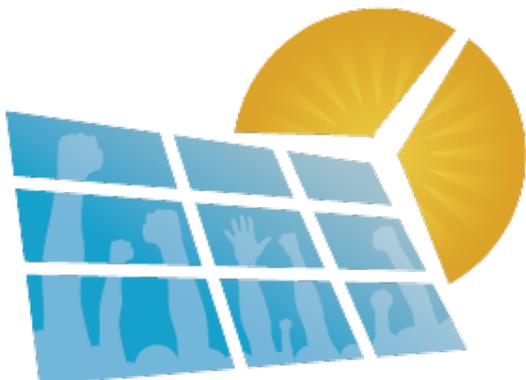


# Inclusive Financing for Efficiency and Renewable Energy

John Farrell & Karlee Weinmann  
November 2016



IISR's  
**ENERGY  
DEMOCRACY  
INITIATIVE**

November 15, 2016: Look for an update to this report shortly, clarifying some of the technical language regarding on-bill repayment and tariff-based financing programs. Apologies for the confusion.

## Executive Summary

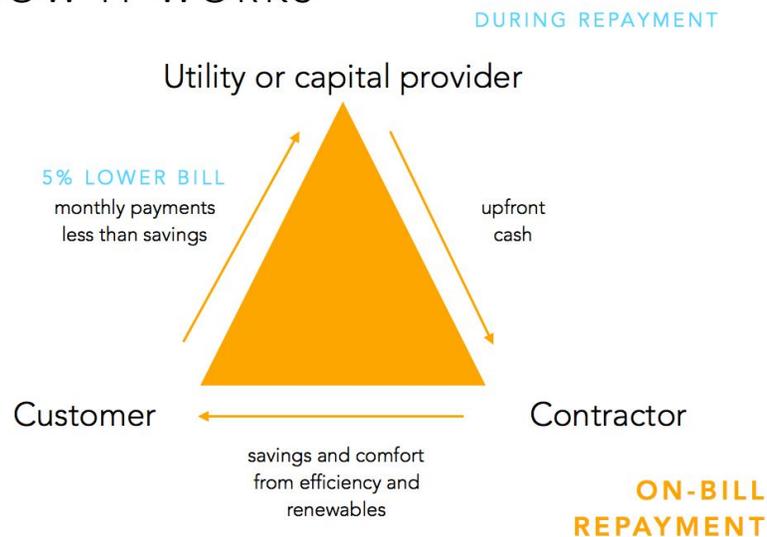
Energy efficiency and renewables represent our most promising pathway to lower energy costs for both individual consumers and utilities. Programs that help utility customers pursue home improvements, like better insulation or rooftop solar panels, can slash monthly utility bills and eliminate the need for utilities to add costly -- and outdated -- power and gas infrastructure. The upside is undeniable, with energy efficiency measures alone predicted to save customers \$2 trillion by 2030.

*On-bill repayment...allows customers to reimburse the utility for energy improvements made to their property via a line-item on their monthly bill*

But limited access to well-designed programs hinders progress. The best energy efficiency programs serve less than 2% of customers each year, and few reach those most in need, including those with lower incomes and people of color, who pay disproportionately high energy bills.

Utilities have a valuable inclusive financing tool to knock down major barriers to energy efficiency and renewables. It's called on-bill repayment, which allows customers to reimburse the utility for energy improvements made to their property via a line-item on their monthly bill. Structured as a "tariff" line item rather than a loan, it solves many of the problems dogging the push for a more sustainable, affordable, and equitable energy economy.

### HOW IT WORKS

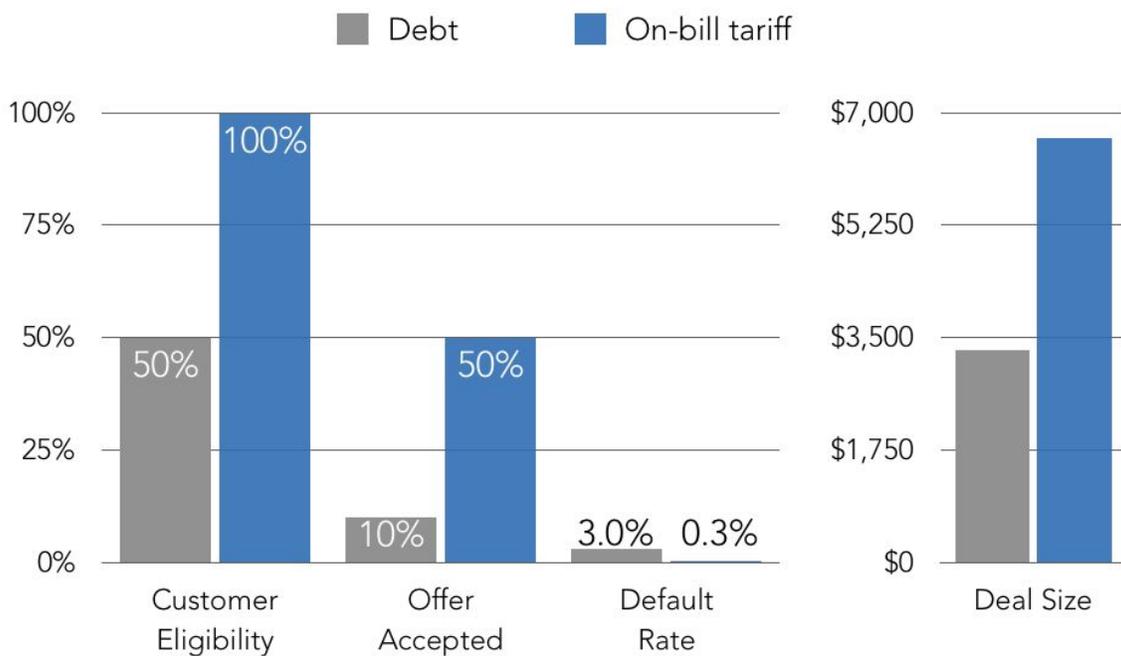


## The Opportunity

When a utility supports energy-savings efforts by offering low-risk, bill-based financing rather than traditional debt financing, there are five major benefits:

- Instant Savings - well designed on-bill programs result in energy savings that show up on the bill, on day one
- Universal Access - anyone with a good utility bill payment history can access on-bill repayment, unlike debt-based financing programs that don't serve customers with lower credit scores
- Simplicity - with finance on the bill and no loans, on-bill repayment makes investments in energy efficiency and on-site renewable energy much easier
- Bigger Savings - customers tend to invest twice as much in energy improvements when offered on-bill repayment compared to a personal loan
- Low Risk - default rates for on-bill programs average one-tenth the default rate for typical consumer loans

## BENEFITS OF ON-BILL REPAYMENT



Source: Clean Energy Works

Inclusive financing with on-bill repayment is not a panacea. Renters, in particular, face challenges around who pays the utility bills and having permission to make property-related improvements. But given the impressive results from existing programs, utilities and customers should look to on-bill repayment tariffs as a powerful tool to drive energy savings.

## A Huge Opportunity

The opportunity to reduce energy consumption and related costs by boosting energy efficiency and renewables is staggering.

By 2030, the U.S. Department of Energy estimates, a mounting push for efficiency will reduce energy use enough to [slash electricity customers' bills by \\$2 trillion](#). Residential customers alone may see [as much as \\$15.4 billion](#) in savings by 2030 in the northeastern U.S., with individuals owning energy-efficient homes cutting their bills by [25 to 35 percent](#) over 15 years. Rooftop solar can help reduce costs, too. In Minnesota, for example, a homeowner can generate [between \\$13,000 and \\$28,000](#) over 20 years with rooftop solar.

The benefits multiply when the calculus factors in benefits to the energy system. Lower on-site use and higher local energy production reduce demand, translating to a longer life for existing distribution and generation infrastructure and reducing the need for new power plants.

In addition, a booming energy efficiency sector [drives notable job growth, as does distributed solar](#).

The upside presented by energy efficiency and distributed renewable energy is stoking an appetite for communities to maximize these financial and wider economic benefits, and to distribute them widely. Boulder, CO, has [sought to take over](#) its electric utility and amplify local public benefit. Minneapolis, MN, forged [a unique partnership](#) with two utilities to advance its Climate Action Plan, tailored to promote a clean, local, equitable, and affordable energy future.

## Limitations

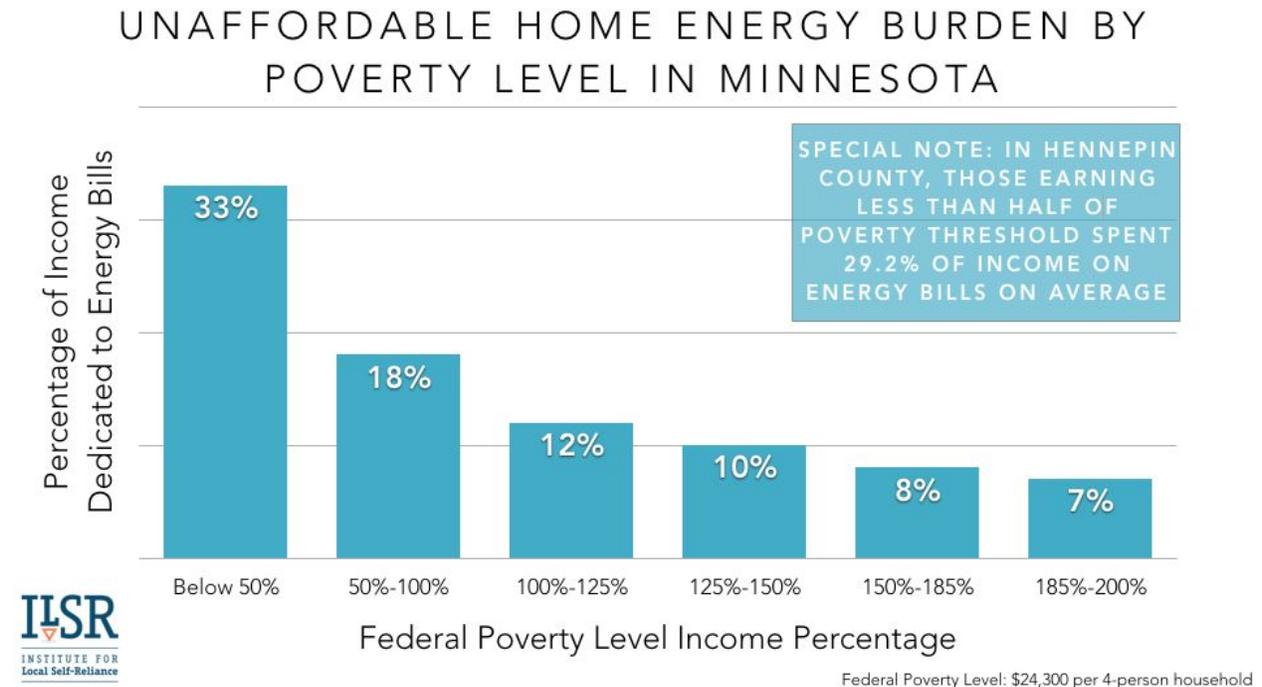
Despite enthusiasm from the the municipal level to the [White House](#) for reduced energy use and increased renewable energy production, many customers are short on tools to participate. The problem is exacerbated by [a general lack of awareness](#) of the benefits tied to energy efficiency and renewables, including significant cost savings.

The problem is particularly perverse for low-income customers often shut out of programs even though they shoulder the heftiest utility bill burden. In fact, those households spend [up to three times as much](#) of their income on energy charges as their higher-wage counterparts. The trend persists even when energy prices sink, because low-income customers tend to live in older, less-insulated homes.

For example, households in Minnesota's Hennepin County (which includes Minneapolis) whose income falls below 50 percent of the federal poverty level spend an average of [29.2 percent of](#)

[their earnings](#) on energy costs, well beyond the 6 percent threshold that is [considered affordable](#). That shakes out to [roughly \\$2,050 per year](#).

Across the state, those earning below 50 percent of the federal poverty level [spend 33 percent](#) of their income on energy bills. Access to energy-efficient improvements could soften the sting.



Meanwhile, the gulf is widening between what is considered affordable and what Minnesotans actually pay for energy. The gap [grew from \\$652 million in 2011 to \\$675 million](#) in 2015, according to national research firm Fisher Sheehan & Colton, an energy affordability watchdog. Just bringing the homes of low-income residents up to the average level of home efficiency in the U.S. would help them enormously, reducing energy costs by one-third.

The problem isn't just access by income, but by race. Bringing the homes of low-income residents up to the average level of efficiency would do much more to reduce energy burdens for people of color. "For African-American and Latino households, 42 percent and 68 percent of the excess energy burden, respectively, would be eliminated," says [one report](#).

Despite the need, low-income households are [routinely locked out](#) of the energy efficiency programs. Their [general lack of awareness](#) about efficiency options obscures their willingness to participate, underscoring the need for highly accessible programs that accommodate customers who have the most to gain.

Overall, even in the best efficiency and renewable programs, only about 1-2% of customers take advantage of energy savings opportunities each year. Information on many programs is limited

to bill inserts or marketing that may fail to reach many customers. One California [study](#), for example, found utilities had trouble reaching customers “that were non-white, lower-and middle-income, non-college educated, or non-English-speaking.” Even when the message reaches customers, the complexity of identifying contractors, finding financing, or enduring work on their property becomes an insurmountable barrier. Still, many cities, like Minneapolis, have ambitious goals for reducing energy use.

The Minneapolis Climate Action plan sets the goal of reaching 75% of single- and multi-family customers with energy services by 2025. With about 10% served by existing programs, **approximately two-thirds of electric and gas customers must be reached in the next 10 years.**

To get there, the status quo is not sufficient.

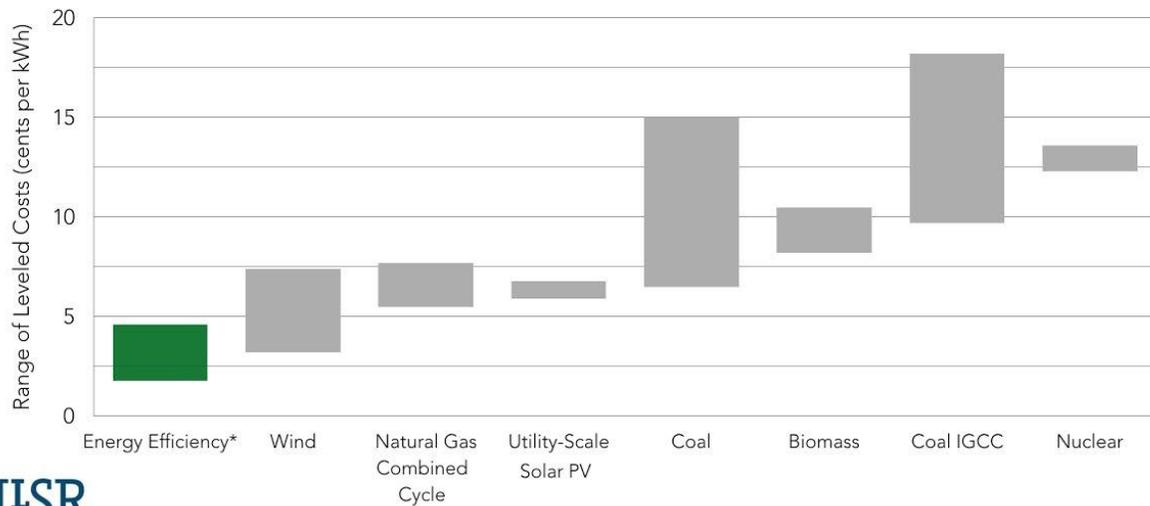
## A Necessary Paradigm Shift

For decades, most U.S. electric and gas utilities have operated as monopolies, with revenue rooted in building new infrastructure and selling more energy. Regulators tend to defer to utility plans for the electric and gas grids -- plans that have only modestly shifted from the historic priority to build more and sell more.

Last century’s business model no longer works in an economy where customers have more choice in the energy they use -- by supplanting utility electricity with rooftop solar, for example. Energy efficiency standards have dramatically lowered the energy consumption of large appliances, and technology advances have reduced power consumption as well as the size of many electronic devices.

From smartphones to solar, the onslaught of new technology has reconfigured how Americans view energy use and consumption. It’s also flipped the calculus of utility companies in meeting energy supply. The crux of this new paradigm is that the cheapest new energy supply is energy saved through conservation and efficiency, not expensive new generation. The following chart illustrates the cost of procuring new kilowatt-hours of electricity from energy efficiency compared to new power plants.

## COSTS OF EFFICIENCY VS. NEW POWER GENERATION



\*Notes: Energy efficiency program portfolio data from Molina 2014; All other data from Lazard 2015. High-end range of coal includes 90% carbon capture and compression.

The economics of energy efficiency and renewables permeate the marketplace. For every \$1 invested in efficiency, utility customers [see between \\$1.24 and \\$4.00 in benefits](#), including smaller bills and avoided expenses tied to building new infrastructure. That frees up substantial savings that can be spent elsewhere, stimulating the local economy.

Utilities can and must embrace a new way of doing business that favors energy efficiency and renewables, starting with a tool that enables all customers to choose lower energy costs. This inclusive financing tool is called “on-bill repayment.”

## A Powerful, Universal Tool: Inclusive On-Bill Repayment

Since debuting more than two decades ago, an inclusive financing strategy -- on-bill repayment -- is [steadily taking hold](#) around the country.

The program requires either the utility or a private lender to cover the upfront costs of qualifying home energy improvements, to be reimbursed by the customer over time. Charges for the upgrades appear as a line-item on customers’ monthly bills, simplifying the repayment process for both sides and increasing transparency.

# How Does On-Bill Repayment Work?



1. Ms. Johnson hears about a chance to get insulation and a new furnace.

2. Utility visits Ms. Johnson to provide the best solutions, offering financing, and provide qualified contractors.



3. House is made more comfortable, monthly **energy costs drop**.



4. Energy bill goes down.



Well-designed tariffs set up a system where whoever lives at the property pays for -- and directly benefits from -- the more efficient home or rental unit.

Under the tariff model, customers carry no lien or debt associated with their improvements. They get instantly lowered electric or gas bills, plus a more comfortable and sustainable home. If the upgrade (like a new furnace) fails and is not repaired, they don't make payments until it is (in some programs).

The model leverages a tool refined through years of use, with [established guidelines](#) and best practices. On-bill repayment programs have been successful, [serving more than 230,000 utility customers](#) across the U.S. and injecting \$1.8 billion into improvements for customers' homes and businesses.

Roanoke Electric, based in North Carolina, runs one of the existing programs. It initially sought to boost customers' energy efficiency with improvements financed using loans, but that model required customers -- many with low incomes and shut out of more traditional financing -- to receive loan approval and take on debt. Roanoke contacted 1,000 of its customers about the program, but fewer than 10 signed up.

The utility blamed the lackluster debut on customers' poor credit histories and reluctance to shoulder new debt. It has since implemented a tariff-based framework that is demonstrably more effective. After tweaking its model, the utility reports, customer interest -- and results -- gained substantial momentum.

While inclusive financing doesn't solve the problem of *motivation* to invest in efficiency or renewable energy, it removes most of the financial barrier for those who want to participate.

## Program Design

The capital for energy-saving or energy-generating improvements can come from the utility itself or from a third party. In general, utilities can source capital for loans or tariffs from private capital markets or public financing facilities.

Stitching tariffs into energy efficiency programs was a relatively novel idea just a few years ago, recognized in [a 2014 report](#) as a potential “game-changer” because they help avoid overly stringent third-party lending standards. Of the 30 on-bill programs examined in the report, 10 offered line-item billing and 13 offered on-bill loans, while just seven leveraged on-bill tariffs. For a breakdown of information on those programs, see the data in [Financing Energy Improvements on Utility Bills](#) from SEEAAction.

Multiple active on-bill repayment programs use bill payment history as the primary underwriting standard for participation. This approach accurately accounts for the risk tied to those programs, and opens them to more customers, especially those who can't afford or qualify for consumer loans. Of the 30 programs listed in the report, just one relied solely on traditional underwriting criteria to vet applicants. In turn, it [rejected over eight times as many](#) would-be participants as other initiatives that focus instead on utility bill payment history.

Investor-owned, cooperative, and municipal utilities can all implement on-bill repayment for energy-saving improvements. With a tariff-financed model, the utility owns the improvements until it recovers the cost through a set repayment plan, then the customer takes ownership. Because tariffs are tied to the meter and an individual customer, the payments and upgrades transfer to the current occupant of a given property.

As a condition of participation, utilities can require customers to keep the upgrades operational. Those pursuing more efficient air conditioning systems, for example, would be responsible for changing filters. Paying monthly utility bills can be considered part of that agreement.

If new energy-efficient equipment stops working or underperforms, the customer could stop payments on the product unless the utility -- likely through the contracted installer -- determines why it failed and a plan to fix it. The measure protects customers, but the risk for utilities is also low when eligible improvements include proven technologies and certified contractors.

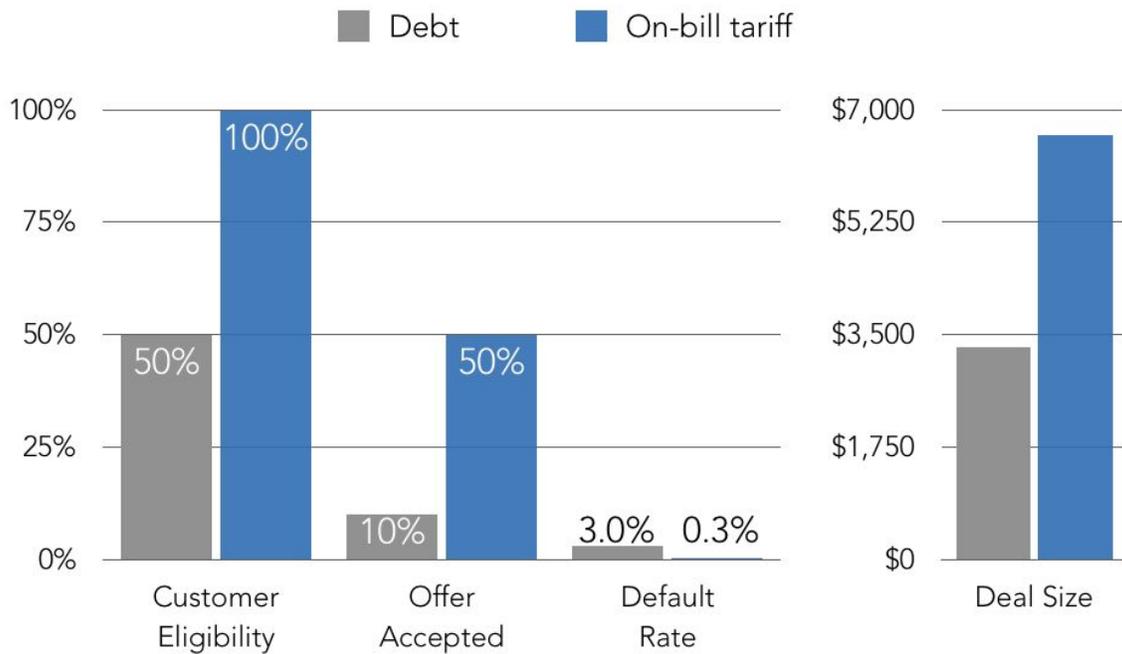
## Key Results

There are a range of options for implementing on-bill repayment. Not all of them improve access for traditionally under-served customers. If properly designed, however, on-bill repayment can deliver immediate cost savings, allow near-universal participation, remove financial and

non-financial barriers, and provide deeper energy and cost savings than traditional energy savings programs.

The following chart illustrates several of these benefits, comparing inclusive financing via on-bill repayment to traditional consumer-loan-based financing for energy efficiency.

## BENEFITS OF ON-BILL REPAYMENT

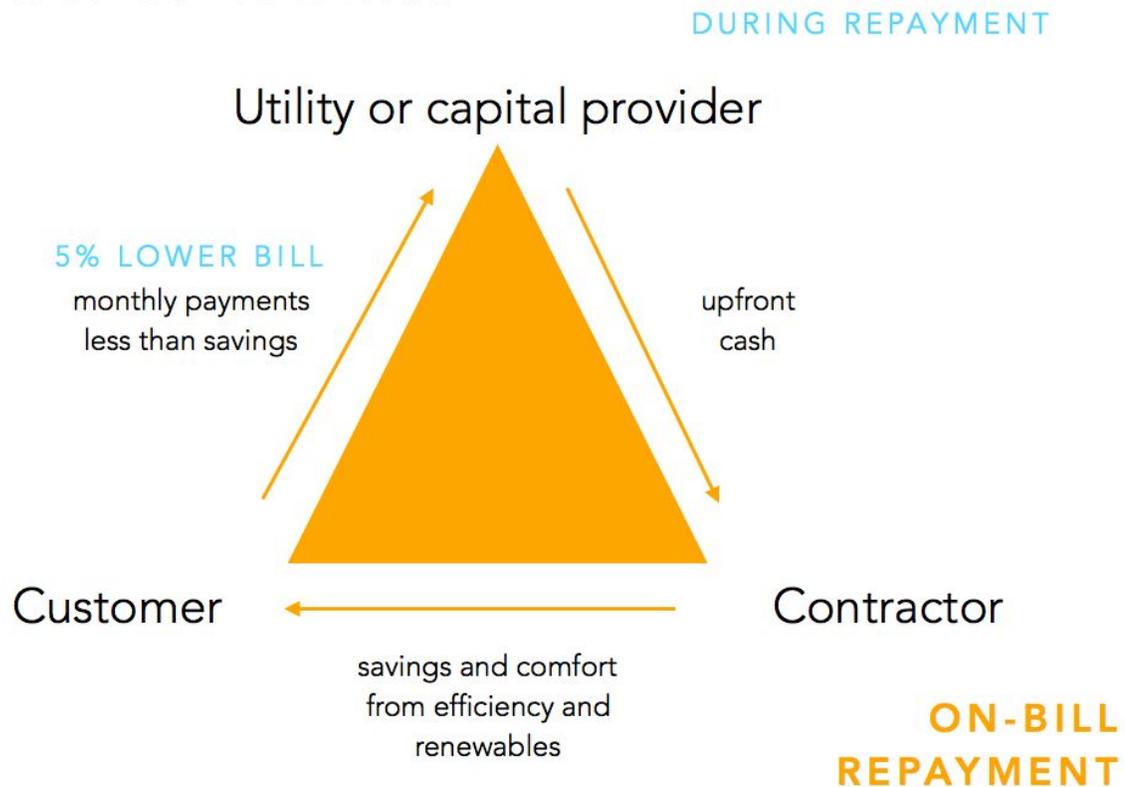


Source: Clean Energy Works

### Instant Savings

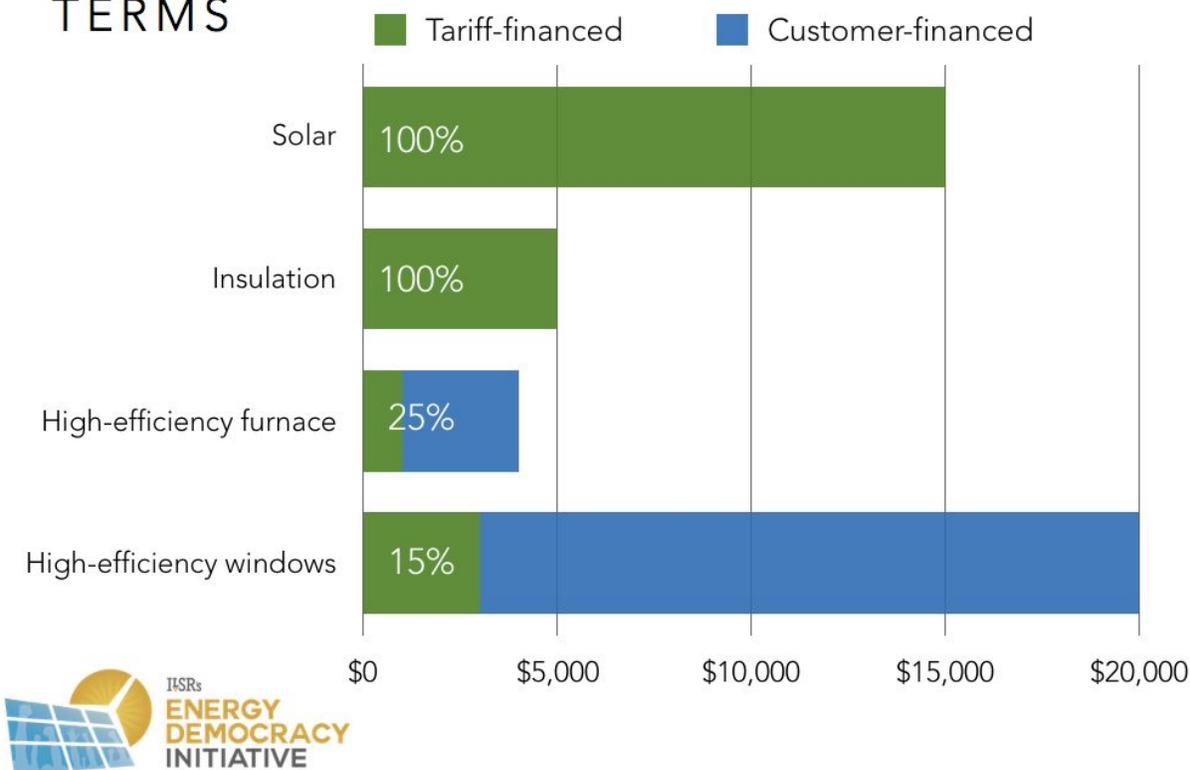
On-bill repayment can deliver immediate financial benefits to customers by supporting cost-effective energy improvements and by structuring the payback term to reflect the life of upgrades. In the following graphic, for example, the customer's energy bill initially falls by 5% -- the net effect of the energy savings and the payback costs. After the customer pays off the investments, however, energy savings can rise to 25% or higher.

## HOW IT WORKS



Choosing cost-effective measures represents a balance of customer interest and utility knowledge. Midwest Energy, a cooperative serving Kansas member-owners, helps [finance the full cost of projects that yield significant savings](#), but only part of the cost of projects (such as new windows) that have a lesser impact on energy use. The following chart illustrates in generic terms how a program might be structured for a variety of measures. Solar and insulation that generate substantial energy savings can be fully financed via the tariff. Since only a portion of the investment in a furnace or new windows has related energy savings, the tariff only covers that portion.

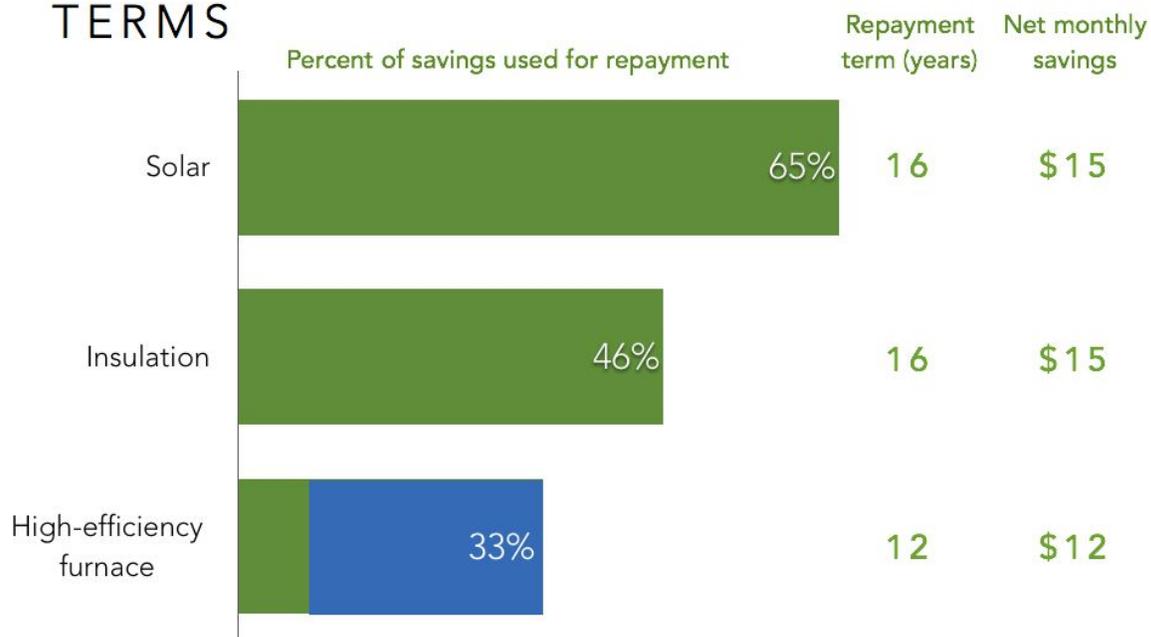
## STRUCTURING ON-BILL REPAYMENT TERMS



Setting the repayment window is also important, both to ensure that improvements are paid off before their useful life expires, and also to reduce monthly payments. Utilities can calculate repayment plans that allow customers to generate savings even as they pay down the cost of their energy upgrades. As a general rule, programs are designed to pay off measures within 80% of their useful life, and to use no more than 80% of the bill savings to pay them off.

The following chart illustrates repayment terms for three common items: solar PV, insulation, and a new furnace. The data is based on 3% interest on tariffed costs, repaid over 80% of the useful life of each item, and the net monthly savings.

## STRUCTURING ON-BILL REPAYMENT TERMS



■ Tariff-financed

■ Customer-financed

On-bill repayment programs don't have to provide financing terms that deliver immediate savings, but without them, few of the customers currently left out will come off the sidelines.

### Universal Access

By using a utility tariff rather than a loan as the financing mechanism, on-bill repayment programs can avoid the sins of other energy savings programs that restrict access to those with prime credit scores. Credit-based programs, often paired with utility rebates, lock out less-affluent customers, leaving them to effectively subsidize wealthier customers' use of the incentives.

A tariff-based program, on the other hand, uses a time-tested method of applying charges to a customer's utility bill to pay for system assets. Tariff is another word for charge, and utilities have many tariffs -- such as charges for fuel costs, environmental compliance, or transmission lines. The on-bill repayment tariff differs in being *voluntary*, but fundamentally it is just another part of an electric or gas bill.

There are several advantages to a tariff-based program. First, repayment obligation is typically tied to the *property* and not the person. This allows customers to make investments that may outlive their residency at the property, with the confidence that they won't be stuck with the tab if they move. It also means that a history of on-time utility bill payment is a more appropriate gauge of repayment than a credit score, which reflects the current, and not future, resident.

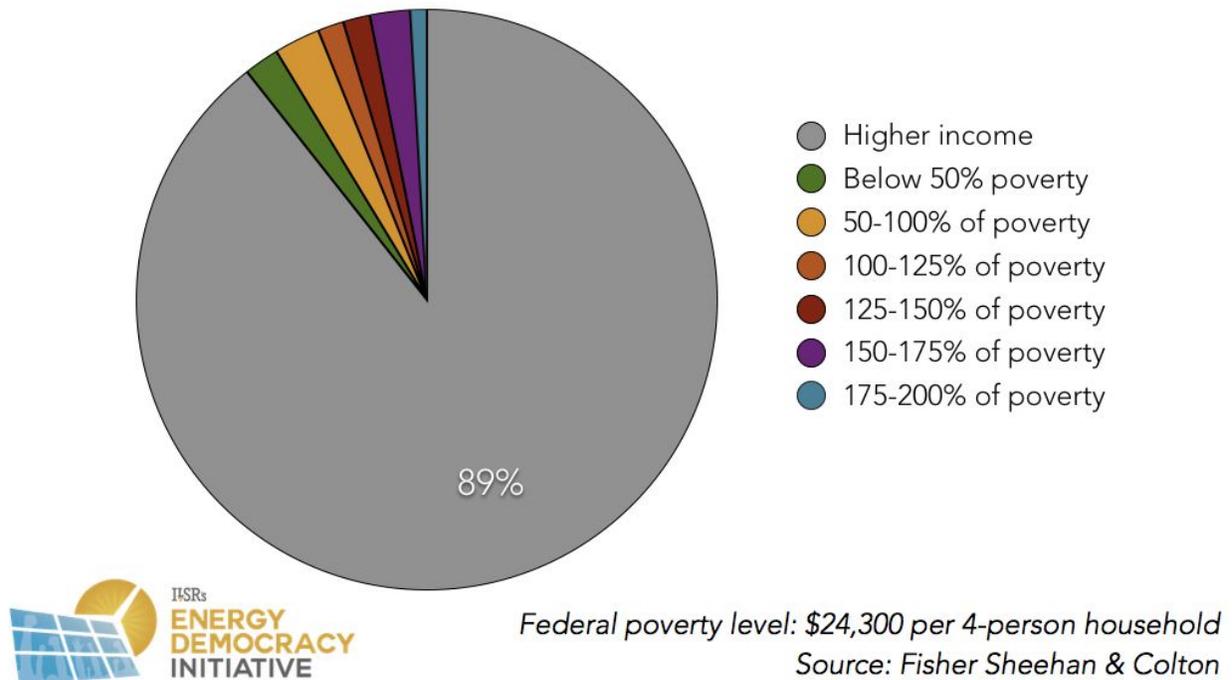
Additionally, the energy savings or production from high-efficiency furnaces or rooftop solar provide more energy for the utility -- just as the power plants and pipelines they finance using tariffs. The tariff is the tool, and allowing customers access to that tool makes sense if they provide the system with similar benefits.

*Although a tariff is more straightforward, on-bill loan programs in South Carolina (and soon in Holland, MI) capture the key elements of a tariff-based program. The loan qualification is based on bill payment history and not the customer's credit score, and the loans may be transferable to the new owner. Laws in both states direct loan programs to be structured in this way.*

*The energy savings or production from high-efficiency furnaces or rooftop solar provide more energy for the utility -- just as the power plants and pipelines they finance using tariffs.*

The tariff-based model lets customers participate who would otherwise be unlikely to have access to financing for energy improvements, including many energy-burdened low-income households. The following chart shows that over 10% of Minnesota's population qualifies as energy-burdened, for example.

## OVER 10% OF MINNESOTANS ARE ENERGY-BURDENED



On-bill repayment can also improve energy savings options for renters by allowing tenants (who pay their utilities directly) to access financing, or by helping rental property owners access on-bill repayment. That's especially important in urban areas with a high proportion of rental properties, and for renters who typically have little incentive to invest in energy savings measures in a property they do not own.

In Minneapolis, for example, owner-occupied homes comprised [just 48.6 percent](#) of the housing stock between 2010 and 2014, according to the most recent Census data available. That means most are rentals, virtually untouchable under less progressive on-bill repayment policy. Plus, the city is adding rental units to the mix -- [it permitted 141](#) in July 2016 alone, continuing steady expansion.

### Simplicity

On-bill repayment programs provide a simpler path to energy efficiency and renewables, like rooftop solar, rather than forcing customers to navigate the complicated process of finding financing on their own. Better on-bill repayment programs incorporate efficiency assessments

and contractor recommendations to help customers discover and vet their options, but these elements are not included by definition.

## Bigger Savings

Research by Clean Energy Works shows customers offered on-bill repayment instead of a consumer loan tend to invest twice as much in energy improvements. While price isn't necessarily an indication of energy savings, it suggests on-bill repayment stimulates deeper investment. Because most customers aren't likely to subject themselves to the disruption of multiple energy retrofits to their property, tariff-based on-bill repayment programs can result in larger energy savings than loan-based programs.

On-bill repayment programs are useful for customers considering a wide range of cost-effective home improvements. The financing arrangement accommodates customers pursuing top-to-bottom retrofits as well as those living in older homes that [only allow for smaller-scale improvements](#). In each case, on-bill repayment simplifies the process simpler and makes it more accessible.

## Low Default Rate

A synthesis of various on-bill programs in place throughout the U.S. showed a [default rate below 1 percent](#) -- far below the typical consumer loan default rate -- disrupting conventional wisdom that bill-related financing is risky or that it spurs less-reliable bill payment. In other words, utilities or their capital providers face minimal risk in fronting efficiency (or renewable) upgrade costs.

In fact, tariff-based financing illustrates how poorly consumer loan standards reflect the likelihood that a customer will pay back energy-saving investments. Unlike car loans, for example, investments in energy efficiency or solar *make money*. A credit score estimates the likelihood of paying back borrowed money in general, not the likelihood of continuing to pay a utility bill after it shrinks.

Midwest Energy in Kansas, which has one of the most established on-bill repayment programs, has vetted gas and electric efficiency upgrades for 2,500 properties. More than half of those customers opted into the program, pushing the total value of improvements past \$8 million. Despite the expansiveness of the program, the utility's cost recovery rate is [above 99.9 percent](#).

Tariff-based financing illustrates how poorly consumer loan standards reflect the likelihood that a customer will pay back energy-saving investments. Unlike car loans, for example, investments in energy efficiency or solar *make money*.

A win-win financing framework hinges on *relevant* screening criteria, like bill payment history. That way, the utility gets certainty without arbitrarily cutting out customers who pay their bills on time as they work to rebuild their credit.

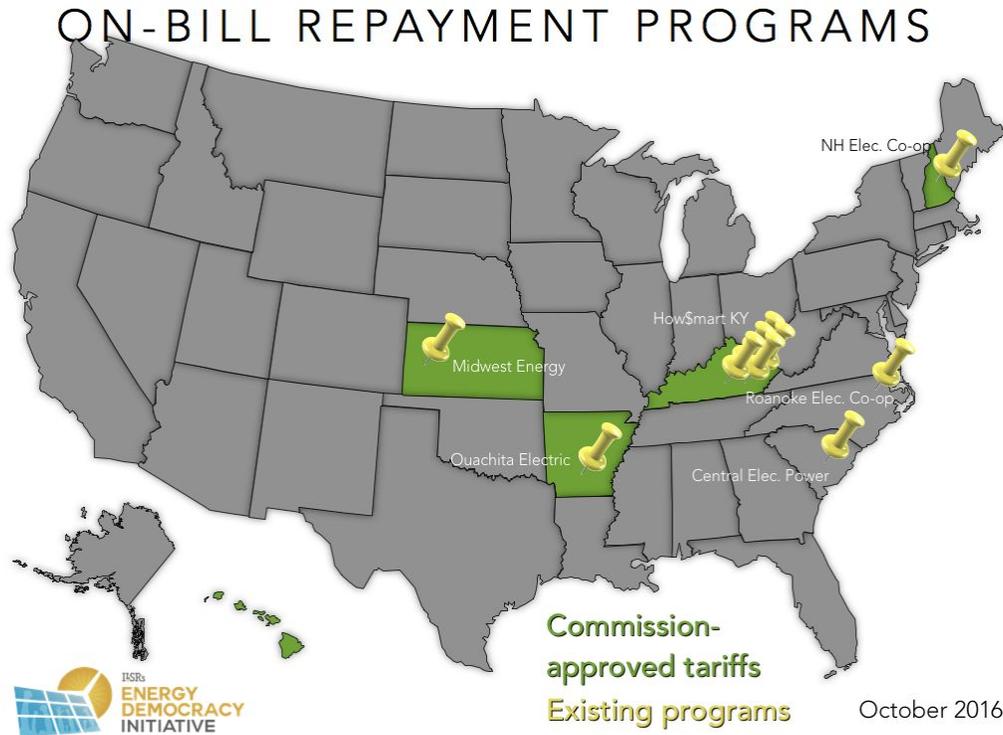
If on-bill repayment programs carry low default rates, then program administrators have the freedom to offer [more attractive financing](#) to expand access. Lower interest rates and longer loan terms could entice a wider array of customers to explore energy-efficient improvements, because the program could be more flexible in addressing their specific needs.

## A Time-Tested Tool

Tariff-based on-bill repayment allows utilities to tap into [a familiar method](#) to expand investment in measures that curb energy use and customer costs. The tariff structure represents an agreement with customers to recover costs initially paid by a utility. Historically, energy providers have used them to pay for new power plants, power lines, or pipelines.

In on-bill repayment programs targeting customer-sited energy efficiency and renewables, a tariff functions similarly by providing the utility with more energy capacity (by reducing on-site energy use) in exchange for the upfront capital. It differs in that repayment is provided by a single customer (who receives the energy improvement) rather than all customers. Because energy efficiency tends to be the lowest-cost energy resource, and because on-site energy generation has such [high value](#), all customers benefit from capital invested in anyone's home or business.

Put simply, utilities make investments for system-wide benefit, this time earmarked for customer-sited efficiency and renewable energy upgrades. Customers return the cost of those investments with interest. The utility cashes in on modernized, efficient infrastructure, while the customer reduces their energy costs.



For answers to questions about implementing on-bill repayment from the utility perspective, see [this Q&A from Pay-As-You-Save](#).

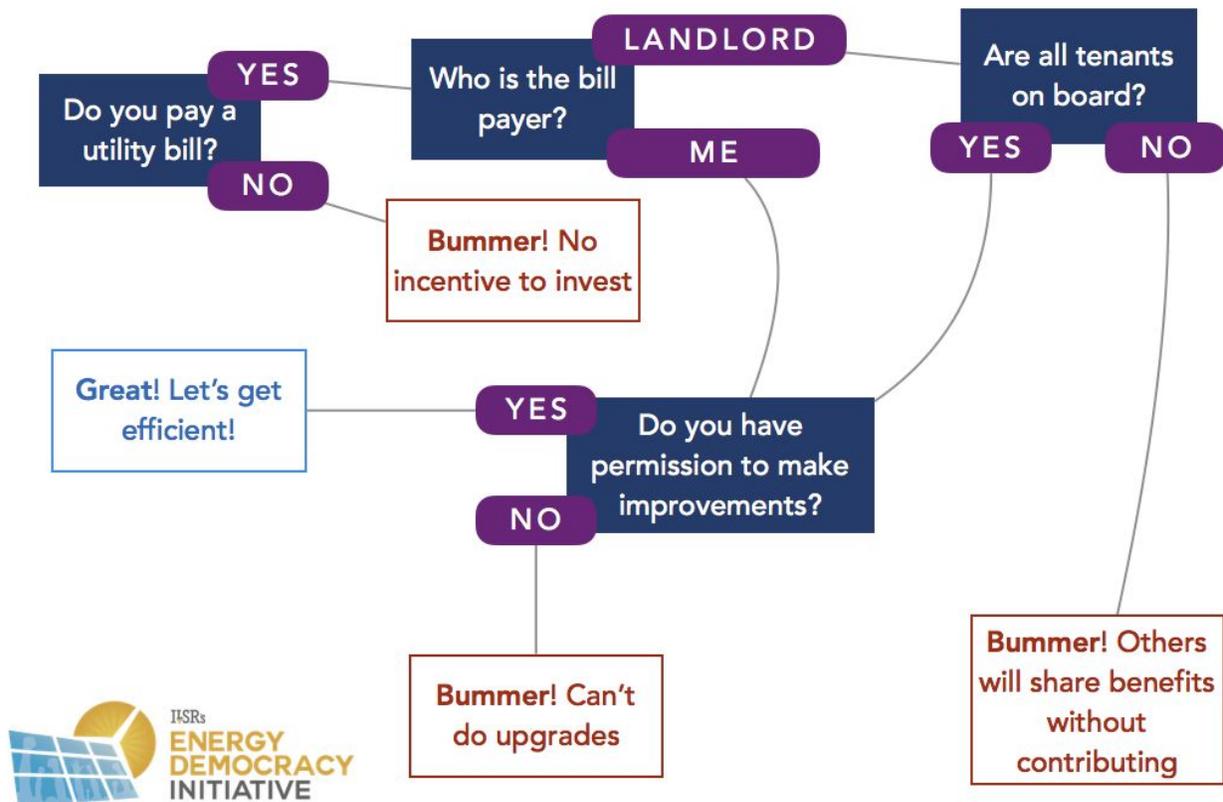
## A Caveat About Renters

As noted previously, a major challenge in expanding energy savings to low-income and energy-burdened households is the high proportion of such families that rent. Although any participant can benefit from the removal of financial barriers to energy efficiency and renewable energy, there are remaining barriers for renters.

In the best case scenario, a renter is in a unit that is individually metered for gas and electricity use, so that there's a clear mechanism to bill them for improvements and a clear bill on which to see the savings. Even in that scenario, however, the renter may need permission to complete improvements or may not have the option to replace a heating or cooling system that serves multiple units.

In a more typical scenario, there may be only a single gas or electric meter serving the entire property. The renter may not pay utility bills at all or may pay a simple proportion of the bill. In the former case, the renter has no incentive (beyond comfort) to make energy-related improvements. In the latter case, the renter would have to share savings from any investments with other residents, regardless of whether others have contributed.

## CHALLENGES REACHING TENANTS



The solution is to motivate landlords to take advantage of on-bill repayment. There are a number of interesting ways to change the rules to make this possible:

- As many cities have done with commercial property, require energy benchmark scores for rental properties, motivating tenants to shop for properties with lower energy costs and landlords to reduce energy consumption
- Use municipal rental licensing rules to motivate landlords to make energy efficient improvements by, for example, lowering licensing costs and reducing review frequency for those that do
- Allow a critical mass of renters in a property (e.g. one-third) to require landlord action on energy improvements if an on-bill repayment program is available

## Inclusive Financing in Practice

### Roanoke Electric Cooperative

North Carolina-based Roanoke Electric has a [high-performing on-bill repayment program](#), which it runs through a wholly owned subsidiary. To date, the program has tackled upgrades in 120 of its members' homes and the utility reports an average cost of \$6,900 -- less than the \$7,500 average price tag it expected to see.

Participating customers have seen average net savings of \$58 per month on their energy bills as they pay the monthly repayment charge, with gross savings of about \$120 per month. That translates to \$1,440 per year, a substantial gain especially for those in lower income brackets. The program has helped reverse customers' unfavorable perception of the utility, informed mostly by their high bills.

Program benefits extend to the utility itself. Roanoke Electric reports paying a lower demand charge for the supply of power it purchases, thanks to greater efficiency among its customers. By all metrics, the utility says the program has beat its expectations -- especially notable after its initial loan-based program got off to a disappointing start.

### Ouachita Electric Cooperative

After implementing a tariff-based on-bill repayment program, Ouachita Electric [saw a surge of interest](#) from its customer base in south Arkansas. In the first three months, the number of customers seeking efficiency assessments -- a precursor to improvements -- doubled from 73 to more than 162.

As of August, [100% of multifamily and rental units](#) offered a chance at the program have opted in. Meanwhile, 92% of single-family customers signed on. The program provides a much-needed pathway to energy efficiency and savings in a poverty-plagued area. Without it, many customers, unable to cover the upgrade costs themselves, pay \$300 or more per month to keep their lights on.

Using smart meters, Ouachita carefully tracks cost savings. It has determined that the program lowers its demand charges and will, in the long run, curtail the need to add expensive new generation capacity.

## Conclusion

Inclusive financing offers proven benefits for both utilities and the communities they serve. Tariff-based on-bill repayment programs in particular can bridge troubling gaps in today's energy marketplace, bolstering energy efficiency and renewables for all customers.

Many existing programs fall short, especially for low-income households facing the heftiest utility bills. Well-designed finance programs, accessible across the board, can provide a meaningful economic boost at the individual and community scale.

On-bill repayment is a natural step for utilities and customers committed to increasing energy efficiency and promoting renewables. Its demonstrated success in markets across the U.S., especially those serving high concentrations of low-income customers, showcases its potential for meaningful economic impact.

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