

Moderated by: **Betsy Agar**, Director, Buildings Program



Agenda

- 1. Opening, context setting and introduction
- 2. Introductory remarks from panelists
- 3. Q&A
- 4. Participant discussions
- 5. Participant replay







Today's Panelists



Laurna Strikwerda
Director, Project
Development & Research
Canada Green Building
Council



Josh Lewis
VP Energy Engineering

Nerva Energy Group Inc.



Victor Hyman
Executive Director

ClimateCare Canada



William Begley
Director of Business
Development
OEC Geo Exchange









Agenda

- What's driving demand?
- What skills do we need?
- How is the market responding?
- How do we grow the workforce?







Demand: The business case and challenges



FINANCIAL INCENTIVES

CIB: \$3B for retrofits



DEMAND DRIVERS

Benchmarking requirements



CLIMATE ACTION INCENTIVES

Large building retrofits could halve carbon emissions



SKILLED LABOUR CHALLENGE

Shortfall of 85K workers by 2033



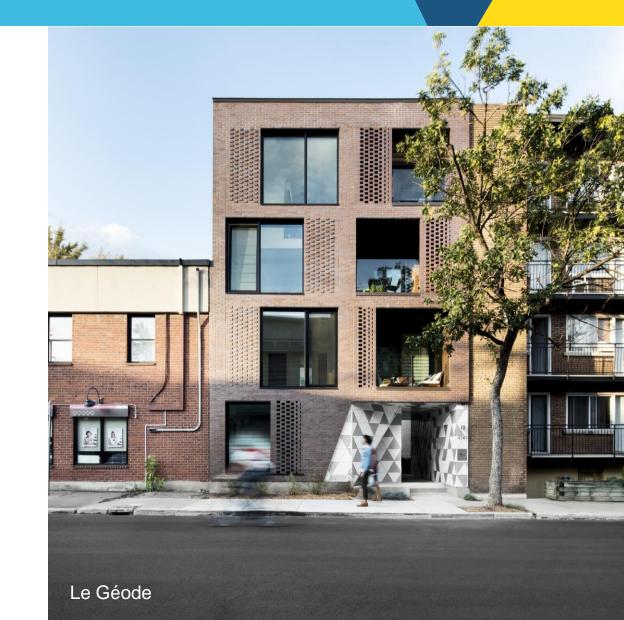


Demand: The case for livability

Climate and housing are critical issues

Solution must include resilient and affordable residential buildings

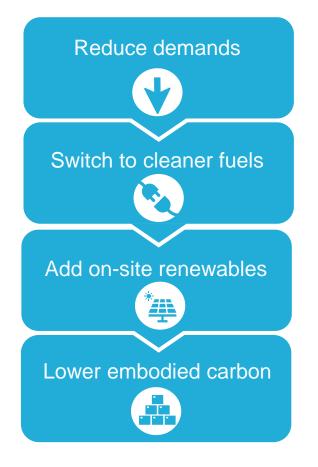
Retrofits are an opportunity







What skills are needed?



Low-carbon building opportunities



Building our Future: A low-carbon training strategy for the trades 9





Building Opportunities: Translating building attributes to building skills

Low-carbon materials

Materials and products

Environmental literacy

Whole-building approach

Relevant trades:



Insulators



Technician



Mechanics Workers



Glaziers

Technicians



Electricians

Plumbers



Modellers



Technicians



Riggers

Envelope performance

Walls, roofs, windows and doors

Relevant trades:











Electricians

Mass timber construction

Low-carbon materials and construction innovation

Relevant trades:











Advanced electrical systems

- Lighting
- Plug loads and digitization

Relevant trades:





High efficiency mechanical systems

- Space heating and cooling
- Ventilation
- Hot water heating

Relevant trades:









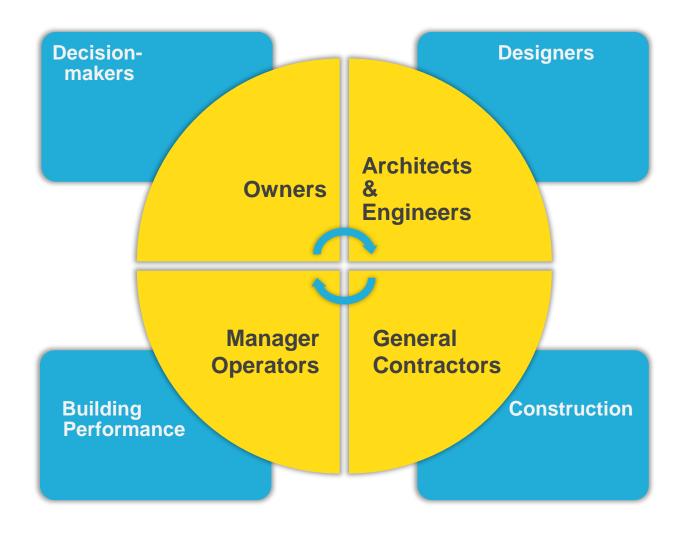






Technicians

Modellers



Low Carbon Training Program: 4,500+ trainees

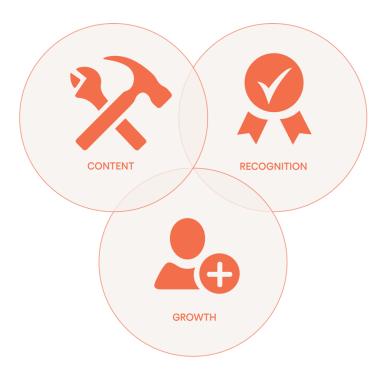
- Supporting professionals in low-carbon training
- Creating opportunities to develop a shared vocabulary across professions
- Creating opportunities for equity-deserving professionals





Building Our Future: A Low-Carbon Training Strategy for the Trades

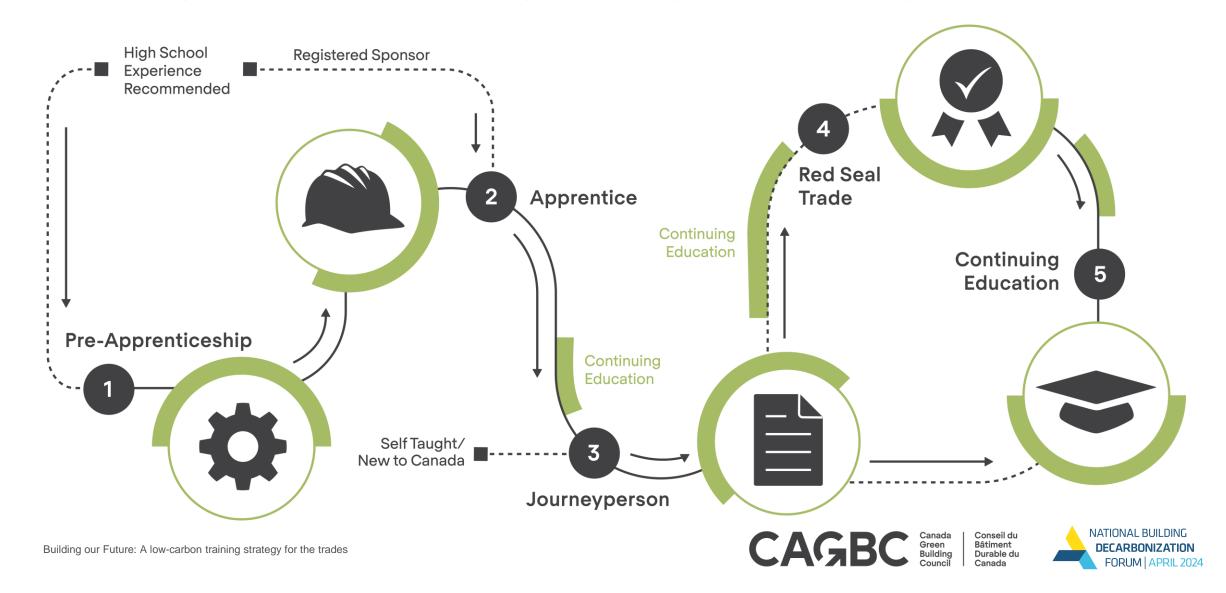








Supporting trades in low-carbon training – identifying opportunities along the entire journey



Training Development Opportunities



High-performance building envelopes



Peak load & demand management



Advanced heat pump systems



Mass timber manufacturing & installation



Embodied carbon materials & products





Growing the workforce: Next steps

- Need investment in retrofit training for all professions, from decision-makers to building operators
- Trades and construction need to be portrayed as climate careers
- Grow the workforce by making it more inclusive











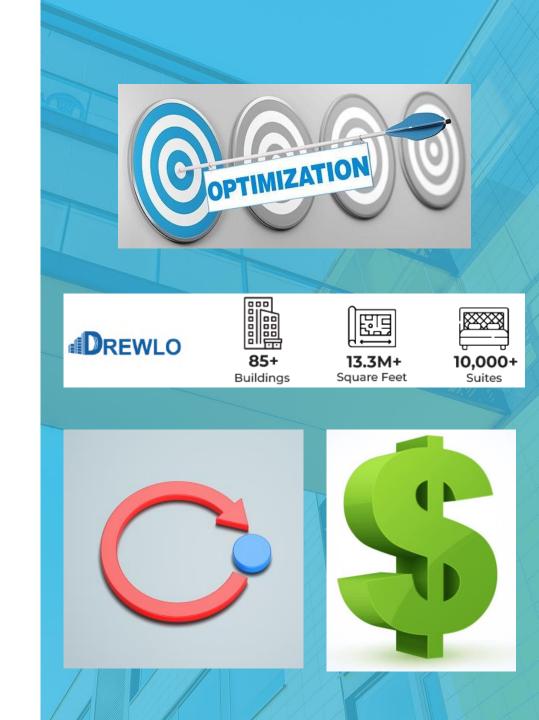


Agenda

- 1. Optimization First
- 2. Largest multi-residential smart building conversion in North America

"The Drewlo Project"

- 3. Design On Real Data
- 4. Integrated Delivery Model







Optimization First

- We need to optimize our buildings before we convert to low/zero carbon heating systems (aka fuel switching)
- Why? If we directly move from natural gas to electricity, we will incur three main problems:
 - Capital investment in low/zero carbon heating too high to be financially viable in the short/medium term
 - Operating costs will likely increase, further imperiling the business case
 - Electricity grid will not be able to grow fast enough to support the new loads
- Example: "The Drewlo Project" demonstrates how much waste there is to drive out of our existing building stock, which then leads us down the path of right-sizing the buildings and grid infrastructure needed to switch away from gas
 - Common sense optimization: Prevent occupant waste & abuse, internal reset logic, nighttime setbacks, VFDs on fans & pumps, minimize hydronic bypass, rightsized ventilation and mechanical systems
 - Not currently making the cut: Envelope upgrades



Largest multi-residential smart building conversion in North America.

A New Era in Energy Performance:

Delivering Measurable Gains in Efficiency & Value







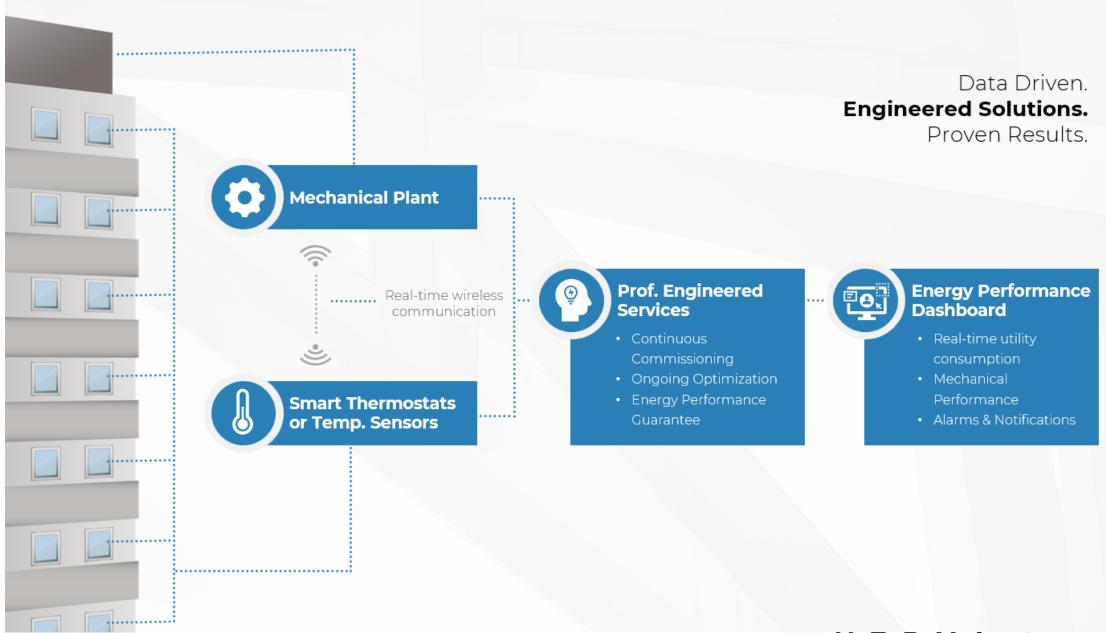


13.3M+ Square Feet











KEY PERFORMANCE INDICATORS





85+ Buildings

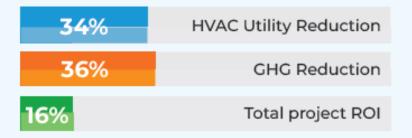


13.3M+ Square Feet



Suites







Project Timeline







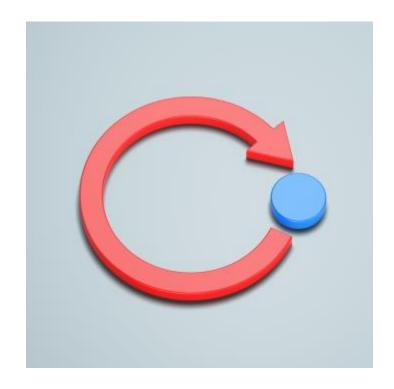
Design On Real Data

- Design low/zero carbon heating systems on real data after optimization
- Example:
 - MURBs have been traditionally designed with heating boiler systems sized at 25 30 BTU/ft²
 - "The Drewlo Project" demonstrated that old, traditionally constructed buildings will operate at 8 12 BTU/ft² during peak demand conditions with no envelope upgrades
 - With 50% safety factor for redundancy, installed capacity can be lowered to <u>12 18 BTU/ft²</u>
- Why is this so critical?
 - Lowers cost of investment into conversion (heat pumps)
 - Reduces electrical service upgrade requirements and grid demand
 - Allows for more projects to proceed at a more rapid pace
- Engineers need to balance liability and efficiency in their designs in order to stay relevant



Integrated Delivery Model

- Most organizations don't have the internal expertise to manage optimization and conversion
 - Audit → Engineer → Tender → Contract → Perform
- Wholistic service providers are needed:
 - Concept
 - Design
 - Determine Guarantee
 - Install
 - Commission
 - Optimize
 - Warranty
 - Uphold Guarantee
 - Plan Next Phases











ENERGY



M&E Engineers



In-House

Technicians

Mechanical Experts



Certified Energy Managers



Integrated Delivery Model

- Every decision ultimately solves to financial outcomes:
 - Technology is only an enabler
 - Understand the audience
- Have a different discussion:
 - Return on Investment hurdle (10% 20%)
 - Alignment on utility and carbon tax escalation forecasts
 - Targets for GHG emissions reduction
 - What is the split of end-of-life versus incremental project costs
- Use those results to develop & deploy practical projects at scale across portfolios with an integrated approach





Thank you!

- Optimization First
- Design on Real Data
- Integrated Delivery Model





Agenda

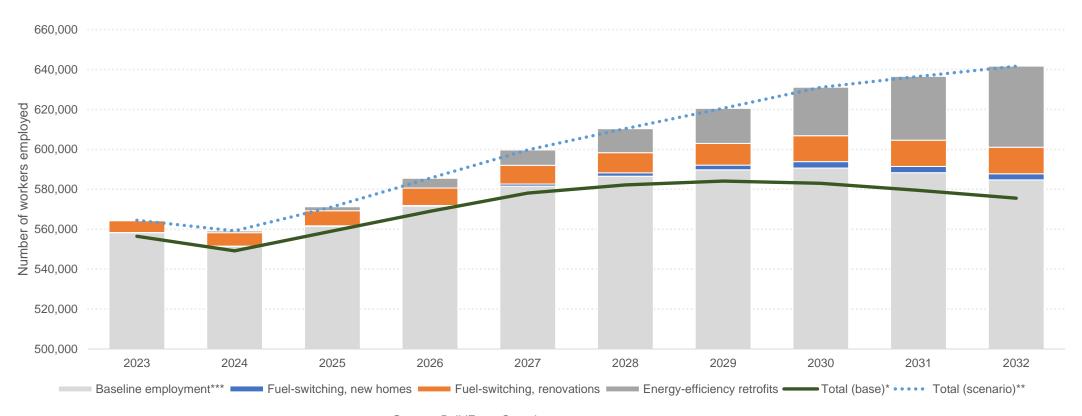
- 1. The labour shortage
- 2. The skills gap
- 3. A possible solution





The Labour Shortage

Residential employment, Canada (direct trades and occupations only)

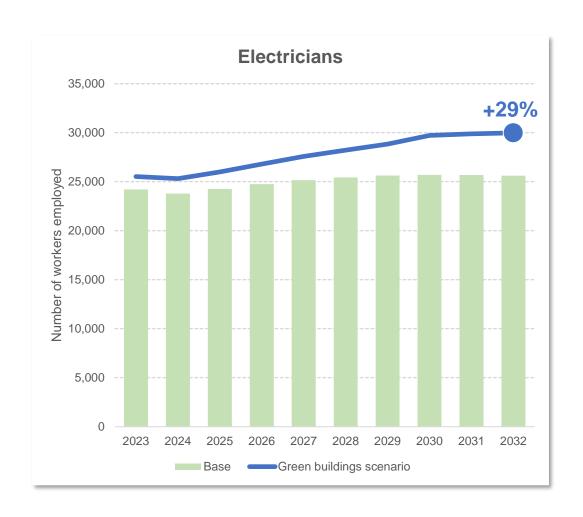


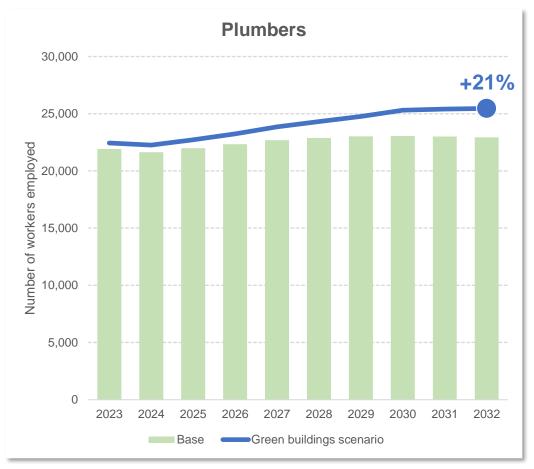
Source: BuildForce Canada





Electrical and Mechanical Trades Demand is High

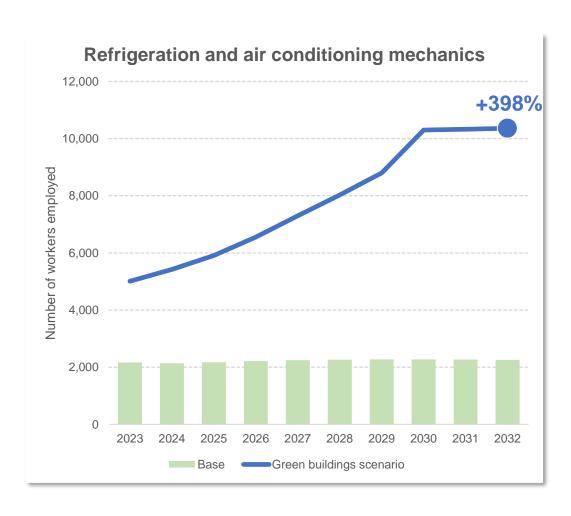


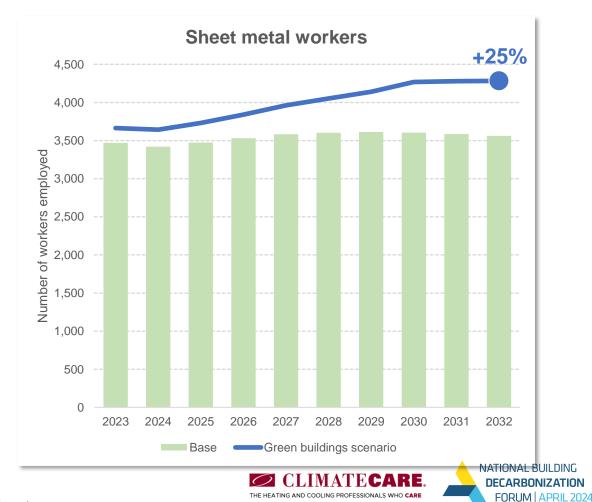






But HVAC is the Most Acute





Source: BuildForce Canada

How Many Gasfitters Will Just Retire?

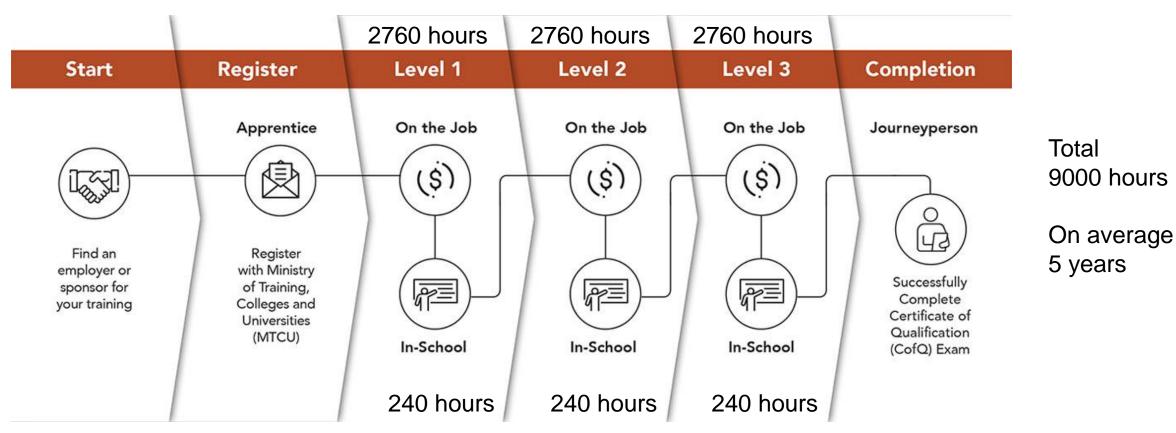






Training new techs is very resource intensive

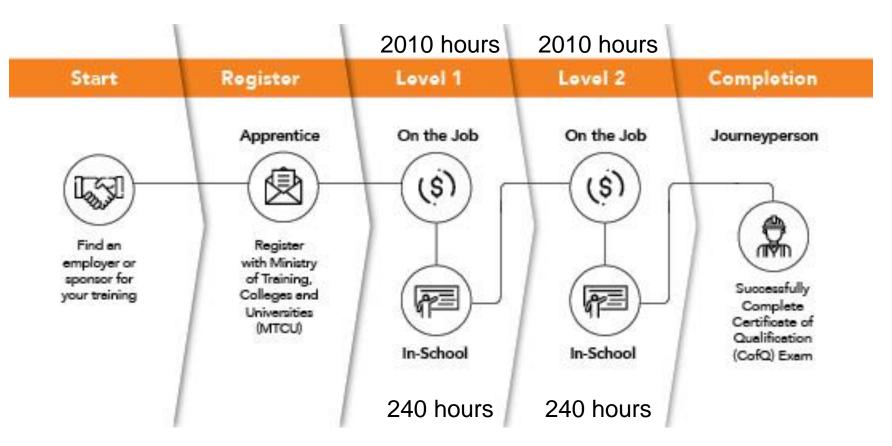
Red Seal 313A – Commercial Refrigeration and Air Conditioning System Mechanic





Finding a shorter path for residential retrofits is key

Ontario & Manitoba 313D – Residential Air Conditioning Systems Mechanic



Total 4500 hours

On average 2.5 - 3 years



- HVAC techs must start their journey with a gas license millions of gas appliances still need maintenance, service, and eventually decommissioning.
- Training curricula have not kept pace with technological changes in the field.
- Residential service, maintenance and replacement work is 50% customer service. We need to train for that, too.

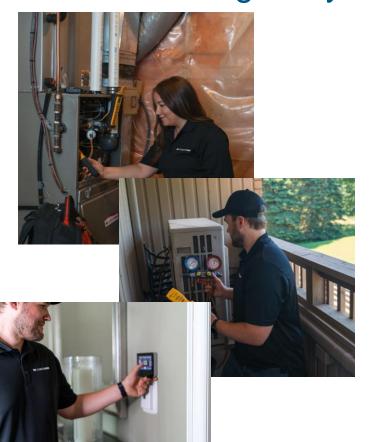
Gas AC/HP Customer Service

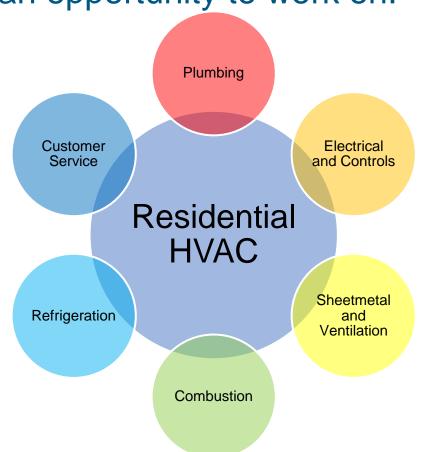


Residential Contractor's Dream of the Future

Residential HVAC is cool!

No other field gives you an opportunity to work on:











We need to accelerate entry to the trade

- A survey of dozens of residential contractors shows only three paths into the trade currently
- More emphasis at the high school level with more events like Support Ontario Youth's *Tools in the Trade* Boot Camps
- Combine the Residential Gas license with the Residential Air Conditioning License (Alberta does this for commercial).





We need to better bifurcate the HVAC trade

- Make the Residential Air Conditioning System Mechanic a Red Seal trade to create inter-provincial portability, improve professionalism, and access federal apprentice supports.
- Too many instructors belittle residential work and convince residential techs to leave for commercial
- Customer service is a significant portion of residential service work, and we need to sell that as a benefit of the residential trade.





Questions?

I have two for you...



How can we get this message out?

- How do we help people see the opportunity for their kids and students? Tens of thousands of jobs will be created in the next ten years.
- How can we better tell the story about residential HVAC? It is technically challenging, interesting work that helps improve lives by creating real home comfort while helping people achieve their decarbonization goals.





Thank you!





Breakout 3C: Developing the Market **Cultural Changes** NATIONAL BUILDING **DECARBONIZATION** FORUM | APRIL 2024

William Begley
Director of Business Development
OEC Renewables





Agenda

- 1. Who is OEC
- 2. Geo 101
- 3. Cultural Shift
- 4. Unintended Consequences
- 5. Carrot or Stick







OEC

Group of infrastructure businesses
 (design, eng, const., metering, utility
 services, locates, etc) ON & W Canada

+2,500 employees, +\$700M operating assets

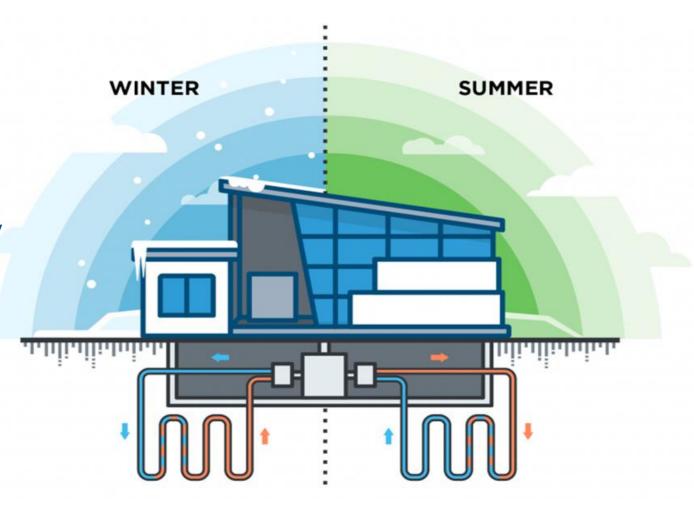
- Utility arm of the portfolio spans +100 yrs
- Oakville & Enbridge shareholders
- Renewables Portfolio of assets –
 geo, solar and hydroelectric
 generation





Geo 101

- Steady core temperature used to provide heating/cooling
- Simple and proven technology
- Uses earth as a thermal battery
- Extended asset life
- Operationally efficient
- Low maintenance
- Climate friendly







Cultural Shifts are Hard

Inherent advantages of status quo

- Incumbency bias
- Like for like is well understood
- Ease of implementation
- Does not require advanced planning (reactive)
- Many service providers ready and standing by to be deployed
- Lowest first cost
- Perceived lower risk



Disadvantages of new technology

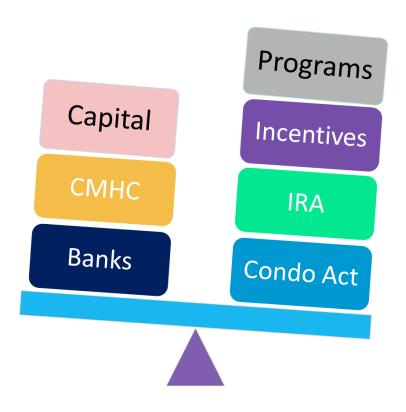
- Competing technology claims
- Change = disruptor to establishment
- One misstep lives on forever
- Proactive planning required
- Financing premiums
- Policy miscues
- Cheaper over lifetime of asset
- Deemed higher risk





Unintended Consequences of Well Intended Actions

- + Incentive and rebate programs that stop & start
- + CMHC Financing
- + Section 112 Condo Act
- + Canada's slow response to the IRA
- + Impatient capital
- + Banks not understanding new tech = risk premiums
- = Mixed signals to the market & reinforces bias towards status quo

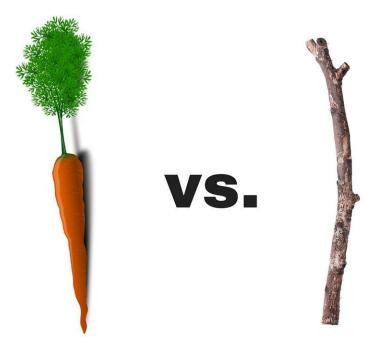






Carrot or the Stick?

- Evolving building standards are great but long runways
 & offramps
- Established service providers delay rollout
- Asking people to do the right thing doesn't always work
- We need to drag them towards decarbonization
- Mistakes will be made along the way embrace them, learn from them, share & improve
- Paradigm shift required (time for the stick!)
- Put more teeth into standards, develop fines, penalties, mandates, noncompliance should hurt







Thank you!









Table Discussions

Individually reflect on the following question, then **discuss** them at your table:

- From your perspective, what services, skills, and/or workforce need to be **built up** to successfully decarbonize the building sector? Which of these are a short-term need versus a longer-term need?
- What potential **solutions or strategies** could be deployed to support the market development required for achieving our building decarbonization goals?
- What can **your organizations do** to support the training, reskilling, or creation of new service delivery models required to meet building decarbonization goals?

Discuss these **additional questions**. You will be asked to **share responses** with the room.

- What were your **key takeaways** from this session's panelist and table discussions?
- What can we **collectively do** to support the labour, equipment, and service transitions required to accelerate the pace of building decarbonization?





Thank you!

