Options for Educating Oregon on Energy Efficiency

Energy Education Research by Grounded Research and Consulting, LLC

Performed for Energy Trust of Oregon

FINAL

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RESEARCH AND CONSULTING

Sources for pictures on the front page and when picture is duplicated later in the report

Left: *http://www.lcmfestival.com/wp-content/uploads/2012/04/IMGP9518.jpg*

Middle: http://panacea.london/project/energy-efficiency-in-education/

Right: *https://www.consumersenergy.com/~/media/CE/Images/Content%20Images/descriptor-images/smiling-family-looking-at-phone-rr.ashxBack%20up*

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Executive Summary

Energy Trust of Oregon (Energy Trust) contracted with Grounded Research and Consulting, LLC (Grounded Research) to research three potential energy education areas. This relatively quick turnaround effort (six weeks) is an initial scan of areas already chosen by Energy Trust. In 2016, these areas were presented to Energy Trust's board as high-level educational concepts. The board indicated interest and the management team gave staff the go-ahead to explore these areas in further detail. Staff will utilize information from this report to help determine if any of these three areas are worth further exploration.

The Research

This research used information from over 50 reports to explore four research questions in three areas of investment.

- Research Goal
  - To provide Energy Trust staff with sufficient decision-making information on which investment areas Energy Trust staff should pursue
- Investment Options
  - Community education and engagement through a variety of approaches
  - K-12 engagement through new offerings
  - Customer engagement via expanding web with general informational content about energy efficiency and generation
- Research Questions
  - What approaches have been used to educate the target audiences, and what examples exist?
  - How effective have past programs been in increasing participation, touching new and diverse audiences, and in creating customer readiness (i.e., customer ability to take action)?
  - What are the benefits and drawbacks of investing in each of the three investment options?
  - How have programs measured success for education-based efforts in these three areas?

The Findings

This research explored the ability of each investment option to lead to one of three outcomes: participation in programs, new and diverse audiences, and customer readiness (i.e., customer ability to take action).

Overall, we found that:

- Community-based engagement may be the most effective option for driving participation.
- Customer engagement via website is a good option for reaching many customers simply because of the ubiquitous aspect of people accessing the internet, but all efforts can reach new audiences.
- Community-based engagement may be the best option for reaching diverse audiences because they can leverage existing networks of community-based organizations that work with diverse audience, but K-12 efforts can also be used to target these groups.
- K-12 engagement is the most likely to document its effectiveness at improving customer readiness because it can be structured as a traditional educational effort; however, it is limited to families with children (which is only 33% of Oregon households[1]) and often to families with children in grade school, as grades 4-6 are typically the focus of K-12 programs.

[1] Households with children under the age of 18. Data from https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk

Table 1. Overview of Effectiveness by Investment Option

Effectiveness Area	**Community-based Engagement** *Research indicates that this type of engagement:*	**K-12 Engagement** *Research indicates that this type of engagement:*	**Customer Engagement via Website** *There is little public research on effectiveness in this area, but there is some evidence that this type of engagement:*
Increasing Participation in Programs	Effectively drives participation in programs or behavioral changes, but may be costly or resource intensive	Is limited in its ability to increase program participation	Can support participation in programs
Touching New and Diverse Audiences	Tends to reach deeper into the communities that are targeted than standard outreach	Can have a broad reach depending on the number of schools and teachers participating	Can reach many people, depending on how the site is marketed
	Can be used to reach diverse populations, although these populations tend to have barriers to participating	Can reach diverse populations such low-income students and families if targeted to these groups	
Creating Customer Readiness	Increases customer readiness by introducing concepts, but knowledge change is not usually measured	Increases knowledge among students and families to help create customer readiness	Can provide a stable source of educational information to increase knowledge

Gray boxes designate the investment option that may be the most effective in that specific area

The literature provided information on a variety of approaches used within each investment category that Energy Trust may want to consider, shown as options in the table below. Each of the options below, come with advantages and disadvantages, discussed in the report.

Table 2. Summary of Approaches and Energy Trust Options to Consider

Investment Option	Categories of Approaches	Options to Consider
Community Engagement	Municipal champion-led model	Create a network of municipal outreach efforts. Energy Trust may want to consider a model that builds on existing efforts and tries to build a stable network of municipal partnerships that can be leveraged year over year
	Community-based organization-led bottom up model	Provide small grants for a bottom-up or "grassroots" education by organizations with ties to the community
	Implementer-led top-down model using "stacked activities" that include community organizations	Increase outreach through top-down model led by an implementer using "stacked activities" that include community organizations
	Program+ models	Choose a specific program where additional education, led by the community, could enhance participation
K-12 Engagement	Classroom-based curriculum and activities—no kits	Continue classroom-based curriculum with the 6th grade that builds on past LivingWise efforts In addition, Energy Trust may want to consider placing teacher plans, student workbooks, or curricula online to build a more stable resource
	Programs with curricula and activities in an afterschool program or energy club	Engage with afterschool programs to deliver curriculum and activities
	Activity-based programs	Consider activity-based school programs such a competition or student energy club
Customer Engagement via Website	Interactive/responsive webpages	Add how-to videos, guidebooks or other resources to the existing website to increase a customer's *ability* to act
	Interactive educational tools where a consumer can go for additional information that they cannot get elsewhere	Add interactive website material such as pledges or competitions that are connected to outreach activities such as community- or school-based effort Enhance existing customer engagement with Home Energy Review (HER) users by allowing them to provide feedback so that Energy Trust can follow up with them later
	Outreach related options	Work with partners to leverage search engines and reach customers who would not otherwise come to the Energy Trust site, or find ways to identify energy high users and offer them links to Energy Trust.

As Energy Trust staff think about how to go beyond the current Energy Trust efforts and educate customers further on energy efficiency and renewable generation, they have a difficult decision. Our research highlights that each of the three possible investment areas offers multiple approaches with their own advantages and disadvantages. In addition, the reported data on effectiveness varies, and the literature lacks robust cost data, meaning that Energy Trust must make their choice with a degree of uncertainty in the outcome of any chosen path.

Introduction

Energy Trust of Oregon (Energy Trust) contracted with Grounded Research and Consulting, LLC (Grounded Research) to research three potential energy education areas. This relatively quick turnaround effort (six weeks) is an initial scan of areas already chosen by Energy Trust. In 2016, these areas had been presented to their board as high level educational concepts. The board indicated interest and the management team gave staff the go-ahead to explore these areas in further detail. Staff will utilize information from this report to help determine if any of these three areas are worthwhile to delve into further prior to designing an energy education offering.

While all the areas focus on energy education, Energy Trust chose to explore three areas that are quite different in terms of targeted audience and engagement activities, as described below.

- **Community-based Engagement** – Programs that generally work with existing community organizations or leaders to educate a wide range of customers on energy efficiency or renewables. This type of program actively looks for and educates the targeted audience.
- **K-12 Engagement** – Programs that target students in one or several K-12 grade levels with a secondary audience of the students' families. This type of program actively recruits schools to bring forward education specific to energy efficiency / renewables.
- **Customer Engagement via Web** – Inclusion of educational materials on a website. This activity includes various ways to educate the customer on multiple topics that may or may not be directly related to programs on energy efficiency or renewables. (For Energy Trust, this type of engagement would be an expansion on the current website that already includes a small amount of educational content.)

Additionally, Energy Trust wanted to know how effective each potential investment area was in terms of: (1) expanding customer participation over the long-term, (2) helping create customer readiness (for energy efficiency, demand response, renewables, etc.), and (3) increasing new audiences and/or diversity (which could be in terms of geography or demographics). In addition, Energy Trust was interested in resources that could become a stable source of information that customers can return to as needed.

Grounded Research researched the engagement areas through a literature review and found varying levels of available written information about the effectiveness of implementation activities within each. For example, we found nothing written that helped describe effectiveness for becoming a stable resource of information. As such, we attempted to discuss the concept overall within each engagement area, but we were not able to provide direct examples.

We structured the report around each area (i.e., community-based engagement, K-12 engagement, customer engagement via web). The report structure is as follows:

- Executive summary
- Introduction (this section)
- Research goal, questions, and method
- Findings by potential engagement investment area (i.e., community-based, K-12, and customer engagement via web)
  - One-page summary of findings in the area
  - A description of the area and past and/or current Energy Trust activities in the area
  - Categorization of the information found within our research to help describe the variation within each engagement type
  - A detailed table of findings and summary of effectiveness in terms of participation, new audience, and customer readiness
  - Benefits and drawbacks grounded in the literature review findings
  - Grounded Research's thoughts on investing in the area with specific options for Energy Trust to consider
- Study Conclusions and Summary of Investment Options

Research Goal, Questions, and Method

Based on our discussions with Energy Trust staff, this research focused on these three areas of potential investment in energy education:

- Community education and engagement through a variety of approaches
- K-12 school engagement through new educational offerings
- Customer engagement through expanding general informational content about energy efficiency and generation on the website and through the call center

Within these three areas, Energy Trust has several outcomes that they want from energy education:

- Expanding customer participation over the long-term
  - This area focuses on increasing participation in Energy Trust programs, and is closely tied to creating customer readiness and attracting new audiences, both of which can serve to expand participation in future Energy Trust programs
- Helping create customer readiness (for EE, DR, Renewables, etc.)
  - This includes providing educational information on energy efficiency or other areas that helps get customers "ready" to make decisions in the future. For this research, we infer that knowledge of energy efficiency, demand response or renewable options enables a customer to consider energy efficiency or renewable options when they are ready to take an action
- Attracting new or diverse audiences
  - New audiences are customers that Energy Trust can provide services to that are not yet aware of Energy Trust's services
  - For Energy Trust, diverse audiences are lower-income customers, geographically remote, or demographically in the minority.
- Becoming a stable resource of information that customers can proactively go back to as needed
  - For this research, we assume that a stable resource is a place or organization where people know they can get useful information or infrastructure that exists over a long period.

Goal

The goal of this research was to provide Energy Trust staff with sufficient decision-making information on which investment areas Energy Trust staff should pursue (i.e. community engagement, interested general population engagement, K-12 engagement, or a combination of these).

Questions

To reach the goal, Grounded Research answered the following questions:

1) What approaches have been used to educate the target audiences, and what examples exist?
2) How effective have past programs been in in increasing participation, touching new and diverse audiences, and in creating customer readiness (i.e., customer ability to take action)?
3) What are the benefits and drawbacks of investing in each of the three investment options?
4) How have programs measured success for education-based efforts in these three areas?

Method and Limitations

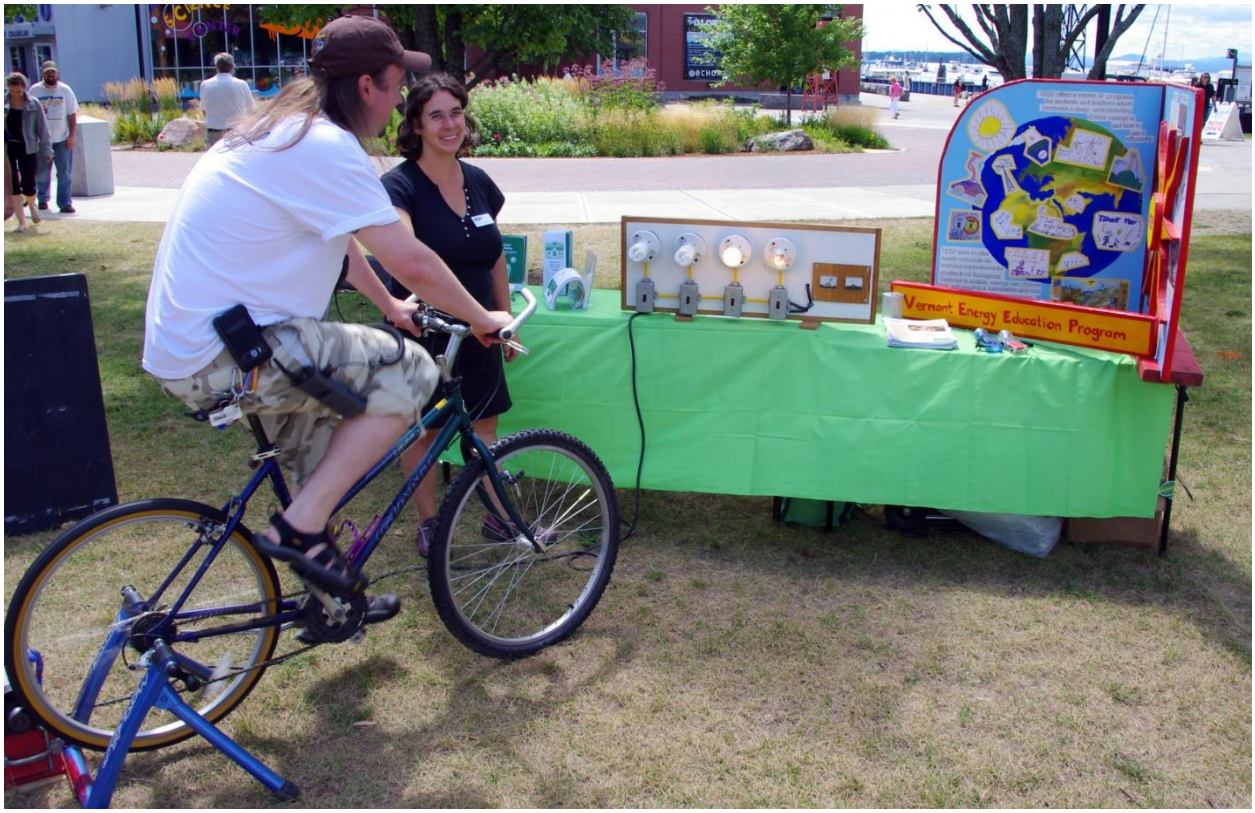
Grounded Research performed three distinct data collection activities during this research. Our primary task was reviewing existing literature. It is important to note that our review was not intended to enable quantitative analysis across each area, but as an initial scan of possibilities that Energy Trust could explore further. We held four short (30 minute) listening sessions with Energy Trust staff to enable us to understand past Energy Trust efforts. Lastly, we made short, targeted calls to various people to dig deeper into specific reports and answer questions that went beyond the written report.

During our literature review, we provided Energy Trust staff with short summaries of our findings and requested feedback on how we had categorized the information.

We note that our study cannot compare the engagement efforts through the lens of program costs or measurement costs because program assessment reports often do not include program costs and virtually never include measurement costs. We went outside of the reports and looked at utility filings when possible to understand program or evaluation costs, but were successful only in a few cases. While we provide cost information in general terms and by ranges, this often-used decision making criteria is not available from this study. However, we have attempted to help decision makers by providing significant levels of detail on what we found from the literature and giving very loose estimates of cost where we could.

Community-Based Engagement

Investment Option Findings



Source: http://www.lcmfestival.com/wp-content/uploads/2012/04/IMGP9518.jpg

Community-Based Engagement Summary

Community-based efforts range in size and approach

Community-based efforts target a specific population that is connected by geography and potentially a common social structure or network (i.e., church, Asian American network). They often work with local organizations to reach individual homes or businesses, but the level of involvement with the local organization ranges. These efforts include a variety of activities including door-to-door canvassing or other in-person strategies (workshops, events, parties). Innovative efforts also use community-based social marketing (CBSM), which draws from several available behavior change tools including competitions, feedback, and web-based activities. We categorize efforts into city-led, Community Based Organization (CBO)-led, implementer-led and Program+ models.

Other information specific to this area

Not all CBOs are created equal; the best examples are ones that already have a network to reach out to communities, and efforts that benefit both the program administrator (such as Energy Trust) and the local CBO (e.g., they learn about other things while going door-to-door). "Stacked" activities are thought to be most successful.

Effectiveness of Community-based Efforts

Community-based efforts can:

- Effectively drive participation in energy saving programs or behavioral changes. Participation rates tend to be higher with than without the community-based effort, but comes with increased costs.
- Can be used to reach diverse populations, although these populations tend to have barriers to participating.
- Increase "customer readiness" by introducing concepts, but generally are not measured by changes in knowledge.
- Tend to be shorter-lived than other outreach or program efforts, but this has the potential to change.

Other Benefits and Drawbacks

Category	Benefits	Drawbacks
All	• Can adapt to community needs • Participation tends to be higher	• Costs and resources required from program administrator tend to be higher • Tracking can be difficult
Municipal-Champion	• Leverages city resources • Can be a more stable network than CBO-led models	• City resources can be limited • Requires a champion
CBO-led bottom up "grassroots" education	• Leverages CBO knowledge • Reaches new audiences	• Diffuse, and so sometimes seen as less effective
Implementer-led top down through stacked activities	• Steady model that uses lots of outreach activities; broader reach	• Can be expensive
Program+, add on to program	• Increases participation	• Tend to be expensive

Program Cost Info

Small grant efforts range between $5,000 and $35,000.

Community-based programs range from $150,000 to over $1 million per year. Higher costs are typically associated with offering enhanced incentives.

Measurement Cost Info

For grantees, measurement can occur through status reporting at no additional cost.

For participation-based efforts, measurement can be from low-cost participation analysis or more costly quasi-experimental methods.

Community-Based Engagement

Community-based efforts aim to reach a specific population that is connected either by geography or by a common social network (i.e., church, Asian American network). Community-based efforts can target households, businesses, or municipal facilities. They generally work with local organizations to reach individual homes or businesses, but the level of involvement with the local organization ranges from playing an advisory role to active outreach and/or implementation of energy efficiency projects. Innovative efforts also use community-based social marketing (CBSM) techniques, which draw from several available behavior change tools including competitions, feedback, and web-based activities[2].

> *"CBSM is an approach to achieving broad sustainable behavior in our communities. It combines the knowledge from psychology and social marketing to leverage community members' action to change behavior (not just make them aware of an issue). CBSM is more than education, it's spurring action by a community and for a community." (From* https://commonspark.wordpress.com)

In the literature on community-based efforts, there are a wide-range of activities mentioned including: volunteer training, canvassing (door-to-door), hosted events (block parties, house parties), workshops, demonstrations, technical trainings or technical assistance, giveaways (e.g., CFLs or energy efficiency starter kits) as a "gateway" action, in-home or business audits, in-home installations, competitions (e.g., neighborhood energy sweeps), and film festivals or video projects. In the literature, there are also examples of community-based efforts that work with schools through school visits, field trips, or other school-based activities. Notably, most community-based efforts use multiple activities that are stacked together to reach the community that they target.

Community-based efforts are also almost always coupled with traditional marketing efforts.

Through this research, Energy Trust sought to explore options for expanding their existing community-based efforts, which include, but are not limited to:

- **Partnering with Sustainable Northwest to host workshops to educate communities about energy saving and generation opportunities.** In 2016, Energy Trust provided technical and staff support, as well as small sponsorship to Sustainable Northwest for their Making Energy Work for Rural Oregon workshops in four communities. This effort is expanding to additional communities in 2017.
- **Helping Hood River County and other communities acquire an energy and sustainability coordinator** through AmeriCorps Resource Assistance for Rural Environment Program. The position was an outcome of the Making Energy Work for Rural Oregon series, hosted by Sustainable Northwest. In addition to Hood River, there have also been AmeriCorps volunteer placements in other communities including Talent, Roseburg and Pendleton.

In addition, past Energy Trust efforts in this area include, but are not limited to:

- **The Corvallis Energy Challenge** (2008-2009): The Corvallis Energy Challenge was designed as a year-long effort between Energy Trust of Oregon and the Corvallis Sustainability Coalition. This challenge "used hundreds of volunteers as well as expertise from Energy Trust, to involve the community and raise awareness about and interest in energy efficiency and renewables, and to achieve a targeted level of participation in some of Energy Trust's existing programs.[3]" It completed 800 (of 1,000 goal target) Residential Home Energy Reviews and 50 (of a targeted 50) walk-through assessments for small and medium sized businesses at a cost of about $112,000.

[2] See also the Customer Engagement section for more information on web-based activities and competitions.
[3] Dethman and Associates. 2010. *Corvallis Energy Challenge Evaluation: Final Report.* Prepared for the Energy Trust of Oregon.

- **The Georgetown Energy Prize** (2014-2016): Energy Trust supported Bend and Corvallis with technical assistance and a small sponsorship as they competed for the Georgetown Energy Prize, a national challenge to communities to rethink their energy use, and implement creative strategies to increase efficiency. As part of this effort, Energy Trust also provided kits for a Bend door-to-door outreach effort with AmeriCorps volunteers. While these communities are no longer competing in the Georgetown Energy Prize, Energy Trust continues to provide some support for energy-saving community efforts through established program offerings in 2017.
- **Partnering with Zoo Teens.** Energy Trust partnered with the Oregon Zoo, Zoo Teens program, to provide outreach on energy efficiency and Energy Trust programs during the annual Zoo Lights celebration.

Below we describe additional community-based opportunities that Energy Trust may want to explore to build on these past and existing efforts.

Categories of Community-Based Efforts

Community-based efforts can take many forms. In looking across the literature on this topic, there appear to be four types of models. Each of these models offers Energy Trust different opportunities in terms of an overall approach to community-based outreach. Note that many of the activities within these models are the same, but Energy Trust's objectives, involvement and role would be different by model.

- **Municipal champion-led model ( ):** This type of model both engages a city or community, and looks to the city or community to provide leadership in the effort. This type of an effort can range from working directly with the city government to working with a town energy committee or local city-wide champion that serves on a voluntary basis. It may include working with one city or municipality, or be open to all communities across a state. Within a Municipal-champion model, the goals can be set in collaboration with the municipality, or Energy Trust could set a goal and challenge cities to commit to reaching the goal. One point of distinction in this model is that there is *active* leadership by the city or community, which means that while Energy Trust is also an active player, Energy Trust is not carrying the full burden of the effort. These are generally multi-year, longer-term investments that build some capacity within a city as they work towards the goal. The efforts described below range from $150,000 to over $1M per year, but this more expensive option can be scaled down to a lower level of investment. (For the sake of this document, we put shorter-term, implementer-led challenges in communities where the implementer is the primary driver in a different category.)
    - **Goals:** The goals of these efforts are generally engagement of the community and energy savings, often coupled with sustainability or CO2 reduction goals.
    - **New and diverse audiences:** These are less likely to specifically target diverse audiences. However, by targeting the community in more depth, they can reach these audiences more effectively than broader based marketing. That is, they can reach deeper than standard outreach efforts by Energy Trust. The municipal leadership, however, may also work with non-profits that target minority or low-income populations.
    - **Examples of municipal champion efforts include**:
        - Renew Boston (MA): This effort was led by the City of Boston Mayoral office. The effort engaged program administrators, implementation contractors, and a network of community-based organizations. City of Boston representatives were responsible for developing marketing and outreach materials, maintaining the website, and providing overall marketing and outreach coordination. *Renew Boston* had dedicated staff who worked on-the-ground with community groups on managing and customizing outreach across the city of Boston and Community partners. Renew Boston targeted both residential

and business customers in 2010-2011, with the goal of increased participation in existing audit and rebate programs.

- Connecticut's Clean Energy Communities (CT): This effort challenges cities and towns to make a 20% reduction in municipal and board of education buildings. To date 158 of 169 Connecticut communities have pledged to reduce energy. Cities and towns receive grants based on residential and business participation. There is also a Sustainable-Energy Community level that towns can achieve when they continuously engage in outreach and energy-efficiency campaigns with their residents, community organizations, and businesses; integrate *eesmarts™* curriculums into the schools; and have achieved 30 percent residential-program participation as well as 20 percent commercial-program participation, among other requirements.
- Hometown Rewards (IA): This was a two-year partnership with communities to develop and implement energy savings initiatives. Cities worked with the implementer to analyze baseline energy consumption and set a city or community goal. This effort required government support from the mayor or city council.
- Take Charge Challenge (KS), This effort was run as a challenge over a two-year period (with the second year being ARRA supported). Residents and businesses competed based on whole house energy efficiency, lighting changes, and community involvement. The winning communities were awarded with prizes.
- Vermont Home Energy Challenge (VT): This effort was a year-long[4] engagement to test the potential of local communities to help raise awareness of energy efficiency and increase the number of homes in the Home Performance with ENERGY STAR program. VEIC provided a framework, and worked with town energy committees or local municipal champions.

The New York State Energy Research and Development Authority is also in the process of developing a new municipal-champion model to engage communities through Clean Energy Communities by offering grants, direct technical support, tools and resources, and recognition to local governments. No information on effectiveness was available at the time of this report since it was just launching, and the activities represent a much larger effort than what is currently being considered by Energy Trust.[5]

- **Community-based Organization, CBO-led, bottom-up models of "grassroots" education ( ):** This type of a model usually includes an RFP or grant-based process that actively solicits ideas for how the non-profit CBO would help Energy Trust meet their outreach / education objectives. Successful efforts leverage the activities, networks, and mission of the CBO in a mutually beneficial manner. The administrator develops the criteria for selection and selects the groups, builds standardized reporting, provides high-level support for multiple organizations, and then the CBOs implement the effort. These tend to be smaller grants (in the $2,500 to $25,000 range for each community) but the program administrators should also factor in some administration costs.
    - **Goals:** The goals can be flexible (based on the strengths of the CBO) but generally include increasing awareness or programs and program resources through grassroots education.

[4] We looked at the evaluation of the 2013 program. This effort continued beyond 2013.

[5] NYSERDA's Clean Energy Communities (CECs) expects to collect a large number of indicators. Example indicators include the number of Clean Energy Communities that join, the number of communities that complete 1, 2, 3, 4, or more high-impact actions, the number of CEC's that indicate that clean energy is a priority, the number of communities that regularly access the portal, and energy savings. The budget for this effort ranges from $3M to $5.5M per year for a total three-year budget of over $14M not including partner support (from NYSERDA's Clean Energy Fund Investment Plan: Communities Chapter, revised March 3, 2017).

- **New and diverse audiences**: This type of a model has potential for reaching diverse audiences by working with diverse CBOs. CBOs are selected by what they offer to the program administrator.
- **Examples of Bottom-up CBO efforts:**
  - Silicon Valley Energy Watch's Community Energy Champions Grant (CA). This effort offered grants (up to $25,000 for a non-profit or $35,000 for cities) to 16 community-based organizations to increase participation in energy efficiency programs and reduce overall energy consumption.
  - California CBO outreach (CA). In 2006-2008, California partnered with 17 CBOs. Each CBO attended a 2-day training, which included interactive sessions on social marketing strategies. After the training, CBOs were required to hold at least 6 events and complete other activities to disseminate information. The goals for the program were to increase awareness on energy efficiency issues and distribute as much information as possible to populations that might not otherwise be exposed to the Flex Your Power message through mass media efforts. CBOs received a small stipend (on the order of $5,000 to $10,000 each). California continued to use a similar model into 2015.
  - VT Button-up Day (VT). The Button Up Day of Action is a day in the late fall dedicated to educating and motivating Vermonters to take actions to lower energy use. Efficiency Vermont provided 7 CBOs with energy experts, signage, and other educational resources. CBOs received up to $2,500.[6]

The New York State Energy Research and Development Authority is also in the process of developing a new model to engage local organizations in specific regional economic development regions. NYSERDA's Community Energy Engagement Program intends to recruit 10 local organizations (one in each of 10 Economic Development Regions) through a competitive bid process to drive targeted low and moderate income (LMI) customers to energy efficiency and renewable programs. No information on effectiveness is available since these efforts are just rolling out; however, NYSERDA expects to collect a large number of indicators such as the amount of funding received by customers, the number of partnerships, the number of customers assisted with clean energy applications, the number of completed loans, and the number of projects completed. The budget for this effort is $4.4M from NY's Clean Energy Fund, with additional $1.4M of RGGI funding for a total of over $5.8M . No energy savings will be reported for this effort.[7]

- **Implementer-led top-down model using "stacked activities" that include community organizations ( ):** These models tend to fit into the definition of CBSM outreach provided above. They are sometimes thought of as behavioral programs, but they often take a community-oriented approach (often appearing similar to a Municipal-champion effort because they challenge the city, town or community). They are actively led by an implementer using multiple activities, including community-based outreach, and the activities may change over time. They may provide rewards through competitions challenging communities, households or businesses. A rough estimate of the cost of this type of a program for Energy Trust is in the $200,000+ range but would depend on the extent of the effort.
  - **Goals:** The goals of these efforts can be participation in programs and/or behavioral changes in the home or business. Some also include the numbers touched or energy saving goals from behavioral interventions.

[6] This was part of a larger effort in Vermont, but this RFP was open to any organization. Vermont also has a similar day in the spring.
[7] NYSERDA. 2017. Clean Energy Fund Investment Plan: Communities Chapter. (Revised March 3, 2017).

- **New and diverse audiences:** Less likely to directly target diverse audiences, but may reach new audiences (more than traditional program outreach) since these efforts go deeper into a community.
- **Examples of top-down community-based efforts:**
  - Community Energy Savers (OH). Used behavioral strategies such as goal setting, community-level feedback and peer-to-peer interactions to encourage energy efficiency program participation (in any program) in seven communities that had participated at lower rates than surrounding communities. Also offered a prize.
  - Cool California Challenge (CA). Inter-community challenge to get cities to compete against each other to reduce greenhouse gas emissions from household energy and transportation. Also offered a prize.
  - One Change (multiple areas, door-to-door with giveaway). Used volunteer networks to go door-to-door to make energy efficiency relevant and personal through giveaways of gateway measures such as CFLs or advanced power strips (APS's) for businesses.
  - RI Find Your Four (RI). Asks Rhode Islanders to pledge to find four ways to save energy in their homes and their communities.
  - Consumers Smart Energy Challenge (MI) – A rewards-based program that engages customers and achieves energy savings through gamification, rewards, competition, traditional marketing, and community-based social marketing.
  - Step Up Power Down – Commercial (CA). PG&E's multi-faceted behavior change campaign in San Francisco and San Jose. PG&E partners with the cities to increase awareness and knowledge of energy conservation, change energy use behaviors, and drive participation.

- **Program+ model – add on or enhancement of existing program** (): This type of a community-based effort can be a stand-alone program that rolls off an existing program, or a community-based outreach effort that complements an existing program to get deeper penetration. These efforts generally build on the desire to expand participation in a particular program (usually a whole-home retrofit or weatherization program) and may include activities such as neighborhood blitzes (where the implementer goes to a single neighborhood and attempts to reach a large number of consumers). The implementer examines participation for the program by segment (often through marketing segmentation work already underway), and then looks for CBOs to support increasing participation in specific communities that have been harder to reach. This is sometimes referred to as "an enhanced program," that is, a program enhanced by community outreach efforts. At times, these types of efforts include increased incentives for specific populations, which generally make these efforts more expensive (in the $125,000 to $1,125,000 range).
  - **Goals:** The goal of these efforts is to increase awareness of and participation in a *specific* program.
  - **New and diverse audiences:** The audience depends on the program. If the community-based effort enhances a LIHEAP or weatherization program, the direct target is a diverse community.
  - **Examples of Program+ Models:**
    - Efficient+ Neighborhoods (MA). Deployed micro-targeting analysis to select customers and communities to target to increase participation in their weatherization program. Adjusted the design of the core audit and weatherization program to increase relevance of the program offerings and address target audience barriers, and relied on a range of targeted marketing outreach efforts to engage the targeted customer segment.
    - Green Jobs, Green New York (NY). Used constituency-based organizations to raise awareness, and work with customers to complete audits and projects through the Home Performance with ENERGY STAR program.
    - Energy Champions (CA). Engaged 103 CBOs to promote upgrades to minorities in LA County.

- Home Energy Squad (MN). Sought to increase participation in a whole-house residential program using community-based marketing.
- Marshfield Energy Challenge (MA). Targeted communities in Marshfield to reduce demand/reduce need for new distribution.
- iConserve (WI) and We2 (WI). Used local events and outreach activities; targeted neighborhoods based on homes' ages, construction materials, energy usage, etc.; utilized direct one-on-one customer contact via energy advocates; and established strong connections with unbiased community leaders to help promote the audit and weatherization program.

Effectiveness

Community-based efforts have been shown to be very effective in increasing participation in programs, and reaching new and diverse audiences. They also can provide some education and information to expose people to new ideas (as part of "customer readiness").

Effectiveness information is in the table below, with highlights (shaded in the table below) for efforts that were not as successful as the implementer had hoped.

Table 3. Examples of Effectiveness for Municipal-Champion Efforts

Municipal-Champion	Participation	New Audiences	Customer Readiness	Other	Information on Effectiveness
Connecticut's Clean Energy Communities program (CT, multi-year effort)	X			X (benchmarking, energy savings)	158 of 169 municipalities in Connecticut were participating in Clean Energy Communities as of 2016—a success rate of 95 percent. The program administrators began recruiting municipal participation in April 2012, and had achieved a 20 percent participation rate statewide (i.e., participation by municipal facilities) by the end of the first calendar year. From 2013 to 2015, the program administrator continued to engage and educate municipal leaders, and program enrollment increased yearly to 43 percent, 71 percent, and 91 percent, respectively. By end of 2015, had benchmarked over 1,500 municipal and board of education buildings in the state. In addition, residential participation also increased. "As a result of 35 local outreach campaigns, more than 9,500 households participated in Home Energy Solutions...an uptick of 15 to 24 percent, compared to the few remaining communities that have not opted into the program.[a]"
Corvallis Energy Challenge (2009)	X				Completed 800 (of 1,000 goal target) Residential Home Energy Reviews and 50 (of a targeted 50) walk-through assessments for small and medium sized businesses However, "results showed that they spent more to deliver the savings achieved based on the information available[b]"
Hometown Rewards (IA, 2010-2013)	X			X (energy savings; community engagement)	Fairfield reduced energy usage by 8.5% in residential sector and 50% participated in at least one program initiative; Dewitt reduced residential energy use 2%; North Liberty reduced energy use by 10.6% One local elementary school leveraged the Program to implement a semester-long educational and behavior campaign, which resulted in a reduction in electricity use of about 11%; Community used financial reward from successfully meeting Program goals to install an array of solar panels on the Public Library. Supported local economy by using Fairfield-based businesses and organizations to support Program outreach and implementation efforts.
Making Energy Work for Rural Oregon (OR, 2015-2017)				X	This varies by community, but includes building alliances, hosting workshops, developing Clean Energy Plans, obtaining AmeriCorps interns, and exploring projects, among other things.
Renew Boston (MA, 2010)	X		X	X (energy savings)	An evaluation of the tracking data indicated that at the time of the evaluation (end of 2011), the effort was still ongoing, having achieved 21% of the insulation project goal and 30% of the total MMBtu goal in the residential sector; and 69% of its electric and 40% of its gas goal in the business sector. Many households encountered participation barriers. Based on a survey of households touched (n=74) 95% of respondents indicated that their knowledge increased because of the efforts (with 42% saying it increase a lot). Among businesses touched (n=70), 87% said the effort increased their knowledge of energy saving options.
Take Charge Challenge (KS, 2009-2010)	X			X (energy savings)	1st competition: savings of more than 6 million kWh in 1 year; winning town reduced by 5.5% relative to control town; 2nd competition: additional savings, 112 assessments and 300 in weatherization assistance program.

Municipal-Champion	Participation	New Audiences	Customer Readiness	Other	Information on Effectiveness
Vermont Community Energy Mobilization Project (VCEMP) (VT, 2009)	X			X (energy savings)	Data analysis showed that over 700 homes participated in 5 months, and measures installed expected to save 366,421 kWh and 1448 BTUs in the first year. EVT met its goals for annual savings (5-7% savings achieved community wide) and participation (40-45% of all residential accounts participated), it found that staff time and other expenses were significantly higher than other energy efficiency opportunities. For example, the levelized cost of energy efficiency for the Community Energy Initiative pilots was approximately 18 cents/kWh saved. In comparison, the average cost for energy efficiency measures in Vermont has been around 3 cents/kWh and the approximate cost of comparable electricity supply is 14 cents/kWh. Staff time and other expenses were significantly higher than other energy efficiency opportunities.
Vermont Home Energy Challenge (VT, 2013)	X			X (pledges)	Grew out of VCEMP effort described above. 79 town energy committees and local partners agreed to participate, setting a goal of weatherizing 3% of homes in communities. From tracking, 1,512 pledge cards and 1/4th agreed to doing a comprehensive project. Not evaluated for savings.

Gray boxes are efforts that were not as successful as the implementer had hoped

[a] McCarthy-Bercury, D. and Borrelli S. 2016. *Transforming Towns and Cities into Sustainable-Energy Communities.* ACEEE Summer Study. Eversource Energy and The United Illuminating Company.

[b] Dethman and Associates. 2010. *Corvallis Energy Challenge Evaluation*

Table 4. Examples of Effectiveness for Bottom Up Efforts

Bottom Up Examples		Participation	New Audiences	Customer Readiness	Other	Information on Effectiveness
Silicon Valley Energy Watch Grant (CA, 2011-2012)	Creating Sustainable Communities (grant to Alviso Neighborhood Group)		X			Status updates reported workshops for 90 children and 18 adults (from community of 500 homes/2,000 individuals). Not as effective as they had hoped. They had difficulty locating local contact, translating, and getting adults to participate in workshop. Rental properties and language barriers also posed challenge for these diverse communities, making it difficult for those targeted to participate.
	Cupertino GreenBiz (grantee)	X		X	X (energy savings, H20, certifications)	City estimated $17,316 energy and water savings through certification. Status updates indicated 95 businesses had energy and water audits and received resource education. 16 businesses were certified as Green Businesses.
	Cupertino Growing Greener Blocks (grantee)	X		X	X (energy savings H20)	City staff estimated average savings per home of 308 kWh, 43 therms, and 8,565 gallons of water a year. Also "Increased awareness and knowledge" according to final reports, although data were not provided.
	Sacred Heart Saves Energy (grantee)	X	X			Status updates reported 2,700 homes receiving bill assistance and 380 homes receiving weatherization. They estimated energy savings at $45 per home. Served low-income (primarily Vietnamese and Spanish-speaking homes). Also effective in helping the CBO collect valuable information to help provide services to community.
	Vietnamese Community Energy Savings Project (grantee)	X	X			Status updates report that they assisted with over 500 CARE and LIHEAP applications; Targeted Vietnamese, Burmese, and Latino households. Events (two events of 1,000 and 300 with 200 sign-ups for more information, 750 items given away, 15 interested families); Workshops (6 workshops with more than 130 referrals, and distribution of energy saving devices); Media Campaign (resulted in at least 6 calls per day); Youth education (taught students in summer program)
Vermont Button Up Day Grants (VT 2016)			X		X (kits, sales of energy efficient products)	In South Burlington, residents received energy saving kits at polling locations throughout their city. 200 kits were distributed in just two hours. The Home Energy Makeover Exhibit in Hartford, Vermont was featured on the NBC 5 nightly news. The Glover Energy Committee presented an electric energy saving lesson to the elementary classes at the Glover School. Hardware stores in Montpelier, Brattleboro, Barre, Colchester, Burlington, South Burlington, Essex Junction all held in-store events with special pricing on energy efficient products.
California CBO Outreach (CA 2007, grants to 17 CBOs)			X		X (number of events and number touched, pledge cards)	Recorded 215 events and estimated reach of 645,957 individuals; over 120,000 tip and pledge cards. Goals for the program were to increase awareness on energy efficiency issues and distribute as much information as possible to populations that might not otherwise be exposed to the FYP message through mass media efforts.

Table 5. Examples of Effectiveness for Top-Down Efforts

Top-down Examples	Participation	New Audiences	Customer Readiness	Other	Information on Effectiveness
Community Energy Savers, AEP (OH, 2015)	X	X		X (energy savings)	Data analysis showed that efforts Increased participation by 1,164 customers, saving 662,704 kWh beyond what was expected from programs alone; 46% aware of programs compared to 35% aware in comparison communities. Communities were more likely to be aware of programs than comparison communities. Targeted under-participating communities.
Cool California Challenge (CA, 2012-2013)	X			X (energy savings)	Analysis of energy data for communities compared to control group showed that the effort reduced electricity consumption in 2012-2013 by 14% relative to delayed control group. Engaged 2,700 participants.
One Change (Multiple, 2005-2010)	X		X (CFLs)	X (energy savings, favorability toward PA, earned media)	Multiple evaluation efforts showed increases in energy saving behaviors, and increases in attitudes towards energy conservation and the program administrator. Across 6 states: increased likelihood to purchase CFLS and drove program participation. PSE: significantly more likely to purchase CFLs next time (77% v 65%); NJ: significantly more likely to purchase CFLs next time (50% v 23%); Alberta (68% v. 59%); Increase favorability or positive impressions. BC Hydro: giveaway increased favorability towards utility (41% v 27%). Total costs ranged from 1-2 cents per kWh. Earned media 3X paid media. They also reported data on number of communities, events, volunteers, and community groups engaged.
One Change- Small Commercial Power Strip (IL, 2015)			X (APS)	X (energy savings)	Program had a target of 50,000 strips or 4,360 net MWhs per year that would otherwise not have been given out. Did not review evaluation.
Rhode Island Find Your Four! (RI, 2015)		X (CAPS)		X (actions, pledges, web engagement and community projects)	From data tracking, 9,230 face-to-face customer interactions at over 58 events; 3,935 people signed up to take the challenge; 11,000 votes and 13,000 page views for video challenge; prizes of $7,500 to towns led to community projects Held training sessions at all the Community Action Programs (CAPs)
Smart Energy Challenge, Consumers (MI, 2016)	X			X (web engagement, customer satisfaction)	Web analytics, participant tracking databases and customer surveys showed that engagement was "boosted", while energy savings and customer satisfaction scores increased. At 3.5 months: 908 DIY kits, 189 home energy analysis, 3,818 promocodes entered for points, 1,100 rewards claimed; 60% purchased EE lights, 47% saw signage in store; 20% purchased appliance; 28% applied for rebate; 7% participated in utility program; 70% turned off lights and appliances; 30% talked to friends and family; 50% were more interested in energy efficiency; website was highly engaging -- 2,500 registrations through web; 10 mins on website, nearly 7 visits on average, 33% email opt-in rate, 7,929 refer-a-friend emails
Step Up Power Down – Commercial (CA, 2015-2016)	X		X	X (energy savings, pledges)	Based on random assignment to a treatment or control group, 2% of SMBs signed up, which was twice as much as in control population. Goal was 100 large businesses and 900 SMBs pledging, and had 113 large businesses and 974 SMBs pledge by May 2016.

Table 6. Examples of Effectiveness for Program+ Efforts

Program+	Participation	New Audiences	Customer Readiness	Other	Information on Effectiveness
Efficient Neighborhoods+ (MA, 2014)	X	X Middle-income/		X (energy savings)	Data tracking showed that over a short period (six months), the initiative resulted in the completion of 927 energy assessments and 248 projects with weatherization improvements, achieving a total of 700 MWH and slightly over 35,000 therms in energy savings. The evaluation results looking at participating versus non-participating communities indicated that 74% of electric savings and 84% of gas savings of the Efficient Neighborhoods Plus initiative would not have been achieved under the core audit and weatherization program. This equates to over 516 MWH and 29,000 therms. In addition, tracking data showed 91 low-income customers were channeled to LI programs.
Green Jobs, Green New York (NY, 2016)	X	X			As of June 2016, constituency-based organizations conducted 1,686 events to raise awareness and educate customers, resulting in a total of 11,430 applications for the Home Performance with ENERGY STAR (HPwES) program. These organizations also worked with customers to complete 7,755 audits and assist with 2,201 projects through the HPwES program.
Energy Champions Program (CA, 2010-2011)	X	X			Goal of 700 retrofit projects, but based on data tracking they completed only 176 in 1.5 years. Not as successful as they hoped. Tried to reach out to minority communities. "Since the program was complex with many offerings, requirements, and levels of assistance, it was a challenge for the CBOs to properly explain the program and effectively answer questions"
Home Energy Squad Enhanced (builds off an older effort) (MN, 2013-2014)	X	X	X		Data tracking showed increased participation to 7% of community, 6,000 homes (up from 1,800 in first year). Workshops and door-knocking raised awareness, although no data was provided. This effort targeted under-participating communities.
iConserve (WI, 2010-2012)	X			X (costs$)	Data tracking and analysis of energy use showed more than 1,300 HER assessments, 60% completion rate, residential participants reduced electricity use by 3%. Analysis of costs per complete showed community marketing and outreach cost per project completion: $48.56.
Marshfield Energy Challenge (MA, 2008-2009)	X			X (solar)	Data tracking showed 10-15% of population got an audit; 1,300 participants in MEC, as well as participation in rebate programs (3% of population refrigerators, 1% windows) 32 homes installed solar panels
We2 (MN, 2010-2012)	X			X (costs$)	Data tracking and analysis of energy use showed 2,283 residential total home energy audits, 796 total project completions (35% conversion rate) Analysis of costs per complete showed, community marketing and outreach cost per completion $32.41

Gray boxes are efforts that were not as successful as the implementer had hoped

Measurement for these efforts is often conducted looking at participation or energy savings for a defined geographic area pre- and post- intervention. Where there is a website, participant feedback through the website is often used to understand the effect of the effort. In addition, some efforts have conducted follow up surveys to understand educational effort and knowledge change; however, this requires contact info and can be expensive.

Notably, for the top-down efforts, several of these efforts are challenges with experimental or quasi-experimental designs.

For smaller efforts, measurement is usually built into status reporting, and includes counts of activities rather than measurements of effectiveness.

Participation Effectiveness

Community-based outreach efforts have been shown to increase program participation both generally, and among specific target audiences. For example, participating communities in Connecticut saw an uptick in program participation of 15% to 24%, and Step Up Power Down's commercial effort doubled the number of small and medium businesses when compared to the control group. Even smaller grant-based efforts reported participation; for examples, Sacred Heart Saves Energy helped 2,700 homes receive bill assistance and 380 receive weatherization. These were mainly Vietnamese and Spanish-speaking households. For some of the community-based efforts, however, the increases in participation did not justify the overall cost of marketing and/or staff time required (see the Corvallis and VCEMP examples in the table above).

Among the models presented above, Program+ efforts are specifically designed to increase participation in other programs. Municipal-champion and Top-down also increase participation if this is one of the objectives of the effort. Bottom-up CBO led efforts—while they can lead to program participation—tend to be the least successful in this area because resources are more limited, and the goals are not as focused as in a Program+ model.

New Audiences Effectiveness

Community-based efforts, specifically the Bottom-up and Program+ models, have also been successful at reaching diverse audiences (that is, minority and low-income populations). In Bottom-up efforts, CBOs that work with diverse audiences daily bring a network that program administrators can leverage to reach out to these groups, and Program+ models for LIHEAP or other low-income programs specifically target these groups. In addition, other community-based efforts are designed to reach new audiences that are not yet reached by standard outreach efforts. For example, AEPs Community Energy Saver program was specifically designed to target communities with low participation in AEPs programs. The Community Energy Saver program increased participation by 1,164 customers more than comparison communities, saving 662,704 kWh more than they would have without the community-based effort by reaching deeper into a community than the standard outreach efforts.

Customer Readiness Effectiveness

Community-based efforts are less likely to report on knowledge or awareness increase (as compared to increasing participation or reaching new audiences); but many are educating customers about the programs. Several, however, did report some educational gains. For example, One Change's Porchlight effort went door-to-door educating about how to save energy in the home, and several of the Top-down efforts taught about changes that can be made in homes or businesses to save energy. Smaller efforts such as Cupertino's two community-based efforts educated business customers about how to become more green in their business practices, and they also reported increasing awareness and knowledge among residential customers.

The level of education conveyed by community-based efforts varies by the type of effort. Some education can occur through peers, workshops and web or fliers within a community-based effort; however, in general, community-based efforts tend to focus more on raising awareness of an issue and sending the customer to a website or program administrator to learn more. There are, however, a few efforts that educate through more in-depth workshops or sitting down with customers, but several of these outreach efforts use volunteers (non-experts) to quickly catch individuals at a booth or at their doorstep, so the educational part is not as in depth as might be possible through a K-12 or web-based effort. Community-based efforts, however, when coupled with

an action such as telling individuals about the Energy Trust website or program resources, can get people to the right places for more information.

Other Effectiveness

Community-based efforts have also been effective at providing: positive media, utility or organization satisfaction and awareness, and increased favorability and satisfaction with program administrator.

Other Benefits of Community-based Engagement Efforts

Across all the models, community-based efforts have several benefits. In addition to increasing participation, reaching new audiences and educating, they can:

- **Leverage non-program resources to reduce program costs.** When partnering with community organizations, the community organizations often lend their networks, staff or other sources of funding to the effort.
- **Adapt to the community (provide community-specific offering to increase engagement).** Statewide efforts do not always take the specific needs of a community into account, but by approaching the outreach on a smaller level, the outreach can specifically adapt to reach the community in the best way for that specific area.

Other Drawbacks of Community-based Engagement Efforts

Maintaining staffing levels to support the community, the community team structure, and management of the data needed from the community organizations have been challenges for past community implementers. Community-based efforts can also be costly in terms of staff resources and efforts (if not well-designed). Examples of this from the literature include:

- **Bainbridge Island**: "After the grant period had ended, RePower staff reported that, although well received in the community, this time- and labor-intensive outreach method did not yield enough participation to justify the investment.[8]"
- **Efficiency Vermont (EVT):** "The state of Vermont's energy efficiency utility ran an intensive Community Energy Initiatives in two towns from 2006 to 2008. While EVT met its aggressive goals for annual savings (5-7% savings achieved community wide) and participation (40-45% of all residential accounts participated), it found that staff time and other expenses were significantly higher than other energy efficiency opportunities. For example, the levelized cost of energy efficiency for the Community Energy Initiative pilots was approximately 18 cents/kWh saved. In comparison, the average cost for energy efficiency measures in Vermont has been around 3 cents/kWh and the approximate cost of comparable electricity supply is 14 cents/kWh. While the Community Energy Initiatives included one-time program development and startup costs, EVT management judged that even the direct staff time spent was simply too much to meet their mandate to find low-cost sources of energy savings. In response, they decided to look for ways to engage community.[9]"

In addition, past efforts point out the importance of having a thoughtful tracking system to understand what is happening in the community. For example, the Corvallis Energy Challenge evaluation stated that they "Need a better system to track key Energy Trust metrics, including methods to determine the incremental influence of the Challenge on energy savings and the cost of those savings."

Ramp-up time can also be an issue. Often community based efforts take time to ramp up, but the program cycle is not long enough to allow for program success (see SVEW and Renew Boston references).

[8] Research Into Action. 2015. *Spotlight on Key Program Strategies from the Better Buildings Neighborhood Program Final Evaluation Volume 6*. RIA for Better Buildings.

[9] Fuller, M., Kunkel, C., Zimring, M., Hoffman I, Lindgren Soroye K., and C. Goldman. 2010. *Driving Demand for Energy Efficiency.* LBNL for PG&E.

It is also important to note that not all communities are a good fit for energy efficiency outreach. The best organizations have knowledge of the community that they are planning to serve. Past efforts have been forced to shift tactics when they identified a program model first and then tried to apply it to a particular community, rather than first understanding the community's needs and then using the available resources to develop an appropriate program.[10] This same study found that the most successful models for reaching diverse audiences are the ones that can "integrate multiple community needs and complex responses into single, coordinated initiatives."

[10] Silicon Valley Energy Watch. 2013. *The Community Energy Champions Grant Program Handbook & Case Studies*.

Researcher Thoughts: Options for Investing in Community-Based Efforts

Community-based efforts have been shown to be very effective in increasing participation in programs, and reaching new and diverse audiences. They also can provide some education and information to expose people to new ideas (as part of "customer readiness"). The advantages and disadvantages of various options are presented in the table below.

Table 7. Community-based Options for Energy Trust

Option	Advantages	Disadvantages	Measurement
Municipal-champion led efforts	• Energy Trust is not carrying the full burden of the effort • This can be a multi-year, longer-term investment that builds some capacity within a city as they work towards the goal • Leverages city resources • Can be a more stable network than CBO-led models	• City resources can be limited • Requires a champion • This can be a larger investment than a quick turn-around outreach event	• Measurement is often conducted in aggregate by looking at participation or energy savings for a defined geographic area pre- and post- intervention • Surveys to understand educational effort and knowledge change would require contact info and can be expensive
CBO-led bottom-up or "grassroots" education	• Leverages CBO knowledge • Reaches new audiences • Allows for creativity on the part of grantees • Can focus on social groups that are already involved with diverse communities	• Diffuse, and so sometimes seen as less effective • May be a one-off effort because the grantee cannot continue activity absent the grand funding	• Measurement is usually built into status reporting, and includes counts of activities rather than measurements of effectiveness • Depending on the activity, can include short surveys to participants to understand changes in knowledge
Implementer led top-down models using "stacked activities" that include community organizations	• Steady model that uses lots of outreach activities; broader reach • Can result in behavioral changes in the population	• Not usually able to be done on a low budget	• Several of these efforts are challenges that have been designed as quasi-experimental or RCTs • Can also be tracked through websites if website information is collected as part of the challenge
Program+ models	• Increases participation	• Can be resource intensive	• Measured through participant lift in a *specific* program—ideally in comparison to control communities

Community-based efforts tend to be shorter-term efforts (3 months to one year); however, above we present some community based efforts that are multi-year engagements. The shorter-term nature of the engagement occurs when groups are volunteers, receive paid stipends, or are only contracted for one year.

While not generally thought of as a stable resource, if Energy Trust approaches community-based efforts as part of a longer-term plan, they could work to build a long-lasting network of champions that you could go back to year after year. As such, Energy Trust may wish to consider:

- Building up from the current Sustainable NW- Making Energy Work for Rural Oregon efforts to fund a systematic Municipal-champion based effort that starts with municipal leaders to build networks throughout the town to get residents, businesses, and schools engaged.

Alternatively, if Energy Trust desires to reach diverse populations such as minority or low-income communities, they may want to consider identifying key CBOs that already have links to the specific communities that they wish to target.

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K-12 Engagement

Investment Option Findings

K-12 Summary

School programs include multiple types of activities within a single program.

Most K-12 school programs include curricula (i.e., teacher lesson plans and student workbooks) that is grade specific and follows state educational standards. Many also include workshops or other types of teacher training opportunities. Student energy efficiency clubs provide extracurricular activities sponsored by K-12 programs and these clubs can include various activities by the students (e.g., performing school energy audits, fundraising through selling low-cost efficient equipment). Other K-12 program activities include school events (e.g., energy themed theatre), field trips, competitions between schools to save energy, obtaining pledges from homes to save energy, and kits of low cost energy efficiency measures.

Effectiveness of K-12 Programs

Depending on the activities included in a K-12 program and how the program is targeted, research has shown that they:

- Increase knowledge among students and families to help create customer readiness
- Engender changes in energy related behaviors in the school and at home
- Reach low-income students and families
- Are limited in their ability to increase energy efficiency program participation

Other Benefits and Drawbacks

Benefits	Drawbacks
Includes enthusiastic participants as teachers are often willing to use lesson plans if they are aligned with the state standards	Needs ongoing staff effort if the program includes curricula to ensure ongoing alignment with state standards
Can create a stable source of information as teacher guidance and student workbooks can be placed online for ease of use	Can be difficult to maintain school participation
	Little is known on persistence of student knowledge over time and would be very expensive to perform longitudinal type of research.

Program Cost Info

- K-12 efforts can be grant based where annual grants range between $4,000 and $25,000
- K-12 programs can range from $300,000 to over $1 million per year. Higher costs are typically associated with inclusion of energy saving kits or reaching many students (e.g., 10,000 to 80,000).

Measurement Cost Info

- Most research did not include study cost
- In the few studies where we found both a study cost and a program cost, the study cost ranged from $16,000 to $88,000 and was between 7% and 12% of the program cost.

Other information specific to this area

- The federal government has K-12 resources (curricula) available online for free.
- Most K-12 programs are implemented by third-parties who offer a range of activity options.

K-12 Engagement

K-12 energy efficiency programs can include both activities to educate students and activities to reduce energy in the school (e.g., incentives for installation of energy savings measures). This research focused solely on those activities designed to directly educate students; it did not focus on programs directed towards installing measures to reduce energy in schools. However, some of the K-12 school programs include components that save energy in the school (e.g. competitions) or in the students' homes (e.g., energy efficiency kits).

Past K-12 education Energy Trust activities in this area include:

- Supporting youth education through a curriculum-based program for sixth-grade students [11] that includes providing energy efficiency kits (e.g., low-cost items such as LED bulbs, low-flow shower, etc.) to students so that their families can install low-cost energy saving measures at home.
- Helping high school students attend trainings on building science fundamentals and other energy topics.

The 2016 Annual Report shows that, since 2003, Energy Trust has also supported schools more broadly in ways specifically tied to energy savings. These include:

- Providing more than $9.5 million in energy-efficiency projects nearly 1,000 public K-12 Oregon schools.
- Providing more than $3 million in funding for solar electric and wind energy systems at close to 60 public schools.[12]

Energy Trust's current support for their curriculum-based offering is ending because the energy-saving kits are no longer cost effective and therefore do not meet Energy Trust's requirements. Below we describe other K-12 opportunities that Energy Trust may want to explore as they consider whether and how to work with schools after the current kits-based program is phased out.

Categories of K-12 Programs and Activities

Educating through a school-based program is a built-in way to inform the next generation about energy efficiency. K-12 programs are used by many organizations to educate both students and their families. Across the nation, the level of effort associated with educating students varies tremendously, from an annual grant of less than $25,000 to programs with annual budgets over $1 million dollars.

Organizations typically include several different activities within K-12 programs to educate students broadly on energy and more specifically on energy efficiency, such as:

- **Teacher training workshops** - Many programs include workshops or other types of teacher training opportunities.
- **School visits in-class or through a larger school event** – Some programs offer teaching assistance through experts that visit a class and teach about a specific energy subject while others have a broader event within the school. For example, the National Theatre for Children (NTC) has school-wide plays with energy themes that go along with curriculum.
- **School energy clubs and activities** - Student energy efficiency clubs provide extracurricular activities sponsored by K-12 programs and these clubs can include various activities by the students (e.g., performing school energy audits, fundraising through selling low-cost efficient equipment, etc.).
- **Field trips** – Georgia Power provides field trips to a generation plant (either a hydroelectric dam, a fossil-fuel generator, or a nuclear reactor) as part of their K-12 offerings.
- **Benchmarking school or home energy use via dashboard** – We found school benchmarking as part of an energy club activity. These are often tied to student actions to reduce energy within the school.
- **Competitions** – Competitions occur between schools to see who can save the most energy.

[11] Teacher lesson plans and student workbooks that are grade-specific and follow state educational standards.
[12] *2016 Annual Report to the Oregon Public Utility Commission & Energy Trust Board of Directors. April 2017*.

- **Commitments** (pledges) – Students' families pledge to reduce energy use and can be tied to watching energy use via a utility dashboard.

Many of the K-12 programs are "stacked" programs, that is, they include multiple activities all stacked together to educate students. We have grouped programs into four categories to help describe the variety of K-12 programs found in our literature review.[13]

- Classroom-based curricula and activities that tie to energy savings kits
- Classroom-based curricula and activities (no kits)
- Programs with curricula and activities used in afterschool programs and clubs
- Activity-based programs (no curricula)

The human resources needed to provide K-12 programs varies. Some organizations implement their own programs (such as Learning Power by Georgia Power or Energenius by PG&E) and therefore need a high level of human resources. However, K-12 programs are most often contracted out to third parties, which requires a lower level of management. While not the full suite of implementers, we found that Alliance to Save Energy (ASE), National Energy Education Development Project (NEED), National Theatre for Children (NTC), National Energy Foundation (NEF), and Resource Actions Programs (RAP) were often contracted by utilities to implement a K-12 program. These implementers tend to have a 'typical' activity (such as NTC's theme based school theatre event), but also offer a suite of other activities (such as efficiency kits or teacher training). Some programs are unique in how they are implemented. For example, K-12 Energy Education Program (KEEP) has been providing K-12 programs in Wisconsin for over 20 years. The program is based in a university and has several utility sponsors as well as university staff and third-party contractors to help implement the program. Additionally, behavioral based efforts such as school competitions are bringing in newer organizations in this market.

Effectiveness

K-12 programs are effective at increasing knowledge among students and families to help create customer readiness. Depending on the specific activities, K-12 programs engender changes in energy related behaviors in the school and at home. Specific implementation choices by program funders enable K-12 programs to reach low-income students and families. However, this type of program is typically limited in their ability to increase energy efficiency program participation.

A summary of effectiveness within the categories in which our research focused is shown below in Table 8.

[13] These are not necessarily clean groupings, though as we found one program that has both classroom based curricula and afterschool activities.

Table 8. Examples of Effectiveness for K-12 Programs

(color key below represents the program main activities shown in the table)

Curricula	Student energy clubs	Commitments
Teacher training workshops	Field Trips	Helping the school raise funds (e.g. LED holiday lights)
Energy efficiency kits	Benchmarking school or home use via dashboard	Other
School visits in class or a larger school event	Competitions	

Programs	Participation	New Audiences	Customer Readiness	Other	Information on Program *(in italics)* and Effectiveness
Classroom-based curricula and activities that tie to energy savings kits					
LivingWise® (OR) *(Note that this is Energy Trust's existing program)* 			X	X (activity in home)	*Energy Trust is one of many utilities who have implemented LivingWise for several years. For Energy Trust, this program included energy efficiency kits along with curriculum and a family pledge. The information below is from the 2016 Energy Trust program summary report.* Student survey showed that student knowledge increased from 55% to 78% Family survey showed that families installed energy saving equipment from kits at various percentages; 46% of families changed how they used water; 54% of families changed how they used energy; 69% of students worked with their families around saving energy
Energy Efficiency Education for Schools (NC, SC) 			X	X (activity in home; utility favorability)	*Utility program that used theatre (along with curricula and kits) in more than 1,200 schools with a goal of educating students on using energy wisely.* Survey of families indicated that family knowledge on how to save energy and reduce utility bill increased "a lot" (13%) or increased "somewhat" (37%) Families also indicated in the survey that they took actions based on Energy Savers booklet that was in kit and discussed the performance and savings energy, with 28% much more positive about the utility while 36% were somewhat more positive. A pre/post billing analysis showed savings in the home from both the kit and behavioral change.

Programs	Participation	New Audiences	Customer Readiness	Other	Information on Program *(in italics)* and Effectiveness
Classroom-based curricula and activities – no kits					
Children's Energy Education Program (KY) 			X		*Utility program that focused on elementary and middle school teachers and has an Energy Education Coordinator who provides teacher training workshop, supplies, and program support materials. Additionally, the program provided student energy team training with a kit for the school that included tools for the team to assess energy consumption and behaviors in their schools.* The program tracking data showed that this effort covered many schools in the utility service territory (80% of all districts and 65% of schools). Teacher survey indicated that 95% of teacher workshop attendees indicated they agree or strongly agree that workshop increased the teacher's energy knowledge, and 96% agree or strongly agree that workshop will allow them to increase students' energy knowledge
Energenius (CA) 		X	X		*Utility program that provides hardcopy teacher guides and student workbooks on energy safety, energy efficiency, and water conservation for grades K-8 via an online web portal. Costs tend to be related to number of workbooks sent out. Curricula provided to close to 80,000 students annually, with most in kindergarten and grades 4-6.* Program tracking databases showed that ~50% of their curricula went to schools where a large percentage of students needed food assistance Teacher survey indicated an increase in student knowledge
KEEP (WI) 	X		X	X (awards, positive media)	*The Wisconsin K-12 Energy Education Project (KEEP) leverages teachers to improve energy efficiency education. KEEP has been in place for 20 years with continual updates. The program is housed in a university setting, is funded by multiple utilities, and used contractors to help implement the program.* Based on a program tracking analysis, the School to Home program increased participation in other EE programs A teacher survey showed an increase in teaching about energy, a positive change their views on energy conservation and an increase in teacher's personal conservation behaviors The program received multiple awards and had multiple peer reviewed articles during the 20 years of their existence.
Green Ninja Energy Reduction 				X (energy savings)	*Grant based effort (<$25K) that developed an online home energy reduction contest and accompanying lesson plans for school grades 4-12.* Self-reported household decrease of 15% on average

Programs	Participation	New Audiences	Customer Readiness	Other	Information on Program *(in italics)* and Effectiveness
Green Schools Program 			X	X (act. home)	*Program was just beginning at the time of the research noted below. It included teacher training, curriculum and as part of an energy club, students performed an audit of the school and did "energy patrols" to try to reduce use.* Student survey indicate that program highly improved awareness (5 of 10 students) and knowledge (6 of 10 students) of energy efficiency after participation as well as 7 of 10 perceiving energy efficiency as very important after participation (1 perceived this as very important before participation) Student survey (8 of 10 students) indicated taking energy related actions at home after participating in the program
PEAK 		X	X	X (act. home; shared info)	*This utility program is based in California and has been in place for many years. They focus on training teachers so that teachers can then continue teaching about energy.* *A* program tracking database review showed that ~50% of their schools had a large percentage of students needing food assistance. A pre/post student survey showed increased student knowledge (e.g., from 44% to 64% knowing the concept of a renewable resource); 62% of students shared learning with others; 50% of students took more energy reducing actions with friends or family; 77% of students indicated an increased interest in science and 84% showed an increased awareness of green careers
Programs with curricula and activities in afterschool program					
CORAL Energy Champions 		X		X (actions taken)	*Grant based effort (<$25K) that incorporated an energy themed unit into the existing afterschool program at 10 schools. Included structured literacy activities, in-class discussion, and hands on demonstrations.* Spearheaded by an organization serving families in need (Catholic Charities of Santa Clara County), so this effort targeted those families too. Survey of students indicated that 4% cared more about energy savings and efficiency after participation and 6% more turned the lights off when they left a room after the thematic education unit.
Enlighten Energy Watch Promotion 				X (kept curriculum)	*Grant based effort (<$25K) that developed and implemented an English-Mandarin energy efficiency themed curriculum for after school Chinese students. Taught students how to advocate for energy efficiency in their curriculum* Organization decided to continue having an environmental module in the future

Programs	Participation	New Audiences	Customer Readiness	Other	Information on Program *(in italics)* and Effectiveness
Activity-based programs (no curricula)					
PowerSave Schools			X	X (shared info)	*PowerSave Schools has been in place for many years and focuses on saving energy in the school, but this study discussed both a pilot (with 6 participants) and a follow up study (with 29 participants) to assess the possibility of longer term changes based on students affecting family behaviors.* Interviews with participants in the pilot showed increase in student awareness and knowledge; students interviewed friends and family too and noted changes in awareness and actions among friends and family based on conversations with the student; follow up study found increase in awareness, knowledge, and perceived importance of EE as well as behavioral changes (19 of 29 indicated awareness changed "a lot", 18 of 19 indicated knowledge changed "a lot", and 18 of 29 indicated that energy efficiency was very important before the club and 23 of 29 indicated energy efficiency was very important after joining the club)
Silicon Valley Energy Fair		X		X (trained energy ambassadors)	*Grant based effort (<$25K) where the grantee trained students to participate and act as "energy ambassadors" in an energy fair and partnered with local businesses and organizations to promote, organize, and hold the fair. The fair took place in the middle of a diverse community and drew from that community for attendance.* Trained 40 students aged 14-18 to be energy ambassadors during the fair
Green Energy Agents		X		X (sale of energy efficiency measures)	*Grant based effort (<$25K) that trained youth to become energy ambassadors in their respective communities. Half of the activities took place in a disadvantaged community and half did not. In one area, youth sold low cost energy efficiency items to raise money for their church. The program found they needed to adjust activities based on specific community.* Program tracking indicated that youth aged 12-17 sold 40 items in 1.5 hours to raise $150.
2012 Greenlight Film Festival				X (expanded reach of videos)	*Grant based effort (<$25K) that included a new "Community Energy Champions – Conservation and Efficiency" award within a pre-existing Film Festival (where middle and high school students create the films).* Expanded reach of their celebration of Earth Day message
Change our 2morrow Schools' Challenge				X (media)	*This challenge is a school and community program designed to promote energy efficiency in homes through a "fun and engaging" online competition.* Received earned media
DC Green Schools Challenge				X (energy savings)	*This was a three-week competition among schools that used a building dashboard to watch buildings' energy and water consumption* DC schools saved 76,000 kWh in one competition

Evaluation of the effectiveness of K-12 programs varies. The broad array of activities included in K-12 programs leads to program funders desiring targeted information when they choose to assess a program. When part of a small grant (i.e., <$25,000), evaluation is often minimal or absent, such as shown within the Silicon Valley Energy Watch grants. K-12 programs are often comparatively small budgets and evaluation can be low in absolute values (i.e., less than $30,000), but are a relatively high percent of the program (for example, across three years, Ameren Illinois' K-12 school kits program was $240,000 / year with an annual evaluation budget that was between 7% and 12% of program costs, but each year was no more than $29,000). Table 15 and Table 16 in Appendix A list the types of information most often included in K-12 evaluations and a very rough estimate of data collection and analysis costs.

Participation Effectiveness

This type of program is typically limited in its ability to increase energy efficiency program participation. While many K-12 programs may use students as an avenue for reaching families for a home audit and subsequent participation in an energy efficiency program, only KEEP assessed this path to find that between 5% and 8% more families participated in a rebate programs compared to families with students not involved in the K-12 program.

New Audiences Effectiveness

Low-income students can be reached if the program is marketed to school districts with high percentages of students with free and reduced lunches. Also, if student workbooks or materials for families are written in different languages (such as the Enlighten Energy Watch Promotion) then K-12 efforts can reach a diverse set of students and their families learn about energy efficiency.

In addition, since students move up a grade each year, the program essentially reaches new audiences every year.

Customer Readiness Effectiveness

K-12 programs are effective at increasing knowledge among students and families to help create customer readiness so that these future customers and their families can make informed energy choices. The curriculum and activities have been shown to increase knowledge across a broad spectrum of energy related subjects, from energy efficiency, to renewables or battery storage. Students in programs such as PEAK and PowerSave Schools also shared their learning with their family. Often actions at home such as installation of energy efficiency kit measures can lead to family discussions on energy saving (as seen in the Energy Efficiency Education for Schools program) or family changes in how they used energy (such as in LivingWise). It is not just students and families who are affected by K-12 program, though, as teachers also learn more about efficiency. For example, within the Children's Energy Education Program, virtually all the teachers attending a workshop on teaching about energy indicated that the workshop increased their knowledge while teachers within the KEEP program indicated a change in their views on energy conservations and an increase in their own conservation behaviors.

Other Effectiveness

K-12 schools can engender behavioral changes in the school or at home. Afterschool clubs may include student led activities to help other students and teachers perform everyday school activities such as turning off the lights when they leave the classroom. A small sample of Green Schools Program students (8 out of 10 queried) indicated taking energy related actions at home after participating in the program and the PEAK program showed that students share information learned at schools with family (62% of students shared information). Several programs were effective at garnering energy savings, although these typically included energy saving kits or competitions. K-12 programs can result in earned media as seen in the Change our 2morrow schools challenge and the Wisconsin KEEP program (who also received accolades for their design).

Other Benefits of K-12 engagement efforts

- **Teachers willing to adopt.** Includes enthusiastic participants as teachers are often willing to use lesson plans if they are aligned with the state standards. The program can be somewhat easy to "sell" as teachers are typically very appreciative of lesson plans in energy efficiency, as shown quotes such as "In my opinion, what students liked best about the program was discussing multiple forms of energy

production in our area, and how that relates to their daily lives" (LivingWise) or "Adding this energy lesson to my existing sustainability unit in Foods class was really useful" (KEEP).

- **Can create a stable source of information** as teacher guidance and student workbooks can be placed online for ease of use. Curriculum can be placed online for ease of use by a school (and ease of updating by the program) and create a stable source of information.

Other Drawbacks of K-12 engagement efforts

- **Requires ongoing efforts** if the program includes curricula to ensure continuing alignment with state standards. While not a large effort, including curriculum within a K-12 program requires ongoing awareness of state standards with subsequent updates to information.
- **May be difficult to maintain school participation**. Year over year participation most likely requires ongoing engagement with teachers by a program. For example, a study of two California programs showed that ~37% of schools re-enrolled at least once within a five-year period.
- **Persistence is unknown.** Little is known about the persistence of student knowledge over time and a longitudinal study, while logistically possible, would be expensive and most like not worth the cost.
- **Evaluation can be a high percentage of program costs, if not embedded in the program.** Depending on the program activities, evaluation efforts such as pre/post student surveys or family surveys (where the survey is sent home via the child and returned to the school) can be embedded into the design and reduce data collection costs (although the cost to analyze the data remains). A low level of incentives, such as providing a pizza party for the classroom with the most returned surveys, may improve embedded data collection. If evaluation occurs outside of the program design, it tends to be a high percent of the program costs.[14]

Researcher Thoughts: Options for Investing in K-12 Efforts

K-12 is effective at increasing knowledge within the target audiences. As such, could use K-12 efforts as one channel for increasing customer readiness (that is, educating students and their families about energy efficiency and other energy-related issues).

Program implementation choices can be made to target low-income or diverse schools so Energy Trust could consider having goals for reaching out to these schools.

K-12 programs that include classroom curriculum may offer a somewhat stable resource if teachers include the content year over year. Additionally, federal sites have online lesson plans and could serve as a built-in and stable resource. However, Energy Trust would need to ensure ongoing alignment of federal lesson plans with state standards. Once a set of curriculum are in place, Energy Trust could use community based efforts or links on the website to increase awareness of the teacher resource.

[14] Our few data points show an evaluation cost between 7% and 12% of the program cost where many evaluations are closer to 5%.

Table 9. K-12 Options for Energy Trust

Option*	Advantages	Disadvantages	Measurement
Classroom-based curriculum and activities – no kits	• Stability: classroom is a stable educational space • Activities can be stacked to engage students more than standalone curricula • If diversity is the goal, can market to specific areas to increase diversity but generally offered to all schools	• Measurement can be expensive or difficult if not embedded into program	• Database for tracking program outputs • Surveys of teachers, students or families implemented through embedded data collection (less expensive) with analysis by third party or separate survey and analysis by third party (more expensive) • Program could have an interactive web component that collects data on actions in home
Programs with curricula and activities in an afterschool program or energy club	• Less expensive if done through grantee • Allows for more customization for the specific group • If diversity it the goal, can market to specific groups	• Not traditional education • Reaches fewer people that an effort that seeks to reach an entire grade	• Program tracking database or status information to indicate numbers touched • If fundraiser, can also collect numbers sold
Activity-based programs (no curricula)	• Clubs: Can target specific groups • Competitions: Easy, scalable and ca reach many people, engaging, measurement for competitions can also be easy	• Not traditional education • Clubs: Reaches fewer people • Competitions: Tend to be shorter-lived (although could occur each year); may be a nice complement to other school based efforts	• Program tracking database or status information to indicate numbers touched • If web engagement or pledges, data for measurement is embedded into the program

*Note that we have not included any options with student efficiency kits because they are no longer cost effective for Energy Trust.

Energy Trust may also want to consider:

- Creating a web-based classroom curriculum-oriented K-12 efforts (without energy saving student kits) that can serve as a stable resource for the future. This could be accomplished by:
  - Investing in a web-based curriculum that can be downloaded by schools or using federally available resources that are free online (but state alignment would need to be considered).
  - If curriculum was easily available, working through the cities/towns to encourage schools to educate students on energy efficiency. Could choose one grade level and expand based on available funding.
  - Including kits for the teachers that include hands-on materials that are part of a lesson plan, which would make it very easy for the teacher to use the plan
- Investing in non-school efforts by working with youth organizations to target diverse groups
- Looking at options outside of schools. While not covered here, there may be opportunities to work with youth organizations under a bottom-up model for community-based efforts. See the community-based write-up for additional details

Customer Engagement via Web

Investment Option Findings

Customer Engagement via Web Summary

Web engagement: Utilities across the county provide general energy efficiency information on their websites. In some cases, the information is static or non-interactive – that is, a person reads the data on the website and that is as far as it goes. Most static information takes the form of tips, handbooks, graphics depicting where energy can be saved in residential homes, or educational language about measures. Other websites include more interactive content, where a person provides some information online and receives information back. Additionally, some utilities have email and phone numbers available so customers can directly email or call to ask energy efficiency questions. Web engagement is often coupled with outreach to drive web traffic.

Effectiveness of Engaging Customers via Web

Little public research is available on customer engagement via energy efficiency websites, but websites:

- Can increase knowledge
- Can touch many people, but need to be coupled with outreach efforts to reach new audiences
- Can support participation in energy efficiency programs and provide the information needed to participate

Other Benefits and Drawbacks of Web Engagement

Benefits	Drawbacks
Desired form of communication for many	Requires additional effort and cost of a marketing campaign to increase website traffic
Allows for flexibility to change messaging/Enables an organization to "manage their message" to consumers	Difficult to directly measure actions taken or knowledge learned
Can be tested easily to understand use and value	
Allows people to self-educate at own speed and own time frame	
Relatively easy to update once content is chosen	

Measurement and Measurement Cost Info

- Website analytics are low cost and provide statistics on web traffic.
- Direct measurement could be A/B testing of marketing campaign to look for uptick in website traffic (which measures the effectiveness of the marketing on reaching a targeted population) and then a pop up survey of those on the website (1-2 questions only).
- None of the studies that we reviewed included the cost to maintain a website or the costs associated with measuring effectiveness of use of the site.

Customer Engagement

Energy Trust expressed interest in finding ways to increase customer engagement by offering access to more general information to reach customers not yet served, who may need more education in order to participate in the future. According to Energy Trust's 2016 report to the Oregon Public Utility Commission, they recently initiated several efforts to increase customer engagement, including:

- **Redesigning Energy Trust's website**, making it easier for customers to navigate and find information and incentive forms. The website is also more visually engaging and optimized for phones and tablets.
- **Launching a new mobile-optimized Energy Trust blog for news and featured content** organized by customer type.
- **Enhancing monthly and quarterly email newsletters distributed to stakeholders and customers**, with higher readership than compared to industry average.
- **Launching a new Interactive Voice Response System**, the automatic greeting and navigation instructions that customers hear when they call Energy Trust's main phone number.

Related to engagement of customers via the website, in 2016, Energy Trust highlighted that they:

- **Received 944,000 website visits in 2016, a 9 percent increase** over the 858,000 website visits in 2015, reflecting Energy Trust's increasing use of online applications and forms, email newsletters, online advertising and social media.

While Energy Trust reported that they have optimized their website to drive participation in programs, incentives or services, this research effort seeks to explore the value of new content on the website packaged specifically as educational or informational content, potentially through the use of online tools, blogs and social media posts, and general outreach materials. Below we explore whether there are additional opportunities for Energy Trust to expand customer engagement through the website, online tools, or other web-based outreach efforts.

Categories of Customer Engagement

Through our review of the websites of similar organizations and relevant literature, we came across several types of customer engagement information, which we describe below. These are described in three categories: non-interactive resources, interactive resources, and outreach-related efforts. We also include web links for each of the websites discussed below (see Appendix B).

Non-interactive, or static, informational resources: Many program administrators across the county provide general energy efficiency information on their websites. In some cases, the information is static or non-interactive – that is, a person reads the data on the website but cannot provide any information back to the utility.

Most static information on the websites takes the form of tips, handbooks, graphics depicting where energy can be saved in residential homes, or educational language about measures. The Energy Trust website offers much of the same type of educational information as on other program administrator websites, such as information on how to participate in programs, as well as low and no-cost tips for how to improve a home. Other engaging (but non-interactive) information found on similar sites include:

- **Tips augmented with videos** (such as YouTube videos) to help people understand how to take energy efficiency related actions. Videos can take "tips" one step further to show customers how to take action. PG&E provides a video on their tips page to actively walk consumers through the process of caulking and how to keep the home warm. According to PG&E, these videos can help increase a motivated individual's *ability* to take action by walking them through the process.[15]
- **Handbooks and guides** to offer more detailed information on saving energy that can be downloaded. Utilities such as Idaho Power's website has guidebooks such as *30 Simple Things You Can Do To Save*

[15] Information from PG&E interview on 4/21/17.

Energy. This 96-page guidebook is also distributed through outreach events. They have used this booklet for more than seven years, and widely distribute it through customer representatives and community educational representatives. Based on an Idaho Power evaluation, these representatives report "good uptake and popularity" but we did not find information on the numbers distributed[16]. At the end of 2016 they were considering creating a short version of booklet as well.

- **Graphical pictures of homes** to help show users where they can save energy. Utilities such as Baltimore Gas and Electric offer graphical pictures of the home (specifically of a "summer" and "winter" home) with the ability to click on areas of the home and learn about how to save energy. This type of web content can be tied to summer and winter media campaign efforts.

Interactive/responsive webpages: Many websites also include more interactive content, where a person provides some information online and receives information back. Energy Trust has several online tools and interactive pages on the current Energy Trust website including an online audit, calculators to understand customer payback, and a tool that provides solar proposals. Other types of interactive information seen on similar websites (links provided in Appendix B) include things such as:

- Some webpages include interactive and responsive content that are easily included within K-12 or community engagement efforts, such as:
    - **Pledges**, which can be community (or group) pledges, or individual pledges. These may be done in conjunction with games or competitions (below). These are often tied to a community or school outreach effort.
    - **Games or competitions**, that have a website as a central part of the effort. Examples include competitions and games by Cool Choices (an online card game played by households as well as within organizations that teaches players to save energy and water) or Vermontivate (a web-based game built around taking climate change actions and played by teams in the community, schools, or workplace). Like pledges, these can be tied to a community or school outreach effort. A 2015 CIEE study reports that competitions can be very cost effective and can be scaled up to reach a large population.[17]
    - **Web-based tools for managing energy within a community**. For example, Massachusetts is providing public/commercial customers with a web-based tool (MassInsights) for managing energy. The tool appears to be something like Energy Star Portfolio Manager, but designed to provide customized energy usage information for the municipally owned and operated buildings — town hall, fire station, police department, library, and schools, as well as vehicles. The system offers: usage information for individual buildings, graphical comparisons of function-to function usage, reports comparing building-to-building usage) where they can see energy use across several buildings.
- **Interactive educational tools where a consumer can go for additional information that they cannot get elsewhere**, such as Marketplace (discussed in table below), where customers can input preferences on energy-efficient products and the site filters information to present energy efficiency options. Marketplace is an example of an educational tool that taps into search engine criteria to educate about efficiency and could bring new audiences to the Energy Trust site.

[16] Leidos Engineering. 2016. Final Report: Residential Energy Efficiency Education Initiative Best Practices Review. Prepared for Idaho Power Company. (Presented in Supplement 2: Evaluation of the 2016 Idaho Power Demand Side Management Annual Report)

[17] Vine, E. and Jones C. 2015. *A Review of Energy Reduction Competitions. What Have We Learned?*

- **Customer Blogs:** PPL created Project Envolve that used bloggers in their area to talk about energy efficiency in a very personal way on the utility blog site, where other customers can 'like' and link to the site.[18]
- **Online energy advisors or "Ask an Expert" links,** such as SRP's Energy Advisor where they challenge you to "stump" the energy advisor by asking difficult questions, or ComEd's Energy Doctor, where a customer can email the Doctor and receive information within five business days.
- **Targeted phone based resources:** Seattle City Light has an Energy Advisor phone number along with a link for people to join a "Green email" list, and Efficiency Vermont has a manned phone available during work hours to answer energy efficiency questions.

Outreach-related options: In addition to the web-based resources described above, some program administrators use customized videos, apps or search engines to draw new audiences to their websites. Examples of these include:

- **Personalized videos:** One utility is using emails that link to a short video (1.5 – 2 minutes) with personalized information based on the customer's billing data. The pilot (which tested engagement of people around bill information) showed positive results in terms of click-thrus, watching the video, and customers' finding the information useful. Each video was planned to promote programs and offerings. Videos ended with messages such as "Click here for more information about energy savings programs or to conduct an online energy analysis of your home.[19]"
- **Weather bug app:** Apogee offers a weather app to drive traffic to utility websites and link to ways to save energy. If included on the program administrators site, this app would be promoted by search engines when customers are searching for the weather. [20]
- **Capturing customers during their journey.** The Marketplace website uses digital marketing (paid search, paid social and retargeting) to appeal to shoppers who are in the market to purchase appliances or related equipment. These are customers who otherwise might not have come to the website, but are on their journey to purchase household appliances. This tool is intended to increase program reach and support ongoing engagement.[21] Other ways of meeting customers on their journey include capturing feedback from customers while the customer is using a home energy audit. Specifically, customers provide feedback on what they have done or are willing to do, and the utility can follow-up to provide additional relevant information that will help enable them to act.[22]

Effectiveness

There is little public information on the effectiveness of educational pages within a larger website. When data are presented (as shown below in Table 10), it is typically around number of website visits (unique or total) and time on the site or page. We did, however, find effectiveness information for a few of the above-mentioned efforts, including information for several web-based competitions or games, one example of the effectiveness of an interactive educational tool (i.e., Marketplace), and a couple of examples of the effectiveness of outreach-related efforts. These are presented in the table below.

[18] Johnson, S. and S. Welty. 2016. *Social Media in Energy Efficiency Customer Engagement.* Presented at National Conference, Association of Energy Services Professionals.
[19] Puryear, E. and G. Cook. 2014. *Wow'ing Customer with Personalized Videos for Bill Explanations and More*. Old Dominion Electric Cooperative (Glenn Allen, VA) and Community Electric Cooperative (Windsor, VA). Presented at National Conference, Association of Energy Services Professionals.
[20] Gilbert, S. and B. Jackson. 2015. *Give Customers a Windshield, Not Just a Rearview Mirror*. Apogee Interactive, Atlanta, GA.
[21] Binley, K., A. Arquit Niederberger, G. Champniss, and A. Katzman. 2016. *Insights from PG&E's Marketplace Initiative on Influencing Purchasing Decisions.* Presented at the ACEEE Summer Study on Energy Efficiency in Buildings.
[22] Information from PG&E interview on 4/21/17.

Table 10. Examples of Effectiveness in Customer Engagement [23]

Example in Category	Participation	New Audiences	Customer Readiness	Other	Information on Effectiveness
Non-interactive information found on websites (e.g., tips with videos, guidebooks, graphical pictures of homes)					No information on effectiveness of these specific components of a website was found in the studies that we reviewed. Most effectiveness information is for a broader website, or the full campaign including all mass media and outreach efforts. Note that this type of information is usually collected via internal usability studies, which are usually not made public.
Interactive Competitions *Findings from review of 20 competitions described in Vine and Jones 2015*				X (energy savings)	When measured through billing analyses, savings were around 5%, although several case studies saw higher savings (14% and 21%). Savings took place during the competition period with no further measurement of whether savings persisted after the competition. Two specific examples are provided below.
Interactive Game/Competition *Cool Choices Online Game (WI)*				X (energy savings)	Households within a school who played the game saved between 1% and 5% per household compared to those who did not play. Also, the Milwaukee Fire Department saved 6.6% after playing the game for 8 weeks (in comparison to the fire departments who did not play the game).
Interactive Game/Competition *Vermontivate Online Game (VT)*			X	X (efficacy)	Based on surveys, 94% of players reported average to above-average understanding of climate change and sustainability after playing Vermontivate! (compared to 78% prior to playing 85-87% of players strongly agreed that Vermontivate! helped them feel like they could make a positive change in their life and community.
Interactive educational tool *PG&E's Marketplace (CA)*	X	X	X	X (fewer applications rejected; customer satisfaction)	Based on web statistics, Marketplace sends customers directly to rebates programs in real-time (where products qualify/rebates exist) and applications have been as high at 17% of all rebate applications with fewer online applications rejections (4.3%) versus paper/web portal channels (18.9%). Customers look at an average of 3 pages per visit, and linger an average of 3:45 minutes According to authors in-market shoppers who might not otherwise have been reached are made aware of programs when Marketplace is integrated into retailer sites. Educational metrics: Case study participants (small sample size of 15) felt that Marketplace had a measurable influence on their purchase decision (7.2 on a 1-10 scale with 1 is "not at all influential" and 10 is "very influential" Three of four rated PG&E more favorably after using the website

[23] Links to websites reviewed as part of the study are included in Appendix B. Reports are included in Appendix C.

Example in Category	Participation	New Audiences	Customer Readiness	Other	Information on Effectiveness
Outreach-related *Video Messaging for Old Dominion (VA)*	X	X	X	X (Open rates, click-thrus, desire for more, customer satisfaction)	Used online survey at end of the video and web analytics to collect information. In the first couple months of full roll out, the utility saw higher click-thrus (46% compared to industry average of 25%), and open rates of 30% compared to industry average of 4%. At the six-month mark, these values had changed somewhat, seeing 32% open rates and 13% click thrus. Educational metrics from survey included: 92% felt the information was useful, and 92% felt that the video format was an effective way to communicate (e.g., educate). 99% would like more videos According to authors, "These customized video messages offer a cost effective and creative opportunity to strengthen customer satisfaction first by increasing member-consumer understanding regarding bill changes and second by increasing awareness and participation in cooperative programs." The supporting data was not presented in the paper.
Outreach-related *Apogee Weather Website Application (Unknown state)*	X	X		X (driving to website; customer satisfaction)	Apogee claims that the weather application drives traffic to the website and encourages repeat traffic saying that one utility announced the website application in a bill insert, the website visits increased by a factor of 6 and their electronic newsletter drove the visits up by a factor of 8 for a 40% increase over the same period the previous year (no additional details provided) According to Apogee "This application has positive impacts on program participation, therefore, increasing satisfaction." The supporting data was not presented.
General Website Usage Statistics for Energy Efficiency Pages					
Website Usage-CPS Energy Saver website *(TX)*				X (# of visitors, time on website)	Web analytics show 45,000 unique visitors in about a year Average time on the site was 3 minutes and 50 seconds 20% go to online assessment page, where 24% then click-through to the rebate page
Website Usage-Energy Upgrade California website *(CA)*			X	X (multiple)	A general population survey showed that 43% know to go to the website to learn more (aided) 21% of visitors view three or more pages 35% of visitors spend five seconds or more on a page Educational metrics from web-users showed that compared to information from other sources, more people found web information new (35% most or all new for web versus 20% for retail site and 24% from CBOs). California consumers tend to use search engines as their main place to look for information (~60%), followed by utility websites (~45%)

Example in Category	Participation	New Audiences	Customer Readiness	Other	Information on Effectiveness
Website Usage – Energy Trust *(OR)*				X (visits)	According to the 2014 Residential Awareness and Perceptions Study, of the 49% of Oregonians who are aware of Energy Trust, 15% visit the Energy Trust website.
General Web Data					
Multiple Utility Website Usage *Chartwell Survey*				X (desire for and mode of receiving information)	67% of consumers say that want energy usage information on the web 50.6% of consumers prefer information for receiving information/updates from a utility via a computer based website and 39.9% prefer accessing the website on their phone Less than half (47.2%) of utilities share a specific brand promise with their customers. *(See J.D. Power line below that describes interaction with website based on brand awareness.)*
Website Engagement Efforts-LG&E/KU *LG&E / KU Survey (KY)*				X (familiarity with energy, satisfaction and participation; other)	Customer familiarity with energy topics is moderate, suggesting limited overall customer knowledge Half of customers surveyed reported having seen or heard communications from the utility in the past six months. Customers who self-reported they participate in program are also highly satisfied Media engagement varied by age with those 18-34 years old more likely to seek out information on the utility's website or engage with the utility via social media.
Multiple Utility Website Usage *J.D. Powers Survey*				X (brands and returning to website)	30% of customers experienced difficulties with mobile phone version of the utility's website or app. When the 'brand' of the utility was high, more customers returned to the utility website (56% of people viewing a website among brands in the top quartile said would "definitely" return versus 50% among brands in the bottom quartile)

The most common method of measurement includes reviewing web-statistics. Ideally, web statistics should be collected and reviewed over time (i.e., longitudinal data) and in conjunction with other marketing efforts that may drive web traffic.

Pop-up surveys, or follow up surveys where customer data is collected, can also be used to assess effectiveness. To keep response rates high, though, this type of survey should be very short (i.e., 2-3 questions).

In some cases, where participation is the goal, click-thrus to program webpages, participation statistics (i.e., conversion rates), or energy savings are used to measure effectiveness.

Participation Effectiveness

Websites are often integral at helping customers get the information that they need to participate in programs (e.g., rebate forms and information), but generally customers need to be both aware of the website, and have the motivation to get to the website.

The literature review identified sites such as Marketplace, which educate customers about products and directly link to rebate applications. This directly increases participation. In addition, we found outreach-related efforts which attracted new customers to energy efficiency program websites; these were also reported to have increased participation by bringing new audiences to the website (discussed more below).

New Audiences Effectiveness

Energy Trust seeks to reach customers who have yet to participate in programs despite standard outreach efforts. Websites can touch many people at a low cost; but on their own they are not necessarily a good way to "reach new audiences." They need to be coupled with outreach that can bring people to the website, so the ability to reach new audiences will depend on the outreach effort.

Innovative email or web-based outreach, such as personalized videos, can drive customers to utility websites, which enables customer participation by helping them learn about the programs available. Web pages or applications that are searchable (e.g., paid search, paid social and retargeting) or that find ways to link to shoppers who are in the market to purchase appliances or related equipment can also bring in new audiences, or audiences that would not have been reached through the standard outreach efforts.

In addition, add-ons such as pledges and games, which usually are tied to outreach efforts, can help drive people to the website, where customers can learn about programs and eventually participate.

Finally, large scale media efforts (such as California's Energy Upgrade campaign, where all outreach points to the website) allow programs to reach deeper into the population.

We did not find examples of website effectiveness in specifically engaging diverse audiences, although targeted marketing that is either geographically or language based (e.g., Spanish language marketing), could capture new audiences for a website.

To be accessible to as many as possible, it is important to ensure that the website is "technically accessible," that is, formatted for mobile devices and loads quickly (for customers who have phones but do not have access to computers. not have access to computers).[24]

Customer Readiness Effectiveness

The information provided through educational web-pages can be effective at increasing customer knowledge and helping to get them ready to make efficiency choices. PG&E's marketplace provided information that customers said helped them decide to purchase efficiency equipment; the site was shown to influence customers' choices for 15 case study participants. Additionally, in web-based games such as Vermontivate, players reported a 16% increase in climate change knowledge after playing the game.

[24] Information from PG&E interview, 4/21/17. Energy Trust recently redesigned their website to be accessible on multiple types of devices, which can help reach these audiences.

Other Effectiveness

Examples from the tables above show that these efforts can also lead to energy savings, increase individuals' ability to take action (self-efficacy), reduce the number of applications rejected through the program process, and increase customer satisfaction and favorability towards the program administrator.

Other Benefits of Customer Engagement Efforts

- **Desired form of communication for many**. Websites are a desired method of engaging customers. Chartwell indicates that 67% of consumers want to learn about energy efficiency via a website, 45% of Californians turn to their utility websites to learn about energy, and LGE/KU found that a website or social media appealed more to younger customers (18-34). A website allows an organization to manage the messages they want to provide their customers and, depending on the web design, can be relatively easy to update once content is chosen.
- **Allows for the flexibility to change messaging/Enables an organization to "manage their message" to consumers**. An organization can change focus of website content based on the time of year or specific topic to maintain relevancy (and support repeat visits), such as is done by Baltimore Gas and Electric which changes information on their site for summer and winter.
- **Can be tested easily to understand effectiveness**. Administrators can use web stats and A/B testing to make changes. The reports we found on customer engagement via web or phone often include website statistics, which are relatively easy to obtain. Impacts of reading materials on the site can be inferred. For example, 21% of Californians on the Energy Upgrade website visited more than 3 pages and 35% spent more than 5 seconds on a page. From these statistics, one could infer that people explored the site and read some information and therefore could gain knowledge. However, it can be more difficult and costly to directly measure actions taken or knowledge learned by those who visit a website.
- **Allows people to self-educate** at their own speed, on the topic of interest to the customer, and when they are ready to hear about it. That is, they are a stable resource that people can come back to when they are ready.

Other Drawbacks of Customer Engagement Efforts

- **Requires marketing campaign, or outreach, to increase website traffic.** Website, by themselves, cannot engage customers and need marketing to point people to the site. Some websites, such as the California Energy Upgrade site, are part of an overarching campaign to drive customers to the website. In the past, California has funded their marketing, education, and outreach activities for well over $1 million dollars a year and 43% of people knew about the site. As a comparison, a 2014 study found that of the 49% of Oregonians who are aware of the Energy Trust, 15% access the Energy Trust website. However, the requirement of a marketing campaign to increase website traffic may be a drawback only in the beginning of the site as people become aware of and engage with the site.
- **Difficult to directly measure actions taken or knowledge learned.** It can be hard to gauge "knowledge change," through a website. Studies generally look at touches, length of engagement, conversions, or they use pop-up surveys. If customer-specific information is collected, there is a possibility of following up with customers to assess how knowledge may have changed.

Researchers' Thoughts: Options for Investing in Customer Engagement Efforts

Enhancing the Energy Trust website can be an attractive idea as straightforward updates to reflect educational campaigns or efforts could be relatively low cost. Small low-cost changes (such as the first option in Table 11) could help increase customer readiness. Below, we also present options by category that could enhance Energy Trust's existing website.

Table 11. Customer Engagement via the Web Options for Energy Trust

Option	Description	Advantages	Disadvantages	Measurement
Non-interactive enhancements: Add information to existing website such as how-to videos or guides to increase a customer's *ability* to act	Choose a do-it-yourself task such as sealing windows, and create a video to that shows how to perform the task Create and provide information such as a guidebook. See also next option for ways to make static information more interactive.	• Increases customer's ability to act *(customer readiness)* • Low cost option • Can update videos to keep information fresh on the site • Are available at the time that the customer wants to know more (*stable resource)*	• While can be low cost, may need to pay a bit to ensure professional look to the video	• Use can be measured through analytics on number of unique viewers, viewers who watched to end, or short one-question pop up at end of video
Interactive enhancements: Develop "new" interactive website material that connects to a community- or school-based effort Or Enhance existing engagement with Home Energy Review (HER) users; continue to assist them in journey by recording what they have done and following up	Choose to incorporate a more interactive component such as a pledge, competition, or game and cross-market the site through other programs such as community or school based efforts Consider adding "already taken action" "will take action" and "never going to take action" buttons to existing online HER to allow for follow-up through email or phone outreach	• Allows people to go deeper into a subject that they learn about through other educational outreach efforts *(customer readiness)* • Leverages outreach efforts to ensure that people go to the page • Can provide measurement or tracking of in-person community outreach • Allows for feedback from customer so that Energy Trust can continue to engage the customer along their journey. *(customer readiness, stable resource)* • Small change to existing site to collect information	• Requires some investment of Energy Trust time and resources • If a competition, may be short-lived (one year or less) unless connected to a longer-term effort to build a community or school based outreach effort	• Measured through number of pledges or number of participants, self-reported actions, conversions to program • Competitions are sometimes measured through savings, and can include RCTs or quasi-experimental studies, if desired • Can include follow-up survey to measure knowledge gain, but not likely • Measured by examining conversions or increases in HER activity
Outreach-related: Consider reaching out to customers at other points in their journey, such as when they are searching for information on new appliances or home improvement projects	Examples include working with partners that leverage search engines to reach customers who would not otherwise come to the Energy Trust site, or finding ways to have utilities identify high users and offer them links to Energy Trust	• New leads	• Comes with a cost; Usually a service, so not a one-time cost • May require coordination with utilities	• Website analytics to see who is spending time on the site and how long they use it • Short pop-up surveys with emoticons can elicit satisfaction with the site.

Study Conclusions and Summary of Investment Options

As Energy Trust staff think about how to go beyond the current Energy Trust efforts and educate customers further on energy efficiency and renewable generation, they have a difficult decision. Our research highlights that there are differences between the three possible options, that literature lacks robust cost data, and reported data on effectiveness varies, meaning that Energy Trust must make their choice with a degree of uncertainty in the outcome of any chosen path.

As shown in the previous sections, Grounded Research explored three investment options that are diverse and that have individual benefits and drawbacks. Our understanding of the effectiveness of each area derives from varying levels of publicly available information. Table 12, below, shows our analysis of the effectiveness for each option as a single table.

Table 12. Effectiveness of All Three Investment Options

Effectiveness Area	**Community Engagement** *Research indicates that this type of engagement:*	**K-12 Engagement** *Research indicates that this type of engagement:*	**Customer Engagement via Website** *There is little public research on effectiveness in this area, but there is some evidence that this type of engagement:*
Increasing Participation in Programs	Effectively drives participation in programs or behavioral changes, but may be costly or resource intensive.	Is limited in its ability to increase program participation	Can support participation in programs
Touching New and Diverse Audiences	Tends to reach deeper into the communities that are targeted than standard outreach efforts	Can have a broad reach depending on the number of schools and teachers participating	Can reach many people, depending on how the site is marketed
	Can be used to reach diverse populations, although these populations tend to have barriers to participating	Can reach diverse populations such low-income students and families if targeted to these groups	
Creating Customer Readiness	Increases customer readiness by introducing concepts, but changes in knowledge are not usually measured	Increases knowledge among students and families to help create customer readiness	Can provide a stable source of educational information to increase knowledge
Other	Tends to be shorter-lived than other outreach or program efforts, but this has the potential to change Can create energy savings	Prompts change in energy related behaviors in the school and at home Can create energy savings	

Gray boxes designate the investment option that may be the most effective in that specific area.

Each of these investment areas is effective in its own way. Community-based engagement may be the most effective option for driving participation; however, customer engagement via the website has the potential to reach more people than the other two investment areas simply because of the ubiquitous aspect of people accessing the internet. Not surprisingly, the K-12 investment option is particularly effective at demonstrating improvements in knowledge, which is the backbone of increasing customer readiness. Past research has documented knowledge change in both students and families. However, while we have designated this to be the most effective of the three investment options in terms of creating customer readiness, it is limited to participating teachers and the 33% of Oregon families with children—or an even smaller percentage given that grades 4-6 are typically the focus of K-12 programs.

In addition, research has shown that both community based and K-12 programs can lead directly to energy savings. Often, savings are due to competitions or giving away energy savings kits.

In addition to their ability to increase program participation, provide customer readiness, and reach new and diverse audiences, each of the investment options also has additional benefits and drawbacks. Table 13, below, shows some of the other benefits and drawbacks of each investment area.

Table 13. Additional Benefits and Drawbacks of The Three Investment Options

	Community Engagement	K-12 Engagement	Customer Engagement via Website
OTHER BENEFITS	Can leverage other resources to reduce program costs Can adapt to the community (makes offer community specific to enable increased engagement)	Includes enthusiastic participants as teachers are often willing to use lesson plans if they are aligned with the state standards Creates a stable source of information as teacher guidance and student workbooks can be placed online for ease of use	Consumers like websites to learn about energy efficiency Enables an organization to "manage their message" to consumers Relatively easy to update once content is chosen Can be tested easily to understand use and value Allows people to self-educate
OTHER DRAWBACKS	Maintaining community staffing levels, the community team structure, and required data management have all been challenges for past community implementers in community-based outreach efforts. Can be costly in terms of Energy Trust staff resources and efforts (especially if not well-designed),	Needs ongoing staff effort if the program includes curricula to ensure ongoing alignment with state standards Can be difficult to maintain participation as a program competes with the multiple other draws on a teachers' time Little is known on persistence of student knowledge over time and would be very expensive to perform this type of research Evaluation can be a high percent of program costs, if not embedded in the program	Requires marketing to increase website traffic Difficult to directly measure knowledge learned or actions taken based on information provided

For Energy Trust to make choices, it is important to understand the level of effort required by Energy Trust, both in terms of staff time and program costs. We cannot empirically derive this level of effort, but expect that the lowest level is customer engagement via the website. Within each section, we discuss options that are low-cost options (under $50,000) as well as more expensive efforts over this amount.

Energy Trust could choose low-cost efforts in one or more areas or create a multi-year plan that supports energy efficiency education across multiple investment areas. Table 14 shows the specific options for Energy Trust to consider across each of the investment options. The final table summarizes the options presented throughout the report.

Table 14. Summary of Energy Trust Options to Consider

Investment Option	Options to Consider
Community Engagement	Create a network of municipal outreach efforts. Energy Trust may want to consider a model that builds on existing efforts and tries to build a stable network of municipal partnerships that can be leveraged year over year
	Provide small grants for a bottom-up or "grassroots" education by organizations with ties to the community
	Increase outreach through top-down models led by an implementer using "stacked activities" that include community organizations
	Choose a specific program where additional education could enhance participation
K-12 Engagement	Continue classroom-based curriculum with the 6th grade that builds on past LivingWise efforts
	Engage with afterschool programs to deliver curriculum and activities
	Consider activity-based school programs such as a competition or student energy club
	In addition, Energy Trust may want to consider placing teacher plans, student workbooks, or curricula online to build a more stable resource
Customer Engagement via Website	Add how-to videos, guidebooks or other resources to the existing website to increase a customer's *ability* to act
	Add interactive website material such as pledges or competitions that are connected to outreach activities such as community- or school-based effort; or enhance existing customer engagement with Home Energy Review (HER) users by allowing them to provide feedback so that Energy Trust can follow up with them later
	Work with partners to leverage search engines and reach customers who would not otherwise come to the Energy Trust site, or find ways to identify energy high users and offer them links to Energy Trust.

Appendices follow and are the remainder of the report.

Appendix A – K-12 Engagement Details

This appendix includes a table of the type of data information collected by K-12 programs and a table of the different types of data collected for program measurement (Table 15). Additionally, Table 16 includes a very rough estimate of the data collection and analysis costs by each type of data collected. Both Table 15 and Table 16 are adapted from previous research (see Ridge et.al 2017).

Table 15. Type of Past Data Information Collected by K-12 Programs

Type of Information Collected	Summary of Information Collected
Basic Outputs	Evaluations of other programs included the basic outputs of numbers of: schools 'touched', hard-to-reach (HTR) schools, participating districts and schools contacted. Additionally, the evaluations provided the numbers of participating staff, teachers, administration, students, and (where relevant) events. When energy conservation kits were part of the program, this was a prominent metric. The number of audits was included when the program attempted to move families into their home audit program. When trainings were part of the program design, the number of trainings conducted and teachers trained were included as well as the diversity of trainings and teacher satisfaction with the training.
Teacher Awareness / Knowledge / Behavior	Other evaluations survey teachers to obtain multiple disparate types of data including: how equipped the teacher feels to teach about energy, teachers plan to participate again, time spent on educational materials, and whether the teacher would recommend the program to a colleague. At times, the use of the materials is described based on the competency/certification level of the teacher. Surveys also ask teachers about changes in several areas, including: teacher awareness/knowledge/behavior, presentation style, and ability to each science concepts.
Student or Family Awareness / Knowledge / Behavior	Measurements of changes in student awareness and knowledge with respect to energy use are common in the literature. These are generally measured through student tests or surveys administered by the teachers. Other methods have also been used, such as having teachers rate or assess the change in student knowledge, but self-assessments by students (ideally pre- and post- assessments) are more accurate. Evaluations have also assessed family awareness of energy, whether the student discussed energy within the family, energy actions taken based on program information, energy savings (from energy conservation kits or audits), and participation in other utility energy efficiency programs.
Materials and Curriculum Related Indicators	Evaluation of materials included teacher ratings of the program resources, quality of program materials, alignment with state academic standards, and incorporation of energy efficiency into curricula. Assessments included satisfaction of teachers with the program and program materials as well as other participant satisfaction

As shown above in Table 15, K-12 programs collect many different types of data as they assess their programs. Most have basic output data and some go further to explore and document the changes in knowledge and behaviors by teachers and students.

Table 16. Schools Programs Data Collection within Evaluation Reports with Estimated Evaluation Costs

Options for Types of Data Collection	Could embed data collection (with significantly decreased costs)	Data Collection and Analysis Cost*		
		Low	Medium	High
Background information				
Interview Program Managers		X		
Interviews with decision-makers and "gate" keepers (i.e., those making decisions about whether and how to adopt an energy efficiency program)		X		
Teachers				
Observe teachers (or other events)			X	
Teacher surveys (phone, web, mail)	X			X
Teacher in-depth interviews			X	
Non-participant teacher surveys				X
Students and Families				
Student post surveys	X			X
Student pre- and post-surveys	X			X
Student in-depth interviews			X	
Parent post-card survey	X		X	
Non-participant parent surveys				X
Review of materials and databases				
Assess instructional design of programs			X	
Review documents		X		
Review databases		X		
Review case studies done by others		X		
Benchmarking/review of other utilities		X		
Review and analysis of billing data				X

*Costs are approximations for data collection and analysis only and do not include costs to write up research plan or report. Data collection costs vary based on sample size and therefore costs could shift between categories.

Low = Less than $5,000 Medium - $5,000 to $25,000 High = Over $25,000

Appendix B – Customer Engagement Information

Grounded Research provided the table of information in this appendix to Energy Trust prior to the report. We include it here as a place for the website links.

Categories of Customer Engagement via Web or Phone	Examples from Initial Scan
1. Static web information	• Over the past several years, California has had a single main marketing website called Energy Upgrade California. (http://energyupgradeca.org/) *There is information on website statistics from an evaluation, see below in the Notes section.* • CPS Energy is a one-stop website for energy efficiency information that includes videos, calculators, rebate, calculators, and financing information. While they have a website for all, they also have a site that is only open to customers. *There was information on website statistics from approximately a year of use, see below in the Notes section* The websites below do not have evaluation reports that we could locate to help us understand the effectiveness of the sites. Most likely any information on the website use is known internally, but not made public. We include them as example of the type of information that some utilities are including on their sites. • PSE has tips on their website that are easily found https://www.portlandgeneral.com/residential/energy-savings/ways-to-save • Eugene Water & Electric has tips to save energy http://www.eweb.org/residential-customers/rebates-loans-and-conservation • ComEd has a customer handbook that includes how to be safe as well as save energy https://www.comed.com/MyAccount/CustomerSupport/Pages/CustomerGuides.aspx • Xcel Energy has saving on their front landing page that leads you to tips and programs https://www.xcelenergy.com/ • Electric Cooperatives of Arkansas has labeled their webpage that has energy efficiency type resources as "Smart Energy Resources" (and brochures). Specifics are easily found and range from energy tips to fundamentals of electricity. http://www.aecc.com/smart-energy-tips • National Environmental Education Foundation (NEEF) has broad information on multiple topics of which energy is one (under Resolve to Save they talk about both saving water and energy). They also support a national survey of knowledge attitudes and behaviors which has information on baselines regarding environmental 'literacy'. (https://www.neefusa.org/weather-climate). • The Post Carbon Institute website had information on energy and "taking a pledge" around building energy literacy (http://energy-reality.org/primer/) • Baltimore Gas and Electric has graphic picture of areas in the home in which energy can be saved. Graphics are differentiated by summer versus winter http://www.bge.com/WaysToSave/ToolsResources/Pages/InteractiveHome.aspx
2. Interactive Web based tools (interactive content)	• PG&E's marketplace includes 19 different categories of energy using equipment. People can explore which are the most efficient, pricing of each, and how others have reviewed the items. People can sign up to receive price drops of the equipment as well. Rebates are noted where available, but not all items have a rebate. When a product is chosen, a map and listing of retail stores with product is available. https://marketplace.pge.com/ *Evaluation of a small set of people using the site showed positive impacts on knowledge and purchasing*. • Cool Choices, based in Wisconsin, provides an online card game that supports saving resources (e.g., energy, water). The game has been played by households as well as within organizations. The website includes a blog written by Cool Choices staff. https://coolchoices.com/take-a-look/ *There is evaluation on the savings from playing the game. See the Notes section below for a few details.* https://coolchoices.com/how-it-works/verified-results/

Categories of Customer Engagement via Web or Phone	Examples from Initial Scan
	• Apogee Interactive has a personalized website that includes weather information and forecasted energy use (and energy cost) based on the weather. According to Apogee, the website has positive impacts on program participation and that overall website traffic increased 40% over same period the previous year (however, we do not have their report on this claim). • Vermontivate! (http://www.vermontivate.com/about) is a free web-based game playing site built around taking climate change actions. In 2015, there were multiple types of teams (community, school, workplace, and other) with varied number of players on a team (we saw from 1 to 48 on a team.) – *Vermontivate was evaluated. We provide the findings below in the Notes section*. (Could also be *Interactive Content) (Not currently in use)* The websites below do not have evaluation information to help us understand the effectiveness of their efforts. • Salt River Project has an Energy Advisor page with specific tips and links to different information such as technology specific data (e.g., tankless water heaters) to becoming a home energy audit detective (which leads the reader through what an energy audit may uncover) or getting a contractor referral. One area is more interactive as a person can ask an expert and receive information back via Facebook, Tweets, or email. http://www.savewithsrp.com/advice/default.aspx • ComEd has an Energy Doctor web location where a customer can email the Doctor and receive information within 5 business days. https://www.comed.com/WaystoSave/ToolsResources/Pages/EnergyDoctor.aspx • Massachusetts is providing public/commercial customers with web-based tool for managing energy (something like Energy Star Portfolio Manager) where they can see energy use across several buildings.
3. Phone	None of the sites in this section have any evaluation information that we could find. We present the sites as examples of utilities that have phone numbers on their websites that are specific to energy efficiency. • Seattle City Light has a phone number for an Energy Advisor along with an email and the ability to join a green email list http://www.seattle.gov/light/conserve/ • On the Save Energy area, NYSERDA has a phone and email address for getting advice https://www.nyserda.ny.gov/Residents-and-Homeowners • Efficiency Vermont has phone available M-F 8 AM – 5 PM to answer energy efficiency related questions, or can email them (https://www.efficiencyvermont.com/contact) • PG&E has the customer service center call number prominently on their website for EE https://www.pge.com/en_US/residential/save-energy-money/savings-programs/savings-programs-overview/savings-programs-overview.page? • Georgia Power has a 24/7 phone line for customer questions (email is also available), but may be for general utility questions and not EE related information for the home. They do have an Energy Services ability for MUSH and federal customers with a phone number https://www.georgiapower.com/residential/home.cshtml?hp=hd_for_my_home https://www.georgiapower.com/business/programs-and-services/energy-services/
4. Other	• One utility is using emails that link to personalized information. The pilot (which tested engagement of people around bill information) showed positive results in terms of click-thrus, watching the video, and finding the information useful. • PPL created Project Envolve that used known bloggers in their area to talk about energy efficiency.

Categories of Customer Engagement via Web or Phone	Examples from Initial Scan
	• Several utilities have social marketing presence such as Facebook or LinkedIn • DTE created a partnership with professional hockey team to reach new audiences for EE program participation; leveraged hockey teams social media during the specific campaigns

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