

Leverage- How Utility-Funded Programs are Addressing Cost-Effectiveness and Rate Impact Issues through Co-Funding

Fred Gordon, Energy Trust of Oregon
Elaine Prause, Regulatory Assistance Project
Mark Wyman, Energy Trust of Oregon
Marshall Johnson, Energy Trust of Oregon

ABSTRACT

Many utility-funded energy efficiency programs have acquired most of the “low hanging fruit” of inexpensive energy efficiency opportunities. Now, program administrators are confronted with the higher cost and difficult-to-acquire next tier of efficiency. Costs are a particularly thorny issue for serving residential customers with limited incomes. Most cannot make efficiency investment unless other parties pay all or most of the cost. Reaching such customers is important both for social justice reasons and because they represent a significant portion of the remaining available resource.

Efficiency initiatives to address these customers are sometimes challenged to meet regulatory investment criteria. Funding of initiatives that cost more per kWh or Therm saved can also increase consumer rates, and this can limit their scale.

One way to address this problem is to leverage co-funding with government entities, low-income service organizations, health management organizations, and others for initiatives that save energy and meet other participant needs. This paper reviews the design and progress of efforts of one Northwest US program administrator to secure these complementary revenue streams by working with a variety of such organizations. We have learned that these efforts are time- and labor-intensive and specialized, but some early successes have been achieved. Ultimately the value of these efforts in meeting resource acquisition and social justice goals depends on how quickly and how much the initiatives can scale up. This remains to be seen. This paper provides insights into how to maximize the chances of this larger success.

Introduction- What is Leverage? What Can It Do?

Leverage occurs when an efficiency program uses Other People’s Money (OPM) to help pay for the cost of delivering efficiency in homes, buildings, and facilities. It requires awareness of organizations with funding for complimentary purposes. In some cases, the efficiency program provides help the consumer understand and access financial opportunities beyond the efficiency program. This approach is often taken with Federal and state tax credits. In other instances, the efficiency provider must invest years to build a partnership and create a conjoint delivery system. This paper will provide examples of some of the more recent and active approaches.

Why Focus on Leverage Now?

Utility-funded energy efficiency programs are confronting an era where the opportunities to add easy and inexpensive savings from lighting, shower heads, efficient new construction in homes and businesses, and many other historically important sources, are diminishing, particularly for electric efficiency. (Moersfelder, 2018, p 13) This reflects a generation of impressive accomplishments by efficiency programs and State and Federal initiatives (Gross, 2021) (Energy Trust, 2020 (4)) in achieving savings in these markets. In many cases, once programs create broad market acceptance of efficient purchase choices and construction approaches, the related energy savings are locked in through state and Federal minimum efficiency codes and equipment standards. This success should be celebrated. However, it leaves a more difficult environment for ongoing efficiency programs.

A large proportion of the remaining energy savings opportunities involve additional difficulties. Sometimes the measures do not pass traditional regulatory investment cost effectiveness tests. Also, due to limited financial resources among limited income customers and smaller businesses and split incentives between landlords and tenants for rentals, some of these resources are difficult to acquire in volume unless incentives are set to pay most of or the entire cost. There are also sometimes higher costs due to issues such as the need for repairs prior to energy retrofit of lower income housing or the need to invest in more outreach to enlist customers who have not been reached by prior approaches. In some cases once program delivery costs and incentives are considered the costs of the program as a whole may exceed maximums allowable under cost effectiveness tests. The sections below describe how leverage helps measures and programs meet specific regulatory investment tests.

Experience with Leverage

Leverage has been a key feature of energy efficiency programs for decades. Tax credits have come and gone since the 1980's, and many programs have utilized them. Leverage has been an essential feature of many renewable energy programs. For example, for irrigation districts, Energy Trust partners with a wide array of groups to fund replacement of canals with pipes and then install hydroelectric generators. Partners include entities interested in farm welfare, river health, fish, and community welfare, as there are benefits from all these perspectives (FCA, 2021).

Benefits and Regulatory Implications

Leverage has several direct benefits in funding and delivering efficiency programs. First, at least in Oregon, leverage can provide a way that programs and measures can maintain a positive score on the Total Resource Cost test (TRC) or the Societal Test. Regulators in many states use one of these as the primary test of cost-effectiveness to decide whether efficiency investments are in the interest of ratepayers and may proceed with funding from rates. The TRC considers all costs and benefits resulting from an efficiency investment to the participant and the utility system. The societal test adds all costs and benefits that extend beyond the utility system and participant (for example, economic and employment benefits, cleaner outdoor air). Oregon's Public Utility Commission (OPUC) employs the TRC. Some non-energy customer benefits are readily quantified (e.g., the value water savings from efficient showerheads) and can be

considered in calculating the TRC. However, other non-energy benefits are highly variable from site to site or study to study. For example, benefits of increased productivity from lighting in an office can depend on what equipment is replaced, the quality of the design of the replacement, other variables in office design, systems commissioning, and what is done in the office. Different study methodologies may also produce divergent estimates of value.

Regulators in various states have taken diverging approaches to address this uncertainty and variation. Some allow or require program providers to estimate benefits and include them in cost/benefit tests even where there is a wide uncertainty band around the estimate. The Oregon Public Utility Commission (OPUC) has chosen instead, through their cost-effectiveness rule, to allow quantitative consideration of benefits that are readily and reasonably estimated, and then will consider allowing exceptions where large, difficult to quantify, non-energy benefits are identified (OPUC, 1994).

While this rule established an orderly process for considering benefits, the process for agreeing on exceptions can be significant and challenging. However, the OPUC has further allowed, through an administrative interpretation, that, where government entities or other parties who are not the customer or the property owner contribute funds toward efficiency measures, those funds can be deducted from costs for purposes of the TRC test. This reflects the expectation that these investments are at least partially driven by motivations other than energy savings (e.g., occupant health, jobs, environmental conditions). This interpretation has its origins in the great recession of 2007-9, when the Federal Government provided funding for efficiency programs and tax credits for installing efficiency measures as part of a jobs development effort (Amadeo, 2022). This is an example of how leverage can help measures pass regulatory investment tests where they help achieve complimentary goals.

Leveraged funds can also allow programs to reach more difficult markets while keeping costs within limits set by the Utility Cost Test (UCT). Reaching these markets often requires higher incentives, more extensive and customized outreach efforts, or both. This can translate into higher utility costs per kWh or Therm saved. The UCT is an additional regulatory test which asks whether the costs paid through rates to support utility-funded programs are justified by the benefits to the utility system. This test is also employed in Oregon- measures and programs must pass both the TRC and the UCT. Leveraged funds reduce the required ratepayer-funded contribution to these programs. This can allow them to pass the UCT and also moderate the impact on utility rates. Reaching such customers is important both for social justice reasons and because they represent a significant portion of the remaining available resource. For example, PacifiCorp, one of the two investor-owned electric utilities in Oregon, estimates that 72% of their Oregon residential customers fall into low- or moderate-income groups, so constitute a large share of the efficiency resource potential. (Pacific Power, 2022).

Rate impact is an additional issue for all efficiency programs, but especially for those with higher costs per kWh or Therm. While regulations in many states provide for acquisition of all cost-effective measures, the incorporation of higher costs per kWh or Therm saved to reach markets with higher barriers to participation means that less savings are acquired for the same efficiency budget. If programs are to scale up to acquire volume savings from these markets equivalent to historic rates of savings, then more revenue is required from rates. Revenue requirements from rates for efficiency may compete for priority with rate increases to fund basic utility operations and address specific problems such as wildfire safety. Furthermore, higher rates can lead to inability to pay for more consumers, and not just low-income customers on special rates. These considerations make it more difficult for utilities and commissioners to prioritize the

long-term benefits of efficiency over other needs, even when it minimizes overall utility bills.¹ Leverage is one potential tool to moderate the impact on rates of reaching more difficult markets- by finding other sources for part of the costs of efficiency programs.

The remainder of this paper will focus primarily on leverage as a tool to access additional markets for energy efficiency programs at reduced cost, with a focus on historically under-served low-income, ethnically diverse, and rural residential markets (ADM, 2021). These markets have experienced cost, communication, cultural, and housing structure barriers in larger numbers than other customers. There is also one case study focused on demand management as a source of complimentary funds. This paper does not focus on federal tax credits because in recent years, while they are still available and important in some specific situations, their availability has significantly diminished.

Case Studies

The next several sections of this paper focus on a handful of specific opportunities in various stages of development with an array of non-energy purposes and co-funders:

- Co-funding of low-income programs with county Community Action Agencies.
- An initiative to remove and replace distressed older manufactured homes in Oregon.
- Co-funding of home smart thermostat installation with a utility demand control program.
- Efforts to co-fund efficiency services with health-focused services in limited-income households.

For each of these initiatives, we describe the basic value proposition- why would the other organization co-fund? What are the benefits to Energy Trust of Oregon as an efficiency program provider? Then the initiative itself is briefly described, including the co-funding arrangement and delivery strategy. Lessons from each case study are provided.

Case Study One: Community Action Program of Washington County

Context. In Oregon, designated low-income efficiency programs are funded separately from the Energy Trust of Oregon. Funding comes from an array of sources including a portion of public purpose charges on electric bills (ORS, undated), and state and Federal funding. They are operated by Community Action Agencies (CAA's)- local, mostly county-level non-profits set up many decades ago to do this work. Some have diversified into other related funding sources and work, such as construction of new low-income housing. Others stay focused on low-income home retrofit. There is a separate funding path from gas utilities for low-income retrofit; in some cases the same agencies perform the work.

Like similar programs throughout the country, the low-income energy efficiency retrofit programs of Oregon's CAAs are designed around the requirements for Federal funds. While they can pay up to the full cost of measures, they are subject to a fixed cap for payments per site. Their cost-effectiveness criteria allow for more expensive measures than Energy Trust's criteria, but they must prioritize the most cost-effective measures within that cap. Consequently, sometimes they cannot install measures that are less cost-effective, but have a high value to the customer for other reasons, such as new cooling or water heating systems. Based on decades of

¹ It is typical for cost-effective efficiency programs to lower overall costs to the utility system, but increase power or gas rates, because the remaining costs are covered by fewer kWh or Therms.

experience, the CAAs are careful about changing their business model or scale of operation in response to short-term funding which may disappear and require wrenching organizational changes in a few years.

Energy Trust does not duplicate the efforts of the CAAs. However, many of our initiatives provide efficiency and on-site renewable energy for low-income customers (Energy Trust, 2020 (2)). This occurs both through customer participation in broader programs and several efforts targeted to low income. One example is an initiative that provides free duct and air sealing and some low-cost measures for existing manufactured homes. Energy Trust also provides efficient lighting giveaways in the offices of agencies with a low-income clientele, the manufactured home replacement program referenced below, a multifamily program with many initiatives, enhanced incentives for measures in rental housing, work with low-income new home developers, a low-income solar power initiative and more.

In addition to these efforts, for 4 years Energy Trust has explored, then initiated, efforts to enhance the reach of the CAA programs while working within their business model (Energy Trust, 2021 (1)).

Initiative Concept. Sometimes CAAs have opportunities and available crews to cover more houses but have expended all funds for a fiscal year from their traditional sources.

Many (not all) measures that CAAs fund are also measures which Energy Trust offers incentives for and are considered cost-effective by Energy Trust. Examples include ceiling installation, efficient furnaces, heat pumps and water heaters.

Through this initiative, Energy Trust offers to pay the maximum cost-effective incentives for those measures for many homes, freeing up funds for the CAAs to cover additional homes and/or to acquire deeper savings within each home served (Energy Trust 2020 (3)).

The first CAA to work with Energy Trust in this way was the Community Action Organization of Washington County. After extensive planning, this initiative began in fall 2019. The detailed development involved discussion with Oregon Public Utility Commission, the two investor-owned utilities serving portions of Washington County (Pacific Power and Portland General Electric), and the Community Action Partnership of Oregon.

Results. Most of the customers served lived in manufactured homes, and the primary measures installed included floor insulation and ductless and ducted heat pumps (Energy Trust, 2020 (2)).

In program year 2019-20 and 20-21 combined the initiative installed 96 HVAC systems, insulation in 120 homes, paid audit fees for 229 homes, and installed 337 other measures. This saved a total of 617,513 annual kwh. Incentives for measures were \$549,152. As a portion of Energy Trust's overall residential goals (25.4 million annual kWh for 2021 alone) these results are modest, but this funding was helpful to this individual agency in extending their reach in one county. As a result of this success the initiative was continued for the following year, with the expectation of expanded participation. Also, a CAA in one additional county has agreed to work with Energy Trust in a similar manner. Our hope is that as the success of this initial effort becomes more broadly understood, other CAAs will participate over time, resulting in a significant volume of savings.

Lessons. We have learned that there is sufficient flexibility for CAAs to serve additional customers with added funding, but it requires a significant up-front investment of labor hours by both parties to bring this arrangement to fruition, and additional staff time for the CAA's for

administrative support. There is a need for an onboarding process for CAA's and ongoing coordination to assure that data requirements are met, and financial transfers are consistent with the project agreement. This project developed a structure for incentives which may prove useful in delivering savings through other types of community-based organizations as well as CAA's.

Leveraging funding is an important element of this initiative, but leveraging of the Community Action Agencies' expertise, position in the market, and contacts were equally important. This observation also applies to partners in the following case studies but is included only here to avoid repetition.

Case Study 2. Manufactured Home Replacement Program

Context. Oregon has a population of many thousands of older manufactured homes that are a critical housing source for people with very limited financial resources who otherwise would likely not be housed. These older homes were built before there were efficiency standards for manufactured homes. In addition to being energy sieves, they often have water leakage, structural damage, mold, and other issues that make them health hazards (Opinion Dynamics, 2020).

Initiative Concept. This initiative pieces together funds from many sources to replace the oldest and least efficient and healthy manufactured homes, achieving significant savings per home and providing families with housing that does not have severe negative health and budget impacts (Energy Trust, 2021 (1)).

Starting in 2015, Energy Trust invested significant work hours in a multiyear effort to build alliances for funding with charitable groups and state agencies who have funds for home retrofit and billpayer assistance. The objective was to replace the oldest and worst homes with homes that meet efficiency standards for new homes under Energy Trust's new manufactured homes initiative.

A pilot initiative was initiated in 2017 under an exception to cost-effectiveness rules granted by Oregon PUC. A package of financing and incentives was assembled from multiple sources which reduced the participant's cost to an amount that was less than their savings on utility bills. Sources of additional funding included the following:

- Oregon Housing and Community Services' (OHCS) Home Replacement Program (HB 2896)
- Low-income public purpose charge funding
- Craft 3 (a nonprofit bank) home replacement loan
- US Department of Agriculture Rural Development funds
- Disaster Recovery Funding, including public or private funds such as insurance settlements, FEMA payments, state funding

The program was developed in close partnership with nonprofits working with this customer base on housing and energy issues, including CASA of Oregon, the Network for Oregon Affordable Housing, Development Northwest, Oregon Department of Housing and Community Services' Manufactured Housing Advisory Committee, and Neighborworks of Umpqua.

To succeed, the pilot needed to address many unusual issues; many of the homes had unaddressed septic, soil stability, and other site issues which needed to be dealt with before an investment in a new home was feasible.

Participants included operators of home parks where the operator owns and leases the homes, other parks where the tenant owns the home and leases the land, and individual homes on private property. The financial and logistical process was customized for each situation.

Results. The pilot succeeded in replacing 52 homes (Energy Trust, 2021 (1)). The pilot determined that there are significant savings from replacing the old homes, and that there are significant contributions leveraged from other parties. While these contributions vary from situation to situation, they proved on average to result in a net cost that passes the TRC if the contributions of other parties were deducted from the overall costs.

Based on the pilot, a scaled-up initiative has been approved and budgeted. The OPUC has provided a cost-effectiveness exception for projects that do not pass the TRC, justified by the many difficult-to-quantify occupant benefits. The agreement includes a cap on total funds for projects that do not pass the UCT.

Since the approval of the scaled-up program, there have been commitments to projects to replace an additional 15 homes. Replacement schedules are uncertain, in part because of Covid impacts on manufacturers. Additionally, many manufactured homes were lost in the 2020 wildfires and the demand for replacements has outstripped factory capacity.

Lessons. Costs vary and are difficult to predict because of variable condition of the homes and the sites (Opinion Dynamics, 2020, page 2). The primary benefit in addition to energy savings described by pilot participants is increased thermal comfort. Most surveyed occupants reported health improvements and some reported reduced worry and a feeling of greater safety in their new home. One lesson which was carried to the scaled program was the need to create a “program navigator” role to help clients manage engagement, and to manage projects.

There was no single financial bundle that worked for everyone. The pilot included loan resources, but not all participants qualified. Different packages of resources worked for different participants and situations.

Based on the pilot experience, Energy Trust created a broader suite of marketing materials to engage at all points in the complex web of different ownership, loan, and sales channels for manufactured homes. Energy Trust also simplified the pre- and post- field inspections to address only critical issues and reduce costs.

Case Study 3. PGE/Energy Trust Smart Thermostat Co-funding

Context. Energy Trust is responsible for delivering energy efficiency programs for Oregon’s investor-owned utilities- Pacific Power and Portland General Electric, and three gas utilities. The electric utilities deliver demand control programs and other demand management offerings. Prior to the joint effort described below, Energy Trust was already running initiatives to install smart thermostats in single family and manufactured homes, relying primarily on retail and new construction channels, with some retrofits. This was justified entirely on the energy and peak savings from installing the thermostats without dispatchable control. However, the amount Energy Trust could pay was limited by the energy efficiency value to the system.

Initiative Concept. With pooled funding and benefits from PGE for demand control and Energy Trust for energy efficiency, it became financially feasible and cost-effective to significantly accelerate the installation of residential smart thermostats by covering most of the cost of the device and installation by a contractor.

The program was implemented using a contractor hired by PGE, and also through other channels such as a Bring Your Own Thermostat offer. Having the utility deliver the thermostat installation program made it easier to enroll participants in PGE's demand control program. The joint incentives were limited to models with features that met Energy Trust's specifications for producing energy savings, and PGE's for connecting with their system for demand control. One thermostat manufacturer acts as an aggregator, controlling the thermostats at the utility's request. For the other manufacturers the thermostats are controlled by the utility. Customers have override capability.

Development required concerted efforts by PGE and Energy Trust to align their budgets and technical specifications, and create new arrangements and agreements to co-fund. Under guidance from Oregon's Public Utility Commission there is not yet an approved cost-effectiveness method for efficiency and demand control combined. However, Energy Trust is permitted to perform an energy cost-effectiveness analysis that deducts PGE's payment toward the thermostat from the total cost. Likewise, PGE can deduct Energy Trust's payment from the cost in their benefit/cost analysis. Payment by the other party is taken by Energy Trust and PGE as a proxy for the value of demand control and energy savings, which allows for cost-benefit analysis based on the residual costs. With this approach to cost-effectiveness the incentives offered by the joint effort is cost-effective for efficiency and separately for demand response.² This approach is not perfect but is a streamlined and reasonable way to deal with two different benefits streams to different parties.

Results. This initiative significantly increased the volume of residential smart thermostats installed which accelerated Energy Trust energy savings, while providing PGE with a demand control resource. Based on Energy Trust evaluations and other sources, the thermostats were estimated to save between 282 and 594 kWh/year for electrically heated homes, and 13-46 kwh/year and 28-35 Therms for gas heated homes. The range reflects differences between multifamily and single family dwellings, different heating systems, and home with and without air conditioning. Based on experience with a prior "bring your own thermostat" pilot, PGE estimated that control of each thermostat could save .9 kW in the summer and 1.0 kW in the winter. The demand management program provided customer with an opt-out option during demand events through thermostat notifications.

In 2021, 7,084 thermostats were sold through PGE/Energy Trust cooperative agreement, out of a total of 13,910 sold through all Energy Trust channels for all Oregon investor-owned utilities combined.³

Incentives have varied over the course of the initiative. Beginning in mid-2021, customer payments cover from 0-12% of cost, depending on the thermostat model. Energy Trust pays 35-55% of cost. PGE pays 39-53% of cost depending on the thermostat model and the heating

² A cost-effectiveness exception was provided for homes with gas heat, where the demand savings are available to PGE only for air conditioning, not for heat, and the measure is not cost-effective. This allowed for streamlined operation and also allowed PGE to gain experience with savings from these homes.

³ Most of the rest were sold through an instant coupon channel. An unknown number of these also signed up for PGE's demand control program.

system. The differences reflect the varying value of each model and heating system to efficiency compared to peak reduction (Johnson, 2019).

Lessons. It takes a considerable amount of work to line up the processes and procedures between two organizations to jointly fund a consumer offering to meet two different purposes. Among the issues were creating a common technical specification that was a reliable source of energy and peak savings, agreeing on the delivery vehicle, creating the transaction documents between Energy Trust and PGE, and advance planning for goal and marketing alignment.

The situation for Oregon's investor-owned utilities may be unusual in that different organizations deliver savings for energy efficiency (Energy Trust) and for peak (investor-owned utilities). However, informal discussions with program managers at utilities who deliver both types of programs in other states indicate that their efficiency and demand programs are often subject to disparate regulatory filings and delivered by different internal groups. As a result, similar issues often are encountered.

The project was a sufficient success that PGE and Energy Trust are planning several coordinated ventures. We are currently testing together a demand control device for ductless heat pumps and researching technologies to marry demand control with heat pump water heaters. There are several others.

Case Study 4. Health plus efficiency funding potential

Context. This section of the paper is somewhat different in that it reports on exploration for a type of funding leverage that the Energy Trust of Oregon has not yet employed, but we think will be important in the future. We review the overall opportunity and context, and then briefly report on efforts elsewhere that may serve as a model.

Health related co-funding is one potential funding stream that Energy Trust has not leveraged yet but is exploring for a few reasons. It has potential to open up new savings opportunities and reach new customers that are most in need of assistance with efficiency improvements to their home environment which would also improve their health outcomes, producing high social impact.

Recent changes in thinking in the health care industry related to project focus and funding (preventative versus reactive) (VEIC, 2019) coupled with a growing body of research into the links between health and efficiency have led to several examples of where health funding is being used explicitly to support home efficiency improvements to improve occupant health. To date, these funding partnerships have been on a small scale and are described as "pilots", designed to test the logistics of co-funding mechanisms but also to verify that energy savings plus measurable health benefits are achieved. Both efficiency and health organizations benefit from these collaborations. Health agencies co-fund in the interest of improving health outcomes and reducing costs for repeat and emergency care for respiratory issues and injury prevention. Efficiency programs can extend their budgets to reach more customers and acquire more energy savings.

In most cases the efficiency program delivery organization builds additional health measures and expertise into existing home energy audits. These additions help to round out the

eight healthy home principles (US HUD)⁴ that may not already be achieved with home efficiency program designs.

The health funding sources include public health agencies through state government appropriations, and health care funding through state Medicaid Managed Care Organization's (MCO's) programs, state Children's Health Insurance Program (CHIP) Health Services Initiatives (HSIs), and local partnerships with community health workers, community hospitals, and practitioners.

Initiative Concept. Examples that illustrate a variety of approaches follow. States including Missouri, Maryland and New York have changed or are working to change Medicaid rules to enable Medicaid payments for in-home energy and health assessments. Missouri changed its Medicaid rules and created new Medicaid billing codes to allow Medicaid to pay for in-home assessments for asthma patients by Building Performance Institute's Healthy Home Evaluators.

A partnership between New York State Energy Research & Development Authority (NYSERDA) and the New York Department of Health (DOH) led to the development of the Healthy Homes Value-Based Payment (VBP) Pilot in 2020 (NY Health, 2020). VBP is the mechanism the state Medicaid MCOs use to direct funding to provide services that address social determinants of health such as housing conditions and energy burden. The pilot uses the VBP framework for funding to design services and validate impacts such as health care cost savings and benefits to residents from interventions like energy efficiency/weatherization and home injury prevention measures.

In Washington, the state legislature appropriated \$4.3 million in 2015 to expand the low-income residential weatherization program to include healthy homes improvements and become the Weatherization Plus Health program. Weatherization agencies collaborate with community health workers to identify homes and deliver services. Results show many low-income clients are also medically vulnerable, and 65% reported fewer respiratory symptoms after program services were delivered. The non-energy benefits meet or exceed measure costs (VEIC, 2019).

In Wisconsin, the Lead-Safe Homes Program (LSHP) is statewide program which provides financial assistance for qualifying residents to make repairs to their homes that mitigate lead risk and can be used for weatherization projects (Wisconsin DHS).

One path for exploration. Inspired by these examples and recent collaborations led by ACEEE (ACEEE, 2021), one possible path for Energy Trust to explore to leverage of health funding could be to 1) identify and quantify participant health benefits from home efficiency measures they deliver in Oregon, 2) share these findings and build relationships with state and local health organizations, 3) test and measure the impact of combining funds, 4) scale where benefits are clear. This section explores these steps in more detail.

Identifying health benefits. People in the United States spend 87% of their time indoors (Gillingham, 2021), so quality of indoor air is essential to human health. Energy upgrades such as new windows, insulation or new heating and cooling systems save energy while positively impacting quality of life by improving indoor air quality, mitigating thermal stress during extreme heat or cold, and reducing exposure to hazardous ambient air quality resulting from wildfire smoke and other conditions.

⁴ Eight principles include keeping homes dry, clean, safe, well ventilated, pest free, contaminate free, well maintained, thermally controlled. US HUD

These findings hold growing importance considering the needs for climate adaptation. In 2020, Oregon experienced devastating wildfires to rural communities with impacts of poor air quality throughout the state and beyond the region. 2021 brought temperature extremes to the state with a multi-day grid outage from a February snow and ice event followed that summer by a record setting and deadly heat event. (Senate Finance Committee, 2021) These events raised awareness of disparities in energy equity as lower income residents were less likely to have air conditioning or well weatherized homes to maintain comfortable temperatures for longer periods.

Reductions in local air pollutant emissions from energy efficiency that improve outdoor air quality, and provide substantial benefits to human health, are another important consideration. However, such benefits are not currently considered in the Oregon cost-effectiveness framework, because they accrue to everyone, not specifically the utility and participant. This would make them a component of the Societal test.

Monetizing health benefits. Although health benefits to program participants have been identified and recognized, they are often disregarded or undervalued in cost effectiveness tests used by program administrators to justify ratepayer funded programs. (Lazar and Colburn, 2013)

As research linking energy efficiency improvements with health benefits increases, there are more resources available to program administrators for standardized approaches or methodologies to monetize benefits which don't require funding costly primary research studies but do need to be tailored to local conditions, census data and program offerings. (Hayes, 2020) (EPA, 2018). In Oregon, the Energy Trust also has the option of describing the significance and pervasiveness of health benefits, and if estimates of these benefits vary significantly due to differences in study design, participant characteristics, or program designs, Energy Trust may request a cost-effectiveness exception from the Oregon PUC.

Funding Health. The next step takes commitment of time and patience as the work shifts from introspection and analysis to relationship building. Identification of which of the eight principles of healthy homes (US HUD) is important to the health funder and which of those principles are being achieved through the efficiency program create mutual understanding of what the collaboration can achieve.

An example of public health funding new to Oregon is through Healthy Homes Program legislation, HB 2842 (Oregon Legislature, 2021). This bill appropriated funding to the Environmental Public Health section of the Oregon Health Authority to administer grants to low-income households for home repair and energy efficiency projects. The act of establishing this program is evidence that policy makers in Oregon are acknowledging the linkages between efficiency and health and health organizations are therefore more likely to be receptive to forming a complementary relationship.

Another example of a potential health funding opportunity highlighted in ACEEE's recent work is the Children's Health Insurance Program (CHIP). This federally funded program with state matching fund requirements (80/20) provides health coverage to children in families with incomes above Medicaid limits yet unable to obtain insurance. In many states like Oregon, there is unspent administrative CHIP funding that might be used for Health Service Initiatives which support home assessments and efficiency upgrades where the efficiency program funding could be the state match source.

Challenges and Opportunities. So far, leveraging health funding for efficiency is happening at small scale as these relationships and mechanisms are still new and so many challenges remain. Health care and efficiency delivery organizations may not be familiar with each other, it takes time to find the right people at the right organizations who have similar objectives of increasing impact as well as the authority to designate funding to do so. Public health agencies may be further along in linking health to home efficiency.

Creating a clear business case that can be tested and verified may be essential to securing health care funding. That may mean adding new analytical, evaluation and reporting requirements to efficiency programs. Verifying health benefits at a project level may not be realistic for large scale program delivery.

Health funding may be available for participants who are qualified based on health or related conditions but is unlikely to be available to all participants that qualify for the efficiency program. This makes administration complex to start.

In Oregon, traditional low-income efficiency programs are delivered by Community Action Agencies. Health funding agency resources (E.G. Medicaid funds) are targeted for those with greatest need which tend to be lower income residents. The best documentation of health benefits centers on low-income programs which deliver a different basket of efficiency services from Energy Trust's weatherization initiatives.

The diversity of health maintenance structures throughout the country makes it hard to directly replicate solutions, the work of customizing takes time and commitment.

Conclusions

Leveraging funding has enabled energy efficiency program providers to achieve modest but meaningful increases in program results that would not have been possible otherwise - i.e., it makes sense to combine funds. Opportunities to leverage funding are worth exploring for any type of regulated utility rate-funded energy efficiency program provider, especially where rate impacts or cost-effectiveness are at issue.

Leverage has not thus far reduced Energy Trust's costs to achieve savings- it is more promising as a means to increase energy and financial savings within reach from customers with higher barriers to participation, while moderating or avoiding increased cost per kWh or Therm saved.

Leverage is often the fruit of years of work on an intentional partnership, but sometimes is a consequence of independent actions by others. State and federal tax credits, for example, have provided significant leverage, with decisions often made by political bodies with little reference to program offerings. However, tax credits are less effective for customers with limited incomes, and the volume of capital available from these credits (at least in Oregon) has been waning. As a multi-year endeavor with new partners, work on new sources of leverage is inherently uncertain. It sometimes takes years just to build the experience and understanding for a joint investment to make sense to both parties. It is important to work toward a checkpoint where both parties can ask whether the partnership and consequent joint investments are promising, are a priority and are feasible.

While this paper focuses primarily on leveraging funding, the leveraging of expertise, customer and contractor relationships and understanding and trust within diverse communities is also very important element of successful partnerships.

There is a tradeoff between detailed reporting and the ability to build partnerships. Not all organizations that can access other funding are willing and able to provide detailed reporting on that funding or on customer participation in the way that efficiency programs and regulators often expect- particularly if the leveraged funding provides a complex of services not limited to energy efficiency. Sometimes it is wise to focus not on the financial details of the non-energy efficiency partner's operation, but more simply on reporting how much savings was leveraged. Avoid delays in scaling by thinking through necessary information exchange when the partnership achieves the level of maturity to support this discussion. Key data issues include format, frequency, what information is essential, and sharing of platforms and existing reports.

A key decision by the Oregon Public Utility Commission enhanced the usefulness of leveraged funding- in certain situations allowing funding by other parties to be evidence of additional values beyond energy savings that can be factored into the TRC. This allows programs and measures that would otherwise not pass this investment test to do so. We are not aware of other states where this is the case. Regulators in other states may wish to consider adapting this provision to align their efficiency resource value-focused investment tests with a world where additional values are often both important and difficult to otherwise quantify.

Efforts to achieve financial leverage with other funders are likely to be most successful under the following conditions:

- There are clear, large benefits beyond energy savings to the utility, and another entity who has a mission to achieve those benefits.
- That other entity has a clear line on funds to augment funds from the utility program provider.
- For that other entity, criteria for success are clear and complementary to energy savings goals.
- The potential funding partners understand and support each other's accountabilities and reporting needs.
- The other funding entity is organized to deliver consumer programs that improve homes, buildings, or equipment, is prepared to significantly expand and alter their structure to do so, or willing to directly fund the efficiency program provider.
- To the extent that the programs address historically under-served communities, there is an established dialogue and trust relationship between the community members to be served and the entities who will directly provide the services.

As we face the need to move past acquiring easy and inexpensive energy efficiency, the importance of combining sources of funds and expertise will only grow. In the next few years, experiments with scaling up projects like those described in this paper will determine whether new forms of leverage focused on housing, social justice, and peak reduction become a significant element of an energy efficiency. Our ability to achieve climate goals for energy efficiency may depend on these more creative financial arrangements.

References

ACEEE, 2021. *ACEEE Seeks Partners to Tap \$1B in Federal Funds to Improve Home Health and Efficiency*, Washington, DC: American Council for an Energy-Efficiency Economy.
<https://www.aceee.org/blog-post/2021/11/aceee-seeks-partners-tap-1b-federal-funds-improve-home-health-and-efficiency>

ADM 2021. “2020 Customer Insights Study Final Report Prepared for Energy Trust of Oregon” ADM, Sacramento, Ca. Page 1.<https://energytrust.org/wp-content/uploads/2021/04/Energy-Trust-CIS-Final-Report-wSR.pdf>

Amadeo, 2022. Amadeo, K, *ARA, the Details, with Pros and Cons*, New York: The Balance, [American Recovery and Reinvestment Act \(ARRA\): Details \(thebalance.com\)](https://thebalance.com/american-recovery-and-reinvestment-act-arra/)

EPA, 2018. “Quantifying the Multiple Benefits of Energy Efficiency and Renewable Energy: A Guide for State and Local Governments”, Washington, DC: U.S. Environmental Protection Agency.

https://www.epa.gov/sites/default/files/2018-07/documents/epa_slb_multiple_benefits_508.pdf

Energy Trust, 2020 (1). Johnson, M, and M Wyman, *Co-Funding Demonstration Period Evaluation: Energy Trust of Oregon and Community Action of Washington County*, unpublished, Portland, OR: Energy Trust of Oregon.

Energy Trust, 2020 (2). *September 2020 Conservation Advisory Council Packet*, Portland, OR: Energy Trust of Oregon. <https://www.energytrust.org/wp-content/uploads/2020/09/CAC-Meeting-Packet.pdf>

Energy Trust, 2020 (3). *2021 Action Plans*, Portland, OR: Energy Trust of Oregon. https://energytrust.org/wp-content/uploads/2021/12/Action-plans_1.pdf, pages 19-21

Energy Trust, 2020 (4). *Energy Trust Annual Report Highlights Achievements in 2019*, Portland, Or: Energy Trust of Oregon. <https://blog.energytrust.org/energy-trust-annual-report-highlights-achievements-in-2019>.

Energy Trust. 2021 (1). *May 14, 2021. Conservation Advisory Committee Packet*, Portland, OR: Energy Trust of Oregon. <https://energytrust.org/wp-content/uploads/2021/04/CAC-Packet-May-14.pdf>, pages 59-81

Energy Trust, 2021 (2). *August 4, 2021. Conservation Advisory Council Packet*, Portland, OR: Energy Trust of Oregon, Portland, OR. <https://energytrust.org/wp-content/uploads/2021/02/Packet-August-4.pdf>

FCA, 2021. Farmer’s Conservation Alliance, *Energy Trust Investment*, Hood River Oregon: Farmer’s Conservation Alliance. https://2pw3hvl1eaczqwfly22eqqvb-wpengine.netdna-ssl.com/wp-content/uploads/2021/05/IMP_Energy-Trust-Investment-Impacts-2.2021.pdf

Gillingham, 2021. Gillingham, K, P. Huang, C. Buehler, J Peccia, and D. Genter, *The Climate and Health Benefits from Intensive Building Energy Efficiency Improvements*, Science Advances, Vol 7, Issue 34. <https://www.science.org/doi/10.1126/sciadv.abg0947#core-R6>

Gross, 2021. Michelle Gross, “Building Energy Codes are a Quiet Success Story of the Infrastructure Bill”, Alliance to Save Energy, Washington, D.C.
<https://www.ase.org/blog/building-energy-codes-are-quiet-success-story-infrastructure-bill>

Hayes, 2020. Hayes, S., C. Kubes, and C. Gerbode, *Making Health Count: Monetizing the Health Benefits of In-Home Services Delivered by Energy Efficiency Programs*, Washington, DC: American Council for an Energy-Efficient Economy, www.aceee.org/researchreport/h2001

Johnson, 2019. M. Johnson, *Final DI Thermostat Workshop Presentation*, Portland, OR: Energy Trust of Oregon, February 15, 2019. unpublished

Lazar and Colburn, 2013. Lazar, J. and K. Colburn, *Recognizing the Full Value of Energy Efficiency*. Montpelier, VT: Regulatory Assistance Project. <https://www.raponline.org/wp-content/uploads/2016/05/rap-lazarcolburn-layercakepaper-2013-sept-09.pdf>

Moersefelder, 2018. Moersefelder, S, Gordon, F, Cullen, J, and Engel, B, *Long Term Energy Efficiency Forecasting- Board Learning Paper*, Energy Trust of Oregon, Portland, Oregon.
https://www.energytrust.org/wp-content/uploads/2018/05/Long_Term_EE_Forecast_Paper.pdf

NY Health, 2020. New York State Department of Health, Albany, New York: *Medicaid Redesign Team II, Executive Summary of Proposals, March 19, 2020*,
https://www.health.ny.gov/health_care/medicaid/redesign/mrt2/docs/2020-03-19_executive_summary_of_proposals.pdf

Opinion Dynamics, 2020. “Energy Trust of Oregon- Manufactured Home Replacement Pilot Evaluation”, Opinion Dynamics, Waltham, MA, Page 1. https://energytrust.org/wp-content/uploads/2021/05/Manufactured-Home-Replacement-Pilot-Evaluation_Final-.pdf

Oregon Legislature, 2021. “Enrolled House Bill 2842”, Salem. OR: Oregon Legislative Assembly.
<https://olis.oregonlegislature.gov/liz/2021R1/Downloads/MeasureDocument/HB2842/Enrolled>

OPUC, 1994. Oregon Public Utility Commission, “Order UM 551”. Salem, Oregon

ORS, Undated. “Oregon Revised Statutes 757.612”, Salem, OR, Oregon Legislative Assembly,
[ORS 757.612 - Requirements for public purpose expenditures](https://www.oregonlegislature.gov/orsc/ors/757.612)

PacifiCorp, 2022, *Presentation for PacifiCorp’s 2023 Integrated Resource Plan (IRP) public-input meeting on May 12, 2022*, Salt Lake City, Utah, pacificorp.com/energy/integrated-resource-plan

US HUD, undated. *Healthy Homes- Eight Tips for Keeping a Health Home*, Washington, DC: US Department of Housing and Urban Development.
<https://www.hud.gov/sites/documents/HH8TIPS.PDF>

Senate Finance Committee, 2021. *Wyden Calls on Oregon Insurers to Provide Seniors with Cooling and Air Filters*, Washington, DC: Senate Finance Committee.
<https://www.finance.senate.gov/chairmans-news/wyden-calls-on-oregon-insurers-to-provide-seniors-with-cooling-and-air-filters->

VEIC, 2019. “Energy-Plus-Health Playbook, Burlington, Vermont: Vermont Energy Investment Corporation. <https://www.veic.org/clients-results/reports/energy-plus-health-playbook>

Wisconsin DHS, 2021. *The Lead-Safe Homes Program*. Madison, WI: Wisconsin Department of Health Services. <https://www.dhs.wisconsin.gov/lead/lshp.htm>