Next-Generation Performance-based Utility Program Models

Leveraging Performance-based Utility Program Models to Accelerate Deep Energy Retrofits and Enhance Demand Flexibility

Utilities today face numerous challenges in navigating the increasingly complex energy system, while also working to achieve ambitious energy efficiency and emissions reduction requirements and goals. Meeting these challenges will require adopting Active Efficiency strategies – moving beyond traditional energy efficiency measures to optimize energy supply and demand. Performance-based utility energy efficiency programs can enable Active Efficiency approaches that accelerate both deep energy retrofits and demand flexibility, while achieving energy and cost savings and emissions reductions.

The Active Efficiency Collaborative held a series of regionally focused workshops during September-November 2020 to explore these topics, resulting in a set of Guiding Principles for Next-Generation Performance-based Utility Program Models. The Guiding Principles describe elements that performance-based utility programs should incorporate—such as developing holistic metrics, enabling long-term financing, and balancing different stakeholders' needs—to ensure they accelerate deep energy retrofits, enhance demand flexibility, and achieve equitable and inclusive outcomes.

The workshops were co-hosted by **NYPA**, **NYSERDA**, **ConEd**, **National Grid**, **MEEA**, and **SEEA**, and each included 30-60 participants representing utilities and regulators, energy services companies, state and federal government agencies, technology companies, and research institutions.

Learn more about performance-based utility programs:

A performance-based utility program is an energy efficiency program that delivers energy savings and/or demand flexibility by providing incentives for measured and verified energy and/or demand reductions over a specified time period.

Explore some of the performance-based utility programs across the United States.

- **Business Energy Pro, a Pay for Performance initiative of NYSERDA, New York utilities, energy efficiency providers, and other partners**
- **New Jersey Clean Energy Program's Commercial and Industrial Pay for Performance Program**
- **Seattle City Light's Deep Retrofit Pay for Performance Program**
- **Seattle City Light's Energy Efficiency as a Service Pilot Program (EEaS)**
- **Metered Energy Efficiency Transaction Structure (MEETS) Program**
- **ComEd Accelerate Performance Program**
- **National Grid's ConnectedSolutions Active Demand Response Program**

Guiding Principles for Next-Generation Performance-based Utility Program Models

The Guiding Principles for Next-Generation Performance-based Utility Program Models are intended to provide a framework for developing programs that will accelerate deep energy retrofits and enhance demand flexibility to help meet energy, economic, equity, and environmental goals. The Active Efficiency Collaborative developed these Principles based on input from a series of regional, multi-stakeholder workshops held in September-November 2020. The workshops explored how performance-based utility program models can equitably accelerate the implementation of Active Efficiency strategies, including through supporting beneficial electrification and the growth of grid-interactive efficient buildings (GEBs).

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Customer-centered Program Design

1 **Design and implement programs that provide equitable access to services and benefits to all customers.** Equity and inclusion should be integral elements of performance-based program design, implementation, and funding. As utility energy efficiency programs incorporate more complex elements, barriers that traditionally limit program access and participation—e.g., high upfront costs and lack of customer awareness and trust—will be compounded by the lack of reliable internet access among underserved customers. Utilities, regulators, and energy service providers should address these underlying barriers, develop key metrics and performance indicators to define and measure equity for performance-based utility programs, and design and implement programs to increase energy savings and demand flexibility for all customers.

Key Success Factors

- Prioritize the provision of affordable internet infrastructure to underserved customers.
- Include goals for participation by underserved communities as a regulatory performance metric for utilities in addition to traditional savings targets and cost tests.
- Leverage partnerships with community organizations to better understand customer needs and build awareness and trust among customers in utility programs and new technologies.

- Offer multiple utility program options to increase access and participation in demand flexibility programs – e.g., bundle time-of-use (TOU) rates with other programs.
- Ensure that program educational materials, marketing professionals, and managers/administrators reflect the demographics of the communities they serve.
- Combine multiple programs and/or blend incentive and funding streams to address prerequisite health and safety issues in low-income communities to minimize contractor "walk away" rates.

Equitable Design and Implementation in Action

- The U.S. Department of Energy's **Weatherization Assistance Program** (WAP) provides funding for states to improve energy efficiency in low-income homes through better insulation and efficient equipment. WAP includes a notable measure of protection that could be incorporated into other programs targeting low-income customers: the program limits state grantees from raising rent for tenants as a result of the weatherization work.
- **Efficiency Smart**, a program administered by VEIC, **partners** with local food banks, senior centers and schools to provide no-cost energy efficiency kits for vulnerable customers in Ohio and Delaware. Partnering with community organizations can build trust within underserved communities and increase awareness about energy efficiency technologies.
- **The Delaware Energy Efficiency Advisory Council** (EEAC) is a collaboration of stakeholders who develop and deploy statewide energy efficiency programs. The EEAC's Low-Income Energy Efficiency Subcommittee consists of a diverse set of representatives, including a low-income sector advocate and county-level community members, to ensure that low-income energy efficiency programs and initiatives include input from the communities they serve.

2 **Streamline the customer experience.** Simplifying programs, rates, and technical solutions can boost program participation, including in underserved markets.

Many customers – particularly in the residential and small commercial sectors – are not able or willing to invest significant time and resources to understand complex energy management measures and actions. Simplifying program structures, minimizing required customer interaction, standardizing solutions, and automating controls will be critical to accelerating progress in deep energy efficiency retrofits and demand flexibility. Efforts to streamline and simplify programs will also help ensure that the benefits of new programs do not only accrue to high-consumption and high-income customers.

Key Success Factors

- Offer customers a range of attractive and understandable choices of programs, including both performance-based and other incentive-based utility programs.

- Offer integrated systems packages to provide customers with program choices while minimizing their required effort.
- Increase collaboration between utilities and internet service providers to scale up installation of broadband internet services and smart energy-saving devices for low-income customers.

Streamlining the Customer Experience in Action

- Lawrence Berkeley National Laboratory's **Integrated System Packages (ISPs)** provide a model for streamlining the customer experience in energy efficiency programs. To help simplify the path toward a desired level of performance, the ISPs are pre-engineered energy efficiency projects that can help achieve "deeper savings while minimizing expertise and effort required for implementation," in turn reducing risk for the customer. The ISPs are designed to be used during common building life-cycle events, including property sale, tenant changes, refinance, and building repositioning.
- Performance-based utility programs can incorporate elements of programs that have successfully scaled up the deployment of energy-saving smart and connected equipment: Based on a **pilot program** in 2018, Ameren Illinois's **Smart Savers** program offers free smart thermostats to residential customers within low-income zip codes. Access to smart thermostats can be combined with enrollment in utility demand response programs to achieve greater savings while providing grid services to all customers.

3 **Enable aggregation for smaller energy users.** Program design should allow utilities, energy service companies, curtailment service providers, and others to aggregate projects to effectively serve smaller buildings and energy users.

While many large commercial and industrial (C&I) customers participate in performance-based utility programs, there is an opportunity to improve the cost-effectiveness and scale of program models by aggregating smaller customers, unlocking significant potential for efficiency and demand flexibility. Aggregators can be utilities, energy service providers, and curtailment service providers, among others.

Key Success Factors

- Empower aggregators to manage and deliver performance-based, time-specific measures so they can simplify the contractual relationship with customers who want to participate with fixed compensation. With the authority and resources to play this role, aggregators can dynamically measure and manage aggregate energy demand in real time and ensure that customers incur minimal costs and risk.
- Address data use and cybersecurity issues: Ensure AMI data are formatted to a documented and consistently applied standard, resolve data ownership issues, and obtain customer authorization for data use.

- Use benchmarking to target buildings with high energy use intensity (EUI) for retrofits.
- Take measures to ensure the legitimacy of third-party aggregators and build customer trust in their services.
- Resolve legal and regulatory ambiguities around appropriate third-party incentives for utilities, particularly in highly regulated regions such as the Midwest.
- Work with consumer advocates and community organizations to ensure program designs address the needs of customers of all income levels.

Aggregation in Action

- Consumers Energy, a utility in Michigan, uses Uplight's Marketplace to aggregate small, residential energy loads to achieve significant energy savings during peak periods. By offering rebates and monetary bonuses, the program encourages customers to install smart thermostats and enroll in Consumers Energy's demand response program.
- Southern California Edison aggregates the loads of hundreds of thousands of residential, commercial, and industrial customers to facilitate integration of distributed energy resources into wholesale energy capacity markets. While each customer separately is too small to participate in a wholesale energy market, in aggregate, they enable the utility to improve the reliability of the energy system.

4 **Design programs for large commercial and large industrial customers to drive deeper, holistic savings and demand flexibility.** Programs targeting large commercial or industrial customers serve different customer needs but share many characteristics. Both commercial and industrial customers can achieve deeper savings when programs customize solutions and provide compensation for delivered energy efficiency and demand reduction.

Large commercial and large industrial customers constitute two key markets for performance-based utility programs: Both types of facilities have high energy densities and often employ dedicated staff for energy management, enabling participation in sophisticated programs with specialized solutions. Despite some progress, however, penetration of these markets has been limited due to split incentives in commercial buildings, opt-out clauses or exemptions for industrial customers, measurement and verification (M&V) complexity, and short (1-3 year) payback expectations. Performance-based utility programs that support customized solutions and provide compensation for delivered energy efficiency can help overcome these barriers.

Key Success Factors

- Design programs that appeal to large commercial or industrial customers in regions where they are not required to participate in energy efficiency programs, such as the U.S. Midwest.

- Scale up installation of advanced metering and controls in commercial and industrial facilities.
- Promote education, energy management system implementation, and behavior change through Strategic Energy Management programs.
- Introduce minimum energy savings thresholds or prescribed improvements for required interventions.
- Provide incentives for building controls and energy information system installations that include prescriptive or performance-based cost share.
- Enable or provide long-term financing mechanisms (e.g. energy services agreements, performance contracting, on-bill financing) that minimize upfront capital requirements for customers, drive persistent savings, and generate project cash flow that satisfies the financial requirements of both the customer and the energy provider.
- Base programs on rate and market structures that allow monetization of the entire value stream of demand flexibility.

Large Commercial and Industrial Programs in Action

- In Seattle City Light's **Energy Efficiency as a Service (EEaS) pilot** program, the utility provides a long-term financing solution for carrying out deep retrofits in commercial buildings using a power-purchase-agreement structure that can last up to 20 years. The EEaS model enables the implementation of Active Efficiency strategies that are too complex and expensive or have paybacks that are too long for traditional programs.
- The U.S. Department of Energy's **50001 Ready** program can help facilities, including large commercial and industrial organizations, prepare for participation in performance-based utility programs. The 50001 Ready designation is given to facilities that demonstrate continued energy performance improvement over time through implementation of an ISO 50001-compliant energy management system.
- Bonneville Power Administration's **Energy Smart Industrial Program** provides co-funding and support for industrial customers to hire an energy project manager to implement energy efficiency projects. Dedicated energy project managers can help customers set energy performance goals, prioritize energy-efficient practices, and foster internal support for investing in energy-efficient technologies or participating in energy efficiency incentive programs.

Demand Management and Decarbonization

5 **Include traditional energy efficiency improvements – along with renewable energy, beneficial electrification, and demand response – in programs targeting demand flexibility.** When combined with Active Efficiency measures, foundational energy efficiency upgrades such as building envelope improvements lower the cost and improve the performance of demand flexibility strategies.

The more efficient buildings are, the more easily they can provide demand flexibility. In addition, energy efficiency improvements enhance a building's resilience by reducing its back-up power or energy storage requirements. Performance-based utility programs should incentivize a range of efficiency and resiliency measures, from passive (e.g., insulation and air sealing) to active (e.g., smart building controls and heat pump water heaters that provide demand flexibility services to the grid), as well as the integration of other distributed energy resources (DERs).

Key Success Factors

- Design regulatory frameworks and integrated resource plans (IRPs) to enable procurement of energy efficiency as a resource alongside other DERs.
- Incentivize third-party verified performance for above-code efficiency programs.
- In cold climate regions, implement electrification improvements as primary heating resources that may be backed up by existing secondary energy sources to provide demand response or backup fuel supplies for resiliency purposes.
- Use long-term financing mechanisms to create an incentive and investment framework that elevates efficiency as a resource, attracts capital, and enables deeper energy savings.

Valuing Energy Efficiency as a DER in Action

- In the Midwest, **PJM's "Reliability Pricing Model" capacity market** is an example of a different kind of pay-for-performance model – related to power procurement – that demonstrates how to value both energy efficiency and demand flexibility as capacity resources within the same platform. The market ensures long-term grid reliability by procuring power supply resources such as demand response and energy efficiency upgrades from participants to "meet predicted energy demand three years in the future." Capacity market participants, such as utilities or electricity suppliers, receive compensation for delivering on demand during emergencies or must pay for non-performance.

6 **Transition to decarbonization frameworks.** Decision-makers should adopt program frameworks that focus on decarbonization to integrate energy efficiency, renewable energy, and demand flexibility goals.

Program decision makers, including utility regulators, should work with utilities to move toward performance-based outcomes with decarbonization as an overarching goal, alongside the provision of safe, reliable, and affordable power. Combining energy efficiency, renewable energy, and demand flexibility frameworks with beneficial electrification and energy storage programs reduces competing objectives and complexity that can delay or limit customer adoption of key technologies.

Key Success Factors

- Set long-term decarbonization goals (e.g., net-zero carbon buildings by 2050).
- Periodically update carbon abatement cost analyses.
- Consider creating standardized bundles of measures that are suitable for large-scale deployment to reduce cost and complexity and to streamline financing.
- Support the integration of DERs into the grid to enable demand flexibility and emissions reductions.

Decarbonization Frameworks in Action

- New York State's **Climate Leadership and Community Protection Act** (CLCPA) establishes targets for decarbonization, including reducing greenhouse gas (GHG) emissions 85% by 2050 and achieving 100% zero-emission electricity by 2040. In addition, New York City's **Local Law 97** complements the CLCPA by setting goals to achieve an 80% reduction in citywide GHG emissions by 2050 and a 40% reduction in aggregate emissions from covered buildings by 2030. These targets are designed to spur a variety of renewable energy, energy efficiency, and demand flexibility approaches to meet the ambitious goals set by the city and state.
- Southern California Edison, in partnership with the University of California and California State University, launched a **Clean Energy Optimization Pilot** in 2019 focused on performance-based carbon reduction. The program depends on measurable avoided carbon emissions instead of measured reductions in energy use to incentivize holistic decarbonization practices within the universities.

Valuation & Metrics

7 **Quantify the multiple benefits and value of energy efficiency and demand flexibility.** Determining the value of energy efficiency and demand flexibility is critical for assessing cost-effectiveness, ensuring policy support, and designing appropriate program incentives and compensation.

To develop viable compensation structures, program designers must understand the full set of value streams that energy efficiency and demand flexibility bring to various stakeholder groups. In addition, where regulatory action is needed, documentation of the value of these programs will be required. Traditional valuation of energy efficiency benefits has focused on resource costs and deemed savings. However, recent efforts have focused on monetizing benefits beyond energy savings, such as emissions and system cost reductions, improved grid performance, and **health benefits**.

Key Success Factors

- Develop metrics for demand flexibility that reflect the complexity of the topic but are simple enough to implement.

- Expand supply-side resource development to consider all cost-effective opportunities as well as distribution planning.

Demand Flexibility Metrics in Action

- The **GridOptimal Initiative** by the New Buildings Institute and the U.S. Green Building Council **has developed metrics** for demand flexibility that can be used for utility programs, building codes, policies, facilities management, and performance evaluation. The eight metrics include a building's Grid Peak Contribution (i.e., the degree to which building demand contributes to load on the grid during peak hours), Short-term Demand Flexibility (i.e., the building's ability to reduce demand for one hour), and Resiliency (i.e., ability to "island" from the grid and/or provide energy for critical loads for 4-24 hours).

8 **Use standardized methodologies to meet new valuation needs.** To the extent practicable, programs should adopt standardized, public methodologies to carry out program cost-benefit analysis; and evaluation, measurement, and verification (EM&V) of energy and demand savings, demand flexibility, and other benefits of utility programs.

Performance-based utility programs should use transparent, validated methodologies for measuring and verifying energy savings, demand savings, demand flexibility, and other program benefits. Standardized M&V methods are critical to enabling apples-to-apples comparisons and cross-state analyses.

Key Success Factors

- Maintain flexibility by periodically updating standardized practices as technology evolves and program impacts are better understood.
- Base methodologies on robust industry standards such as **IPMVP** and leverage advanced metering infrastructure (AMI) and advanced M&V ("M&V 2.0") meter-based approaches; but provide allowable alternatives for use when necessary.
- Use baselines determined by standard methodologies to estimate energy and demand savings tied to performance-based utility program compensation. Eventually the use of AMI and M&V 2.0 may allow compensation to be directly tied to real-time performance in achieving dynamic demand targets.
- Allow program evaluators to use EM&V protocols, including net savings adjustments, to satisfy specific public utility commission requirements such as program cost-effectiveness tests. However, tie compensation to actual building or aggregated portfolio performance.

Standardized Methodologies in Action

- The April 2020 **National Standard Practice Manual for Benefit-Cost Analysis of Distributed Energy Resources (NSPM for DERs)** provides a framework for aligning cost-effectiveness testing approaches with state policy goals. The manual also provides flexibility to change the methodology for cost-benefit tests as policy needs evolve or vary across jurisdictions.

Market Enablers

9 Encourage collaboration among regulators, legislators, and other decision makers to achieve deep energy retrofits and demand flexibility. Collaboration among decision makers can enhance the success of performance-based utility programs and encourage deep, equitable, and long-term energy savings and demand flexibility. Regulators, legislators, and other decision makers should work together to integrate utility programs with building performance standards, rate design, efficiency credit trading, RTO/ISO capacity markets, and other policies that stimulate market demand.

Key Success Factors

- Set clearly articulated, ambitious targets for measured deep energy and demand savings or emissions reductions to encourage investment in meaningful long-term performance improvements; a sequence of 'stepped' targets with associated dates could further stimulate the market.
- Leverage utility rates – e.g., dynamic prices as a result of time of use (TOU) rates, critical peak pricing (CPP), and real-time pricing (RTP) – to drive efficiency and demand flexibility, and ensure they are designed to be understandable to all and accessible to low-income customers.
- Provide regulatory authority and support for long-term performance-based contracts that align the needs of utilities and service providers with the compensation and benefits realized by building owners and tenants.

Legislative and Regulatory Collaboration in Action

- In 2006, the Illinois General Assembly passed legislation requiring major electric utilities in the state to offer their residential customers an hourly pricing option. This led to the 2007 launch of ComEd's **Hourly Pricing Program**, which allows residential customers to benefit from lower energy prices by shifting usage to off-peak hours. Using real-time hourly pricing has saved customers $23 million and 65 million kWh since the program's inception.
- U.S. cities, including **Washington, DC**, and states like **Washington** are adopting building energy performance standards. To ensure the performance targets are met, many jurisdictions are coordinating efforts to make standards-compliance and participation in **utility energy efficiency incentive programs** complementary toward achieving deep energy retrofits and demand flexibility.

10 **Improve data access and insights to empower customers and aggregators.** To catalyze and enable performance improvements, customers need access to actionable insights based on energy use and emissions data. Aggregators need access to energy and operational data to be able to control demand, verify performance, and monetize services.

Utilities and energy service providers should accelerate the deployment of user-friendly platforms that leverage AMI, M&V 2.0, and renewable generation monitoring to provide real-time energy use and greenhouse gas emissions data for aggregators and actionable insights for customers.

Key Success Factors

- Invest in energy sub-metering in markets where increased data access has been shown to result in measurable savings.
- Where possible, allow building controls to automatically respond to dynamic utility rates, grid status, or demand curtailment signals.

Data Insights in Action

- NYSERDA incentivizes commercial, industrial, and multi-family building customers to install **Real-Time Energy Management (RTEM)** systems. The systems use sensors, meters, and cloud-based technology to gather real-time data on energy performance and provide insights to participating customers on opportunities for energy improvements – such as identifying optimal times to use HVAC systems based on building occupancy.
- **Google** is testing load flexibility at its data centers using a **"carbon-intelligent computing platform"** to match energy loads with available carbon-free energy supply. The platform uses energy supply and demand data to inform strategic load shifting, empowering Google to consume more energy when the grid's carbon intensity is low.