

CASE STUDIES

Delivering Net Zero Carbon Buildings:

The Role of Cities in Skills Development and Training in North America



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Advisory

Key Takeaways for City Involvement: Fostering Industry Cohesion



- **Develop a forum for industry, trade unions, and training program delivery agents to connect.** Providing a platform to connect fosters cooperation, builds buy-in, as well as provides municipalities a better understanding of the needs and priorities of the various stakeholders. Enabling a building specific platform for City officials and staff to connect with industry and training organizations can increase a culture of collaboration and innovation.
- **Create partnerships with local training program administrators.** Cities that develop partnerships with training program administrators create an opportunity to align local building performance standards and goals with the next generation of trained professionals.

Key Takeaways for City Involvement: Fostering Industry Cohesion



- **Incentivize training.** Cities can drive industry cohesion by encouraging relevant green skills training programs within the construction sector.
- **Funder of green skill training programs.** Cities can champion green skill training programs by providing financial support (cash or in-kind).
- **Program marketing and promotion.** Municipalities can support the promotion of green skill training programs by advertising the program through their networks and marketing channels.
- **Emphasize support to training programs that address a Just Transition.** Municipalities can create opportunities for diversity when they act as convenor and facilitator between the local green skills training organizations and the building industry.

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Project Background & Objectives

- This research project focuses on how North American cities can bridge the **gap between the building sector and skills training programs** to accelerate the development of net zero-carbon buildings (NZCB).
- It examines **NZCB, and other construction training programs** in a variety of cities, including the role cities play in their initiation and day-to-day operations, with a particular focus on **funding models** and other success factors – with case studies that showcase innovative and successful training models and partnerships
- This project puts forward a suite of considerations for cities to contemplate as they develop local capacity to deliver more NZC buildings.
- It is intended that this report will act as a useful resource for the local government members of C40 Cities and contribute to the efforts of several C40 Working Groups, including: the Green Economy Forum, the City Finance Programme, the Energy and Buildings Programme, and the Inclusive Climate Action Programme.



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Barriers & Opportunities for Training Programs



Barriers

- Many building design and construction companies are **small businesses** operating within slim margins and do not have surplus human resources or financial bandwidth to invest in training;
- Builders install what owners ask for. Traditional procurement processes focus on the **lowest capital cost, not lifecycle value**, and owners do often not know to ask for NZC buildings or perceive them as too costly;
- The construction supply chain is **complex and highly risk-averse**, which makes it a slow-moving industry;
- A **lack of a "culture for learning"** in construction and no or little requirement for professional development for most occupations.

Barriers & Opportunities for Training Programs



Opportunities

- ✓ COVID-19 has forced sweeping **operational and strategic changes** onto cities and businesses, along with a recalibration of priorities;
- ✓ COVID-19 relief funding can accelerate **upgrading skills** to participate in the emerging green and low-carbon economy;
- ✓ A **highly trained workforce** is critical to delivering low-carbon new construction and deep energy retrofits at scale;
- ✓ A more **cohesive training and building sector** can result in a pipeline of trained workers that can achieve local building standards, goals and performance targets.

Role of Cities in Green Skills Training Programs

Cities of all sizes have a leadership role to play in **fostering alignment** of green skills training programs with municipal policy, building performance, and standards

Cities play a pivotal role as **goal setters** through short- and long-range policies and as facilitators to ensure existing programs are properly utilized and curricula are aligned with city policies and goals.

Cities are well-positioned to **catalyse the development of programs** and **convene** green skill training program administrators and stakeholders across the construction value chain.

What Can Cities Do to Advance Green Skills Training Programs?

Where Can Cities Start

Understand issues and address the needs of the community.

Placing the needs of the community first will catalyze alignment with green skill training opportunities.



Take the time to develop a deep understanding of all stakeholders needs.

Make sure to align program design with the city's strategic goals and priorities.



Map the construction, NZCB and green skill and training ecosystem.

Understand the key actors and the connections between them. Consult with key stakeholders to test and validate any assumptions made.



Consult Industry.

Connect with trades, designers, contractors, educators to determine what projects are needed to meet NZCB goals, what skills are missing, and how to deliver training for their communities.



Maintain engagement throughout the program to maintain quality standards.

Set up an advisory panel to define and implement actions and provide a broad perspective and network.

The logo for C40 Cities, featuring the text "C40" on the top line and "CITIES" on the bottom line, both in a bold, black, sans-serif font. The text is centered within a white square that has a thick black border.

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Appendices

1. Finance Mechanism for Training Programs
2. Just Transition Best Practices for Training Programs
3. Methodology
 - a) Objective for Case Study Profiles
 - b) Case Studies (Slide 13- 26)

1. Finance Mechanisms for Training Programs

FUNDING MODELS FOR GREEN SKILL TRAINING PROGRAMS	DESCRIPTION
Direct Payment	Direct payment from the participants for training by building construction workers and their employers.
Training Levy / Apprenticeship System	Resourced by a levy on employers based on a percentage of reckonable earnings of employees in certain employment courses, which is collected through a centralized system (federal or provincial/state, depending on country). This funding model is used in the QualiBuild Program.
National Training Funds	Grants from the federal government to support national strategies.
State/provincial level funds for training	Grants to support state or provincial initiatives.
Energy Companies & Financial Institutions	Financial contributions from electricity or gas utility companies as well as construction pension funds.
Building Products Manufacturers	Capital investment from private companies providing materials, products, models and venue hire.
Corporate Sponsorship or business development-focused training	Courses offered directly by manufacturers for product-specific training, for little or no charge, to encourage contractors to buy their products.

2. Just Transition Best Practices for Training Programs



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- For pre-apprenticeship programs, soft skills and social assistance can enable some participants better access to the opportunities.
- Encouraging younger, racially diverse and women speakers at events in forums for AEC can be challenging while maintaining an experienced and representative panel.
- Virtual components, reduce barriers to participate scheduling, travel time, time away from, reduced program cost.
- Training programs need to provide pathways to employment that evolve with market demand to ensure opportunity for participants.
- Training programs that provide entrepreneurship pathways can empower marginalized persons and support an equitable transition to a low carbon economy.
- Stipend to participate in training programs can reduce accessibility issues.

3. Methodology

Literature review & jurisdictional scan

- A literature review and a jurisdictional scan of existing resources and leading skills training programs and models for green and net zero carbon building construction was conducted

Evaluate training programs

- Twenty-eight training programs were selected for their unique features and best practices. See slide 11 for the full list of criteria used to evaluate the programs.

Key informant interviews & case study development

- Interviews were conducted to identify programs that facilitate cities' goals for Net Zero Carbon (NZC) buildings and address the Just Transition.

Methodology: Training Program Evaluation Criteria

- Name of Training Program
- Jurisdiction (City + Province / State)
- Country
- Program Description (approx. 200 words)
- Lead Administrator
- Program Launch Date (i.e., length of time the program has been active?)
- Other key partners involved in the program's development and administration
- Role of the local government
- Technical focus (new construction, retrofits, homes, multifamily, etc.)
- Targeted Subsector for Training (e.g., construction, engineers, architects, energy advisors, building officials, HVAC etc.)
- Target Demographic (e.g., youth mentorship / apprenticeship, post-secondary education, professional development, mid-career reskilling / upskilling, women in trades, etc.)

- Target Demographic (e.g., youth mentorship / apprenticeship, post-secondary education, professional development, mid-career reskilling / upskilling, women in trades, etc.)
- Target skills (energy modelling / assessment/ building science, envelope (carpentry, windows, etc.), HVAC, etc.)
- Delivery Model (In-person, virtual, hybrid, Theory vs Experiential, applies, mentorship etc.)
- Certification Outcome
- Name of Certification and potential value associated with it
- Co-benefits, Skills and Gaps
- Funding Model (e.g., private, public, public-private, NGO, etc.)
- Relevance to equity and just transition narrative
- COVID-19 Impact & Adaptations (has the program pivoted to adjust for COVID-19, such as offering virtual learning modules, etc.)

Objectives for Case Study Profiles

The objective of the case study profiles is to showcase best practices and lessons learned of leading green skills training programs to inform how Cities can best position themselves to enable net zero carbon buildings through green skills training.



The goal of the case studies is to profile approximately 10-12 (total) best practice models – approximately two to three under each of the four funding model areas (i.e., private sector, public sector, public-private partnerships, and citizen-led initiatives) and uncover barriers and opportunities for municipal leadership for green skills in the building sector.

Selected Case Studies

Knowledge Exchange Center

Centers of Excellence established by cities to facilitate NZC training at the design level

ZEBx

The Building Energy Exchange (Be-ex)

Affordable Housing Design Leadership Institute

Training Models for Disadvantaged Persons

Programs focused on green training with strong connection to the Just Transition

Louisiana Green Corps

GRID Alternatives

Priority Hire

Highway Construction Careers Training Program

Institutional Training / Facility Model

The British Columbia Institute of Technology

Skill Change from High Carbon Industry

Iron and Earth

Utility Rebate / Skills Registry

Apprenticeship funding or programs supported by local policies.

QualiBuild

Clean BC Better Homes Program

Apprenticeship

Apprenticeship funding or programs supported by local policies.

GPRO – Urban Green Building Council

UK Apprenticeship Levy

Forum to connect real-estate and design communities to energy and lighting efficiency solutions through education, exhibitions, technology demonstrations and research;

- Resources for building decision-makers;
- Partnerships with other organizations to develop outreach to a broader audience.

Best Practices

- Monthly symposia designed for stakeholder engagement on topical events;
- Exhibits are hands-on experiences about energy efficiency, displaying technology and inspiring action;
- Educational forums, technology demonstrations, and professional training programs to affect change in the building industry by advancing progressive discourse on high-performance, low-carbon buildings .

Funding Model

- Funding from New York City, New York State, other public and private corporations;
- Additional funding from memberships and professionals within the community;
- Considering subscription service for other cities to share content.

Just Transition

- Outreach through NYC Accelerator to disadvantaged neighborhoods (low income or polluted);
- Developing programming in more languages.

Case Study: Knowledge Exchange Center

- Center to support the goals of the city's zero emission building plan, with city in an advisory role
- Provides a forum for the green building industry (developers, designers and builders)
- Identifies and removes barriers such as training, resources and permitting.

Best Practices

- Events – webinars, workshops, dialogues, seminars, tours, technology demonstrations;
- Resource development – case studies, technical playbooks for high performance construction, trend analysis for new construction and its performance, policy guides for industry;
- Incentivizing with platform for leaders to share expertise;
- Incentivizing with Near Zero – identify and gather costs, savings and performance data and share insights.

Funding Model

- Seed funding provided by the City of Vancouver gradually declining over three years;
- Additional funding required to be secured from other sources;
- Supported by public and private grants.

Just Transition

- Encouraging younger, racially diverse and women speakers;
- Measuring involvement of women in panels at events.



Case Study: Knowledge Exchange Center

Affordable Housing Design Leadership Institute (AHDLI)

Cities across the US

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For over 10 years, AHDLI brings together building developers and design leaders to share best practices and to take on affordable housing's increasingly complex construction, policy and finance challenges. As a result, developers have amplified their projects to improve the lives of the residents and communities they serve.

Best Practices

- Educating and training Developers are a key intervention point in greening existing and new construction buildings;
- Leveraging urban design principles through an equity lens can help the real estate development ecosystem unpack development complex challenges require to advance green buildings;
- Buy-in from City Mayors is essential for training program to have lasting impact throughout the building development value chain. There is a need for City leaders to believe in big ideas that can transition the building stock to net zero.

Funding Model

- AHDLI is funded through foundations and local sponsorship;
- Participants must apply to be accepted into the program. Once accepted participation is free.

Just Transition

- Educating and training developers on equitable and sustainable design principles for low-income housing development can maximize the development's impact on the local community.

Case Study: Knowledge Exchange Center

BCIT's High-Performance Buildings Lab, BC Energy Step Code Courses and Passive House Training program are part of BCIT's School of Construction located in Burnaby British Columbia. The courses are targeted to the construction industry to support the transitioning to the new BC Energy Step Code, the new City of Vancouver Zero Emissions Building bylaws and the upcoming changes to Canada's National Building Code.

Best Practices

- The City of Vancouver heavily promoted the program in their newsletters and covered 50% the cost of the training program for participants who were working on any city related projects. This resulted in half of the class participants had received a program grant from the City;
- The training program linked City building performance targets. E.g. If builders do not meet the City's air tightness target by a small fraction, the City will approve the occupancy permit under the conditions that a person from the builder's team attends the Passive House Training program.

Funding Model

- BCIT's High-Performance Buildings Lab, BC Energy Step Code Courses and Passive House Training program is funded by the Province of BC, WorkBC, BC's Real Estate Foundation, Vancity, BC Hydro , BC Housing, City of Vancouver and Fortis BC.

Just Transition

- The programs offer grants to programs participants funded by the City of Vancouver and WorkBC to increase the accessibility of the program;
- The High-Performance Buildings Lab is partnering with the Construction Pension to deliver training to marginalized communities so enable pathways to employment in the construction industry.

- Upskilling existing workforce to green skills, 2013-2016 to reach 2020 energy-saving targets;
- Certification through a Skills Registry provides list of qualified workers for hire;
- Primarily renovation of existing buildings to improve energy efficiency.

Best Practices

- Encourage active participation and collaboration between trades in courses;
- Communications campaign to homeowners on the importance of employing trades upskilled in quality and energy efficiency;
- Focus on prefabrication allows for more thorough training on fewer skills for specific tasks in factory.

Funding Model

- IGBC coordinated the program with government in an advisory and facilitating capacity;
- Funding provided through Intelligent Energy Europe Programme for three years;
- Limerick Institute of Technology and other universities provided courses through contracts.

Just Transition

- Retrain unemployed bog workers (similar to fossil fuel sector) with new skills;
- Difficulty in attracting younger workers and women to construction;
- Suggest greater awareness efforts in early education.

Case Study: Utility Rebate / Skills Registry



Clean BC Better Homes Program

Clean BC Better Homes Program has a Registered Contractors Program that provides training for contractor on heat pumps and insulation. Once a contractor goes through the training they get on a preferred list on the Clean BC Better Homes website. The program is linked to BC Hydro's rebate program so that contractors can offer their customers rebates on insulation and heat pumps.

Best Practices

- The development of this program is linked to BC's home performance stakeholder council. The council informs training to foster training alignment with the building code;
- Municipalities support this program and promote it within their networks;
- A growing number of local governments in BC are offering top-up rebates (Municipal Top-ups) to the CleanBC Better Homes and Home Renovation Rebate Program. This creates an additional economic incentive for contractors within the local region to become a preferred contractor.

Funding Model

The program is funded by BC Hydro, Fortis BC and the Province of BC.

Just Transition

- This program is not directly linked to a just transition.

Case Study: Utility Rebate / Skills Registry

Highway Construction Careers Training Program

Illinois

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- Pre-apprenticeship training coordinated between Dept of Transportation and colleges;
- Skills offered are based on openings of trade union apprenticeship programs.

Best Practices

- Work closely with the trade unions to establish buy-in;
- Advisory Board to direct dynamic offering of courses based on anticipated needs of industry;
- Marketing initial outreach through unemployment offices, state agencies, schools, vendor fairs, career fairs.

Funding Model

- State funding for schools and for apprenticeship training;
- IDOT funding to reimburse \$15/hr for apprentices hired through the program.

Just Transition

- This program is not directly linked to a just transition .

Case Study: Training Models for Disadvantaged Persons



Louisiana Green Corps

New Orleans, LA

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- Construction and Conservation job training program for disadvantaged youth;
- Created after Hurricane Katrina to rebuild with more energy efficient and sustainable techniques.

Best Practices

- Work closely with the trade unions to establish buy-in;
- Advisory Board to direct dynamic offering of courses based on anticipated needs of industry;
- Marketing initial outreach through unemployment offices, state agencies, schools, vendor fairs, career fairs.

Funding Model

- Combination of public and private funding;
- Recent private donation is allowing them to double their size;
- Partnerships with corporations have supplied tools and resources.

Just Transition

- Poor and disadvantaged youth gain construction and soft skills while earning a wage;
- 91% obtain employment at the end of the program.

Case Study: Training Models for Disadvantaged Persons



Priority Hire

Seattle



Program was created in 2015 for City public works construction projects of \$5 million or more, in 2017 it expanded am to public/private partnership projects with significant City investment.

Due to Covid, 2020 shift in focus on worker retention (Construction Recruitment, Training, Job Readiness and Retention) in collaboration with community based organizations: a) Apprentice and/or journey worker retention support to increase the number of Priority Hire individuals that stay in and advance in construction careers; b) Recruitment of Priority Hire individuals, with a focus on those who are also justice system-involved; c) Pre-apprenticeship construction training and/or job readiness services.

Best Practices

- Partnering with Port of Seattle, Sound Transit, working with union, the apprenticeship programs and community-based organizations, bring everyone to the table. Hope is that community-based organization will partner with unions and pre-apprenticeship and apprenticeship programs;
- Invest in community awareness, training and ongoing support in the worker pathway. Set workforce requirements and goals on public works & City public-private partnership projects. Engage all stakeholders and partners throughout development and implementation.

Funding Model

Annual collaborative funding of the City of Seattle, in partnership with the Port of Seattle and Sound Transit, is seeking proposals for the Construction Recruitment, Training, Job Readiness and Retention use public funds ("local dollars", internal revenue). An estimated total of \$1,754,000 will be available for the program period of January 2021-December 2022. Covid caused no change in funding.

Link to Just Transition

- The Program prioritizes the hiring of residents that live in economically distressed areas, particularly in Seattle and King County. In addition, City projects and public/private partnership projects have apprentice utilization requirements and women and people of color aspirational goals;
- Recruitment, training and support services for workers living in economically distressed ZIP codes, women and BIPOC (Black, Indigenous and people of color);
- Reduce economic inequities by opening doors to well-paying construction careers for underrepresented groups to enter and maintain employment.

Case Study: Training Models for Disadvantaged Persons

GRID Alternatives

Grid alternatives provides hands-on solar PV installation training and experience to marginalized persons while installing solar electric systems for low-income families in LA region. The program has been in operation for ten years and operates under a 12 week program structure. The program trains approximately 60 people each year.

Best Practices

- Work with the local community to design programs that meet the needs of the local community;
- Empower local community to create job opportunities in the green building sector by offering entrepreneurship training;
- Developed strong relationship with employers so that once training is complete participants have access to jobs in the sector. E.g., Job fairs within partnership with industry associations.

Funding Model

Grid Alternative relies on a layered funding approach and partners with local municipalities, corporations and foundations to provide the systems; businesses and community and technical colleges to provide job training; and nonprofit organizations, affordable housing providers, and other community organizations to reach the families the receive roof top solar installations.

Just Transition

- GRID Alternative works with formerly incarcerated individuals, at risk youth, veterans, people of colour and women;
- Some program participants received a stipend to participate in the program. The paid training component of the program helps to increase the programs accessibility for disadvantaged persons;
- GRID Alternative partners with a variety of organizations to provide “wrap around services” such as mental health services, legal support and access to transportation.



Case Study: Training Models for Disadvantaged Persons

Iron & Earth

Introduction to Solar Photovoltaic (PV) System Design and Installation is located in Alberta Canada and is not tied to a specific city. The are key programs designed to prepare fossil fuel industry workers for careers in solar. There is a program for electricians and one for labourers.

Best Practices

Training is designed to be paired with hands-on project experience. The pandemic created a need to shift to hybrid models of program delivery. Some of the training is suitable for remote learning, and this also allows workers to spend less time away from work.

Funding Model

Funding is currently provided through Energy Efficiency Alberta and the Municipal Climate Action Fund. This is supplemented by foundation funding. Likely opportunities to scale up the program with federal funding for the development of remote learning programs. Further interest from energy companies interested in the transition to net zero.

Just Transition

Training is designed for people who have been left out of the old energy economy – a goal is to make the training welcoming to women. Developed in partnership with Louis Bull Tribe, and they are co-owners of the training programs. Curriculum was developed in partnership with elders, represent Indigenous ways of knowing and being, and can be applied differently depending on the territory they are being delivered on. Program enrollment prioritizes either 50% women or 50% Indigenous workers.



Case Study: Skill Change from High Carbon Industry

GPRO is an international training and certificate program that aims to teach the principles of sustainability and trade-specific green building construction knowledge to people who build, renovate and maintain buildings. It is targeted towards experienced building professionals (e.g., building operators, plumbers HVAC technicians etc.) who seeks to integrate green practices into their existing trade.

Best Practices

- Curriculum is developed in collaboration with industry to incorporate best practices;
- Program delivery is flexible in order to meet the needs of the target audience (existing building professionals) – offered online and in-person (pre-COVID). GPRO also has selected delivery partners that are authorized to provide training to organizations and the general public in local markets or to audiences at member organizations, such as unions;
- Stakeholder engagement (e.g., unions, educational institutions, employers, USGBC, CaGBC etc.) is a key factor in marketing and success;
- Action-oriented follow-up: all participants come out of the training with key action items to focus on;
- Market trends and policy are a key driver for participation e.g., NYC's Climate Mobilization Act, Local Law 97.

Finance Model

- Urban Green Council is non-profit organization;
- GPRO training program is partially funded by NYSERDA;
- Delivery partners (unions, green building associations, educational institutions employers – real estate and construction firms) also have additional avenues for funding;
- Program fees.

Just Transition

- Important to frame skills development and retraining in a positive light;
- Efforts are underway to improve opportunities for marginalized groups;
- Looking to reincorporate environmental justice content as part of the curriculum.

The GPRO logo, with "G" in black and "PRO" in a light green color.

Case Study: Apprenticeship

Apprenticeship Levy

United Kingdom

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- An attempt by the UK Govt to increase the quantity and quality of apprenticeships with a levy on large employers to provide funding;
- Lack of strategic objectives or structure aligned with goals has allowed for misuse;
- Businesses value program because it produces more well-rounded individuals and professionals.

Best Practices

- Funding levels for apprenticeships have doubled, number of apprentices has decreased;
 - The definition of apprentice has been skewed because of misuse and abuse of the program;
- Training accreditations must be reviewed periodically to remain relevant
- Businesses value apprentices because they are well-rounded and have experience to build on.

Funding Model

- Large employers (2%) with a pay bill of over £3 million pay 0.5% of their total annual pay bill;
- Funds are accessible by those employers and other SMEs to fund apprenticeships.

Just Transition

- No specific just transition focus;
- 10-11% minority participation;
- 11% learning difficulties or other disabilities.

Case Study: Apprenticeship