Song: Barrio Bueno – The Cabildos

August 30, 2018

Vancouver launches Zero Emissions Buildings Exchange

As part of its Zero Emissions Building Plan, the City of Vancouver and its partners, including Passive House Canada, recently announced a Zero Emissions Building Exchange (ZEBx) – a local support centre located in Gastown, BC, to help the construction industry to meet Vancouver's ambitious clean-building targets.

The Zero Emissions Building Plan, which requires most new buildings to be near zero emissions by 2025 and all new buildings to be zero emissions by 2030. Also, in 2017, British Columbia released the BC Energy Step Code, which sets the path for all new buildings to be net zero ready by 2032. ZEBx is dedicated supporting the industry through this transition, acting as a catalyst that transforms the entire design and construction value chain, and at the same time increasing knowledge, interest and capacity for effective, attractive, low-energy residential and commercial buildings.

At rapi

Credit: Suspencewl

The first of its kind in Canada, ZEBx aims to boost knowledge among residential and commercial building operators

The October civic election is destined to result in a new-look city council running Vancouver, but it's still been business as usual for Mayor Gregor Robertson and his team. For example, Robertson will be on hand on

JULY 2018

VANCOUVER SUN

Commercial Real Estate

Commercial Real Estate: Vancouver launches Zero Emissions Buildings Exchange

Evan Duggan
Jul 26, 2018 • July 26, 2018 • 3 minute read • Join the conversation

Zero Emissions Building Exchange opens in Vancouver

Peter Caulfield August 13, 2018

ZEBX — From left to right, Vancouver Mayor Gregor Robertson; Sean Pander, City of Vancouver green building manager; Fiona Famulak, VRCA president; Christian Cianfrone, ZEBx executive director; Eesmyal Santos-Brault, Regenerative Applications CEO; and Rob Bernhardt, Passive House Canada CEO.

RR-2

CITY OF VANCOUVER

POLICY REPORT
DEVELOPMENT AND BUILDING

Report Date: July 5, 2016
Contact: Sean Pander
Contact No.: 604.871.6542
RTS No.: 11195
VanRIMS No.: 08-2000-20
Meeting Date: July 12, 2016

TO: Vancouver City Council

FROM: Green Building Manager, Sustainability Group

SUBJECT: Zero Emissions Building Plan

RECOMMENDATION

A. THAT Council approve the Zero Emissions Building Plan (attached as Appendix A) and adopt a target to reduce emissions from new buildings by 90% as compared to 2007 by 2025 and to achieve zero emissions for all new buildings by 2030 including intermediary time-stepped GHG emission and thermal energy demand targets as described in the Plan.

B. THAT Council direct staff to report back with specific recommendations to reflect the first step of these limits in the Rezoning Policy for Green Buildings and Vancouver's Building Bylaw along with any synergistic updates to Neighbourhood Energy connection requirements by Q1 2017.

C. THAT Council direct staff to build all new City-owned and Vancouver Affordable Housing Agency (VAHA) projects to be Certified to the Passive House standard or alternate zero emission building standard, and use only low carbon fuel sources, in lieu of certifying to LEED Gold unless it is deemed unviable by Real Estate and Facilities Management, or VAHA respectively, in collaboration with Sustainability and report back with recommendations for a Zero Emissions Policy for New Buildings for all City-owned and VAHA building projects by 2018.

D. THAT Council direct staff, in consultation with industry, to develop a three year, $1.625 million Zero Emissions Home Program for detached and row houses ($325K in 2017 from the Climate Action Rebate Incentive Program Reserve, $650K in 2018 and $650K in 2019 from a funding source to be determined and reported back to Council), and report back to Council with specific recommendations for tools to catalyze leading builders to demonstrate cost effective approaches to building zero emissions homes by 2017.

F. THAT Council approves in principle $700,000 over three years ($300K in 2017, $200K in 2018, and $200K in 2019 from the City's 2017 Innovation Fund, subject to Council approval of the 2017 Innovation Fund budget) towards establishing a non-governmental Zero Emissions Building Centre of Excellence with the mission to facilitate the compilation and dissemination of the knowledge and skills required to design, permit, build and operate zero emission buildings in BC, and direct staff to engage partners, secure matching funding, consult with stakeholders and report back with recommendations for implementation in 2017.

B2E

Building to Electrification Coalition

B2E

Events Resources FAQ About ZEBx Contact **Get Involved**

Become a Member

Becoming a member of B2E is simple and free. As a member you will enjoy the following benefits:

- Numerous collaboration opportunities with industry leaders through working groups, subcommittees, B2E events, case study development, and publishing online articles;
- Early access to building electrification news, updates and events;
- Recognition on B2E website and acknowledgement that your organization is fully engaged in the decarbonization of the building sector.

Join B2E

What is Building Electrification?

Building electrification is about making the shift away from fossil-fuels and using low-carbon electricity for space heating, hot water and cooking.

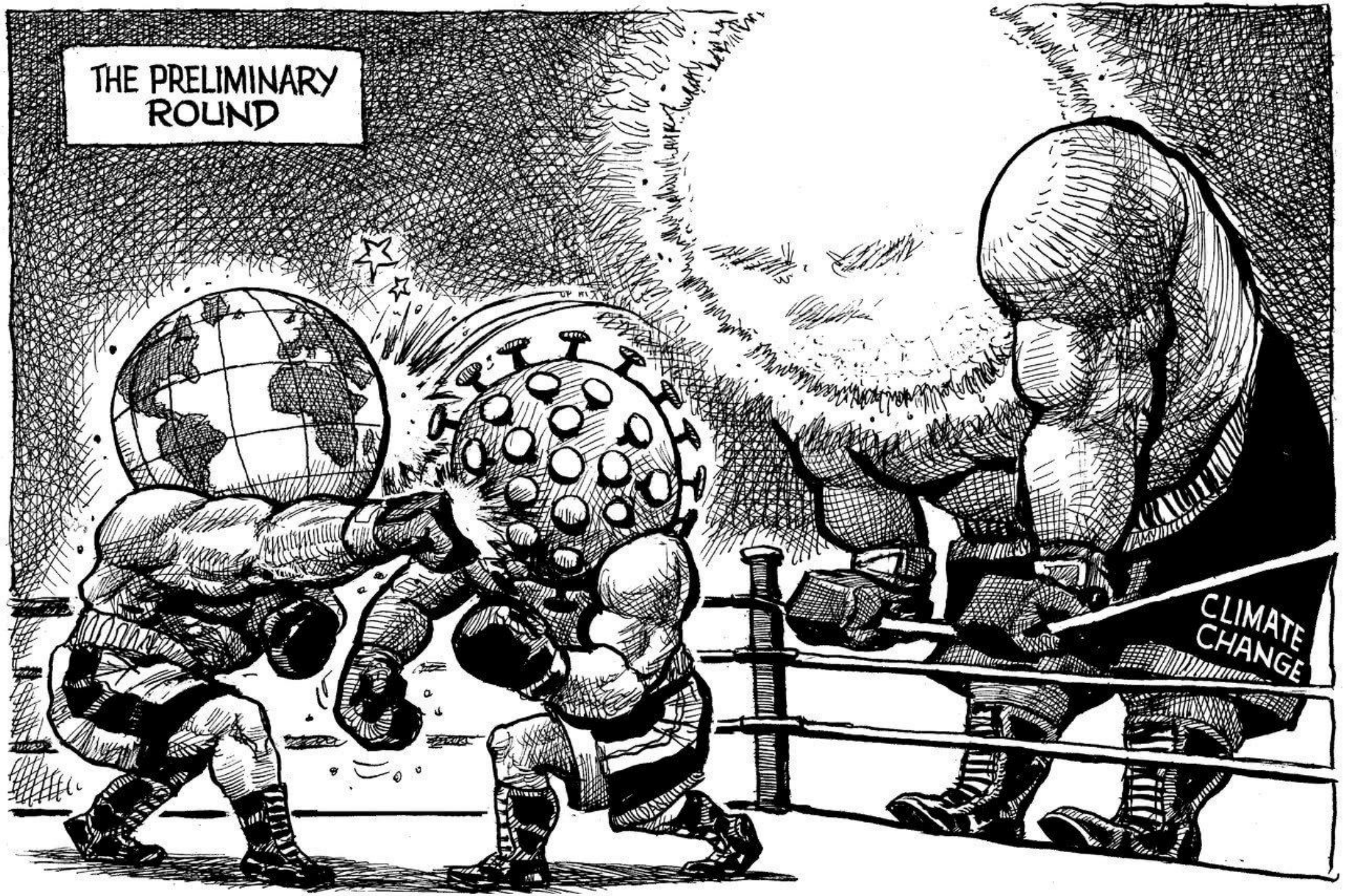
Instead of using natural gas or propane to run appliances like furnaces, kitchen stoves, washers and dryers, everything is electric.

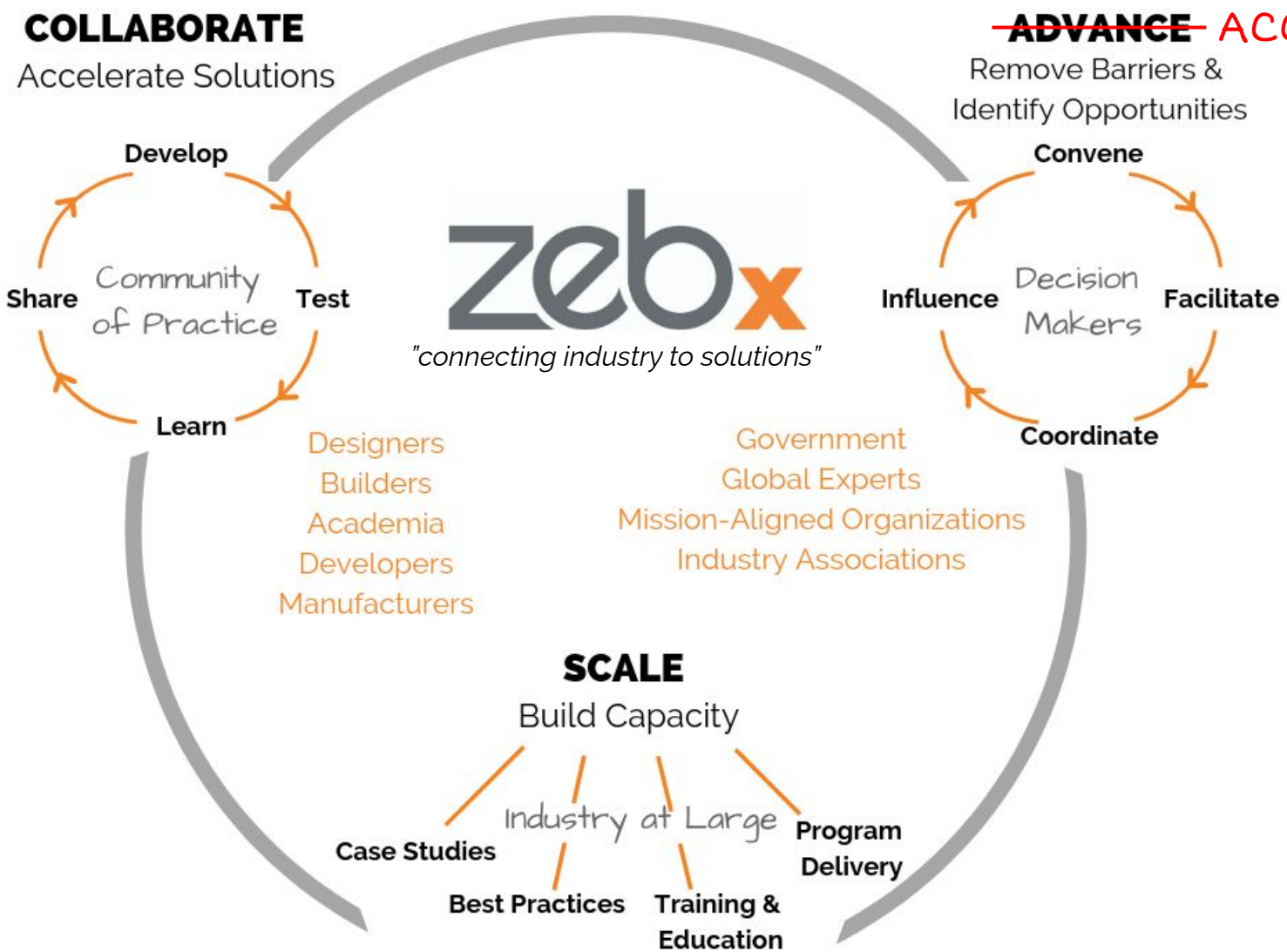
Read more about building electrification on our FAQ page.

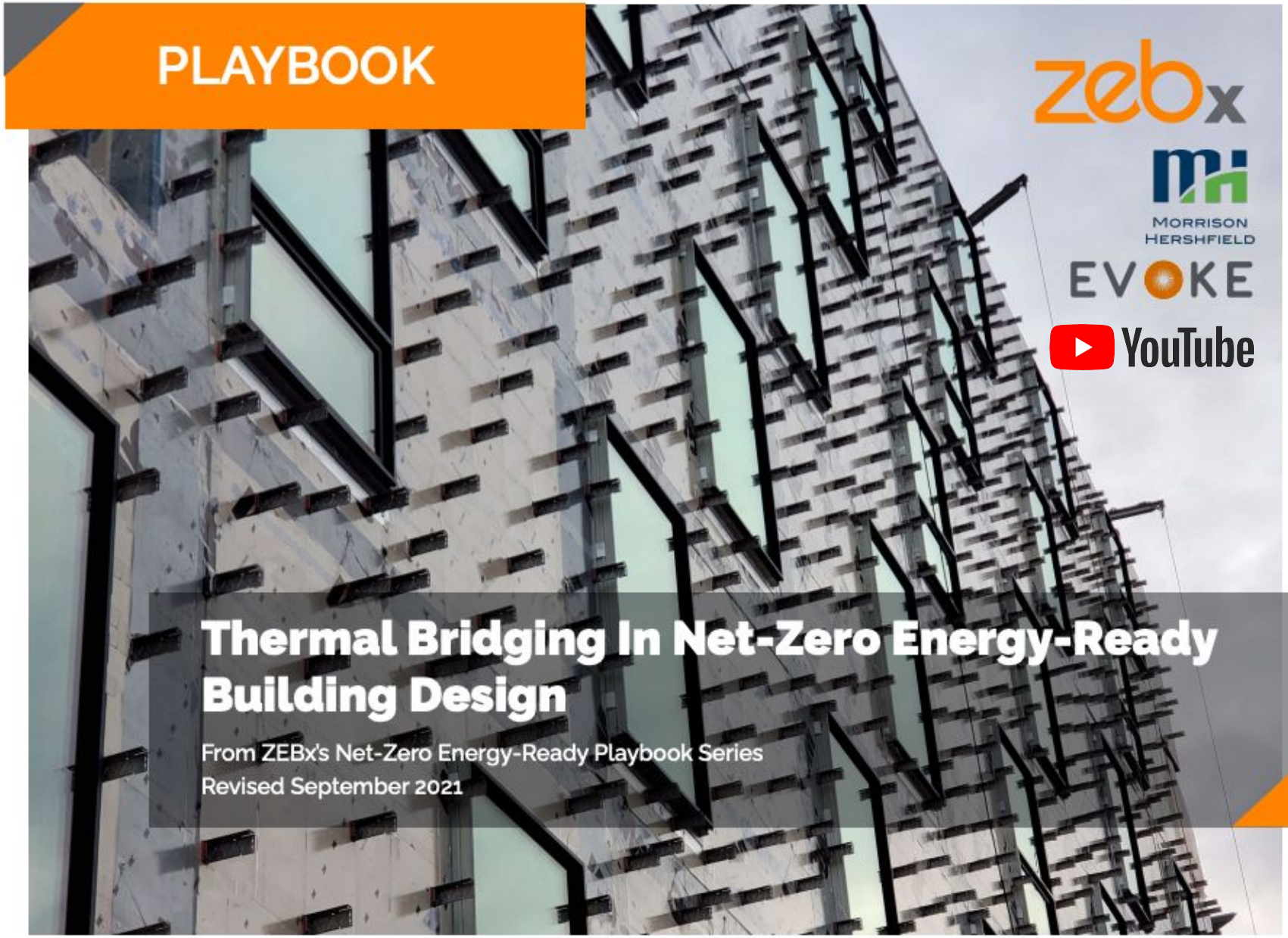
View FAQ

b2electrification.org

Kevin Kallaugher of the Economist




COLLABORATE
Accelerate Solutions
~~ADVANCE~~ ACCELERATE
Remove Barriers &
Identify Opportunities
Develop
Convene
Share
Community of Practice
Test
Influence
Decision Makers
Facilitate
Learn
Coordinate
zebx
"connecting industry to solutions"
Designers
Builders
Academia
Developers
Manufacturers
Government
Global Experts
Mission-Aligned Organizations
Industry Associations
SCALE
Build Capacity
Industry at Large
Case Studies
Best Practices
Training & Education
Program Delivery



cleanBC BETTER BUILDINGS

NET-ZERO ENERGY-READY CHALLENGE

PLAYBOOK SERIES

- Ventilation Strategies for High-Performance MURBs
- Planning Airtight Buildings
- LCA Practice to Estimate Embodied Carbon
- Thermal Bridging
- Low-Carbon Energy Systems
- Planning

www.zebx.org/resources

www.zebx.org

Season 1 Episode 5

Recorded at Past Event: Jul 22 @ 12:00 pm – 1:00 pm

The Builders Have Spoken: The Cost of High-Performance Construction

0:00 / 53:32

ZEBx Slides

Overview

In our June Decarb Lunch, we presented ZEBx's in-depth analysis of construction costs for high-performance multi-unit residential buildings in BC. Of the seven buildings in the study, two all-electric, Step 4 buildings were constructed for well under the average cost of similar code-minimum residential buildings in the area. Both buildings were constructed by developer/builders: Vidorra Developments and Highstreet Ventures. How did they achieve this impressive result? Was it the fact that they are developer/builders? Do they have some special recipe for constructability or cost-effective high-performance building development?

The July 2021 was a collaboration with the Pacific Region UDI.

www.zebx.org/resources

Colliers + zebx

GOLDEN PROPERTIES + zebx

www.zebx.org/resources

CONSTRUCTION COST ANALYSIS OF HIGH-PERFORMANCE MULTI-UNIT RESIDENTIAL BUILDINGS IN BRITISH COLUMBIA

zebx.org/resources

Zebx

JUNE 2021

ARTICLE

Marketing the High-Performance Home

Sep 2021

www.zebx.org/resources

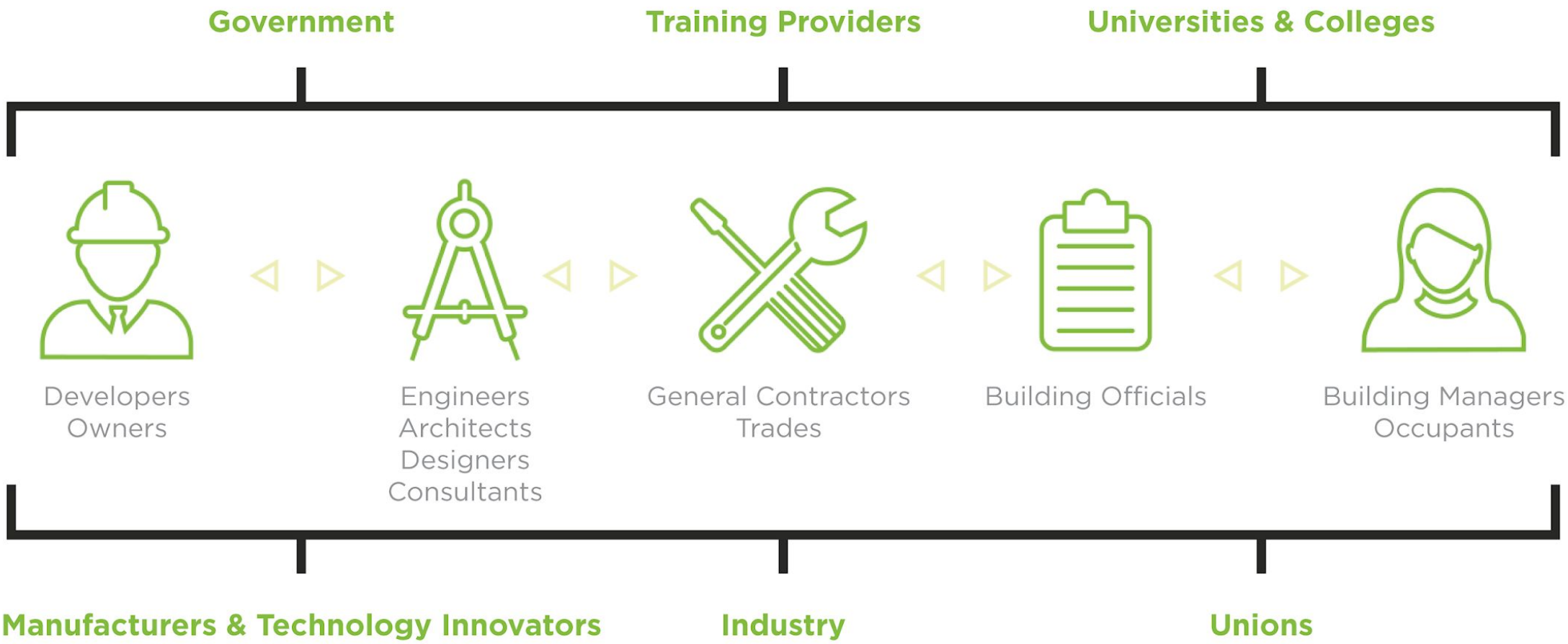
POLL 1

Tell us about yourself!

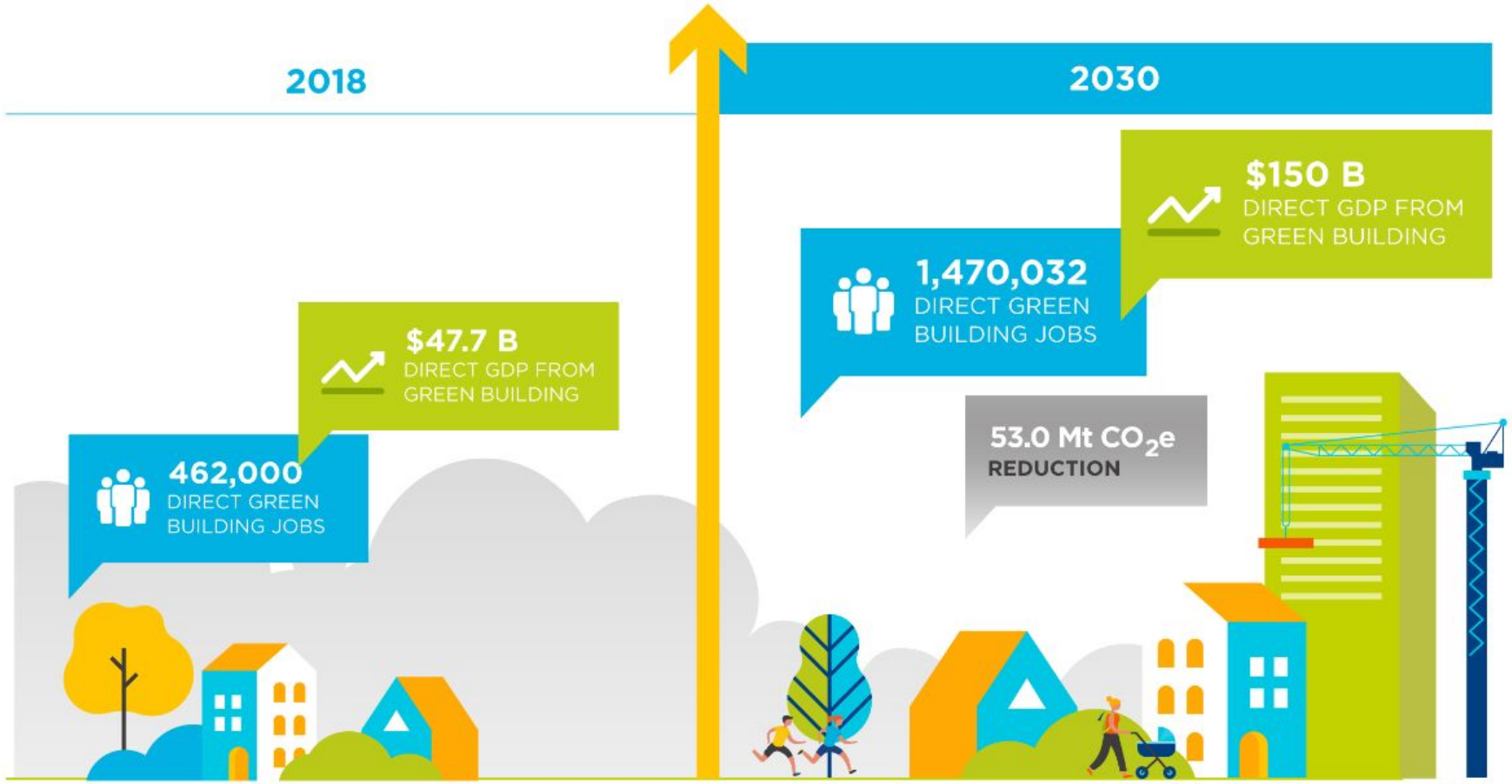
Three-part anonymous poll

Why Workforce?

Workforce Ecosystem

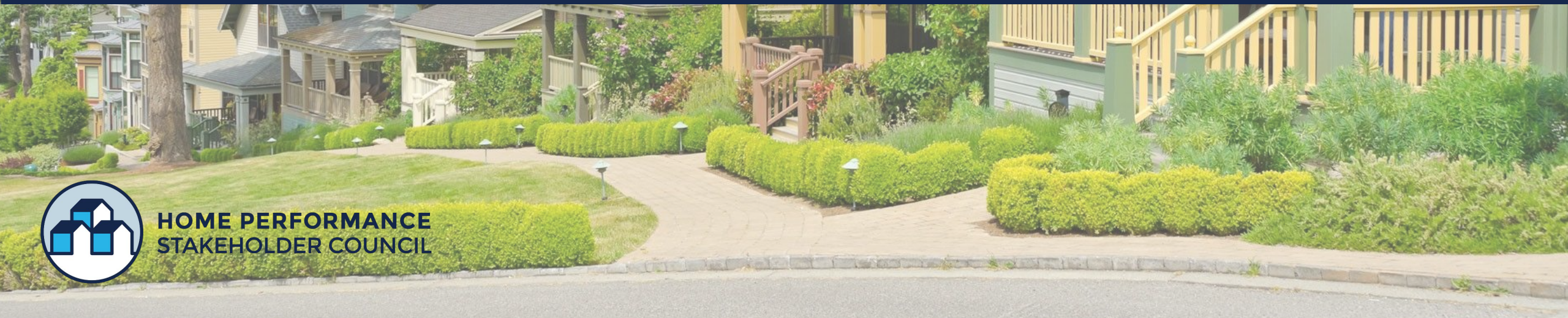


Workforce Size and Impact



Capacity Building of Qualified Residential Retrofit Contractors

November 24th, 2021



HOME PERFORMANCE
STAKEHOLDER COUNCIL

Who is the Home Performance Stakeholder Council (HPSC)?

Vision	**Serve as the lead industry facilitators to increase the supply and demand for BC contractors to deliver quality, affordable services for consumers that focus on whole-home performance.** *High performing homes significantly reduce energy use and carbon emissions while enhancing building durability, occupant comfort, and health.*			
Strategic Pillars	**Advocacy** Create opportunities for industry to work together to provide input and recommendations that remove barriers and promote growth.	**Market Growth** Develop effective, long-term strategies, tools and resources to accelerate industry growth and expand business opportunities.	**Capacity Building** Cultivate and support a trained and qualified workforce that reliably delivers home performance related products and services.	**Quality Workmanship** Help the development and implementation of programs, training and accreditation that supports quality workmanship.
2021 Priority Initiatives	**Networking of Qualified Contractors**	Establish a network of qualified contractors and support ongoing engagement, networking, and consultation within the industry.		
	Home Performance Literacy & Demand	Develop and/or promote awareness and training of house-as-a-system and consumer demand to contractors.		

HOME PERFORMANCE
STAKEHOLDER COUNCIL

HPSC & HPCN Background & Development

Consultation

Leading stakeholders conduct research and consultation on the home performance industry – the HPSC is formed.

Roadmap Finalized

Stakeholders develop a roadmap of actions for the HPSC, including establishing a contractor network.

HPCN Development

The HPSC leads the development of accreditation and qualification criteria with Sector Councils.

HPCN Launch

The HPCN is open for registration.

HPCN Mandatory

The HPCN is a mandatory requirement for rebate and incentive programs.

Program Partners

BC Hydro
Power smart

FORTIS BC™
Energy at work

BRITISH COLUMBIA

Home Performance Contractor Network (HPCN)

Building Capacity of Qualified Contractors

By the Industry – for the Industry

HOME PERFORMANCE
STAKEHOLDER COUNCIL

HPCN Sectors

FENESTRATION

Registration OPEN

Mandatory* OCTOBER 2021

HEATING, COOLING, & VENTILATION

Registration OPEN

Mandatory* SPRING 2022

INSULATION

Registration OPEN

Mandatory* FALL 2022

RENOVATION

Registration OPEN EARLY 2022

Mandatory* TBD

ENERGY ADVISORS

Registration OPEN EARLY 2022

Mandatory* TBD

*** For Participating Programs**

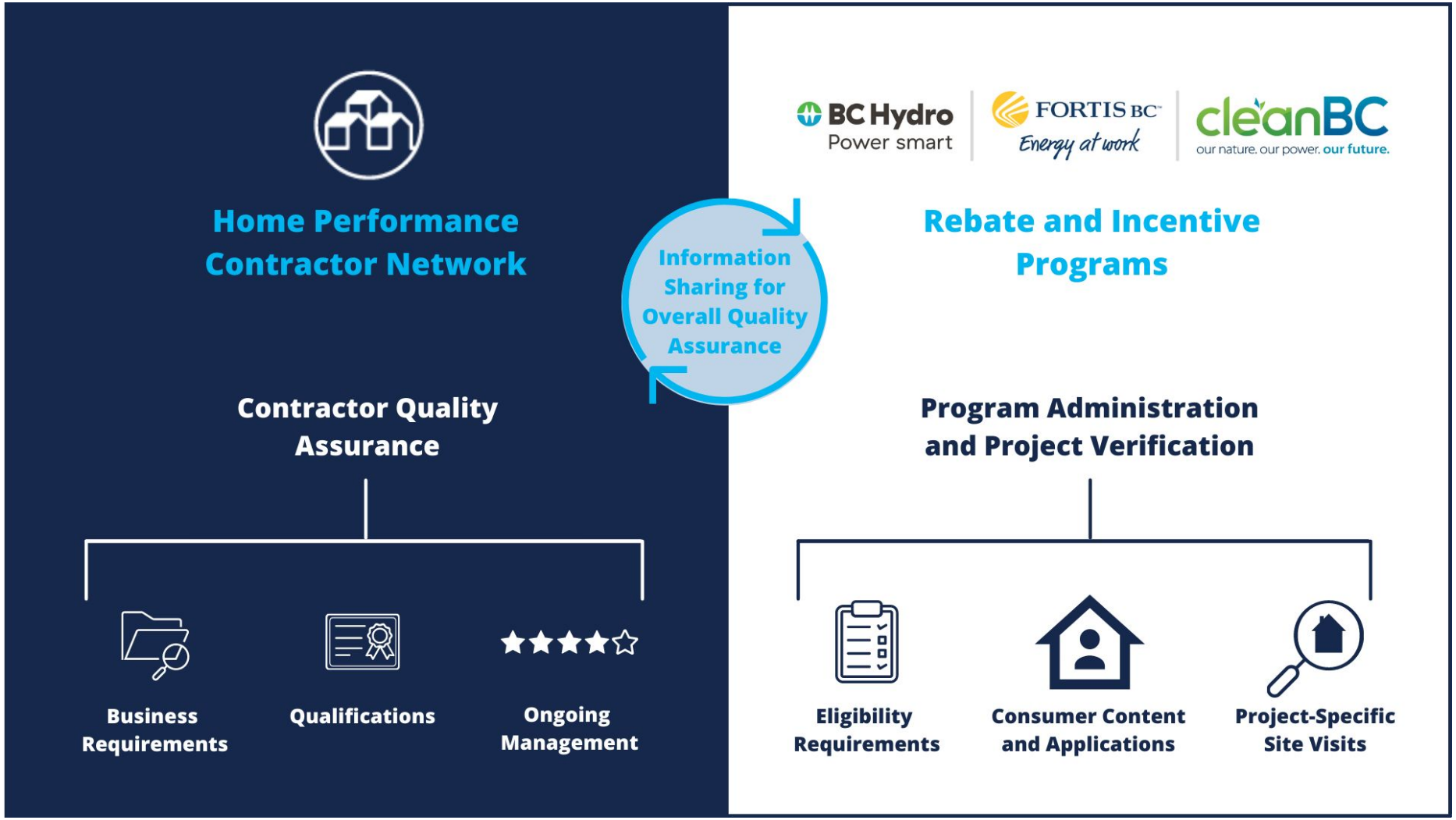
HOME PERFORMANCE STAKEHOLDER COUNCIL

Why Join the HPCN?

- Subsidized training (for a limited time)
- Eligibility for rebate and incentive programs from program partners
- Business information displayed in a public directory/search tool and promoted across BC
- Invitations to exclusive networking, engagement, and training opportunities
- Public recognition for quality work and use of the HPCN logo

HOME PERFORMANCE
STAKEHOLDER COUNCIL

HPCN and Rebate/Incentive Programs



Home Performance Contractor Network (HPCN)

HPCN Eligibility, Accreditation & Qualifications

Ongoing Support Mechanisms

HPCN Eligibility

- Must be a company or independent contractor
- Directly employee their installers for the relevant sector
- Be currently be operating in British Columbia
- Must have current, industry specific insurance coverage including Worksafe BC, and a license to work in each municipality listed under the contractor search tool.

HPCN Registration

Company

1

Application

- Business information
- Code of Conduct
- Reference Checks

Employees

2

Qualifications

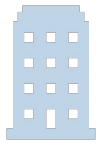
- Sector-specific: trade designations (as applicable) and training

Company

3

Business Documentation & Agreement

- Submit: municipal/regional business licenses, proof of warrantee, updated insurance, and WorkSafeBC clearance letter
- Sign network agreement



Company & Employees

4

Membership & Ongoing Management

- Displayed on the public search tool
- Access to subsidy reimbursements, network logo, networking
- Ongoing management

HOME PERFORMANCE
STAKEHOLDER COUNCIL

QUALIFICATIONS - HVAC

Required to Complete Registration

Furnace Contractors Only: Certified Class B Gas Fitter Certificate

+

Course: HPSC's Retrofitting with a House-as-a-System Approach

+

Complete Two Specific Courses from Either of These Providers:

Option 1
TECA
- Principles of Moving Air
- Heat Loss/Gain

Option 2
HRAI
- Principles of Residential Ventilation
- Heat Loss Heat Gain Calculations

Required within 6 Months of Starting Qualifications

Course: HPSC's Quality Installation of Forced Air Furnaces and Air Source Heat Pump Retrofits in BC Homes

Optional

Heat Pump Contractors: Red Seal Refrigeration and Air Conditioning Mechanic

Program Training

Course: HPSC's Air Sealing Retrofits in BC Homes (coming soon)

QUALIFICATIONS - INSULATION

Required to Complete Registration

Course: HPSC's Retrofitting with a House-as-a-System Approach

+

Course: HPCN Insulation Training for BC Homes

+

Course: HPSC's Quality Installation of Insulation Retrofits in BC Homes (Modules 0-2)

Required within 6 Months of Starting Qualifications

Course: HPSC's Quality Installation of Insulation Retrofits in BC Homes (Modules 3-8)

Optional

Program Training

Course: HPSC's Air Sealing Retrofits in BC Homes (coming soon)

QUALIFICATIONS - FENESTRATION

Required to Complete Registration

Course: HPSC's Retrofitting with a House-as-a-System Approach

+

Resource: FENBC and BC Housing's Best Practices for Window and Door Replacements

+

Knowledge Check: FENBC's Installers Exam

Required within 6 Months of Starting Qualifications

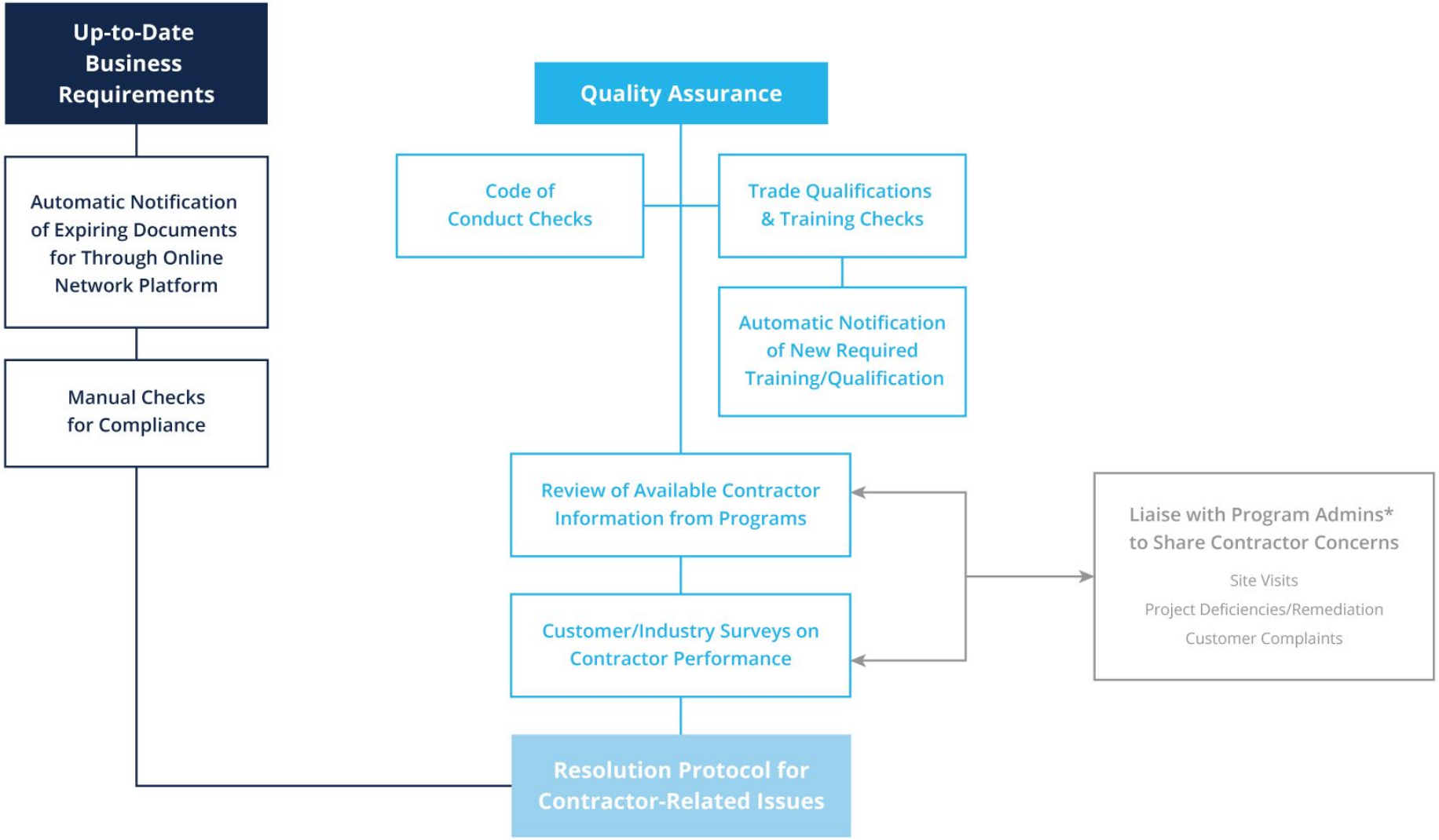
Future Development

Optional

Program Training

Course: HPSC's Air Sealing Retrofits in BC Homes (coming soon)

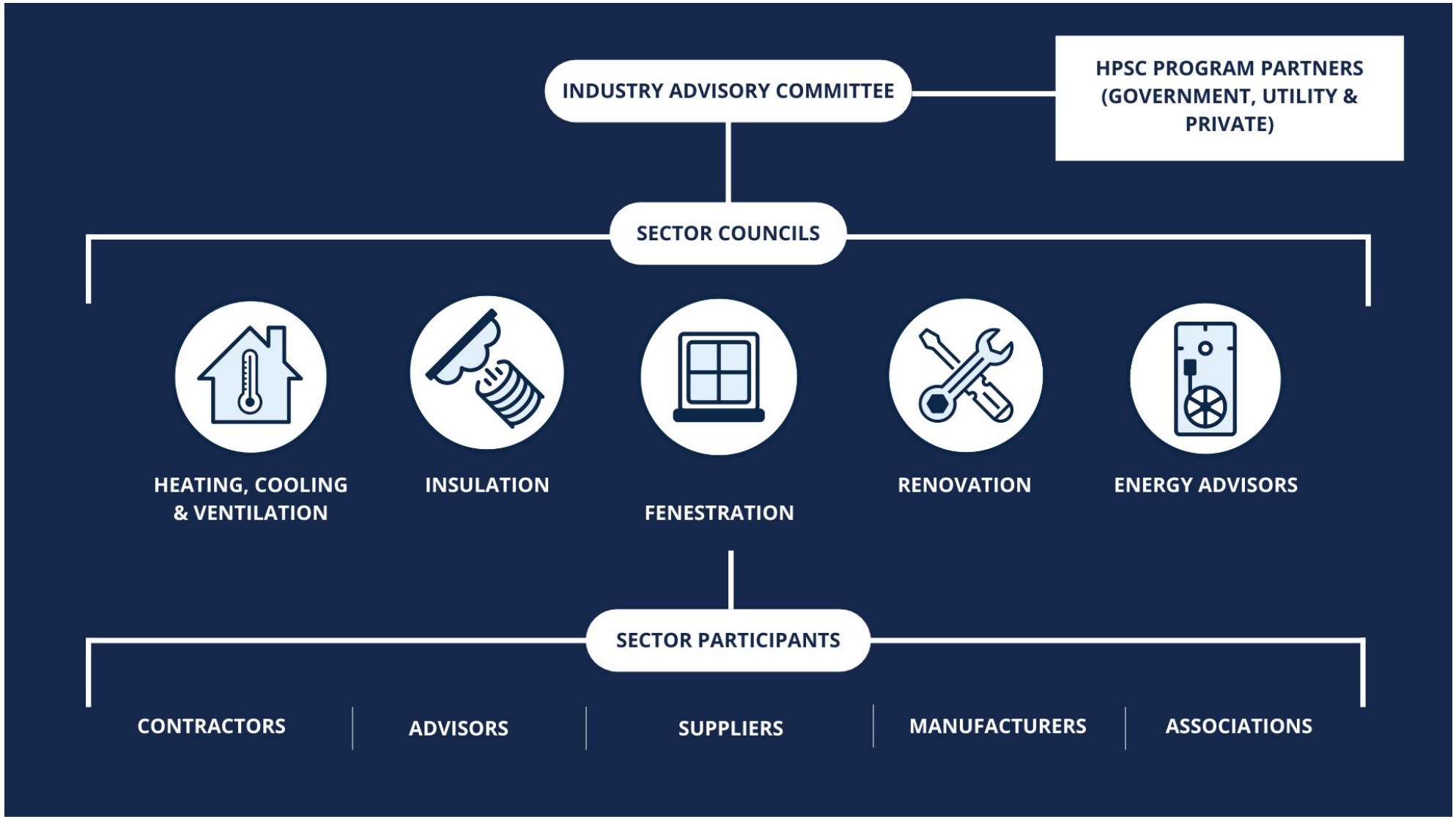
HPCN Ongoing Management



HOME PERFORMANCE STAKEHOLDER COUNCIL

*Participating program partners

Home Performance Sector Councils



HOME PERFORMANCE
STAKEHOLDER COUNCIL

What We Are Hearing From Contractors? What Do Contractors Want to Know?

General

- Supply chain and capacity/labour issues
- Current and ongoing subsidy availability for training
- Current and ongoing rebates – the process, & eligibility (homeowner, contractor, products & labour)
- *'Let us know about new programs, processes and expectations – talk to us, ask us for feedback, keep us in the loop and support us.'*

What We Are Hearing From Contractors? What Do Contractors Want to Know?

HVAC

- HVAC equipment availability
- Regulations and permits – specific to heat pumps and other electrical systems

Insulation

- Consistent access to raw materials such spray foam
- Working collectively to increase program awareness

Fenestration

- Historic levels of glass shortages
- Residential retrofit testing and workmanship best practices

Q & A

Thank You

HPCN Details and registration

homeperformance.ca/contractornetwork

Additional questions?

Email info@homeperformance.ca or
Call (604) 755-3469

HOME PERFORMANCE
STAKEHOLDER COUNCIL

Canadian Green Retrofit Economy Study

Ensuring a Competent Low Carbon Workforce & Sufficient Supply Chain Capacity

CANADA GREEN BUILDING COUNCIL • CONSEIL DU BÂTIMENT DURABLE DU CANADA •

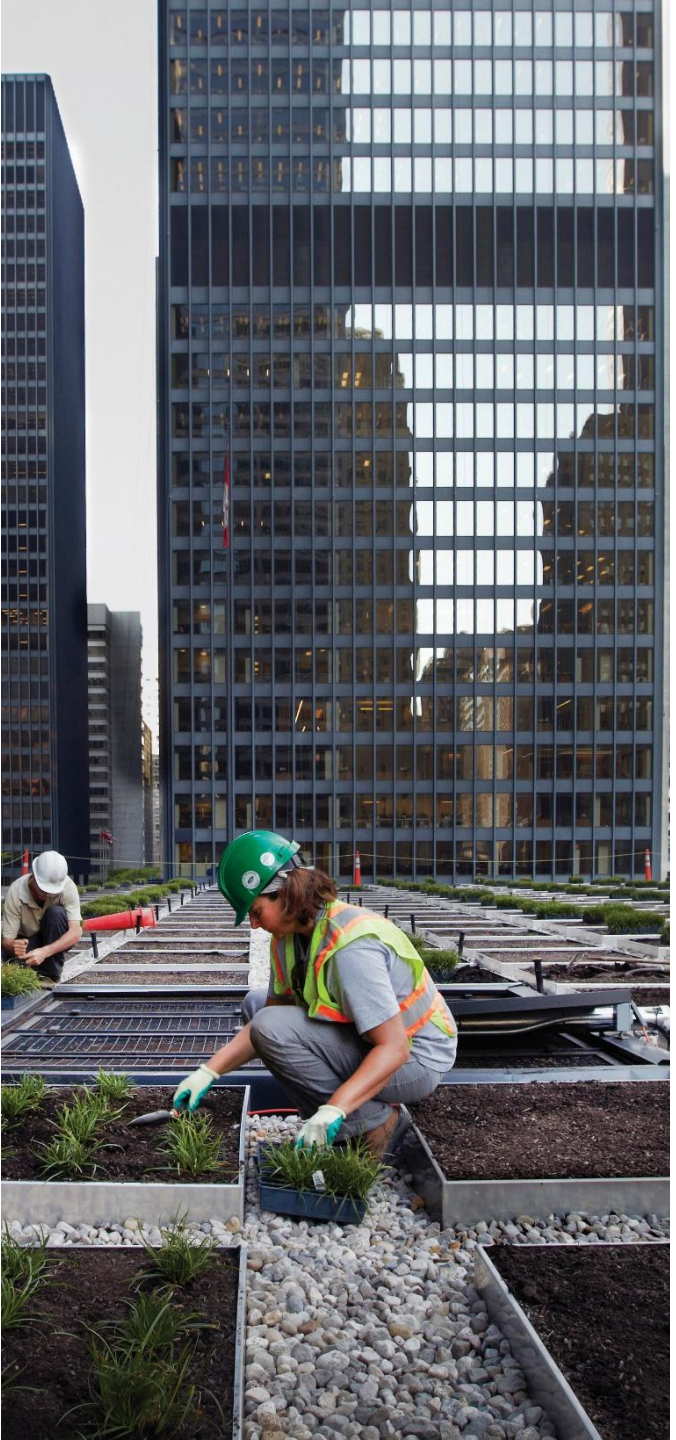
DELPHI GROUP

Project Overview

Green Building Ecosystem

Ideas to Consider for Q&A

1. Barriers to scaling up large building retrofit activity
2. Opportunities for new technology
3. Component upgrades vs. whole building renewal
4. Risks from global supply chain disruption



Context: The Market Need

- Building retrofits are needed to achieve GHG emission reduction targets
- Over $3.6 billion has now been committed to finance energy efficiency and low carbon upgrades to large buildings – a historically large investment
    - $2 billion from the Canada Infrastructure Bank
    - $1.5 billion Infrastructure and Communities Canada
    - 163 million from Federation of Canadian Municipalities
- The green building workforce will need to more than triple by 2030 to meet demand for sustainable building construction and renovation.

Green Building Retrofits at Scale

- New investments combined with a low carbon skilled workforce and a robust supply chain will enable green building retrofits at scale and support a green building industrial strategy for Canada.

New, large public and private investments in existing building retrofits projects → New Investments

+

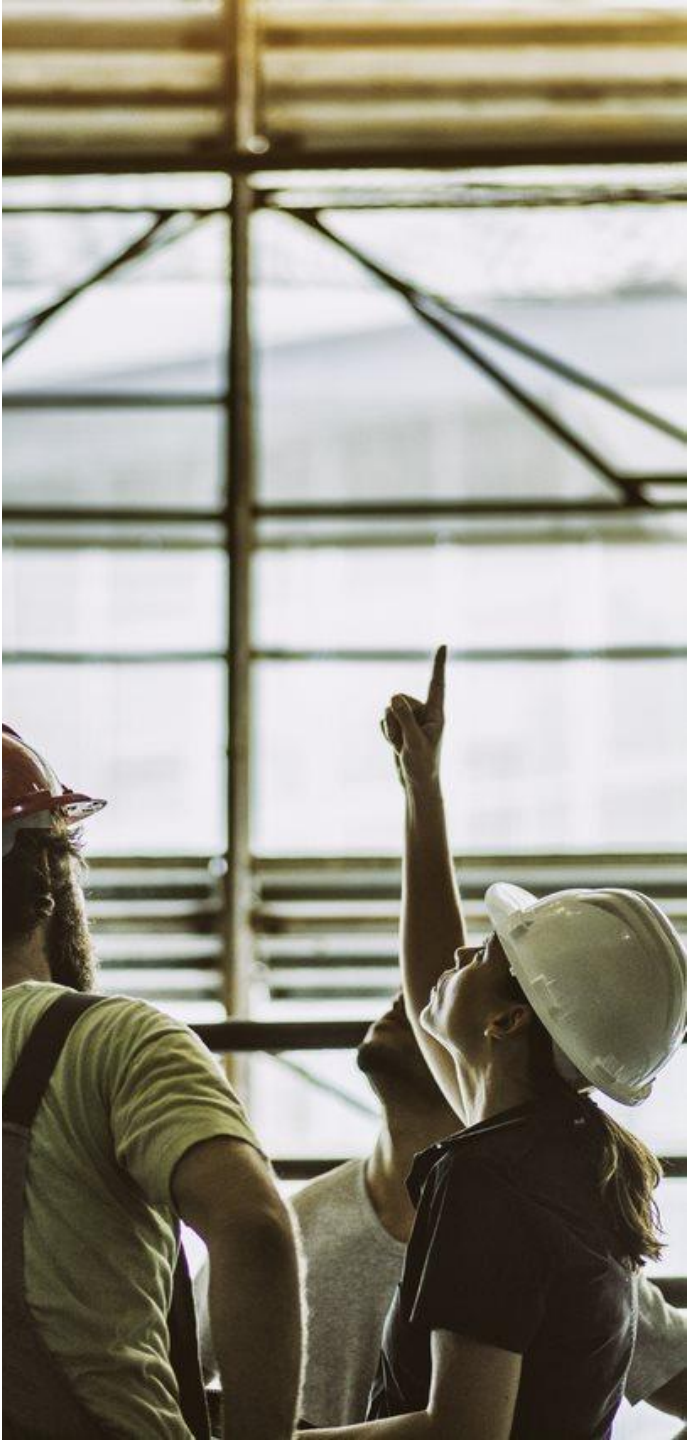
Low-carbon skills and the right number of workers in the right place at the right time to support the volume of projects → Skilled Workforce

+

Affordable low-carbon construction products, technologies, and materials → Supply Chain

→ Green Building Retrofits at Scale

→ Green Building Industrial Strategy



Project Overview

To meet our climate targets tomorrow, Canada needs a skilled workforce and robust supply chain today. The goal of this study is to **equip governments and industry** with insight about the key steps they will need to take to support a competitive, modern and low carbon building supply chain.

Specifically:

- Determine the **workforce and supply chain opportunities** presented by Canada's Part 3 retrofit economy.
- Identify by Province / region the necessary:
  - Occupations, skills and workforce qualifications; and
  - Technologies, material and products
- Provide insight on the commercial success factors to accelerate low-carbon building retrofits

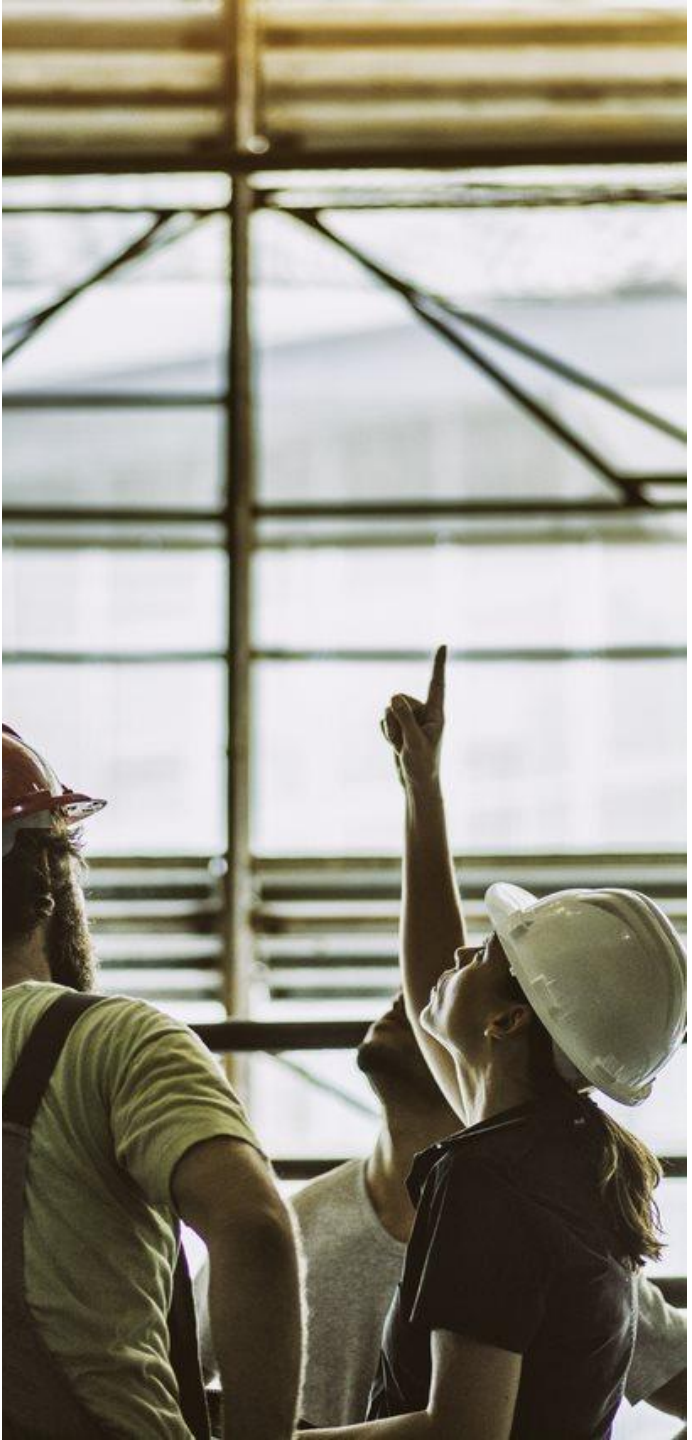
Scope (continued)

- Workforce and supply chain research parameters include:
    - Building type, size, age, and class (including residential)
    - Geographic location considering provinces, territories and climate zone
    - GHG emission reduction pathways and related technologies, equipment and materials
    - Workforce capacity, including available skills and the number of workers
    - Supply chain relationships including manufacturers, wholesalers, and retailers, alongside builders and trades

- Additional areas of focus in the demand and supply analysis will include:
    - Specific considerations for affordable housing retrofits
    - Mechanisms for developing local retrofit markets

Technical Solutions & Decarbonization Pathways

- Key Technical Solutions
- Retrofit Measures
- Equipment Required
- Key Professions
- Demand-side Analysis



Early Insights

The study launched on November 17, and here are some early insights:

- Currently the business case for deep energy retrofits is weak in many areas, with a disconnect between policy makers, building owners, and contractors
- In order to decarbonize the existing building stock by 2050, we need to move from isolated retrofit projects to a systemic approach in developing local retrofit markets
- Better market for integrating solar PV and renewables outside of BC, where energy is less regulated
- For some portfolios, mechanical system upgrades are common, while large building envelope upgrades are only happening at end of life
- Electrical capacity is a barrier for fuel switching, but heat pumps and other measures can help free up the available load

Questions and Discussion:

1. Where are the barriers and pinch-points to scaling up large building retrofits? Policy drivers or industry capacity?

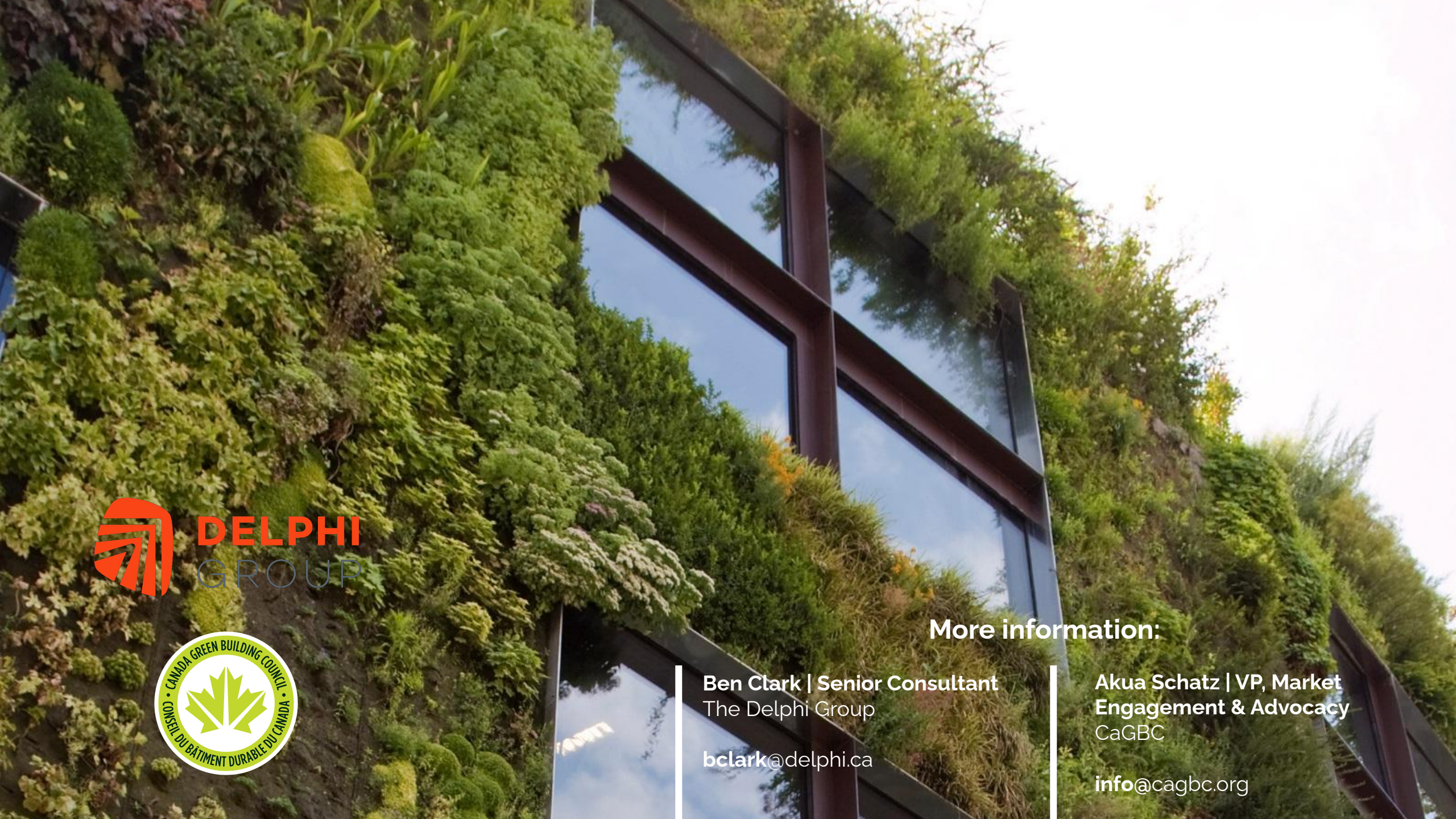
2. Where are the greatest opportunities for new technology to be mainstreamed?

3. What conditions need to be in place to move from mainly upgrading one building system at a time, to a whole building renewal approach? How does this change the effort required?

4. What are we doing / what more can we do to advance the retrofit mission in the face of global supply chain disruption?

Further Information

- Landing page and project backgrounder at www.delphi.ca
- Key informant interviews underway
- Larger stakeholder workshop in January
- Continued stakeholder engagement and alignment with existing research and initiatives



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More information:

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The Delphi Group

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Akua Schatz | VP, Market Engagement & Advocacy
CaGBC

info@cagbc.org

VANCOUVER ECONOMIC COMMISSION

Heat Pump Technology Attraction Study

Background Availability Research Findings

ZEBx Deep Emissions Retrofit Dialogue 3

November 24, 2021

dunsky
Energy + Climate

Expertise

- Buildings + Industry
- Renewable Energy
- Clean Mobility

Services

- **Quantify** Opportunities
- **Design** Strategies
- **Evaluate** Performance

dunsky
Energy + Climate

Expertise

- Buildings + Industry
- Renewable Energy
- Clean Mobility

Services

- **Quantify** Opportunities
- **Design** Strategies
- **Evaluate** Performance

GOVERNMENTS | **UTILITIES** | **CORPORATE + NON-PROFIT**

Presentation Contents

Summary

Purpose: Develop a strategy to increase the supply of heat pumps in the market to support meeting BC's ambitious goals for decarbonization of buildings.

Objective of this initial phase of the project is to **identify the needs, availability, gaps, and opportunities in heat pump supply in BC.** To do this we completed:

1. Desktop research
2. Interviewed local industry players and,
3. Leveraged our team's internal industry expertise in heat pump technology and understanding of the BC market

Project Team:
Dunsky Energy + Climate Advisors in partnership with FRESCo

Background Availability Research Key Findings

1. Much of BC's heating electrification needs can be met by available technology

- Key drivers for demand: building codes, incentives, carbon tax
- Not all available products are well known

2. Improvement in technology availability is still needed to fill remaining gaps

- Low GWP for space heating systems
- Higher temperature air-to-water space heating units for retrofits
- Low capacity 120V in-room units for low heating demand applications
- Ventilation integrated in-room units

3. Additional Takeaways

- Increasing the number of available models and manufacturers to improve awareness and confidence

Presentation Contents

Technology Needs Overview

Heat pump technologies are needed to serve a variety of different applications, end-uses, building types and climate zones, as shown below:

Applications	• Retrofit • New Construction
End-uses	• Space heating • Water heating
Building types	• Ground oriented residential • Apartment residential • Small/Medium Commercial • Large Commercial
Climates	• Zones 4, 5, 6 and 7, with some marine (temperate humid) areas

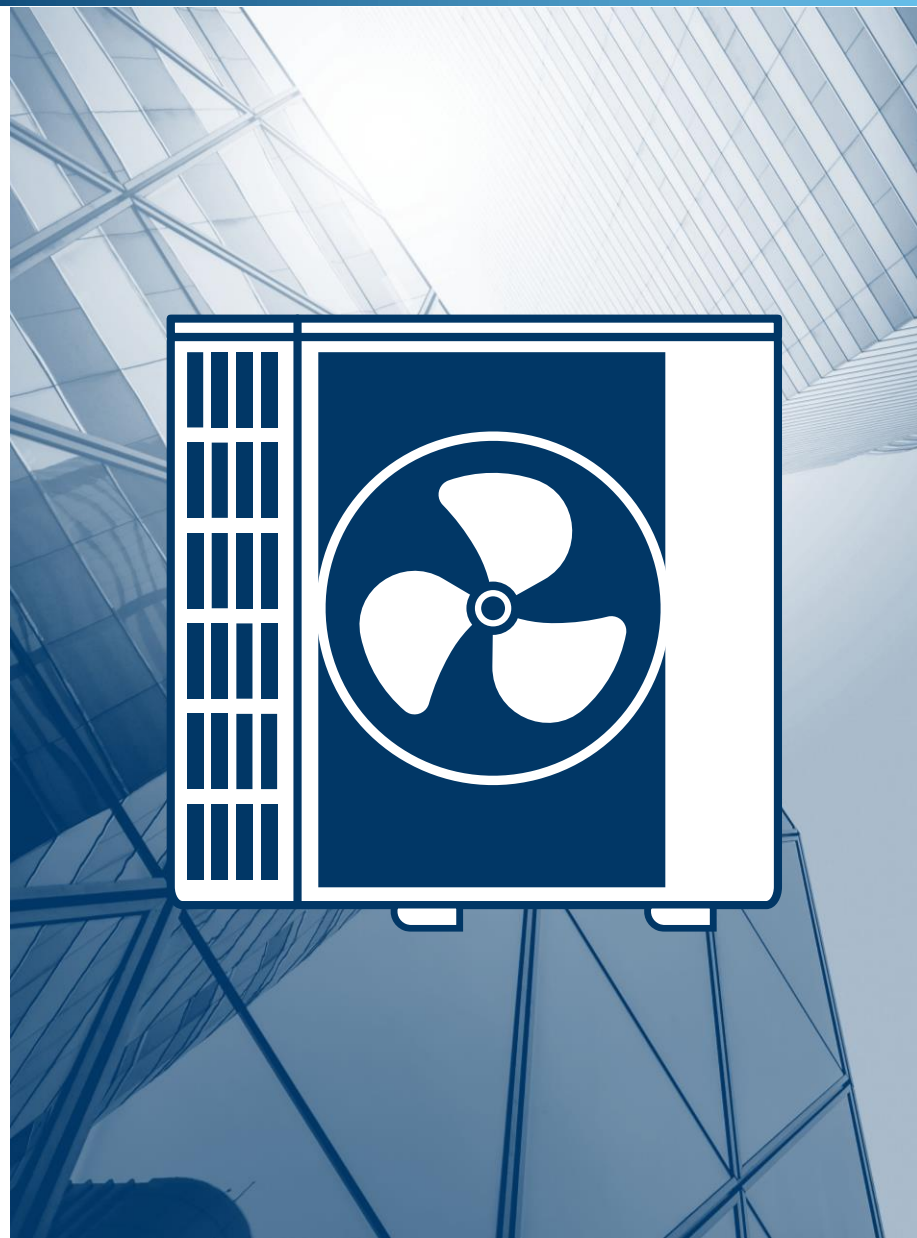
Considerations for compatibility with the BC building stock

- ☑ **Match (or replace) the distribution system (Forced Air, Hydronic, In-Room)**
- ☑ **Work with the electric service**
- ☑ **Match the building's demand**
- ☑ **Comply with permitting regulations**
- ☑ **Work in the local climate**
- ☑ **Have low GWP refrigerants & low refrigerant leakage**

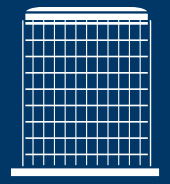
Presentation Contents

Space Heating: Key Finding

Most needs are covered by available products, but some gaps do remain, particularly regarding low GWP refrigerants.



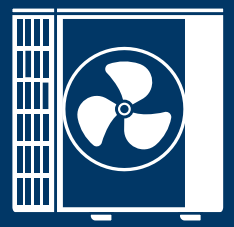
Space Heating: Ducted Systems

	Application	Availability	Gaps
Ducted air-to-air heat pumps 	• Replace furnaces in ground-oriented residential buildings	• Widely available including cold-climate models. • Mid GWP models available.	• Low GWP refrigerants
Ground source water-to-air heat pumps 	• Replace furnaces in residential buildings (limited applicability due to space & cost)	• Widely available. • Domestic hot water also available.	• Low GWP refrigerants (less of an issue since most models are packaged)
Rooftop heat pumps 	• Replace gas-fired rooftop units in small and medium commercial buildings	• Standard and cold-climate models available.	• Low GWP refrigerants (less of an issue since most models are packaged)

Space Heating: In-Room Systems

	Application	Availability	Gaps
All-in-ones (PTHPs) 	• Apartments, Hotels • Cooling retrofits into ground-oriented residential buildings.	• 120V systems available. • Products which require minimal outdoor infrastructure are available.	• No cold-climate nor low/mid GWP refrigerant models (less of an issue since most models are packaged). • Very low-capacity units.
Ductless mini-split heat pumps 	• Apartments and ground-oriented residential buildings. • Can be used in high-rises if outdoor units acceptable.	• Widely available including cold-climate models and units with multiple heads. • Mid GWP models available.	• Low GWP options. • Very low-capacity units.
Variable refrigerant flow heat pumps (VRFs) 	• New construction apartments and commercial buildings. • Can be used in retrofits in some cases.	• Widely available including cold climate products. • Mid GWP models available.	• Low GWP options. Concerns about refrigerant leakage are at their most pronounced for VRF's

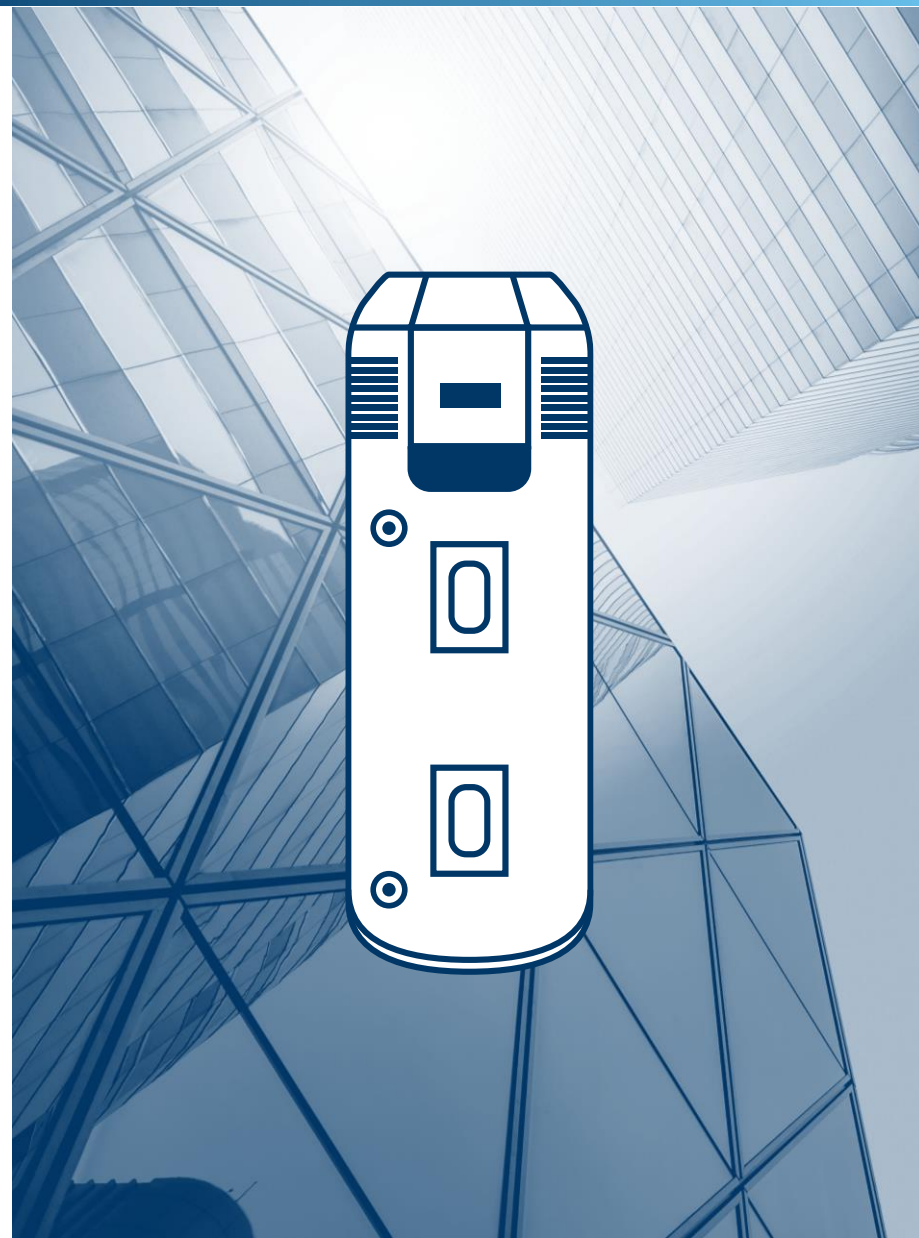
Space Heating: Hydronic Systems

	Application	Availability	Gaps
Air-to-water heat pumps 	• Replace boilers (and chillers) across the whole range of segments	• Improving, but choice of models is limited • Supply temperatures up to 175F (80 °C) • Provide space heating and cooling	• Models for full heating load in coldest climates (can be filled via hybrid systems) • Higher temperature distribution. • Low GWP refrigerants (less of an issue since most models are packaged)
Water-to-water heat pumps 	• Replace boilers (and chillers) across the whole range of segments • Space and cost constraints limit the applicability of ground source systems	• Available but, there is a limit to the distribution water temperature • Domestic hot water, space heating/cooling also available.	• Low or mid GWP options (less of an issue since most models are packaged).

Water Heating: Key Findings

Most needs are covered but the market is very dependent on a few key products.

Remaining gaps include 120V CO_2 systems for residential retrofits, 600V systems for large commercial applications, and low-GWP refrigerant packaged systems.



Water Heating

	Application	Availability	Gaps
Split heat pump water heaters 	• Replace fossil-fuel fired and electric resistance water heaters across range of segments, from ground oriented residential through to large commercial buildings.	• Full capacity range of cold-climate models with low GWP refrigerant (CO_2) • Provide very hot water temperatures (175°F/80°C). • Cheaper conventional refrigerant systems for mild climates also available.	• Breadth in the product range • 600V systems for large commercial applications, 480V units used instead (additional costs and complexity)
Packaged heat pump water heaters 	• Replace fossil-fuel fired and electric resistance storage water heaters in ground-oriented residential and in apartment units. • Can use air ducted from the outside or use indoor air in an unconditioned space.	• 240V conventional refrigerant systems	• 120V systems • No mid or low GWP products, or any cold-climate specific products. • At the intersection of all three of these gaps, there is a big need for a 120V CO2 packaged system.

Presentation Contents

1. Overview	Summary Key Findings
2. Technology Needs	Building Stock Distribution System GHG Savings
3. Availability & Gaps	Space Heating Water Heating
4. Barriers	Market Supply Other

Market Barriers: Initial Findings

Barriers

The cost-competitiveness of heat pumps relative to natural gas fired equipment remains the key barrier to adoption.

1. **Upfront and operational costs both challenges**

   improvements in heat pump efficiency and increasing carbon price mean that the operational cost gap is closing

2. **Lack of acceptance and experience within the contractor community is another widely cited barrier which increases installation cost and the potential for failures.**

3. **Electric service constraints also pose a challenge to adoption**

Drivers

A mixture of policy, improved awareness, and rising temperatures is driving demand.

1. **Tighter municipal building codes**
2. **Clean BC Incentives**
3. **A desire to reduce carbon emissions – particularly in the institutional and residential markets**
4. **Increased demand for cooling on the residential side**

Supply Barriers: Initial Findings

The following potential supply barriers were identified in this phase of the project. We will test these out with manufacturers in the next phase of the study:

Technical barriers

- **Voltage** service differences between US and Canada (600 vs. 480V)
- **Frequency** differences between North America and Europe/Asia (50 vs. 60 Hz)

Regulatory barriers

- **CSA certification** takes time and money, and the process requires the right expertise.
- **Translation of technical standards** is needed to help manufacturers understand what they need to do to make their products comply in BC. There are differences in technical standards across Canada which makes this particularly difficult for manufacturers.
- **Double walled heat exchangers** are needed for domestic hot water products in North America but not in Europe and Asia.
- **Refrigerant flammability regulation** makes it more difficult to use low GWP refrigerants.

Awareness barriers

- **Manufacturer awareness** as to the scale of the market in BC market and the proximity to California, Oregon, and Washington.

Other Barriers

A few other barriers came up during the project which do not fit neatly into supply or demand buckets:

- **A lack of clarity and consistency in noise regulation** in local byelaws, and outdated impressions of how noisy heat pumps are.
- **A lack of a local manufacturer presence** for some manufacturers makes it harder for suppliers, designers, and installers to get technical advice.
- **Limited availability of spare parts.** Installers may be reluctant to buy heat pumps even if a product is available to match their use case for fear that they won't be able to get spare parts if things break.

Interview Participants

We interviewed the following companies who supply heat pumps in the BC market:

Supplier	Contact(s)	Market(s) covered	End-uses covered
Olympic International	Jay Jagpal	Ground-oriented residential Apartments Commercial	Space heating Water heating
Small Planet Supply	Albert Rooks	Ground-oriented residential Apartments	Space heating Water heating
Johnson Barrow	Jean-Sébastien Ratté	Apartments Large Commercial	Space heating Water heating
ClimaDesign Technologies Ltd.	Mark Anderson, George Polychroniou	Ground-oriented residential Apartments	Space heating
Riada Sales Inc.	Scott Adair	MURB Commercial	Water heating

We also contacted the following suppliers but were either unable to schedule an interview within the time constrains of the project, or did we did not receive a response:

- ClimaCool
- Mitsubishi Canada
- HVAC Systems
- ECCO Supply
- EMCO HVAC
- Refrigerative Supply Ltd.
- Canadian Aerothermal
- The Master Group

Next Steps

1. **Identify and evaluate heat pump manufacturers**
   - Ability to fill gaps in the BC market
   - Increase the supply of products
   - Improve affordability
2. **Engage with high priority manufacturers to understand barriers and solutions**
3. **Develop a strategy to overcome barriers and capitalise on opportunities**
   - Identify collaboration opportunities with key players in the BC market
4. **Formalize a Working Group to execute the strategy**

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