

**Advancing Climate Literacy in  
Union Vocational Education and Training Programs in the  
United States**

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**ABOUT CIRT:** *The Climate and Industry Research Team comprises academic researchers from English Canada, Europe, the United States and Quebec whose expertise in climate science, labour relations, apprenticeship, trades training and a variety of low carbon construction issues, support its mandate under the Building It Green project to provide research on climate literacy in Canada and internationally.*

**ABOUT Building It Green:** *The Building It Green project focuses on bringing together industry best practices from around the world to improve the education and understanding of skilled trades workers related to their role in constructing and maintaining net-zero projects and help Canada meet its climate goals. This project is funded by The Government of Canada's Union Training and Innovation Program (UTIP).*

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## Synopsis: An Overview of the U.S. Report

### Executive summary

This report is a culmination of over a year's study on good practices in teaching climate literacy focused on union apprenticeship and journey-level education. The US report is part of the broader Building It Green project <sup>1</sup> that is informed by the work done jointly by the CIRT team on the literature, current policy, and interviews on climate literacy on the US, Canada and Europe. In the US, the focus is on the joint labour-management educational approaches to climate literacy. This report is meant to offer ideas, curricula and practices that will be helpful for the Canadian Building Trades' development of pilot curriculum intended to prepare members for the green shift.

### Organization of the Report

The report is organized into several areas. The first section describes the polarized political culture in the US and how it has affected climate policy. But as environmental concerns rise internationally, pressure has mounted to transition the economy's reliance on energy and materials towards low carbon sources. Just as the movement for addressing global warming is growing and so is the demand for good green jobs and an equitable transition.<sup>2</sup> At the same time, Building Trades like other unions in the US are contending with low union density.

Section 2 contextualizes climate literacy within the literature of union renewal within the US construction industry. Union renewal refers to the methods unions use to recruit new members and to reorient its own structures. Here the consideration is how climate literacy with an equity lens can offer a route for building union density. This perspective situates the movement for incorporating climate literacy in vocational education and training within a larger struggle to raise labour standards through union organizing.

Section 3 surveys climate policy in the US on a state and federal level. The lack of strong climate policy in the US retards the process in which climate literacy is valued. Weak federal policy has spawned strong local organizing and the formation of coalitions to establish legislation that favour union construction in the green economy on a state or even municipal level. The federal climate legislation and funding under the Biden administration is a historic acknowledgement of the need for massive federal action to mitigate climate change. Hundreds of billions of dollars are available for investment in clean building and transport systems because of efforts by many labour and climate advocates to get federal support for both green and good jobs.

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<sup>1</sup> Building It Green, Canada. <https://buildingtrades.ca/workforce-dev/building-it-green/>

<sup>2</sup> Stevis, D. (2012). Green jobs? Good jobs? Just jobs? US labour unions confront climate change. In *Trade Unions in the Green Economy* (pp. 195-211). Routledge. McCauley, D., & Heffron, R. (2018). Just transition: Integrating climate, energy and environmental justice. *Energy Policy*, 119, 1-7.

However, the federal legislation depends on the private sector to protect climate and labour standards and equity, rather than using public money to insure high labour standards. The Inflation Reduction Act (IRA) for example, advantages developers whose package includes union wages, and who support an inclusive pre-apprenticeship, but these practices are not mandatory and developers are still attracted to projects in states with laws hostile to unions. Another aspect of the IRA is that substantial federal dollars go towards projects with technologies unproven at scale to allow fossil fuel facilities to continue polluting emissions toxic to the climate.<sup>3</sup> Building CCS plants that store carbon produced in refineries, cement and chemical plants are considered good green jobs if workers make good wages, regardless of whether the technology stalls fossil fuel phaseout and contributes to the disaster of an intensifying climate crisis.

This section also summarizes successful local and state-wide climate and jobs legislation where most political action for climate has been possible. In many cases, unions aligned with environmental justice and environmental groups were critical to ensuring high labour standards and community benefits. In half of the fifty states anti-union and climate change denying politicians dominate state legislatures and the governor's office. While some of these states have developed renewables, they eschew passing any climate goals. For example, Texas has the second largest renewable capacity in the country (after California), but incentives for more renewable power projects were removed during the 2023 Texas state legislative session as corporate oil currently has the upper hand.

The fourth section lists the organizations interviewed for the study on climate literacy practices. It provides a discussion of the most outstanding findings. The Advisory Board for the Building It Green project and CIRT (Climate Industry Research Team) leadership guided the choice of building trades. NABTU (National Association of Building Trade Unions) gave us their support to reach out to training directors in these trades. In addition to NABTU, help was obtained through the tradeswomen network, as a number of women have reached the level of training directors or are trainers in a number of trades and tended to be more accessible for interviews and or connected the interviewer with their male counterparts.<sup>4</sup> Furthermore, CIRT also encouraged interviewing training adjacent bodies, such as the Division of Apprenticeship Standards, labour leadership, third party educational development agencies such as Urban Green Council and Labour Leading the Climate, and community organizations involved in coalitions with the trades for climate legislation.

The fifth section summarizes the structure of the US VET system. The sixth presents and

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<sup>3</sup> Cha, J.M. The Future of the Labor-Climate Alliance, Dissent, Spring 2023, <https://www.dissentmagazine.org/article/the-future-of-the-labor-climate-alliance>

<sup>4</sup> Thanks to Pat Williams, Ret. Operating Engineers Local 12 for helping me find women who moved up the ranks from rank and file workers to becoming involved in several ways with various trades' education and training programs and thanks to all the women and men who agreed to speak to me or whom I met in the classroom.

discusses the findings from the interviews and fieldwork, followed by the conclusion.

One of the strongest messages from trainers was that without incentivizing contractors through policy, legislation, organizing, etc, it is nearly impossible to justify developing and offering climate literacy training. There are many examples of VET energy efficiency curricula, and efforts at providing green skill training of various sorts. However, these are neither adopted across the country, nor do they encompass the range of climate literacy important for preparing workers for the green economy. One of the paradoxes is that the Building Trades continue to support and advocate for training in skills that continue or lengthen the life of fossil fuel-based industries because of the extent of or the promise of work in those areas. Seeing some of the breakthroughs in policies and funding for climate adaptations provides hope for the future.

Several interviews revealed profound reflections on the value of climate literacy and preparing students to take up this work. There were some who expressed a broad vision of the need for climate awareness that used the language of Indigenous thinkers, in this case the idea of planning and building with seven generations ahead in mind. Here is a passage from one of the most visionary of the interviewees:

*We need to make sure that we're not just training because this is a job that they could be doing amongst all the other tasks they could be out there, doing a lot of things. We do need to make sure that we bring it back to why we're making this energy transition. and understand that there is severe impact to how we've been doing things for these decades upon decades we're feeling those consequences now. Our time is running short of when we can really make change to avoid some of these disasters that are coming, so we need to make sure that the climate is part of the dialogue. We're encouraging solar not just because we want to put our members to work...but because we want to make people's lives more resilient, we want to make sure that we, the environment is there for future generations. It's going back to you know earlier cultures on this land about looking seven generations out with all your decisions. We haven't done that, for a very long time. We've had a very immediate act and respond; we don't we don't think long term and about the consequences, and I think we need to get back to that mindset. (Illinois IBEW trainer)*

### **The report makes the following arguments.**

1. The climate crisis requires that local and national government design robust plans to build a healthy future for all with strong labour and inclusion standards in consultation with stakeholders including labour and community. The private sector will not advocate for thorough decarbonization or for high labour standards by itself. Union trainers observe that developers and contractors do not embrace green building standards unless they are required by government action in the form of green building codes or through other incentives. Up until recently, the federal government has been unable or unwilling to

deliver legislation that effectively decarbonizes sectors across the economy. The most ambitious federal policy only incentivizes employers primarily in the private sector to propose climate projects with high labour standards. State and local governments have been more accessible for the passage of green policies.

2. Climate literacy is supported by many union trainers in the United States, but it is not explicitly integrated into their curriculum. Instead, it is generally incorporated as how-to skills depending on what is in demand for each trade. For example, Plumbers and Sheetmetal workers need to understand refrigeration gases that are regulated by environmental codes which protect against global warming; insulators must know how their materials promote energy efficiency. Electrical workers have higher and more diverse energy sources, like solar, that are connected to lowering emissions. Cement workers are sometimes asked to adapt to lower carbon emitting building materials. Laborers must separate building waste differently, and so on. However, climate literacy is more than developing disparate skills. It involves a broader understanding that includes recognizing the human causes of global warming on the climate, particularly from fossil fuel. It requires an awareness of how everyone on a job site interacts and makes an impact on building performance. The best examples of unions promoting climate literacy is through collaboration on curriculum with non-profits such as Urban Green, the developers of Green Professional (G-PRO). The United Association (plumbers and pipefitters), the Insulators and the Electricians' unions have each worked with Urban Green to design trade specific G-PRO modules.<sup>5</sup> But these modules are only adopted into training by locals who feel that their work picture requires green skills. Another way unions encourage climate literacy is through the establishment of Net Zero training facilities that model the technology and provide hands-on application of green practices.
3. Many unions are active in lobbying for favourable climate legislation and funding for green jobs with high labour standards. But while they advocate for policies that promote union jobs in the green economy, they often lobby against regulations that reduce emissions in protection of fossil fuel jobs. Climate literacy enables rank and file workers to understand climate change more clearly and understand the direction they want their leadership to take.
4. Endorsing a climate literacy curriculum and allying with communities fighting for a more equitable economy can lead to a winning strategy for union growth. Cross union and community coalitions have had legislative victories supporting green construction with high labour standards and community benefits. For example, the Illinois' Climate and Equitable Jobs Act (CEJA) has been a boon to union construction, as it integrates labour standards into the bill for projects over a certain size.<sup>6</sup> Climate Jobs Institute, part of the

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<sup>5</sup> Urban Green website <https://www.urbangreencouncil.org/>

<sup>6</sup> The Illinois Environmental Protection Agency CEJA page <https://epa.illinois.gov/topics/ceja.html#:~:text=The%20Climate%20and%20Equitable%20Jobs,the%20Energy%20and%20transportation%20sectors.>

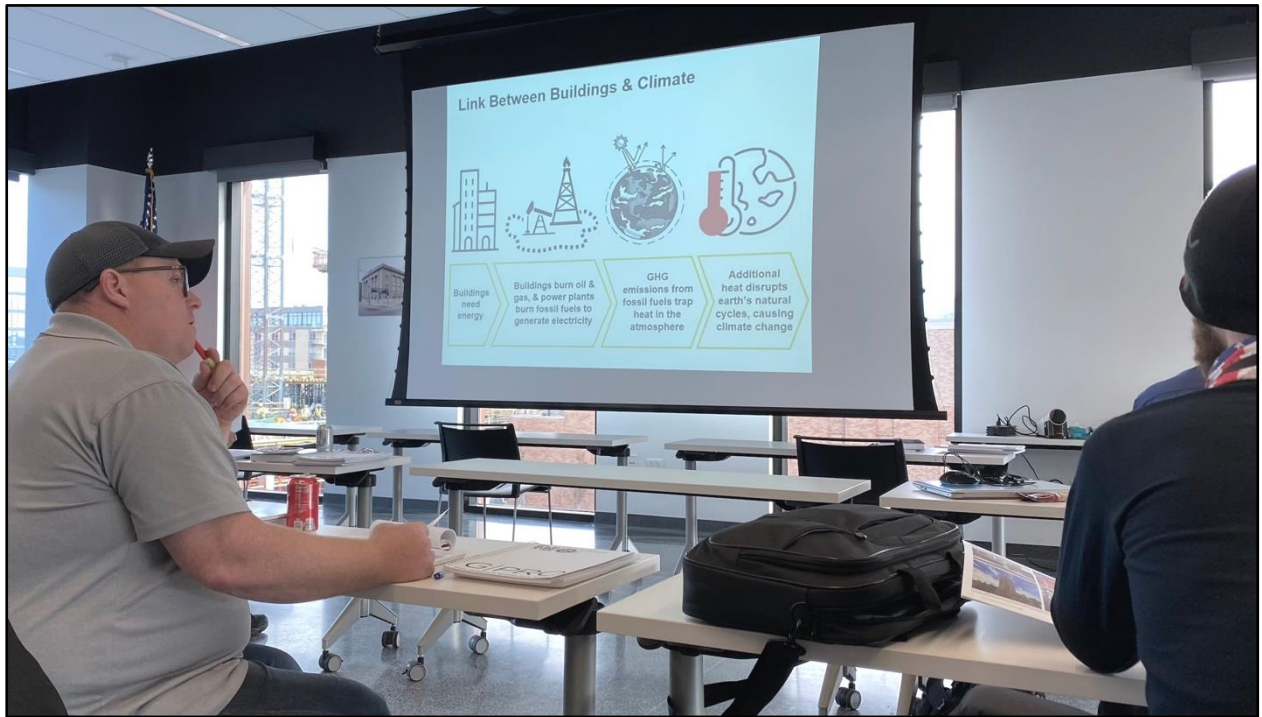
Cornell School of Industrial Labor Relations provides research and workshops for building trade unions and their allies to work towards state legislation and to encourage developers to take advantage of federal legislation that would support higher labour standards and be union-friendly.

5. The Building Trades try to win public recognition as deserving of the right to represent workers in the construction workplace. They work to defeat anti-labour legislation and gain stable government support for a green economy with high labour standards. But it is a difficult fight. Construction in the US is a major industry employing 10 million people, about 1 in 16 workers nationally. Union density in the Building Trades has been falling since 1971 when 42% of construction workers were union members. By 2019 the rate had fallen to 12.6%, which is parallel to the overall decline of unionization in the United States. Anti-union employer organizing and resulting legislation limiting organizing makes it difficult for unions to protect labour standards and fight anti-worker policies.<sup>7</sup> The Building Trades' main approach has been to recruit contractors to become signatory, rather than recruiting workers. Creating a union renewal campaign which includes a focus on climate literacy, that effectively recruits and retains youth and workers from many backgrounds, that is receptive to women, Indigenous, all racial groups and communities, that advocates for equity in urban and rural development and a green and healthy future is critical to raising labour standards and fair worker representation.

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<sup>7</sup> Erlich, M., & Grabelsky, J. (2005). Standing at a crossroads: The building trades in the twenty-first century. *Labour History*, 46(4), 421-445.





**United Association of Plumbers and Pipefitters Train the Trainer Session, Chicago, 2021**

*Photo by Vivian Price*

## **Promoting Climate Literacy in a low union density context requires a broad strategy that links jobs and equity**

Climate literacy in the Building Trades has many facets and objectives, most directly to prepare apprentices and journey level workers for success in performing work in the green economy.

Yet generating a demand for climate literacy requires political support. In the United States the fossil fuel industry has had an upper hand in influencing public policy and the media about what is good for the nation. Industry has sometimes successfully solicited building trades support to block climate legislation, sustaining the fossil fuel economy. Correspondingly public opinion on climate change has become increasingly polarized. However, as environmental concerns rise internationally, the movement for addressing global warming is growing and so is the demand for good green jobs and an equitable transition.<sup>8</sup>

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<sup>8</sup> Stevis, D. (2012). Green jobs? Good jobs? Just jobs? US labour unions confront climate change. In *Trade Unions in the Green Economy* (pp. 195-211). Routledge. McCauley, D., & Heffron, R. (2018). Just transition: Integrating climate, energy and environmental justice. *Energy Policy*, 119, 1-7.

Cornell's Climate Jobs Institute (CLI), a leading force in the US Building Trades labour climate movement, notes that equity is integral to its goals. The CLI defines itself as "guiding the nation's transition to a strong equitable and resilient clean energy economy by pursuing three aims: to tackle the climate crisis: to create high-quality jobs and to build a diverse inclusive workforce."

The Urban Sustainability Directors Network<sup>9</sup>, addressing the need for the decarbonization of cities, notes that equity goes beyond inclusive job creation and VET. "With any new policy, there is an imperative that local governments center equity in process, goals, and outcomes. Status quo government action often creates, codifies, and exacerbates inequities. When approaching decarbonization, communities should investigate the specific 'why' for doing the work equitably. The answer, different for every community, should provide the guiding charge for resulting initiatives." An example of equity beyond inclusive job policies they include in their campaigns is anti-displacement and anti-gentrification measures.<sup>10</sup> Building coalitions to pass high road labour and climate legislation means building a shared platform that puts labour and community demands and power together.

### **Declining union density in the construction industry**

The acceptance of labour as a legitimate actor is not as common in the United States as it is in Europe. Labour's success in overcoming opposition reached its apex in the 1960's. Since then, all sectors, including construction have lost power and membership.

Construction in the US is a major industry employing 10 million people, about 1 in 16 workers nationally. Union density in the Building Trades has been falling since 1971 when 42% of construction workers were union members. By 2019 the rate had fallen to 12.6%, which is parallel to the overall decline of unionization in the United States. Anti-union employer organizing and resulting legislation limiting organizing makes it difficult for unions to protect labour standards and fight anti-worker policies.<sup>11</sup>

The Building Trades are at the centre of the transition with a huge stake in how the shift to lowering emissions takes place. A key question is who will retrofit the outdated structures and build the new infrastructure, and under what terms and conditions? Leading green entrepreneurs have not been union friendly.

In twenty-seven states, "right to work" laws keep unions weak by preventing unions from requiring dues collection from non-union members who work under a union contract, rules which have proven difficult to change. Historically these laws emerged from the efforts to

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<sup>9</sup> Urban Sustainability Directors Network <https://www.usdn.org/about.html>

<sup>10</sup> Decarbonization: American Cities Climate Challenge.(n.d.) Urban Sustainability Directors Network. <https://www.usdn.org/uploads/cms/documents/decarbonization-slides.pdf>

<sup>11</sup> Erlich, M., & Grabelsky, J. (2005). Standing at a crossroads: The building trades in the twenty-first century. *Labour History*, 46(4), 421-445.

maintain segregation<sup>12</sup> to keep workers divided, unions weak and make collective bargaining difficult. Pro-business, anti-union organizations like the American Legislative Exchange Council fund the development and circulation of bills with a conservative agenda throughout state legislatures, making it difficult for unions to gain ground.<sup>13</sup> The public ends up paying for social services to help workers—even in the construction industry—make ends meet.<sup>14</sup>

The literature on the decline of union density in the construction industry in the US lays out the growth of anti-union developers and contractors who grew powerful during the late 1960's through the rise of the Business Roundtable. But even union contractors felt free to build a non-union side to their businesses, undercutting their own union workers. Linder (2000)<sup>15</sup> argues that while the decline of unionization in industry that was the result of companies moving overseas, union construction jobs “were taken by compatriots, some of them until recently union brothers, employed by cut-rate antiunion construction firms—some of which had been union firms in good standing. Indeed, some non-union contractors are subsidiaries of long-time respectable union contractors” (p. xiii).

The construction industry has become deeply bifurcated into growing low-road and diminishing high-road sectors since the 1970's. Building trades unions have their strongest presence in urban areas of the Northeast, the Midwest and West Coast, especially commercial and industrial, but even in these markets, there are “large and growing segments of the industry [that] are outside the union sphere of influence...” Contractors often “reduce labour costs through whatever means possible... They pay low wages without benefits, subcontract, misclassify employees as independent contractors and pay workers under the table.”<sup>16</sup> Some union contractors have a non-union side so they can take advantage of low bidding.<sup>17</sup>

Non-union contractors are not necessarily bad employers, but most do not want to see any regulations that increase or strengthen labour-related terms and conditions, a point that is reiterated by their stance on regulations in government climate grants. For example, the Associated General Contractors (AGC) America Climate Task Force released a 2021 report which included the provision: “Ensure climate policies do not mandate construction labour and workforce policies that will impede the success of those projects and achievement of

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<sup>12</sup> See Pierce, M. (Feb 22 2018) Vance Muse and the Racist Origins of Right-to-work Laws, American Constitution Society Blog. <https://www.acslaw.org/expertforum/vance-muse-and-the-racist-origins-of-right-to-work/>. See also the Pro Act which tried to create a national right to organize a union. <https://www.warren.senate.gov/newsroom/press-releases/senator-warren-and-representative-sherman-reintroduce-the-nationwide-right-to-unionize-act-call-for-passage-of-the-pro-act>

<sup>13</sup> For example, ALEC's Right to Work legislation <https://alec.org/model-policy/right-to-work-act/>

<sup>14</sup> Public Cost of Low Wage Jobs in Arizona Construction Industry, <https://laborcenter.berkeley.edu/the-public-cost-of-low-wage-jobs-in-the-arizona-construction-industry/>

<sup>15</sup> Linder, M. (2000). Wars of attrition: Vietnam, the Business Roundtable, and the decline of construction unions. *Wars of Attrition: Vietnam, the Business Roundtable, and the Decline of Construction Unions*, Fanpihua Press.

<sup>16</sup> Jacobs, K., Huang, K., MacGillvary, J., & Lopezlira, E. (2022). The Public Cost of Low-Wage Jobs in the US Construction Industry. <https://escholarship.org/content/qt1vg7t2xd/qt1vg7t2xd.pdf>

<sup>17</sup> Northrup, H. R. (1995). Doublebreasted operations and the decline of construction unionism. *Journal of Labour Research*, 16(3), 379-385.

infrastructure goals.”<sup>18</sup>

Several regions and areas of work are dominated by non-union employers. “The residential sector operates virtually union-free in many trades and regions. Significantly, union-free cities primarily in the Sunbelt, are some of the fastest growing in the country... With wages too low to attract the industry’s traditional demographic base of recruits, contractors turned to immigrants to fill the vacuum.”<sup>19</sup> Hired especially by non-union contractors, 2006, Latino immigrant workers represented more than 20 percent of the U.S. construction industry’s workforce.<sup>20</sup>

Campaigns to win back market share for unions have deployed project labour agreements,<sup>21</sup> a pre-hire set of terms and conditions that apply to all contractors who bid on construction contracts for that project. They are especially useful in publicly funded construction projects to ensure higher labour standards and community benefits. But to arrest union decline, more must be done.

## **The relationship between union renewal and promotion of climate literacy**

Union renewal refers to the idea that unions try to reinvent themselves and attract member involvement and increased strength. As there is more education about climate change in the schools, young people have an increased interest doing work that lowers emissions. Could unions attract motivated people to join the apprenticeship if they incorporate climate in their curriculum? Might unions preparing workers for jobs in the green economy raise union density?

Union renewal campaigns in the 1980’s began incorporating labour history in apprenticeship classes not only to take pride in the history of people fighting for respect in the workplace, but also to come to terms with the racial exclusion, segregation, gender discrimination, and anti-immigrant policies within the Building Trades that was widely practiced until challenged by the Civil Rights Movement. The Building Trades became subject to legislation that led to outreach, pre-apprenticeship, mentorship, and retention programs to bring in and retain marginalized groups and members who formerly would have been excluded because of race, gender, sexual orientation, indigeneity, nationality, and age. The campaign coupled labour

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<sup>18</sup> The AGC Climate Task Force Final Report, June 2021.

[https://www.agc.org/sites/default/files/Files/Communications/AGC\\_Climate\\_Change\\_Task\\_Force\\_Final\\_Report.pdf](https://www.agc.org/sites/default/files/Files/Communications/AGC_Climate_Change_Task_Force_Final_Report.pdf)

<sup>20</sup> Iskander, N., & Lowe, N. (2010). Hidden talent: Tacit skill formation and labour market incorporation of Latino immigrants in the United States. *Journal of Planning Education and Research*, 30(2), 132-146.

<sup>21</sup> Name Redacted, June 28, 2012. Project Labour Agreements, Congressional Research Service, [https://www.everycrsreport.com/files/20120628\\_R41310\\_731846eb1c5bc373a7ea40ebd566f72ded8a8771.pdf](https://www.everycrsreport.com/files/20120628_R41310_731846eb1c5bc373a7ea40ebd566f72ded8a8771.pdf)

history with an action plan of “salting” in which members would take jobs in non-union construction firms and organize the workers in the shop. There was an expansion of members during that time period.

Recently unions have recognized the importance of forging bonds with immigrant organizations to organize groups, like Latinos, who’ve become an integral part of the non-union workforce. For example, Texas Climate Jobs Project <sup>22</sup> works with the Workers Defense Project<sup>23</sup> on innovative policies that increase union market share and build connections with Latinx workers and promote high road standards on green construction projects.<sup>24</sup> The WDP worked with unions to design and lead the Better Builder Standards<sup>25</sup> campaign in pursuit of creating higher labour standards in the anti-union Texas construction market.

What makes climate literacy particularly important for unions is that it offers a pathway to incorporate all the tools of union-building and more. Much of the legislation passed for climate justice are based on coalitions between unions and communities and require engagement by communities in the implementation of pro-union laws. Climate literacy and equity and inclusion are integrally related.

The trades try to combat the low road labour conditions by the methods referred to above, such as utilizing PLA’s, pushing for climate policy that advocates for high road terms, as a winning approach.<sup>26</sup> Creating partnerships with community organizations is a key strategy for gaining market share; it is an important part of winning project labour agreement awards especially in green jobs. Community benefits agreements, local hire agreements are both ways that Building Trades Councils are growing their work. Building coalitions that advance climate legislation calling for PLA’s and funding, such as Illinois Climate Equitable Jobs Act are more successful when they include vocational education partnerships in communities disproportionately affected by pollution.

## **Climate policy in the US and its impact on construction**

Focus on the built environment to reach climate goals is an important priority for many nations. In the US the federal government sets policy for the country, with states and the national government in contest with each other over jurisdiction. Federal bills generally need to pass both in the House of Representatives and the Senate, with the House having power over the budget and its distribution. The Executive generates policy through Executive

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<sup>22</sup>Texas Climate Jobs Project <https://www.txclimatejobs.org/>

<sup>23</sup>Workers Defense Project <https://workersdefense.org/en/>

<sup>24</sup> Building Austin, Building Injustice, A report of the Workers Defense Project <https://workersdefense.org/wp-content/uploads/2023/01/Building-Austin-Building-Injustice.pdf>

<sup>25</sup> Better Builder Standards <https://www.betterbuildertx.org/en/>

<sup>26</sup> Zabin, C. (2020). Putting California on the High Road: A Jobs and Climate Action Plan for 2030.

Orders, Agency rulemaking, and other administrative actions that have bearing on federal properties. The Supreme Court can hear cases to affirm or overrule Congressional or Executive actions.

US federal policymaking around climate has been stymied because of the power of the fossil fuel industry to underwrite elected leaders. Less discussed is the longtime practice of recruiting unions to defeat climate legislation, especially appealing to those unions who represent workers in their industries. In 2009, The Building Trades through NABTU developed a partnership with the Oil and Gas industry, the Oil and Gas Labor Management Committee.<sup>27</sup> Noting for example that industrial production and pipelines offer BT workers good jobs, workers learn that attempts to restrict fossil fuel threatens their work. Unless they feel that their jobs are not at risk, or that real alternatives with good pay and benefits are available for them, workers who have their livelihood at stake will resist change.<sup>28</sup> This is a key element in understanding how to get to just transitions. If there are to be shutdowns and a smaller pool of employment, it is critical for the green expansion to have funded support in place for displaced workers and explicit legislation that ensures high labour standards and makes union organizing less onerous.

Facing inconsistent support for progressive climate change policy in many administrations, increasing opposition in Congress, and uneven victories in the Supreme Court, environmental movements looked beyond the federal level. City and state led initiatives have been the locus of legislation and policies, especially when they incorporate strong labour terms and conditions, that motivate employers and training programs to prepare the construction workforce with necessary skills to work in a low carbon economy.

Below is a discussion of the federal and state policies that have emerged since the Obama presidency in 2008, a period most relevant to this study on climate literacy.

#### **a. Federal Building Decarbonization policies and legislation**

The Obama presidency ran into opposition in passing goals for decarbonization. Under that administration, the president announced a pledge to set a goal of making new building zero emissions by 2030, to improve new building efficiency by 50% and existing buildings by 25% to meet a 2030 reduction target. While the cap-and-trade bill failed, the Executive Branch was able to utilize the US Energy Department to promote efficiency standards and

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<sup>27</sup> Sweeney, S. (2016, May). Contested futures: Labor after keystone XL. In *New Labor Forum* (Vol. 25, No. 2, pp. 93-97). Sage CA: Los Angeles, CA: SAGE Publications.

<sup>28</sup> Building Trades are the quintessential American craft workers. See Palladino, G. (2019). *Skilled hands, strong spirits: A century of building trades history*. Cornell University Press. On racial exclusion: Black Power at Work: Community Control, Affirmative Action, and the Construction Industry. (2010). United Kingdom: ILR Press/Cornell University Press.



conduct energy efficiency determinations.<sup>29</sup> The Obama administration released a significant document, the Mid-Century Strategy for Deep Decarbonization (MCS) in 2016 that assessed the progress in the prior eight years and goals for the future.<sup>30</sup> Its analysis of the Building sector noted a decline in emissions due to “energy efficiency policies, including federal efficiency standards for most major end uses, voluntary partnership programs such as ENERGY STAR, state and local building energy codes, and demand-side energy efficiency programs across all 50 states and including ‘energy efficiency resource standards’ in 20 states that require a minimum level of demonstrated energy savings each year, among many others. Consequently, building CO2 emissions have decreased 16 percent since 2005 (EIA 2016d) even while building space has increased substantially.” (p.59) However there were setbacks during the subsequent presidency.

Since Biden was elected, there has been significant movement. In 2021 he issued Executive Order 14057 which calls for, among other things, “a net-zero emissions building portfolio by 2045, including a 50 percent emissions reduction by 2032.”<sup>31</sup> In the same year, Congress passed the American Jobs plan, the Infrastructure Bill, which should increase investment “in building and upgrading public schools and community colleges, childcare facilities, affordable housing, VA hospitals and clinics, and federal buildings.”<sup>32</sup> Importantly for unions, the Bill “may facilitate PLA use and provide job opportunities to historically marginalized communities that have traditionally been excluded by the building and construction trades.”<sup>33</sup> Note that in this bill, as in many others, the federal government combines opportunities for companies to incorporate high high labour standards and community equity.

In late 2022, the U.S. Department of Energy (DOE) announced a new rule, the Federal Building Performance Standard, “to electrify new federal buildings and federal buildings undergoing major renovations. From 2025, federal construction would have to reduce on-site energy-related emissions by 90 percent, compared to 2003 levels. By 2030, new federal buildings and major renovations would be required to show full decarbonization, to help “meet the president’s goal of reaching net-zero emissions in all federal buildings by 2045.”<sup>34</sup> Federally funded projects are generally majority union projects.

It is the Inflation Reduction Act which is considered landmark legislation, authorizing

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<sup>29</sup> For example, the stimulus package formally called the [American Recovery and Reinvestment Act of 2009](https://www.politifact.com/truth-o-meter/promises/obameter/promise/462/make-buildings-more-energy-efficient/) awarded \$3.1 billion to states to meet or exceed existing standards, as well as several other grants .  
<https://www.politifact.com/truth-o-meter/promises/obameter/promise/462/make-buildings-more-energy-efficient/>

<sup>30</sup> [https://unfccc.int/files/focus/long-term\\_strategies/application/pdf/mid\\_century\\_strategy\\_report-final\\_red.pdf](https://unfccc.int/files/focus/long-term_strategies/application/pdf/mid_century_strategy_report-final_red.pdf)

<sup>31</sup> <https://www.whitehouse.gov/briefing-room/presidential-actions/2021/12/08/executive-order-on-catalyzing-clean-energy-industries-and-jobs-through-federal-sustainability/>

<sup>32</sup> <https://www.constructconnect.com/blog/what-bidens-infrastructure-plan-means-for-the-construction-industry>

<sup>33</sup> <https://www.lcwlegal.com/news/infrastructure-bill-paves-path-for-expanded-use-of-project-labour-agreements-more-equity-in-the-building-trades/>

<sup>34</sup> <https://www.whitehouse.gov/briefing-room/statements-releases/2022/12/07/fact-sheet-biden-harris-administration-announces-first-ever-federal-building-performance-standard-catalyzes-american-innovation-to-lower-energy-costs-save-taxpayer-dollars-and-cut-emissions/>

\$391 billion in spending on energy and climate change.<sup>35</sup> Its passage was widely seen as a miraculous breakthrough in a highly contentious battle. A compromise based on the Build Back Better Plan, the IRA gained approval in the summer of 2022. It has a direct impact on the construction industry and the building trades, including a Dept of Energy \$1 billion dollar pool for local jurisdictions to raise energy code standards if they are at least as efficient as the 2021 codes.”<sup>36</sup> The Act revolves around a system of tax credits for developers and contractors to increase energy efficiency, lowering emissions and applying high labour standards. There are many ways this massive bill may positively incentivize the building industry to bid on contracts to increase the energy efficiency of buildings, to get reimbursed for the cost of higher low carbon construction materials and to work on green federal projects.<sup>37</sup>

Under the Inflation Reduction Act, “enhanced tax benefits for a range of clean energy projects to taxpayers that ensure Davis-Bacon Act prevailing wages are paid to workers on such projects, and that registered apprentices are utilized, in accordance with the Act.”<sup>38</sup> Based on a workshop put on by Climate Jobs Institute, five times the tax credits are available to those who pay prevailing wage and hire registered apprentices, and these requirements are locked in for ten years.<sup>39</sup> Applicants for competitive (rather than directive) grants are also evaluated on their community benefits package. They must show how they will do four things. They must demonstrate that they will fulfill the Justice 40 Initiative<sup>40</sup> that 40% of the benefits flow to disadvantaged communities; that they will meet the diversity, inclusion and accessibility goals of the administration; specifically how they will create good jobs where workers have a free and fair chance to join a union, where workplace health and safety is front and center; that they will establish meaningful engagement and accountability with labour union partners. Another feature of the IRA is that by elevating the equity incentives it is potentially creating a bigger demand for graduates from pre-apprenticeships and secondary schools who are from disadvantaged communities, Indigenous groups, the formerly incarcerated, foster youth, women and the LGBTQ community and so on.

Critics of federal legislation point to several problems. Two major ones are that taking advantage of the “high road” tax credits is voluntary. Rather than requiring Davis-Bacon prevailing wages when federal funds are offered, developers may take lower tax credits and bid with lower wage scale in mind. Secondly, a substantial amount of the Act’s funding is directed to experiments for what detractors argue are unproven technologies like carbon capture and hydrogen production that prolong the life of fossil fuel projects. This led organizations like the Climate Justice Alliance to issue a press release entitled, “The Inflation

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<sup>35</sup> <https://www.energy.gov/lpo/inflation-reduction-act-2022>

<sup>36</sup> <https://www.nrdc.org/experts/lauren-urbanek/2022-banner-year-building-decarbonization>

<sup>37</sup> [https://meadhunt.com/ira-impact-building-projects/#:~:text=The%20Inflation%20Reduction%20Act%20\(IRA,for%20energy%20and%20climate%20provisions](https://meadhunt.com/ira-impact-building-projects/#:~:text=The%20Inflation%20Reduction%20Act%20(IRA,for%20energy%20and%20climate%20provisions)

<sup>38</sup> <https://www.dol.gov/agencies/whd/IRA>

<sup>39</sup> <https://www.youtube.com/watch?v=8tQXFfXmeSY>

<sup>40</sup> <https://www.whitehouse.gov/environmentaljustice/justice40/>



Reduction Act is Not a Climate Justice Bill.”<sup>41</sup>

In Jan 2022, The Dept. of Labor passed the Good Jobs Initiative<sup>42</sup> with the potential of sustaining and centering strong labour quality and equity. It provides easily accessible information to workers, employers and government about rights and responsibilities, but also technical guidance on how to apply for competitive grant funding. Each agency of the federal government is participating in spelling out the frameworks for good jobs to meet the goals of workforce development in grants like the massive IRA which can otherwise seem intimidating.

To some extent, the success of IRA will depend on how and whether local governments can take advantage of federal laws to develop good climate jobs with high labour standards and equity in a way that satisfies the goals of both labour unions and environmentalists. Speaking to this point, Senator Euer from Rhode Island describes how state and municipal policymakers should use the federal goals and support to integrate climate goals and family-sustaining good jobs with equitable and diverse job recruitment.<sup>43</sup> Euer emphasizes the importance of passing enforceable laws on the state level to ensure that the programs meet expectations on the frontlines. For example, the Rhode Island 2021 Act on Climate Legislation includes mandatory enforcement through individual citizen lawsuits. Passing bills with benchmarks and goals for climate and jobs and equity are important to incentivize the market and beyond. Because of polarization in the United States, it is most likely that those with Republican majority state houses or a Republican governor will not pursue this avenue, although there can be exceptions.

## **b. State and local level climate legislation**

The number of states that adopted goals for reducing emissions grew substantially over the last few years. Many of these states are outlining ambition plans for reaching their goals, through legislation, referendums, state agency initiatives, with several of them being led by coalitions of unions with other partners.

The Center for Climate and Energy Solutions maintains a state climate policy map website to keep up with developments across the United States. As of January 2022, twenty-four states plus the District of Columbia have adopted specific greenhouse gas reduction targets. The map hugs the coasts, with three additional sunbelt states, Montana, three midwestern states, and Louisiana.<sup>44</sup> Some states have carbon neutrality or net-zero goals that aim for emission removal or emission avoidance. Thirty-three states have climate action plans.<sup>45</sup> Eleven states

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<sup>41</sup> See for example, <https://climatejusticealliance.org/the-inflation-reduction-act-is-not-a-climate-justice-bill/>

<sup>42</sup> <https://www.dol.gov/general/good-jobs>

<sup>43</sup> Ibid footnote 24 <https://www.youtube.com/watch?v=8tQXFfXmeSY>

<sup>44</sup> <https://www.c2es.org/document/greenhouse-gas-emissions-targets/>

<sup>45</sup> <https://www.c2es.org/document/climate-action-plans/>

use cap-and-trade carbon pricing policies through the Regional Greenhouse Gas Initiative (RGGI) The program “requires fossil fuel power plants with capacity greater than 25 megawatts to obtain an allowance for each ton of carbon dioxide they emit annually. Power plants within the region may comply by purchasing allowances from quarterly auctions, other generators within the region, or offset projects.”<sup>46</sup> Critics of cap and trade argue that this is an ineffective policy, especially as it does not require the reduction of pollution from disproportionately affected communities.<sup>47</sup> A common state policy to reduce GHG from the power sector is the portfolio standard.

In 2021 Colorado, Illinois, Massachusetts, Oregon and Washington, and North Carolina all passed significant climate legislation. All but the last were accomplished in states with a Democratic majority in the state house. This underlines a theme in this study that the United States has a particularly polarized political culture which permeates beyond the federal level.

**Washington State:** The Climate Commitment Act, created a novel carbon “cap-and-invest” system, a form of cap-and-trade to measure and tax emissions and use the proceeds to fund new investments in climate mitigation and adaptation. The objective is to reduce economywide greenhouse gas emissions by 95 percent by 2050. Its provisions go past those of California’s, avoiding an “oversupply of emissions allowances, reliance on hard-to-police emission offset credits, and insufficient oversight of facilities that use offsets to delay emission reductions to the detriment of local communities. And the program’s inclusion of natural gas utilities, emissions-heavy industries, and transport (road, rail, water and air).”

**Illinois’ Climate and Equitable Jobs Act** is an example of one of the state bills propelled by a coalition that included labour as a key leader. Some of its main provisions include a new renewable portfolio standard will raise renewables’ share 10 percent every decade goal of a net-zero electricity sector by 2045. There will be \$580m in subsidies for renewables, with more from funds already collected by utilities. Rooftop solar funding will increase, and private coal- and oil-fired power plants must retire by 2030, with the one publicly owned coal plants being required to reduce emissions and close by 2045. Privately owned gas plants must also reduce emissions or close by 2045. Most importantly for labour, there will be a \$40m a year displaced worker fund, and all renewable energy projects must use PLA’s and residential projects must pay prevailing wage. They all must produce “diversity hiring reports that they have recruited qualified BIPOC candidates and apprentices.” An \$80m a year Clean Jobs Workforce plan is also included in the bill, establishing 13 hubs that target “low-income and underserved populations. Resources will be put toward outreach, recruitment, training and placement.”<sup>48</sup> A number of Illinois union leaders were interviewed for this paper.

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<sup>46</sup> <https://www.c2es.org/content/regional-greenhouse-gas-initiative-rggi/>

<sup>47</sup> For example, see Avi-Yonah, R. S., & Uhlmann, D. M. (2009). Combating global climate change: Why a carbon tax is a better response to global warming than cap and trade. *Stan. Envtl. LJ*, 28, 3.

<sup>48</sup> <https://www.canarymedia.com/articles/policy-regulation/illinois-brilliant-new-climate-jobs-and-justice-bill>

**Oregon** voted in House Bill 2021, with the most ambitious state goals for decarbonizing electricity by 2040. The government set up a listening tour and there were many differences of opinion and political clashes that came up along the way. Labour was involved, primarily the public sector union, SEIU, and other unions decided to be neutral. Wins for labour were prevailing wages for clean energy projects of 10 megawatts or larger, apprenticeship standards and goals for a more inclusive workforce. 10m dollars were set aside for a healthy home initiative calling for weatherization, air filtration.

**Colorado** passed a 2019 Climate Action Plan law to cut carbon emissions in half by 2030 and 90% by 2050. 2021 saw a great conflict play out over what to target and whether they should be incentivized or be enforced, with transport and building decarbonization landing in the first area, and electricity, industrial and oil and gas sectors in the second. Therefore there are no carbon-reduction mandates for vehicles and buildings.<sup>49</sup>

**North Carolina** did pass a modest bill, the only one from a Republican State legislature.

**Massachusetts'** Republican governor vetoed the first version of its climate bill but finally signed legally binding emission-reduction targets for electricity, transportation, commercial and industrial buildings, residential buildings, industrial processes and natural-gas distribution. The targets are 50 percent reductions by 2030, going up 25% by 2040, and reaching net-zero carbon emissions by 2050. There is a clause that allows the state to underperform in two of sectors if they've met goals in a five-year period for five of the others.<sup>50</sup>

Looking specifically at building decarbonization policies at the local level, the NRDC points to several outstanding developments in raising energy code standards in 2022. Many of the changes were for new construction. Montgomery County, Maryland banned gas in new residential and commercial buildings with a December 2026 enforcement start date. Chicago passed an energy enforcement code that requires wiring for new construction to have the capacity to handle all-electrical appliances, and Illinois is working on a stretch code that will move in the same direction. Los Angeles also passed a new building electrification code that addresses issues of environmental justice.

In 2019, **New York** passed Climate Leadership and Community Protection Act (CLCPA) Law 97, requiring most buildings over 25,000 square feet to meet new energy efficiency and greenhouse gas emissions limits by 2024, with stricter limits coming into effect in 2030. This law, as other code regulations, could create thousands of new jobs and preserve high labour standards. Recently the State of New York passed the Advanced Building Codes, Appliance and Equipment Efficiency Standards Act of 2022 to align with Law 97. But there have been many updates and controversies around the law.<sup>51</sup> For example, Democratic Mayor Adams,

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<sup>49</sup> <https://www.canarymedia.com/articles/climate-crisis/colorados-climate-change-compromise-bill-sets-emissions-mandates-for-electricity-industry-and-oil-and-gas>

<sup>50</sup> <https://www.wbur.org/news/2021/03/26/new-mass-climate-law-faq>

<sup>51</sup> <https://www.urbangreencouncil.org/content/projects/all-about-local-law-97>

through the Dept. of Buildings, has passed a new rule which could delay enforcement for two-thirds of commercial buildings and one quarter of residential buildings, such that the jobs that were supposed to be forthcoming will likely be put on hold. Still the recommendations have not been finalized<sup>52</sup>

### **c. Union coalitions promote state and local climate and job policies and funding**

Craft unions arose historically as business unions rather than social unions. Business unions service their members and bring them economic benefits, while social unions serve their members but also think more broadly and take positions on issues beyond their members' jobs. Yet Building Trades Unions have taken various positions on climate depending on how they see as their members interests. Several, the IBEW, Pipefitters, the Laborers,<sup>53</sup> joined the Blue Green Alliance (BGA) to work in coalition across unions and with national environmental groups to advocate for a green industrial policy and green building. But as Stevis points out (2014) the crafts are not interested in an economy-wide plan to achieve energy efficiency, but rather work closely with contractors who advocate with developers for large sites regardless of social needs.<sup>54</sup>

In recent years, several of the Building Trades have come together, sometimes with education and public service unions, as well as with community organizations, to create momentum for green building policies that would provide benefits for all partners. These important alliances are major forces within the US climate jobs horizon. The Illinois CEJA and the New York Act among others were the product of union coalitions.

A majority of these efforts are led by a Cornell University research team that works closely with the Building Trades. The Climate Jobs Resource Center (CJNRC) and its Action Fund are “labor-led organizations that work to combat climate change, create good union jobs, and reverse racial and economic inequality by building a worker-centered renewable economy.”<sup>55</sup> The university researchers provide support to unions to develop state-specific science-based climate action plans through Cornell’s School of Industrial and Labor Relations new Climate Jobs Institute (CJI). CJI’s objectives are to provide resources both to unions and policymakers on the transition to clean energy.

CJI highlights two campaigns that generate union jobs and address equity for under-resourced communities: carbon free and healthy schools and the development of offshore wind, both of which potentially can leverage federal funds for use in the states. In conjunction with unions, CJI develops appropriate state plans, helps organize the campaigns and the public advocacy

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<sup>52</sup> <https://rules.cityofnewyork.us/rule/procedures-for-reporting-on-and-complying-with-annual-greenhouse-gas-emissions/>

<sup>53</sup> The Laborers left the BGA over the Keystone Pipeline.

<sup>54</sup> Stevis, D. (2014). US labour unions and climate change: technological innovations and institutional influences. In *Climate innovation: Liberal capitalism and climate change* (pp. 164-187). London: Palgrave Macmillan UK.

<sup>55</sup> <https://www.cjnrc.org/about-us/>

needed to pass legislation. This is accomplished by building Climate Job coalitions in each state.

Starting with a labour coalition in New York to win renewable investment in wind, train members in climate change, and promote union jobs, the efforts have grown to include building coalitions for green projects in Connecticut, Illinois, Rhode Island, Texas, and Maine. Each state lists a formidable number and range of unions and community organizations that meet to build a consensus on goals and strategies. The partners differ from state to state, depending on relationships and histories of coalitions. The primary unions are various members of the building trades, but these vary too. For example, the Plumbers and Pipefitters are part of the New York group, but not Illinois; the Nurses are members in New York, but not in other states. Most of the coalitions work with their state AFL-CIO.

Climate literacy education is also being offered to locals beyond these state coalitions. Since 2020 the Climate Jobs Institute (CJI) is providing educational workshops to a number of unions in the building trades, in the education and the service sector, for communications workers, retail workers and hospital workers. The trainings are one-time sessions that touch on the science of climate change, examining feelings and attitudes, as well as impacts of climate change on people in their workplaces. Depending on what the unions want, the trainings may be about how public sector workers and building trades workers can act together to improve climate resiliency of their workplaces and communities, a focus on job creation and job skills in a particular trade, and a coordinated labour approach to accessing public funds to develop jobs, including providing and pooling information on local and state campaigns, such as the Carbon Free and Healthy Schools campaign. CJI is developing agendas in Connecticut, Illinois, Massachusetts, Washington, Wisconsin, Maryland, California and Pennsylvania.

Texas Climate Jobs is an example of a coalition operating in a “right to work” state, with a Republican Governor and State legislature that strikes down municipal initiatives that support strong labour standards like prevailing wage and registered apprenticeships. Texas has a higher concentration of renewable wind energy projects than most states, incentivized by tax credits in Obama’s administration.<sup>56</sup> These green jobs brought modest benefits to the area.<sup>57</sup> Texas Climate Jobs representatives report that while the IRA will bring many more green jobs to the Gulf Coast, but they will “continue the low-wage, unsafe, exploitative conditions that pervade the construction and offshore oil industries there.”<sup>58</sup> Given the restrictions on unions and PLA’s in Texas, unions have had to find alternatives to fight for good green jobs.

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<sup>56</sup> For more details on federal and state subsidies and a national and international comparison with Texas renewable growth, see: Mormann, F., Reicher, D., & Hanna, V. (2016). A tale of three markets: Comparing the Renewable energy experiences of California, Texas, and Germany. *Stan. Envtl. LJ*, 35, 55.

<sup>57</sup> De Silva, D. G., McComb, R. P., & Schiller, A. R. (2016). What blows in with the wind?. *Southern Economic Journal*, 82(3), 826-858.

<sup>58</sup> Pontecorvo, E. (Oct. 14, 2023) “Will offshore wind bring ‘good-paying, union jobs’? Texas workers aren’t so sure.,” *Grist*. <https://grist.org/energy/will-gulf-offshore-wind-bring-good-paying-union-jobs-texas-workers-arent-so-sure/>

The work that the Austin IBEW local did in alliance with their local teachers' union and with Texas Climate Jobs will be described in more depth in the findings.

This section has reviewed a wide range of federal, state, and local climate policies with some examples of action plans. The last few paragraphs show how research institutes can work with unions to learn about climate change and develop ways to build coalitions and leverage the funding that will bring positive change to their communities.

## **List of organizations interviewed**

### **Site Visits and Interviews conducted**

NABTU Apprenticeship Director  
MC3 Pre-apprenticeship national coordinator  
Training Center Director, IBEW National  
Solar Training Director IBEW Chicago, Illinois  
Executive Director, Illinois Climate Jobs  
Training Director International Heat and Insulation  
Organizing Director IUPAT National Office and Mass. Painters  
Director Rhode Island Federation of Trade Unions  
President. Rhode Island LIUNA  
Organizer, Oregon Labourers International Union National Association  
Training Director, International Sheetmetal Workers  
Training Director, International Operating Engineers  
Training Director Urban Green Council  
California Division of Apprenticeship Standards consultant  
President, Chicago United Association of Plumbers and Pipefitters  
National Training Directors, United Association of Plumbers and Pipefitters  
Vice President, IBEW 520, Austin,  
Board Member, Texas and Climate Jobs Texas  
Trainer, Climate Jobs Institute, Cornell University, New York  
Trainer, pre-apprenticeship  
On-site-3 day Clean Energy- train the trainer workshops, contractor and elected officials workshop

## **Structure and educational approaches of VET Stakeholders in the US Construction Industry**

It is useful to briefly lay out the structure of VET in the US to contextualize how curriculum is developed and deployed. In many ways the organization of the US Building Trades

apprenticeship has strong similarities to those in English Canada.<sup>59</sup> Registered apprenticeships in the construction industry are characterized either as jointly run by unions and employers or employer run and generally less formal and shorter in duration. As in Canada, apprenticeship completion rates tend to be higher among unionized apprentices (Glover and Bilingsoy 2005). Many unionized trades dispatch apprentices to jobs to alleviate the burden of hunting for work as well as providing contractors certified apprentices. This support for employment and concern that apprentices become experienced in many aspects of the trade, as well as the regular increases in pay make union apprenticeship a stronger career path than working non-union. Training is organized by trade or affiliated occupations with union apprenticeships generally requiring 3-5 years of 80 percent of on-the-job training with 20 percent classroom and workshop hours.<sup>60</sup> Apprentices are expected to have enough experience by the end of their program to mentor an apprentice, to work independently, and possibly become foreperson on the job.

As in English Canada, the programs that are jointly run by unions and employers fund training with contributions based on negotiated clauses in collective agreements for which journey-level members and employers both pay a portion. In practice, this gives unions the ability to operate their own facilities and play a strong role in curricular development. While in some states, joint apprenticeships work together with community colleges and trades classes may be given credit towards matriculation, such cooperation and accreditation are not widespread. In some states, unions have also successfully pushed legislation to require that trades workers pass a state licensing test and then periodically take a continuing education course. In many unions, upgrades and certifying courses are also offered, providing two possible entry points for a climate literacy class for those who have already journeyed out.

While some trades have congenial relationships, jurisdictional disputes are common and are adjudicated under the Green Book. As in Canada, the siloed training and in many cases competition over whose work is whose leads to a difficulty in communication among trades workers, an important element in achieving high building performance. It also interferes with a cross-trades response to legislation that might benefit all of them.

The structure of apprenticeship training in the US is decentralized, complicating any strategy for waging a national climate campaign. Union apprenticeships are either overseen by the Department of Labour (DOL) through the Office of Apprenticeship who supervises apprenticeships in half the states and the other half are run by State Apprenticeship Agencies (as in California); some are governed by a combination of state and federal regulation.<sup>61</sup>

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<sup>59</sup> The Canadian Building Trades Unions is officially the office of its counterpart in the US, the North American Building Trades Unions.

<sup>60</sup> Apprentices take evening classes or have blocks of their time set aside for classroom training. Apprentice wages start at approximately 50 percent of journey level wages and are elevated regularly until they complete their studies and work hours.

<sup>61</sup> For example, an apprenticeship program in the State of CA can be Federally approved, state-approved, or dual-approved. In each case, there are committees who routinely review apprenticeship standards and if they were inclined, may be able to integrate climate literacy into the standards This is a thought shared with me by a

The primary role of the North American Building Trades Unions (NABTU) is to work with the local unions in the 14 trades who are their affiliates in the US and Canada along with state and local building trades councils. NABTU's focus is to support and promote their apprenticeships and pre-apprenticeships and partner with stakeholders to diversify the trades and protect labour conditions.<sup>62</sup> They organize the Apprenticeship Readiness Program using a curriculum called Multi-Core Curriculum begun in 2007 to address the need to replace retiring tradespeople “and to make the trades look more like the communities they serve.”<sup>63</sup> It requires 120 hours of instruction. NABTU maintains an extensive portfolio of course material that include a basic core set of classes as well as many others such as the highly respected G-PRO Climate Change Fundamentals developed by the Urban Green Council, courses NABTU develops or has donated to them by various locals that include detailed training in wind turbine and solar installation, as well as labour history, anti-racist, sexual harassment and anti-homophobia training. It is up to the local Building Trades Council and their educational partners like high schools, colleges, transitional programs for the formerly incarcerated, women's programs, to determine what training to offer. The culture of the mechanical trades—electrical, Operating Engineers, Plumbers and Pipefitters—is vastly different from the culture of trades that are more diverse in their membership, like the Labourers and Allied Trades and they tend to have much deeper roots in communities of color.

While in many respects similar to Canada, the construction VET system in the US has structural particularities that affect how it addresses climate change (Belman and Ormiston, 2021). There is, for example, far less government funding of apprenticeship, placing more responsibility on individual workers, their unions and employers to train the workforce. Further, there is no form of national testing and certification like the Red Seal. This magnifies the challenge of introducing of a broad-based integration of subject matter such as climate literacy across the country. Most trades have centralized curriculum development such as the electricians, the plumbers and pipefitters and the sheetmetal unions. Just as NABTU does with pre-apprenticeships, these centers provide core curriculum and modules that locals around the country can request depending on their regional economies, their capacity, and their preferences for developing new areas of work.

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civil servant working in a state apprenticeship agency. For more data and information on apprenticeships governance in the US, see <https://www.dol.gov/agencies/eta/apprenticeship/about/statistics/2020>

<sup>62</sup> NABTU endorsed the CBTU study, Building It Green, and helped facilitate interviews with training directors among its members that is the basis of research for this article.

<sup>63</sup> “The goals of the Building Trades ARPs are to (1) increase the number of qualified candidates for apprenticeship across all crafts, (2) to increase the diversity of apprenticeship candidates by recruiting women, people of color and veterans, and (3) to increase the retention rate among apprentices by providing them with a deeper understanding of both the industry and the role of craft unions in construction.” <https://nabtu.org/wp-content/uploads/2017/03/Why-We-Should-Adopt-the-MC3-in-Our-School-2-22-17.pdf> NABTU commissioned a report on diversity, inclusion and equity in the construction trades, both union and non-union programs, which was conducted by the Institute of Construction Employment Research [https://tradeswomentaskforce.org/system/files/iceres\\_study\\_diversity\\_equity\\_and\\_inclusion\\_initiatives\\_in\\_the\\_construction\\_trades.pdf](https://tradeswomentaskforce.org/system/files/iceres_study_diversity_equity_and_inclusion_initiatives_in_the_construction_trades.pdf)



## Findings from the interviews and field visits

Green construction as a term is gaining currency, but its meaning and purpose is often not clear.. Union apprenticeships routinely incorporate energy efficiency skills into their curricula, as cost savings and efficiency are important to the contractors, clients and government regulations, but efficiency's relationship to reducing carbon and addressing climate change is not explicitly made. There are many examples of building trades' efforts to prepare their members to learn methods of saving energy, water and controlling air flow. There is little discussion of why these and other efforts are needed not only to save costs, but to contribute to building a society in balance with nature. Many training directors, depending on the local economy, have members and work with contractors who rely on fossil fuel employment, and want to avoid references to the causes of climate change. Yet climate literacy and green construction are not just a set of skills but entails understanding the why as well as the how-to in order to make a more cohesive and successful transition. Despite many outstanding examples of vocational education that contribute to reducing emissions, how green construction is viewed is riddled with disconnection from the broader context of climate change, politicization of the subject that impedes focus, and an inconsistency of practice across the states. Furthermore, the concept of how the built environment contributes to building a healthy and equitable society is even more elusive in the vocational education and training arena.

Public opinion is swaying in favor of addressing climate change. Government and the market are passing legislation to reduce greenhouse gasses and have identified the built environment as a major source of emissions. Building trades unions are actively involved in shaping policy and form relationships with employers, other unions and community organizations to push for legislation that favors union jobs in the green economy. Therefore more ambitious green construction education is also emerging.

The interviews provide nuanced insights into the challenges and opportunities trainers, training directors, labour leaders and organizers are having as they integrate climate literacy of various sorts into their vocational education.

The following analysis sets out the general findings culled from interviews from all the individuals and organizations that provide a snapshot of views and practices around climate literacy and green vocational educational practices in the US.

There are six themes that emerge from the interviews.

- 1) Develop in-house vocational education and training initiatives relevant to climate change**

- 1) **Work with Third Party organizations to develop climate literacy curriculum and training.**
- 2) **Encourage Contractor interest in green jobs**
- 3) **Build political power for green jobs**
- 4) **Connect education and training for green construction to a larger vision of a healthy and equitable society.**
- 5) **The impact of government policies on climate literacy efforts since the passage of the Inflation Reduction Act (based on follow-up interviews)**

## 1) Develop in-house vocational education and training initiatives

Interviewees stressed the importance of pre-apprenticeships to bring in the next generation of building trades workers as the workforce ages, but also specifically to prepare new workers for green construction and to recruit a more diverse workforce. Typically, these are 8–16-week courses, but they are flexible based on the interests and schedule of the local offering facilities.

Nationally, NABTU developed what they call the Multi-Core curriculum (MC3) with a range of material that includes green training from many trades as well as from the Urban Green Council (GPRO) that looks at climate science but doesn't track what is presented to participants.<sup>64</sup>

Many unions have their own pre-apprenticeships that touch on green technology, but some pre-apprenticeships bring all the trades together around this theme. For example, in New York, the Carbon Free and Healthy Schools Apprenticeship Program is part of the campaign to incorporate low carbon training in the trades that receives federal funding initiatives for schools. Another New York City pre-apprenticeship, Nontraditional Employment for Women, partners with the state energy and research development agency, NYSERDA, to include sustainability and green technology into their programs. These are just a few of the many pre-apprenticeships around the country introducing new workers to the trades and to green construction.

**In terms of curriculum in the apprenticeship, there have not been many references to climate change, but that is changing.** The emphasis on making buildings more energy efficient has been part of the vocational curriculum for decades. Several trades shared their trades textbooks that reflect this perspective. In the last few years, one director noted, energy efficiency training is accompanied by more focus on digitization and automation. “We are not doing anything that much different,” he went on to say. However, the cost savings of low energy lighting and energy applications, insulation, water, and air circulation, has begun to be connected to doing green, low carbon construction. Now with the development of policies favoring utility scale solar, EV charging, even house electrification, several trades are including climate change in the training language and showing pride in leading the way.

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<sup>64</sup> For more detail see footnote 58.

**Trainers providing various kinds of climate literacy need content preparation** as well as an approach that encourages students to see the positive contribution green skills can make regardless of political views. Some interviewees noted that climate change is a controversial and sometimes contentious issue and trainers need to be prepared to address that.

For example, one trainer noted that as “the discussion of climate change comes up in the classroom and just general conversation we try not to let that get in the way of the material. because everybody has their feelings on climate change. Some people are behind it, some people say it’s all a hoax. just a way for people to make money and we try to leave that emotion out of it and just try to focus as much as we can, on industry trends.”

Another trainer offered their perspective. “I personally like to teach in a narrative manner. I just I don’t want to talk down to everyone, I want it to be a conversation right, I want, I want to hear their thoughts, so we do try to bring that [climate] perspective into it.”

A labour leader suggested that appealing to the expansion of jobs was his practical way of encouraging members to embrace climate literacy, and beyond members, foster climate education in the schools. “For me climate literacy means jobs. It means that the earlier we get in and educate the youth, for example, about what their environment looks like about what’s affecting them in their environment, about what steps they can take to be effective in addressing the negative impacts in their environment, I think the better, to mitigate opposition.”

A consultant to the Building Trades and to the industry stressed the value of identifying teachers who have enthusiasm for climate jobs, and who can speak to the younger generation and connect the content of a new green economy with the trades. The consultant argued that some schools are excellent at integrating green vocational education into their programs which take advantage of a growing interest in climate issues. “The younger folks are definitely more interested than the older than the older folks. New York City has a robust current technical education program, like 52 schools or something. 26 of them are devoted to architecture and engineering. So they invited me to the electrical lab [at Queens vocational school] and I expected to walk in there and be like well and in green building we do this, and we do, and I was just like holy shit like I have nothing to say. I was trying to explain how you are so lucky to have this teacher.. this is so amazing the stuff that you’re doing is like the far end of this of a sustainable, you know job site, you know, this is not normal. This is great, and when you guys go to job sites you’re going to feel good about talking about the stuff that you saw the stuff that you learned.”

Another interviewee emphasized that training centers should offer green skill courses. The news is carrying more information on “the renewable energy industry, energy efficiency industries, the electric vehicle industries and all these things are great drivers to get [people interested]. We need to make sure that our training centers are all addressing this in the

building trades. You know people hear about the advancements that are happening and they see a commercial for the F 150 lightning and think oh that's pretty cool. Well, someone has to install that charging station right to make it happen so people get excited about this stuff and our apprentices coming in, they expect to learn it."

**Training centers are emerging that model sustainable systems of energy or water and air advertise themselves as net zero or clean energy sites.** Some centers present their sites as purely technical while others go further to demonstrate how energy and other elements can be organized in a circular economy that limits waste.

The Chicago Plumbers and Pipefitters Union is among the joint labor management training centers that have a model demonstration and teaching hub for green systems. Their center integrates rainwater and greywater harvesting that filters water and recirculates it (non-potable), safe black water disposal, a green rooftop water system, and a solar vacuum tube heating system. "This facility is crucial to our future buildings and city infrastructure. Pride in its people, its place, and its processes is at the core of the union's culture," their website states. The national director said, "LU 130 in Chicago is a hands-on training facility for all UA members. LU 130 apprentices learn on all the water systems, and the UA offers regional classes for all locals hosted by LU 130." They also have a state-of-the-art mobile trailer which is stationed at their facility but can move around the region offering plumbers and HVAC technicians at smaller centers hands-on green skill training on Heat Pump Water Heaters and Heat Pump Comfort Systems.

Some centers hold job fairs where schools bring their youth to experience hands-on what an electrician or a plumber does. From observation, having a forward-looking center with current technology is attractive to the public, potential recruits, especially when people can interact with diverse tradespeople who are trained in doing outreach. Classes at Local 130 were relatively diverse with women and men of color among the apprentices. Their center was also a space where they invited public officials and contractors to participate in a clean energy summit, described further below.

Other examples of model green training facilities are the Net Zero IBEW Training Facilities in Dublin and Los Angeles CA., and the Sheetmetal Training Institute in St. Louis. They are noteworthy for having invested in advanced green technology systems that offer students access to visionary renewable and sustainable practices and training.

**Trainers in several trades pointed to explicit connections between the use of certain construction materials, practices, and efforts to reduce global warming** that have become central to their craft.

The Sheetmetal Training Program offers an outstanding example. Their curriculum developer explained that when the use of ozone depleting refrigerants was abandoned, they learned that the new gas had a high global warming potential. Shifting again to a different gas that has a lower global warming risk, they saw that the substance is mildly flammable and requires

extra training and certification. She noted, “we also have a book published internally for our purposes that’s a green Leed construction for the sheet metal industry.” It covers energy in high performance schools, and for buildings that operate round the clock like the health care industry. Some of the training is designed for states with high net zero goals, like California, where Sheetmetal workers do a kind of commissioning process.<sup>65</sup>

Certainly, the Electricians point to minimizing climate change by their solar and wind and EV charging installations, the UA references heat pumps and geothermal systems, the Ironworkers direct attention to wind turbines, and so on.

Many training directors also discussed their coordination with manufacturers, distributors and in-house experts on the use and installation of low carbon materials and equipment. Depending on the situation, industry may come with some plans or go to the training center to ask for help to design curriculum so that their products can perform well.

## **2) Work with Third Party groups to develop climate literacy curriculum and training**

The most repeatedly discussed example of third-party and building trades climate literacy collaboration is the curriculum produced by the Urban Green Council in New York. According to Urban Green, it was by bringing many stakeholders-- architects, scientists, project managers and trades-- together that they were able to develop a foundational course that is useful for reaching a general construction audience. It is noteworthy that there is a distinct section on the human causes of climate change, the major role of the built environment in contributing to the release of greenhouse gases. This section also describes the disproportionate impact of pollution and toxic emissions from fossil fuel sources on fenceline communities, an environmental justice perspective. Each of these are areas that union trainers felt were sensitive topics. In the words of one trainer before starting to deliver the module, “We are not planning to throw our brothers in fossil fuel jobs under the bus.” I attended a national UA train the trainer session where this material was delivered, and the participants were all tested to see if they were then certified to teach the modules if it were requested by their local centers.

Aside from the foundational course, a number of labour management training centers developed G-Pro units with Urban Green specifically for their trades; these include the Insulators, the Electricians and the Plumbers and Pipefitters. These modules are made available to local unions around the country but are not required.

Another third-party organization has emerged in the last few years. The School of Industrial Labor Relations at Cornell University formalized the establishment of the Climate Jobs Institute (formerly known as Labor Leading the Climate). In addition to conducting research

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<sup>65</sup> The United Association (plumbers and pipefitters) overlap with the Sheetmetal trades in their focus on water and air circulation.

and advocacy, the CLI conducts workshops with many of the trades and allied unions on how climate change is opening up new job opportunities. In part, these workshops are efforts to promote climate literacy as well as encourage Building Trades union members to participate in mobilizing support to develop those jobs for union labour.

### **3) Encouraging Contractor interest in green jobs and working with manufacturers on green tools and materials**

Several trades expressed frustration that the contractors they work are reluctant to bid on green construction projects. The International Association of Heat and Frost Insulators and Allied Workers (HFIAW or *Insulators*) explained that they have taken steps such as using energy audits to win work for contractors to use MIT insulation in schools. One trainer stated, “we’re firm believers that by insulating mechanical systems properly you’re saving on the environment. You’re saving on the life expectancy of the equipment; you’re cutting pollution and lowering carbon emissions. So that’s where we’ve been pushing. It’s more been political I would say, trying to get tax incentives for contractors. We need to bring together the science behind insulating and that it’s saving energy.” The trainer noted that the connection with climate change, at least at the time of this interview, had not been raised. “We will tell them, you know how it reduces pollutions in the atmosphere, but I’ve never actually got into the climate change and how pollution effects climate. The problem with installation is it’s not glamorous right everybody wants something shiny and new they can look at us or fan or a windmill.”

The UA is particularly assertive in exhorting their union contractors to seize the opportunities to bid on contracts and employ their members to install. They brought together legislators, contractors and union members to hear testimonials about the significance of geothermal and heat pump technology to meet federal policy goals. They went to this extent because they saw that contractors are often unwilling to bid on green construction, delaying local unions from offering the G-Pro modules. The UA national training director described the lack of interest among contractors and its impact on training, and why they put on their national Clean Energy event. “We have 278 locals and not one local sent one instructor to a training, because the contractors don’t think they need [GPRO]. So this, the clean energy and infrastructure are going to put some, pun intended, energy back into [people taking] this course.”

### **4) Build political power for green jobs**

**The Building Trades work with the federal and state government to develop climate and low carbon guidelines that will incentivize contractors and others to take up the work and hire union labour.**

The Building Trades maintain lobbyists in state and federal arenas to learn about legislation and to shape it. Many training directors and labour leaders from across the trades discussed

their interest in working alongside legislators to institute climate policies that would galvanize green construction. The UA training director expressed the need to be more like the Canadian industry: “They are probably a little more aggressive up there that we are because of the federal guidelines that they have. That we don’t do a lot of our everything we’re doing is voluntary, through us G-Pro or some other outreach but in Canada there they offer a little more oversight at the federal level that that helps them implement and get participation.

The IBEW is also concerned about legislation. “if we see something coming down the line, just like we are with all these decarbonisation efforts, then, then, again we, we need to get it. We can’t just wait and let it pass us by let somebody else get it, so you know and that’s why we pay attention to industry trends and and also what happens, you know. on the government side because a lot of times you know and in even in electrical world, a lot of times what drives our decisions it comes from a government decision.” Similarly, Sheetmetal, the Allied Trades, and Laborers all expressed the importance of being ahead of the legislation that would affect their work.

**The Building Trades regularly work in coalition** with other organizations, trades, unions and communities to advocate for legislation they see as favorable to their members. NABTU formed a partnership with industry over a decade ago called the Oil and National Gas Labor Management Committee that was also joined by many individual affiliates to advocate for pipeline and other fossil fuel related initiatives and legislation.<sup>66</sup> This committee routinely advocates against legislation that puts restrictions on fossil fuel. An example is California SB 1137, a bill passed by the legislature in 2022 which called for a 3200 foot restriction between new oil drilling and sensitive receptors like schools and residences, as well as leak detection on existing wells.<sup>67</sup> California Independent Petroleum Association (CIPA)<sup>68</sup> led the Stop the Energy Shutdown Campaign to launch a referendum repealing SB 1137, called the California Oil and Gas Well Regulations Referendum. SB 1137, according to CIPA’s webpage, “is a political war on California’s energy workers and producers, costing Californians quality of life and jobs with skyrocketing gas prices.” As the Ballotopedia page documents, the California Building Trades support the industry referendum.

The Building Trades do not refrain from joining coalitions to pass climate legislation that support prevailing wage jobs. A coalition with prominent building trades’ support came together for the Climate Equitable Jobs Act (CEJA) in Illinois. According to the director of the Illinois of the Clean Jobs Coalition, BT unions, Teacher unions, environmentalists, and community organizations agreed on a range of programs including prevailing wages, an array of green projects, VET training for impacted communities as well as a displaced workers bill of rights. CEJA required a great deal of negotiation, debate, compromise. It appears, for example, that ratepayers will bear at least some of the cost, that nuclear sites will count towards zero carbon, as well as a transition of fossil fuel fired electric power plants to

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<sup>66</sup> Oil & Gas Labor Management Committee website at <https://ongil-mc.org/about/>

<sup>67</sup> California Legislative Information, SB 1137  
[https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill\\_id=202120220SB1137](https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202120220SB1137)

<sup>68</sup> CIPA’s website <https://www.cipa.org/i4a/pages/index.cfm?pageid=1048>

renewables.<sup>69</sup> The Clean Jobs Coalition did not encompass all of the Building Trades, notably, the UA was not among the supporters while the IBEW was among the coalition partners.

The Climate Jobs Institute assists the development of similar coalitions in Maine, Rhode Island, MA., New York and Texas. The Rhode Island coalition has been spearheaded by the state's AFL-CIO as have several of the others. The present director of the RI AFL-CIO described a long history building alliances between Building Trades, Transport Unions, the Teachers Union and Environmental Groups in order to create momentum for a raft of legislation around climate change.

But the problem of phasing out fossil fuel jobs remains a problem. A RI Building Trades and LIUNA leader noted that they are not climate deniers, that New England is clearly experiencing sea level rise. He offered this insight into the problems they see in a green transition and why they are part of their green coalition. "For my organization labor's international as well as the UA plumbers and pipefitters half of our manhours are in energy, pipeline and distribution and that type of old energy system that we have. Taking people that are employed today and put them on a green job tomorrow [is uncertain], as you can have big gaps waiting for these green jobs to be cited. And waiting for long periods of time when we're when we're stopping traditional projects, we still need backup capacity." He went on to say that they know that renewables are the wave of the future, that the environmentalists want things done right away. He ended by stating that they need to be part of the coalitions to represent member needs.

Texas Climate Jobs demonstrates how the Building Trades can work with partners in anti-union states not only to expand labour rights and jobs, but also to build bridges with immigrant workers, of critical importance to strengthening the labour movement.

In 2019 the Austin Labor Council and the Texas Labor Council passed two resolutions advocating for something "like" a green new deal. An IBEW officer explained, "Fossil fuel jobs are already going away. We're seeing this in Texas right now; my union here had tons of oil field workers coming through my local looking for career changes because they know that these jobs aren't coming back." Since the green sector doesn't have the labour standards in fossil fuel, the vision is to push for labour legislation. "If we pass this up, and let the market dictate how things are going to be, then we're going to get screwed," he added. Texas Climate Jobs was launched in 2021 by the AFL-CIO. They work with the National Climate Jobs Task Force but also have state and locally based campaigns. Working in an anti-union state, they have to be extremely creative in developing strategy.

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<sup>69</sup> The Citizen's Utility Board's brief analysis and endorsement of the CEJA can be found here: <https://www.citizensutilityboard.org/climate-and-equitable-jobs-act/> There were many news reports. A doctoral dissertation which sheds some light on the evolution of CEJA is Lesser, T. (2023). *Solar Strategies* (Doctoral dissertation, The University of Chicago).



In 2022 in Austin, where city government is most union friendly, the IBEW local launched the Carbon Free and Healthy Schools Campaign with the Teachers union to pass a \$2.44 billion bond issue to improve energy, plumbing HVAC and other facilities' needs, with energy savings going to the teachers. IBEW members mobilized in a citywide campaign and the voters agreed to the bond issue.

Another coalition that Texas Climate Jobs and the Austin IBEW partnered with is the Workers Defense Project on campaigns to improve labour standards, an important way to strengthen the union sector and build bridges with immigrant workers. The Workers Defense Project was founded early 2010' to defend immigrant workers' rights. In Austin, they are allies on the union fight to make sure the school district upholds Davis Bacon. The WFP organized a campaign that reinforces workers' rights, the Better Builder Program,<sup>70</sup> which calls for living wages, OSHA safety training, worker's compensation coverage, local hiring goals and independent third-party monitoring.

The Austin IBEW officer expounded on the partnership with the Workers Defense Project. "I work closely with them. They work with largely undocumented workers. They're a great organization who've produced many state leaders. Together we got the wage theft ordinance passed, working on it for years—now bad contractors found guilty of wage theft will be put on public list and not awarded any city contracts. We are bracing ourselves for the state legislature to come in to stop it... they try to stop everything."

Texas Climate Jobs is now (2023) working on initiatives to bring offshore wind turbine construction and manufacturing under federal prevailing wage standards, with a campaign centered in Houston where the economy is centered on the fossil fuel industry.

## **5) Connect education and training for green construction to a larger vision of a healthy and equitable society**

An IBEW solar training director from Illinois offered a perspective unique among all the interviews conducted as his concerns were not only about green jobs, but about the purpose and social impact of energy transition.

His first point was that the training is not just about doing a job, but about actively dealing with the destructive impact of the fossil fuel economy and thinking ahead of the generations to come. "We need to make sure that we're not just training, because this is a job that they could be doing amongst all the other tasks they could be out there, doing a lot of things. We do need to make sure that we bring it back to why we're making this energy transition. and understand that there is severe impact to how we've been doing things for these decades upon decades we're feeling those consequences now. Our time is running short of when we can really make change to avoid some of these disasters that are coming, so we need to make sure

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<sup>70</sup> Better Builder Program <https://www.betterbuildertx.org/en/>

that the climate is part of the dialogue. We're encouraging solar, not just because we want to put our members to work...but because we want to make people's lives more resilient, we want to make sure that we, the environment is there for future generations. It's going back to you know earlier cultures on this land about looking seven generations out with all your decisions. We haven't done that, for a very long time. We've had a very immediate act and respond; we don't we don't think long term and about the consequences, and I think we need to get back to that mindset."

He also argues that the shift to renewable energy should not be uncritical. He described the approach of the one-year Renewable Energy Technology certificate and associate's degree program he oversees through the IBEW at Triton Community College in River Grove, Illinois. The program encourages students' understanding of the benefits of union membership no matter how they continue their career, along with the subject matter training in renewable energy. "In some programs, even renewable energy is examined for its negative impacts. We study not only just the technology and the energy it's going to produce, but what is the embedded energy of this technology, the components that we're installing and the supply chain they're part of. There are consequences of harvesting raw materials and the labour practices around them."

Finishing this section with a long view of climate literacy, one that focuses not only on maintaining employment of union workers and supporting high labour standards, but also thinks critically of the purpose and impact of energy systems is a fitting way to conclude an analysis of the ideas and activities described by trainers and labour leaders throughout the Building Trades in the United States.

## **Conclusion**

The United States is undergoing a green shift that has been a long time coming. The last few years has seen the most sweeping federal legislation ever passed in the US to finance and incentivize the development of green jobs to fight climate change. There is still an uphill battle in making sure that the jobs and projects that come out of this legislation have good labor standards, especially in the face of union decline. Creating a more inclusive and diverse union workforce and advocating for building healthy communities for all is critical to winning public opinion and approval of labour unions as a force for positive change. Most recent legislation rewards developers with tax credits for promoting high labour standards as well as for incorporating equity and the needs of disadvantaged communities. Many state level laws are the result of labour unions, including the building trades, entering into coalitions to pass legislation that has good green jobs and equity at their core. But these are still recent legislation that have to be tested and implemented.

Building Trade Unions have faced many challenges, including strong anti-union forces and

contractors who choose low road labour practices that have taken advantage of immigrant groups who are trying to get a foothold in the United States. Embracing climate literacy and becoming better educated about the ways to expand apprenticeships through working with other unions and community groups may be advantageous for the Building Trades to renew union strength.

There are vast differences among the trades and across the country around how to adapt vocational education to address shifting to a low carbon, low-energy economy. There are several outstanding new efforts to incorporate climate literacy of various kinds into building trades vocational education training.

As incentives and policies shift, several trades have developed green construction modules for instruction,<sup>71</sup> produced pre-apprenticeship and apprenticeship courses to work on renewable energy or understand procedures required due to regulations curbing high GHG emissions. Several large locals in major cities have remodeled their training facilities to train apprentices in green technology; several are actively organizing to leverage policies to promote employment in clean energy and low emission retrofits. A few trades integrate green building methods throughout their training, as opposed to the modular approach. As noted above, some trades are working with organizations like the Climate Jobs Institute to introduce and engage their members in understanding how climate change will affect their jobs, and to motivate them to be active participants in policymaking that will improve the chances of Building Trades union members getting work in wind and green school retrofits, among other projects designed to adapt to climate change. If the work expands, climate education may expand too. If work expands, apprenticeships may grow and increase union density. This reinforces the theme that promoting climate literacy can be a tool for union renewal.

Based on the research conducted in the US, only a few regions and trades explicitly incorporate climate literacy. Overall, the curricula do not explain the “why” of green construction, namely the science of climate change and how the trades can mitigate emissions. There is a fear of criticizing fossil fuel facilities where many members work, as well as a hope that embracing unproven technologies like carbon capture will be able to prolong the life of these jobs. There is an absence of discussion around how more explicit collaboration among the trades, between the trades and all other participants within the building project can improve what is known as the performance gap. A stronger approach to climate literacy would also integrate an understanding that building respect for all members of the crew, and valuing diversity within crews, needs to be part of the curriculum.

Finally, the notion of equity is a key part of climate literacy not only for workplace inclusion and retention, but also for motivating building trades workers to see their contribution to establishing healthier and thriving communities who will in turn support good labour terms

and conditions. There are individual programs and initiatives that do take up many of these points, and it is important to see what they are doing differently and understand the challenges. Even in arenas hostile to unions such as Texas, the coalitions that the Building Trades are forging are making a difference in passing legislation and funding that can promote the expansion of labour rights, support projects like green schools that have wide popular support, and partner with immigrant groups for mutual advantage.