



Workforce Development

*How the Midwest Will Equitably Meet
Its Climate Goals in New Construction*



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Abstract

As states and municipalities across the Midwest continue to adopt significant climate and greenhouse gas (GHG) emissions reduction goals and implement policies and programs to achieve those goals, there is increasing demand for skilled workers to support the construction of more efficient buildings. Additionally, there is a need to equitably diversify the building and construction sectors' workforces to better embody and reflect the region's population. This paper will present an overview of clean energy workforce development initiatives in the Midwest, with a specific focus on jobs related to energy efficiency in the construction of new buildings as energy codes are updated.

This paper will explore several key initiatives in the Midwest that are shaping the clean energy workforce. From heat pump collaboratives to developing the next generation of code officials, central themes found across these initiatives are a commitment to innovation and fostering equity. There is also a strong dedication to providing training and employment opportunities to disadvantaged and underrepresented populations. These examples can serve as practical models, illustrating effective strategies and opportunities for building a sustainable and equitable clean energy workforce in the heartland of America. This paper will highlight several examples, including challenges and opportunities, and serve as a resource for policymakers, industry leaders and educators. While this paper focuses on new construction and energy codes specifically, many initiatives could cross over into the existing buildings workforce.

Introduction

Establishing climate goals and setting targets serve many purposes. Reducing GHG emissions helps slow the detrimental impacts of climate change and improves human health outcomes, especially for disadvantaged communities. To meet established climate goals, it is important to continuously improve existing implementation programs while developing new ones to address gaps. One such identified gap is the need to expand the clean energy workforce to realize the desired performance of new buildings to meet adopted climate goals, including new energy codes.

There is a growing shortage of skilled labor to construct energy-efficient buildings. At the same time, municipal departments are also experiencing a decline in trained building officials to review construction plans and inspect new construction for compliance with building and energy efficiency requirements. Adding to the challenges of achieving climate goals and implementing clean energy building practices is a gap in workforce training and education to effectively incorporate new technologies, materials and advanced construction techniques that will meet updated energy-efficiency requirements in new construction. This paper explores climate goals and action plans adopted in the Midwest, the major trends in clean energy and climate workforce, and the workforce initiatives and incentive programs that are essential to address this gap and effectively realize the nation's climate goals.

Climate Goals and Action Plans

Globally, the building and construction sector is the largest contributor to overall GHG emissions, accounting for roughly 40 percent of global emissions, and is not currently on track to achieve the United Nations Environment Programme's (UNEP) goal of full decarbonization by 2050 (UNEP 2022). In the United States, existing residential and commercial buildings account for 30 percent of GHG emissions by electricity end use (EPA 2021). In response to the compounding impacts of climate change, many states and localities have set GHG reduction goals or established zero-energy building targets. The U.S. Department of Energy (DOE) has set targets to reduce total U.S. building GHG emissions 65% by 2035 and 90% by 2050 relative to 2005 levels (DOE 2024a). Governments cannot meet their GHG reduction goals and reduce their vulnerabilities to the impacts of climate change without improving construction practices on new buildings. Having a robust skilled workforce to effectively carry out energy codes and advanced building construction practices is a necessity.

Energy targets and emissions reduction goals have been increasingly adopted by both states and local jurisdictions to address climate change and its associated impacts. The Center for Climate and Energy Solutions has developed a resource library where state

climate action plans are catalogued; Elemental Green's Zero Energy Project currently lists 92 Midwest Cities with Climate Action Plans¹. In the Midwest, Illinois, Iowa, Kentucky, Michigan, Minnesota and Wisconsin currently have statewide climate action plans. Some jurisdictions continue to expand their goals through more stringent targets, such as specific emissions reduction goals or social initiatives like environmental justice targets. Statewide policies often focus on larger industries such as transportation, agriculture and buildings or addressing new construction through updated energy codes. Found in many policies is the increased importance of engaging local governments and tribal nations to build clean energy workforce capacity through education and skills development initiatives. Jurisdictions of all sizes, from large cities to small and rural localities, are working on climate plans and initiatives which highlight the importance of setting climate targets and planning for future impacts.

The Energy and Climate Workforce

A key component of achieving energy-efficient and decarbonized buildings is having a robust building energy workforce, which includes energy code professionals. Regardless of the energy code version or incentive program adopted, energy savings and carbon reductions will not be realized without professional enforcement and implementation. As building systems and codes advance to include new and innovative technologies, and achievement of low carbon goals are further integrated into the model codes, the professionals responsible for adoption, implementation and compliance must have the knowledge and skillset required to enforce them. Establishing a diverse and comprehensive workforce will allow jurisdictions to better prepare for the implementation of new technologies and advanced building construction practices.

The energy codes workforce encompasses various roles across contracting, manufacturing, wholesale, building analytics and related industries, involving individuals in the design, sales and installation of measures to enhance efficiency in homes and businesses. Tasks range from installing insulation, smart lighting and thermostats to optimizing appliances like HVAC systems, as well as managing energy systems and operating buildings for optimal savings and comfort (MacPherson and Ribeiro 2018). The implementation of advanced technologies and operation of high-performance buildings necessitate workforce skills beyond traditional training, including familiarity with sophisticated equipment, systems integration and automation.

Engineers, operations staff and contractors must adapt to new demands, potentially requiring specialized skills such as computer programming, to effectively manage

¹ Elemental Green's Zero Energy Project has a repository of municipal climate action plans that are in concept, development, or implementation phases, which is further outlined below.

energy use and ensure occupant comfort (Srivastava, Awojobi and Amann 2020). Ongoing training is essential as technology evolves, with the skill sets required for the workforce continually expanding.

Advanced building construction practices require engineers and technicians to possess specific skills and knowledge. Skill deficiencies among these professionals can hinder the ability to fulfill climate goal promises, negatively affecting energy savings, indoor environmental quality, cost-effectiveness and long-term sustainability (Srivastava, Awojobi, and Amann 2020). The Interstate Renewable Energy Council (IREC) gathered industry experts to determine high-priority career paths and the most in-demand jobs in the energy efficiency space. The Green Buildings Career Map, a build out of IREC's stakeholder engagement in collaboration with DOE, identifies these careers, as captured in Figure 1. From this compilation of energy efficiency jobs, trained individuals are required to construct, evaluate and inspect new energy-efficient buildings to meet robust climate targets. To ensure the building industry meets established climate goals, it is imperative to recruit, train and retain a skilled energy workforce equipped with the knowledge and expertise to implement sustainable and energy-efficient practices.

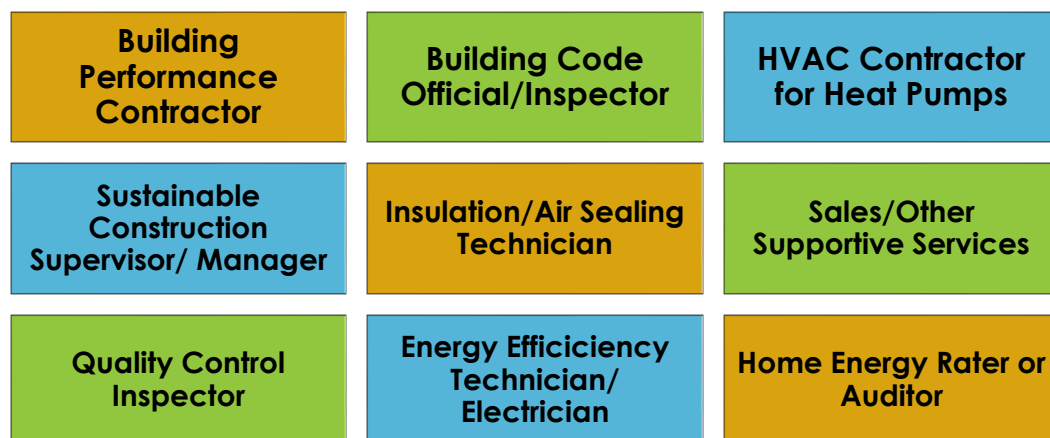


Figure 1. Energy Efficiency Career Paths. Source: Green Buildings Career Map. U.S. DOE Office of Energy Efficiency & Renewable Energy, IREC.

Energy and Climate New Construction Workforce Gaps and Needs

A 2015 report published by the National Institute of Building Sciences (NIBS) and International Code Council (ICC) illuminates the troubling trajectory of workforce decline among building code professionals, revealing an anticipated 80% retirement rate between 2015 and 2030. This statistic underscores the imminent challenge posed

by aging demographics within the profession, necessitating urgent measures to bolster the workforce and ensure continuity in safeguarding the built environment. Additionally, the report identifies key barriers to attracting younger individuals to the field, including limited awareness of career opportunities and misconceptions about the role of code officials. The study underscores the importance of professional development and education in preparing future code officials to meet evolving demands in the built environment, such as energy and climate related competencies. Addressing these challenges requires collaborative efforts among industry stakeholders, educational institutions, and government agencies to implement effective recruitment strategies and provide robust professional development and education opportunities for aspiring code officials (NIBS 2015). In essence, the findings of this report underscore the critical need for proactive measures to mitigate the impact of workforce decline and sustain the integrity and safety of our built environment for future generations.

According to the U.S Bureau of Labor Statistics (BLS), the United States is experiencing a shortfall in skilled workers in the energy efficiency industry, with the aging workforce retiring and younger generation of workers not transitioning into skilled labor careers. Adding to the shortage of trained workers, according to the BLS "2022-2032 Employment Projections", skilled job openings are anticipated to increase. As a sampling of this data, mechanical technicians and construction worker job openings are anticipated to increase by approximately 4%. As reported by energy efficiency employers, anticipated job growth was expected to be 1.7% over the previous year, however, the actual growth of energy efficiency jobs was 2.3% -- 45% greater than expected (BLS 2022). These statistics highlight a clear imbalance between job availability and the clean energy workforce established to fill the growing availability of energy efficiency jobs.

On the construction side, the annual U.S. Department of Energy (DOE) Energy & Employment Report (2023) concluded that 30% of construction companies find it difficult to recruit efficiency workers (DOE 2023d). And, according to a 2021 homebuilding market overview in the November 9, 2021 edition of Professional Builder, home construction primarily slowed down due to a growing shortage of skilled construction workers (Rosario 2021). The National Association of Home Builders also analyzed data from the BLS report and calculated a shortage of an additional 740,000 construction workers, to meet the housing demand between 2022 and 2024, including general, electrical & HVAC laborers, skilled trade laborers, and construction managers and operators. This gap provides an opportunity to train new workers in the construction industry on emerging techniques and technologies that will support more efficient buildings and achieve established climate targets.

Energy and Climate Workforce Growth

There has been significant progress in the growth of clean energy and climate-related job opportunities as jurisdictions continue to invest their resources in achieving ambitious climate goals (DOE 2020). Energy efficiency supported 2.2 million jobs in 2022, with the sector experiencing growth since 2021 (DOE 2023e). This includes jobs focused on designing, manufacturing, distributing and installing energy-efficient products and services throughout the building and construction sector. The federal government has also invested significant resources in the clean energy and climate workforce to meet the nation's climate goals through programs like the Bipartisan Infrastructure Law (BIL) and Inflation Reduction Act (IRA). The IRA is expected to create more than 303,500 jobs each year for new energy project construction and roughly 100,000 permanent jobs each year (Environmental Entrepreneurs 2023). This job creation focuses on diversification of new clean energy and climate jobs that continue to address emerging issues such as decarbonization of the construction industry (BCG 2022).

The Importance of Workforce Development Programs

Workforce development programs provide an avenue to ensure the existence of a present and future skilled workforce. Prior to establishing a workforce development plan, it is important to analyze the current landscape of the existing workforce, what educational programs are available and whether they provide the education, certification or degree necessary to begin a clean energy or climate career in the built environment. With over 25 areas of discipline to choose from in the building code sector, and much of the job requiring expertise on local rules and regulations, it is important to determine the current needs of the jurisdiction and develop a specific plan for outreach and education around those needs. There is also an opportunity to collaborate with neighboring jurisdictions to identify areas of overlap and peer-to-peer education opportunities. It is key to consider the current economic situation of the jurisdiction, the availability of current staff to participate in educational opportunities and gaps in education.

It is expected that in the coming years, many current building professionals will be retiring, taking their institutional knowledge with them. While new career disciplines continue to emerge, it is glaringly obvious that investing in the future workforce now is critical to making a seamless transition. With new energy and climate career opportunities continuing to expand, which require knowledge of energy efficiency, building science principles and advanced building construction, many existing workers will require upskilling through additional training and education on advanced clean energy construction practices.

To ensure effective implementation of modern building energy codes, it is imperative to focus on training existing code officials, particularly in states that lack mandatory certification. Although about two-thirds of states require code official certifications, only seven states require certification on energy code provisions. DOE residential code compliance field studies have demonstrated that adequate training is key to effective implementation—after training and education in those seven states, annual energy costs due to varying levels of code compliance decreased by an average of about 45% (DOE 2019). Assessing the current construction practices, establishing compliance and enforcement goals, and accessing intake plan review inspection tools are the first steps to successful compliance and enforcement. Training and credential requirements are equally important. The gap between the efficiency levels required in energy codes and those achieved in the field is influenced by the extent of code official training on the energy code.

Several exemplary training program models address the need for expanded building performance skills by providing technical education on energy efficiency, building science principles and advanced building construction through a combination of in-class instruction, hands-on learning and practical training (Srivastava, Awojobi and Amann 2020). These programs employ two main approaches: providing foundational knowledge for industry newcomers and upskilling existing building professionals to fill knowledge gaps and learn new technologies (Srivastava, Awojobi and Amann 2020). Skills needed to fill energy efficiency jobs can be learned through apprenticeship programs, construction trade association apprenticeships, vocational certificate programs, high school or community colleges, and technical trade school programs. Utilities, labor unions and other organizations offer continuing education opportunities, while apprenticeships and programs in community colleges and universities focus on developing building performance skills from the ground up, including areas such as data analytics, systems measurement and verification.

As discussed in the next section, many free or low-cost energy efficiency training programs are available across the Midwest. Professionals can learn new skills or improve existing skills in all disciplines—from air and duct sealing and heat pump installation to remote virtual inspections (RVI). As new technologies are introduced and demand for high-performing and zero-energy buildings increases, building trades need to be ready to meet the demands. Jurisdictions can learn from peers through workshops, case studies and best practices to advance the knowledge and skillset of the existing and growing clean energy and climate workforce. The following sections will explore national and Midwest-specific workforce development programs and initiatives that are paving the way to implement effective energy-efficient and advanced building construction practices to meet the nation's climate goals.

Workforce Funding Assistance

A key component to advancing the skilled labor force is how to fund its development. Including funding in clean energy policy initiatives not only signifies a substantial financial commitment but also underscores the government's strong determination to bolster the workforce, support sustainable energy practices and achieve ambitious climate goals established across state, local and national governments.

Equity Within the Workforce Program Framework

As energy efficiency training programs are developed in response to climate action plans, proactive engagement with underrepresented communities is necessary to ensure equity across the building and construction sectors. Residents of historically excluded communities may not be aware of training opportunities due to passive communication approaches. There may also be a lack of trust in free training and education from corporate and government leaders. To ensure intentional inclusion and successful participation of underrepresented communities, it is essential for workforce program developers and implementers to work directly with community groups, local trade associations, religious institutions and other community organizations that have already established relationships and partnerships with these identified populations.

Integrating equity into the development of the energy efficiency workforce is paramount to effectively address climate goals, particularly considering the disproportionate burden that marginalized communities bear from the impacts of climate change. By prioritizing equity, initiatives can ensure that historically excluded populations have access to training and employment opportunities in the clean energy sector, thereby fostering economic empowerment and resilience in communities most affected by climate change. This approach not only enhances social equity but also strengthens the workforce's capacity to implement sustainable solutions, ultimately contributing to more inclusive and effective strategies for mitigating and adapting to climate change.

As previously noted, the shortage of workers in various sectors of the construction industry provides an opportunity to establish a well-trained, skilled workforce who are devoted to delivering energy efficiency and clean energy solutions. Some workforce programs, like the programs established through the Climate and Equitable Jobs Act (CEJA) in Illinois, focus on the different needs of each community. CEJA Central Regional Administrator Nate Keener of Illinois Department of Commerce and Economic Opportunity (DCEO) sees momentum as new partnerships are formed through these workforce programs. Mr. Keener believes that CBOs are an important part of any workforce program that intends to reach underrepresented communities (Keener,

2024). While many CBOs have a learning curve in joining a large statewide workforce program, by providing services to help build their capacity to participate, many doors are opened for all represented parties.

Developing cross-cutting workforce programs that emphasize collaboration and diverse partnerships is crucial for equitable workforce development in the building energy sector. These initiatives ensure that all stakeholders are included and benefit from the transition to sustainable energy practices.

Pairing Climate Action with Workforce Initiatives

Enacting climate goals and subsequent workforce development programs to meet the needs of emerging issues across the Midwest is important, but their effective implementation requires infrastructure to realize these goals. The 2020 U.S. Energy and Employment Report stated that 80-90% of the efficiency employers reported difficulty in hiring workers. Preparing the future workforce for energy efficiency jobs requires recruitment and training. Programs are being implemented at local, state, regional and national levels, with more programs actively being developed, to train existing workers and those professionals entering the energy workforce—such as energy auditors, energy inspectors, energy raters, heat pump installers, building officials and weatherization specialists. Some notable and replicable examples from the Midwest and nationally are outlined below.

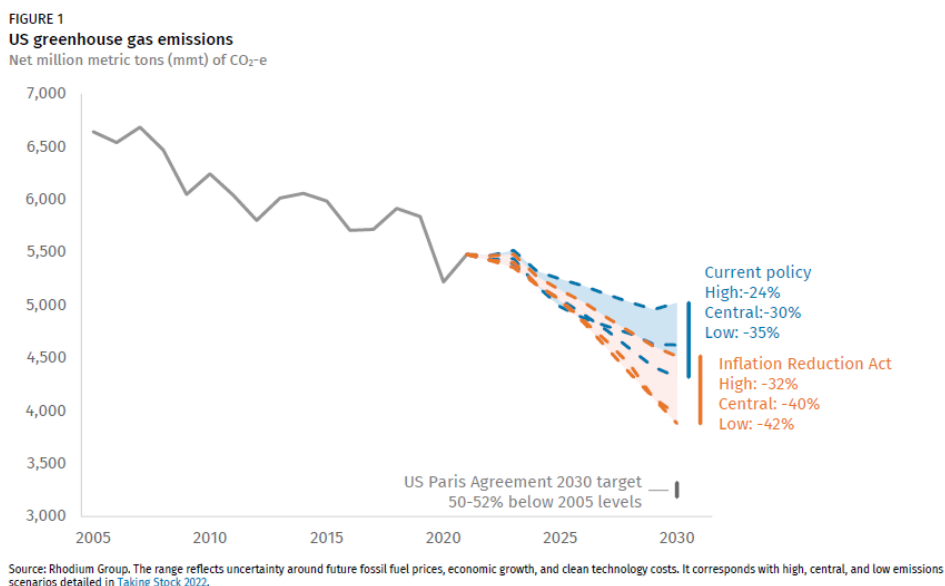


Figure 2. Comparison of high, central, and low emissions scenarios between the previous policy landscape and with the Inflation Reduction Act. Source: Rhodium Group, 2022.

National Climate Goals and Workforce Programs

In 2016, the United States joined the Paris Agreement², an international treaty to mitigate the rise in global temperatures through GHG emissions reduction. Under the Biden Administration, the passage of the BIL and IRA marked a historic moment in the United States, ushering in unprecedented funding dedicated addressing climate change and advancement of the energy workforce. The IRA's \$369 billion in funding for climate and clean energy provisions could cut national GHG emissions 32-42% below 2005 levels in 2030 (compared to 24-35% without it), finally putting the U.S. on track with its decarbonization commitment to the Paris Agreement (Rhodium 2022).

BIL includes several programs specifically aimed at advancing workforce development in the energy sector. One such program is the Clean Energy Workforce Training Program, which allocated \$72 million to establish assessment centers at trade schools, community colleges, and union training programs to bolster the development of highly skilled professionals in various facets of the clean energy sector (DOE 2022). This includes funding opportunities aimed to address pressing workforce needs related to renewable energy, energy efficiency and grid modernization. By investing in training programs tailored to emerging clean energy technologies and practices, the initiative seeks to equip individuals with the expertise necessary to develop sustainable and long-term clean energy careers. Additionally, BIL established the Energy Auditor Program, which allocates \$40 million to train the clean energy workforce, aiming to bolster expertise in renewable energy, energy efficiency, and grid modernization (DOE 2024b). With a focus on expanding access to high-quality training programs, this initiative seeks to equip individuals with the skills needed to meet climate goals while also transitioning to a clean energy economy.

Additional workforce programs established through BIL include the State-Based Home Energy Efficiency Contractor Training Grants, or Residential Energy Contractors (TREC) program, and Career Skills Training program administered by DOE's Office of State and Community Energy Programs (SCEP). The TREC program allocates \$200 million to state energy offices for training, testing and certifying residential energy efficiency and electrification contractors, often in collaboration with nonprofit organizations, to facilitate the adoption of clean energy technologies in homes (DOE 2023c). DOE distributed over \$36 million in formula funding during July 2023 to Midwest states through the TREC program, which allows states to leverage contractors trained under TREC to

² In 2020, the U.S. withdrew from the Paris Agreement, but rejoined in 2021.

undertake projects funded by the DOE's Home Energy Rebates Programs.^{3,4} The Career Skills Training program allocates \$10 million to foster nonprofit-led partnerships between industry and labor organizations, enabling students to gain industry-related certifications through concurrent classroom instruction and on-the-job training in energy-efficient building technologies (DOE 2023a). It aims to enhance collaboration between industry and labor, focusing on best practices for career skills training, industry credentialing and recruiting individuals from disadvantaged communities for careers in the energy sector.

BIL also established the DOE-led program, Resilient and Efficient Codes Implementation (RECI), to award competitive grants for sustained cost-effective implementation of updated energy codes. RECI provides \$225 million—\$45 million annually from 2022 to 2026—to support implementation of updated building energy codes. A major pillar of the program is focused on activities that support energy code workforce development. In July 2023, DOE allocated \$90 million in competitive awards spanning 27 projects in 26 states. Of the awards, five projects covering the Cities of Fort Collins and Denver in Colorado, Kansas, Missouri, Pennsylvania and Louisiana established workforce development programs and initiatives to advance the effective implementation of building energy codes to support governments' climate and energy goals (DOE 2023b).

IRA also includes targeted measures to address workforce development challenges exacerbated by inflationary pressures. One key program under IRA is the Climate Workforce Investment Program, which provides funding for workforce training and retraining programs in sectors critical to advancing climate and energy objectives. These programs focus on areas such as renewable energy deployment, energy efficiency upgrades and grid modernization efforts. At the municipal level, the Milwaukee Climate and Equity Plan was awarded a \$25,000 EPA grant to establish a demand-side financing strategy for the purchase of net-zero, off-site constructed housing. In addition, \$1 million in American Rescue Plan Act (ARPA) funding was allocated to this net-zero, off-site constructed housing project.

Another national-level program is the Empowering the Future Workforce in Renewable Energy, Power Systems Engineering, and Distributed Generation (EMPOWERED) program, initiated by IREC through a \$2.1 million DOE funding stream, which stands as a pivotal effort in addressing the evolving needs of the energy sector. This program aims to cultivate a skilled and diverse workforce capable of navigating the complexities of renewable energy, power systems engineering and distributed generation. The

³ The TREC Administrative and Legal Requirements Document (July 2023) includes a breakdown of formula funding allocations by state.

⁴ The Rebates Program offers rebates to eligible residents for energy-saving retrofits and appliance upgrades.

program focuses on fostering inclusivity, aiming to increase representation from underrepresented communities in the clean energy workforce.

Partnering with educational institutions, industry stakeholders, and workforce development organizations allows this program to provide academic knowledge, technical expertise and practical skills required to work in renewable energy. A key component of the EMPOWERED program's outputs aimed at advancing the energy workforce was the establishment of the Clean Energy Clearinghouse (Clearinghouse), offering free educational resources related to solar, energy storage, high-performance buildings, electric vehicle charging equipment and permitting and inspection. This online platform serves as a centralized hub for resources, best practices and collaborative opportunities within the clean energy sector. The platform also encourages collaboration among industry experts, educators, policymakers and students, facilitating the sharing of innovative ideas and solutions to address the evolving challenges facing the energy workforce. Through the Clearinghouse, EMPOWERED provides continuous learning, skills development and professional growth within the clean energy sector.

Also at the national level, the International Code Council's (ICC) signature Safety 2.0 initiative focuses on the next generation of professionals to advance the workforce and support the growth and implementation of the building safety profession. The Safety 2.0 program consists of various workforce development initiatives including technical training, career path development, and leadership and mentorship. A core pillar of Safety 2.0 is the Technical Training Program (TTP), which teaches the International Residential Code® to high school, college and construction trades program students. TTP provides an opportunity for students to obtain different stackable and transferable Certificates of Completion in five disciplines: building, energy, electrical, mechanical (HVAC) and plumbing. The program is structured to enable technical schools to integrate one or more disciplines of the program into the current construction trade curricula to better prepare students for careers in the construction and energy efficiency fields.

Midwest Climate Goals and Workforce Programs

This section introduces and examines climate plans of select Midwest states and cities, shedding light on their proactive efforts to address decarbonization of their built environment and foster sustainable development within their communities. Given these activities, there is an increasing need to recruit, educate and train a robust clean energy workforce to facilitate the implementation of advanced building construction methods and practices to equitably achieve ambitious climate and emissions

reduction goals. This section also includes examples of equity components of the highlighted workforce programs.

Milwaukee

The Milwaukee, Wisconsin Climate and Equity Plan was adopted on June 23, 2023. One of the overarching goals is to reduce 45% reduction from the baseline date of the adopted plan to 2030 and net zero emissions by 2050. A core component to achieve this reduction is to “build new, affordable, and energy-efficient housing in Milwaukee by promoting infill development⁵ and homeownership for low-moderate income buyers.” The construction of new homes in existing communities is intended to revitalize neighborhoods by removing unsafe structures and providing affordable, sustainable, and net-zero housing. Energy efficient infill buildings provide a sustainable solution by leveraging existing utilities and establishing denser communities that are more walkable. The Milwaukee Climate and Equity Plan also includes targets for improving racial and economic equity by creating green jobs that pay at least \$40,000/year and recruit local people of color. In Wisconsin, people of color represent only 30% of the energy efficiency workforce, while women represent less than 30% of the workforce (E4 Future 2022). These statistics underscore the need to diversify the local clean energy workforce.

At the local level, the City of Milwaukee's 2023 climate action plan incorporated the Green Jobs Accelerator Program. Originally established as a partnership with DOE in 2020, the program was designed to build interest and awareness, streamline workforce pathways and improve skills for Milwaukeeans interested in careers in energy efficiency (City of Milwaukee 2023). With federal funding allocated to train and educate contractors on energy efficiency and building electrification, Milwaukee plans to leverage the funding to roll out the Accelerator Program. The program is to be led by the City of Milwaukee and the Milwaukee County Workforce Development Board, in partnership with Milwaukee Public Schools and other private organizations. The focus areas for training that were determined necessary to fill existing workforce gaps include electricians, plumbers, heating-air-conditioning-and-refrigeration mechanics, and insulation workers.

Milwaukee's workforce program has established processes to track employment rates by race, which is used to determine their success in aligning with Justice 40 Initiative intentions of having 40% of the benefits of clean energy, including career placement, focused towards historically excluded communities. As discussed previously, Milwaukee's program also ensures competent salaries for disadvantaged community

⁵ Infill development is the constructing of buildings on vacant lots between existing buildings; buildings may or may not have been previously located on the vacant lot.

members, provides subsidized transitional jobs during training, and promotes Black and Brown business development as a co-benefit of the program. Career guidance, certifications, credentials and internships are also provided to program participants to establish longevity and security in their new green career.

Minneapolis

Minneapolis, Minnesota has a history of adopting policies that address climate change, starting with the 1993 Minneapolis-Saint Paul Urban CO2 Project Plan. In 2004, Minneapolis signed the U.S. Conference of Mayors Climate Protection Agreement (Mason 2014). In 2023, the city adopted the Climate Equity Plan, which is an updated version of their 2013 Climate Action Plan (City of Minneapolis 2023a). In the 2023 plan, in addition to accelerating decarbonization goals, socioeconomic disparities from prior climate actions are being addressed through the prioritization of investments in “Minneapolis Green Zones”. The data which developed the 2,017 Green Zones was used by the city's Environmental Justice Task Force to inform a citywide climate change vulnerability assessment. The assessment analyzed eight characteristics of socioeconomic inequity, including housing, jobs and health outcomes. In addition, the Environmental Justice Task Force ensures that green job training is provided to interested Green Zone residents (City of Minneapolis 2023b).

Minneapolis' Climate Equity Plan is supported by the Minneapolis Employment and Training (MET) office within the Community Planning and Economic Development (CPED) Department. MET assists residents obtain and retain clean energy jobs and provides services for low-income adults, laid-off workers and youth. The city of Minneapolis manages a Green Careers Exploration program, which is a public-private partnership designed to help K-12 students and young adults of color prepare for green energy and environmental jobs. The program provides STEM and environmental education, allows participants to earn certificates of education and assists with green job placements. Since 2020, over 1,000 students and young professionals have engaged with the program (City of Minneapolis 2023c). Additionally, the Minneapolis Health Department established a green career program to help young students of color prepare for green careers, while other MET programs provide services for low-income adults, laid-off workers, and youth.

Illinois

Illinois' Climate and Equitable Jobs Act was passed into law in 2021 with several key targets, including broadening cost-saving energy efficiency programs, moving towards building electrification and expanding economic opportunities for disadvantaged communities and people of color. The main goal of CEJA is to transition Illinois to 100% clean energy by 2050. Community organizations and existing energy efficiency

businesses helped to draft the legislation, ensuring their mission and values are incorporated into the core activities of the law.

The state's work through CEJA highlights the importance of embedding workforce development strategies into climate goals. The Clean Jobs Workforce Network Program is currently setting up thirteen Workforce Hubs across the state, offering a Pre-Apprenticeship program that includes training, certification preparation and skills development for entry-level jobs in various clean energy related industries, including energy efficiency. The Pre-Apprenticeship Program establishes up to three regional hubs serving the Chicago metropolitan area, Northern/Central Illinois and Southern Illinois. Another component of the Pre-Apprenticeship Program is the Energy Transition Navigator Program, which focuses on outreach, recruitment and enrollment to grow the clean energy workforce across the state.

Participation is prioritized in communities that historically face economic and environmental inequity. The program seeks to bolster a diverse workforce and help clean energy businesses grow. CEJA has provided funding for various career development opportunities including: the Craft Apprenticeship program, the Multi-cultural Jobs program and the Energy Transition Community Grants program that support individuals of color, low-income and re-entry. CEJA provides training and job placement opportunities for clean energy jobs, prioritizes disadvantaged businesses and allocates grant funding for community programs. Workforce Hubs will be built in historically disadvantaged social, economic and environmental communities. Community-based non-profit organizations with a history of serving low-wage or low-skilled individuals from disadvantaged communities have been installed as Energy Transition Navigators to manage the pre-apprenticeship program. According to CEJA Central Regional Administrator Nate Keener, CEJA's focus on equity is at the heart of its workforce programs (Keener 2024). CEJA works to ensure the benefits of this generational shift reach all communities that have suffered from historical disinvestment and environmental injustice.

Missouri and Kansas

The State of Missouri has not adopted a climate action plan but is actively participating in programs that address climate change and support local climate action plans. One such effort is the Climate Pollution Reduction Grants (CPRG) program under supervision of the U.S. Environmental Protection Agency. This competitive grant program, administered by the Missouri Department of Natural Resources (DNR), has a plan to distribute grants to local jurisdictions to develop climate action plans (Missouri DNR 2023).

Missouri's Climate Pollution Reduction Grants program will focus on workforce challenges and opportunities in two initiatives. First, due to feedback from building officials, a Workforce Analysis and Development Strategy is set to start in late summer 2024. Building officials across the state have already indicated that workforce deficits exist amongst building officials, home energy raters and mechanical contractors, and knowledge gaps exist for heat pump installations. The second initiative under Missouri's Climate Pollution Reduction Grants program will establish technical assistance to support local jurisdictions' climate goals and action plans. The Mid-America Codes Collaborative (MACC), a partnership between Missouri, Kansas, Kansas City and many state and local organizations, was formed to expand the workforce to design, construct, test and inspect energy efficient buildings. The project will collect data on workforce growth to assess the program's effectiveness.

In Missouri and Kansas, MACC seeks to partner with CBOs to build up the energy efficient buildings workforce. Once work through MACC begins, the collaborative will leverage its multistate network of approximately 30 regional, state and local community partners to build the energy efficiency workforce in the building industry throughout rural and disadvantaged communities across Missouri and Kansas. Each partner has a unique connection to various underrepresented communities and will work to meet community needs. MACC will assist individuals with identifying careers within the construction industry and disseminate community input regarding best practices for engaging new and existing workers. Project partners with expertise in workforce recruitment will then guide individuals through training and job placement.

Midwest Air Source Heat Pump Collaborative

The Midwest Air Source Heat Pump Collaborative, led by numerous non-profit energy efficiency organizations (Midwest 2023), was formed in 2022 to accelerate air source heat pump adoption and implementation across the Midwest. Workforce development is a core pillar of the collaborative, providing the industry with relevant education on best practices and training on key competencies to ensure effective air source heat pump implementation throughout the region. Workforce-related resources, like local government toolkits, are provided to relevant stakeholders such as local jurisdictions, and contractors, ensuring further expansion of the technology's effective use.

The Midwest Air Source Heat Pump Collaborative is fostering an Equitable Partner Collaboration Cycle, which takes an apprenticeship approach to skills development and job placement in the mechanical trades. Workforce development market actors involved in the program include community colleges, technical institutes, trade schools, manufacturers, distributors, trade associations, community-based organizations, non-

profits and contractors. A core mission of the Collaborative is recruitment of women and individuals from historically marginalized groups.

Conclusion

Climate goals both depend upon and enhance the clean energy workforce. This paper underscores the critical importance of developing a skilled and diverse clean energy workforce in the Midwest to support the new construction trades that will impact the region's ambitious climate and greenhouse gas emissions reduction goals. By highlighting various workforce development initiatives, this paper illustrates the importance that a commitment to innovation, equity and inclusivity has in shaping a sustainable future. Addressing challenges such as the shortage of skilled labor and trained building officials is essential for successfully implementing clean energy building practices and achieving climate targets. Working together to equitably enhance the workforce for the greater good to address climate change will also uplift economies in the affected communities.

As policymakers, industry leaders and educators continue to collaborate and invest in workforce training and education, these efforts will play a pivotal role in realizing the full potential of clean energy technologies and advancing environmental and social sustainability in the heartland of America. Workforce development needs to be considered and included when setting climate goals and energy efficiency policies, and climate planning should be considered as an opportunity to build the workforce.

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