model creates revenue from coordination services and platform operations while reducing capital intensity and stranded asset risk. The DSO operates software-enabled coordination platforms generating steady returns without betting billions solely on decade-long infrastructure projects with potentially low utilization rates. This model also sets the foundation for Performance-Based Regulation (PBR). When the utility's role shifts from infrastructure owner to network coordinator, regulators can hold them accountable for outcomes rather than simply compensating them for capital inputs. Utilities under PBR earn based on metrics that matter: reliability, efficiency, customer satisfaction, and successful integration of distributed resources, aligning the utility's interests with customers' interests and removes the zero-sum nature of utility profits in the COSR model.

REFERENCES FROM OTHER MARKETS

The operational potential of Retail 2.0 is not theoretical, it's proven in markets that have implemented the necessary regulatory enablers.

Octopus Energy (UK)

Octopus provides a clear blueprint for Retail 2.0 at scale. Through integrated demand response programs like Intelligent Octopus (for EV charging) and Saving Sessions (for emergency peak reduction), they reward customers for flexibility when the grid needs it most. The retailer is empowered by:

- Ubiquitous smart meters with 30-minute data access
- Supplier-consolidated billing creating direct brand relationships
- Transparent settlement allowing them to monetize load shifting
- Ability to build Virtual Power Plants (VPPs) for grid balancing and peak reduction

Their strong Net Promoter Scores, customer-centricity, and creativity on flexibility has enabled them to grow to become larger than any other load-serving entity in the UK. They've proven that competing on customer experience and flexibility, not price gimmicks, is a winning strategy.

Critically, Octopus succeeded not through regulatory mandate, but through market competition once the enabling rules were in place. The UK's combination of smart meter data access, supplier-consolidated billing, and accurate settlement created conditions where the best operator could win through genuine value creation.

Base Power (ERCOT, Texas)

Base Power installs large BTM battery systems, subsidizing the hardware cost for homeowners by monetizing the battery's ability to provide high-value grid services (peak load reduction, frequency regulation) to ERCOT. They make battery backup affordable to everyday Americans by using wholesale market revenues to pay for the battery at the house.

The success of this model, achieved without government subsidies or mandates, validates the core Retail 2.0 leverage: the retailer creates a new revenue stream from grid services that dramatically reduces the customer's effective energy rate. Base Power's business case works because:

- ERCOT allows accurate settlement based on actual meter data
- There are no capacity tag obligations preventing immediate value capture

- Wholesale market volatility creates substantial arbitrage opportunities
- The retailer can monetize ancillary markets via their BTM batteries

Because their revenues are achieved through market competition rather than subsidy, their incentive is to build the cheapest and most reliable battery on the market, disrupting the incumbent hardware manufacturers.

Origin Energy (Australia)

Origin, a large legacy retailer, is aggressively pursuing VPP strategies to integrate customer solar and battery storage, creating a 1.5GW VPP within their retail energy portfolio[18]. This VPP investment is viewed as critical for customer retention in an increasingly competitive market, proving that the future of retail is tied not to selling electrons, but to orchestrating flexibility.

This represents a necessary competitive response once market conditions enable it. Origin's transformation from a centralized generation-centric company to a customer-centric flexibility platform demonstrates that even legacy utilities can adapt when market forces require it. The Australian market's combination of high solar penetration, accurate settlement, and competitive pressure created the conditions where flexibility became the only viable competitive strategy.

The lesson is that regulatory enablement plus competitive pressure can create rapid innovation and customer benefit from an incumbent.

18 Origin Energy FY25 Results, August 14, 2025 https://www.originenergy.com.au/wp-content/uploads/174/FY25_Results-presentation.pdf

CONCLUSION

The capacity crisis in PJM, characterized by historic high prices and systemic supply bottlenecks, is not merely a failure of market design but a consequence of misaligned economic incentives embedded in both the traditional investor-owned utility structure and the outdated Retail 1.0 model. The IOU model rewards capital expenditure over system efficiency, while Retail 1.0's adversarial, low-trust nature actively hinders the adoption and utilization of customer-sited assets that could rapidly balance the grid. This status quo perpetuates cost escalation and system fragility by ignoring the vast, low-cost flexibility trapped behind the meter in EVs, batteries, and smart appliances. The solution lies not in eliminating retail choice, but in fundamentally reforming it to incentivize resource orchestration and customer value creation.

The vision of Retail 2.0 defines this necessary pivot, positioning the competitive retailer as the architect of a customer-led, flexible grid. As evidenced by international leaders like Octopus, Base Power, and Origin, competitive retailers when properly empowered can rapidly deploy Virtual Power Plants that monetize BTM assets at scale. Retailers lower the cost structure by reducing usage during peak priced hours and capacity displacement. These lower costs enable lower customer retail rates and subsidization of BTM hardware. Lower rates and free or subsidized hardware drive customer adoption and market share growth. A larger customer base creates more flexibility capacity, lower the cost for energy and capacity for all customers on the grid, not just Retail 2.0 customers. The cycle repeats, creating exponential growth in flexible capacity that is not burdened by the PJM interconnection process.

The long-term vision extends beyond wholesale markets to encompass both distribution and transmission optimization. BTM assets deployed for energy and capacity optimization can provide real-time locational flexibility to stabilize distribution feeder lines during localized peaks such as overnight EV charging constraints that don't coincide with system peaks. This flexibility defers costly distribution infrastructure upgrades.

Additionally, states retain authority over transmission rate design. By establishing variable transmission rates that tie costs to peak-hour consumption, states enable BTM assets to co-optimize for transmission system peaks alongside energy and capacity signals. When aggregated across thousands of customers, this flexibility shifts transmission demand curves left during peak hours, deferring transmission expansion and lowering costs for all customers.

Combined with wholesale market optimization, this creates a fully optimized grid across all layers: energy, capacity, distribution, and transmission, all achievable entirely through state-level regulatory action. Retail 2.0 is the necessary foundation for this complete optimization across all grid layers.

The long-term evolution transforms utilities into Distribution System Operators coordinating millions of distributed resources through locational flexibility markets rather than owning generation or customer equipment. This restructuring fundamentally changes how grid costs are allocated. Instead of utility spending flowing to infrastructure contractors with costs passed to all customers through rates, DSO payments go directly to customers providing flexibility services at constrained locations. Advanced European DSOs prove this model increases utility returns and DSO sets up the opportunity for states to move utilities into outcome-based PBR incentive models.

This model shifts competition from margin extraction (Retail 1.0) to value creation (Retail 2.0), tying shareholder success directly to customer benefit and grid efficiency. Retailers who fail to deliver genuine value lose customers and take on bigger wholesale market risk exposures while retailers who over-serve customers win market share while also increasing customer transparency and accountability. This is how markets should work.

To realize this outcome in the PJM footprint, state-level Public Utility Commissions and Legislatures must act decisively on four essential reforms:

1. **Accurate Settlement:** Ensure the wholesale market financially rewards load shifting, creating the economic foundation for Retail 2.0
2. **Granular Data Access:** Remove the information asymmetry that prevents sophisticated load optimization and enables Retail 1.0 exploitation
3. **Capacity Tag Reform:** Enable immediate value capture from BTM assets, making mass-market deployment economically viable
4. **Supplier-Consolidated Billing:** Create brand accountability and the high-trust relationships that flexibility requires

Retail 2.0 solves the core crisis of speed to capacity deployment. While new central station generation waits years in PJM's interconnection queue, BTM assets deploy in weeks or months, not years. They bypass transmission upgrade requirements entirely. Assets install exactly where capacity is needed, in load centers where people live. Deployment scales in parallel across thousands of locations simultaneously. No new transmission or distribution infrastructure or approvals by PJM are required. A single Retail 2.0 company can coordinate the deployment of 100 MW of battery capacity across 1,500 homes in a single month, providing both energy arbitrage and capacity services immediately. Compare this to a new natural gas peaker plant requiring 3-5 years in the queue, transmission upgrades, one centralized location, and limited operating flexibility.

The benefits extend far beyond participating customers:

- All customers see lower energy costs AND capacity costs because flexible demand shifts demand curves left during peak hours, reducing clearing prices for everyone on the grid
- Default service customers are protected by competitive pressure that drives out Retail 1.0 exploitation
- Grid reliability improves through distributed capacity that's inherently more resilient than centralized generation
- Economic development accelerates as lower energy costs attract data centers and industrial load while managing costs for all

This is how we achieve the goals that have historically been in tension: faster capacity deployment, lower costs for consumers, and better customer experiences. All simultaneously and without any funding of subsidies or utility programs. The authority to implement these reforms lies with state Public Utility Commissions. Governors concerned about capacity prices and affordability have a clear path forward by directing their PUCs to implement the four essential Retail 2.0 reforms. This is not a multi-year process requiring federal action or PJM governance changes. These are state-level regulatory decisions that can be made in months.

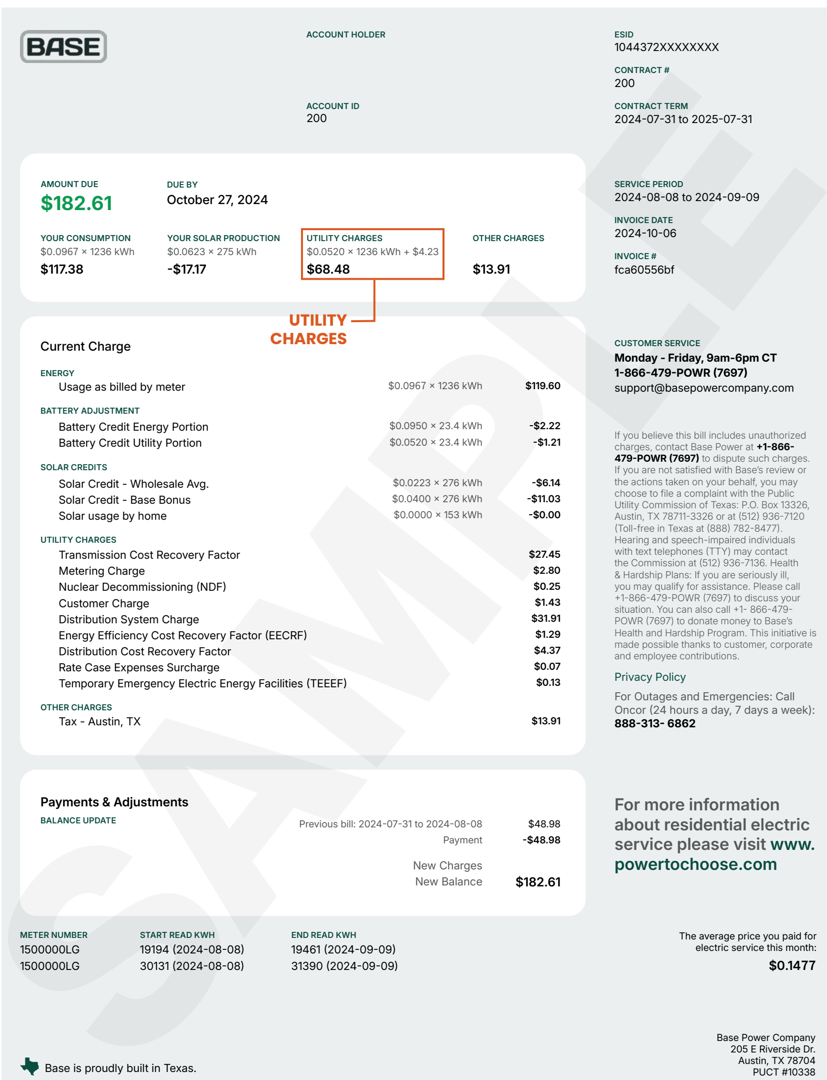
These reforms complement rather than compete with other energy policy initiatives. States can pursue Retail 2.0 alongside transmission planning reforms, utility regulation updates, and other capacity solutions. Retail 2.0 is a no regrets approach: the flexible capacity and customer benefits it creates have value regardless of what other policies succeed or fail.

States that act first will see immediate relief on capacity costs as BTM deployment accelerates, attract Retail 2.0 companies and the jobs and investment they bring, demonstrate a viable path forward for other restructured states, and position themselves as leaders in the clean energy transition. States that delay will continue paying ceiling-level capacity prices, watch customers suffer from Retail 1.0 exploitation, and miss the window to deploy flexible capacity at the speed and scale the crisis demands. The technology is ready and the business models are proven in other markets. The question now is whether states will act decisively to unlock customer-led grid flexibility and address the capacity crisis through market-driven solutions available today.

Appendix

Sample supplier-consolidated billing

Supplier-consolidated billing (SCB) is the global standard for restructured markets, utilized in the UK, Germany, France, Japan, and Australia. Under SCB, the competitive retailer sends the bill directly to the customer, presenting utility delivery charges on the consolidated bill — the customer gets one bill for all T&D +Energy Charges. This model replaces the confusion of Retail 1.0 with direct brand accountability: when the retailer's logo is on the bill, they can no longer hide behind the utility's reputation to mask price shocks. Retailers use this direct relationship to make energy data approachable, using intuitive design to move customers toward flexibility services that lower their costs. Importantly, SCB does not diminish regulatory oversight. State regulators maintain full authority over the information presented on the bill, ensuring that consumer protections remain robust while allowing for a superior, technology-driven customer experience.



BASE

ACCOUNT HOLDER

ACCOUNT ID
200

ESID
1044372XXXXXXXX

CONTRACT #
200

CONTRACT TERM
2024-07-31 to 2025-07-31

AMOUNT DUE	DUE BY		
$182.61	October 27, 2024		
YOUR CONSUMPTION	YOUR SOLAR PRODUCTION	UTILITY CHARGES	OTHER CHARGES
$0.0967 × 1236 kWh	$0.0623 × 275 kWh	$0.0520 × 1236 kWh + $4.23	
$117.38	-$17.17	$68.48	$13.91

UTILITY CHARGES

SERVICE PERIOD
2024-08-08 to 2024-09-09

INVOICE DATE
2024-10-06

INVOICE #
fca60556bf

Current Charge

ENERGY		
Usage as billed by meter	$0.0967 × 1236 kWh	$119.60
BATTERY ADJUSTMENT		
Battery Credit Energy Portion	$0.0950 × 23.4 kWh	-$2.22
Battery Credit Utility Portion	$0.0520 × 23.4 kWh	-$1.21
SOLAR CREDITS		
Solar Credit - Wholesale Avg.	$0.0223 × 276 kWh	-$6.14
Solar Credit - Base Bonus	$0.0400 × 276 kWh	-$11.03
Solar usage by home	$0.0000 × 153 kWh	-$0.00
UTILITY CHARGES		
Transmission Cost Recovery Factor		$27.45
Metering Charge		$2.80
Nuclear Decommissioning (NDF)		$0.25
Customer Charge		$1.43
Distribution System Charge		$31.91
Energy Efficiency Cost Recovery Factor (EECRF)		$1.29
Distribution Cost Recovery Factor		$4.37
Rate Case Expenses Surcharge		$0.07
Temporary Emergency Electric Energy Facilities (TEEEF)		$0.13
OTHER CHARGES		
Tax - Austin, TX		$13.91

CUSTOMER SERVICE
Monday - Friday, 9am-6pm CT
1-866-479-POWR (7697)
support@basepowercompany.com

If you believe this bill includes unauthorized charges, contact Base Power at **+1-866-479-POWR (7697)** to dispute such charges. If you are not satisfied with Base's review or the actions taken on your behalf, you may choose to file a complaint with the Public Utility Commission of Texas: P.O. Box 13326, Austin, TX 78711-3326 or at (512) 936-7120 (Toll-free in Texas at (888) 782-8477). Hearing and speech-impaired individuals with text telephones (TTY) may contact the Commission at (512) 936-7136. Health & Hardship Plans: If you are seriously ill, you may qualify for assistance. Please call +1-866-479-POWR (7697) to discuss your situation. You can also call +1- 866-479-POWR (7697) to donate money to Base's Health and Hardship Program. This initiative is made possible thanks to customer, corporate and employee contributions.

Privacy Policy

For Outages and Emergencies: Call Oncor (24 hours a day, 7 days a week): **888-313- 6862**

Payments & Adjustments

BALANCE UPDATE	Previous bill: 2024-07-31 to 2024-08-08	$48.98
	Payment	-$48.98
	New Charges	
	New Balance	$182.61

For more information about residential electric service please visit **www.powertochoose.com**

METER NUMBER	START READ KWH	END READ KWH
1500000LG	19194 (2024-08-08)	19461 (2024-09-09)
1500000LG	30131 (2024-08-08)	31390 (2024-09-09)

The average price you paid for electric service this month:
$0.1477

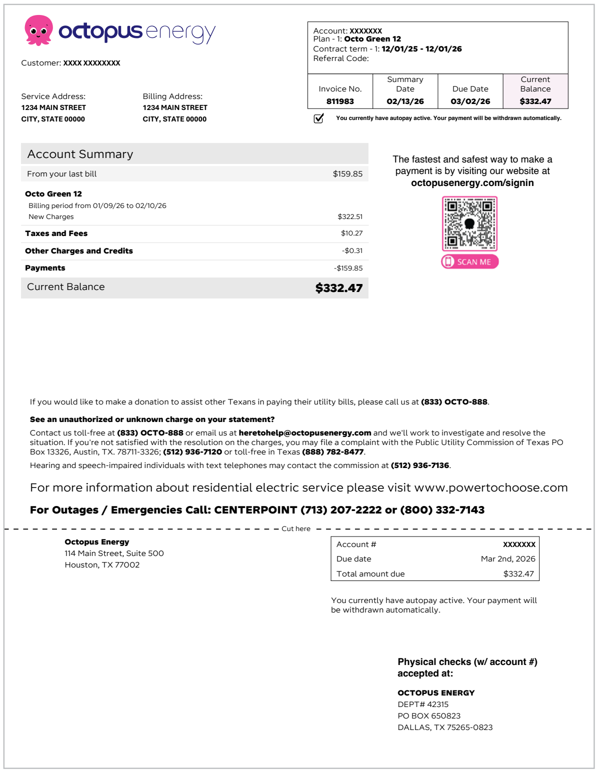
Base Power Company
205 E Riverside Dr.
Austin, TX 78704
PUCT #10338

Base is proudly built in Texas.

SAMPLE

FIGURE 8.

Supplier-consolidated bill sample from Base Power Company



octopus energy

Customer: XXXX XXXXXXXX

Service Address:
1234 MAIN STREET
CITY, STATE 00000

Billing Address:
1234 MAIN STREET
CITY, STATE 00000

Account: **XXXXXXX**
Plan - 1: **Octo Green 12**
Contract term - 1: **12/01/25 - 12/01/26**
Referral Code:

Invoice No.	Summary Date	Due Date	Current Balance
811983	**02/13/26**	**03/02/26**	**$332.47**

You currently have autopay active. Your payment will be withdrawn automatically.

Account Summary

From your last bill	$159.85
Octo Green 12	
Billing period from 01/09/26 to 02/10/26	
New Charges	$322.51
Taxes and Fees	$10.27
Other Charges and Credits	-$0.31
Payments	-$159.85
Current Balance	**$332.47**

The fastest and safest way to make a payment is by visiting our website at **octopusenergy.com/signin**

SCAN ME

If you would like to make a donation to assist other Texans in paying their utility bills, please call us at **(833) OCTO-888**.

See an unauthorized or unknown charge on your statement?

Contact us toll-free at **(833) OCTO-888** or email us at **heretohelp@octopusenergy.com** and we'll work to investigate and resolve the situation. If you're not satisfied with the resolution on the charges, you may file a complaint with the Public Utility Commission of Texas PO Box 13326, Austin, TX. 78711-3326; **(512) 936-7120** or toll-free in Texas **(888) 782-8477**.

Hearing and speech-impaired individuals with text telephones may contact the commission at **(512) 936-7136**.

For more information about residential electric service please visit www.powertochoose.com

For Outages / Emergencies Call: CENTERPOINT (713) 207-2222 or (800) 332-7143

Cut here

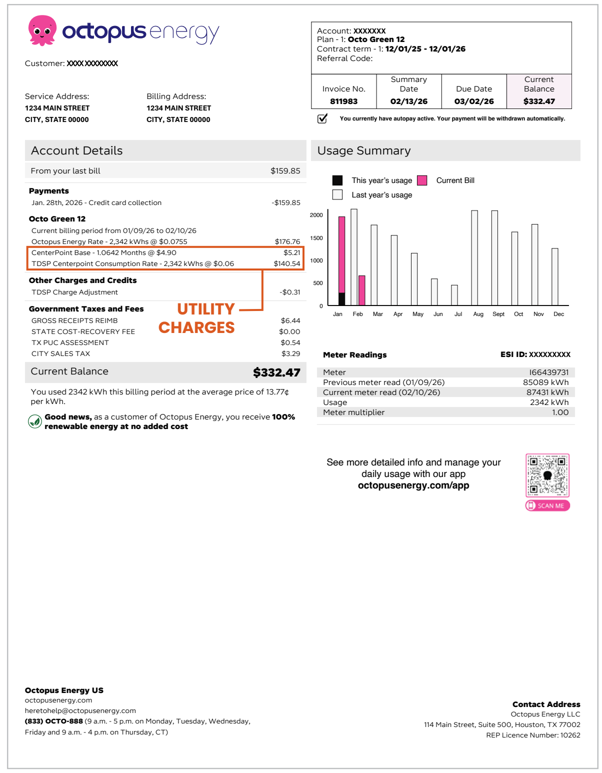
Octopus Energy
114 Main Street, Suite 500
Houston, TX 77002

Account #	**XXXXXXX**
Due date	Mar 2nd, 2026
Total amount due	$332.47

You currently have autopay active. Your payment will be withdrawn automatically.

Physical checks (w/ account #) accepted at:

OCTOPUS ENERGY
DEPT# 42315
PO BOX 650823
DALLAS, TX 75265-0823



octopus energy

Customer: XXXX XXXXXXXX

Service Address:
1234 MAIN STREET
CITY, STATE 00000

Billing Address:
1234 MAIN STREET
CITY, STATE 00000

Account: **XXXXXXX**
Plan - 1: **Octo Green 12**
Contract term - 1: **12/01/25 - 12/01/26**
Referral Code:

Invoice No.	Summary Date	Due Date	Current Balance
811983	**02/13/26**	**03/02/26**	**$332.47**

You currently have autopay active. Your payment will be withdrawn automatically.

Account Details

From your last bill	$159.85
Payments	
Jan. 28th, 2026 - Credit card collection	-$159.85
Octo Green 12	
Current billing period from 01/09/26 to 02/10/26	
Octopus Energy Rate - 2,342 kWhs @ $0.0755	$176.76
CenterPoint Base - 1.0642 Months @ $4.90	$5.21
TDSP Centerpoint Consumption Rate - 2,342 kWhs @ $0.06	$140.54
Other Charges and Credits	
TDSP Charge Adjustment	-$0.31
Government Taxes and Fees	
GROSS RECEIPTS REIMB	$6.44
STATE COST-RECOVERY FEE	$0.00
TX PUC ASSESSMENT	$0.54
CITY SALES TAX	$3.29
Current Balance	**$332.47**

UTILITY CHARGES

You used 2342 kWh this billing period at the average price of 13.77¢ per kWh.

Good news, as a customer of Octopus Energy, you receive **100% renewable energy at no added cost**

Usage Summary

Meter Readings	**ESI ID: XXXXXXXXX**
Meter	I66439731
Previous meter read (01/09/26)	85089 kWh
Current meter read (02/10/26)	87431 kWh
Usage	2342 kWh
Meter multiplier	1.00

See more detailed info and manage your daily usage with our app **octopusenergy.com/app**

SCAN ME

Octopus Energy US
octopusenergy.com
heretohelp@octopusenergy.com
(833) OCTO-888 (9 a.m. - 5 p.m. on Monday, Tuesday, Wednesday, Friday and 9 a.m. - 4 p.m. on Thursday, CT)

Contact Address
Octopus Energy LLC
114 Main Street, Suite 500, Houston, TX 77002
REP Licence Number: 10262

FIGURE 9.

Supplier-consolidated bill sample from Octopus Energy

GridLAB

GridLab is an innovative non-profit that provides technical grid expertise to enhance policy decision-making and to ensure a rapid transition to a reliable, cost effective, and low carbon future.

gridlab.org

hello@gridlab.org