

Building Workforce Capacity in the Green Economy

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ABSTRACT

The economic promise of millions of jobs created by the federal Inflation Reduction Act is expected to increase the demand for workforce training. This paper explores successful urban and rural strategies for green job training, using case studies from the District of Columbia and Vermont. The District's case study describes a comprehensive workforce development program whose regulators had set energy efficiency performance benchmarks that could be met most effectively with the creation of the program. The Vermont study investigates policy steps to remedy participation barriers to green workforce development, and those policy outcomes. Each jurisdiction has aggressive climate and employment goals. The District plans to double the number of small, local businesses and cut citywide unemployment by 50 percent in persistently unemployed and underemployed populations, by 2032. Vermont has binding climate goals that necessitate a five-fold increase in weatherization workers, in under five years. Both jurisdictions offer trackable, targeted, workforce development models. By engaging contracting and weatherization industries, the programs provide customizable strategies for effective outreach, recruitment, job placement, mentorship, and retention. Each framework aligns national training and certification with native work classifications. The programs meet participant and employer needs while ensuring high-quality career pathways and the availability of skilled, green workforce professionals. The frameworks are evolving in response to changes in local policy, and promote contractor engagement and training in industrialized construction and weatherization techniques. The models show how other jurisdictions can build their workforces, remove participation barriers, navigate funding, and incorporate governmental energy and climate initiatives.

Introduction

The American job market is undergoing unprecedented shifts in employment attitudes and practices. Hybrid working, a workforce that benefits from increases in artificial intelligence to manage repetitive tasks, staffing for operational efficiency and resilience, an emphasis on skills, and employee monitoring and analytics are what *Forbes* calls the “five biggest workplace trends of 2022” (Marr 2021). In this context, evolving federal legislation that addresses climate change, and economic recovery from the protracted COVID pandemic and other disruptions have brought about different kinds of job opportunities.

This paper demonstrates that workforce development in the clean-energy or green economy can readily be, and is (in some places already), an important part of effective energy efficiency program design. The shifting economy is leaving business-as-usual behind, especially in light of a growing number of jurisdictional goals for climate resilience, lower greenhouse gas emissions, and clean-energy generation. Many programs have shifted toward customer-engaged strategies for ongoing energy improvements in the commercial and industrial market, and

increasingly so in the residential market. Innovative technologies too have helped drive customer demand for efficiency services, business resilience for utilities, and stability for the grid.¹

Innovations in advanced technology, efficiency program design, and the engagement of utilities and grid in efficiency program implementation are already under way. However, one remaining frontier for next-generation innovation lies in workforce development initiatives. Such innovation goes well beyond traditional workforce development programs, which typically provide clearinghouses for job opportunities, tips on writing resumes and interviewing successfully, and access to employers and organizations offering apprenticeships.

The new, post-pandemic economy is also an economy for rebuilding communities; this is a key concept for shaping next-generation workforce development. Jobs are integral to that rebuilding, whether necessitated by severe climate change events, a diminishing service sector, political tensions at all levels of government, or widening income inequality.

Further, it is important to recognize that well-paying jobs in the expanding clean-energy market offer disproportionately favorable benefits to local, state, regional, and national jurisdictions (Foster 2021, ACEEE 2022).² In the authors' experience, those jobs and careers depend on the presence of a well-functioning, purpose-driven workforce development program that measures its success in *careers launched*, not jobs filled or apprenticeships completed.

Careers launched could become a new metric for general employment practice; it already has a foothold in the green economy. The District of Columbia Sustainable Energy Utility (DCSEU) Workforce Development Program shows that such a metric requires a novel approach to training, with an emphasis on localization. That is, the DCSEU designed its workforce development strategy to support the fulfillment of a contract obligation for “green jobs created.” The strategy matched (1) the workforce development curriculum to the program needs of the DCSEU, (2) the practical-experience opportunities to the DCSEU participating contractors' labor objectives, and (3) job placement to the District's goals for putting underemployed and unemployed people to work (DCSEU 2017, 26).

The DCSEU example indicates that a program administrator must know its own economy's socioeconomic character (for example, the extent to which it has urban, suburban, semi-rural, and / or rural elements and where common needs might overlap among them) and knowledge of its essential local-market characteristics such as demographics, culture, and building stock. Finally, as with many successful, long-term business practices, creating a *career-centric* workforce development program for a post-pandemic age requires partnerships across the full spectrum of DCSEU activity: construction, the supply chain, engagement with all customer classes, and collaboration with utilities.

¹ The literature is replete with accounts of increasing customer engagement in energy efficiency projects, and of the role of technology in achieving objectives for utilities and the grid. VEIC's own, well-documented experience with these trends—ranging from its seminal work in strategic energy management in 2007 to its flexible load management innovations with grid-interactive energy-efficient buildings in 2021—supports the national findings. VEIC and other service delivery organizations are also tracking reductions in greenhouse gas emissions from their work; this is a feature of a national trend that, taken together with the market- and technology-related shifts, tends toward holistic energy efficiency programming and accountability.

² VEIC has determined from its own experience in the District of Columbia that investment in a workforce development program for green careers results in [four times more jobs created](#) than if the investment went into other business sectors. In addition, VEIC has determined that the program cost to bring an under-skilled, unemployed person into a green career averages just under \$38,500. The analysis uses [ACEEE's formula for job creation](#), and counts direct, indirect, and induced jobs.

What Makes This Era Different?

A successful shift in designing workforce development programs away from *job* metrics as a success factor, and toward *career* metrics, is likely to add stability to the green economy. The following case studies examine two approaches to green economy workforce development in differently regulated environments. The DCSEU is in a city with persistent double-digit unemployment rates in two of its eight wards (DOES 2022). Underemployment and unemployment have driven the design of the DCSEU's Workforce Development Program, whereas the case study for Vermont examines a construction industry characterized by a lack of skilled laborers and commitment to ongoing training in green construction techniques and business management. As the case studies demonstrate, both jurisdictions have laid the groundwork for workers to consider green construction as a career, rather than as an industry for a seasonal or temporary job.

Case Study: District of Columbia

The DCSEU delivers financial incentives, technical assistance, and information to tens of thousands of District residents and businesses (DCSEU 2022). Since 2011, and unlike all other energy efficiency programs in the United States, the DCSEU must meet a performance benchmark for green job creation (DOEE 2017, C.39.1.1, p. 36), measured in numbers of full-time-equivalent employees whose work contributes directly to the other performance benchmarks for energy consumption and demand reduction, services to low-income people, and other program success indicators (DOEE 2017, C.40.8.4, p. 49). To support the achievement of the green jobs benchmark and to fulfill a contract obligation for workforce training (DOEE 2017, C. 18, p. 26), the DCSEU created a workforce development program to attract, recruit, train, and find job placements as a substantial step toward green careers for unemployed and underemployed District residents. It has also created a training program to support a contract requirement for attributing at least 35 percent of DCSEU work to local businesses with Certified Business Enterprise (CBE) designations. This latter program helps to ensure the delivery of high-quality, accountable work among participating contractors engaged in DCSEU projects. Together, both programs actively contribute to the entry of District residents and business owners into the expanding green economy.

The DCSEU Workforce Development Program

The DCSEU Workforce Development Program enhances the ability of unemployed and underemployed District residents to achieve economic stability by increasing their marketable work skills. To satisfy that basic objective, the DCSEU created an externship program, similar to job shadowing, with accompanying classroom and field training.

This program helps District residents obtain jobs, be promoted in them, and / or transition on a career pathway into the green workforce (DCSEU 2022). Participants work in the field and attend training 40 hours per week. They are paid the District Living Wage by the DCSEU, in exchange for their labor and for being mentored at partner organizations. Participants commit to weekly professional development meetings where they receive technical training in the basics of energy efficiency and renewable energy in buildings, and life skills training in financial literacy, maintaining employment, and effective communication. Technical training and life skills are considered equal in importance. After seven years of program experience, the DCSEU has

achieved average graduation and placement rates of 85 percent (DCSEU 2022). Program graduates have been able to take jobs in cutting-edge infrastructure industries such as electric vehicle supply equipment and have improved their financial stability by developing marketable skills.

A complementary program has evolved, preparing workers to join the area's green contracting base, and thus expand it to meet the expected growth in demand.

Train Green Sustainable Energy Infrastructure Capacity Building and Pipeline Program

The DCSEU operates the Train Green Sustainable Energy Infrastructure Capacity Building and Pipeline Program (DCSEU 2022), which trains people to join the Washington Metropolitan Area's contracting base (DOEE n.d.).³ The DCSEU launched this program in 2020 with the primary purpose of helping CBEs and CBE-eligible firms acquire new or enhanced skills in and knowledge of energy efficiency and renewable energy design, construction, inspection, and maintenance.

Train Green has made it possible for CBE contractors and relevant businesses to increase staff capacity at no up-front cost to them. This has been an asset for meeting growing demand. Building owners can use the program to ensure staff are trained to improve a facility's energy performance and to incorporate efficiency into maintenance routines. The curriculum is flexible enough to train beginners and all other worker levels, up to experienced professionals.

Train Green also supports implementation of the District's building energy benchmarking law and its Building Energy Performance Standards legislation. The presence of those laws and policies drives market opportunity in the District.

Prospects for Scalability

The DCSEU Workforce Development Program and Train Green curricula are open sourced. Although each program responds to contract requirements or a law calling for their existence, each has also delivered results that exceed expectations. Their successful designs could easily be adapted to other jurisdictions, without the attendant legal frameworks. Both programs have identified pain points—such as double-digit rates of unemployment or underemployment in two of the District's eight wards, struggling economic development among certain industries, and worker shortages. Budgeting for an adequate level of support, however, requires foresight in efficiency program planning.

Considering an efficiency program's infrastructure for workforce development means thinking comprehensively about where the program wants to be in several years. If there is a shortage of contractors capable of weatherizing a desired (or mandated) number of units in a jurisdiction's residential sector, the training can be targeted at those contracting businesses. This requires outreach, recruitment, orientation, and an attractive value proposition to the contractors.

The DCSEU has calculated a program cost of \$38,500 to recruit, train, place, and mentor each DCSEU Workforce Development Program graduate (Foster 2021). The comprehensive Workforce Development Program training is more labor intensive than Train Green's, which VEIC knows from its own tracking costs \$2,600 per participant for two years.

³ Train Green was created in response to Section 402 of D.C. Law 22-257, of the Clean Energy DC Omnibus Amendment Act of 2018, whereby the Department of Energy and Environment (DOEE) must, with the District Department of Small and Local Business Development (DSLBD), for at least five years, provide training, credentialing, and certification to CBEs and / or CBE-eligible firms.

One can conclude from these data that the costs of doing business for an efficiency program can and should involve:

- Training costs for residents recruited for a workforce development program
- Incentivizing businesses to offer job shadowing and other elements of workforce development in the green economy

Embedded into a program portfolio of costs, these elements support long-term cost effectiveness of program dollars.

Case Study: Vermont

Vermont passed legislation in 2020, calling for significant reductions in greenhouse gas emissions (State of Vermont 2022).⁴ The targets demand aggressive increases in weatherization from the current rate of between 2,000 and 2,500 homes a year in 2020 to 12,500 homes a year by 2025, and 13,400 a year by 2030 (EAN 2021). Figure 1 illustrates the scope of the proposal, derived by the Energy Action Network (EAN), a nonprofit organization dedicated to achieving Vermont’s climate and energy commitments.

Weatherization: actual & projected



Sources: What We've Done: Vermont Department of Public Service, "2019 Report on VT's Progress Toward Building Energy Fitness Goals"; What we said we'd do: 10 V.S.A § 581. Others: EAN.
1. Vermont Housing Finance Agency (VHFA), Vermont Housing Needs Assessment: 2020-2024, 2020.

Figure 1. Energy Action Network’s proposed number of homes that must be weatherized to meet Vermont greenhouse gas reduction goals for 2025 and 2030 (EAN 2021, p. 27).

To meet these targets, EAN has estimated that Vermont’s qualified weatherization workforce needs to grow five-fold within five years (Smith 2021). Meeting the five-fold target will require the State to overcome the following market barriers:⁵

1. **An unclear pathway for careers in the construction trade:** a “four-year-college-or-bust” mindset promoted to the state’s young people preparing to graduate from high school, and unclear career pathways in Vermont’s construction trades
2. **A shortage of workers:** in general—and specifically, a shortage of skilled workers, and current low unemployment rates

⁴ The Global Warming Solutions Act (Act 153) created legally binding emission reduction targets: not less than 26 percent below 2005 levels by 2025, not less than 40 percent below 1990 levels by 2030, and not less than 80 percent below the 1990 levels by 2050.

⁵ The five barriers are drawn from an Efficiency Vermont industry survey, conversations with industry members, and the Smith report. See Capps 2021.

3. **Inadequate pay for the type of work:** wage competition with jobs that do not involve undertaking weatherization projects under uncomfortable conditions (hot attics and damp crawlspaces, for example)
4. **Market instability:** historical volatility in funding and in the availability of incentives supporting weatherization; these factors drive market fluctuation, which creates instability for local construction contractors and affiliated businesses
5. **Workforce housing shortage:** a lack of stable, affordable, year-round housing for workers

Meeting the Five-fold Increase in the Weatherization Workforce

Efficiency Vermont, the statewide energy efficiency utility, launched the Efficiency Excellence Network in 2013 to help customers find qualified contractors and to support contractors in growing their businesses (Efficiency Vermont 2014, p. 23). Since 2017, Vermont has recognized a need for ensuring workforce development capacity, and in 2021 used 2018 legislation to reinforce the weatherization workforce statewide. Vermont's General Assembly passed Act 74 of 2021, creating the Weatherization Workforce Group, and specified that Efficiency Vermont:

... develop plans for the coordinated delivery of a standardized statewide Building Sciences curriculum that includes weatherization. The curriculum shall be designed to establish a career pathway in energy efficiency construction and shall include a certification that is broadly recognized, transparent, and portable (Vermont General Assembly 2021).

The Weatherization Workforce Group assignment is part of a broader Weatherization at Scale – Network Action Team strategy (EAN 2021). Related efforts for statewide weatherization workforce development are:

- Act 189, relating to workforce development (2018)⁶
- The General Assembly's Climate Caucus, Workforce Development Subcommittee
- Vermont Skilled Trades Workforce Stakeholder Group

To draft the curriculum, Efficiency Vermont convened more than 50 industry representatives in June 2021 to inform the Weatherization Workforce Group's determination of what would be necessary to meet the five-fold target. The Group completed the following:

1. Surveys of weatherization personnel, construction trainers, and workforce development stakeholders
2. Relevant training topics, learning objectives, and core competencies
3. Design of curriculum and certification delivery and maintenance framework (Capps 2021)

⁶ Among the documents fulfilling the Act's requirements are its [Implementation Report](#), a [2019 Regional Workforce Summits Report](#), and [Career Technical Education Funding Pilot Projects and Middle School Collaboration](#).

Addressing the three primary barriers, from unclear career pathways to adequate compensation. With particular attention to Barrier 1, the Group met with weatherization industry and training providers to draft a curriculum and certification delivery framework. They also identified four training areas for entry-level weatherization workers, and advanced topics for career progression in weatherization (Figure 2). as proposed by the Group.

The market already offered some training, and the industry survey results indicated there was room for standardized, weatherization-specific training grounded in building science, and for forward-looking industrialization of the retrofit market. The survey responses also indicated that the training should produce consistent learning outcomes, regardless of the training provider and resulting certification. The Group determined specific learning objectives for each training topic, and core competencies expected upon completion of the entry-level topics.

Wx Installer	Wx Apprentice	Wx Journeyman	Residential HVAC Contractor	Wx Expert
Soft skills for employees Carpentry basics Building science basics Air sealing & insulation installation	Building codes for Wx Wx installers & technician registered apprenticeship / energy audits & building diagnostics Historic building Wx Carpentry applications Managing water in buildings Building & product certifications, standards & codes	Healthy buildings Residential energy modeling basics Building management systems & integrated control technologies (smart homes) basics Industrialized Wx	HVAC design HVAC installation & commissioning HVAC installation & commissioning – hydronics Domestic hot water systems	Building science applications Crew leader Crew leader & manager soft skills Running a Wx business Train the trainer

Figure 2. The Working Group’s proposed weatherization career training progression, from Vermont Weatherization Installer to Expert, with required topics to be completed to gain certification for each level, to the extent that Vermont will choose to follow this progression (Capps 2021).

An emphasis on learning objectives allowed training programs to be flexible enough to meet the needs of their target audiences—while also meeting weatherization industry needs for worker knowledge and skills. For example, Building Science Basics taught to high school students would have a different structure and duration from what might be taught to industry-experienced adult learners. Nevertheless, the learning objectives had to be the same. Likewise, employed and highly functional professionals would require less training and mentoring in soft skills than would be needed for workers who are underemployed, new to the workforce, or otherwise struggling with employment. However, both categories of worker had to be able to deliver the same level of professionalism when working on a team.

The curriculum complements and does not replace the training and certification protocols available via Vermont’s Weatherization Assistance Program (WAP) and Home Performance with ENERGY STAR® program training and certification protocols. Training programs can

adapt curricula to complement existing programs of study, accelerating green workforce development in high school and adult education courses.

Programs can offer classroom, online, hands-on, and on-the-job delivery methods, depending on course content and the target audience. Understanding the value of hands-on application for adult learners, the curriculum framework designers have emphasized apprenticeship-style learning. The certification pathways also now recognize and give credit for prior construction experience.

New entrants in the weatherization workforce can be trained to earn Vermont Weatherization Installer certification by completing four of the topical requirements shown in Figure 2. Vermont Weatherization Installer certification aligns with the Vermont WAP training program. Workers are not required to have these certifications to be employed by weatherization contracting companies. However, workers with these certifications might be more qualified for construction and weatherization-related job positions and therefore can command higher wages than uncertified workers.



Figure 3. Vermont Weatherization Installer training program by Vermont Adult Learning in partnership with WAP held at a weatherization agency in Rutland, September 2021.

Beyond the Installer certification, the framework allows the State to add certification for Weatherization Apprentice, Weatherization Journeyman, and Weatherization Expert. There is also an option for a Residential HVAC Contractor.

A decision to adopt this progression for the Weatherization Workforce will further define the weatherization career ladder. This addresses Barrier 1 by demonstrating an alternative-to-college career pathway to students and adults. The certification framework assumes the five-fold increase in weatherization projects will result in a maturing industry and a market that finds value in worker certification. By applying credentials to the career ladder, weatherization jobs can command competitive pay, as is seen in

the plumbing and electrical trades in Vermont; this strategy addresses Barrier 3.

The Workforce Group determined that the framework would operate optimally with a State agency, or its appointed designee, as administrator. An accountable administrator can ensure the delivery of high-quality services, while helping to expand the effort between now and 2025, and course-correct as the industry matures. The administrator(s) will be responsible for drafting two documents for registering and tracking training programs and individuals:

1. Vermont Weatherization & Building Science Training Program Directory
2. Vermont Weatherization & Building Science Professionals Workforce Directory

The Training Program Directory will support aspiring and current workers, and employers, in identifying training opportunities. It will also verify training program eligibility for meeting certification-specific criteria. The Workforce Directory will support training programs in identifying qualified trainers and inspectors, and other relevant stakeholders, in tracking the state's workforce capacity, to inform future policy decisions.

Next Steps

Although this training and certification structure makes the weatherization-related career pathways visible (addressing Barrier 1), Vermont will also need to consider how it can effectively promote to young people the benefits of working in the weatherization trades, especially to workers who are not inclined to proceed on a four-year college track.

A well-operated weatherization workforce program will support resolutions of barriers 2 and 3, related to working conditions. The State must determine the extent to which it can support setting incentives and thus stabilizing contractor workflows (Barrier 4), while not ignoring Barrier 5, the availability of affordable workforce housing.⁷ The latter two barriers are beyond the scope of the Group, but it identified them as challenges affecting Vermont's ability to expand its weatherization workforce and meet climate goals. Such an increase in weatherization projects will not occur unless Vermont policymakers also address barriers 2 through 5.

Efficiency Vermont will request proposals from training organizations to design and deliver programs meeting the Vermont Weatherization Workforce Curriculum. The State has allocated \$2 million for the delivery of training and certification, and program maintenance, and—separately—for the expansion of NeighborWorks of Western Vermont's HEAT Squad.⁸

The funding is available in 2022 and will carry through 2024. The request for proposals will encourage programs that:

- Meet the requirements of the American Rescue Plan Act, the source of the \$2 million allocation
- Target young people, non-traditional labor pools, and underemployed populations, with effective screening and mentorship to increase participation completion and success rates (addressing barriers 1 and 2)
- Provide hands-on experiential learning for participants (Barrier 2)
- Offer direct job placement and on-the-job training / apprenticeship (barriers 1 and 2)
- Apply the curriculum, certification, and training delivery framework recommended in the Vermont Weatherization Workforce Curriculum (Barrier 1)
- Offer training across Vermont, with targets for underserved markets (barriers 1 and 2)
- Rely on Vermont-based partnerships (barriers 2 and 4)
- Maximize participation rates and job placement (barriers 2 and 3)
- Create lasting infrastructure for training new workers beyond the grant funding period (barriers 2 and 4)
- Provide train-the-trainer services, to increase the number of qualified trainers and number of participants reached (barriers 1, 2, and 4)

⁷ The authors recognize programs demonstrating success in pairing workforce housing development with workforce development; the programs offer opportunities to trainees to build and repair homes they subsequently purchase or rent. Sample programs are [Build UP \(Urban Prosperity\) Birmingham](#), [Yestermorrow](#), and [Forest Grove High School](#).

⁸ [HEAT Squad](#) provides low-cost energy audits for homes and businesses, project coordination, and access to financing options and rebates.

Comparing the Two Workforce Development Experiences

Table 1 offers a comparison of the Vermont and District of Columbia workforce development experiences. The Vermont Weatherization Workforce Group has identified evidence-based strategies for designing and scaling a statewide program, whereas the DCSEU has created and continues to evolve a closely examined workforce development program that supports jurisdictional goals. Taken together, the strategies for recruitment offer a wide range of options for nearly all jurisdictions. Further, these two programs offer blueprints for mixing and matching nascent and existing strategies for building the green economy's career base.

Table 1. Features of two workforce development efforts in jurisdictions with mature, regulated energy efficiency programs

Feature / need	Current status, with additional strategy needed where indicated	
	Vermont ⁹	DC
Prevailing situation	• Very mature efficiency program • Pockets of high unemployment • Ambitious energy goals • Rural character (housing and transportation are challenges, little to no industry licensing requirements)	• Mature efficiency program • Pockets of high unemployment • Ambitious energy and economic goals • Urban character (economic development that benefits local businesses is a priority)
Recruiting people to work in the green economy	• Building partnerships across trades, employment services, and tech programs • Ongoing need to rebuild the contractor supply • Strategy needed: ○ Early field experiences for teenagers, instilling a “trades mindset,” and demonstrating long-term career and salary potential ○ Emphasis on environmental and community benefits of careers in weatherization. ○ Support for women and other new entrants in the construction workforce ▪ New Americans - orienting training in English as a Second Language to construction industry	• Comprehensive workforce development program, with compensation-at-risk metrics for performance ○ Skills certification ○ Mentoring ○ Participants paid the Living Wage ○ Energy efficiency program sponsorship, with dedicated program manager and follow-up ○ Includes training in cutting-edge topics ○ Supports local economic development

⁹ The strategy recommendations reflected here are drawn from the Weatherization Workforce Group's surveys and from “Workforce Development in Vermont's Thermal Sector” (Smith 2021).

Feature / need	Current status, with additional strategy needed where indicated	
	Vermont ⁹	DC
	vocabulary and expanding soft-skills training ▪ Childcare and paid training programs	
Tracking success	• Proposed strategy: ○ Report wages by position, level of experience, and completed certification(s); identify wage disparities ○ Create and maintain statewide directory(ies) of weatherization and building science professionals ○ Research and publicize effective employee retention strategies across a wide variety of markers (age, job type, qualifications needed, business culture)	• Regular required reporting on full-time equivalent hours worked, program progress, number of graduates, job placements, careers launched • Policy to expand workforce capacity resulted in creation of Train Green program • Train Green supports implementation of DC's well-tracked building energy benchmarking and building energy performance requirements
Creating workforce housing	• Strategy needed: Statewide, energy-efficient affordable housing development¹⁰	• Existing building stock for workers needs efficiency upgrades
Sustaining demand for green economy jobs / scalability	• Energy efficiency program incentives for workforce development • Weatherization program funding (needs to be predictable, reliable, and scalable) • Adequate pay is paramount • Strategy needed to diversify weatherization funding sources and value real estate improvements	• DCSEU picks up training costs for workforce development program recruits. • DCSEU incentives and programs available to all residential and commercial customers. • Market demand for skilled workforce created by BEPS and enhanced energy codes • Living Wage mandated for recruits, anyone else involved in program

Conclusion

This is a tale of two workforce development programs. It offers insights into the DCSEU's mature, urban model that is accountable to the policy makers of the District of Columbia's government—just as it also examines the very different needs of Vermont, which is in the process of coordinating solutions across five major market barriers. Both seek to address underemployment of workers and labor shortages.

¹⁰ The Workforce Group has suggested modeling programs combining workforce housing development with workforce development: [Build UP \(Urban Prosperity\) Birmingham](#), [Yestermorrow](#), and [Forest Grove High School](#).

The DCSEU's program ties to a long-term contract for clean-energy delivery, with performance compensation at risk. The challenges in Vermont tie to statewide training, coordination with the long-standing WAP model, and how to extend and adapt the WAP model while supporting for-profit weatherization businesses in accessing well-trained workers. Together, they reflect the challenges experienced across the United States: (1) clean-energy and weatherization construction techniques are the key to the next generation of resilient American buildings; (2) despite some examples to the contrary, the industry lags in promoting clean-energy construction skills; and (3) shifts in post-pandemic work environments might well create strong opportunities for professions in the skilled construction trades.

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