Advancing Climate Literacy in Union Vocational Education and Training Programs in in Quebec: Analysis, Findings and Lessons Learned

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Table of Contents

***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).*

Synopsis: An Overview of the Quebec Research

The Quebec research contains findings from the relevant literature coupled with extensive site visits and interviews with union leaders, instructors, journey workers and apprentices. Besides the fact that it ranks second in the country – just after Ontario – for the importance of its construction industry with nearly 20% of employment in the sector, presenting a separate report on the Quebec experience is justified by the fact that institutional features of work and employment in the province differ from English Canada in several major respects.

This situation can be explained in part by the fact that under the Canadian constitution, employment falls under the jurisdiction of the provincial legislatures, except in the case of federally regulated companies. This is particularly true in construction where the North American building trade unions coexist with other labour organizations and have evolved within a specific and comprehensive legal framework, combining both legislation similar to that found in other North American jurisdictions (e.g., labour relations regimes based on the American "Wagner Act") and others inspired by French-speaking European countries, particularly in terms of regulation of the labour market.

For the purposes of this report, Quebec stands out from English Canada by the obligation that workers hold a certificate of qualification (CQ) for any of the 25 trades recognized for institutional, commercial and industrial (ICI) construction, engineering and road works, as well as some residential construction work. The preferred way to obtain an apprenticeship CQ is to complete a vocational education diploma (DEP) issued by the Government of Quebec at the end of a program offered in public training centers. The monitoring and control of trade workers' qualifications are the responsibility of a state body – the Construction Commission of Québec (CCQ) – administered by representatives of recognized employers and labour associations, including Quebec's Provincial Council of Building Trade Unions (CPQMC-I). CCQ also intervenes in an advisory capacity with the provincial Department of Education for construction DEPs and is responsible for the administration of funding and the promotion of continuing education and training. The training and qualification system in place in Quebec is therefore highly centralized and the representatives of employers and workers play an important role in its administration.

Main findings from interviews and documentary research

Overall, even though the extensive regulation of the labour market in Quebec's construction might allow for more coordination in the training of a more climate-literate workforce, very limited progress was found in the inclusion of such content in the initial and continuing vocational education and training (VET) programs, and few actions have been initiated by stakeholders to promote climate literacy among skilled workers in the building trades. The findings also reveal that major institutional roadblocks will need to be overcome to achieve

better performance in training a climate-literate workforce that is able to fully contribute to a successful transition toward low energy construction. More specifically, the following institutional factors have been highlighted:

- At the time of the fieldwork, most – if not all – DEP training programs for construction trades did not include any climate literacy element. This situation might be explained by the long timespan between the evaluation and revision of programs, which also accounts for their alleged outdatedness as to new technologies and materials.

- Minimal awareness of the relevance of such training was found in many trades. At an individual level, many workers – including some building trades representatives – feel confident about their ability to acquire the new skills and knowledge that might be associated with transition by themselves, without formal training.

- Even though continuing VET in Quebec's construction benefits from sustained, collectively bargained funding by all employers, only a few training activities specifically address environmental or sustainable development principles in construction and offer technical training. There are at least two possible explanations for this state of affairs.

    - First, given the lack of awareness of the benefits of energy and climate literacy in construction, the social dialogue mechanisms associated with VET are currently not being used by the industry's stakeholders to further its development. In fact, some interviewees went as far as explaining that climate issues were not a priority, or even on the agenda, of most joint VET committees.

    - Second, it has been reported that even where the representatives of a trade would like to introduce a new training activity, the administrative requirements for its approval as recognized, fundable continuing training could prove overwhelming (e.g. UA's local 144 training center).

In addition to the abovementioned observations, there is another impediment. Even if the building trades' VET programs in Quebec were to include contents on the topic, climate and energy literacy would also be negatively affected by the fact that the current skilled labour shortage allows for the issuance of apprenticeship CQs to workers who have not completed the DEP program for their trade, a situation that has recently been amplified by changes to the vocational training regulation, aiming to reduce the impacts of the labour shortage by allowing aspiring trade workers to work on construction job sites before the completion of their DEP.

The idiosyncrasies of Quebec's construction industry, including social dialogue and the comprehensive regulation of work and employment, lead observers to conclude that its stakeholders have the resources and levers required to successfully undertake a just climate transition. Unfortunately, the findings suggest that elements of climate and energy literacy are

largely absent from trades education and training, and that they might not even be on the agenda of the advisory committees in charge of VET in the building trades. This state of affairs seems to have many causes, including a lack of awareness or understanding of the climate issue by the stakeholders, the rigidity of Quebec's public VET system, as well as a lack of leadership on the matter by the CCQ.

In many respects, Quebec's construction industry is an exception regarding labour relations. Since 1968, this sector has been subject to a special legal framework that replaces laws of general application governing collective labour relations[1] and minimum working conditions[2], and implements a public labour and employment policy specifically aimed at vocational training and qualification. The idiosyncrasies of the Quebec's construction, including social dialogue and the comprehensive regulation of work and employment, create a certain impression that its stakeholders have the resources and levers required to successfully undertake a just climate transition[3]. We sought to test this hypothesis by focusing on the ways that climate and energy issues were approached in the vocational training of construction workers in Quebec.

To describe our findings, this report is divided into two sections. The first section is descriptive; it provides an overview of Quebec's construction industry and briefly presents the labour relations regime found in the *Act respecting labour relations, vocational training and workforce management in the construction industry*[4] (*Act R-20*). The first section then finishes with an examination of the rules and regulations concerning the sector's workforce training and qualifications.

The second section focuses specifically on the results of the research carried out over the recent months as part of the *Building it Green!* project. This section describes the extent to which climate and energy literacy are factored into Quebec construction workers' vocational education and training (VET) activities, under *Act R-20*.

Labour relations in Quebec's construction industry[5]

The construction industry is an important part of Quebec's economy. In 2020, capital expenditures into this industry totaled just over 53 billion dollars, or roughly 15% of

[1] *Labour Code*, CQLR c C-27.
[2] *Act respecting labour standards*, CQLR c N-1.1.
[3] Calvert, John (2014). "Overcoming Systemic Barriers to 'Greening' the Construction Industry: The Important Role of Building Workers in Implementing Climate Objectives at the Workplace", *Alternative Routes*, 25 (1), pp. 81-116.
[4] CQLR c R-20.
[5] For a more developed, albeit dated, exposé, see: Charest, Jean (2003). "Labor Market Regulation and Labor Relations in the Construction Industry: the Special Case of Quebec within the Canadian Context", in G. Bosch and P. Philips (eds), *Building Chaos: an International Comparison of Deregulation in the Construction Industry*, London: Routledge, pp. 95-113.

Quebec's GDP[6]; furthermore, businesses operating in this sector employed 287 000 people[7]. Of these workers, over 190 000 employees, who performed work on construction job sites for some 26 500 employers, were covered by the special labour relations system instituted by *Act R-20*[8].

The origins of the labour relations regime

The regime contained within *Act R-20* and its rules comes from a European-inspired labour law that provides for a legal extension by which all firms working in the same sector or professional field, in a given geographic area, are subject to certain collectively bargained minimum working conditions - whether their employees are unionized or not[9]. The monitoring and implementation of these working conditions is entrusted to a joint committee, composed of representatives of the parties to the government-extended collective bargaining agreement.

This so-called "decree" system was enacted in 1934. Following the crash of 1929, and under pressure from Quebec's catholic unions, the legislator sought to limit the most harmful effects of competition on the workforce[10]. The construction unions were among the first to assert this new right, and many decrees, covering most trades, came into force in several Quebec regions[11].

Beginning in the 1960s, the opening of regional construction markets and the launch of large-scale construction projects in Montreal, Quebec City and areas mostly remote from urban centers disrupted the decades-long geographical division of labour representation, and fueled persistent interunion conflicts. Taking stock of the shortcomings of the existing legal framework, notably the problems caused by the interplay between the *Labour Code* and the decree system, the Assemblée nationale du Québec (provincial legislature) adopted the *Act respecting labour relations in the construction industry* (commonly known as *Bill 290*)[12], which integrated the system of juridical extension found in the decree system and the rules of

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[6] Commission de la construction du Québec (2022). *Statistiques annuelles de l'industrie de la construction 2021 [Annual statistics of the construction industry, 2021 edition]*, table A3 : https://www.ccq.org/-/media/Project/Ccq/Ccq-Website/PDF/Recherche/StatistiquesHistoriques/2021/A3.pdf?la=fr-CA&rev=5a171db0c6ac4d429c6d393d33335f35.

[7] https://www150.statcan.gc.ca/t1/tbl1/fr/tv.action?pid=1410039201&pickMembers%5B0%5D=1.20&cubeTimeFrame.startYear=2021&cubeTimeFrame.endYear=2021&referencePeriods=20210101%2C20210101

[8] Commission de la construction du Québec (2022). *Statistiques annuelles de l'industrie de la construction 2021 [Annual statistics of the construction industry, 2021 edition]*, table A1 : https://www.ccq.org/-/media/Project/Ccq/Ccq-Website/PDF/Recherche/StatistiquesHistoriques/2021/A1.pdf?la=fr-CA&rev=841fcdf76e95420798e395b88d8225fa.

[9] *Act respecting collective agreement decrees*, CLRQ c D-2.

[10] Rouillard, Jacques (2011). "Genèse et mutation de la *Loi sur les décrets de convention collective au Québec* (1943-2010)" [Origins and Transformation of Quebec's Collective Agreement Decrees Act, c. 1943-2010], *Labour/Le Travail*, 68, pp. 9-34. See also: Bergeron, Jean-Guy and Diane Veilleux (1996). "The Quebec Collective Agreement Decrees Act: A Unique Model of Collective Bargaining", *Queen's Law Journal*, 22 (1), pp. 135-165.

[11] Hébert, Gérard (1963). "L'extension juridique et les métiers de la construction au Québec" [Juridical extension and construction trades in Quebec], *Relations industrielles/Industrial Relations*, 18 (3), pp. 299-317.

[12] SQ 1968, c 45.

collective relations found in the US-inspired *Labour Code*[13] and similar to labour laws in the rest of Canada.

The first years following the application of the new regime were marked by the persistence, even aggravation, of certain conflicts, requiring a public inquiry into some practices of trade unionism[14]. Several reforms were subsequently implemented to recognize union pluralism in construction, promote a stronger employers' representation, and implement rules regarding work and employment on construction worksites[15]. After significant reforms during the 1980s and 1990s, the regime has maintained a fairly stable form for over 25 years.

The regime today: an overview

In most provinces, construction labour relations are covered by specific rules contained in labour laws but the ones included in Quebec's *R-20* regime are by far the most extensive, going beyond the enactment of more centralized structures of collective bargaining to provide for specific rules for the representation of employees and employers, and the administration of some working conditions by a third party. Moreover, the regulation of employment covers the settlement of jurisdictional disputes by the provincial labour board, but also issues like labour mobility and apprenticeship, which are more commonly found in collective bargaining agreements outside of Quebec.

The main features of the regime, in its present form, are as follows:

- Mandatory employee membership to one of five labour associations[16], representing labour at the provincial level, directly or through affiliated unions[17];
- Mandatory representation of contractors by a province-wide employers' association (AECQ) and three sectoral employers' associations (ACQ, ACRGTQ and APCHQ);
- With the exception of occupational health and safety, employees' working conditions are detailed in province-wide collective bargaining agreements covering all job site

[13] As most labour relations laws in the rest of Canada, Quebec's *Labour Code* rests on the core principles of the American *National Labor Relations Act* (29 U.S.C. § 151-169 (2000)).
[14] See: Quebec (1975). *Report of the Commission of Inquiry on the Exercise of Union Freedom in the Construction Industry* (Robert Cliche, pres.), Quebec City: Quebec Official Printer.
[15] Delagrave, Louis et Jean-Luc Pilon (2009). *Histoire des relations du travail dans la construction au Québec [History of Labour Relations in Quebec's construction]*, Quebec City: Les Presses de l'Université Laval.
[16] In the 1990s, this form of worker representation has been the subject of legal challenges; however, in 2000, it's conformity with Canadian constitutional law was upheld by the Supreme Court of Canada, in R. *v* Advance Cutting & Coring ltd., [2001] 3 SCR 2009. This judgment provides both a historical and contemporary description of union representation in Quebec's construction sector.
[17] Of the five associations, the *Conseil provincial du Québec des métiers de la construction (International)*, represents Quebec' locals of the trade unions affiliated with Canada's Building Trades Union (CBTU). According to the union ballot at the 2020, it represented 23% of all employees covered by *Act R-20* in Quebec. This degree of representativeness tends to vary significantly across trades and occupations; some affiliated locals may represent over 85% of all employees in a given trade. See: Commission de la construction du Québec (2020) *Scrutin syndical 2020 – Représentativité (votants)* : https://www.ccq.org/-/media/Project/Ccq/Ccq-Website/PDF/Recherche/DossiersSpeciaux/stats_rep_synd_scrutin_2020.pdf?la=fr-CA&rev=bf9762cbb35d49269180a0f98771fe30&hash=E654D2E118F2399B9A77E445596C41DA.

work by trades and occupational titles in the following subsectors: civil engineering and heavy works, industrial, institutional-commercial, and residential;

- Collective bargaining takes place every four years;
- The implementation of the collectively bargained working conditions is ensured by the parties involved (grievances and arbitration) and by the *Commission de la construction du Québec* (CCQ), a government agency with tripartite administration (employers' representatives, labour representatives and independent administrators);
- CCQ is also responsible for the implementation of labour and employment policy stemming from *Act R-20*.

Over the years, this labour relations system, very different from those found in other Canadian provinces, has contributed to a relative industrial peace. Elements such as the sectoral scope of working conditions, and employment regulations which foster greater control over the labour market, particularly in regard to workforce qualification, has helped it mitigate the effects of construction activity intermittency.

Vocational education and training (VET) at the heart of the regulation of work and employment

As this report focuses on climate and energy literacy, it is important to examine the rules governing Quebec's construction industry workers' vocational training and qualification.

Quebec's construction industry differentiates itself from the rest of Canada in several ways, notably in the number of trades for which a certificate of qualification (CQ) is mandatory, and for its regulation, both by the provincial government and the parties to collective bargaining. *Act R-20* also allows for quantitative control of the workforce; this can be important, given the intermittent employment experienced by many workers in this sector.

Initial VET and access to the industry

In the Province of Quebec, all work covered by *Act R-20* is divided among trades and occupational titles, and all employees working on a construction job site must hold a certificate of qualification (CQ) issued by the CCQ. Under the *Regulation respecting the vocational training of the workforce in the construction industry*[18], there are 25 recognized trades[19], each of which requires a specific CQ. Generally speaking, obtaining an Apprentice

[18] CQLR c R-20, r 8.
[19] Schedule A of *Regulation r 8* provides the jurisdictional delimitation between these trades. As such, it constitutes the basis upon which all jurisdictional disputes are settled (not the *Plan for the Settlement of*

CQ requires the worker to successfully complete a trade specific in-class course. In order to obtain a Journeyperson's CQ, the Apprentice must then complete apprenticeship on job sites, and successfully complete a provincial certification exam. For any of the jobs that fall outside of the 25 mandatory trades, there are set minimum requirements for obtaining a CQ; some occupational titles (e.g. blaster-drillers, divers, and surveyors) also require previous professional education.

Since the 1980s, obtaining a diploma of vocational studies (DEP) has been the preferred way of getting into the construction industry in Quebec. VET programs fall under the purview of the Quebec's Department of Education (MEQ). Programs are offered throughout the Province at vocational training schools, within the public education network.

The CCQ plays an advisory role in the review and revision of the construction-related VET programs. To such an end, the CCQ relies on its joint Committee on vocational training in the construction industry (CFPIC). This committee is composed of representatives of the five labour associations, of five employers' associations, and a representative from the MEQ. It is further supported by 26 trade subcommittees (one for each recognized trade, plus one for occupational titles). On top of helping the CCQ in its advisory role to the MEQ, the CFPIC and its subcommittees help in predicting labour needs. This forecasting is used to set admissions targets for vocational studies programs. This system allows for the anticipation of labour shortages and avoids surpluses.

In some situations, a person can obtain an Apprentice or Occupational title CQ even though they don't satisfy the DEP requirement. The first exception is a labour shortage in a given area[20]. In such circumstances, a contractor can hire someone who has not completed their DEP, on the condition of guaranteed working hours. Nonetheless, this method of accessing construction job sites does not exempt the employee (whether they are an apprentice or occupation title holder) from their requirement to follow VET, as the *Regulation respecting the issuance of competency certificates*[21] provides that the individual must fulfill certain responsibilities in this regard so that their certification may be renewed.

The second exception allows access to apprenticeship in a trade for anyone having relevant experience of at least 35% of the duration of the concerned apprenticeship. This exception has been in force since April 2021. Students enrolled in a VET program can take advantage of an exception that allows them to obtain a 6-month Apprentice CQ for their chosen trade. Unlike the program for experience recognition, student-apprentices are only required to produce letter of engagement from an employer; they are not required to receive guaranteed hours.

Jurisdictional Disputes in the Construction Industry [*Green Book*], as in the rest of Canada and in the United States). See list of all 25 mandatory trades in appendix A.

[20] According to the *Regulation respecting the vocational training of the workforce in the construction industry* (*supra*, note 18), labour shortage occurs when fewer than 5% of the total number of employees holding the required occupation competency certificate are available, according to data compiled by the CCQ, based on employers' monthly reports.

[21] CQLR c R-20, r 5.

Despite these exceptions, 600 to 1 800 hours of classroom training are generally required before being granted access to a construction job site[22].

On-site apprenticeship and upgrading

The *Regulation respecting the vocational training of the workforce in the construction industry*[23] states that once the individual has obtained their Apprentice CQ, they must complete one to five apprenticeship periods of 2 000 working hours on job sites, depending on their trade. The same regulation sets ratios of Journeypersons to Apprentice for each trade.

After having completed the trade's apprenticeship periods, the apprentice must successfully complete a provincial qualification exam to receive their Journeyperson CQ.

Labour mobility and the Red Seal Program

Despite its idiosyncrasies, Quebec' construction industry remains relatively integrated with its counterparts in the rest of Canada. In addition to the Canadian Free Trade Agreement, interprovincial agreements have been negotiated over the years between Quebec, Ontario, and New Brunswick to foster labour mobility via home province skills recognition.

Quebec also participates in the federal Red Seal Program. This program allows workers from other parts of Canada, who hold a Red Seal professional recognition in their respective trades, to be exempted from Journeypersons' certification exams, allowing them to practice their trade in Quebec.

The CCQ and the Government of Quebec acknowledge the importance of the Red Seal program, but despite the requirements of the national program's qualification exams being taken into account in both the educational contents of DEP programs and in provincial qualification exams, Quebec workers seem to remain relatively underrepresented amongst Canadian Red Seal certification holders[24].

In Quebec, as in the rest of Canada, continuing VET (or upgrading) activities are offered by institutions such as training centers and schools, employers, equipment and material manufacturers, and other training service providers. Historically speaking, Quebec unions have not had a significant role in upgrading; however, that seems to be shifting, as evidenced by the creation of a training center by UA local 144.

[22] In the case of Apprentices, some of these hours will be credited, effectively reducing the length of apprenticeship periods on job sites.
[23] *Supra*, note 18.
[24] Canadian Council of Directors of Apprenticeship (2021). *2020 Annual Review*, 16 pages. https://www.red-seal.ca/_conf/assets/custom/docms/ccda-2020-ar.pdf

Construction workers are not required to enroll in upgrading activities (except for those who have been granted an apprenticeship without holding a DEP for their trade or occupational title). However, since 1993, both employer's associations and trade unions have agreed to allocating funds dedicated to enhancing construction workers' training[25]. These funds have been merged between 2011 and 2015, and the Training Fund of Construction Industry's Employees (FFSIC) is now managed by the CCQ. The funds come from an employer contribution of 20¢ per hour. The funds are then used to cover training expenses for eligible workers, and finance the promotion of continuing training and education throughout the industry.

This initiative by the representatives of employers and labour in the construction industry predates the enactment of the more comprehensive *Act to promote workforce skills development and recognition*[26]. Under this Act, all employers whose payrolls reach a certain amount[27] must dedicate an annual investment for the training of their workforce; this investment must amount to 1% of their payroll. Besides the fact that several employers in the construction sector are not subjected to this requirement[28], the pooling of investments compensates for intercompany employee mobility - an inherent difficulty for the to continuing VET of construction workers[29].

Construction VET in Quebec and Climate and energy literacy

The following section presents the current state of the inclusion of climate and energy literacy in Quebec's construction VET. Its content is the result of interviews with 21 trade union representatives, and of a review of initial VET (DEP) curriculum documents, and upgrading activities. Contrary to our initial hypothesis, we find that, at the present time, Quebec's construction actors do not have (or use) the necessary resources and levers to successfully undertake a transition toward low energy construction. Indeed, DEP programs and continuing education courses offered in Quebec are very slow to adapt to the training needs of the employment market. Moreover, the rigidity of the centralized institutions presented in section 1 of the present chapter is reported to prevent the actors who may otherwise be able to introduce innovative, although limited, initiatives to do so. The social dialogue mechanisms

[25] The creation of a separate funds for both residential and non-residential sectors of construction follows a legal battle between the sectoral association of residential sector employers, the APCHQ, and other sectoral employers' associations and trade unions.
[26] CLRQ c D-8.3.
[27] At the outset, employers with payrolls over $250 000 were subject; this threshold is now set at $2 000 000.
[28] In 2021, 80% of companies subject to Act R-20 employed only fewer than five employees. See: Commission de la construction du Québec (2022) *Statistiques annuelles de l'industrie de la construction 2021*, table B3. https://www.ccq.org/-/media/Project/Ccq/Ccq-Website/PDF/Recherche/StatistiquesHistoriques/2021/B3.pdf?la=fr-CA&rev=775a13a1b76142c4a500ad158c71bbb3
[29] Charest, Jean and Chantal Dubeau (2003). "Organisation du système de formation continue dans l'industrie de la construction au Québec" [The organization of continuing vocational education and training in Quebec's construction industry], *Gazette du travail/Workplace Gazette*, 6 (3), pp. 62-74.

found in this industry are not being used to further energy and climate literacy, even if we can see a clear potential. The main elements that stand out from the interviews are the absence of energy and climate literacy training within the VET programs and a minimal awareness of the relevance for such training in many trades. On the other hand, we also find trade unions who have the desire to pursue such endeavours and feel that they are not properly supported and even limited by the institutional context.

To increase our understanding of the state of affairs regarding climate change and the construction workforce in Quebec, we present the results of interviews and documentary research on the following topics: skills, initial VET and upgrading, employment opportunities, and union strategies.

Skills, old and new

At the present time, adaptation to climate change seems to affect trades differently, as some do not experience changes outside the normal evolution of materials (bricklayers-masons, cement finishers, electricians, and insulators) while others report having to deal with greater changes in technologies, materials and techniques (boilermakers, crane and heavy equipment operators, insulators, ironworkers, millwrights, roofers, and sheet metal workers). For example, a millwrights representative explained how increases in temperature variations within short periods of time impacted their work on the job sites, requiring calculations and work protocols to take into account the expansion of materials during or immediately after installation. Respondents also mentioned how recent weather changes, including extreme weather events, affected work schedules by increasing the set-up period for outside work (covering up, heating up, defrosting, etc.) (bricklayers-masons and roofers).

Some mechanical trades are more concerned about those changes (electricians, insulators, plumbers and pipefitters). Representatives from those trades report being aware of new skills their members need to master, and reaching out to locals outside Quebec to access relevant training resources. For many interviewees, major impediments to the modernization of trade skills are the lack of interest of Apprentices and younger Journeypersons in the acquisition of more advanced skills and the widespread resort to prefabricated materials. Those are generally seen as dangerous contemporary trends leading to a loss of skills in the trade (millwrights, roofers, and sheet metal workers), turning workers into mere “installers” rather than skilled craft workers. On the other hand, other respondents paint a brighter picture of younger members of the trades, reporting that they generally tend to be more interested than their more experienced colleagues in learning about new products and technologies (boilermakers). Many respondents mentioned that the introduction of new materials and techniques has always been part of the trades’ reality, and that it does not really matter if the source of these changes is climate-related or not (boilermakers, bricklayers-masons, crane and heavy equipment operators, roofers, and sheet metal workers). In order to deal with these changes, workers are expected to acquire new skills on the job, sometimes by themselves,

and some respondents don't believe that it will change anytime soon (boilermakers, crane and heavy equipment operators). Some respondents go even further, stating that, to some extent, the introduction of "greener" equipment doesn't entail higher skills requirements and that workers can self-train themselves if needed, and will continue to be able to do so (millwrights, cement layers, boilermakers, roofers, and sheet metal workers). This is an interesting finding that shows a considerable gap between the views held by some respondents and what can be learned from recent studies[30].

Another discrepancy between some literature and the views of some interviewees concerns the quality of workmanship for the construction of energy-efficient buildings and most notably those with a LEED certification. Based on their experience with some LEED certified projects, respondents underline the difficulty to effectively deliver an actual high-quality good because of the pacing of work and the importance of other cost-cutting practices by employers operating under the "lowest bidder" system.

Climate and energy literacy in construction VET

Beyond trade representatives' understanding and awareness of climate change and its impact on the skills required for construction work, the goal of this study was to assess the inclusion of climate and energy knowledge in Quebec's construction VET system.

Initial VET (DEP) programs

The construction DEP programs administered by Quebec's Department of Education are almost unanimously criticized by interviewees for backwardness (from 5 to 30 years behind, depending on respondent) and too slow to update to properly follow the industry's reality (electricians, cement layers). Out of all the respondents, only the boilermakers representative considered his trade's program to be up to date (last revision completed four years ago) and teaching new technologies (dust collectors and antipollution systems). The lack of funding for the professional training centers is often brought up as a major inhibiting factor for the development of state-of-the-art training. The revision of programs is also reportedly slowed down by the cumbersome process involving MEQ, CCQ and vocational schools. As a result, it comes as no surprise that none of the DEP curricula that we have had a chance to read includes elements of any kind regarding climate and energy literacy.

[30] See, for example: Clarke, Linda, Fernando Duran-Palma, and Melahat Sahin-Dikmen (2021). "Towards Nearly Zero Energy Building in Europe: Challenges of Vocational Education", in: Leal Filho, W., A. M. Azul, L. Brandli, A. Lange Salvia, and T. Wall (eds) *Industry, Innovation and Infrastructure. Encyclopedia of the UN Sustainable Development Goals*, Cham: Springer; See also: Clarke, Linda, Colin Gleeson and Christopher Winch (2017). "What kind of expertise is needed for low energy construction?", *Construction Management and Economics*, 35 (3), pp. 78–89.

Another issue raised by interviewees stems from the current labour shortage, and more importantly from the recent policies (see above, ss. 1.3 a) implemented by the CCQ to increase the labour supply in the industry. Some respondents reported on the delivery of Apprentice and Occupational CQ without proper in-school training having an adverse effect on the enrollment to DEP programs (ironworkers, roofers, and sheet metal workers), allowing unskilled workers to perform skilled work, and creating health and safety hazards.

Upgrading

The continuing education courses offered through the CCQ are described by interviewees as too general and inadequate for the current needs (cement layers, electricians, and plumbers-pipefitters), despite the fact that around 10% of upgrading activities supported by the FFSIC are labeled as associated with "sustainable development" by the CCQ. These activities cover a wide range of topics, from the "airtightness of the building envelope" to the "theoretical aspects of the restauration of old buildings", but none of them have been specifically mentioned by the respondents.

Enrollment to these courses is also difficult, as many are not offered on a regular basis, have very limited places (ironworkers and insulators), and are mostly offered in the Montreal area during the weekends, making it hard for many workers to attend. As a possible consequence, classes are often cancelled due to a lack of registration. Online classes, introduced during the COVID-19 pandemic, seem to attract more interest, especially from workers living outside of Montreal (cement layers, electricians, and millwrights).

All respondents mentioned a strong demand for trade-specific upgrading activities but when asked about the current situation, they pointed out the difficulties and frustration they experience when suggesting new courses, all stating that their proposals are not received favourably, unlike employers' ones (boilermakers, ironworkers, and millwrights). They also underline the slowness of the CCQ's CFPIC subcommittees to introduce new activities, even when specific skills are required for an upcoming or ongoing major project (boilermakers, ironworkers, and millwrights). A trade local's representatives even reported having to resort to pressure tactics to get the CCQ to organize a training activity after requesting it for many years. As for initial VET, respondents denounce the fact that many upgrading courses offered through the CCQ are outdated and as well as the lack of new training activities (boilermakers, electricians, and heavy equipment and crane operators). Many interviewees feel that new skills are more likely to be taught by instructors hired by employers or by the manufacturer of a new product rather than in CCQ-approved upgrading activities (electricians, ironworkers, and heavy equipment and crane operators).

Some trades report a strong wish for more autonomy in the training of their members, asserting that it would allow them more flexibility to adapt to the current changes. Quebec's

plumbers and pipefitters are more advanced than others in this matter, as UA local 144 recently opened its own training facility meant for upgrading activities and is already planning sessions with trade employers for specific projects, despite difficulties regarding access to the CCQ-managed FFSIC. Other well-organized trade locals are also showing an interest in reappropriating trade skills training, as they feel that their voice is not heard as the employers' one at the CCQ's CFPIC and its trade subcommittees.

UA Local 144 Trade School's Case

Quebec saw its first union-owned trade school in 2019 built and managed by UA Local 144, affiliated to CBTU. This new construction includes local headquarters and vocational training center which were designated as Canada's first LEED v4 Platinum industrial building[31]. The headquarter building is made of cross-laminated wood structure and benefits from natural lighting through large sections of translucent insulation strategically positioned on the south wall (see A).

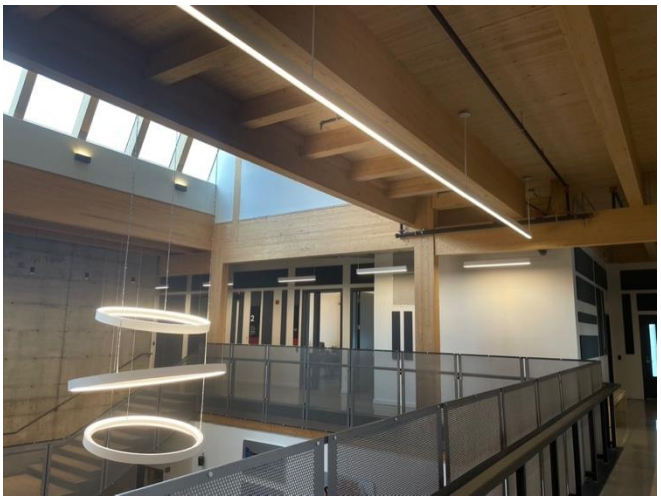
This system allows the building to benefit from abundant light while maintaining a high-performance envelope. The training center is linked by a footbridge and made of a traditional steel structure. It includes three large workshops for training pipefitters and welders (See E and F) and teaching classrooms meant for in-person and distance-learning courses. Interestingly enough, it is one of the buildings with the largest amount of voltaic panels in Quebec, with 430 panels producing around 240 000 kWh annually (See B). These buildings use a variety of green technologies for heating, ventilation, air-conditioning, grey waters recovery, lighting, etc. They include geothermal energy, aerothermal energy, a high-performance envelope, a radiant heating system, natural ventilation, natural lighting and ventilation by displacement. Moreover, the welding hoods in the workshops have a variable flow rate and the heat of the air extracted by them and by the dust collector is recovered. Outside, we can find many green spaces with fruit trees and charging stations for electric cars in the parking lot.

Coherent with its learning objective, everything is set up so that you can understand how mechanical systems work, especially plumbing systems. The goal was "to demonstrate that you can design a

[31] Soucy, S. (2023) Gros plan sur le bâtiment LEED v4 Platine du Local 144. VoirVert. Retrieved at: https://www.voirvert.ca/projets/gros-plan-sur-batiment-leed-v4-platine-local-144

building that is very efficient, doesn't skimp on comfort, and uses as few resources as possible"[32]. Moreover, the Local opted for a mechanical room entirely visible through a large bay window that can also be visited for training purposes (See C). Made to accommodate a group, students can observe working the grey water recovery system (See D), heat pumps and a geothermal system in the mechanical room (See H, I, J). There are also strategically displayed glass windows showing different systems in the walls, like the radiant heating system's plumbing in the headquarter (See G). However, workers following a professional development course have the opportunity to see these working systems and ask questions but cannot attend specific courses covering these technologies. It is believed that showing these working systems allows workers to be more familiar with these relatively new technologies by initiating a first contact, even if they are not specifically trained to instal and repair them. Indeed, the training center does not dispense such classes because of the way the continuous training is administered by the CCQ, limiting the continuous educations courses to the public sector professional training centers. This means that all the courses identified as being linked to sustainable development (SD) by the CCQ are only offered in the public training system (centers offering VET programs mentioned above). However, the fact that these SD-related courses are in the official CCQ catalog does not guarantee that the courses are taking place, since many continuous education courses are cancelled due to a low enrollment or a lack of available trainer. There was no data available on the number of SD courses that took place in the last years, nor the number of workers who may have followed them. Because of these limitations, the training centre offers courses mostly based on the industry demands and specific projects requirements, like training workers for a specific pipe welding technique necessary to build a new plant. The union is expressing an interest in taking on more training, but such changes would require major changes on the sectoral level. Overall, UA Local 144 trade school holds an interesting potential to increase climate literacy in the trades and is currently acting as a visibility tool.

[32] Idem



A- Headquarter

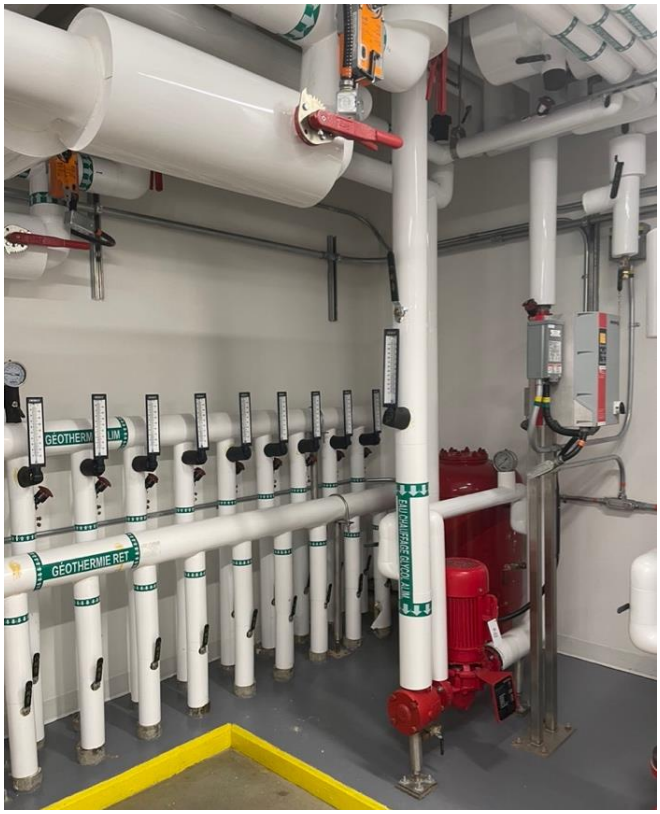
B- Solar panels covered roof

D- Water recovery system

C- Mechanical and its room bay window

G- Wall windows

H- Mechanical room



I- Mechanical room (geothermal system)

J- Mechanical room (geothermal system)

As mentioned in section 1, the Red Seal certification is not popular amongst Quebec trade workers. Many trade representatives, a notable exception being the crane operators, reported that in most cases, it was not required for traveling members to be employed outside the Province (bricklayers-masons, ironworkers, millwrights, plumbers-pipefitters, roofers, and sheet metal workers). Differences between Quebec and English Canada regarding trades' demarcation lines[33] are said to increase the difficulty of the Red Seal exam for Quebec's trade workers even though Quebec's provincial qualification exams take Red Seal standards into account (plumbers-pipefitters).

The construction labour market and climate-related employment opportunities

Some respondents reported an increase in jobs associated with a "greener economy", like electric public transport infrastructures, windmills, solar panels/farms, and biomethanization plants. Even though there is a decline in employment associated with fossil fuel industries, the maintenance and repair of infrastructures such as refineries and pipelines are still considered as a source of "good jobs" (ironworkers, plumbers-pipefitters). Moreover, the additional precautions taken on such worksites to protect the natural environment generates additional working hours for some trades (e.g. heavy equipment operators, pipefitters).

In some cases, the construction of greener buildings is associated with an increase in prefabricated materials used. This has an impact on the working hours of various trades. For some, it represents more work, as in the case of heavy equipment operators who must move the prefabricated components around the job site; for others, like plumbers-pipefitters, and sheet metal workers, the resort to prefabrication results in less work hours for trade workers who used to assemble various parts directly onsite.

The evolution of construction technologies and regulation is sometimes accompanied by a change in who gets the work, as it can be moved between trades or handed over to a (non-trade) specialized technician whose work falls outside the scope of *R-20 Act*. An example of an environment-related change leading to a transfer of hours from one trade to another is that it is now possible to use glued-laminated timber for buildings up to 12 floors, whereas the erection of structures that tall used to be exclusively done by ironworkers.

Union strategies and solutions

To address the need for new skills and the aforementioned shortcomings in education and training, trade locals have developed strategies to support their members' employability, especially when they have access to trade schools in other Provinces and in the United States (ironworkers, insulators, and plumbers-pipefitters). Some respondents reported going as far

[33] *Supra*, note 19.

as directly hiring trainers or sending members to be trained outside Quebec so they can later act as trainers themselves (heavy equipment operators). Quebec's first union-run training facility, created by UA local 144, is stated by many interviewees as an example of how unions wish to play a bigger role in the training of their members but are impeded to do so by the CCQ and the regulation of the industry (insulators, ironworkers, and plumbers-pipefitters)[34]. Many respondents referred to the Canadian trade schools' system, in which unions manage the training funds and administer the training, as an example of how new knowledges and skills – and therefore climate and energy literacy – could be introduced more efficiently in the education and training of members of the trades.

Conclusion

The regulatory framework of labour and employment in Quebec's construction industry is both unique and comprehensive. Elements such as the very high union coverage, and province-wide multi-trade collective bargaining have contributed to reduce precariousness in the industry. Along with the extensiveness of employment regulation, including mechanisms for the qualitative and quantitative control of the labour supply, they contribute to the fact that Quebec's construction might be more akin to a coordinated market model (e.g. Belgium, Germany, and Scandinavia) than a liberal market one (like the United States, Britain and Australia), like the rest of the Canadian economy[35]. As we mentioned earlier, this has led some observers to hypothesize that the actors of the sector had more available resources than others to engage in a just transition towards a greener economy. Unfortunately, the analysis of interviews conducted with trade local representatives and documents regarding VET curricula and course descriptions reveals that elements of climate and energy literacy are largely absent from trades' education and training. This state of affairs seems to have many causes, including a lack of awareness or understanding of the climate issue, the rigidity and funding issues of Quebec's public education system, as well as a lack of leadership on the matter by the CCQ.

Considering the latter's status as an agency of the Government of Quebec, a stronger policy regarding climate transition could go a long way to activate a system that has the potential to have a large-scale impact on industry practices. Another possibility, somewhat related, would be the demand, by contractors' associations, for new climate and energy-related skills and knowledge to be included in construction VET. Such a possibility would certainly necessitate the introduction of new requirements in the construction norms or in the tendering process of large public construction projects (in which the "lowest bidder" rule still prevails).

[34] This state-of-the-art training facility, as well as the local's offices, are housed in a LEED v4 platinum building, mainly powered with solar and geothermal energy, and equipped with a grey water recuperation system.

[35] Hall, Peter A., and David Soskice (2001). *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage*, New York: Oxford University Press.

Finally, findings lead to conclude that using the Red Seal Program to introduce knowledge about climate and energy in construction VET curricula and upgrading activities offered in Quebec would have limited success. At best, it would have an indirect impact, and only insofar as the CCQ's CFPIC use the Red Seal as a reference for the contents of DEP and the provincial certification exams.

Appendix A: Compulsory Trades in Quebec

List of 25 compulsory trade, as per *Regulation respecting the vocational training of the workforce in the construction industry*[36]:

- Boilermaker
- Bricklayer-Mason
- Carpenter-Joiner
- Cement Finisher
- Crane Operator
- Electrician
- Elevator Mechanic
- Erector Mechanic (glazier)
- Fire-protection Mechanic
- Heavy Equipment Mechanic
- Heavy Equipment Operator
- Insulator
- Ironworker
- Interior Systems Installer
- Millwright
- Painter
- Plumber-Pipefitter
- Plasterer
- Refrigeration Mechanic
- Reinforcing Steel Erector
- Resilient Flooring Layer
- Roofer
- Sheet Metal Worker
- Shovel Operator
- Tile Setter

[36] *Supra* note 18.