Quantitative Energy Equity

How utilities can create cost-effective, adaptive and targeted energy equity programs

The Essence

▶ There is a significant equity gap in customer energy bills but many utilities have incomplete data on the scale and extent of the problem

▶ Energy equity metrics quantify performance and progress of energy assistance programs

▶ Utilities can meet greater energy assistance need without increasing program budgets through data-driven program delivery

▶ Relying on a quantitative framework for delivering energy assistance programs gets the right assistance to the right customers

empower dataworks

ABOUT THE AUTHORS

EMPOWER DATAWORKS LLC is a boutique consulting firm that specializes in data and engineering analytical services. We help utilities achieve their clean energy and equity goals.

Empower Dataworks is proudly headquartered in Central Washington and works with clients throughout the US and Canada.

For more information, contact:

hassan@empowerdataworks.com
lacy@empowerdataworks.com

Or schedule a call:
https://www.empowerdataworks.com/about/#contact

CORE TEAM

HASSAN SHABAN

Hassan has a data science background in both the supply side and demand side of the energy industry, including energy efficiency program implementation, evaluation and power plant operations. In a previous life, he worked on IoT applications in nuclear power plant safety and monitoring.

Hassan holds a Ph.D. in Mechanical Engineering from the University of Ottawa and a B.Sc. in Mechanical Engineering from Alexandria University.

LACY STOCKTON

Lacy brings notable technical capacity as an experienced marketing and process optimization specialist. In addition, she has a multidisciplinary background centered around the built environment with a focus on sustainable development, energy management and green building practices.

Lacy holds three Bachelor's degrees: Community and Environmental Planning from the University of Washington, Mechanical Engineering and Computing Technology from the University of Ottawa.

EXECUTIVE SUMMARY

For low-income customers, energy bills as a portion of income are three times higher than for the average customer. The shift to customer energy solutions like solar and batteries, smart homes and high-efficiency equipment is an exciting trend. But it is also expanding this equity gap because low-income customers cannot afford the capital expenses of these technologies so they cannot realize the benefits.

Utilities have been running various forms of energy assistance and low-income programs for decades, but the need is outpacing the current program capacity. Utilities can optimize the impact of their programs, without massive budget increases, by using data-driven strategies for program planning, design and delivery.

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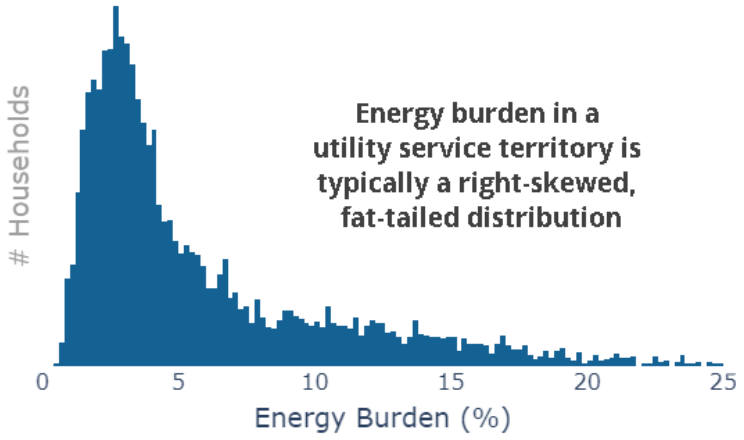
Six Key Energy Equity Concepts

Energy equity is more complicated than it first sounds. And just to keep things interesting, it can also mean very different things to different people.

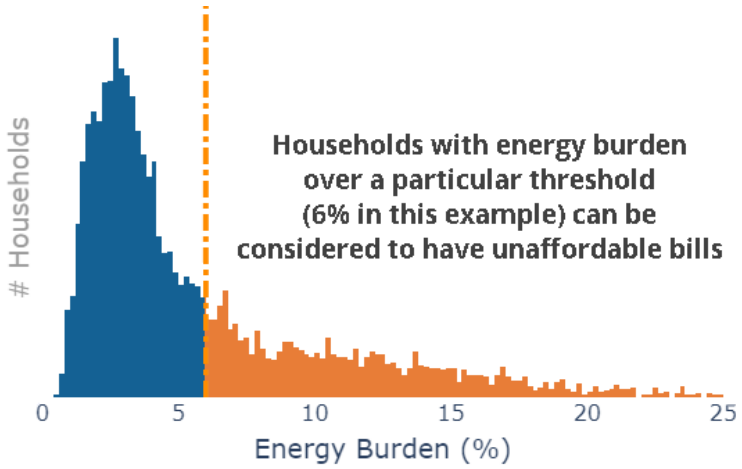
In general, a high level of energy equity means that customers across a utility service territory *share the costs and benefits* of the grid relative to their usage and have access to affordable energy. Let's unpack this by looking at some of the key concepts and definitions surrounding energy equity.

Energy Burden: Energy burden is the ratio between annual energy expenses and gross annual income for a household. It is a percentage that typically ranges from close to zero to over 15%. In a given service territory, the distribution of energy burden among customers is usually heavily weighted towards the left (low energy burden) and has a long tail consisting of the lowest-income, highest burden households.



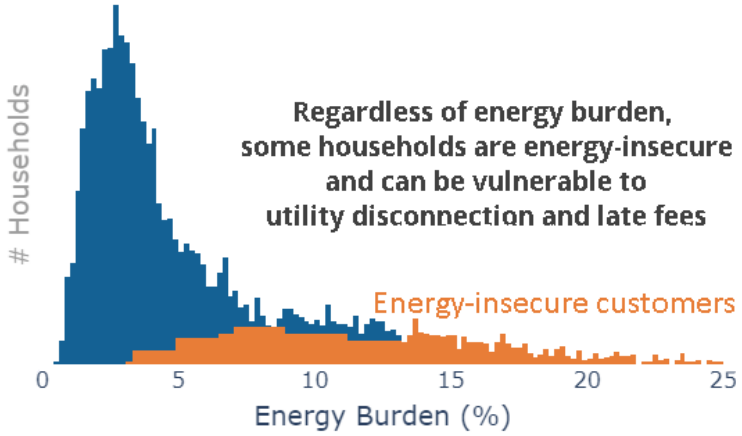
Energy Affordability: Energy affordability is an indicator of whether energy costs are low enough to allow a household to pay for other basic needs (food, shelter, clothing and medical care). Two households in different parts of the country can have identical incomes and energy costs, but one of them could consider their energy costs unaffordable if the cost of living is relatively higher in their area.

A quantitative way to capture energy affordability is by setting an energy burden threshold that is specific to a particular area. If the energy burden for a household exceeds this threshold, then their energy costs are considered unaffordable. In essence, this serves as a quantitative proxy for energy affordability.



Energy Insecurity: Energy insecurity is related to the vulnerability of a household to making delayed bill payments, having late payment fees and being disconnected from utility services.

In general, we can expect energy insecurity to be highly correlated with energy burden. But this correlation is not perfect; households with low energy burden can have high energy insecurity due to external factors (job loss, high medical bills etc.), while households with a high energy burden can have a low level of energy insecurity if they have access to energy assistance programs. Energy insecurity can be much more subjective than energy affordability and burden, so it is more difficult to quantify.



Energy Poverty: Energy poverty is defined by the U.N. Development Program as the *"inability to cook with modern cooking fuels and the lack of a bare minimum of electric lighting to read or for other household and productive activities at sunset."* The Energy Information Administration has estimated that half a million Americans, mostly in U.S. territories or on American Indian reservations, live without access to basic electricity services.

Energy Assistance: Energy assistance is a blanket term that encompasses initiatives and programs aimed at reducing energy insecurity and burden, and increasing energy affordability. These typically take the form of *direct cash assistance* (bill discounts, low income rates, donation programs, crisis assistance), *conservation* (low income energy efficiency, weatherization) or *arrearage management* (payment plans that assist customers with repayment of overdue energy bills).

Energy Assistance Need: The total dollar amount of unaffordable customer energy bills. In other words, it's the portion of customer energy bills that exceed a set energy burden threshold on an annual basis. If you could cut a check and bring all customer energy bills to an affordable level for each customer, how big would that check need to be?

Each utility's energy equity and needs landscape is different, and its energy assistance strategy should be optimized for its unique situation. Step one is to **decide where to focus**: energy poverty, affordability, insecurity or overall energy burden. Then, utilities can build a business case for specific energy assistance programs and judge their feasibility and ROI.

The Business Case
for Utility Investments in Energy Assistance Programs

Energy utilities are businesses. Their core mission is to maintain grid infrastructure to supply safe, reliable power services to their customers.

Implementing energy assistance programs can be viewed as straying from their core technical competencies and mission.

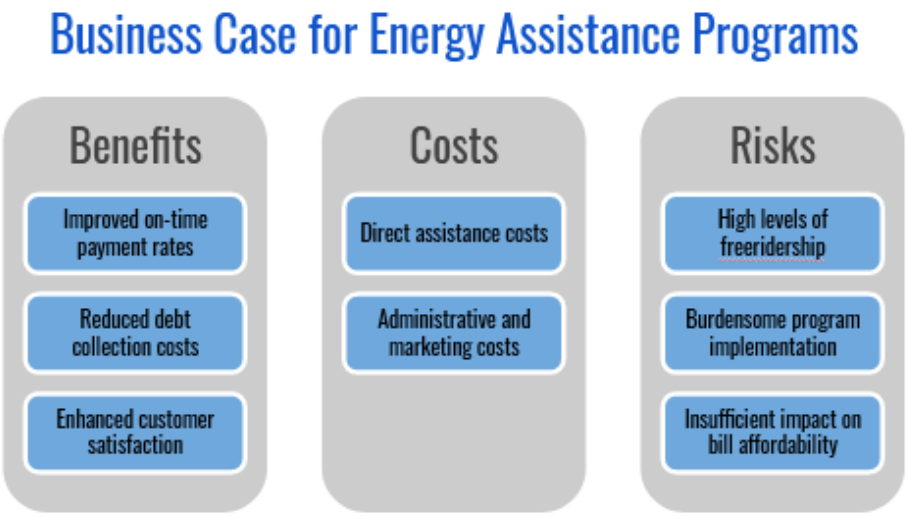
However, many utilities run energy assistance programs for a variety of reasons. Some utilities have regulatory mandates to run energy assistance programs. Others provide additional funds to community organizations that implement federal or state programs. Still others voluntarily run in-house programs because they see the value.

Mandates or otherwise, what is the business case for utilities to launch or redesign an energy assistance programs?

*Energy assistance programs have **two concrete value propositions**: improved payment rates and enhanced customer satisfaction*

Energy assistance programs are aimed at making energy bills more affordable for customers who experience a high energy burden with the ultimate goal of reducing late payments and disconnections.

Utility disconnections can be damaging to a utility's public image especially if they occur during periods of crisis or severe weather or if they affect a large number of disadvantaged customers. Disconnections also come with direct and indirect costs related to lost revenues, collections and administrative burden. Energy assistance programs help mitigate these issues with two concrete value propositions: improved payment rates and enhanced customer satisfaction.



VALUE PROPOSITION #1

IMPROVED PAYMENT RATES

Well-run energy assistance programs are not simply social justice projects that distribute financial benefits to low-income customers; they are a utility investment that allows low-income customers to make consistent payments for utility service, by reducing their energy burden.

The most direct financial benefit of energy assistance programs to the utility is to minimize arrearage write-offs and collection costs. Of course, the costs and resources associated with administering these programs should be in line with the magnitude of its benefits to the utility.

Reducing Late Energy Bill Payments through Prevention

Generally, prevention is better than the cure. Providing support to high-burden customers before they are late on payments is often more cost-effective in the long run than disconnections and debt collection.

Preemptive bill payment support need not be expensive. Light touch approaches like **targeted marketing** could help inform customers of available assistance programs and provide a needed buffer in their cash flow. Enrolling customers in **conservation programs** can also reduce their energy burden and reduce the size of large seasonal bills. Even simple, no-cost approaches like **equal payment plans or adjustable bill due dates** can go a long way to avoid late payments.

*Both prevention and intervention assistance measures can be **more cost-effective** for utilities than the status quo*

Mitigating Late Energy Bill Payments through Customer Interventions

For customers who are late on their bills, it is important to understand their unique situation and help them with the right kind of assistance.

For many customers, the inability to pay utility bills on time stems from temporary hardship (job loss, unexpected expenses etc.). This is a cash flow problem that can be addressed with **bill deferrals or arrearage management plans**.

Other customers experience a more sustained energy burden due to low incomes or inability to work. These can be assisted with **direct cash discounts or rate adjustments**.

Programs that are not targeted to specific customers can serve "free-riders"—customers who may be low income, but whose energy costs are not a significant portion of their expenses (that is, they do not have a high energy burden). Free-riders can meet their bill obligations without assistance and the resources devoted to them can be better utilized for the customers who are most in need.

Both prevention and intervention assistance measures can be more successful and cost-effective than moving down a path of late fees, service disconnections and collections, with a positive financial return for utilities.

VALUE PROPOSITION #2

ENHANCED CUSTOMER SATISFACTION

Customer satisfaction has become a key focal point for most utilities, driven by competition from customer energy solutions like solar and storage, as well as the presence of a competitive retail energy landscape in some jurisdictions. Happy customers trust their utility and are loyal to it over the long term.

Looking ahead, many challenges in the grid of the future require cooperation between utilities and their customers. Large industrial and commercial customers are more likely to positively engage with utilities that demonstrate high levels of corporate responsibility and customer care.

As a model for utilities, high customer satisfaction has been linked to trust in leadership, higher stock prices and higher credit quality for companies in many industries. This would translate to higher shareholder value for investor-owned utilities and long-term confidence in leadership for publicly-owned utilities and coops.

Energy assistance programs serve utility customer satisfaction goals

*Utility assistance programs **drive higher customer satisfaction** – not only for program participants but for all customers*

First, low-income customers who experience these programs first hand show strong appreciation for the assistance from their utility. Customers have long memories when it comes to customer service, good and bad.

A customer who remembers a seamless experience through their utility's energy assistance program has a very different experience than one going through the collections process or a service disconnection. These customers also tend to spread the word and enhance the reputation of the utility, while serving as free marketing for the assistance programs.

Secondly, utility customers in general look upon their utility more favorably when it leads energy assistance initiatives that have a societal benefit, as long as they

are run efficiently and do not waste ratepayer funds. Even better, customers are happy to support these initiatives when given the chance, as evidenced by the success of assistance programs based on customer donations in many utilities across the country.

So, what's the business case for a utility considering launching or revamping its energy assistance programs in a nutshell?

When the programs have clear objectives and when they are targeted at the right customers, they result in clear societal benefits. This makes **customers across the board happier and more loyal to their utility**, while reducing costs to the utility associated with bill delinquencies.

If your existing programs are struggling to achieve these goals in a concrete way or you cannot measure their effectiveness and reach, then your programs would benefit from an evaluation and redesign to meet your goals cost-effectively.

An Energy Burden Framework
for Quantifying Energy Equity

One major challenge with improving energy assistance programs is with defining what a "good" program is, whether it's for discount programs, low-income weatherization or arrearage management.

Some metrics are easy to calculate but don't actually tell you anything about the quality of the program.

- *We serve 5000 customers a year*. Participation is the quintessential vanity metric. How much of these customers' energy burden is actually reduced? Are those the right customers to be serving?
- *100% of participants are satisfied with our program*. Who doesn't like free, whether in the form of home upgrades or money? Is the high customer satisfaction being translated to an improved image of the utility more widely? Do customers even know the utility's role in the program?
- *Our annual energy assistance budget is $XX million*. Bigger isn't always better—are these funds being used cost-effectively? Could these funds be used in different ways for more persistent benefits?

Before developing metrics or KPIs, utilities should be crystal clear on the goals of their programs – steering clear from vague, unmeasurable benefits and vanity metrics.

The two main value propositions for energy assistance programs are improved on-time payment rates for low-income customers and enhanced customer satisfaction. These assume that the programs manage to improve energy affordability for program participants and that this impact is communicated to the utility's customers.

*Realizing the benefits of energy assistance programs starts with **demonstrating a reduction of energy burden** for high-burden customers*

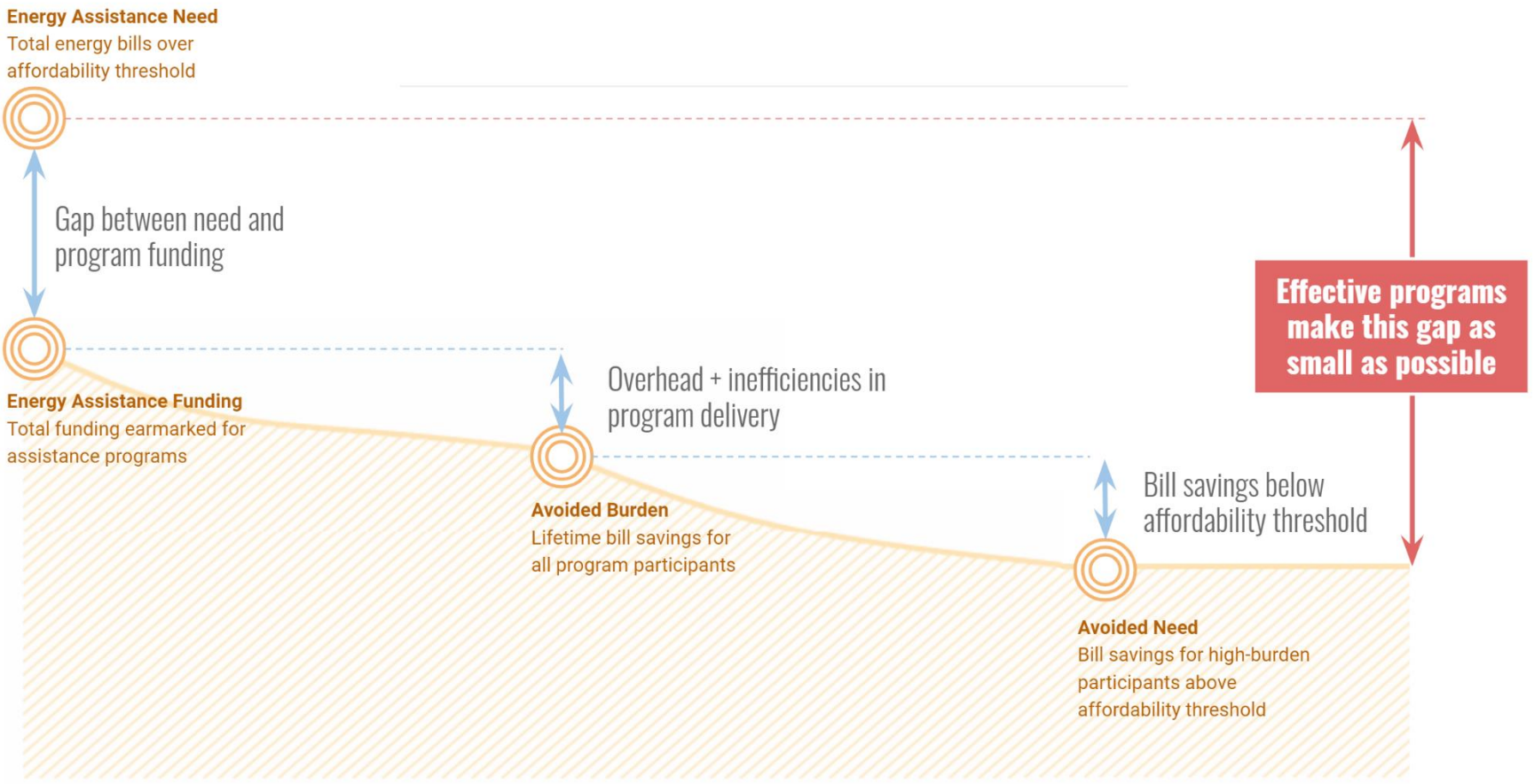
Utilities should use **simple metrics tied to energy burden reductions** that can be quantified and tracked to drive concrete improvements to programs.

WHAT PROBLEM ARE WE SOLVING?

Our goal is to reduce **energy assistance need**. In other words, we don't want high-burden, low-income customers to spend more than a certain percent of their incomes on energy (this threshold can be anywhere from 4% to 10%). To get a clear picture of program performance, we need to calculate four values (see image below):

Energy assistance need is a single dollar value that can be calculated for a service territory and tracked year-over-year. Some approaches to calculating this number are discussed in a later section.

In most areas, the total **energy assistance funding** that is available to customers is some fraction of the energy assistance need. But funding levels by themselves do not capture the success of a program. You could theoretically dump millions of dollars in a program and not affect energy assistance need by a single dollar, because the funds aren't reducing energy burden for high-burden customers. This takes us to the concept of avoided burden.



Energy assistance programs should consider four main quantitative metrics to identify areas of improvement

Avoided burden is the *actual* dollar reduction in customer energy bills resulting from energy assistance programs. This can be lower than the total energy assistance funding due to overhead expenses or the installation of non-cost-effective conservation measures. This number is an output of program impact evaluations. Ideally, it would be calculated annually or every couple of years, but, unfortunately, many assistance programs rarely, if ever, get evaluated.

This is not the end of the story. Remember, as utilities, we're trying to help payment-troubled, high-burden customers, not simply offer free cash and home upgrades to low-income customers. So the final value we need to calculate is the **avoided need**. This is the avoided burden specifically for high-burden customers and can easily be calculated from program data. It's usually much smaller than avoided burden because most low-income programs do not target high-burden customers.

PROGRAM EFFECTIVENESS METRICS

Using this energy burden framework, effective energy assistance programs have a high level of avoided need and demonstrate continuous progress by shrinking the gap between avoided need and total energy assistance need.

We can express this energy assistance to avoided need gap with three ratios. Each ratio represents a lever we can use to improve our energy assistance program effectiveness.

Funding Ratio: the ratio between energy assistance funding and energy assistance need

Operational Effectiveness: the ratio between avoided burden and energy assistance funding

Targeting Effectiveness: the ratio between the avoided burden and avoided need

Three Levers of Effectiveness

$$\text{Avoided Need} = \text{Total Need} \times \left(\frac{\text{Assistance Funding}}{\text{Total Need}}\right) \times \left(\frac{\text{Avoided Burden}}{\text{Assistance Funding}}\right) \times \left(\frac{\text{Avoided Need}}{\text{Avoided Burden}}\right)$$

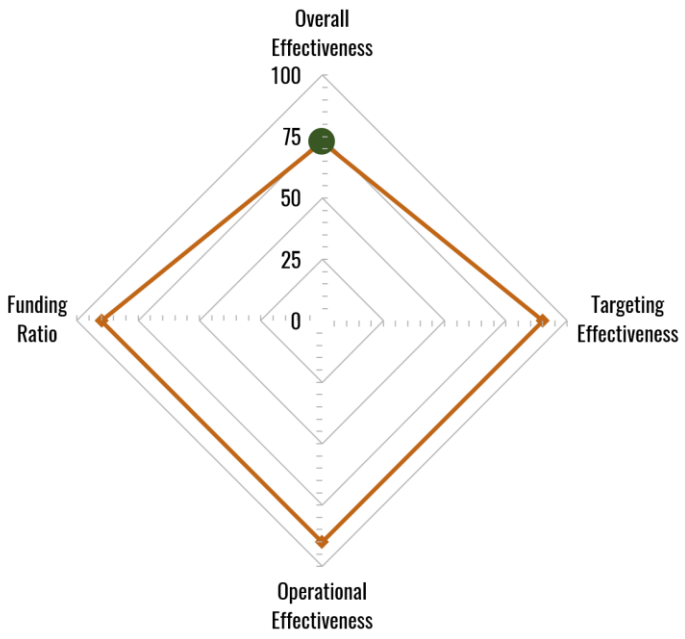
Funding Ratio — Operational Effectiveness — Targeting Effectiveness

Overall Effectiveness

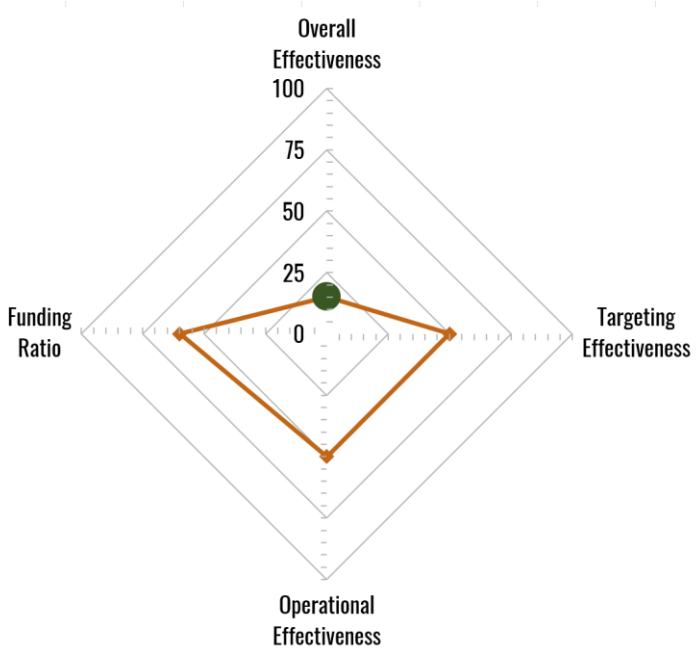
These three ratios multiplied by each other yield the **Overall Program Effectiveness** at reducing the energy burden of high-burden customers.

So, we have three levers to create a great energy assistance program: *increase funding, improve efficiency of operations and effectively target high-burden customers.*

A great program has enough funding, streamlined operations and is designed to target high-burden customers. It looks like the following (with the height of the green circle indicating overall effectiveness):



Most programs, however, have insufficient funding and aren't particularly intentional about targeting or operational effectiveness. Three small ratios multiplied by each other result in a much smaller overall effectiveness.



HOW DO WE GET TO THE GOLD STANDARD OF EFFECTIVE ASSISTANCE PROGRAMS?

By influencing the three levers: funding, operations and targeting.

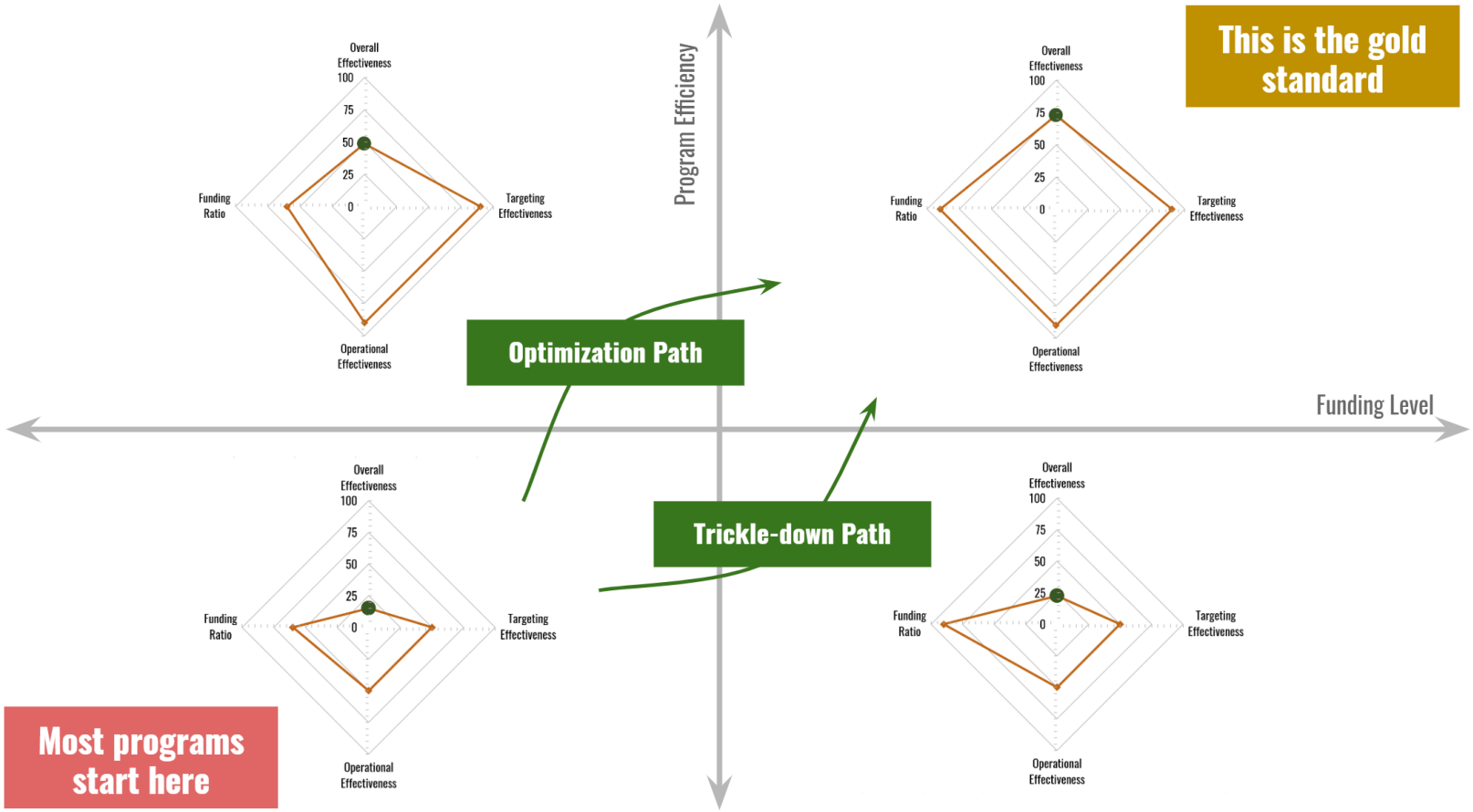
Unfortunately, **the default reaction is to use the funding lever** by pumping more money into program budgets whenever a utility or program administrator considers doing more for low-income customers.

If the programs are inefficient, when we rely on this option, we are hoping for a *"trickle-down"* effect. Funds are injected in the program budget. Some of it will be spent on program administration, operations and customers who don't need the assistance. Only a portion of the additional funding will eventually make its way to the right customers. Most of these funds aren't actually addressing program goals.

Another alternative is to leave program budgets unchanged and instead divert some of the funds to doing things smarter by optimizing operations or targeting high-burden customers.

Operational effectiveness encompasses things like program workflows, marketing, customer service, choice of incentive levels and measures, performance tracking and KPIs, among others. **Program evaluations**, when well-executed, can yield valuable insight and actionable recommendations for improving operational effectiveness or even guiding a full program (re)design.

Improving targeting effectiveness requires a comprehensive understanding of the demographic and geographic characteristics of high-burden customers to guide targeted marketing and outreach approaches. This can be accomplished through **low-income needs assessments**. Program designs can also support the purpose of targeting by designing incentive or discount structures that are better aligned with energy burden. **Integrated marketing** that intentionally focuses on key customer segments is also vital to improving overall program targeting effectiveness.



Energy assistance programs have two paths to reducing customers' energy burden: spend more money or optimize current programs

HOW DO WE CALCULATE PROGRAM EFFECTIVENESS METRICS?

Metric #1. Energy Burden

The calculation of energy burden requires data on the annual energy bills and gross income for a group of customers or an entire service territory. These can be obtained from census microdata (for example from the American Community Survey), from customer surveys administered by the utility or by using a combination of utility billing data and customer-level demographics (from customer data aggregators).

In most cases, some level of modeling will be required to fill in data gaps, but the degree of modeling will vary based on the extent of available data. For example, census microdata covers less than 5% of customers in a service territory and requires extensive modeling, while utility data requires minimal modeling.

Metric #2. Affordability Threshold

Once energy burden has been calculated, you need to determine a threshold value above which a customer would be considered to have "high energy burden" for your service territory. Sometimes, this value is set by regulators. Or a program/utility could set its own threshold—usually varying from 4-10%, with 6% being a very common threshold.

Alternatively, utilities can deploy a well-designed survey that identifies this threshold for their service territory. This type of survey would tie the level of customer energy burden with their ability to afford other basic necessities, their likelihood of being late on their bill payment and the practice of keeping homes at unhealthy temperatures to save on bills. The advantage of this approach is that it takes into account specific needs and perceptions of a utility's customers, along with competing expenses for other essentials and the general standard of living in the area.

Metric #3. Low-Income Threshold

The low income threshold is more of a program design question revolving around eligibility rules for programs than a metric for program effectiveness. However, it is useful to incorporate various low income thresholds when evaluating programs or performing needs assessments to understand the repercussions of this choice. Low income thresholds are typically set as a percent of the federal poverty limit or the area median income.

Metric #4. Energy Assistance Need

The total energy assistance need in a service territory depends on several factors:

- Household energy use and efficiency
- Household income levels and, by extension, unemployment rates
- Weather, especially the severity of winters in northern climates and summers in southern climates

The energy assistance need can be calculated in several ways, as described below, depending on data availability and intended use of the analysis.

Approach #1. Econometric Modeling of Sampled Data

The first "econometric" method of estimating energy assistance need relies on sampled survey data along with extrapolation models that yield metrics across a county or service territory. One excellent example of this approach is the Low-Income Energy Affordability (LEAD) tool published by the Office of Energy Efficiency and Renewable Energy at the Department of Energy. Note that the LEAD tool only provides estimated averages of energy burden, not the actual energy assistance need - some additional analysis would be required to arrive at the latter.

Pros: This class of methods can be very useful for policy purposes, as it offers consistent calculations that can be applied across an entire state or even the whole country for comparative analysis.

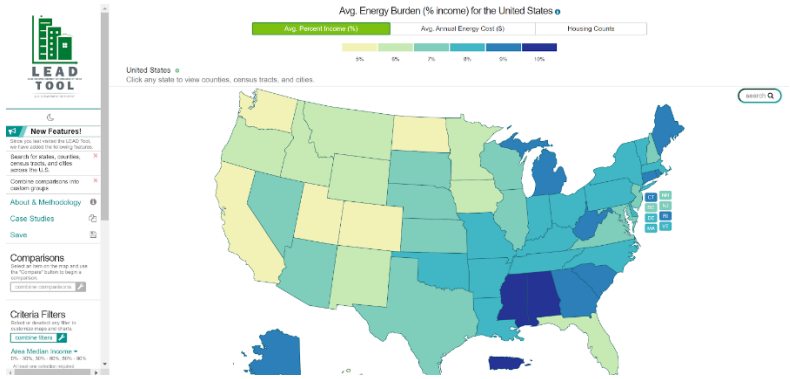
Cons: However, these methods can suffer from drawbacks that limit their applicability in energy assistance programs, specifically:

Timeline: Most of these approaches (including the LEAD tool) are based on 5-year American Community Survey microdata. So, the results are based on data that may be outdated and also too smoothed out to detect year-over-year changes in the future.

Sampling accuracy: The data used in these methods is sampled from a small portion of the population (under 10%) and extrapolated across a service territory. When using the American Community Survey, the energy use data is self-reported and for a single month. The accuracy of extrapolating energy use from one month to a full year will depend on when the survey was answered and the level of seasonal variability for a service territory, calling into question the reliability of energy burden estimates.

Granularity: Even if we were to overlook potential questions of timing or accuracy, these approaches do not tie data to utility customer accounts and often only go down to the census tract level. This means that results can be affected by "outlier" meters that do not represent most customer accounts (for example, vacation homes, garages, commercial uses, etc.). This also means that the results are too broad to use for specific program design and marketing strategies because the geographical units are too broad.

These drawbacks mean that the approaches can fall short of providing actionable data for driving program design and informing targeted outreach for specific utility programs. However, they could still be useful for comparative analysis in academic or high-level policy contexts.



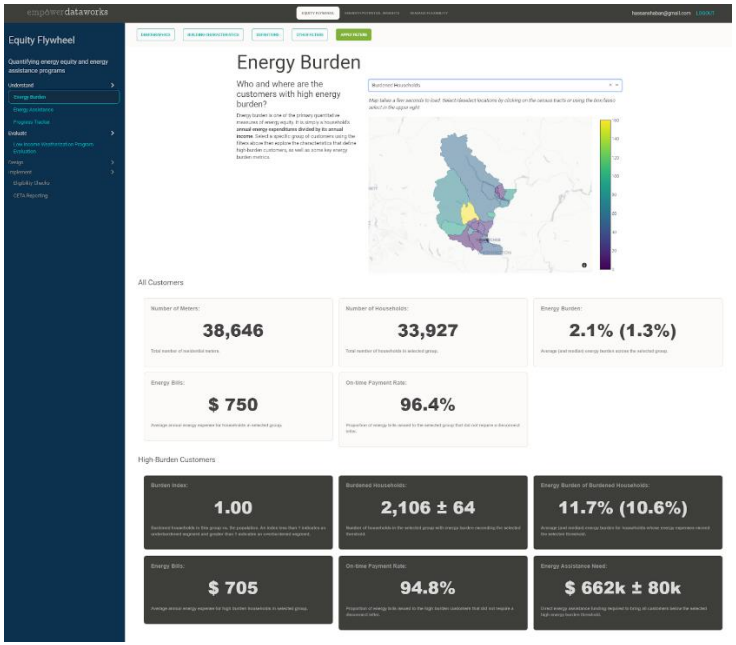
LEAD tool

Approach #2. Bottom Up Aggregation of Customer Data

A second, "data-science" approach to estimating energy assistance need relies on gathering as much real data as possible from the service territory, with minimal modeling to fill in data gaps. For example, the utility has energy use data for 100% of its customers. Income data can be purchased from credit bureaus. One example of this approach is delivered through the Empower Dataworks Equity Dashboard, which allows utility program managers to slice and dice their data and develop customized program delivery strategies for their service territory.

Pros: The advantage of working with customer or meter-level data is the ability to control the quality of data that goes into the energy assistance need estimates. For example, meters that are not tied to households can be identified and eliminated. Meters that show minimal energy consumption can be flagged as potentially unoccupied. If a utility wishes to monitor its energy equity progress, it can always use the most recent data available. Finally, performing the analysis at the household level means that insights can be extracted at various levels of granularity.

Cons: One drawback with this type of approach is the level of effort required to gather the disparate datasets and perform the analysis, but it is more than balanced by the quality of insight that can be gained - the accuracy and granularity of the approach makes it appropriate to designing specific assistance programs.



Empower Dataworks Equity dashboard

Approach #3. Hybrid Approach

A third approach combines elements of econometric modeling with data science. One such method leverages a modeling approach with a statistical procedure called "iterative proportional fitting" as the backbone, but uses real data wherever possible for calibration.

For example, actual energy consumption data can be easily obtained from utilities and used in place of surveyed estimates and actual building data can be obtained from county assessors. Demographic data like income, ethnicity and homeownership is harder to obtain and more sensitive. With this approach, you could rely on American Community Survey estimates of these attributes.

Pros: This approach would enhance the reliability and data relevance of energy assistance estimates while avoiding sensitive data. It also requires a lower level of effort than a pure data science approach, making it suitable for assisting policy makers or setting energy equity targets for utilities.

Cons: This approach would have low granularity, so it may or may not be useful for in-depth program design.

Metric #5. Energy Assistance Funding

This is the total dollar amount of funding flowing through energy assistance programs, including discount, donation, arrearage management and weatherization programs. This is typically well-known to program administrators and can be retrieved from the program accounting systems. One minor tweak to program accounting practices is to attribute funding to specific customers, so that service gaps can be identified for various customer segments.

Metric #6. Avoided Burden

Avoided burden can be determined through program impact evaluations, which identify the actual bill reductions for program participants. Program evaluations rely on data collected from program tracking databases and accounting systems. For conservation programs, program impact is determined by performing an analysis of customer energy consumption prior to and after the installation of efficiency measures.

Metric #7. Avoided Need

Avoided need is calculated by identifying which program participants would qualify as "high energy burden" based on the affordability threshold. The total bill reductions actually experienced by this customer group is the avoided need. The data required for this calculation (income and energy use) is usually stored in program tracking databases as it is required for checking customer program eligibility.

HOW DO WE SEGMENT CUSTOMERS WHEN QUANTIFYING EQUITY?

Most of the discussion so far has revolved around aggregate metrics across a service territory. The true value of understanding energy burden within this framework is when these same metrics can be studied for specific customer segments. This *"slicing and dicing"* is especially valuable for designing specific marketing and outreach strategies, as well as for tweaking program application workflows and incentive levels for maximum impact.

The true value within quant frameworks is when the metrics can be sliced and diced for ***different customer segments***

Some of these relevant segmentation dimensions are:

Geographical Location: Where are the customers with high energy burden located? Where does the current energy assistance funding go?

Income: Is high burden concentrated in customers with the lowest incomes? Or is it a function of high energy costs?

Age: Do older customers on fixed incomes need the most assistance? How do we accommodate working-age families?

Building Type and Homeownership: How does energy burden compare in single family and multifamily properties? Do renters shoulder a higher burden than homeowners, and do they have equal access to energy assistance programs?

Race/Ethnicity/Language: Are there barriers in the existing programs that preclude certain demographics from learning about assistance programs or accessing assistance funds?

Urban/Rural: For larger utilities, are the energy burden and program participation rates markedly different across rural and metropolitan areas?

EQUITY INDICES FOR CUSTOMER SEGMENTS

The overall metrics discussed earlier should be supplemented with some key indices that are applicable to specific customer segments. These indices help quantify equity across customer segments and highlight segment gaps in program delivery.

Equity indices highlight equity gaps for different customer segments ***at a glance***

Burden Index: The ratio between a customer segment's proportion of burdened households and their proportion of the total population. For example, if a certain customer segment comprises 10% of burdened households and is 5% of the population, then the burden index is 2. An index of less than 1 indicates

an under-burdened segment, while greater than 1 indicates an over-burdened segment.

Program Equity Index: The ratio between the percent of total energy assistance budget received by a given customer segment and their proportion of the total population. For example, if a certain customer segment receives 2.5% of total assistance funding and is 5% of the population, then their equity index is 0.5. An index less than 1 indicates an underserved segment and greater than 1 indicates an overserved segment.

Energy Cost Index: The ratio of the median annual energy bill for a given customer segment and the median annual energy bill for customers outside this segment. For example, if the median annual energy bill is $1500/year for a certain customer segment and $1000/year for everyone else, the energy cost index is 1.5. An index greater than 1 indicates higher than average energy use.

Late Payment Index: The ratio of the late bill payment rate for a given customer segment and the late bill payment rate for customers outside this segment. For example, if the late bill payment rate is 10% for a certain customer segment and 5% for everyone else, then the late payment index is 2. An index greater than 1 indicates a customer segment with more frequent late bill payments than average.

CLOSING THE ENERGY ASSISTANCE GAP

We've shared one framework for delivering more effective energy assistance programs. But as with most things in life, **it's all about execution**.

The easiest step that an energy assistance program administrator can take is to start laying the foundation for quantifying energy assistance programs. All of the data you'll need exists in one form or another, and it's usually just a matter of combining the data in a coherent manner. The metrics are also relatively easy to calculate and understand, and once they are placed in the context of a specific utility, it becomes easier to spot potential areas of improvement, underserved customer segments and funding needs.

Smart Strategies
for Optimizing Energy Assistance Programs

A utility's energy assistance portfolio encompasses a variety of programs and initiatives from weatherization programs to bill discounts and crisis assistance. How do you optimize a program portfolio?

We've already looked at the foundations for an effective energy assistance portfolio. In earlier sections, we defined **key energy equity concepts**, laid out **the business case** for utility assistance programs and discussed **an energy burden framework** for quantifying the effectiveness of energy assistance programs.

In essence, we have our **energy equity GPS** that tells us where we are and where we're going while giving us feedback on our speed and location.

But how do we actually get to our goal? Do we walk or bike or just take the rickshaw? Zoom on the freeway or meander along the scenic route?

In other words, now that you can calculate and monitor key metrics that tie directly to energy assistance program goals, **how do you use these metrics to optimize an energy assistance portfolio?**

Here we share three of the data-driven strategies we've developed over the years to inform our decisions, whether we're re-examining a whole energy assistance portfolio, launching a specific program or making concrete program design choices.

01 ▶ How should utilities organize their **energy assistance portfolio**? Which programs or initiatives should they run?

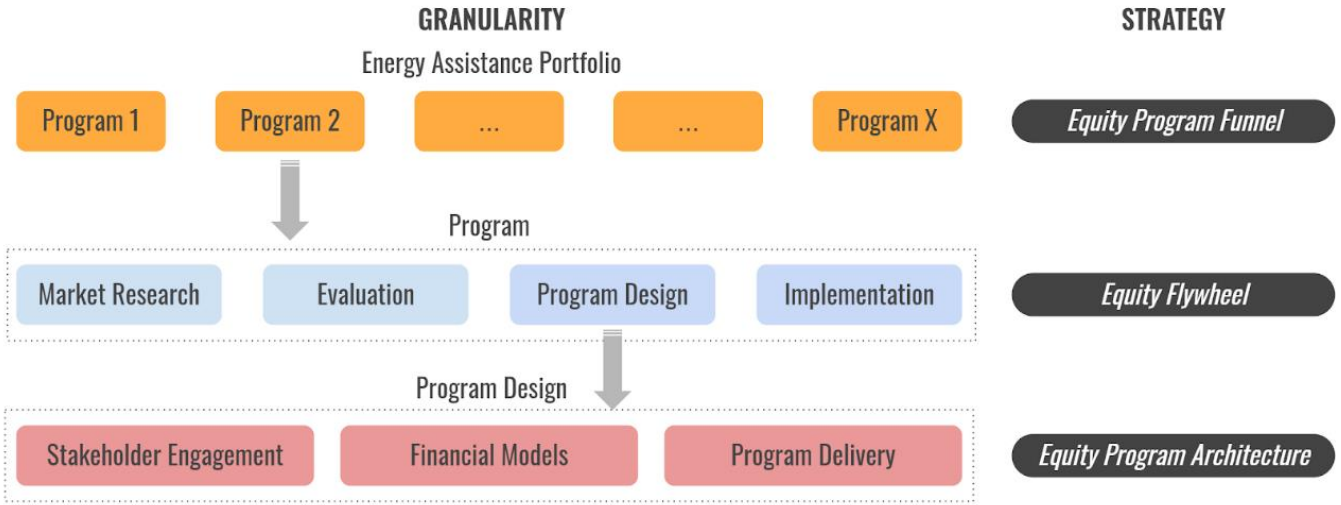
The Equity Program Funnel applies to a utility's energy assistance portfolio and advocates for comprehensive, linked program offerings that yield efficiencies in marketing and program delivery.

02 ▶ How can the energy burden framework be integrated deeply into **program delivery** to ensure continuous improvement?

The Energy Equity Flywheel is a data-driven approach to planning, designing and implementing individual energy assistance programs by relying on strong feedback loops that inform program delivery and improve results.

03 ▶ How do we **design intentional programs** that deliver value?

The Equity Program Architecture lays out a structured approach for designing energy assistance programs that are optimized for continuous evaluation and improvement.



Data-driven strategies can be applied at every level of an energy assistance portfolio

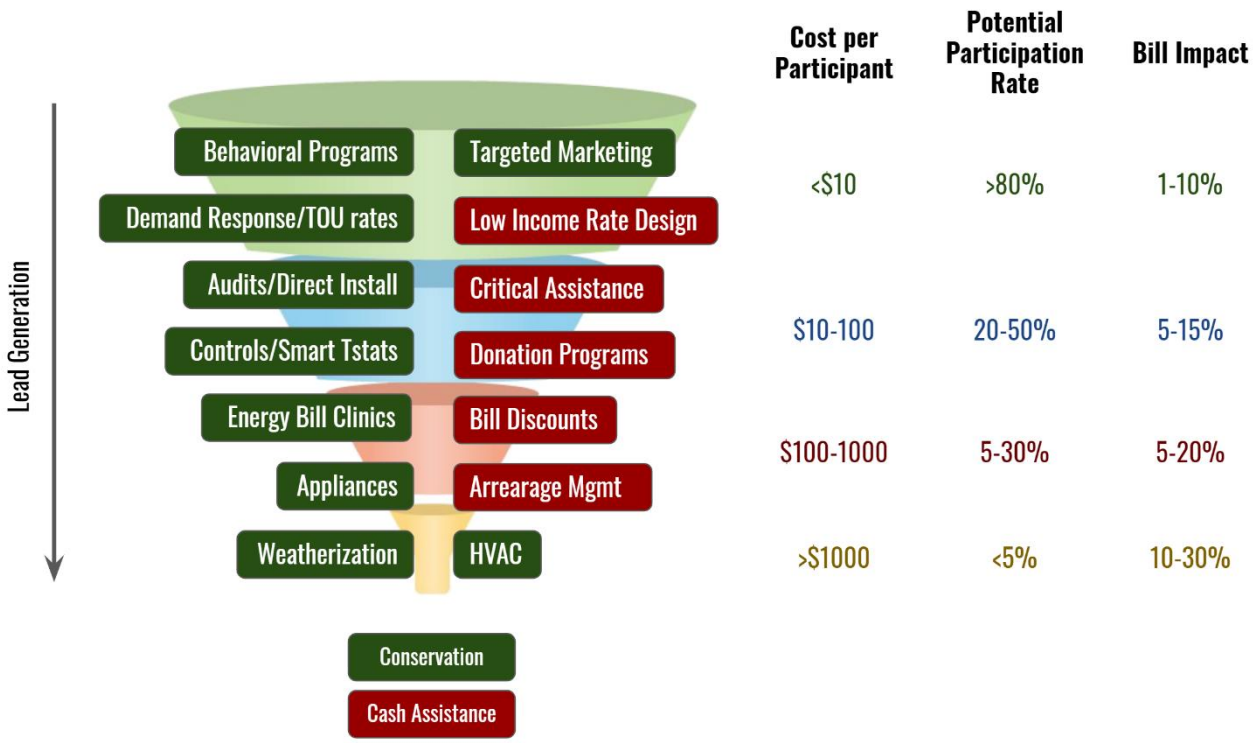
STRATEGY #1

EQUITY PROGRAM FUNNEL

When planning energy assistance programs, utilities have a choice between many program options. Do you target more **immediate bill relief** for customers or **more persistent savings** through energy efficiency? Should you focus on a few high-touch customers or should you build more mass-market programs?

The idea of the Equity Program Funnel is to build a **comprehensive suite of interconnected energy assistance offerings**. At the top of the funnel, we find programs and initiatives that can be rolled out at scale to most low-income customers at a relatively low cost per customer. These include behavioral programs, targeted marketing or rate designs. At a slightly higher level of investment, utilities can implement widget programs (e.g. smart thermostats) or offer free audits to identify low-cost conservation opportunities. They can also administer customer donation programs at a relatively low cost or offer critical bill assistance, which would apply only in certain situations.

Further down the funnel, we find strategies that require a larger investment and higher level of customer support, but are more personalized to



specific customers, including efficient appliance programs, cash assistance and arrearage management.

Finally, at the bottom of the funnel are the heavy hitters: the weatherization and HVAC programs that deliver significant levels of sustained burdened reduction, but at a very high cost per participant.

CRAFTING A CUSTOMER JOURNEY

The Equity Program Funnel doesn't mean running every kind of program out there, but instead focusing on building a *continuous* customer journey from light touch to more demanding interventions.

For example, a utility could leverage targeted bill inserts to low-income customers that include **conservation tips** and information about **critical assistance programs**. In these mailers, they can include information for how to sign up for a free energy audit.

Customers who opt for an **energy audit** can be pre-qualified for **bill discounts** if they meet certain energy burden criteria. And those with high energy savings potential can be directly signed up for the **weatherization program**.

If these same four programs were run separately, the customer would receive a bill insert without a clear call to action. Then, on their own, the customer would somehow have to *learn about and apply for three separate programs*, while navigating separate application forms and different eligibility criteria.

At first glance, crafting a customer journey sounds overwhelming... and expensive. But building a holistic energy assistance portfolio has several advantages:

Economies of scale.

Building interconnected programs creates efficiencies in program delivery and technical infrastructure. Programs can share staff, application workflows, marketing assets and accounting systems to reduce overhead and administrative costs.

Single entry point to the energy assistance portfolio.

Customers appreciate having a one-stop shop for their energy assistance needs, rather than a collection of disparate programs and processes.

Customer engagement. Maintaining strong ongoing relationships with low-income customers reduces barriers to participation in energy efficiency programs, which require a heavier investment of time (and sometimes money) from the customer.

"Automated" marketing. The different programs can more effectively serve as lead generation for each other, especially if they use the same participant databases and have consistent branding.

STRATEGY #2

ENERGY EQUITY FLYWHEEL

When launching or redesigning a specific program that fits in our Equity Program Funnel, how do you ensure that each program is aligned with your goals and with the needs of low-income customers? How big do these programs need to be anyway? And what steps do we take to make sure they are performing well?

Enter the **Energy Equity Flywheel**.

The Flywheel framework relies on **strong feedback loops** between the different components of an energy assistance program. There are four components: Understand, Evaluate, Design and Implement.

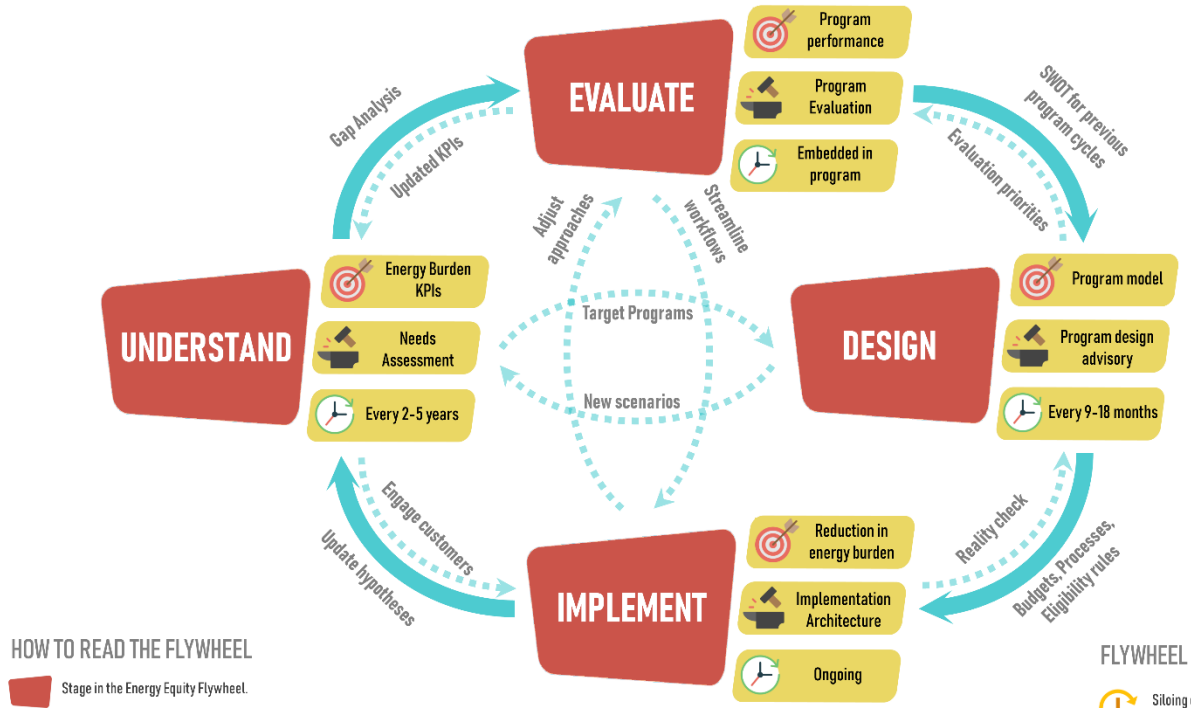
Each feedback loop tracks specific **data points used to drive decisions** in other components of the flywheel.

As the flywheel gains momentum and effective communication and reporting processes are put in place, the feedback loops become stronger. Program delivery becomes more **streamlined**, more customers are served, and program **cost-effectiveness improves**.

The flywheel is then able to keep rolling unless it meets significant resistance from any of the *"flywheel brakes"*, including low funding levels, poor stakeholder engagement or breakdown of feedback and accountability. Explore the different components of the Flywheel in this interactive image or read on for a description.

In the image below, keep in mind that the components in the Flywheel are nothing new. *It's the blue data connections that make the flywheel magic*, by making sure each component meaningfully informs every other one.

THE ENERGY EQUITY FLYWHEEL



HOW TO READ THE FLYWHEEL

- Stage in the Energy Equity Flywheel.
- Key insights or outcomes of a stage.
- Key Empower Dataworks analytical service for a stage in the flywheel.
- Recommended frequency of applying a stage.
- Driver for the following stage.
- Feedback loop

FLYWHEEL BRAKES

- Siloing of Understand/Evaluate/Design/ Implement. Breakdown of feedback loops.
- Poor engagement with stakeholders and/or customers
- Insufficient budgets or restricted budget allocations

UNDERSTAND

How many of my customers have a high energy burden? What's their geographic and demographic distribution? Which customer segments are under-served by current energy assistance programs? How much would it cost to meet the need in my service territory?

The first component of the Energy Equity Flywheel involves understanding low-income customers in your service territory. Understanding the need and program gaps drives better program design and also allows your program evaluations to focus on the metrics and processes that matter. Insight into the low-income segment is also critical to effectively engaging customers during program implementation.

The Understand phase is implemented using *low-income needs assessments* and *conservation potential assessments*, which help you understand energy burden based on geographic, demographic and building characteristics, energy efficiency potential, energy assistance need and the gap between need and energy assistance program performance.

EVALUATE

Do my existing programs deliver customer bill savings? Are they running efficiently? Do they have streamlined processes? How can program delivery be modified to improve performance?

The Evaluate component in the Energy Equity Flywheel is a deep dive into the performance of your existing energy assistance programs. The purpose of this stage is to identify points of improvement in the delivery and cost-effectiveness of existing programs. Also, when paired with the Understand component, we can identify potential gaps that can be filled with tweaks to program design or by deploying additional programs. Evaluation also informs workflow improvements for streamlined program implementation.

The Evaluate phase is implemented through *program process and impact evaluations*, which examine current program processes and workflows, identify customer bill impacts, assess program rules and eligibility criteria and compare with best practices.

DESIGN

Which customers should I target? What should my eligibility rules be? How does a customer apply to my programs? How much should I pay in incentives or discounts? How much should we budget?

The Design module in the Energy Equity flywheel involves crafting a comprehensive program architecture to ensure successful program delivery. The main purpose of this stage is to design cost-effective programs, in line with the insights from the Understand and Evaluate components. Once a program is launched, the architecture can be refined with insights from program implementation.

The Design phase is implemented through *program design architectures*, which include informed incentive/discount structure and economic analysis, recommended program workflows and processes, marketing and outreach strategy including segmentation, budgets and schedules.

IMPLEMENT

What kind of infrastructure do I need to run my programs? What about IT, marketing and finance? Which reports do I need to show compliance? Who should I hire? What should I outsource?

The Implement component in the Energy Equity Flywheel involves setting up the people, process and tools required for cost-effective success and the integrated monitoring KPIs.

The main purpose of this stage is to put the infrastructure in place to efficiently run and scale the program. This includes assessments and recommendations for specific tooling and marketing and IT infrastructure, workshops with trade allies and contractors, training for implementation staff, and everything else needed to begin implementation.

Practical insights in this stage are used to drive improvements in all the other components of the Flywheel.

STRATEGY #3

EQUITY PROGRAM ARCHITECTURE

The Equity Program Architecture is a series of discrete steps, shown on the next page, that use insights and data from other program activities to design energy assistance programs that are effective at reducing energy assistance need.

The design process ingests the results from prior program evaluations, conservation potential assessments and low-income needs assessments, in addition to participation data from existing programs.

The core components of this process are **stakeholder engagement**, **economic analysis** of the program, targeted **marketing strategy** and a **program delivery plan**. Within these steps are ongoing efforts to include best practices from other programs and ensure evaluability.

The design process is not linear but iterative. The goal is to validate or invalidate assumptions early in the process by soliciting constant stakeholder feedback.

Stakeholder Engagement

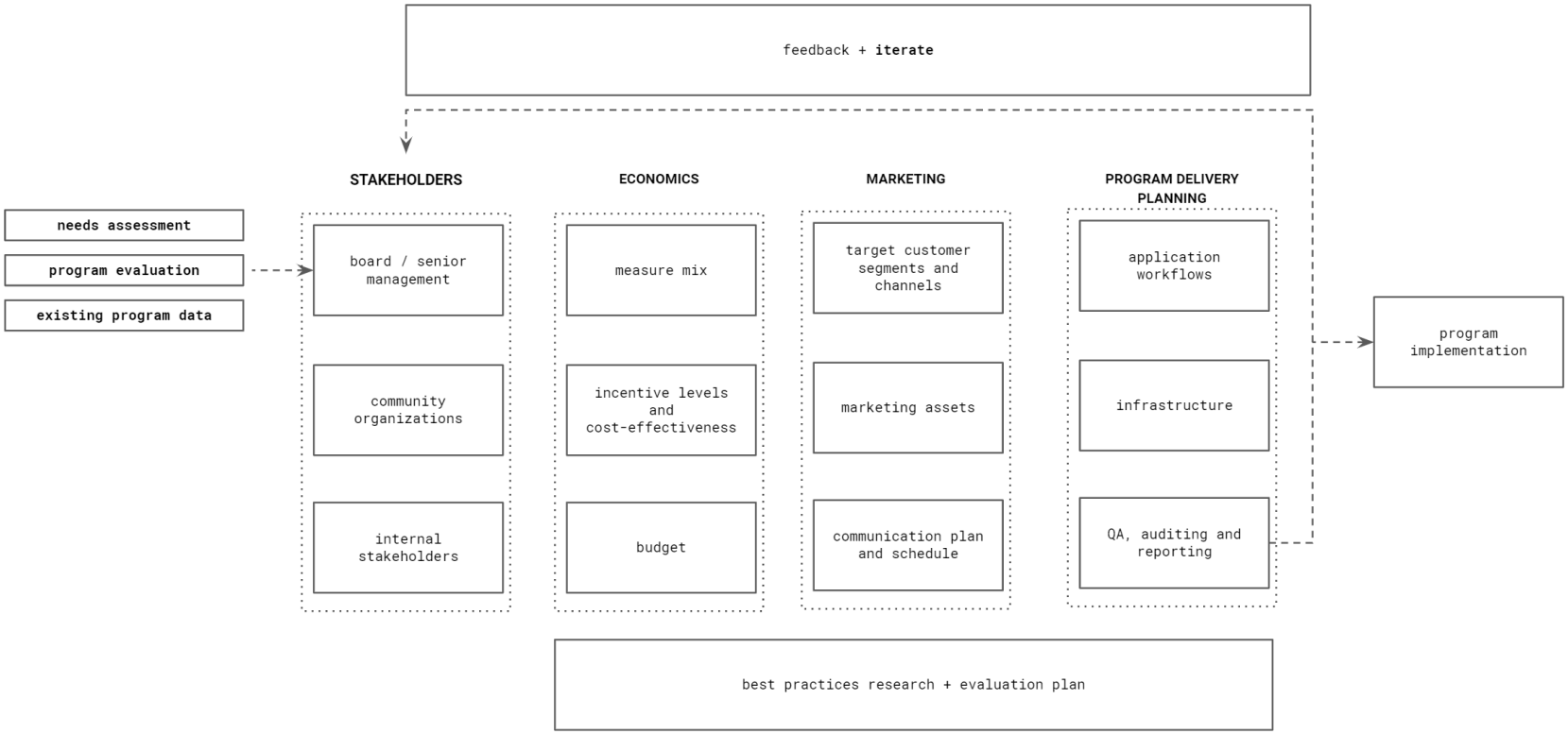
What are the utility's overarching goals with this program? Do initial hypotheses from assessments and evaluations agree with on-the-ground experience of community organizations or customers? How do we integrate feedback from different stakeholders to deliver an effective program?

The work involves working with senior management at the utility, community organizations and internal utility stakeholders to plan brainstorming sessions and agree on the goals of the program design.

Economic Analysis

Which measures or interventions should we offer customers? How should incentives or discounts be structured? How big should the program budget be each year?

This analysis revolves around cost effectiveness modeling by quantifying the potential costs and benefits of the program. These financial scenarios and budgets can be built around on different participation rate scenarios.



Marketing Plan

How do we reach high-burden customers effectively? What kinds of messaging and channels should we use? How do we work with our community partners to spread the word?

This step involves creating a targeted communication plan and schedule, along with the branding and theme for future marketing campaigns.

Program Delivery Plan

Is this a 100% in-house program or do we bring in contractors for support? What level of digital, website and database support do we need? What should our application and review workflows look like? How can we leverage existing program infrastructure to reduce overhead?

This step involves auditing existing program infrastructure and available resources and identifying gaps that need to be filled. This is also a good time to define QA and reporting procedures.

Best Practices Research + Evaluation Plan

How do we avoid recreating the wheel? Which strategies worked elsewhere and how do we adapt them to our territory? How do we build in regular evaluations to keep track of program performance?

This step includes researching energy assistance program strategies through academic and industry sources, as well as peer review of assistance programs in surrounding areas. It also includes developing an evaluation plan and schedule for the following 4-5 years.

Whether a utility is launching new energy assistance programs or revisiting existing ones, **being strategic about your energy assistance portfolio** can return dividends in terms of improved program performance and cost-effectiveness. The three strategies shared here leverage data-driven and quantitative frameworks discussed in earlier sections to orient energy assistance programs towards delivering on their core goal of **effectively reducing energy assistance need**.

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