

Evaluating Workforce Programs: Toward Designing more Effective and Creative Interventions

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ABSTRACT

Workforce programs are all the rage – with good reason. They are meant to create jobs, staff a much-needed specialized work force, and assure that professionals have the expertise to really deliver energy efficiency effectively, safely, and with as much savings as can make sense.

But a recent evaluation of these programs shows that the programs have a way to go to meet their expectations. This study, conducted for a New England state, reviewed programs in place around the country, as well as within the state. An analysis (taking key elements from logic modeling) of the goals, activities, and interventions, coupled with surveys of participants, trainers, and program staff, found significant program design and delivery weaknesses that undermined the programs' abilities to deliver effective workforce improvement.

The study used lessons from some successful programs, as well as best practices that are well-known about training-related programs, to develop a template to help guide the utility staff through the steps of developing a more effective program – from goal setting to contractor acquisition, lesson planning, follow-up, and tracking (and other steps). The study also provided forward-looking and practical recommendations for improving specific programs in the existing workforce development portfolio. Along the way, the project also tackled some policy issues, including in-utility debates about goals, about appropriate funding sources, and other issues that are likely being faced by utilities across the country.

Introduction

Over the past decade we have been faced with continued aging of the energy efficiency workforce coupled with increasingly rigorous state and local efficiency standards (Peters et al. 2010, Q4 2021 Commercial Construction Index 2021, Shoemaker and Ribeiro 2018). The result is a green workforce shortage that limits utility programs as well as contracting companies. In Connecticut (CT), the median age for construction workers is 45, the highest measured in the United States (National Association of Home Builders 2019). To develop a younger and larger green energy workforce, CT has conducted workforce trainings, and implemented a technical high school training program. These programs, like many workforce development programs implemented across the US, focus on conducting trainings for their existing contractor base and supplement school curriculum to increase awareness of green jobs.

Below are brief descriptions of CT's workforce development trainings and high school education programs.

Workforce Development

Energize CT workforce development consists of a set of trainings provided by Energize CT and its implementation partners. The workforce development initiative outlined three main goals for the program.

1. Create and support jobs in the state
2. Create work ready clean energy workforce
3. Develop critical workforce to foster energy efficiency upgrades in homes and businesses

To guide the design of the workforce development initiative, program staff conducted a working session with participating contractors in the utilities' energy efficiency programs. The session was designed so the utilities could gather information on how to better tailor the workforce trainings to contractor needs. After this, the utilities developed the current suite of trainings. During that session, contractors requested trainings for the following broad topics:

- HVAC equipment and controls, lighting, and lighting controls
- Compressed air
- Controls
- Incentives and rebates
- Comprehensive projects (how to sell projects, calculate incentives, and apply)
- Energy management systems (EMS) and building management systems (BMS)
- Submitting a project application and the Companies' approval process
- Natural gas (how to identify energy efficiency and demand reduction opportunities)

As a result of this session, the workforce development initiative conducted a series of trainings focused on these needs. According to the training data, 738 people took a commercial & industrial (C&I) training and 1,067 took a residential training in 2019 – 2020. The Companies offered 33 trainings in 2019 and 2020. The Health & Safety trainings offered in 2020 as a response to the COVID-19 pandemic were highly attended. The trainings range in their scope and intended outcomes. The trainings moved to an online format during the COVID-19 pandemic.

High School Education Program

The high school educational program - Green Sustainable Technical Education Program (Green STEP) has the following primary objective: "to provide students with the opportunity to become more work ready for the clean energy workforce through technical certifications, internships, and work studies in their related fields and trades before they graduate from high school." In 2019, the Companies hired the Capital Regional Education Council (CREC) provide

technical and project management of Green STEP. Green STEP conducts the following activities:

1. Deliver in-person and virtual workshops
2. Provide optional career development opportunities
 - a. certification testing
 - b. a career fair for 11th graders
 - c. guidance and support for CT Science and Engineering Fair participants

At the time of this study, 17 technical high schools in Connecticut participated in Green STEP. Through this program the utilities conducted Green STEP workshops with over 2,800 students in 2019 and 2020.

Research Scope and Methods

Our evaluation of CT's workforce development programs included evaluation of CT's existing workforce trainings and CT's technical high school program (Green STEP). Because these programs had not been evaluated in over ten years, we sought to address the following objectives:

- Document what activities occur within each program
- Identify best practices across other workforce development, training, and educational programs outside of CT and how the CT programs can apply them
- Find efforts likely to change behavior that may lead to energy savings and estimate energy savings, if possible
- Recommend data tracking, training, and curriculum updates to help evaluations and increase the potential for and subsequently estimate energy savings

While these programs are funded as non-resource programs, all publicly funded programs should either directly or indirectly service to save energy. As such, we made a particular effort in our evaluation to identify ways CT can reshape their programs to focus on developing curricula focused on not just developing the workforce but focused on changing behaviors that lead to energy savings. Table 1 shows the evaluation activities we conducted for each education program – Green STEP and workforce development.

Table 1. Evaluation activities by program

Activities	Green STEP	Workforce Development
Program staff interviews	5 utility staff	5 utility and implementer staff
Implementation staff interviews	3 implementation staff	
Program best practices literature review	16 Ed programs 15 non-EE based ed programs	17 Ed programs 3 Ed program summary research papers

Curriculum review	Green STEP curriculum review	8 curricula from outside CT
Training documents review	-	Review of available training documents from staff
Trainer/teacher interviews	3 instructors	6 trainers
Adult education best practices literature review	-	Reviewed 3 best practices research papers
Contractor interviews	-	10 attendees of workforce training sessions
Contractor surveys	-	107 survey completes

Crosscutting Findings and Recommendations

The following are our synthesized findings and recommendations based on our best practices review and primary data collection for both the workforce development and Green STEP programs.

Programs should incorporate the following six best practices when designing workforce development and education programs

As an outcome of our literature review and industry scan, we identified six practices used by effective workforce development and education programs:

1. Collect post-training data
2. Include diversity as a goal
3. Create community partnerships
4. Assess regional needs
5. Recruit widely
6. Use government partnerships

Figure 1 and the subsequent descriptions summarize each best practices used by successful workforce and education programs.



Figure 1. Utility Workforce and Education Program Design Best Practices

Collect post-training data: Implementation teams need to track certain metrics after the training to understand the effect of the trainings on participants and the workforce overall.¹ Collecting post-training data can range from a conducting a participant survey immediately following the training, following up with participants months after the training, or working with employers to confirm/ask about trainings when they hire participants. The data collected can also vary depending on the goals of the program. Data can be collected on the types of work completed, job placement and/or field of new job, effect on current work, and/or satisfaction about the training. All metrics tracked should help the program understand its progress towards achieving its goals.

Include diversity as a goal. When expanding the workforce, it is important to consider *who* is included in expansion and how the workforce can best serve the market. One of the elements of the recent DEEP E3 vision statements is to “Recognize and work to remediate past harm by prioritizing historically overburdened and underserved communities” (E3 2021). Ensuring that the workforce is representative of the market in which it works can build a more robust workforce, provide valuable resources back to the community, and start to remediate past harm on these communities. Many programs we reviewed are currently adding diversity targets to their goals. Some, like the ComEd Diverse Energy Efficiency Service Provider (EESP) Incubator, are even adding full-scale programs that target diverse or underrepresented populations in the community. Codifying efforts to make the workforce more diverse by including them in goals can help diversify the energy efficiency industry and can better provide for the community at large.

¹ The following programs track post-training data: ComEd Workforce Training Programs, NYSEERDA Clean Energy Workforce Development Program, Clean Energy Works Oregon Workforce Development Program, Energy Trust of Oregon Efficiency Sales Professional Certificate Program, Southern California Regional Energy Network Architecture Construction Engineering Students Pathway Program, Ameren Illinois Energy Efficiency Program: Market Development Initiative, California Investor-Owned Utilities’ Workforce Education and Training Program (WE&T), City of Milwaukee, Wisconsin: ReFresh Milwaukee, Tennessee Valley Authority: Building Futures Minority Contractor Training Program.

Create community partnerships: Many of the programs we reviewed work with their communities to engage at a grass roots level. Working with communities directly allows for the implementation team to learn about what the community needs and existing resources that can be leveraged to enhance the program. It is important to engage with the community to understand the pool of potential employees and how to create a useful workforce that is tailored for that community's needs. Community organizations often have access and insight to what the community needs. They may have a list of people looking for jobs, understand and have access to hard-to-reach populations, and can offer insight into how best to reach and tailor content for community members. Community organizations can range from trade organizations, community or cultural centers, or local employment organizations. Partnering with these actors can help ensure that the workforce is developed strategically and can increase efficiency when searching for potential participants and tailoring curriculum. In addition to working with community organizations, a program could partner with industry leaders or members of a contractor network.

Assess regional needs: Successful workforce development and education programs are tailored to the local needs of the area and address market needs for the local region. To learn what the region needs, program designers should systematically review the labor market and customer needs. Where are there gaps in the services needed, and what is the workforce currently able to provide? A systematic review could reveal that there are other barriers to workforce expansion and customer engagement such as language or financial constraints. For example, in some regions there are higher proportions of homes that need asbestos abatement before weatherization could occur. Or, in some communities there may be a higher proportion of contractors who do not speak English and need in-language training materials. Conducting a systematic review of the labor needs of the region and the needs of those who could enter the workforce allows for the program to better reach and meet customers and potential employees.

Recruit widely: Creating a robust workforce means adding new employees to the workforce and enhancing the existing employee pool. This means that recruitment should occur within traditional channels (e.g., trade fairs or through employers) and outside of traditional channels to engage a wider audience. Programs we reviewed had innovative ways of recruiting from outside the traditional channels. They recruited via internships, through community organizations that work with at-risk youth, and, like the Energize CT program, through trade high schools.

Use government Partnerships: Governments have a vested interest in the workforce of a region, and many have existing dollars and resources going toward workforce development promotion. Utilities can partner with governments to tap into these existing networks and provide their expertise on ways to improve the energy efficiency workforce within the region. Governmental organizations may have more insight into the needs of the current labor market, financial resources, pathways to fund programs, and goals that coincide with what utilities are looking for. A robust workforce development program will leverage governmental resources.

Programs need strong, action-oriented goals focused on changing behavior and practices

Program goals need to be well defined, specific, and outline what the program is meant to accomplish (Kellogg Foundation 2004). As such, goals should focus on the end-result the program hopes to create. It should specify the target groups and approach that will help create the desired

end-result (Rand Corporation 2006). The initiative goals, as currently written in the Conservation and Load Management (C&LM) Plan, focus on raising energy efficiency awareness through educational programming and workforce development trainings. Both programs lack action-oriented goals focused on changing behavior or practices.

Goals need to be 1) specific, 2) focus on changes beyond awareness, 3) promote energy efficient behavior changes that can – directly or indirectly – lead to energy savings, and 4) are measurable in some way to show progress toward the goal.

Currently, most program goals are specific, but do not go beyond building awareness and most are not worded in a way that the program can track progress toward the goal (see Table 2).

Table 2. Goals for Each Program

Goal	Specific	Goes beyond awareness	Promotes energy efficiency behavior change	Can assess progress toward goal
Workforce development				
2019-2021 – Develop and maintain a sustainable workforce	No	Yes	Somewhat	No
Offer technical trainings to the Residential and C&I vendor community	Somewhat	Somewhat	Somewhat	Somewhat
2019-2021 - Short-term goal: Identify all workforce training opportunities and market them through the energy efficiency board’s calendar, EnergizeCT website, and targeted e-mails to contractors, trade allies, vendors, stakeholders, and customers	Yes	Somewhat	Somewhat	Somewhat
2019-2021 – Long-term goal: Create a nationally recognized workforce development program by broadening outreach beyond the state of Connecticut	No	No	No	No
2022-2024 - Ensure that Connecticut and the Northeast region have a well-trained, diverse energy efficiency workforce that supports both the Residential and C&I Portfolios	Yes	Yes	Yes	No
Green STEP				
Provide students with the opportunity to become more work ready for the clean energy workforce through technical certifications,	Yes	Yes	Somewhat	Somewhat

internships, and work studies in their related fields and trades before they graduate from high school				
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Not every goal for a program or program needs to meet all four criteria. For example, we highlight ComEd's Diverse Energy Efficiency Service Provider Incubator program, which illustrates several best practices in workforce development programs. The ComEd program outlines four major goals (ComEd 2017). Some of these goals are not specific or do not promote energy saving behavior changes. However, each of these goals serves to flesh out a major component of the program, and, in combination, are specific, go beyond awareness, promote energy saving behavior change, and progress can be assessed (See Table 3).

Table 3. Goal Setting Example from ComEd's Workforce Development Program

ComEd Workforce Development Goals	Specific	Goes beyond awareness	Promotes energy efficiency behavior change	Can assess progress toward goal
Establish a pool of trained installers who will be able to work on the distributed generation and community solar projects Future Energy Jobs Act (FEJA) seeks to develop.	Yes	Yes	Yes	Yes
Assist in the development of a workforce with the requisite knowledge, skills, training, experience, and competence to perform installations in the electric industry, including but not limited to installations enabled by FEJA.	Yes	Yes	Yes	Somewhat
Fund job training programs through community-based, diversity focused organizations that strive to provide participants with development, economic or career-related opportunities within, but not limited, to the electric industry.	Yes	Yes	Somewhat	Yes
Identify partnership opportunities within training programs to maximize the societal benefits of the funds provided pursuant to Section 16-108.12 of the Public Utilities Act.	Yes	Yes	Somewhat	Yes

Figure 2 shows how ComEd's first goal meets the four criteria.

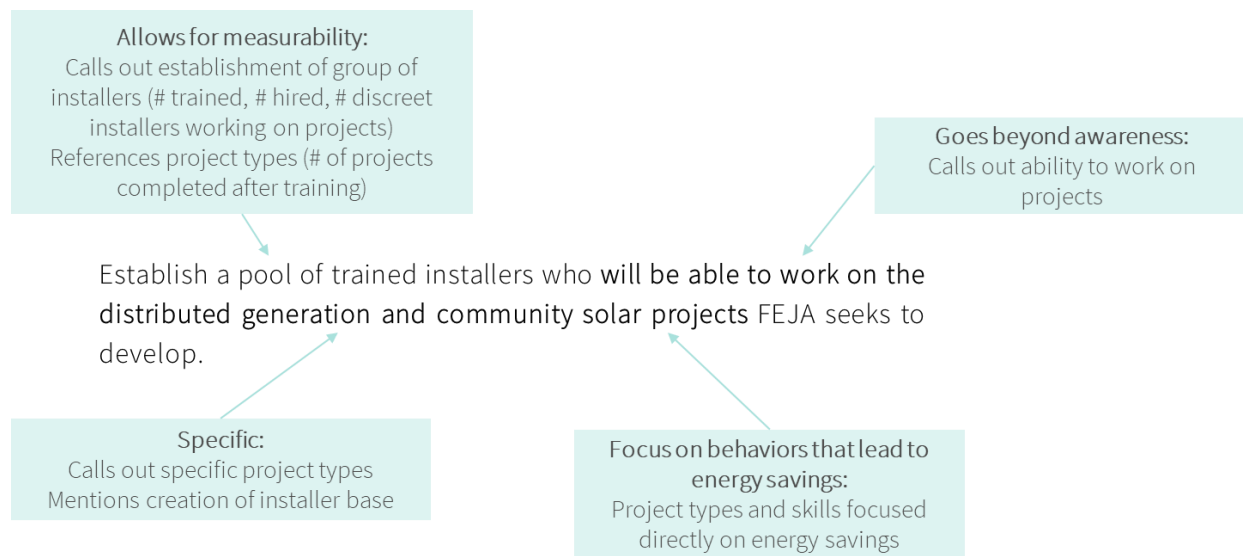


Figure 2. Example of How ComEd's First Workforce Development Program Goal Meets Four Requirements

For each Program, CT should create goals that include these four elements. Once established, these goals will serve as the foundation of the Program. The activities the program chooses to implement and the steps showing how those activities meet those goals (the outcomes of the activities), should all be derived from these goals.

Programs should specify the outcomes they are trying to achieve to ensure program designs match goals

Outlining program outcomes is a vital process to ensure program activities link up with the goals stated for the program. Outcomes serve as the middle ground between the specific program activities—what the program is doing day to day—and the high-level goals the program is trying to achieve across several years. Like program activities, these outcomes need to be tracked, but unlike activities, metric tracking for outcomes is more complex and requires some calculation of data rather than simple counts. With few exceptions, the Connecticut Education and Engagement programs do not have outcomes that link activities to goals.

In some cases, we found no clearly defined outcomes for the metrics to be tied to, as seen in the Green STEP program, where the program outlines a specific goal, and conducts three activities, but has no outcomes linking the activities to the specific goal.

In other cases, the program is tracking outputs as outcomes. For example, the workforce training program is tracking some metrics, but those metrics are directly related to the outputs of program activities, such as how many people attended a particular training. They are not tracking the impacts, or *outcomes*, the program is having in terms of subsequent actions. For example, it is not clear from the utility data whether, after participating in a training, the contractors make any changes to their practice, or whether high school students who receive Green STEP training go on to do anything with it. The result of the lack of defined outcomes is we could not find evidence showing how each program was meeting their goals.

To create measurable outcomes, Programs will need to define the behavior changes they anticipate program activities will create. For example, for California's K-12 education program (Opinion Dynamics 2020), an outcome of conducting technical high-school trainings is:

- Increased student knowledge and skills related to fundamental concepts, emerging technologies, best workplace practices and utility programs
- Increased use of skills related to fundamental concepts, emerging technologies, best workplace practices, and utility programs

Both outcomes directly feed into the larger program goal of an increased presence in the market of skilled workers. Furthermore, these outcomes can be tracked by:

- Measuring student knowledge of concepts, technologies, workplace practices, and utility programs
- Assessing whether there is an increase in the use of concepts, practices, and emerging technologies

While outputs can be measured using simple counts of trainings, most outcomes that provide evidence that the program is meeting its goals require thoughtful measurement and assessment metrics. To create measurable outcomes, the program should:

1. Explicitly outline what the outcomes are
2. How they link to goals
3. Propose potential methods to assess the outcome

A major reason creating outcomes is vital to showing program progress toward goals can be seen in contractor responses to CTs workforce development trainings. Contractors stated they are not necessarily learning the concepts they need to learn, or the trainings are not at the right level for them. Specifically, less than one-half of surveyed contractors (42%) reported they have sharpened existing skills through the training, and about a third (32%) indicated they have learned a new skill in the trainings. Similarly, less than one-half (45%) of respondents indicated they can take on more complicated projects because of what they have learned through the trainings. As an example, one respondent noted, "I'm sure there were people there that had that engineering background; I have a business management background, so I wasn't versed in that type of talk or language."

In response to these findings, the workforce development trainings can outline outcomes that address the mismatch between knowledge of attendees and level of content in the training. Specifically, the program can specify the creation of a comprehensive set of trainings that contractors can enter based on experience as a critical outcome of the program. The program can then show progress toward this outcome by identifying contractor needs (as scoped in the 2022-2024 CL&M plan), showing the creation of a plan, the trainings created and measuring contractor views on the training level appropriateness.

We outline this example, and other potential outcomes that inform the larger Program goal in Table 4. We also provide some potential metrics the program can use to assess the outcome's progress toward the program goal.

Table 4. Example Goals, Outcomes, and Metrics

Goal	Outcome	How to assess progress
Workforce development		
Develop critical workforce to foster energy efficiency upgrades in homes and businesses	Creation & implementation of an outreach plan that incorporates government and community group partnerships	# of government and community groups partnering with program, outreach plan
	Comprehensive set of trainings that contractors can enter into based on experience	Market study identifying contractor needs, Curriculum plan, Trainings created, Trainings attended, attendee assessment of training level appropriateness, continued trainee engagement across curriculum
	Increased engagement with existing and potential workforce through trainings, internships, and apprenticeships	Cross program engagement, calculation of repeat engagement, attendee interest in and participation with green STEP internships
Green STEP		
Develop critical workforce to foster energy efficiency upgrades in homes and businesses	Creation of pipeline from technical high schools to contractor workforce	Change in # of students entering the workforce across time
	Provide work study training options in schools	# of internships created, # of students in internships
	Increased engagement with potential workforce through trainings and internships	Change in training attendance across time, Change in repeat training engagement by individual students

Programs need to ensure activities conducted directly inform the program outcomes and goals

Green STEP and workforce development programs consist of meaningful activities to promote understanding and awareness of energy efficiency in the relevant areas. However, the goals of the programs as articulated in the C&LM Plan do not always align with the activities that are being conducted and the activities often lack the depth needed to effect change.

Across programs, the activities being conducted do not uniformly and consistently support the stated goals of the program. In many cases, the activities are in line with the goals (that is, they are not counterproductive), but they do not robustly support the goals nor are they sufficient to create behavior change. In general, current activities promote understanding and

awareness of energy efficiency, however, to be effective, they need to be more focused on moving from awareness into taking actions.

Figure 3 **Error! Reference source not found.** shows current program activities and their effectiveness toward addressing the program goal. Except for conducting trainings, assemblies, and sending out monthly emails, we found current program activities do not robustly help address program goals.

As we note earlier, this lack of linkage between activities and goals is a result of program goals that are not specific and action oriented. However, some program activities only tacitly link to goals. For example, Green STEP conducts workshops, career, and science fairs. While these each do serve as a foundation to bolster interest in the energy efficiency trades, the activities do not go far enough to directly help create and promote a work ready clean energy workforce.

Goal	Linkage	Activity
Workforce development		
Create and support workforce jobs in the state & Create a nationally recognized workforce development program by broadening outreach beyond the state of Connecticut		Market initiative through existing channels
		Design trainings to meet needs of existing contractor base
		Conduct trainings
Green STEP		
Promote a work ready clean energy workforce		Workshops for technical high schools – grades 9-12
		Career fair for 11th graders
		Science and Engineering Fair

Figure 3. Linkages between Program Activities and Goals

Programs should link goals and outcomes to potential energy savings

Programs funded as part of energy efficiency programs (resource or non-resource) should be able to tie—directly or indirectly—to energy savings. To do this, the programs need to show how the education and engagement activities link to changes in energy behavior and/or create energy savings. For instance, a workforce development training should do more than teach about weatherization. The training should help trainees develop and implement a weatherization action plan.

The evaluation team understands that programs may meet other policy goals that are not directly related to energy savings, such as educating and training a diverse workforce. However, as a program funded through charges on customer bills, it is imperative that energy savings, even if indirect, are a result of the program activities. If, on further consideration, the programs are serving to raise general awareness of energy and energy efficiency without any impact on actions, then it is the opinion of the evaluation team that the program budget may need to be funded through a marketing or outreach fund, rather than through rate-payer energy efficiency dollars.

Because education programs are non-resource programs, they do not have to provide evidence of direct energy savings as resource program do. However, there are ways education staff can estimate – however tacitly – that their programs are linked to savings. We recommend program staff incorporate the following process into their program planning:

1. Create logical links between program activities and goals of the program
2. Measure the outputs of specific activities and the outcomes of those activities, using the metrics you have
3. Assess the effectiveness of those outcomes – are they leading to the targeted behavior change the program hoped for?
4. Link the targeted behavior change to specific energy savings using deemed savings
5. Calculate the effectiveness of behavior change savings by dividing the deemed energy savings by the expenditure made to obtain that behavior change
6. Each program may result in many different behavior changes that are linked to energy savings – for each program, add the quotients together to assess program-level linkages between expenditures and potential energy savings

This calculation does not have to be formalized or as rigorously evaluated as resource programs, but rather, it should be used as a directional tool by program staff to prioritize some activities over others. Other training programs have used similar methods to estimate energy savings. Many Building Operator Certification (BOC) evaluations use a self-reported rating of the training's influence on the participant's decision to take actions to identify the behaviors changed because of the training. They then linked those behaviors changed to energy savings. Similarly, evaluators of the Compressed Air Challenge, a training geared toward managers of facilities with compressed air systems, surveyed training participants to identify the number of respondents who made operational or capital improvements because of the training. They were then able to associate savings with those operational or capital improvements to calculate the training's overall energy savings (US DOE 2004).

Programs need to incorporate continuous improvement mechanisms into program design

Since non-resource programs are not evaluated with the same frequency as resource programs, setting up continuous improvement mechanisms is vital to ensure each program is operating as intended and performing well. Currently, some programs collect information from trainers, teachers, and attendees, but this is conducted in an ad hoc fashion and is not tracked.

Green STEP staff have engaged with teachers to learn what teachers need and want as well as barriers to engaging with the program. As a result, staff have learned that:

- Contractors do not want to take on the liability of employing workers under 18, thus making it challenging for the program to promote internships
- The tech schools already have a formalized internship program in place and teachers say they have sufficient opportunities to place students, but that the students cannot get to the job site due to lack of transportation
- Students can complete some certifications in the program, but the certifications are seen as only a small part of a larger career journey
- The program needs buy-in from the top down, including the Superintendent and principals to allow the program to build the program curriculum into school's curriculum, to ensure teachers do not treat the program as optional

Each of these facts are vital learnings that suggest the program could focus on a smaller set of schools willing to engage deeply with the program. Other, out of the box interventions, such as carpools or driving services to worksites may also prove beneficial in helping the program meet its goals.

As part of this continuous improvement mechanism, programs should also annually assess the effectiveness and cost-effectiveness of each program and redesign or eliminate poor performers. Staff should internally assess the effectiveness of each program annually by reviewing progress in metrics and comparing performance and costs over time and between programs. If programs, programs, or specific activities are not yielding the planned behavior and practice changes, staff should redesign the interventions or consider eliminating poor performers.

Conclusion

The overarching findings and recommendations from the evaluation of CT's workforce development and education study illustrate not only the critical importance of designing programs by tying program activities to outputs, outcomes, and goals, but of also creating workforce and education programs that create behavior change and, subsequently, lead to energy savings. To do this, programs need to:

- Look to best practices used in other workforce and education programs
- Create strong goals that focus on behavior change
- Go beyond identifying outputs and specify outcomes they are trying to achieve
- Ensure program activities tie directly to program outcomes and goals
- Create goals and outcomes that lead to energy savings, either directly or indirectly
- Incorporate continuous improvement mechanisms into the design

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