Breakout 2C: Decarbonization Policies

Decarbonizing heating equipment

NATIONAL BUILDING DECARBONIZATION FORUM | APRIL 2024

Moderated by:
Martin Luymes, Vice President of Government and Stakeholder Relations

HRAI The Heating, Refrigeration and Air Conditioning Institute of Canada
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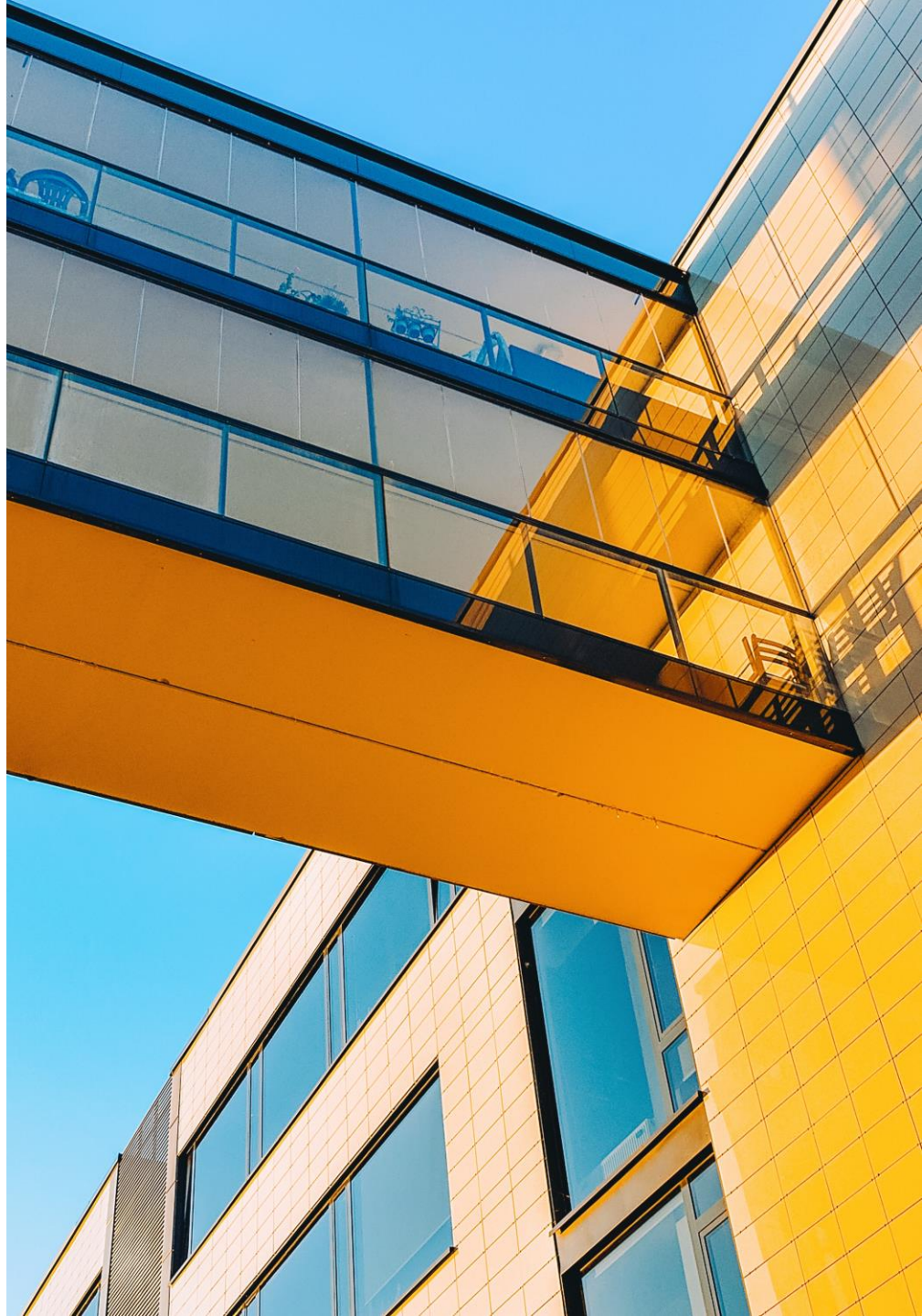
April 17, 2024

Agenda

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



Energy Efficiency Regulations

Key Role

- Set minimum energy efficiency requirements of energy using products that are imported or shipped between provinces
- Energy using products range from heating and air conditioning equipment to household appliances, to industrial / commercial equipment
- Gradually eliminate less efficient technologies

Amendments Allow For

- Further increases in energy efficiency requirements on a product-by-product basis

Canadian Regulations

Energy Efficiency Act
+ Regulations
+ Amendments

BC MB ON QC NB NS

Some provinces have their own regulations, for equipment ranging from gas furnaces, boilers to heat pumps and air conditioners

Energy Efficiency Regulations

Federal Energy Efficiency Act (1992)

- Sets requirements and enforcement provisions for energy efficiency regulations, in terms of the compliance and labelling of energy-using products imported into Canada and/or shipped from one province to another
- Energy using products range from heating and air conditioning equipment to household appliances, to industrial / commercial equipment
- Disincentivize less efficient technologies

Amendments Allow For

- Further increases in energy efficiency requirements on a product-by-product basis

Canadian Regulations

Energy Efficiency Act
+ Regulations
+ Amendments

BC MB ON QC NB NS

Some provinces have their own regulations, for equipment ranging from gas furnaces, boilers to heat pumps and air conditioners

Today’s Panelists

MG

Michel Gauvin
Head, Ozone Layer Protection Programs
Environment and Climate Change Canada

Mariko Michasiw
Program Manager, B2E Zero Emissions Innovation Centre

Chris Higgins
Senior Green Building Planner
City of Vancouver

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HFC Phasedown in Canada

Refrigerant Transition

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Michel Gauvin, Head – Ozone layer protection programs

Environment and Climate Change Canada | Environnement et Changement climatique Canada

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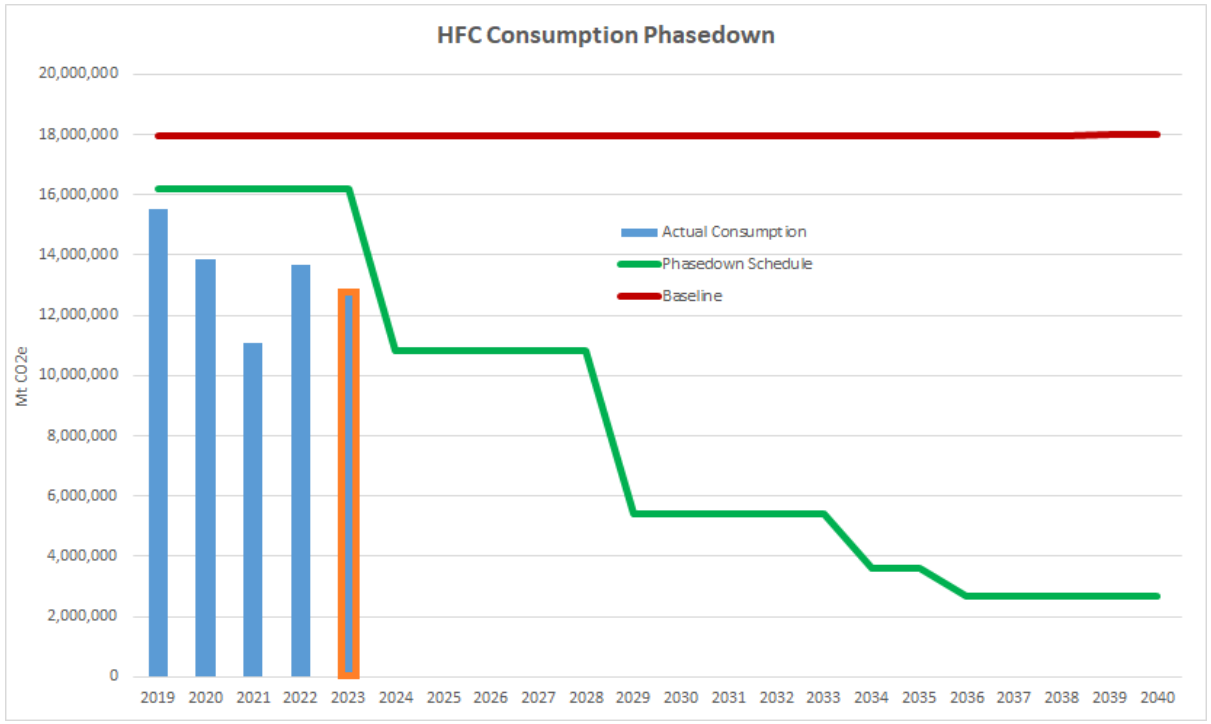
Refrigerant transition and HFC Phasedown

- Canada must meet its international obligations under the **Montreal Protocol**, including the **Kigali Amendment** to phasedown HFCs
- ***Ozone-depleting Substances and Halocarbon Alternatives Regulations*** (ODSHAR) implement Canada's phasedown of HFCs



Phasedown Schedule	
Year	**Reduction**
2019	10%
2024	40%
2029	70%
2034	80%
2036	85%

Expected to result in cumulative reductions of **168 Mt CO2e** of GHG emissions

Contributing to building decarbonization

How is the HFC phasedown contributing to building decarbonization?

- Reduces embodied GHG
- Reduces emissions from operations
- Provides energy efficiency opportunities

Product controlled by ODSHAR	Effective
Pressurized containers (Aerosols)	January 1, 2019
Automobiles	2021 model year
Commercial/Industrial refrigeration	January 1, 2020
Foam and foam products	January 1, 2021
Chillers, mobile refrigeration	**January 1, 2025**
Residential standalone refrigeration	**January 1, 2025**

Why is refrigerant transition and HFC phasedown so important

Provides **generational opportunity** for technological advancements!

HFC Transition in products	High GWP Value	Transitions to GWP	% reduction
Extruded Polystyrene (XPS) Insulation (HFC-134a)	1430	<10	+99%
Spray Foam Insulation (HFC-245fa)	1030	<10	+99%
Large Chillers (HFC-134a)	1430	As low as <10	+99%
Small/Medium Chillers (R-410A)	~2000	~700	~65%
Grocery Store Refrigeration (R-404A)	~4000	As low as 1	+99%
Residential refrigerators (HFC-134a)	1430	<10	+99%

Example of scenario:

Typical grocery store system can contain 1,500 kg of refrigerant, system using R-404A represents 6,000 tonnes of CO2e embodied in the refrigerant – leak rates may be as much as 20-25% annually

Looking forward

- ECCC has decided to **advance the regulatory review** of the ODSHAR from 2027/28 to 2024/25
  - Assess effectiveness of the regulations, administrative efficiency, etc.
  - Evaluate the impact of new technologies, regulatory developments in other jurisdictions
  - Planned consultations in 2024 across sectors

- **Upcoming** controls on **products** containing HFCs:
  - Canada: chillers, residential stand-alone refrigeration, mobile refrigeration (e.g. reefers) **in 2025**

- New step of HFC phasedown on **January 1st, 2029**
  - **70% reduction** from baseline in Canada

Thank you!

Contact information

- **Michel Gauvin**, Head – Ozone Layer Protection Programs, michel.gauvin@ec.gc.ca

- General inquiries about Montreal Protocol, ODSHAR, Ozone Layer Protection Programs, halocarbures-halocarbons@ec.gc.ca

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Photo: courtesy HCMA

Decarbonization Policies in BC

Prioritizing & Supporting Government Actions

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Mariko Michasiw, B2E Program Manager

B2E Powered by zeic

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Agenda

1. BC's highest-efficiency equipment standards
2. Point of sale standards
3. Technology options
4. B2E community feedback
5. Consultation feedback

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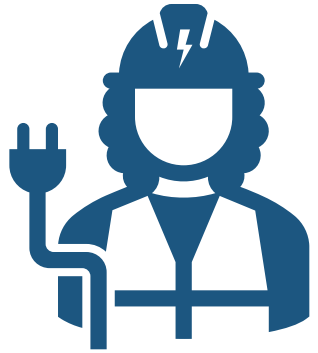
BC's Highest-Efficiency Equipment Standards

Point of Sale

- In consultation
- Energy Efficiency Standards Regulation
- Applies to retailers and distributors

Point of Installation

- To be developed
- BC Building Code
- Applies to designers and contractors



BC's Highest-Efficiency Equipment Standards

"After 2030, all new space and water heating equipment sold and installed in B.C. will be at least 100% efficient, significantly reducing emissions compared to current combustion technology."

In Scope

- Furnaces
- Boilers
- Water Heaters

Out of Scope

- Fireplaces & Stoves
- Process Equipment
- Cooking Equipment

High-Efficiency Technology Options

Electric Resistance

Heat Pump

Dual Fuel Systems

What we heard from the B2E community

- Some local governments requesting the ability to adopt standards early
- Concerns that HEES may not be enough to meet carbon reduction targets
- Concern that hybrid system emissions reductions will not be sustained
- Balance/switchover point for dual-fuel systems is a risk if set too high
  - We recommend that the switchover temp be set to achieve a minimum COP
- Contractor training on heat loss calculations for proper sizing is critical

Photo: B2E Anniversary 2022

What we heard from consultation sessions

- Concerns that costs to buildings with insufficient electrical capacity will be prohibitive
- A need to increase industry and supply chain readiness
- Concerns about affordability from capital and operational perspectives
- Concerns about emergency replacement scenarios
- Nervousness about electric system capacity and frustration with connection delays

Thank you!

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b2electrification.org

Photo: creative commons

Vancouver Policy In Practice

Low Rise Residential
Policy to Decarbonize

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Chris Higgins, Sr Green Building Planner

CITY OF VANCOUVER | GREENEST CITY

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Policy Leverages People

- If you forget everything else I talk about in the next 6 minutes…
- None of this is easy, but with the right policy
- 1.6 million Canadians get up and deliver every day

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Photo: Combined comfort

Agenda

1. Large Homes
2. Decarbonize New Construction
3. Large renovations decarbonize
4. Every new AC is a Heat Pump

Photo: DLP Architecture

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The Large Home Opportunity (Icebreaking)

Photo: One Seed Architecture

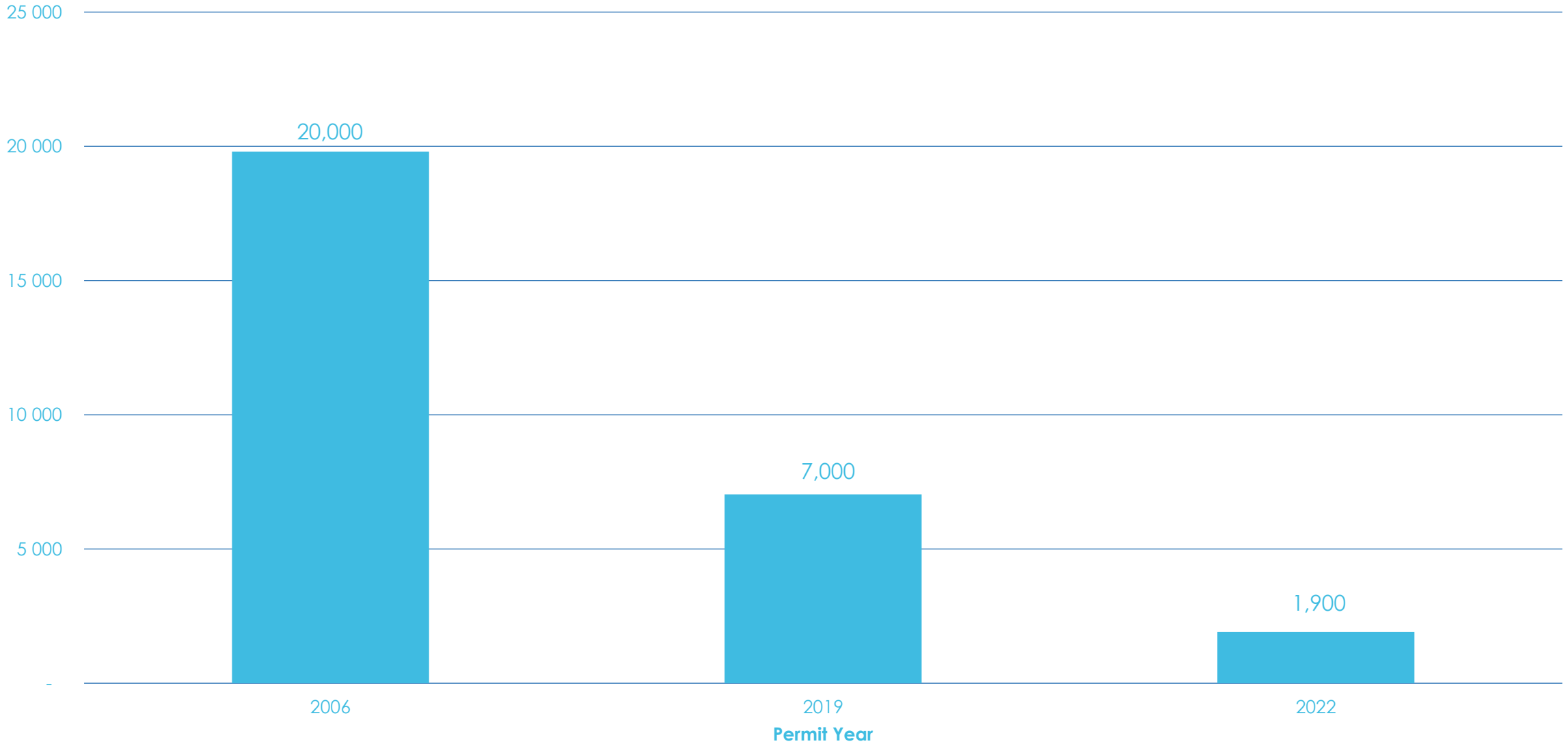
The Largest Homes can accelerate action

- Large Home Policy (2017/2018)
  - This policy limits the carbon pollution of a large home to that of an average home (2 tonnes)
  - Functionally this means the large home is nearly all electric, with better glazing, improved mechanicals and improved insulation levels
  - This policy demonstrated what was possible years in advance of a code change for all new houses, making a path for broader policy

Decarbonized New Construction

- Council Approved: April 2020
- In Force: Jan 1 2022
- Prescriptive Code Requirements
  - Electric Heating & Hot Water (heat pump typical)
  - Better Envelopes
    - Guide for R22 Effective (2x8)
    - U1.0-1.4 Windows
    - Air tightness tested on every project w target
- Attempt to block before implementation from gas boiler wholesalers & manufacturers
- Smooth implementation

Single Family Home Space Heating Needs
(kWh annual, rounded)



Renovations

Require large renovations electrify space heating & hot water

Policy in force Jan 1 2023

Renovations >$250,000

Low hanging / Icebreaker

Photo: Lane Fab Design Bu

Every AC is an opportunity

Photo: SmallWorks

Every AC is an opportunity

- Warming world = more AC installations
- This is routine work that can reduce carbon pollution
- AC units and full heat pumps are made in the same factories with 99% of the same parts.

E VANCOUVER DAILY

VANCOUVER, B.C., TUESDAY, SEPTEMBER 28, 1948

SUCCESSFUL TRIAL RUN of first heat pump to be installed in a Vancouver home brings happy grins to engineer George Remple, 5485 Manitoba, home owner Don Mackenzie, 1832 Arcadia, and refrigeration technicians C. Servise, 2703 Grovely, and B. McMillan, 1145 Ridgeway. The heat pump forces piped gas into the earth where it picks up natural warmth. The fuel is free but there is a monthly electric bill.

HOUSE-WARMER IS 'FRIDGE, TOO

Magic Heat-Pump Has Free 'Fuel'

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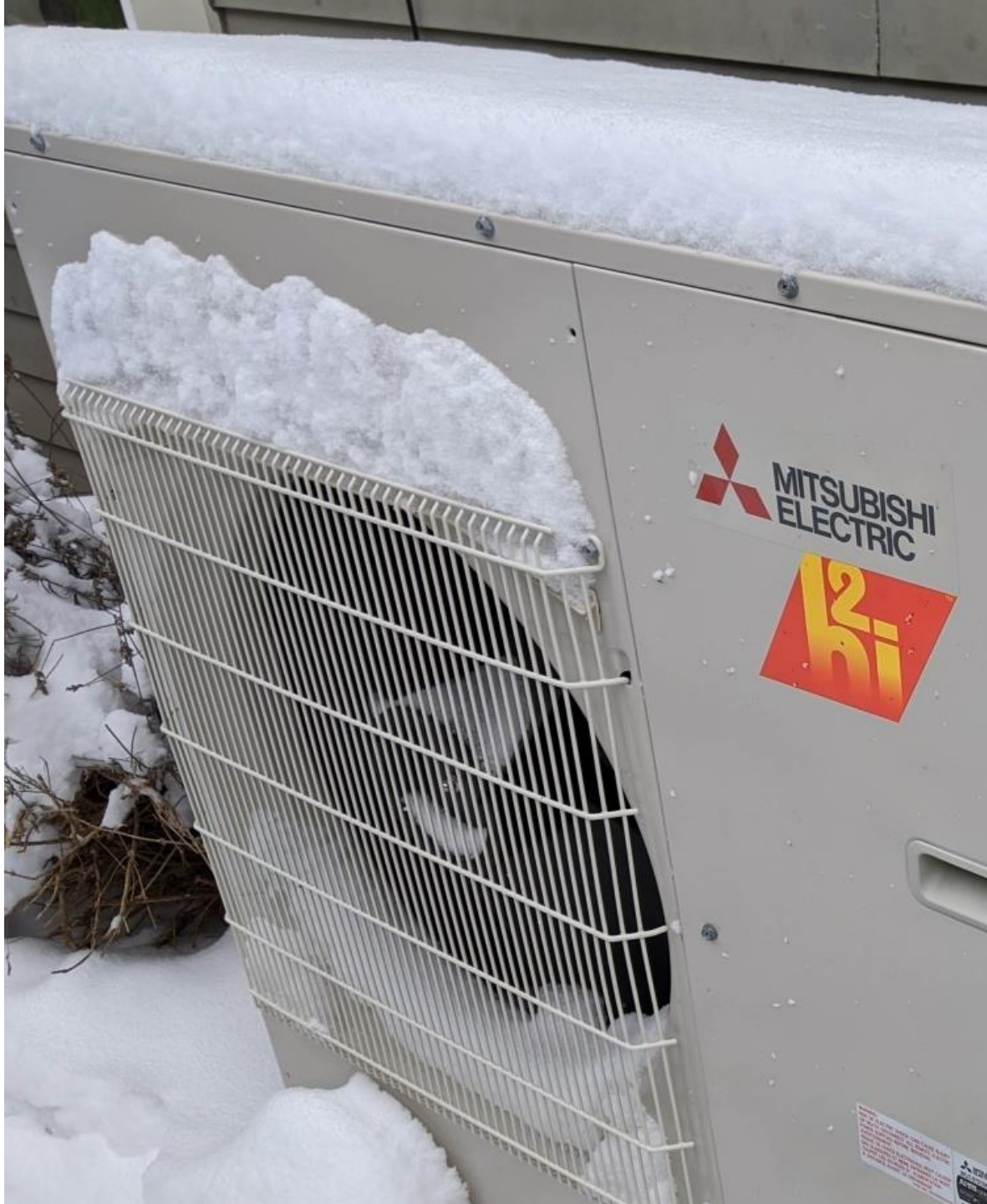
Every AC is an opportunity

- Simplify the supply chain, require heat pumps
- Policy enjoyed industry support with a smooth roll out
- In force Jan 1 2023, after 9 months notice to industry to sell through stock



Thank you!

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Photo: Clay Construction