Who Does the Work? A Roadmap for Staffing our Equitable Energy Transition

Kayla Banta, Kevin Price, Martha Wudka, Evergreen Economics
Sarah Lerhaupt, California Public Utilities Commission
Cody Kleinsmith, Energy Trust of Oregon

ABSTRACT

The number of decarbonization and energy efficiency projects and initiatives continue to grow, while the workforce and labor required for them has not. According to the U.S. Department of Energy, more than 92 percent of employers in the energy efficiency sector report hiring difficulties. Workforce development is critical to ensuring utilities and local and state governments can meet their climate goals.

In this paper, we combine findings from two studies; one follows trainees from a solar training program that covers disadvantaged communities (DACs) across California and the other explores a trade ally model whose goal is to develop the workforce in Oregon, focusing on how to support minority-owned firms. Combining perspectives from these two studies gives us insight from the individuals who make up the workforce and from firms hiring the workers. We will share findings on who is entering the industry and why they are, and what barriers they face. We will also identify the needs of businesses and consider the barriers and opportunities in recruiting, training, and retaining workers.

This research explores barriers to participating in paid training, what one organization does to overcome these barriers, and job outcomes from investing in workforce development within DACs. The findings will also shed light on who currently comprises the trade ally community in Oregon, how utilities and other entities can support workers, and barriers and opportunities in hiring and retaining diverse employees.

Introduction

As we transition towards a cleaner energy future, decarbonization and energy efficiency projects and initiatives are of utmost importance. With federal and state funding ramping up to support these projects, we must also consider the workforce and labor needs within our sector. The U.S. Department of Energy (DOE) releases the United States Energy and Employment (USEER) report annually to track energy sector jobs and overall employment. The 2023 USEER found that while the number of jobs in the energy sector has grown more than overall U.S. employment (3.8% vs. 3.1%, respectively), many companies are still facing hiring challenges. From the same report that surveyed 34,200 employers across the nation, 92 percent of energy efficiency employers reported that hiring qualified workers was somewhat or very difficult.

To bridge the gap between the number of jobs needed for our energy transition and the number of qualified workers who are available, workforce development is critical. The U.S. DOE is leading the charge by collecting resources, case studies, and other materials to help local and state governments, utilities, and others in the energy sector identify solutions to this gap. Workforce development, in this research, refers to policies and programs that help to prepare

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people to meet the needs of employers. This can include sharing knowledge, developing skills, and offering training and support.

During a recent effort to collect data on national workforce development, the DOE convened a Better Buildings Workforce Accelerator to support workforce partners across the country. The goal was to find solutions that other organizations can follow. Some of the featured solutions increased emphasis on program design and evaluation, streamlined career pathways, and engaged K-12 classrooms to share about green careers.

In this paper, we pull findings from two pieces of original research that dive deeper into motivations, barriers, and outcomes of two different workforce development initiatives in California and Oregon. Understanding how different segments of our population face challenges and barriers, as well as how they take advantage of opportunities, is critical to ensuring an equitable energy transition.

Program Backgrounds

This paper pulls findings from two reports of original research we conducted. We briefly introduce both programs here before diving into the findings. The first report comes from an impact and process evaluation of the Disadvantaged Communities – Single-Family Affordable Solar Homes program (DAC-SASH). DAC-SASH is a low-income solar program created by a California Public Utilities Commission's (CPUC) decision to increase adoption of renewable generation in California's disadvantaged communities (DACs). The second is an interview effort for Energy Trust of Oregon's Trade Ally Network. Energy Trust provides business leads, cash incentives, specialized training, technical assistance, and networking opportunities to the trade ally group, with the goal of growing the network of contractors in Oregon.

Both programs had a focus on equity and minority and underserved populations. In California, the DAC-SASH program was implemented within DACs only. DACs in California are specifically targeted for investment to improve public health, quality of life, and economic opportunity in California's most burdened communities. DACs are defined by census tracts and identified by a tool (CalEnviroScreen) that ranks tracts by a number of metrics, including pollution burden such as ozone, diesel particulate matter, toxic releases, and traffic impacts, as well as population characteristics including poverty, unemployment, and education.

In Oregon, Energy Trust focused its main research objectives on hearing from its trade allies that are enrolled with the Certification Office of Business Inclusion and Diversity (COBID). The State of Oregon determines the qualifications for COBID certification, and its goal is to level the playing field by providing certified firms a fair opportunity to compete for government contracts. Firms that are minority-owned, women-owned, service-disabled veteran-owned, or that are emerging small businesses are able to participate in the program.

Disadvantaged Communities – Single-Family Affordable Solar Homes Program (DAC-SASH)

The goal of the DAC-SASH program is to provide opportunities for existing low-income customers within DACs to overcome barriers to accessing on-site solar systems to decrease

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electricity usage and cost without increasing monthly household expenses.[1] Low-income, single-family homeowners residing in DACs within the service territories of the large electric investor-owned utilities (IOUs)—Pacific Gas and Electric (PG&E), Southern California Edison (SCE), and San Diego Gas & Electric (SDG&E)—are eligible. The program is administered by GRID Alternatives (GRID). While the DAC-SASH program includes many mechanisms to achieve its goals of helping low-income households, the main element we discuss in this paper is the job training and workforce development aspect of the program.

Each DAC-SASH project must include at least one job trainee on site, which led GRID to prioritize job training and workforce development in DACs. To promote green jobs in low-income communities, GRID administers a solar installation training program called Install Basic Training (IBT). The IBT courses provide classroom instruction, lab activities, and real-world experience on solar installations to participants. The goal of the IBT program is to provide an effective, efficient, and equitable pathway into the solar industry. GRID also encourages volunteers from within DACs to help with solar projects in their communities. These volunteers may only help with installations on a one-off basis, and they don't receive the same training as the IBT program trainees.

In 2022, we surveyed 114 trainees and volunteers to learn about barriers to participating in training and joining the industry, as well as career outcomes. We also conducted onsite visits to attend training classes and installations in three different California offices (Evergreen Economics and BrightLine Group 2023).

Energy Trust of Oregon Trade Ally Network

Energy Trust's trade ally network provides a number of services and training opportunities for trade ally contractors in their network, with the goal of increasing the number of contractors in the state. Contractors need to fill out an application, have customer references, and provide licensing and insurance information to become a trade ally with the program. Once they join, they can take advantage of the program offerings that Energy Trust provides to its trade allies, including business leads, cash incentives, co-branded marketing, networking opportunities, and more. For this research, we focused on their specialized training offerings and technical assistance.

The findings covered in this paper come from interviews conducted between February 2024 and March 2024 with 146 trade ally contractors. The interviews focused on professional workforce development practices within their firms, training needs, barriers to hiring and retaining diverse employees, and barriers to increasing projects or meeting demand. We also asked about demographic and firmographic characteristics to better understand the trade ally network's composition.

[1] D. 18-06-027. Accessed via: https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M216/K789/216789285.PDF

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Findings

Career Outcomes and Progressions

Almost half of trainees and a third of volunteers with GRID reported that they were unemployed before participating in the training program (Figure 1). After participation, respondents were more likely to report that they had a full-time job. As shown in Figure 2, participants in both groups (46% of IBT participants and 52% of volunteers) reported that they are now working full-time. There was also a significant reduction in unemployment, with only 16 percent of those who attended the IBT course and 5 percent of the volunteers reporting unemployment post-participation.

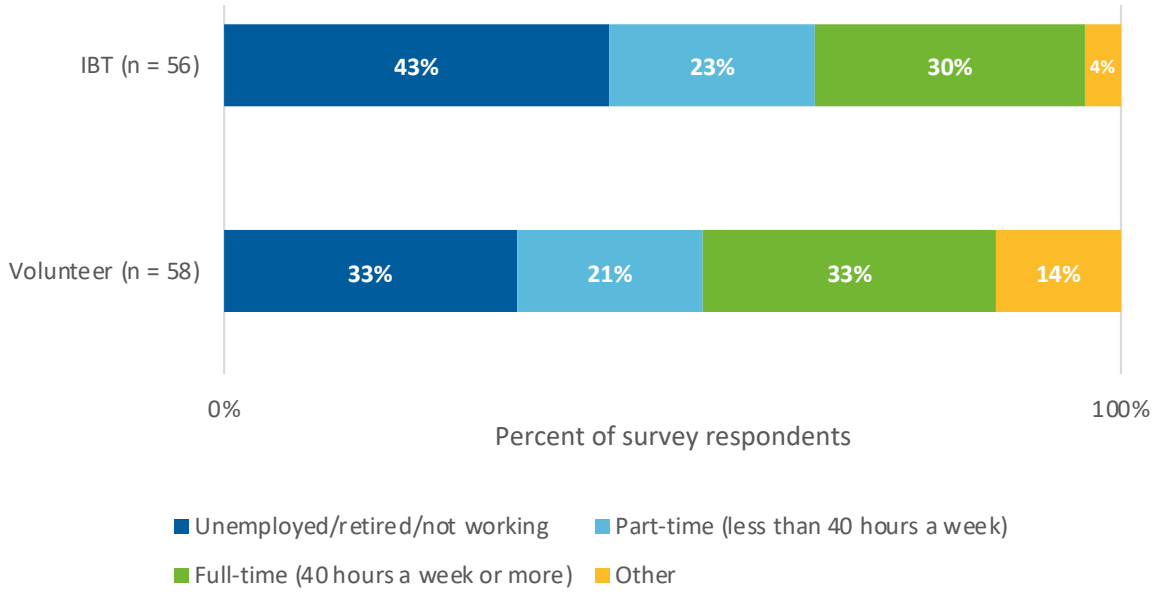

Figure 1: Employment status before participation. *Source:* Evergreen Economics

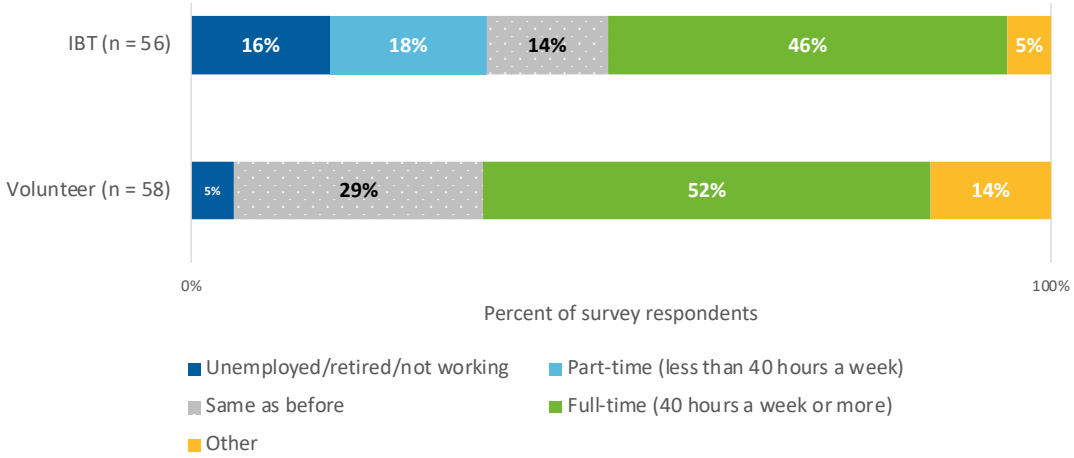

Figure 2: Employment status after participation. *Source:* Evergreen Economics

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Additionally, the training program was effective in bringing more workers to the solar industry. We asked participants to specify types of employment before GRID involvement. Most participants (91%, n=58) had not been employed in the solar industry before participating in the training. Twenty-one percent of respondents indicated that they worked in food services, while 16 percent said construction. Figure 3 displays all other chosen responses.

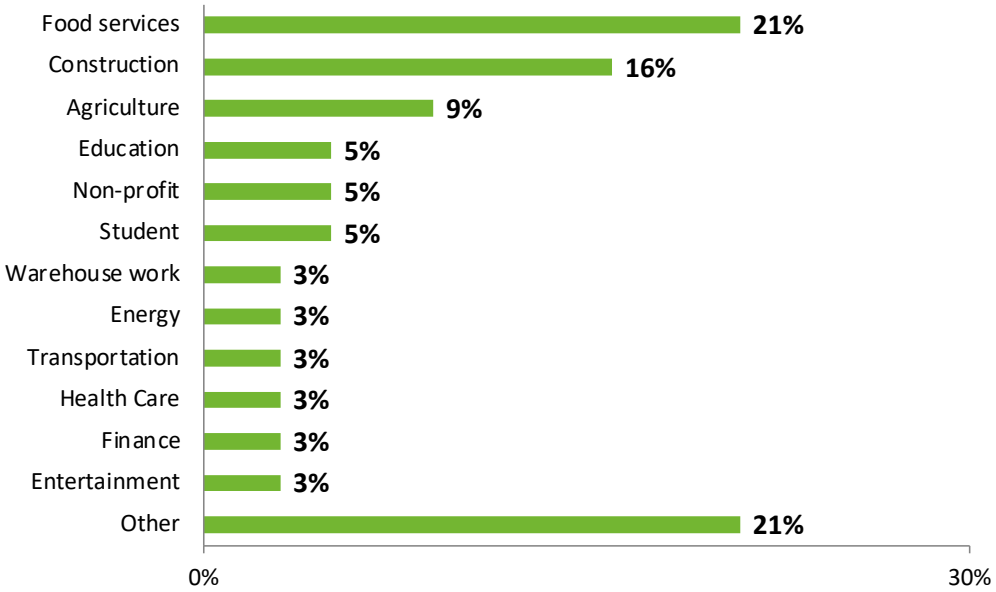

Figure 3: Type of employment before participation. *Source:* Evergreen Economics

For those who selected "Other," respondents indicated that they were working in science research, technology, engineering, pharmacy, and fiber optics.

To investigate career progression, we asked what past participants have been doing for work since the training. Figure 4 shows that half of all respondents have not worked in the solar industry since the training course or since volunteering (n=109). The other respondents either worked in the solar industry for some time (21%), currently work in the solar industry (24%), or are looking for employment in the solar industry (5%). Comparing the pre-employment industries, however, the number of people in the solar industry did increase significantly after participation (9% to 24%).

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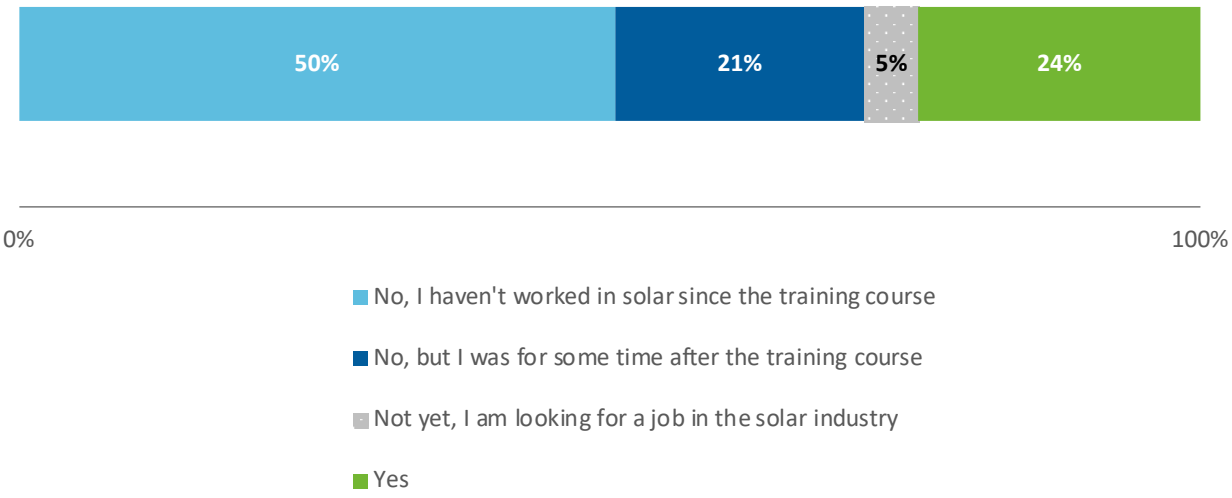

Figure 4: Solar industry employment since participation. *Source:* Evergreen Economics

Among respondents employed in the solar industry, there was a shift in their role after their involvement with GRID and their work on a DAC-SASH or SASH project, as shown in Figure 5 (n=51). Participants listed their current or previous roles in the solar industry. Of those holding current positions in the solar industry, half (50%) fell into the "Other" category and wrote in that they hold positions such as instructors, project managers, and designers. Of those who previously held a position in the solar industry, most (56%) were solar PV installers. Figure 5 provides an overview of respondents' current and previous roles in the solar industry and suggests that many respondents are currently working in more complex and likely higher paid roles after involvement.

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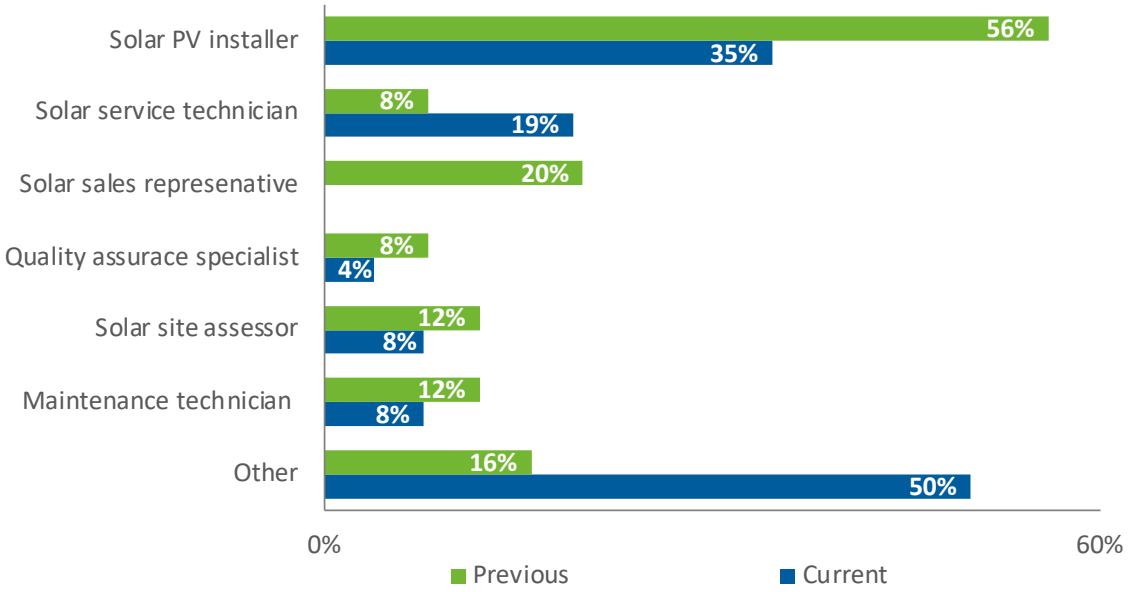

Figure 5: Roles in the solar industry before and after participation. *Source:* Evergreen Economics

Value of Trainings

We asked participants in GRID's IBT program whether they believed that the training they received and the opportunity to perform on-site installations improved their career opportunities in the solar industry. Both IBT and volunteer respondents mostly reported that involvement with GRID projects improved their career opportunities (Figure 6), with volunteers reporting "don't know" more frequently than IBT respondents when asked.

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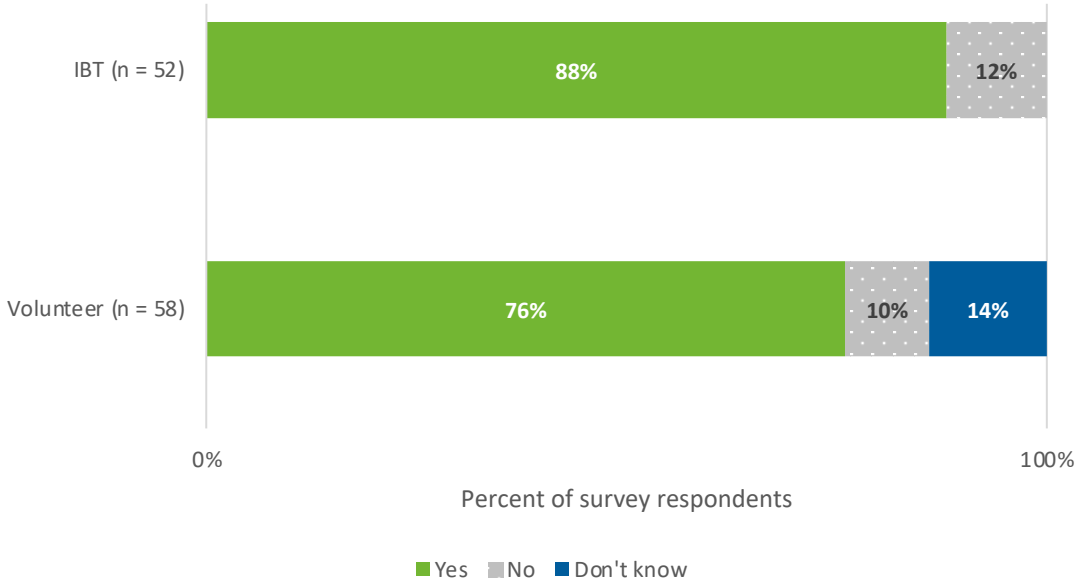

Figure 6: Belief in the improvement of career opportunities after participation. *Source:* Evergreen Economics

We then asked them to describe how the on-site training helped them. Forty-one IBT participants and 39 volunteers gave several explanations as to how they believed their career prospects had improved, most of which are summarized in Figure 7 below.

Gaining more technical knowledge and hands-on experience (n=60, 75%) 	"Being able to sit in a classroom and learn about solar, then get hands-on experience made getting into the industry a reality." (IBT) "Having hands-on experience seems like it will be valuable if I ever interview to work in solar. The process was especially helpful because we were working with more experienced installers who helped to explain everything." (Volunteer)
Assistance with employment and networking opportunities (n=31, 39%) 	"After taking the course I feel I can install a solar panel with little to no help. I know there can be great doors open for me in solar work. All I have to do is apply." (IBT) "Volunteering made me a familiar face with GRID staff, so that created the opportunity to intern, then become a SolarCorps fellow and then project manager…" (Volunteer)

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Personal development (n=11, 14%) 	"It helped me in my interpersonal people skills, it provided me with basic solar installation knowledge, and it taught me how to be a better team player." (IBT) "If I chose to pursue a career in solar, GRID prepared me from beginning to end including prep, the install processes, and what to expect. I developed customer service skills speaking with homeowners and had the opportunity to work more with conduits…" (Volunteer)

Figure 7: Respondent's belief on how participation improved career prospects. *Source:* Evergreen Economics

In the Energy Trust trade ally interviews, we heard more balanced views on trainings. Nearly all respondents (95%) said they receive some sort of training resource from their firm, and most (71%) said the resources were very helpful for career development. Those that reported using external resources, like from utilities, manufacturers, and Energy Trust also mostly reported them being very helpful (67%, Figure 8).

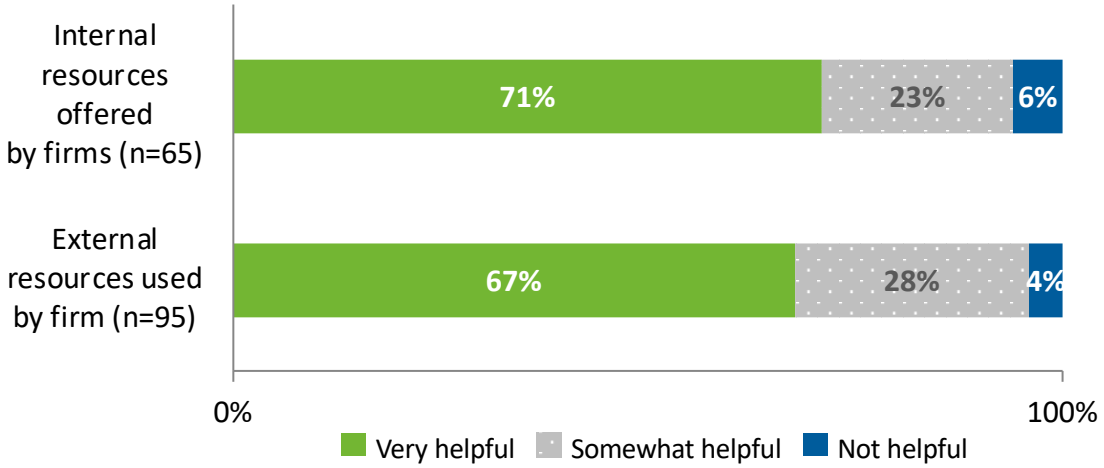

Figure 8: Respondent's belief on usefulness of training resources available. *Source:* Evergreen Economics

However, there were some trade allies that saw trainings as valuable but did not take advantage of them. This subset of respondents reported that time and scheduling was the biggest barrier to participation. Trade allies reported that they were either too busy for additional trainings, that they were not made aware of the trainings in time to schedule them, and that it was challenging to find the balance between sending employees to training sessions and ensuring that they are taking on enough projects to sustain operations (from a financial standpoint). One quote that summarized this group's sentiment is captured: "[It is a challenge to allocate] time to pull employees from projects and put them on days of training without pay and income to the company."

Although we heard that the internal and external resources available to trade allies were helpful, when asked about whether there were gaps in training offered by their firm, almost half

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(45%) said there are. Respondents reported most commonly experiencing training gaps in specific technical or industry-specific knowledge (17), creating standardized onboarding and training plans (5), and incentive training (3).

Geographic Barriers

In California, GRID administers the IBT classes out of its regional offices but did offer a virtual option during the COVID-19 pandemic. The location of training was important to the context of the evaluation to determine if trainees and volunteers were coming from DACs or tribal communities or traveling to those communities for the opportunity. The intent of the workforce development component of the program is to encourage green job training within DACs and to provide economic benefits for those communities.

Trainee data did not include the trainees' home addresses, so we could not determine if most trainees were coming from DACs themselves. Our survey analysis did include questions about distances traveled, however. On average, to attend the GRID's IBT course, half of the respondents only traveled between zero and 10 miles roundtrip, while only about a fifth traveled more than 20 miles (Figure 9). By comparison, roughly one-third of volunteers traveled more than 20 miles to attend installations. Having to travel to access training and volunteer opportunities within DACs could indicate that the participants did not themselves live in a DAC. Installing solar within DACs is crucial to DAC-SASH's mission, but there still seems to be a lack of workforce being reached and leveraged within DACs.

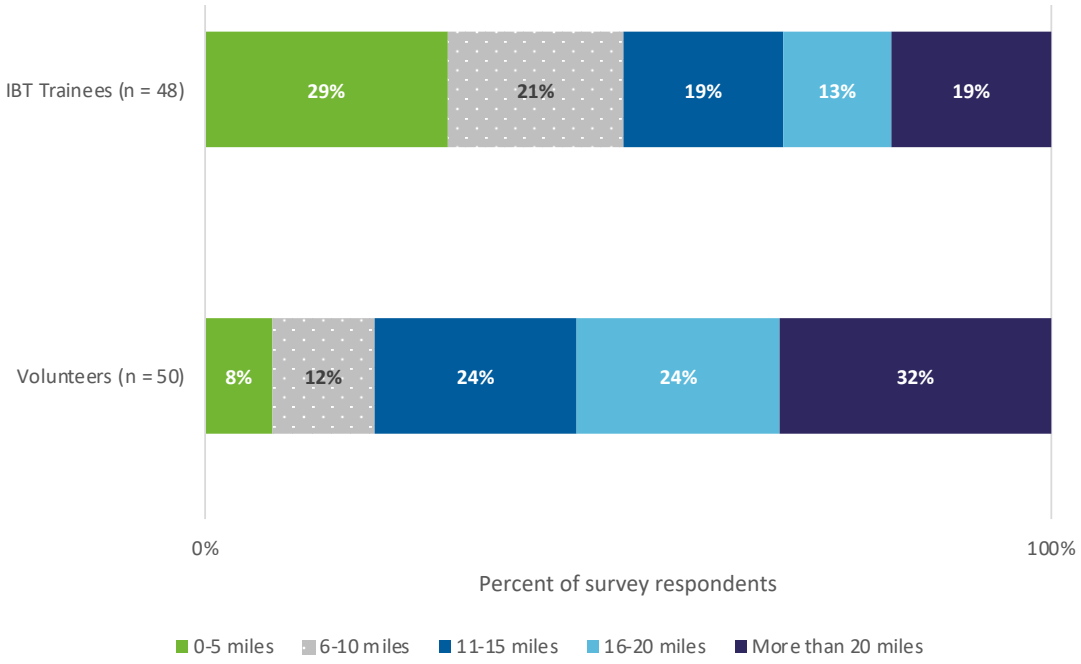

Figure 9: Distances traveled to attend training or volunteer location. *Source:* Evergreen Economics

Similarly, geography plays a big role in Energy Trust's trade ally network's opinions on trainings and resources available. We asked the interviewed firms whether they experience

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internal bottlenecks due to challenges in hiring employees, and less than half of all respondents (44%) said they did. However, firms that serve Eastern Oregon reported many more firms facing challenges (80%, Table 1).

Table 1: Internal bottlenecks with projects due to hiring challenges (n varies)

Firm Characteristics	Category	N	% Reported Challenges
All Trade Allies		**132**	**44%**
Primary Service Area	Entire State	55	40%*
	Southern and Central Oregon	15	40%
	Willamette Valley	23	43%
	Portland	29	41%
	Eastern Oregon	5	80%*
	Coastal Oregon	3	100%

* The differences between groups are statistically significant at the 90 percent confidence interval. *Source:* Evergreen Economics

In another question related to barriers, trade allies were asked if travel costs are factored into bid pricing and if that leads to any advantage for local firms. The majority of interviewed trade allies (84%) said that they factor travel costs into bid pricing. Many trade allies mentioned that their firm charges a travel fee on the project, pays a per diem to their employee, and/or covers lodging for employees. Several firms have a set threshold for when they charge a travel fee, including if a project is further than a certain mileage radius or if their workers have to stay overnight.

A majority of interviewed trade allies (67%) said that local firms have an advantage in terms of winning bids because they do not have to factor in travel costs (which are ultimately passed on to the client in the form of a higher cost project). However, many trade allies elaborated on the nuances of local firm versus out-of-town firm advantages. Many trade allies mentioned that in more rural areas, there might be a lack of specialized firms and thus an out-of-town firm is best suited to conduct the project. One trade ally noted, “when we travel it’s because there are not a lot of HVAC companies around the customers.” Another trade ally put it simply and said, “the problem is there are no local firms.” Bid pricing was mentioned as a key factor in winning bids, and several trade allies noted that the project will go to the lowest bidder, which is not necessarily a local firm.

Other Barriers and Opportunities

In addition to travel concerns, from the DAC-SASH research, participants in both courses were asked how much of a barrier various factors are to getting hands-on experience in the industry (Figure 10). Most respondents said that the options listed were “not at all a barrier.” However, lack of financial resources, lack of transportation, and lack of information were most reported as moderate or extreme barriers.

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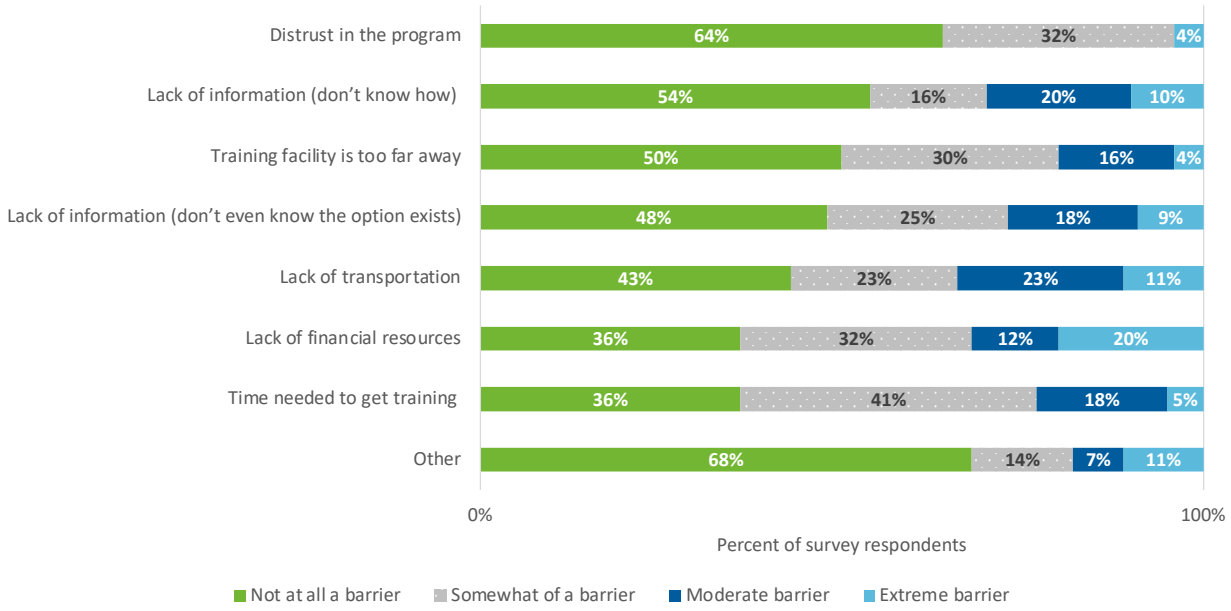

Figure 10: Barriers to participating in training. *Source:* Evergreen Economics

Those who chose 'other' were asked to further specify what they meant, to which the answers reported were:

- Inclusivity barriers due to gender and language (6);
- Lack of work opportunities (3);
- Difficult work environment because of constant schedule changes, long commutes, and no breaks (3);
- Personal motivation (2);
- No job guarantee and low starting pay (2); and
- Family and childcare responsibilities (1).[2]

Trainees who were affected in some way by the barriers reported (n=44) were asked if they had any suggestions for how programs might be developed to overcome any of the barriers. Table 2 categorizes the free response answers into four groups: overall improvements in classes, training, and employment opportunities; assistance with financial and transportation issues; improving inclusivity and support systems; and greater advertisement and outreach.

Table 2: Suggestions to improve workforce training program (n=25)

Suggestions	**%**

[2] Inclusivity barriers were identified as lacking a "sense of belonging for females in the industry," or that it was "male dominated."

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Overall improvements in classes, training, and employment opportunities	48%
Assistance with financial and transportation issues	40%
Improving inclusivity and support systems	24%
Greater advertisement and outreach	12%

Source: Evergreen Economics

The Energy Trust trade ally interviews revealed similar barriers to accessing trainings, but expanded on barriers that face their firms in general as well. We asked interviewees how interested they would be in increasing their volume of projects over the next year and what barriers stood in their way. Most firms (92%) were interested in increasing their project volume over the next year. Both firms that do want to increase projects next year and those that do not both cited labor as their biggest barrier (Table 3).

Table 3: Reported barriers to increasing projects (n varies)

Reported Barrier	**Want to Increase Projects (n=129)**	**Do Not Want to increase Projects (n=19)**
Labor	37%	53%
Supply	20%	26%
Demand	18%	16%
Costs	11%	21%
Marketing	5%	0%
Interest Rates	3%	0%
Other	14%	5%

Source: Evergreen Economics

The similar barriers may reflect that the question posed to trade allies looking to increase project volume asked about barriers more generally, while the question posed to trade allies not looking to increase project volume asked them to speak to their direct experience (and focused on barriers experienced over the past year). For example, one trade ally listed supply as a barrier but commented "There was a lot of supply chain issues - especially during covid, but [it's] far better now." Ultimately, the most important barriers are intertwined—if demand ***increases*** and supply chain issues ***decrease***, the risk associated with staffing ("labor") may become less important or impactful. Conversely, if firms experience shortages in skilled labor, they may be unable to meet demand.

Finally, we asked firms whether they have had challenges retaining or hiring diverse employees, and 102 interviewees responded. Approximately one in five respondents said there

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have been challenges (20%). Of the firms that reported challenges (n=20), most reported that a lack of diverse applicants was a barrier (70%). Other reasons included that their company is too small to focus on diversity (20%), and that hiring in general is challenging (10%). Two illustrative quotes are provided below:

- "The engineering industry in general is not a very diverse pool."
- "I focus on hiring the person and have several different ethnicities come through the firm. If you do a good job, that's all that counts and nothing else matters. If you are a good person and I can trust them, that's all that matters. I like to keep it simple."

Some specific challenges that trade ally firms reported were:

- A lack of knowledge about where to hire more diverse workers;
- Concern about not knowing how to accommodate other genders and races; and
- Worry about new, more diverse workers feeling welcome in the environment.

Conclusions

Training helps people get into the industry. DAC-SASH trainees reported increased employment after the training, and most trainees came from non-solar backgrounds. From the Energy Trust trade ally interviews, we learned that hiring qualified workers was a big challenge, but that firms are not as capable of training up their own staff due to time and cost constraints. Workforce development programs are effective and essential. They require coordination between utilities and other local and state government programs to align needs and address the most pressing barriers to entering the industry.

Barriers are varied and require programs to consider different populations to support them equitably. The most cited reasons for not getting training sooner were lack of financial resources, lack of transportation, and lack of information (DAC-SASH). From trade ally firm perspectives, employers did not have time, budget, or staffing sufficiently covered to allow employees to attend trainings. Solutions from both studies point at paying participants for their time off work, providing accessible materials, offering childcare, providing trainings during off-work hours, and incorporating language and culturally specific materials into marketing and training materials. Workers face different barriers to participating in training. Workforce development programs must consider how different populations encounter different barriers to equitably serve them.

Barriers to participation can also be geographic. California trainees and volunteers had to travel far to job sites in DACs, and traveling to training outside their communities was also challenging (DAC-SASH). Trade ally firms interviewed in more rural areas in Oregon also noted that attending trainings in Portland or other metro centers was a challenge. Additionally, firms in Eastern Oregon were most likely to report hiring challenges than other areas of the state, suggesting that access to training also impacts availability of skilled workers in those areas. Understanding the geographic constraints of programs—including barriers faced by the trade

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allies that provide program services—will be important to ensuring all population are served well.

Racial, ethnic, and cultural diversity may not be a priority for firms struggling to hire. Most interviewed trade ally firm owners self-reported their gender and race as Caucasian (82%) and male (76%). A small subset of interviewed firms reported challenges retaining or hiring diverse employees and cited a lack of knowledge about how to hire diverse workers and how to make them feel welcome. Interviewed firms focused on how challenging it is to hire anyone who is qualified. Relatedly**,** only a small number of trade allies in Oregon reported challenges related to language barriers; an even smaller group reported interest in hiring employees with fluency in multiple languages to support potential customers with limited English language fluency. Employers in places with less racial and ethnic diversity in the population may not currently agree that diversity and inclusion is an important piece of workforce development. Employers cite hiring challenges and lack of diverse applicants as challenges facing their business. While initiatives such as COBID and hiring from DACs encourage equity, businesses may not agree that they are necessary. However, ensuring an equitable approach to workforce development is necessary to fill these workforce gaps and incorporating diverse perspectives will strengthen the industry.

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