

**Advancing Climate Literacy in  
Union Vocational Education and Training Programs in English Canada,  
Quebec, Europe and the US: Analysis, Findings and Lessons Learned**

**Appendix 1: Key Research Insights  
On Climate Literacy in the Trades**

## **The State of Climate Literacy in English Canada, Europe, the U.S., and Quebec: Analysis, Findings and Lessons Learned**

*Interest in promoting climate literacy has arisen in response to climate-induced changes that are having a major adverse impact on today's economy and society. The growing body of scientific evidence concerning the effects of climate change is driving change to the construction industry and its vocational education and training (VET) programs. To address the climate crisis, advancing workforce climate literacy will be a necessary part of efforts by industry, unions, communities, and government to lower Canada's climate footprint.*

The Climate and Industry Research Team (CIRT) is a group of academic researchers from English Canada, Quebec, Europe and the US. They were asked by Canada's Building Trades Unions (CBTU) to provide research to inform the development of a Canadian curriculum on climate literacy that union vocational education and training (VET) programs could include in the training they provide to apprentices, instructors and working journeypersons. The research could also contribute to the content of the Red Seal Standards by providing information on the impact of climate change on the building industry and its workforce.

CIRT examined VET programs in Europe, the United States, English Canada and Quebec to identify ways in which these programs address climate change and to review the actual content of the curriculum they use. It found many positive examples of material explaining the impact of climate change on society, particularly in Europe. Some of this course content also discussed, in considerable detail, how different trades can contribute to reducing energy consumption and greenhouse gas (GHG) emissions in buildings. CIRT found good examples of climate literacy modules currently being used in trades' training facilities and in programs for qualified journey workers.

The research indicated that successful net zero construction requires much higher standards of performance than conventional construction. Buildings and infrastructure must achieve strict requirements for GHG emissions and energy use to achieve climate objectives. Rigorous quality measurements, including comprehensive energy and environmental auditing, are needed to ensure that what is built meets design specifications. Achieving climate objectives requires precise and careful attention to all aspects of construction work. High quality is essential.

However, to achieve this quality, the industry requires a workforce with the knowledge, skills and competencies to deliver high performance construction outcomes. Work must be performed precisely to meet increasingly stringent net zero design and specification criteria. A climate literate trades workforce requires the ability to solve problems as they arise at the work site. Every construction project is different and presents unique challenges in fulfilling design

specifications. This requires understanding the basics of building science and the theoretical principles that underlie the performance of the skills of a trade.

Acquiring a skill to carry out a particular building task is different from understanding the principles underlying the application of the skill. Knowing the principles makes it possible to deal with a variety of different on-site problems and to adopt innovative technologies and working practices because the theoretical knowledge provides the basis for solving new problems. It also means that workers have the capacity to make independent judgements about the appropriate standards and quality of work – and to act accordingly. Consequently, the direction the training system should follow is to upgrade the knowledge, skills and competencies of construction workers and avoid the temptation to focus on training programs that provide only narrow skills based largely on performing task specific assignments rather than providing apprentices and trainees with a variety of different kinds of work.

A key component of this knowledge is systems thinking, that is understanding buildings as integrated systems in which every component must be properly constructed to achieve climate objectives. This is the opposite of seeing building projects as simply a collection of contract silos. High performance construction also needs workers to know more about the work of other trades and occupations on building sites as well as having the ability to work, collaboratively, in teams that share responsibility for project outcomes. Increasingly, teamwork is a key component of high-performance construction practice.

A climate literate workforce understands the climate and environmental impacts of its work and the positive contribution this can make in advancing net zero outcomes when done properly. High performance construction cannot be delivered by a workforce that lacks the relevant training, is unaware why the industry now needs – as a matter of urgency – to achieve ambitious climate goals and has little scope, or commitment, to achieving quality outcomes. Incorporating a stronger focus on climate science in the curriculum of Canada’s VET programs can provide workers with the reasons for the needed changes to industry practice, as well as the resulting societal benefits when they implement these changes. Knowing that what you are doing is contributing to society’s efforts to deal with climate change can provide additional meaning in work. Being aware that high quality construction provides buildings that are safer, healthier, more environmentally friendly, comfortable and that contribute positively to the lives of those who live or work in them can be a source of job satisfaction. Knowing the ‘why’ is important.

A key finding in all jurisdictions is that public policy is behind the push towards net zero. And public policy is based on climate science. Governments, both internationally and in Canada, have recognized the threat that global warming poses to humanity and have implemented a wide range of targets and measures to mitigate further releases of GHG emissions into the atmosphere, while adapting the built environment to reduce its damaging effects. Canada, like other countries has

committed to specific emission reduction targets based on the 2015 Paris climate accord. The current target is a 40% to 45% reduction in emissions by 2030 and net zero by 2050. To achieve these targets, governments have used a variety of policy tools to push the industry towards lowering GHG emissions and reducing energy use. Principal among these are tougher building and energy codes. However, governments are also using other tools such as subsidies, tax incentives, public procurement requirements and public education campaigns.

However, the measures governments and industry have implemented to date have fallen far short of what will be needed to achieve the targets governments have identified. The pace of change has not reflected the urgency of the climate crisis and there are still major gaps in the regulatory framework. Revisions to building and energy codes are proceeding too slowly. The energy performance of buildings is still not adequately measured. Far too many new buildings do not achieve measurable reductions in GHG emissions and energy use which are feasible and affordable with current technologies. The pace of retrofits is alarmingly slow.

To achieve a climate literate workforce all construction workers need access to VET. However, the proportion of the workforce that currently has access to it is quite limited. Too many workers never receive any formal classroom instruction. The apprenticeship and training system currently does not have the capacity, or resources, to address this problem adequately. This is exacerbated by the failure of governments to address the large ‘underground’ economy which some researchers believe constitutes up to twenty per cent of the construction workforce. In this sector access to training is almost non-existent. These features of Canada’s construction industry undermine its capacity to promote a climate literate workforce.

The prevailing economic model of the industry also works against developing the kind of workforce needed for effective net zero construction. Excessive reliance on low bid competition pushes quality downwards, while extensive sub-contracting and self-employment are counter-productive to systems thinking and understanding building projects as integrated wholes. These industry practices also impede achieving the collaborative, team-based working practices needed for successful low carbon construction. Gaps in the regulatory requirements and inadequately resourced building inspection systems exacerbate these problems.

CIRT found that Canada’s apprenticeship programs provide workers with the technical skills required to implement net zero construction. This is a fundamental strength of the system. VET programs based on Canada’s Red Seal Standards enable apprentices to learn the knowledge, skills and competencies of their trades through the classroom curriculum and on-site work experience. This normally results in a well-qualified, technically skilled workforce and provides a solid foundation for the development of climate literacy. However, current programs say little about climate change – in some cases, nothing at all - in their curricula. Nor do they discuss how the construction industry and its workforce can contribute to reducing Canada’s climate

footprint. The apprenticeship system is teaching workers “how” to do high performance construction properly. But it is not providing the “why”- that is why addressing climate change in the construction industry is now so important for our society.

The research team found good examples of climate curriculum in several union programs. One used U.S. Green Building Council’s GPRO ‘green’ training modules for its instructors, apprentices and working trades. Another had developed climate modules that explained the different sources of energy, discussed why the climate is heating up and noted how the resulting changes are affecting the work of the trade. A third had developed an extensive pre-apprenticeship course on climate change. Internationally, the best examples in the English language were found in the very detailed instruction manuals of the Irish trades training system.

CIRT’s European research noted a broad consensus within the European Union (EU) that ambitious climate targets are essential to pushing the industry to reduce its climate and energy footprints. This is reflected in numerous EU policies, most notably its 2010 Energy Performance of Buildings Directive and 2010 Energy Efficiency Directive (subsequently updated). The targets established in these Directives have provided a major impetus to member countries to upgrade their VET systems to enable their workforces to meet ambitious GHG and energy reduction targets.

Through its 2011 – 2017 Build Up Skills program, the EU encouraged its members to assess the existing capacity of their workforces to implement low carbon construction. It found that workers needed a deeper theoretical understanding of energy efficiency and the overall building process as well as better communications skills and cross trade collaboration. The EU asked its members to develop detailed ‘roadmaps’ to guide upgrading their VET systems to provide their respective workforces with the knowledge, skills and competencies needed for future net zero construction. This process has resulted in important changes to their VET programs. The legislated climate targets and related policy initiatives of the EU have played a key role in pushing industry towards adopting climate and environmental best practices.

The construction industries and VET programs of EU member countries vary significantly. There is no single European approach. However, a key finding is that countries such as Denmark, Sweden, Belgium and Germany that have versions of a ‘social partnership’ model for organizing workforce development – a model involving employers and unions, supported by the state – have had more success in preparing their workforces for climate change than those where labour is largely excluded, such as the UK. CIRT also found that in these countries, employers, collectively, play a major role in supporting the training systems as they see a well-trained workforce as essential for a productive industry, one that can successfully implement net zero construction practices.

In contrast, progress on climate literacy in the UK has been very limited. Successive governments have largely excluded labour from its apprenticeship and workforce development programs. Despite extensive public subsidies to employer managed initiatives, the outcomes of its apprenticeship programs have been disappointing. Employers, collectively, have been unwilling to take sufficient responsibility for workforce training or to contribute, financially, to support it. However, the UK has many interesting regional examples initiated primarily by local (municipal) governments. The most successful, such as in City Building Glasgow, combine direct employment of the building workforce in constructing low energy public housing, educational facilities and municipal infrastructure with ambitious training and apprenticeship programs. One Scottish municipality even uses its own employees to manufacture the construction materials which its workers use to build its energy efficient public housing.

As in Canada, CIRT's U.S. research found climate change is not widely included in the trades' curriculum. Climate change remains controversial, both in the broader public and in parts of the industry, acting as a barrier to including it in the trades curriculum. However, some unions are providing workers with the knowledge, skills and competencies needed for low energy construction. Unlike Canada, governments in the U.S. provide little direct support for apprenticeships, leaving much of the responsibility for VET delivery to unions. While the U.S. Department of Labour has standards for some trades under its National Program Standards for Apprenticeship, there is no national equivalent to Canada's Red Seal system. Individual states have varying standards, impeding development of a national curriculum that includes climate literacy.

Low union density, particularly in U.S. right-to-work states, leaves major gaps in the capacity of unions to support VET. However, innovative climate curriculum developments are found where unions have a larger presence on the east and west coasts and the Chicago area. Some unions are using the Green Building Council's GPRO program which provides a wide range of generic climate-focused modules, as well as ones specifically tailored for individual trades. Other unions have used federal funding to develop extensive climate curriculum modules for their trades, although not all their affiliated locals include it in their VET programs. Unions have also successfully pushed some local and state governments to fund programs that incorporate training and apprenticeship, community development, local jobs, workforce diversity, environmental sustainability, and high labour standards.

A major barrier in the U.S. is the absence of strong – and consistent – public policy on climate issues. Without a push from governments, contractors have little incentive to support positive climate practices. President Biden's Inflation Reduction Act has attempted to fill part of this gap. But it still faces opposition to its environmental objectives. At the same time, many of the trades instructors CIRT interviewed were supportive of including additional climate material in their programs and hopeful that public policy will make this easier to do in the future.

As with its labour relations system, trades VET in Quebec is different from other provinces. It is overseen by the Construction Commission of Quebec (CCQ) and carried out in public training facilities. The province requires construction workers to hold a Certificate of Qualification in any of its 25 recognized trades to work on building sites. To obtain the Certificate, apprentices must obtain a Vocational Education Diploma issued by the government. The structure of the CCQ provides both unions and employers with a role in overseeing the content of VET programs.

CIRT's research indicates that Quebec's state-based training system has great potential for delivering climate literacy curriculum. However, climate change has not been a focus of its apprenticeship programs. Although the CCQ's governance structure in theory gives unions a significant role in managing the VET system, in practice unions feel it is dominated by employers. Unions are also concerned that the curriculum for many trades is outdated and needs to be upgraded to reflect current industry practice. Consequently, some unions are exploring whether to set up their own training schools drawing on the expertise available from their international affiliates in Canada and the U.S.

As the preceding, somewhat brief, summary of CIRT's research indicates, it found both similarities and differences in the extent to which climate literacy is found in the training programs of the four jurisdictions examined. As noted, in all jurisdictions it is public policy that is driving the shift towards net zero construction. The industry, on its own, implements best climate practices only if it can see a financial benefit in doing so, or where the building regulations require it. It is governments that are providing the regulatory 'push' to move the industry forward.

In all jurisdictions, employers have a key role in shaping the success of the VET system. Employers are the ones who direct the workforce. How they manage the work process can reinforce, or undermine, what gets taught in the classroom. While there are many employers who strongly support Canada's apprenticeship system, many others do not. Lack of employer commitment both to the overall VET system and to supporting climate literacy on work sites is a major challenge that Canada needs to address. Where employers cooperate with labour and the state in supporting VET programs, as in Sweden, Denmark, Germany and Belgium, the training systems provide a solid basis for advancing climate literacy.

Effective net zero construction also requires those who commission construction work and the professionals who handle the planning, building design and engineering specifications to be on board. There has been significant progress in this area in recent years, but more is still required to meet Canada's climate objectives. Climate literacy requires a cultural change in the industry involving all those involved in the building process, not just the trades workforce. What workers learn in the classroom needs to be reinforced by what they are asked to do on building sites.

The important role of unions in advancing net zero construction is highlighted by the contrast between northern European countries that have a social partnership model and those, such as the UK, which largely exclude labour and rely on employers, exclusively, to oversee VET programs. Where labour has a voice in shaping the training system and exercises agency on building sites, outcomes are better. These VET programs prepare workers for a lifelong career in the industry, rather than simply meeting short term labour requirements. In this, they try to fulfil an important social objective that recognizes the value to their citizens of decent, fulfilling jobs based on having the opportunity to develop their human capacities, exercise some agency at work and take responsibility – and credit – for well-built projects.

The research indicates that awareness of how building to net zero standards meets valuable climate and environmental objectives can be an important motivator, as well as a source of job satisfaction from doing work that contributes to a better society. The VET system can contribute to this awareness. Achieving Canada’s climate targets is not something that the training system, on its own, can implement. But it can make an important contribution to this goal.

*Note: Extensive references are included in the CIRT reports to the CBTU for Europe, the US, English Canada and Quebec.*

***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. Its members are: Pier-Luc Bilodeau, Linda Clarke, John Calvert, Evelyn Dionne, Melahat Sahin-Dikmen, Vivian Price and Christopher Winch.*

***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).*