



UNLOCKING GRID VALUE:

Turning Buildings Into Valuable Grid Participants



Overview

Following decades of flat load growth, utilities find themselves squarely in a new era of demand. The U.S. utilities sector faces the unprecedented challenge of maintaining affordability, accommodating new, energy-intensive customer loads, and building fast enough to support economic growth. While traditional approaches to expanding the grid rely on centralized supply and delivery infrastructure, a transformative opportunity for utilities to efficiently and effectively meet these challenges is available. Utilities are uniquely positioned to lead the energy transition by accelerating the adoption of distributed energy resources (DERs).

By developing innovative customer programs that deploy, aggregate and optimize DERs at scale, utilities create a holistic approach that benefits every stakeholder involved. These programs help manage load growth, decarbonize the grid, enable customers to meet energy and sustainability goals, and support the expansion of a robust DER solution provider industry.

Achieving these benefits and standing up effective DER programs requires strategic design and delivery of key program elements. Building on the best practices from leading customer-sited DER programs, a comprehensive roadmap for utilities to become orchestrators of a cleaner, more resilient grid has been developed and is ready to launch.



The Challenge

While the challenges of rapid, massive expansion and transformation of the system are widely understood, current market and regulatory systems are ill-prepared to address the problem at the speed and scale required. Traditional approaches to load growth are fraught with slow-moving interconnection queues, face increasing private sector behind-the-meter redundancy, and are hindered by highly inefficient customer loads that provide no grid interactivity or ability to transform buildings into grid assets.

What is Needed

Addressing the challenge at hand requires a well-planned and sustained, customer-focused effort over several decades, delivered under a new regulatory model. Accelerating energy efficiency measures is actually a grid-asset in this future, the lowest cost investment is to reduce the usage of the current built-environment to allow for the impending load growth. Second, grid-interactive generation and storage assets must be planned at scale in the most cost-effective locations, both behind and in front of the meter, often sited at or around customer buildings. Such an effort requires grid planning all the way from the central power plants to the end-use customer loads, leveraging category DERs along that path.

Utilities are best positioned to provide these crucial planning and implementation functions at the speed and scale necessary to meet today's grid demands. To meet this challenge, the investor-owned utility (IOU) model should be extended to include building-sited DERs as productive extensions of the grid. By granting new regulatory authority to utilities to assess, plan, specify and capitalize DERs based on their value to the grid, they can transform the grid to meet today's and tomorrow's needs.

Meeting the Needs of Stakeholders

For such an effort to succeed, it must meet the needs of all system stakeholders.

Customers

Customers will need a comprehensive, whole-building solution that addresses their decarbonization, efficiency, resiliency, and transportation goals. For any cost not covered by the value of installed assets to the grid and included in the new regulatory model, customers will also need access to simple and affordable financing.

Private Sector Solution Providers

Solution providers will need access to a large pipeline of qualified opportunities, creating economies of scale. Utilities can position themselves as wholesale customers of a private, competitive value chain for DERs, and related building energy solutions.

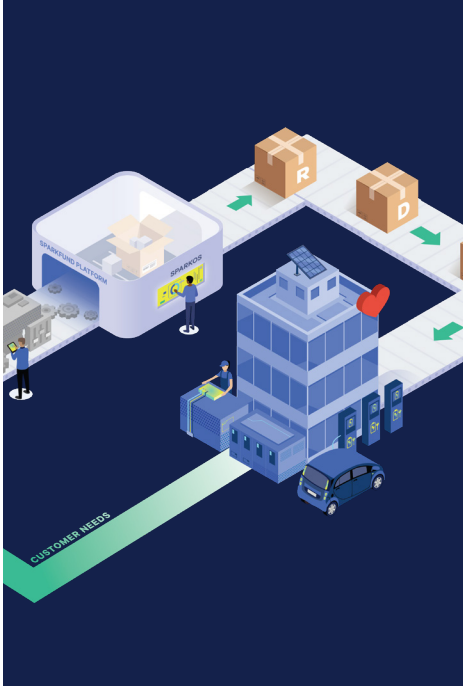
Utilities

Utilities will require a regulator-approved, least-cost, at-scale solution that expands rather than contracts the utility rate base and has a formulaic methodology for calculating the value of customer-sited assets to the grid.

Private Sector Investors

Investors will require an at-scale investment vehicle with little to no collection risk from building owners. Ideally, investments are similar enough to be securitized.





Good, Better, Best: Basic Approaches to Program Design

Utilities across the country are leveraging new regulatory authority to deploy customer-sited DERs to deliver resiliency to customers and the grid. But with the right program design DERs can deliver more than resiliency. By aligning affordability through lower cost capacity value and avoided investment in T&D upgrades, utility-planned DERs offer substantial grid value compared to centralized generation. Utilities have an opportunity to unlock this value as they develop programs that achieve intervenor support and regulator approval.

GOOD

Recoverable Regulated Program

Utilities pursue a recoverable regulated program that socializes costs and benefits all ratepayers, including traditional deemed savings and upfront incentive payments.

Program Characteristics:

- Often customer-driven.
- Minimal scalability of efficiency gains, grid services, or decarbonization.
- Difficult to incorporate program benefits into broadscale utility plans.

BETTER

Value Transfer Programs

Utilities formally value the transfer of cash flows for efficiency, demand response, and decarbonization, creating structures that allow for the transfer of money that is not currently in the marketplace.

Program Characteristics:

- On-bill structures such as OBR, OBF, TOB and MEETS.
- Payment for delivered grid services, such as FLEXMarket and Virtual Power Plants.
- Often customer-driven with lengthy, high-cost acquisition processes.
- Complex programs that are difficult to scale across territories and into buildings broadly.

BEST

Utility-Lead Procurement Programs

Utilities pursue a utility-driven path where investments are made on the customer side of the meter or customer site, allowing utilities to socialize benefits accrued from maximizing grid value to ratepayers.

Program Characteristics:

- Utility lead approach of behind-the-meter, customer-sited projects that optimize grid value.
- Fastest and cheapest way to scale to meet utility load growth and decarbonization goals.
- On-bill structuring.

The Solution

In this next phase of the energy transition, utilities can and should be seen as a critical driver of the growth of the grid and serve as an economic development powerhouse for the built environment. DERs are rapidly becoming the new least-cost resource, which is particularly true when avoided cost of transmission and distribution upgrades are taken into account. How these avoided costs are socialized to customers — especially as more carbon-free energy comes onto the system — is both a key challenge and an enormous opportunity for utilities to maintain affordability during the transition.

Utilities can seize the opportunity by gaining new regulatory authority to plan and capitalize DERs in their territories, massively accelerating the pace of deployment and lowering the net cost to the grid. New customer-sited DER programs that include distributed assets in the rate base make buildings part of an interactive grid and turn them into highly efficient, flexible power plants.

Solve Time to Power Challenge

With proper planning, grid value analysis and capitalization modeling, it is possible to build a greater number of smaller projects faster than bringing large, utility-scale resources online. This will help utilities meet a critical time-to-power challenge embedded in supporting incoming economic development.

Aligning Affordability

At the same time, by placing grid resources closer to the end-user demand, building-sited generation, storage and controllable load growth can reduce the cost burden of transmission and distribution (T&D) upgrades, ultimately lowering the overall cost of grid growth.

Meeting Customer Needs

Rather than turning away or delaying new economic development opportunities, utilities can become an essential driver of new economic activity in their regions. Making buildings a part of the growing grid through new tariffs and rate basing authority lets utilities reduce energy systems costs for new manufacturing plants, data centers, and commercial real estate.



Centralized Utility Planning that Scales the Private Sector DER Market

Granting utilities the authority to include buildings and DERs as a productive and beneficial part of the grid will make it possible to deploy affordable, equitable, and clean energy infrastructure faster and at a lower cost. Further, Utilities can drive planning for DER to the most valuable locations on the grid and organize a robust, competitive, private-market value chain underneath — delivering market efficiency to the program and positioning themselves as the largest wholesale customer of DER solutions in history.

Conclusion

The U.S. utility sector faces unprecedented challenges as the country continues to expand manufacturing, build data centers, and rapidly decarbonize transportation and electrification loads. But this challenge is no greater than the challenge of lightning the country a century ago. And like a century ago, utilities have an opportunity and a societal responsibility to lead the energy transition at hand.

In the last twenty years, the rapid acceleration of technology and reduction in the cost of DERs have created a new paradigm. Onsite upgrades to the grid are less expensive than traditional T&D upgrades. But grid-interactive generation and storage assets must be planned at scale and in the most cost-effective locations.

Only utilities are positioned to provide the crucial planning and implementation functions at the speed and scale necessary to address today's and tomorrow's grid challenges. Doing so will require a well-planned and sustained customer-focused effort with a new regulatory framework.

This approach allows utilities to accelerate the energy transition and become economic development powerhouses for the built environment.

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Sparkfund has supported two distinct program scopes for a leading utility focused on wildfire risk mitigation: one focused on deploying backup generation assets to customers at risk of power disruptions due to wildfires and a second to pilot Virtual Power Plant feasibility in similar conditions.



Program Description and Elements

Sparkfund has supported this program for over four years, providing solutions for both residential and commercial customers.

Residential

The program's residential side focuses on providing backup generators to customers in underserved regions, which are vulnerable to power outages caused by power shutoff events.

Sparkfund has acted as program administrator for the program since its inception, coordinating and managing a roster of installers across the utility's footprint. Sparkfund is responsible for:

- Ensuring that program targets are achieved
- Regularly reporting on performance to the utility's management team
- Troubleshooting programmatic issues
- Liaising with the county permitting office to ensure timely turnaround
- Monitoring and managing the performance of contractors.

Residential customers deemed eligible for the program receive installation of a generator (service and hardware) at no cost. The utility subsidizes 100% of the costs associated with these projects and in certain cases, even allows for the installation of an additional, portable generator to service detached well pumps.

Since its inception, Sparkfund has managed successful installations for over 1,000 residential customers.

Case Study



Commercial

The commercial program provides backup power and/or small microgrid solutions to commercial customers in areas susceptible to outages. These projects are split into:

- Mobile home parks
- Community resource centers
- Commercial buildings

These projects typically include a combination of backup generation, solar, and battery storage. In addition to all of the responsibilities aforementioned in the residential category, Sparkfund is also responsible for project design. Similar to the residential program, eligible commercial customers receive the hardware and installation of these backup power systems at no cost.



Virtual Power Plant Pilot

Sparkfund has separately provided administration for a Virtual Power Plant (VPP) pilot program meant to assess how assets designed for resiliency can also support the grid during periods of peak demand.

Participants in the pilot include single-family homes with existing rooftop solar and a community center that serves as a resource center for the community during emergencies. The center received free installation of two batteries onsite. When VPP participants receive a message about the potential for their devices to be turned off or discharge electricity to support the grid, they can opt-out for certain devices (except battery storage). So far, the opt-out rate has been very low. Within a year after the start of the pilot, the VPP had been successfully tested through seventeen simulated demand response events.

Case Study



Lessons Learned

For the residential program, none of the assets are grid-connected and thus not eligible to help support grid stability during peak events. We recommend an interconnection and contractual approach that allows these devices to help support the grid.

While 100% subsidization offers a tremendous benefit to customers and ensures high program adoption, the model is sub-optimal in several facets. Similar to the residential program, eligible commercial customers receive the hardware and installation of these backup power systems at no cost.

- Because customers have no cost, they often do not prioritize installation and it can be challenging for installers to get commitments on scheduling visits.
- Customers who already have backup power in the form of a battery are not barred from participation, and programming a generator to work in tandem with solar and battery systems can be quite complicated and adds additional liability for installers.
- To conserve the budget, the program offers a standard generator size for every residential customer. In the long run, many customers would be better served by using the subsidy to offset the cost of a battery and solar and by right-sizing the system to match their load.

Individual assets provided to residential and commercial customers for personal use in outages are an incomplete solution for a larger issue. In the long run, utilities would be better positioned by focusing on the development of community virtual power plants, which would provide these remote communities with backup power, reduce the need for costly and dangerous wires and poles infrastructure and ultimately potentially allow these communities to operate self-sufficiently.

Contact us today to learn how we can help you lead the energy transition.

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