Smart Electric Power Alliance

Inclusive Utility Investment Guide

for Distributed Energy Resources

In partnership with CLEANENERGYWORKS

MARCH 2025

Authors

Matt Flaherty, Director of Building Decarbonization, Clean Energy Works
Kai Palmer-Dunning, Senior Associate of Building Decarbonization, Clean Energy Works
Rusty Haynes, Manager, Research & Industry Strategy, SEPA
Sarah LeBarron, Manager, Programs, SEPA

Acknowledgments

The authors greatly appreciate the many contributions of SEPA's Inclusive Utility Investment Task Force as a whole, as well as contributions made by the following individuals: Camille Minns, Carol Davey, Daphne Yuan, Holmes Hummel, Max Toth, and Tamara Jones, of Clean Energy Works; Cynthia Hunt Jaehne, Emily Fisher, Carina Wallack, Ella Rohn, and Ryndrick Gaines, of SEPA; Wally Nixon, of the Arkansas Public Service Commission; Tyler Poulson, of Collaborative Climate; Harlan Lachman and Paul Cillo, of Energy Efficiency Institute, Inc.; David Meisegeier and Amanda Warwood, of ICF; Katherine Johnson, of Johnson Consulting Group; Chris Woolery, of Mountain Association (and Task Force co-chair); Daniel Pate, of North Carolina Sustainable Energy Association; Claire Cowan, of Slipstream; Ashley McBride and Lily Smith, of Southeast Energy Efficiency Alliance; Alice Dasek, of the U.S. Department of Energy; and Taylor Jantz-Sell, of the U.S. Environmental Protection Agency. This guide builds on prior work led by the Southeast Energy Efficiency Alliance, *Utility Guide to Tariffed On-Bill Programs*, published in 2020.

About SEPA

The Smart Electric Power Alliance (SEPA) helps all electric power stakeholders accelerate the transformation to a carbon-free electricity system. SEPA delivers value to our members through research, education, events, working groups, peer engagements, and member projects. We facilitate collaboration, develop innovative strategies and guidance for regulatory and business innovation, and provide actionable solutions for our members and partner organizations. For more information, visit www.sepapower.org.

About Clean Energy Works

Clean Energy Works accelerates inclusive investments that open the clean energy economy to all. We envision a world with a 100% clean energy economy that provides opportunities and benefits to everyone, regardless of race, income, or social status. Our team builds bridges between community champions, leading utility executives, and policymakers to create bright spots of innovation in clean energy.

Racial and social equity are at the heart of our mission. We understand the undeniable impact that unequal access to clean energy can have on the most vulnerable members of society. Clean Energy Works is committed to centering and supporting communities experiencing divestment and communities of color to take the lead in transitioning to a clean energy economy. To learn more, visit www.cleanenergyworks.org.

Table of Contents

Introduction 4

SECTION 1: Overview of Inclusive Utility Investment 5

SECTION 2: Program Development and Approval 8

2.1 Feasibility Assessment 8

2.1.1 Project Economics and Potential Program Reach 8

2.1.2 Utility Value 8

2.1.3 Recovery of Utility Investment 9

2.1.4 Software and Technology 9

2.1.5 Capital Sourcing 9

2.2 Program Design Considerations 10

2.2.1 Program Goals and Stakeholder Engagement 10

2.2.2 Eligibility 10

2.2.3 Program Measures 11

2.2.4 Program Size 11

2.2.5 Program Operator 12

2.2.6 Marketing and Outreach 12

2.3 Consumer Protections 13

2.4 Legal and Regulatory Approval 14

SECTION 3: Program Evaluation and Reporting 14

SECTION 4: Conclusion 15

Appendix: Case Studies 16

Introduction

This guide provides an overview of *inclusive utility investment* for utility-driven deployment of customer-sited energy efficiency, electric appliances, and distributed energy resources (DERs),[1] including on-site energy generation and storage.[2] The rapid shift toward a more renewable energy power supply amid significant load growth illustrates the need for efficient, electric, grid-interactive buildings and transportation assets to help cost-effectively manage this transition. For DERs to be adopted at the speed and scale necessary to meet utility decarbonization and broader societal goals, innovative financial solutions are needed to overcome barriers to access and to ensure faster and more equitable adoption.

> **Inclusive utility investment** is a financial solution for distributed clean energy upgrades (including energy efficiency) via a tariff for site-specific utility investment and cost recovery, approved by the utility's regulatory authority and designed to ensure net annual cost savings for participants.[3]

While programs such as the federal Weatherization Assistance Program provide essential no-cost upgrades to some households, the scale of funding remains vastly lower than the need.[4] Many utilities (and others) offer solutions to broaden access to clean energy home upgrades, yet rebates, loans, and other incentive programs often yield an inequitable distribution of benefits.[5] Consumer lending typically leaves behind lower-income households, those with no or low credit scores, renters, and anyone unwilling to take on personal debt to finance home upgrades.[6]

Inclusive utility investment can help achieve a faster and more equitable clean energy transition by making clean energy home upgrades more accessible on terms that can achieve high acceptance rates. These programs can unlock upgrades to meaningfully reduce peak demand and avoid or defer distribution system upgrades, potentially incorporating the locational value of DERs. Inclusive utility investment also provides utilities with the opportunity to both scale DERs and aggregate them to leverage the grid flexibility potential of these resources through a virtual power plant (VPP).

With the more inclusive eligibility criteria of this utility investment model for clean energy upgrades to homes and businesses, utilities can tap into new value streams while helping to advance a more equitable clean energy transition.

1 Definitions of distributed energy resources vary. For the purpose of this guide, DERs can be thought of expansively to include not only distributed energy generation and storage, but also electric vehicle chargers, grid-interactive buildings and electric appliances, energy efficiency, and demand response.
2 This guide is an update to Utility Guide to Tariffed On-Bill Programs, published by the Southeast Energy Efficiency Alliance (SEEA) in 2020.
3 U.S. EPA ENERGY STAR Inclusive Utility Investment
4 Policy Options to Enable an Equitable Energy Transition (Resources for the Future)
5 A Multi-State Analysis of Equity in Utility-Sponsored Energy Efficiency Investments for Residential Electric Customers (Urban Energy Justice Lab)
6 Bridging the Gap: Ensuring Access to Energy Efficiency for All (Dr. Tony Reames, 2022 ACEEE Finance Forum keynote address)

SECTION 1: Overview of Inclusive Utility Investment

The U.S. Environmental Protection Agency (EPA), within its ENERGY STAR® Home Upgrade initiative, defines the following core tenets of inclusive utility investment:

Utility investment in energy services: The program does not entail consumer lending or personal debt. The tariff for site-specific utility investments specifies that cost recovery charges are part of the energy services at the metered location. Until the utility's investment is recovered, the cost recovery charges automatically apply to any customer paying for service at the location with due notice of terms since they will also benefit from the savings generated by the upgrades.

Site-specific analysis and resource savings estimates: Programs ensure modeled energy and cost savings are specific to the building to provide an accurate estimate on which to base the cost-recovery charge.

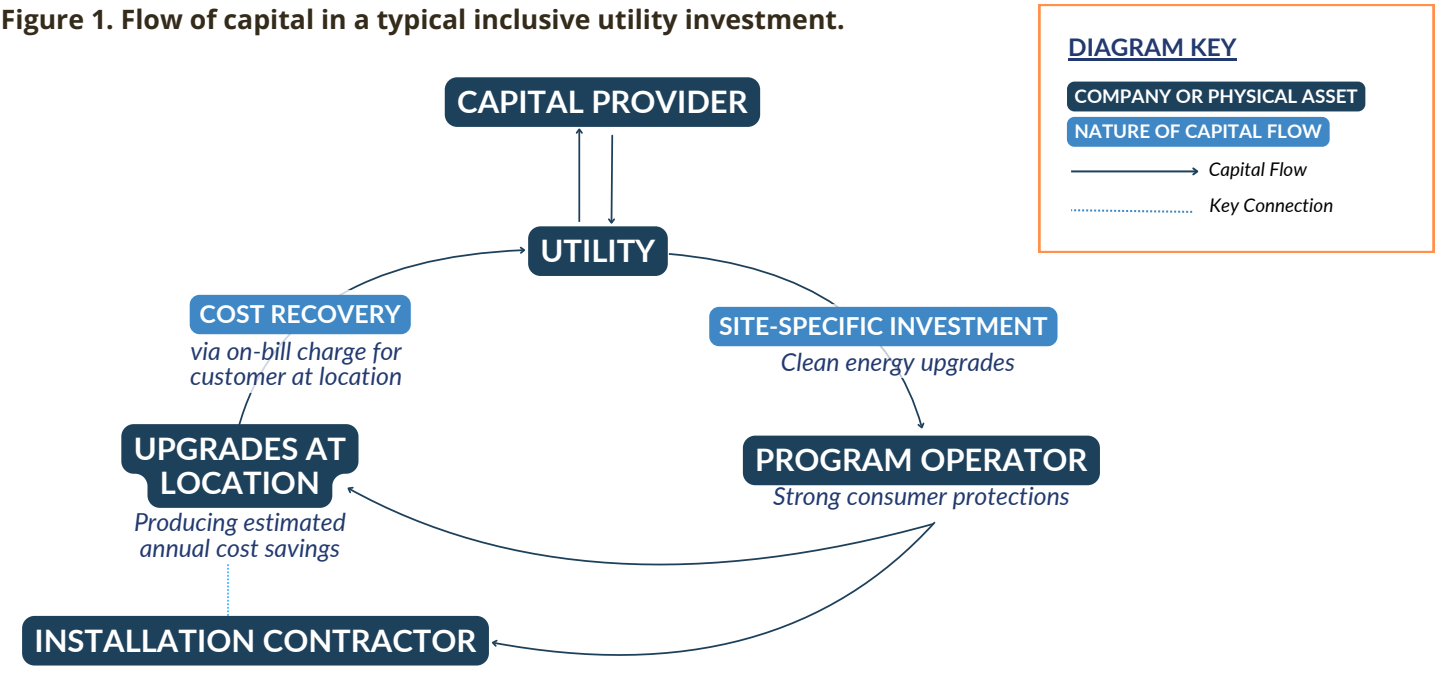
Positive cash flow: The tariff requires that the fixed cost-recovery charges be lower than the estimated energy cost savings on an annual basis. Savings can be generated by resource efficiency or grid value, including energy production that the customer is compensated for.

Inclusive Utility Investment Program Focus

Inclusive utility investment can be applied to any customer class and any energy efficiency or DER technology that produces cost savings for the customer. While efficiency measures in the residential, small commercial, and municipal buildings sectors have been the primary focus of programs to date, energy generation and storage, transit and bus fleet decarbonization, and other applications have been implemented or proposed by utilities and regulatory commissions.

For more information, visit: www.energystar.gov/products/inclusive_utility_investment

Figure 1. Flow of capital in a typical inclusive utility investment.



Among existing programs, types of upgrades include insulation, air sealing and duct sealing, energy-efficient lighting, smart thermostats (enrolled in demand response programs), air-source heat pumps, heat pump water heaters, on-site solar photovoltaic systems, water efficiency measures, and other energy efficiency resources. Electric vehicle (EV) charging infrastructure and battery storage are emerging potential applications. Successful programs include strong consumer protections in design; operations; and post-upgrade evaluation, measurement, and verification (EM&V) of savings.

The original and predominant inclusive utility investment program design is the Pay As You Save® (PAYS®) system, developed by the Energy Efficiency Institute, Inc. (EEI) in 1999. Through this trademarked system, EEI and PAYS® program operators developed many key consumer protections and operational features that have led to program success. An EEI PAYS® Status Report from 2022 detailed the performance of PAYS® programs to date, demonstrating very high acceptance rates among customers for upgrades that generated sufficient savings and utility value streams to fully capitalize upfront costs.

Distinguishing Inclusive Utility Investment from Consumer Lending

In a typical inclusive utility investment design, the utility capitalizes the customer-sited upgrades like any other capital investment and ties cost recovery to the energy service at the upgraded location. While the cost-recovery charge appears on the customer's utility bill, this approach is distinct from all types of consumer lending with on-bill repayment of loans. Despite this, inclusive investment programs are often grouped with "on-bill financing" programs, blurring the distinction between these financial mechanisms and causing confusion. In its 2023 update to the Clean Energy Financing Toolkit for Decisionmakers, the EPA distinguished on-bill loans from inclusive utility investments.

Table 1. Differences in Program Attributes between Typical Inclusive Utility Investment and On-Bill Loan Programs

Program Attribute	Inclusive Utility Investment	On-bill Loan
No upfront cost for upgrades that are cost-effective over their lifetime	✓	✓
No credit or income qualification required	✓	
Renters are eligible	✓	
Estimated annual cost savings must exceed participant payments	✓	
Payment is through a fixed charge on the utility bill	✓	✓
Payments end if upgrade fails and is not repaired	✓	
Cost recovery runs with the location and remains in effect for subsequent customers until cost recovery is complete	✓	

A Holistic Approach to Energy Equity

Inclusive utility investments can support more equitable access to cost-saving clean energy upgrades (and ancillary benefits such as increased comfort and improved indoor air quality) by rooting the investment in the value delivered by the upgrades rather than an individual resident's financial means or credit score. While overcoming systemic barriers to access is essential to achieving equitable outcomes, the utilization of an equity framework is one way for utilities to ensure program development, implementation, and evaluation all incorporate equity holistically. A 2023 SEPA industry brief, Embedding Equity in Utility Transformation, outlines three main components of equity: structural, procedural, and distributional.

Examples of each dimension are included in this guide:

Procedural Equity

- Internalize equity across organizational processes
- Demonstrate intentionality and authenticity
- Improve accessibility and inclusion for under-served communities

Structural Equity

- Recognize the systems that led to injustice
- Understand under-served communities' needs
- Improve system frameworks

Distributional Equity

- Improve the distribution of costs and benefits
- Measure impacts across all communities

Resources: Inclusive Utility Investment Program Model

- U.S. EPA Inclusive Utility Investment webpage
- U.S. EPA Inclusive Utility Investment Current Program Information
- Inclusive Utility Investments: Tariffed On-Bill Programs (EPA Clean Energy Financing Toolkit entry)
- Smart Electric Power Alliance (SEPA) Inclusive Utility Investment Task Force launch webinar
- Introduction to Inclusive Utility Investments (Clean Energy Works)

SECTION 2: Program Development and Approval

This section covers a utility's feasibility assessment, key program design considerations, best practices for consumer protections, and the regulatory approval process. Some utilities have successfully advanced to approval and program launch within six months, although securing approval from a state utility regulatory commission typically takes longer.

2.1 Feasibility Assessment

A critical first step in assessing the feasibility and potential reach of an inclusive utility investment program is to explore what program measures (collectively, projects) are likely to be cost-effective for a meaningful proportion of the utility's customers. This assessment is a primary driver of program success and can also help utilities, regulators, consumer advocates, and community groups develop a shared understanding of program expectations. Additional feasibility considerations include potential ancillary benefits to the utility and customers (e.g., peak demand reduction), cost recovery for the utility's site-specific capital investments, software and technological dimensions, and potential program capital sources.

2.1.1 Project Economics and Potential Program Reach

Programs are designed to produce net savings annually for participating customers by capping cost-recovery charges at a portion of the estimated energy cost savings—typically 80%. The duration of the cost recovery period is also capped at a portion of the estimated useful life of upgrades (also typically 80%) or, alternatively, the duration of an extended warranty period. These cost-effectiveness constraints help protect consumers against uncertainty of energy cost savings and utilities against uncertainty about the useful life of the investment. However, measures that are *not* fully cost-effective (as defined in the program) require an upfront copayment from the participant. Higher copayments also are associated with lower participation rates that can undermine performance and fail to meet stakeholder expectations. For this reason, assessing what measures are likely to have little or no copayment for customers is key.

A project cost-effectiveness calculation uses current utility rates (typically including resource savings from other fuel sources in the case of beneficial electrification), actual project installation costs, and site-specific savings estimates; and applies any available rebates and other incentives (ideally including any non-utility incentives, such as a state agency rebate) that can lower overall project costs. Additional strategies to improve cost-effectiveness for customers can include bulk procurement of equipment, competitive pricing among installation contractors, and the use of low-cost or subsidized capital. When projects can be capitalized by the utility with no customer copayment needed, customer acceptance rates for upgrade offers have been reported at 80-90% in PAYS® programs.[7] This experience highlights the importance of targeting outreach to customers who are likely to have low or no copayment for a given set of measures.

2.1.2 Utility Value

Utilities also should assess a program's potential aggregate impacts on its overall planning, including load growth through electrification, reduced energy consumption through efficiency improvements, peak demand reduction, and demand response (if incorporated into the program), considering the anticipated number of participants. Analyses of two successful PAYS® programs have demonstrated net present value to utilities, thus benefiting all customers – not just program participants.[8]

7 2022 PAYS® Status Update (Energy Efficiency Institute, Inc.)
8 Inclusive Utility Investment in Action: Utility Value of a Pay As You Save® Energy Efficiency Program (Bickel et al. 2022); Utility value of a pay-as-you- save inclusive utility investment program for whole-home energy efficiency and electrification upgrades (Bickel et al. 2022)

2.1.3 Recovery of Utility Investment

For utilities operating and reporting on PAYS® programs, cost-recovery rates from participants have exceeded 99.5% in almost all cases. This exceeds cost-recovery rates for most utilities' electricity sales, meaning that charge-offs from all customers as part of its rate-setting process. High cost-recovery rates from participants are aided by the program design, which requires estimated annual savings for participants before investments can be made. Additionally, because charges are fixed while month-to-month savings may vary (e.g., savings are greater in heating and cooling seasons), programs have a modest bill-leveling effect, which has been recognized to help with energy affordability and financial management.[9] Cost-recovery charges are included in the energy services at the location and can be paused during periods of vacancy, further reducing the risk of uncollectible charges.

Finally, a utility assurance fund has been used in some cases. For example, several cooperative utilities subscribe to an Energy Solutions Reserve Fund administered by the North Carolina Sustainable Energy Association. The Fund provides a second loss facility that can pay utilities (up to a cap) for any charge-offs of unpaid cost recovery charges above the rate experienced in the utility's main line of business. This fund has helped accelerate program adoption by addressing concerns from utility leadership about financial exposure since the utility is responsible for repaying borrowed capital regardless of cost recovery rates from the upgraded locations. In practice, this has primarily been a perceived versus actual risk. However, in rare instances, charge-offs may be unavoidable due to catastrophic loss of the building (e.g., due to fire or natural disaster).

2.1.4 Software and Technology

Utility billing systems must be able to assign and track cost-recovery charges (including remaining costs) at an upgraded location, potentially across multiple account holders over time. Utilities also must be able to temporarily suspend charges in the event of equipment failure or meter inactivity.

Most utility billing systems and leading utility IT and software providers have this functionality. If billing system upgrades are needed, these are typically already incorporated in utility plans and have widespread benefits beyond inclusive utility investment. Third-party utility bill management service providers also may be able to support the deployment of these programs.

Advanced metering infrastructure (AMI) with one-hour (or more frequent) interval data, though not a program prerequisite, helps provide high-quality energy savings estimates and support rigorous post-upgrade EM&V. Utilities or program operators may wish to contract with energy analytics companies to develop protocols for post-upgrade assessments, which can help identify and address cases where savings are not being realized.

2.1.5 Capital Sourcing

A utility's typical sources of capital for investments also can be used for inclusive utility investments. However, some electric cooperative utilities have access to low-cost or subsidized capital from federal programs, including at U.S. Treasury rates or even 0% interest (e.g., the Rural Utilities Service Rural Energy Savings Program and Energy Efficiency and Conservation Loan Program). Cooperative utilities have also accessed capital from specialized cooperative lenders (e.g., the National Rural Utilities Cooperative Finance Corporation (CFC)).

For some utilities, green banks, community development financial institutions, credit unions, and other mission-driven banks also may be suitable partners for sourcing program capital, along with state agencies with bonding authority. Utilities have also used working capital from customer-funded energy efficiency budgets on a revolving basis. However, programs face limits to their scale when sourcing capital from a limited revolving pool; thus, this kind of funding may not be a suitable long-term capital source.

9 A Guide to Improving Electricity Affordability (Resources for the Future)

Resources: Feasibility Assessment

- Tariffed On-Bill Financing Feasibility: Assessment of Innovative Financing Structures for Minnesota (Cadmus 2019)
- Utility-Led Acceleration of Residential Efficiency & Electrification Retrofits (CET 2022)

Rate of Return

While cooperative utilities and public power utilities need only cover the cost of debt, investor-owned utilities (IOUs) may earn a partial or full rate of return if approved by their state regulatory commission. Some commissions have taken (or are considering) an approach that caps the portion of the rate of return borne by participating customers. The remainder is socialized across all customers in recognition of benefits that accrue to all customers, including non-participants.

2.2 Program Design Considerations

A utility's program design phase should follow its feasibility assessment, which can identify what potential program measures are most appropriate based on their cost-effectiveness for participants. This initial assessment should also inform stakeholder engagement and can help utilities establish realistic program goals. In assessing program design elements, utilities also may wish to consult other utilities and program operators that have run successful programs.

2.2.1 Program Goals and Stakeholder Engagement

Early in the program design phase, utilities should engage community groups, local governments, and other stakeholders. This engagement can help inform program goals, eligible customer classes, program measures, priority populations for program impact, and metrics for program success (discussed further in the Program Evaluation section below). Participants in stakeholder processes should represent a broad range of perspectives, especially those from priority populations, to ensure program design addresses inequities impacting these communities most.

By developing strong stakeholder and community relationships and committing to program reporting, utilities can build trust, demonstrate customer value, and make better-informed adjustments to maximize equitable program outcomes. Programs should not be seen as static but rather as part of a continual improvement process that should be adjusted and refined based on key performance indicators and metrics, including as part of a utility's equity goals.

Procedural equity ensures that communities have a voice in the development of utility priorities, with a focus on inclusive decision-making processes that center underserved groups. Developing and implementing inclusive utility investment programs requires building and maintaining trusted relationships with community groups and advocacy organizations.

These partnerships facilitate ongoing participation and feedback throughout program design, execution, and evaluation. By incorporating community input, utilities can better address customer needs, identify areas for improvement, and strengthen outcomes during both the regulatory approval and program design processes. Building authentic partnerships can help ensure programs remain responsive and effective in delivering clean energy benefits equitably.

2.2.2 Eligibility

Inclusive utility investments are based on the cost savings potential from the site-specific upgrades rather than an individual customer's financial characteristics. Thus, technical eligibility is broad; though as previously noted, participation is most suitable where upgrades are cost-effective as defined within a program. Additionally, utilities can achieve broader access by designing their programs for compatibility with other programs, such as bill payment assistance or levelized billing programs.

Structural equity requires recognizing that past and ongoing practices have created disparities in the energy system; understanding the needs of historically underserved and low- and moderate-income (LMI) communities; and focusing on systemic changes that address these inequities by reforming programs and evolving priorities. In the case of programs relying on consumer loans or personal debt obligations, it is important to recognize the structural barriers to eligibility like minimum credit score requirements or property ownership. Substandard housing conditions can further limit access to energy efficiency, rooftop solar, and more, leading to deferral from programs. Inclusive utility investments— especially when braided with programs or resources that address home improvement needs or "pre-weatherization" barriers—help overcome some of the structural barriers that broadly prevent equitable access to clean energy home upgrades (see Appendix: Case Studies, LaGrange).

2.2.3 Program Measures

Utilities should assess which measures to include in a program based on their goals, customer needs and preferences, and (especially) the potential cost savings from each measure. Programs are most successful when deploying fully cost-effective measures (i.e., those that produce adequate estimated net annual savings and utility value streams to fully capitalize upfront costs). Multiple factors affect project cost-effectiveness, including the area's climate, retail electricity rates (and costs of other heating fuels), labor costs, equipment costs, baseline equipment types, housing conditions and types, historical energy usage, and availability of incentives. Utilities may consider single-measure improvements or whole-home packages that include insulation, building envelope, solar, storage, and more. In addition, load management measures can be considered as long as the financial value for customers can be estimated. Multiple options may be presented to a prospective participant, including fully cost-effective upgrades (no upfront cost) and an optional upfront copayment to access an additional set of upgrades.

Asset Ownership

In a typical program, the utility owns the upgrade measures through the cost-recovery period at which point ownership automatically transfers to the building owner. However, a few programs entail immediate customer ownership of upgrades while still allowing cost recovery for the utility's investment as a regulatory asset.

2.2.4 Program Size

Utilities must decide which customer class(es) to include in the program. While most programs have targeted residential customers, some longstanding programs have served commercial and municipal buildings. Some successful PAYS® programs have reached around 1% of customer meters annually, although the utilities that offer those programs are relatively small (<30,000 customers).[10] While a program ramp-up period can facilitate learning and development of internal expertise, a full-scale, permanently authorized program (as opposed to a time-limited pilot) can help avoid future delays related to regulatory approvals, thus accelerating program reach

10 2022 PAYS® Status Update (Energy Efficiency Institute, Inc.)

and benefits. Maximizing participation in inclusive utility investment programs also helps with program cost-effectiveness as fixed start-up and administrative costs recovered from all customers are justified by system benefits of more projects.

2.2.5 Program Operator

Some utilities choose to run their programs in-house, though most have contracted with a third- party program operator. Pursuing in-house implementation may entail more significant internal resources, lead time, and development of expertise. A third-party model can bring direct experience with inclusive utility investment program operations and the potential to scale. Utilities may also be able to leverage existing contractor networks, though installation contractors should not be responsible for estimating cost savings that would be generated by potential upgrades (see the Consumer Protections section below).

2.2.6 Marketing and Outreach

To maximize the number of customers able to participate in inclusive utility investment programs, utilities should prioritize marketing and outreach to customers with the best value proposition (e.g,. for energy efficiency measures, looking at households with high energy consumption or energy intensity). Utilities also can prioritize customers with inefficient baseline equipment or those using delivered fuels or electric resistance technology, as these customers' homes or buildings are likely to have the highest potential energy and cost savings. If possible, the utility should conduct a preliminary analysis of estimated copayments customers might incur for various measures, targeting customers likely to have little or no copayment. This may include prioritizing customers who are income-qualified for higher incentives, which can reduce or eliminate copayments.

Virtual screening tools such as a questionnaire or virtual walk-through — conducted prior to a site visit — can support a more detailed preliminary analysis. Additionally, this can help gauge a customer's willingness to participate based on anticipated next steps (e.g., understanding of the program process, ability/willingness to make a potential copayment, current plans to replace equipment, exploration of alternative pathways to finance upgrades). Finally, these tools can help identify and screen for pre-weatherization barriers that would prevent participation until addressed (e.g., knob and tube wiring, a need for asbestos remediation). If possible, customers facing such barriers should be informed how to address the issue, including any resources available to help, which would then allow them to participate in the program. Community and local government partnerships can provide integral support here.

Leveraging DER Deployment to Support Virtual Power Plants

While most programs to date have focused on energy efficiency and appliances, inclusive utility investment offers a unique opportunity for utilities to drive the deployment of all measures that reduce annual energy costs or produce utility value, including DERs like rooftop solar and battery storage, as well as energy management technologies (e.g., smart thermostats, water heater control switches, smart EV chargers). By aggregating these DERs in a virtual power plant (VPP), utilities can harness them to balance supply and demand and provide other grid services. By incorporating the value of grid flexibility into the customer offer for upgrades, utilities can thus help increase DER uptake, which in turn helps scale the VPP. For example, an offer to capitalize a smart electric water heater upgrade could incorporate both the energy savings of a more efficient appliance and the value of a flexible, grid-interactive thermal storage resource. Offering a more complete set of DERs can create new investment opportunities for utilities; help better manage an increasingly variable, renewable energy supply; and promote broader and more inclusive deployment of these clean energy technologies.

Resources: Program Design

- U.S. EPA Inclusive Utility Investment Current Program Information
- PAYS® Model Tariff
- Applying the PAYS® System to On-Site Solar to Expand Access for All

2.3 Consumer Protections

Ensuring robust consumer protections to avoid unintended consequences should be a primary consideration when designing an inclusive utility investment program. The EPA maintains a list of best practices in the field for consumer protection. Many of those protections are program design elements first developed within the PAYS® system along with program operational practices refined by the company EEtility (a utility program operator specializing in PAYS® implementation). Experience in the field and input from consumer advocates continue to inform emergent best practices, including protocols for ensuring upgrades are performing as expected with regard to the projected energy and cost savings. Including strong and transparent consumer protections and communicating them clearly, early, and often in the process can help utilities build trust with customers, consumer advocates, and other stakeholders, strengthening a program's overall effectiveness and sustainability.

The core tenets of inclusive utility investment (outlined in the Overview section) provide a foundational set of protections for consumers:

- **Utility investment in energy services**
- **Site-specific analysis and resource savings estimates**
- **Positive cash flow**

While the EPA website includes more in-depth information on leading consumer protections, the following list briefly summarizes key considerations:

- **Customer choice among upgrades:** In addition to all cost-effective upgrades, customers can choose to access additional upgrades (those that are not fully cost-effective within program design constraints) by choosing to make a one-time upfront copayment.
- **Equipment warranties:** Programs include warranties and/or maintenance plans for installed equipment throughout the cost-recovery period.
- **Site-specific quality verification after installation:** A utility or program operator verification process ensures each measure meets expected quality markers or test metrics.
- **Monitoring of future energy usage:** With the occupant's permission, future energy usage is monitored to detect changes from expectations.
- **Anomalies are investigated and remedies are provided:** Anomalies that produce negative cash flow for participants are investigated and remedied where appropriate (e.g., faulty installation or equipment settings; unrealized savings).
- **Cost-recovery charges cease if an upgrade fails**: If an upgrade fails through no fault of the customer and the upgrade cannot be repaired, cost recovery charges for that upgrade end; if the upgrade is repaired, then cost recovery charges may resume.
- **Avoidance of conflict of interest:** Programs require independent analysis of cost savings potential by an entity (utility or program operator) responsible for ensuring the performance of upgrades, as opposed to the installation contractor.
- **Notice to subsequent owners and occupants:** The tariff requires participants to provide notice to subsequent occupants before the sale (which can be accomplished through public recordation) or lease, including the added upgrades, estimated savings, and cost-recovery charges and terms.
- **Additional protections for tenants:** When approving upgrades, landlords may be required to commit to a period of not raising rents based on the upgrades.[11] Landlords may also be required to cover any copayments, while tenants are typically responsible for cost recovery charges (while enjoying net annual cost savings and other benefits of the upgrades).

Resources: Consumer Protections

- U.S. EPA Inclusive Utility Investment webpage (section titled "What important consumer protections should be included in an Inclusive Utility Investment program?")
- PAYS® Essential Element and Minimum Program Requirements

11 This is a best practice in federal weatherization programs and a requirement for the residential energy rebate programs funded by the federal Inflation Reduction Act (IRA) of 2022.

2.4 Legal and Regulatory Approval

Inclusive utility investment requires approval from the regulatory authority that oversees the utility's tariffs. In the case of IOUs, the state utility regulatory commission approves tariffs and other program agreements as necessary. Most cooperative and municipal utilities only need board or council approval, but they may require regulatory commission approval in some jurisdictions.

In addition to the utility tariff, programs typically involve agreements outlining the rights and responsibilities of relevant parties, including homeowners, building-owner landlords (consent required for tenant participation), tenants, installation contractors, etc. These agreements and forms are sometimes included in commission filings for approved programs. Additionally, program forms and agreements can be licensed within the PAYS® system. As part of program development, utilities should complete a legal review of the proposed tariff, contracts, and other forms to ensure compliance with all state and local laws.

While utilities may propose and initiate programs through their regulatory oversight body, other pathways to program adoption include legislative requirements and commission-driven processes (e.g., stipulation agreements). Sometimes, these paths intersect. For instance, a state legislature could require the state's commission to direct the development of a utility program that meets certain characteristics or recommend that a commission work with utilities and other stakeholders to consider a potential program. Primary documentation (e.g., tariffs, commission orders, notice forms) from other jurisdictions can be helpful for utilities and others seeking to learn more.

Resources: Legal and Regulatory Approval

- U.S. EPA Inclusive Utility Investment Current Program Information (links to commission orders and other primary documentation)
- Illinois Climate and Equitable Jobs Act (Sec. 16-111.10. Equitable Energy Upgrade Program)
- PAYS® Model Tariff (EEI)
- Implementing PAYS® in Your State or at Your Utility (EEI)
- IUI Municipal Toolkit (CET)

SECTION 3: Program Evaluation and Reporting

As outlined in the Program Development section, utilities should work with stakeholders and community members to help define program success, track progress toward goals, demonstrate customer and utility value, and make informed adjustments to improve program performance. By defining clear metrics of success and reporting requirements or commitments, utilities can create a transparent and accountable framework for managing their program.

Utilities should utilize both Key Performance Indicators (KPIs) and metrics to assess, report, and improve program performance. KPIs align with overall program goals and success, while metrics are operational or process-oriented and can be used to assess and improve program design and implementation.

Program KPIs may include passing or meeting common benefit-cost test expectations (e.g., Total Resource Cost Test, Societal Cost Test, Utility Cost Test, Participant Cost Test, and/or Ratepayer Impact Measure).[12] Customer participation rates (both overall and among identified priority populations), customer satisfaction, total utility investment, average project size, and upgrade offer acceptance rates are all common KPIs for inclusive utility investment programs. EEI's past production of a PAYS® Status Update includes an example of KPIs.[13]

12 National Standard Practice Manual for Benefit-Cost Analysis of Distributed Energy Resources (Appendix E. Traditional Cost-Effectiveness Tests) (August 2020)
13 2022 PAYS® Status Update (Energy Efficiency Institute, Inc.)

Operational program metrics provide an opportunity to identify areas for improvement and areas driving success, especially when analyzed over time. Examples include the time lag from customer expression of interest to a truck roll (site visit) or upgrade offer; the percent of upgrade offers that have no copayment (including which measures); the prevalence and magnitude of copayments by measure (or set of measures); warranty claim rates; and demographic information of participants (if voluntarily shared) or associated with the upgraded location (e.g., census block group statistics).

To evaluate post-upgrade savings at the individual site or portfolio level, upgrades capitalized with inclusive utility investment should be analyzed for measured savings, for example using CalTRACK OpenEEmeter 4.0 or International Performance Measurement and Verification Protocol (IPMVP) Option C methodology. Modeled savings (which should always be site-specific, not based on deemed savings) inform the pre-upgrade cost savings estimates but are not suitable for program evaluation purposes.

Regular, clear, and transparent reporting on KPIs and metrics communicates success and challenges with all stakeholders, including regulatory bodies, investors, program participants, and community members or advocacy groups. By systematically collecting, analyzing, and reporting data, utilities can identify success areas, uncover improvement opportunities, and make data- driven decisions to optimize program design and implementation.

Resources: Program Evaluation and Reporting

- Reported and Evaluated Field Experience from Pay As You Save® Building Efficiency Upgrades (Ferguson et al. 2022)
- Distributional Equity Analysis for Energy Efficiency and Other Distributed Energy Resources: A Practical Guide (Woolf et al. 2024)

Distributional equity ensures the fair allocation of resources (e.g. the benefits of clean energy upgrades) while reducing the disproportionate share of the burdens that communities may bear. Inclusive utility investment can help close the gap and support a more equitable distribution of benefits from clean energy upgrades, like more stable bills, improved thermal comfort, improved indoor air quality, and increased home values. However, these potential distributional benefits do not flow automatically; rather, they require intentional goal setting and evaluation.

A distributional equity analysis (DEA) is one way for utilities to assess distributional impacts, tracking metrics like energy cost savings, health outcomes, and energy insecurity by demographic to ensure equitable benefits are achieved. A DEA complements traditional benefit-cost analysis (BCA) by evaluating how program costs and benefits are distributed among different customer groups, particularly underserved or disproportionately burdened populations. By incorporating DEA into its regular reporting, utilities can identify disparities, adjust program strategies, and refine their approach to achieve equity-focused goals. Integrating this dual-analysis process and engaging community stakeholders helps utilities to make informed investment decisions, enhance program effectiveness, and build trust with priority populations.

SECTION 4: Conclusion

The U.S. electric utility industry is undergoing an enormous amount of change. As utilities embrace their role in efficiently electrifying end uses and harnessing the potential of DERs, inclusive financial solutions for these clean energy upgrades emerge as a promising means toward an equitable clean energy transition. By opening access to the clean energy economy to any customer with a utility account, inclusive utility investment can serve as a foundation for this transition—especially when braided with other resources and programs to best meet the diverse needs of utility customers.

Utilities interested in exploring this model may consider the following next steps: visit the resource library curated by the EPA; review primary documentation for current inclusive utility investment programs; consult utilities and program operators who have run programs to learn more; and work with key utility personnel and community stakeholders to decide whether to conduct a feasibility assessment.

Appendix: Case Studies

Roanoke Cooperative (North Carolina) – Upgrade To $ave™

In 2014, the Board of Directors at Roanoke Cooperative, a distribution cooperative in northeastern North Carolina, set a goal of achieving whole-home energy efficiency upgrades for 1,000 households within five years (~7% of metered locations) to generate member-owner economic benefits and mitigate energy burden. Initially, Roanoke marketed loans for efficiency upgrades to its member-owners but found that only a few households were both qualified and willing to take out a loan for these improvements. After switching to an inclusive utility investment program, Roanoke saw considerable uptake and, from 2015 to early 2022, invested nearly $5 million in site-specific clean energy upgrades to more than 650 homes. Another innovation Roanoke introduced was co-delivering a demand response program via smart thermostats and water heater load control switches, recently highlighted as a case study in the U.S. Department of Energy's VPP Liftoff report.

Program analysis conducted in 2022 determined that household-level electricity savings averaged 18% while household-level peak demand was reduced by approximately 1.2 kW for winter mornings (8-9am, avg. 24° F) and 1.0 kW for summer afternoons (5-6pm, avg. 91° F). Even with reduced electricity consumption, the program generated positive value for the utility (and thus, member-owners), primarily through reduced wholesale peak demand charges and, to a lesser degree, the avoided cost of energy efficiency credits otherwise needed to meet the North Carolina Renewable Energy and Energy Efficiency Portfolio Standard. Cost recovery in the program has remained strong, with Roanoke charging off only $10,000 of a $4.95 million investment portfolio.

Resources:

- Roanoke Cooperative Upgrade to $ave (program page)
- Upgrade to $ave promotional video
- Upgrade to $ave program tariff (navigate to RIDER EECLP)
- Inclusive Utility Investment in Action: Utility Value of a Pay As You Save® Energy Efficiency Program (Bickel et al. 2022)

Duke Energy Carolinas / Duke Energy Progress (North Carolina) – Improve & Save; Built-In-Savings

In 2023, the North Carolina Utilities Commission (NCUC) approved Duke Energy Carolinas (DEC) and Duke Energy Progress (DEP) proposals for two tariffed on-bill (inclusive utility investment) programs: a full-scale program for residential retrofits, Improve & Save, and a DEP pilot program for multi-family new construction, Built-In-Savings. These program proposals followed NCUC's approval of a stipulation agreement with community-based organizations and energy efficiency advocates seeking to help customers manage rising electricity rates and utility bills.

Improve & Save

Improve & Save was launched in 2024 with a goal of upgrading 3,000 homes in its first few years. The program enables customers to pay for energy efficiency upgrades on their electric bills. A certified energy advisor completes a comprehensive energy audit of the home. The information collected during the audit and the customer's energy usage is used to provide the customer with a custom proposal of energy saving measures, energy efficiency incentives, and estimated bill savings. The customer may need to make an upfront payment to meet the cost benefit requirements. The customer will pay the remaining balance over time as part of their monthly bill. Routine maintenance and warranties are provided by the program for HVAC appliances and heat pump water heaters.

Improve & Save is coupled with Duke Energy's Smart $aver® Early Replacement and Retrofit program. Duke Energy sought and received NCUC approval for its Smart $aver® Early Replacement and Retrofit program through the utility's DSM/EE annual cost-recovery rider. This program provides customer rebates in accordance with the energy savings between old appliances that are replaced early (i.e., before failure) and new, energy-efficient appliances. This efficiency difference allows for much higher rebates than those typically available to customers when purchasing a new appliance. By combining increased incentives for projects that demonstrate greater energy savings along with the energy bill savings from an Improve & Save home upgrade, customers will see more cost-effective projects and reduced copayments.

Built-In Savings

The Built-In Savings program will enable Duke Energy Progress to make efficiency investments in new multi-family rental housing in partnership with housing developers, exceeding North Carolina's building energy code requirements. The marginal cost of the efficiency improvements will be recouped through an on-bill cost recovery charge paid by tenants, who will also enjoy estimated net savings from day one (relative to minimum code requirements). As with all-inclusive utility investment programs, charges end once the utility's costs are recovered, at which point all cost savings are enjoyed by the tenant. This pilot program is a prime example of how inclusive utility investment can effectively address landlord-tenant split incentives – in this case, with an elegant design for new construction because North Carolina's building energy code is not aligned with the most efficient state codes.

Resources:

- Duke Energy Improve & Save (program page)
- Improve & Save promotional video
- Improve & Save program tariff
- Revolutionizing Home Energy: Duke Energy Paves the Way for Affordable Upgrades

---

Ouachita Electric Cooperative Corporation (Arkansas) - HELP PAYS®

Starting in 2016, Ouachita Electric Cooperative Corporation (OECC), a distribution cooperative in south-central Arkansas, offered an inclusive utility investment program, HELP PAYS®, to its members. During the program's first five years, OECC upgraded over 400 buildings and 6% of its members across the residential and commercial sectors, yielding more than $3 million in site-specific investments. In addition to typical efficiency measures such as insulation, air and duct sealing, and HVAC, OECC also deployed distributed solar generation, the first utility to do so with inclusive utility investment.

Like Roanoke Cooperative, OECC is notable in that it first operated an on-bill loan program before shifting to inclusive utility investment. Comparing data from similar periods from OECC's on-bill loan program and its inclusive utility investment program offers a unique vantage into differences in performance among a common set of members.

OECC's HELP PAYS® program is also a prime example of upgrades delivered to rental properties, highlighting how inclusive utility investments can overcome landlord-tenant split incentives and broaden access to efficiency and clean energy upgrades. (In cases where upgrades required an upfront copayment—that is, the upgrade package was not fully cost-effective and therefore could not be recovered through bill savings alone—landlords have typically made the copayment.) An analysis of the HELP PAYS® program demonstrated considerable utility and non-program- participant value through peak load reduction, validated by a 4.5% electricity rate decrease approved by the Arkansas Public Service Commission.

Table A.1 - Performance Comparison between OECC's On-bill Loan and Inclusive Utility Investment Programs

	HELP Loan (4/2015 - 12/2015)	**HELP PAYS®** (4/2016 - 12/2016)
Upgraded Locations	70 single-family homes	118 single-family homes 82 multi-family rental units 2 commercial properties
Average Investment Per Home	$2,280	$5,600

Resources:

- HELP PAYS® (program page)
- HELP PAYS® program tariff
- Solar + Efficiency + Innovation = Lower Rates for Arkansas Co-op Members (National Rural Utilities Cooperative Finance Corporation, December 2019)
- Utility Value of a Pay As You Save® Inclusive Utility Investment Program for Whole Home Energy Efficiency and Electrification Upgrades (Bickel et al. 2022)

City of LaGrange Utilities (Georgia) - SOUL™

In 2020, the City of LaGrange, Georgia approved an inclusive utility investment pilot program, Save On Utilities Long-Term™ (SOUL™), modeled on the PAYS® system, for its electric customers. The program focuses on efficiency upgrades for residential buildings, including insulation, air sealing smart thermostats, and HVAC equipment. During its pilot phase, SOUL™ program operator Groundswell projected that participants would enjoy up to $500 a year in estimated energy bill savings and $9,474 in projected lifetime bill savings. Additionally, participants reported increased comfort in their homes—another important benefit of weatherization upgrades.

In implementing the pilot, Groundswell, a program operator, encountered "pre-weatherization" repair and maintenance needs, especially prevalent among housing stock in areas with lower household incomes. This typically leads to deferral from the program. To install the cost-saving clean energy upgrades and ensure the viability of performance and cost recovery, these repairs (e.g., roof and flooring repairs, mold remediation, plumbing repairs) must be addressed first. By braiding the SOUL™ program with multiple rounds of funding from the U.S. Department of Agriculture Housing Preservation Grant program, Groundswell was able to address these program deferrals and demonstrate the potential for more equitable outcomes through complementary programs and resources. As of 2024, Groundswell had leveraged this U.S. Department of Agriculture (USDA) program and served 44 households with more than $788,000 in critical home repairs, making way for the utility's energy efficiency investments.

Resources:

- LaGrange SOUL™ (program page)
- Groundswell Save with SOUL™ (program operator page)
- SOUL™ program tariff
- SOUL™ program profile and Groundswell interview (Drawdown Georgia, February 2024)
- USDA Housing Preservation Grants

1800 M STREET, NW FRONT 1
#3315
WASHINGTON, DC 20036
(202) 857-0898