Heat Pump & Dual Fuel RTU Contractor Readiness Roadmap

PREPARED FOR THE CITY OF VANCOUVER

BY HARBOURGREENE CONSULTING INC.

APRIL 17, 2026

Key Project Takeaways

- The barriers to adoption for Heat Pump RTUs are more difficult to overcome than those for Dual Fuel RTUs. Presenting these options together may create additional barriers that prevents action.
- Dual-fuel RTUs are widely viewed as a low-risk, near like-for-like replacement that fits existing contractor skills and workflows.
- The technical capacity of HVAC contractors is not being reported as a barrier to Dual Fuel and Heat Pump RTU adoption.
- The HVAC contractor has a role in influencing RTU equipment choice, but ultimately the decision belongs with the building owner or property manager.
- First cost is the primary factor in equipment selection. Dual Fuel RTUs must predictably cost less than conventional units to encourage adoption.
- Controls optimization and commissioning need to be explicitly directed and scoped into projects.

The Opportunity

- The City estimates ~7,000 packaged roof top units (RTUs) are on ~2,500 buildings – serving 64 million square feet of occupied space
- 53% of these units are <5 tons, 25% of these units are 5-15 tons
- The vast majority (93%) of these units are found on buildings <50k sqft.
- The estimated annual GHG Emissions from all RTU equipment is 33,000 tons/year.

Ref: October 2025 Decarb Lunch: Decarbonizing Rooftop Units on Commercial Buildings

Project Overview

Tasks:

- inventory existing training and guidance resources
- analyse key knowledge gaps
- create specific interventions

Deliverable:

- a practical roadmap of near-term actions to strengthen contractor capacity for both all-electric and dual-fuel RTU installations

Goal:

- to accelerate heat pump RTU adoption in Vancouver's commercial buildings

Project Team

Harbourgreene Team

- Christine Gustafson, Project Lead- Harbourgreene Consulting
- Matt Gustafson, Technical Lead - Harbourgreene HVAC
- Chris Pulfer, Program Advisor - Posterity Group
- Brendan Dewalt, Market Transformation Advisor - Posterity Group

Client Team

- Brady Faught, Project Manager – City of Vancouver
- Micah Lang, Project Sponsor – City of Vancouver

Project Interest Holders

- Working Group Partners
  - Mariko Michasiw - ZEIC
  - Saeedeh Saghlatoun - Province of BC
  - Aiden Sotres & Olivia Sieniewicz - FortisBC
- Primary Users
  - City of Vancouver
  - Working Group Partners
  - Industry Associations
  - Educational Institutions
  - Allied Municipalities

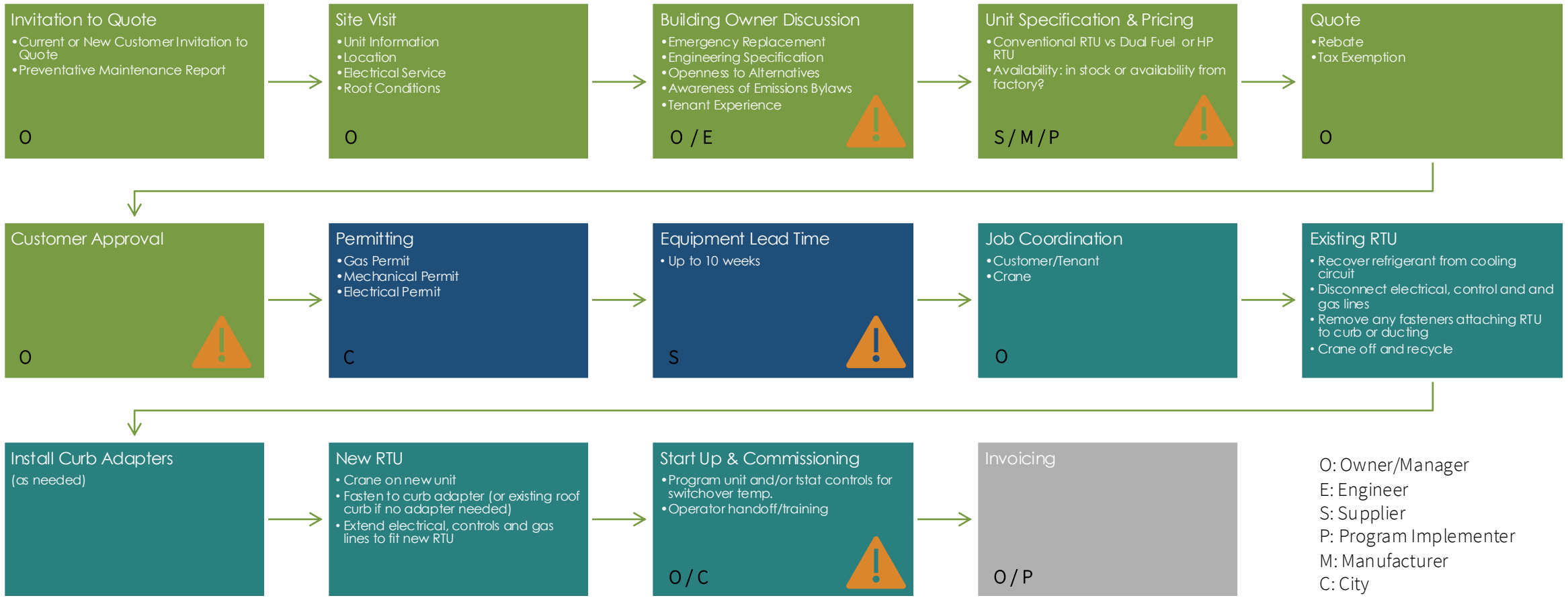
Project Focus

This project looks at the RTU retrofit/installation job from the HVAC contractor's perspective. The *Contractor Journey* (next page) shows the major steps and key considerations. At each step, the contractor may interact with Owners, Managers, Engineers, Suppliers, Program Implementers, Manufacturers, and the City. The Contractor Journey is organized into four phases:

- Getting the Job
- Permitting
- Coordinating the Job
- Invoicing

Contractor Journey

Indicates a known Pain Point



O: Owner/Manager
E: Engineer
S: Supplier
P: Program Implementer
M: Manufacturer
C: City

HEAT PUMP & DUAL FUEL RTU CONTRACTOR READINESS ROADMAP

Catalogue of Existing Supports

PREPARED FOR THE CITY OF VANCOUVER

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Overview

The assessment of existing supports available to contractors indicates that the current suite of resources is sufficient to serve the immediate and near-term market. In a limited number of cases, these supports can be further tailored or repackaged to better align with the particular needs and preferences of priority audiences.

The following catalogue provides an inventory and core competency mapping of current available training, guidance, and incentive resources available to contractors and decision makers as it relates to small commercial packaged heat pump or dual fuel RTUs. Core competencies are listed below. More information is provided for each support in Appendix A: Catalogue of Existing Supports.

- System Design
- Energy Efficiency & Decarbonization
- Equipment Specification
- Communications and Sales
- Costing with Incentives
- Installation
- Controls
- Commissioning
- Troubleshooting
- Maintenance
- Operation

Existing Supports For Contractors

- Industry Training Programs
  - Refrigeration Trades Programs [1]
    - Apprenticeships
  - HRAI Post-Trades Training
  - HVACRedu.net
  - HVAC School: For Techs, By Techs
  - Trane Education Center (TEC)
  - Johnson Controls Training
  - York HVAC Education
  - Manufacturer Training [2]

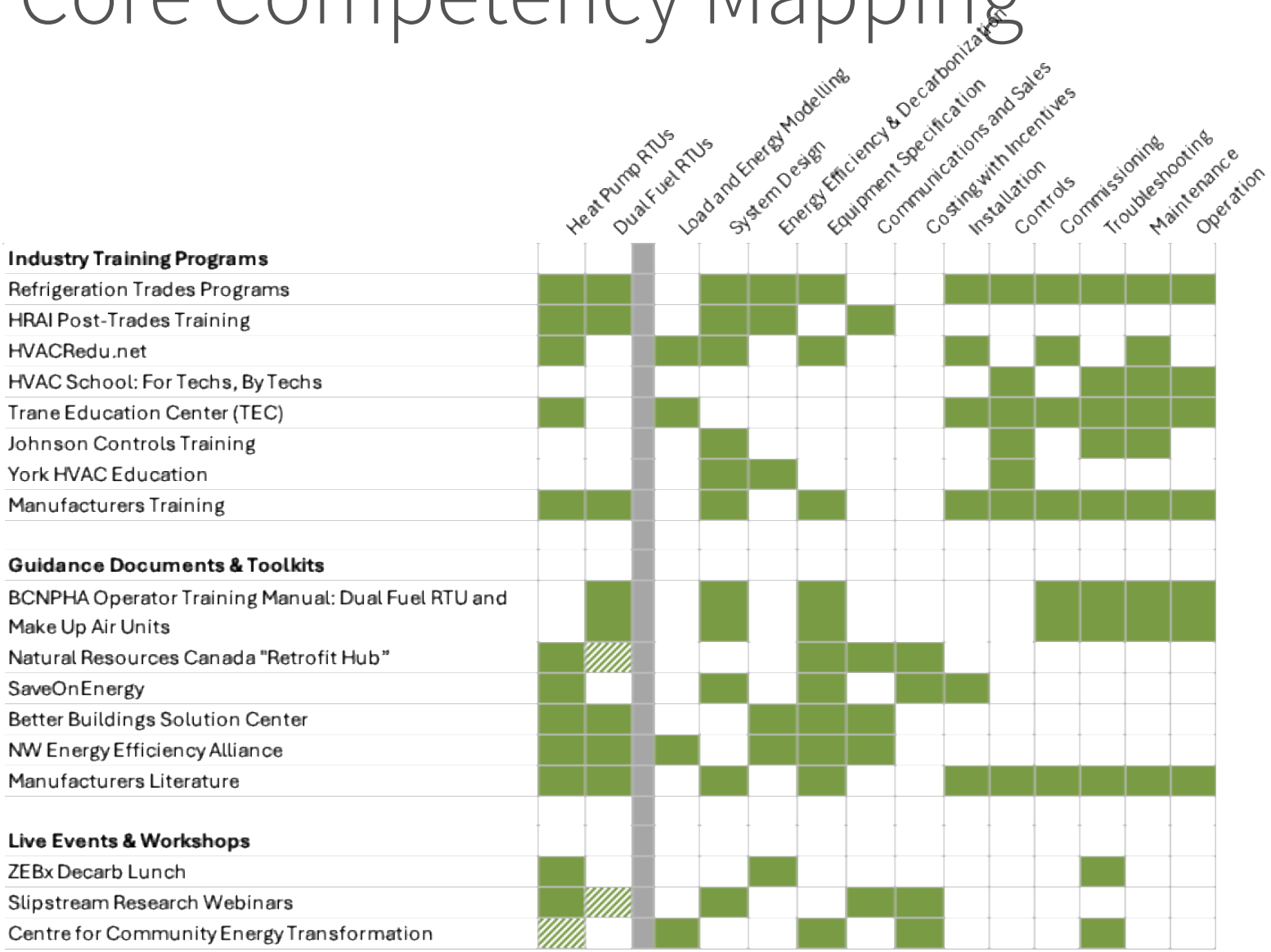
[1] Licensed Red Seal Refrigeration Technicians should be commissioning heat pump and dual fuel RTUs as the refrigeration circuit will be running in heating for the majority of the time. Refrigeration gauges are used during commissioning to confirm refrigerant pressure and assure optimal performance. Some companies may use a combination of gas fitters, electricians and refrigeration technicians for the installation, but only Licensed Red Seal Refrigeration Technicians are trained to work with refrigerants.

[2] Most major OEM offer proprietary training: Trane, Carrier, Lennox, Daikin, Mitsubishi.

Existing Supports For Contractors

- Guidance Documents & Toolkits
  - BCNPHA Operator Training Manual: Dual Fuel RTU and Make Up Air Units
  - Natural Resources Canada "Retrofit Hub"
  - SaveOnEnergy
  - Better Buildings Solution Center
  - NW Energy Efficiency Alliance
  - Manufacturer Literature
- Live Events & Workshops
  - ZEBx Decarb Lunch
  - Slipstream Research Webinars
  - Centre for Community Energy Transformation

Core Competency Mapping*

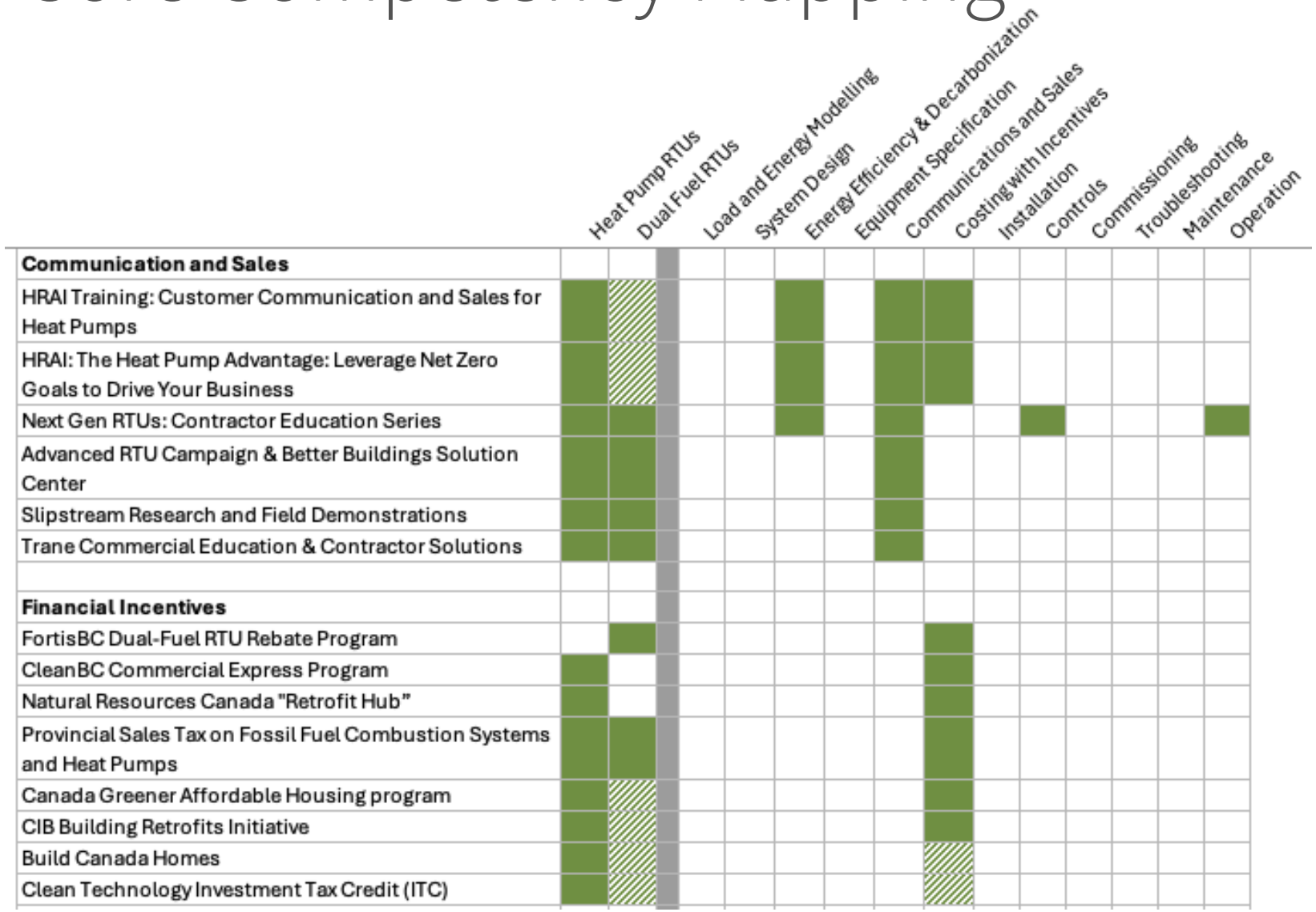


* Some training catalogued may be focused on conventional RTUs, but represents an opportunity to include content specific to heat pump or dual fuel RTUs.

Existing Supports For Contractors

- Financial Incentives
  - FortisBC Dual-Fuel RTU Rebate Program
  - CleanBC Commercial Express Program
  - Natural Resources Canada "Retrofit Hub"
  - Provincial Sales Tax on Fossil Fuel Combustion Systems and Heat Pumps
  - Canada Greener Affordable Housing program
  - CIB Building Retrofits Initiative
  - Build Canada Homes
  - Clean Technology Investment Tax Credit (ITC)
- Communication and Sales
  - HRAI: Reduce Your Customers Risk And Increase Your Sales
  - HRAI: The Heat Pump Advantage: Leverage Net Zero Goals to Drive Your Business
  - Next Gen RTUs: Contractor Education Series
  - Advanced RTU Campaign & Better Buildings Solution Center
  - Slipstream Research and Field Demonstrations
  - Trane Commercial Education & Contractor Solutions

Core Competency Mapping



	Heat Pump RTUs	Dual Fuel RTUs	Load and Energy Modelling	System Design	Energy Efficiency & Decarbonization	Equipment Specification	Communications and Sales	Costing with Incentives	Installation	Controls	Commissioning	Troubleshooting	Maintenance	Operation
Communication and Sales														
HRAI Training: Customer Communication and Sales for Heat Pumps	■	▨			■		■	■						
HRAI: The Heat Pump Advantage: Leverage Net Zero Goals to Drive Your Business	■	▨			■		■	■						
Next Gen RTUs: Contractor Education Series	■	■			■		■			■				■
Advanced RTU Campaign & Better Buildings Solution Center	■	■					■							
Slipstream Research and Field Demonstrations	■	■					■							
Trane Commercial Education & Contractor Solutions	■	■					■							
Financial Incentives														
FortisBC Dual-Fuel RTU Rebate Program		■						■						
CleanBC Commercial Express Program	■							■						
Natural Resources Canada "Retrofit Hub"	■							■						
Provincial Sales Tax on Fossil Fuel Combustion Systems and Heat Pumps	■	■						■						
Canada Greener Affordable Housing program	■	▨						■						
CIB Building Retrofits Initiative	■	▨						■						
Build Canada Homes	■	▨						▨						
Clean Technology Investment Tax Credit (ITC)	■	▨						▨						

Existing Supports For Others

- Building Owners and Managers:
  - Advanced RTU Campaign (ARC)
  - BC Retrofit Accelerator (ZEIC)
  - Building Performance & Decarbonization Guide
  - Next Gen Rooftop Units Tools & Resources
  - BOMA Canada Low-Carbon Training Program
  - HRAI Building Officials Guide – Inspecting Heat Pumps
  - Financial Incentives
- Engineers:
  - ACEEE
- Case Studies
  - Atrium Building Retrofit – Victoria, BC
  - Choice Properties RTU Financing Program
  - Walgreens Proactive RTU Replacement Program (Pacific Northwest/USA)
  - Bonneville Power Administration (BPA) & PNNL Field Tests (Pacific Northwest/USA)
  - Aggregate Studies

Residential*

- ENERGY STAR "Finding Success as a Contractor”
- NRCan Resources: Tools and Marketing for Contractors

* While these resources target contractors working in the Residential sector, they represents an opportunity to modify content to reach contractors working in the Commercial sector..

Core Competency Mapping

	Heat Pump RTUs	Dual Fuel RTUs		Load and Energy Modelling	System Design	Energy Efficiency & Decarbonization	Equipment Specification	Communications and Sales	Costing with Incentives	Installation	Controls	Commissioning	Troubleshooting	Maintenance	Operation
Building Owners, Managers and Engineers:															
Advanced RTU Campaign (ARC)	■	■			■	■	■	■					■		■
BC Retrofit Accelerator (ZEIC)	■	■				■		■	■						
Building Performance & Decarbonization Guide	■	■				■		■							
Next Gen Rooftop Units Tools & Resources	■	■				■		■							
BOMA Canada Low-Carbon Training Program	■	■				■		■							
ACEEE	■	■				■	■		■		■	■	■		■
Residential															
NRCan Resources: Tools and Marketing for Contractors	■	■						■	■						
ENERGY STAR "Finding Success as a Contractor"	■							■		■		■			

HEAT PUMP & DUAL FUEL RTU CONTRACTOR READINESS ROADMAP

Interviews

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Overview

- Interviews covered overall attitudes to dual fuel and heat pump RTU retrofits, the sales process and decision-making, the installation process and technical considerations, pain points, cost, pricing, and client priorities, contractor training, support, and on-the-job learning, and the market, codes, and external drivers.
- The interviews consistently highlight that technology is ready and contractors are generally capable, but adoption of heat pump and dual-fuel RTUs is constrained by capital cost, electrical limits, and owner awareness.
- There is an opportunity to enhance equipment performance by focusing on quality controls programming and commissioning in the heating season.
- The next few slides summarize who was interviewed and their insights on:
  - Market readiness and roles
  - Core decision drivers and barriers
  - Incentives, policy, and program design
  - Technical and commissioning themes
  - Awareness, perceptions, and information gaps

Interviewees (16)

Building Owners/Managers:

- Beedie Property Management Group
- AWM Alliance
- VanCity

Contractors:

- Black and MacDonald
- BC Comfort
- Harbourgreene HVAC
- Dual Mechanical

Government, Utility & Associations:

- City of Vancouver Facilities Management
- BC Ministry of Energy and Climate Solutions
- NRCan
- BOMA BC
- FortisBC

Manufacturers/Suppliers:

- Trane
- Lennox

Engineers:

- SES Consulting
- Building Energy Solutions

Refer to Appendix B: Interview Summaries for **confidential** summary notes from each interview.

Market readiness and roles

- Dual-fuel RTUs are widely viewed across contractors, OEMs, utilities, and advisors as a low-risk, near like-for-like replacement that fits existing contractor skills and workflows.
- Full heat pump RTUs are seen as technically feasible but more challenging due to cold-weather performance concerns, electrical capacity, and limited product maturity.
- Equipment from multiple manufacturers exists, but availability remains an issue (and most RTU replacements are ‘emergency’ - upon failure). Availability is improving slowly with demand generated by the FortisBC program.
- Contractors are not generally viewed as the primary barrier; engineers, owners/managers, and policy/incentive structures often have greater influence on technology choice.
- Tenants are not typically applying pressure to install heat pump and dual-fuel RTUs.

Core decision drivers and barriers

- First cost (not payback) dominates decisions across segments. Uptime and comfort are also primary factors.
- Split incentives (owner pays capex, tenant pays utilities) and limited access to tenant utility data weaken the business case for owners and make savings hard to verify.
- Capital thresholds and fear of unforeseen extras (curb, structure, electrical, roofing) are barriers to adoption.
- Electrical capacity constraints are a barrier to full electrification and a key rationale for dual-fuel solutions.
- GHG and energy outcomes are important mainly for large corporations, public owners, or participants in decarbonization programs.

Incentives, policy, and program design

- FortisBC's dual-fuel RTU rebate is repeatedly described as the main reason current dual-fuel uptake is strong; most interviewees expect adoption to drop sharply if this support ends or weakens.
- Sudden program changes and unclear long-term rules (utilities, carbon tax, codes, tax credits) create planning risk and reinforce "wait it out" behaviour among hesitant owners.

Technical and commissioning themes

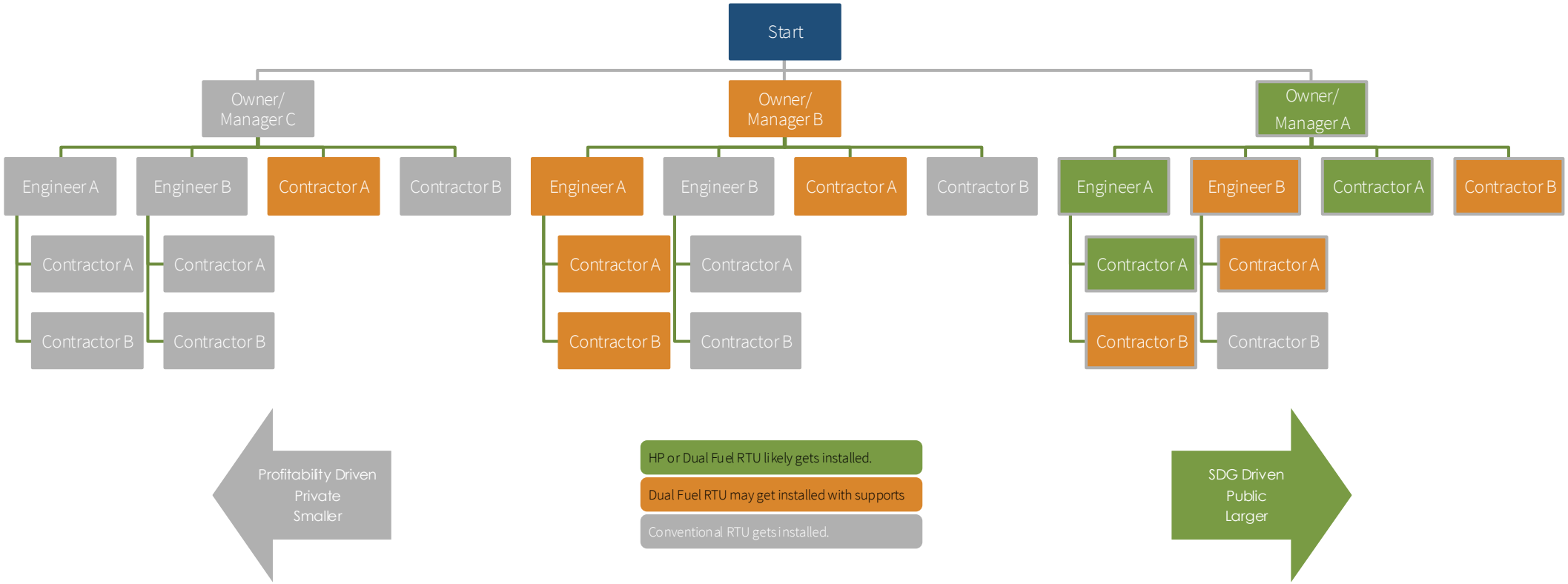
- Key technical issues include electrical sizing, roof structure and weight, condensate/defrost drainage, curb adapters, and thermostat compatibility; none are seen as insurmountable, but they add risk and cost variability.
- DDC and controls optimization are repeatedly identified as high-value levers for emissions reduction, comfort, and troubleshooting, but are not consistently included in projects.
- Commissioning is widely under-scoped; checklists are rushed and controls may be tuned for comfort rather than emissions unless explicitly directed.
- There is a strong standardization preference across portfolios.

Awareness, perceptions, and information gaps

- Awareness of dual-fuel and heat pump RTUs is high among sophisticated owners and low among smaller, Class C, and industrial landlords, who often see heat pumps as residential or niche.
- Negative experiences with other heat pump technologies and misunderstanding of defrost and changeover points create stigma that spills over onto dual-fuel RTUs.
- Owners, property managers, and some engineers request simple, trusted tools: concise case studies, clear design/commissioning checklists, and straightforward rebate guidance, rather than complex modelling.

Insights on Decision Making

- Owners, Engineers, Contractors each influence technology choice.
- Corporate values and stakeholder expectations (SDGs vs profitability), ownership type (public vs private), and the organization's size can greatly impact technology choice.



Guidance for Supports

The following guidance was written together with the City of Vancouver to facilitate decision making on where to focus interventions and supports for contractors.

- Focus roadmap interventions on owner and engineer decision environments: business-case framing, incentive navigation, and specification guidance - not just contractor training.
- Make dual-fuel RTUs visible as a practical, standard option backed with local case studies, clear performance narratives, and robust commissioning templates.
- Pair any regulatory tightening with stable, sufficient financial supports and controls-focused assistance to avoid reversion to conventional gas units or permit avoidance.
- Frame interventions from the perspective of the COV is the driving entity.
- Prioritize lower cost interventions such as communications, advocacy and partnerships.

Opportunities for Intervention

An initial list of 10 opportunities for intervention was generated and included:

Intervention	Description	Barrier/Gap Addressed: Perceived Performance Issues
Targeted education for building owners and managers	Develop workshops, webinars, and guidance materials for commercial building owners and property managers that clearly explain what Dual Fuel RTUs are, how they differ from other heat pump technologies, expected performance, and available incentives and programs.	Confusion with other HP technologies; perceived performance issues; information gaps
Vancouver-specific case studies	Gather and share local case studies that document Dual Fuel RTU capital costs, incentives, measured performance, and lessons learned in Vancouver buildings, and distribute them through industry associations and property management networks.	Perceived performance issues; lack of proof points; risk aversion
Demonstration and proof-of-concept projects	Support highly visible demonstration projects across representative building types with monitored performance and publicly shared results, particularly focused on winter heating operation.	Performance uncertainty; lack of real-world validation
Standardized technology positioning and decision-support tools	Create simple decision-support tools such as technology comparison matrices, application guides, and checklists to reduce misapplication and improve confidence in Dual Fuel RTU technology.	Technology confusion; perceived performance risk

Supports	Description	Barrier/Gap Addressed: Contractor Training
Contractor controls training	Provide incentives to manufacturers to deliver targeted contractor training focused on dual fuel RTU controls, sequencing, and cold-climate operation to improve installation quality and long-term performance.	Contractor skills gaps; operational underperformance
Commissioning and post-install optimization incentives	Provide incentives for commissioning at installation and/or for follow-up optimization 6–12 months post-install to ensure Dual Fuel RTUs operate effectively in winter conditions.	Poor commissioning practices; underperformance in heating mode

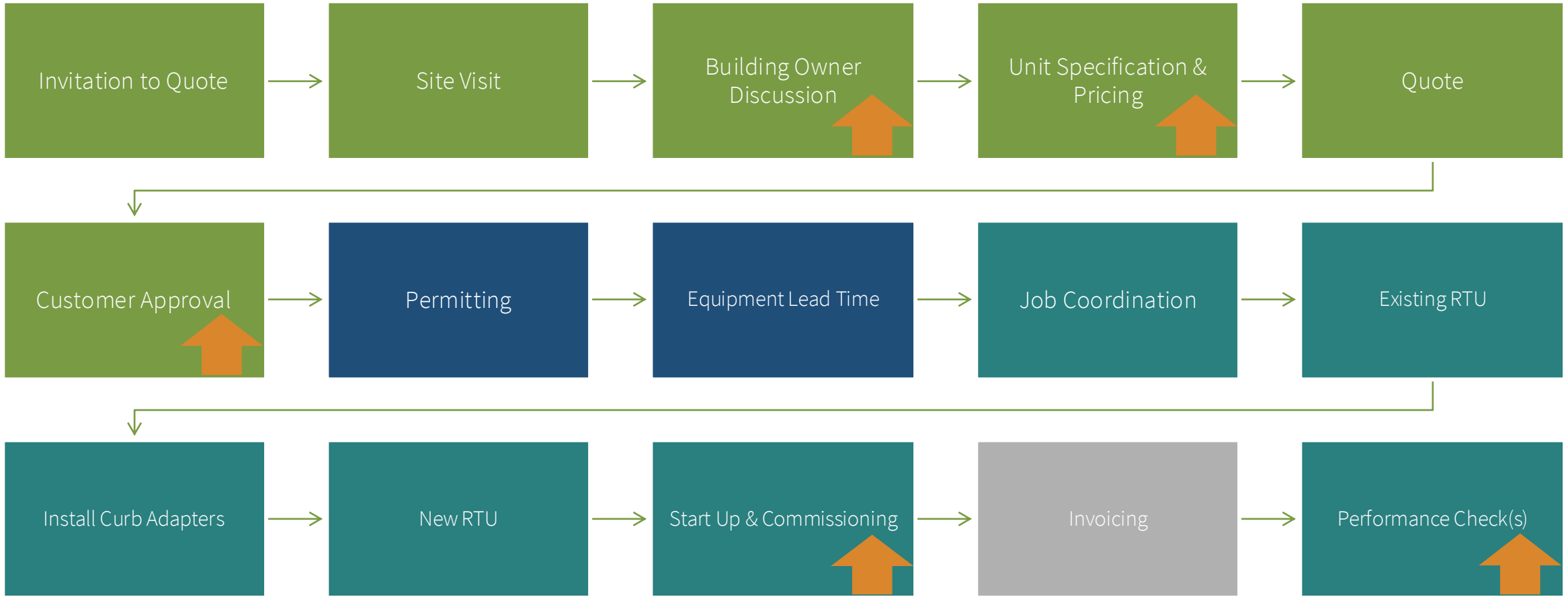
Opportunities for Intervention

Supports	Description	Barrier/Gap Addressed: High Capital Costs
Coordinated and stacked incentives	Coordinate with BC Hydro, FortisBC, and other funding providers to enable incentive stacking, align eligibility criteria, and provide a clear, predictable funding pathway to reduce upfront costs.	High capital costs; fragmented incentive landscape
Midstream incentives for HP RTUs	Provide incentives upstream of the building owner by offering rebates or price reductions to manufacturers or distributors for qualifying dual fuel RTUs, with requirements that incentives be passed through to customers at the point of sale. This approach can lower upfront costs, simplify participation for building owners, and encourage contractors to routinely propose dual fuel RTUs.	High upfront costs; split incentive issues; limited contractor uptake
Split incentive mitigation mechanisms	Promote green leases, capital cost recovery mechanisms, or owner-directed incentives to align owner investment with tenant energy savings.	Split incentive barrier; weak owner business case
Electrical upgrade cost mitigation	Offer incentives to partially offset the cost of electrical service or panel upgrades required to support HP RTUs, potentially delivered in partnership with BC Hydro.	High electrical upgrade costs; electrification barriers

The 10 opportunities for intervention were then focused into five supports.

Contractor Supports and Logic

Contractor Journey – Supports



Indicates a key support opportunity.

Education for Owners/Managers

Issue Statement	Intervention Description	Key Messages
Decisions on commercial RTU equipment replacement are primarily driven by cost – which is lower for conventional gas RTUs than dual fuel RTUs. As such, there is little motivation for commercial building owners and property managers in Vancouver to understand what dual-fuel and heat pump RTUs are, why they should consider them, what performance to expect in local conditions, and how incentives/programs apply to these units. Building owners that are driven by corporate environmental values, goals and targets are the exception.	Make it easy for decision makers to get information on dual-fuel RTUs. This means presenting information that motivates in a format that communicates completely, quickly and asynchronously. Materials should plainly explain costs and incentives available, equipment configuration, operating logic (switch-over temperatures, controls), typical efficiency and carbon performance compared with baseline gas RTUs. Dedicate a webpage section under "Climate action through buildings / Energize Vancouver – Commercial RTU Retrofits" could house all materials and have links to incentives and permitting. Promote clarity through prioritized use of diagrams and plain-language analogies. Avoid technical jargon. Information on dual fuel RTUs should not be combined with information on other potential HVAC solutions, and care should be taken to clearly distinguish from residential solutions (ie. residential dual fuel split systems). Curious decision makers could have email or telephone access for Q&A with City staff, a qualified contractor, or a building owner peer. Communicate available resources through social media, industry associations, and a targeted email campaign.	• Emphasize dual-fuel RTUs as a pragmatic, low-risk option. • Communicate a shift from emergency end-of-life replacements to proactive planning. • Highlight FortisBC rebates create cost parity. Note that FortisBC will honour incentives discussed with KAMs. • Highlight federal and provincial tax credits and financing. Include project delivery options. • Communicate no electrical upgrades required. • Frame RTU replacement alongside capital planning and building modernization for maximum benefits. • Clarify switchover logic (e.g., gas at -3°C in CZ5-8). • Showcase 80-96% GHG cuts with minimal infrastructure changes. • Installation contracts should require factory setting commissioning. • Commissioning and change over point can impact the business case.

Education for Owners/Managers

Inputs	Outputs	Resource Needs	Success Metrics
• Cost and incentive information • Technical content and GHG analysis • Subject matter experts	• Dedicated webpage section. • Commercial Dual-Fuel Heat Pump RTU Primer/ Guidance Document • Decision-Tree: "Is a dual-fuel RTU right for my building?" • Moderated discussion board/ access to SMEs • RFQ template language/ performance specification • Financial Calculator • FAQs • Direct Outreach Pack • Animated Short Video	City staff or consultant time to develop and review materials. SME honorariums. $ **Timeline** Short - Medium Term	• Reach and Engagement: number of website page views, downloads of primers, decision trees, materials, video watches, and click-through rates to incentive program pages. • Knowledge and Confidence: commercial property owner/manager pre/post survey • Market and Program Indicators: year-over-year increase in FortisBC dual-fuel RTU rebate applications, increased share of permit applications for RTU replacements that specify dual-fuel, relative to conventional gas. • Qualitative feedback from Key Partners reporting fewer misconceptions about performance (e.g., cold-weather capability, noise, comfort), clearer expectations around controls and commissioning, and greater acceptance of the technology as the default.

Education for Owners/Managers

Key Partners	Existing Resources Alignment
The City should engage a focused set of policy, market, and technical partners who already work with Vancouver's commercial building owners and managers and can co-develop, deliver, and amplify the new education resources. 1. Strategic Policy & Program Partners: align content with current and upcoming regulations and province-wide retrofit programs. (Province of BC / CleanBC, BC Hydro, FortisBC, Zero Emissions Innovation Centre (ZEIC) / BC Retrofit Accelerator) 2. Owner/Manager and Operator Associations: provide direct access to the target audience and can help shape messaging, delivery channels, and adoption. (BOMA BC / BOMA Canada, LandlordBC, BC Non-Profit Housing Association and similar sector bodies) 3. Technical & Market-Transformation Experts: ensure that the content is technically robust, market-realistic, and grounded in RTU and heat-pump retrofit practice. 4. Industry & Training Organizations: align contractor messaging with the City's owner/manager resources and support consistent market signals. (HRAI, BCIT and other regional training providers, major manufacturers and distributors (e.g., Trane, Lennox, York, Carrier) and key local wholesalers) 5. Engagement & Communications Platforms: provide high-credibility channels to launch and continually reinforce the City's education resources. (ZEBx, Energize Vancouver hub, selected retrofit-coaching and engineering firms active in Energize Vancouver reporting and planning)	• Natural Resources Canada "Retrofit Hub" • SaveOnEnergy • Better Buildings Solution Center (Flow Charts) • NW Energy Efficiency Alliance • Manufacturer Literature • FortisBC Dual-Fuel RTU Rebate Program • Provincial Sales Tax on Fossil Fuel Combustion Systems and Heat Pumps • BC Retrofit Accelerator (ZEIC): ZEBx Decarb Lunch, Building Performance & Decarbonization Guide • Advanced RTU Campaign (ARC) • Next Gen Rooftop Units Tools & Resources • BOMA Canada Low-Carbon Training Program • COV/SES Final Report: On Site Barriers to Commercial Building Equipment Electrification • BC Building Electrification Guide • USDOE calculator Rooftop Unit Comparison Calculator | PNNL.

Case Studies for Owners/Managers

Issue Statement	Intervention Description	Key Messages
Commercial building owners and property managers in Vancouver are cautious about adopting commercial dual fuel RTUs because they perceive job cost risk (capital, electrical upgrade, new curb adapter, engineering, roof reinforcement), performance risk (comfort, reliability, demand charges), are unsure about lifecycle economics, and lack local, trusted examples that clearly demonstrate successful, cost-effective installations within the parameters of their business.	Develop a structured case study program that documents installed dual fuel RTU retrofit projects in representative commercial archetypes (office, retail, light industrial), focusing on fulsome pre/post performance, costs, operations, and tenant experience. Post available case studies on the City's website , securing permissions and data-sharing agreements as needed. Co-created case studies with owners, contractors, and utilities, and packaged into concise, repeatable formats (2–4-page PDF briefs, and technical one-pagers) that speak directly to common concerns: business case, cold-weather performance, comfort, controls integration, electrical capacity. This is also an opportunity for the City to show leadership and install dual fuel RTUs in their own buildings. Share case studies on the City's website and cross-link from Key Partner pages. Use case studies as part of direct outreach packs for building owners and managers. Leverage and reformat case studies into slide decks for events and workshops and short videos.	• Business case: summary of a complete analysis of capital and operating costs and savings. • Comfort and reliability: quotes from tenants and building managers/engineers. • Measurable performance: gas consumption, operating costs, and GHG reductions compared with conventional RTUs, with clear before/after data and independent verification. NOTE: Modelling alone will not sufficiently address this issue. • Shared information: documented designs, control strategies, and commissioning lessons.

Case Studies for Owners/Managers

Inputs	Outputs	Resource Needs	Success Metrics
Project data: baseline and post-retrofit gas and electricity use, demand profiles, capital and operating costs, incentive amounts, and simple payback/NPV outputs. Technical analysis: standardize metrics and provide neutral interpretation (e.g., performance vs. code, carbon reduction, avoided upgrades). Qualitative insights: interviews with owners, property managers, tenants, and contractors on comfort, operations, maintenance, and decision drivers. Incentive for project owners/managers to participate.	Standardized commercial RTU case study template. Case Studies	City staff or consultant time to develop and review case studies. Building owner/manager time to facilitate information gathering. $$ **Timeline** Short – Medium Term	Adoption and reach: number of dual fuel RTU projects documented and published by year and by building archetype. Web metrics: unique views, downloads, and average engagement time for case study pages. Market and Program Indicators: year-over-year increase in FortisBC dual-fuel RTU rebate applications, increased share of permit applications for RTU replacements that specify dual-fuel, relative to conventional gas. Qualitative feedback from Key Partners reporting improvements in owner confidence and reduced perceived cost risk.

Case Studies for Owners/Managers

Key Partners	Existing Resources Alignment
The City should engage a small, targeted group of market, technical, utility, and owner-side partners who already have direct experience with heat pump and dual fuel RTU projects, incentive programs, and field research. 1. Local Technical and Market-Transformation Experts: identify suitable Vancouver/BC sites, shape study design, and translate findings into practical guidance. 2. Utilities and Program Administrators: provide candidate projects from incentive pipelines, metered data, and co-funding for monitoring and documentation. (FortisBC, BC Hydro) 3. Advanced RTU and Dual-Fuel Research Leaders: contribute proven methodologies, data frameworks, and comparable case studies from the Pacific Northwest and beyond. (Bonneville Power Administration (BPA), Pacific Northwest National Laboratory (PNNL), Northwest Energy Efficiency Alliance (NEEA)) 4. Manufacturers, Distributors, and Key Contractors: identify specific projects, provide technical documentation, and co-develop performance narratives. 5. Owner/Operator Platforms for Storytelling and Dissemination: sourcing willing case study hosts and maximizing the reach of the case study library. (BOMA BC, ZEIC / BC Retrofit Accelerator)	• Atrium Building Retrofit – Victoria, BC • Choice Properties RTU Financing Program • Walgreens Proactive RTU Replacement Program (Pacific Northwest/USA) • Bonneville Power Administration (BPA) & PNNL Field Tests (Pacific Northwest/USA) • Aggregate Studies • Slipstream Research and Field Demonstrations • GWL Real Estate • RBC fuel switching projects

Stable Midstream Supports for Owners/Managers

Issue Statement	Intervention Description	Key Messages
High upfront capital costs and a fragmented, changing incentive landscape introduce hesitancy in dual fuel RTU adoption. Wavering municipal, provincial, federal and utility commitments are encouraging a 'wait and see' attitude. Commercial building owners and property managers want assurance that if they plan for dual fuel RTU retrofit in their capital plan, the cost assumptions will not change before they execute the plan. Some commercial building owners and property managers want to plan for multiple phases of retrofits with equipment consistency. FortisBC provides the primary incentive for dual fuel RTUs and must limit participation to approved funding.	Convene municipal, provincial, federal and utility funders to co-design a coordinated "funding pathway" for priority retrofit types that allows predictable incentive stacking and aligned eligibility rules. This pathway would function as a single, prescriptive midstream offer with back-end braiding of municipal, provincial, utility, and federal dollars to reliably cover incremental costs over an assured, predefine, multi-year, period. Provide incentives upstream of the building owner by offering rebates or price reductions to manufacturers or distributors for qualifying dual fuel RTUs, with requirements that incentives be passed through to customers at the point of sale. This approach can lower upfront costs, simplify participation for building owners, and encourage contractors to routinely propose dual fuel RTUs. The DOE RTU Challenge (2011 – 2019) and connected utility DSM programs and later Advanced RTU campaign may be referenced as a model. NB) DOE's Better Buildings Initiative and support for dual fuel RTUs was in place for 13 years (2013 - 2026). Market Transformation in 2-3 years should not be expected for this technology.	• Emphasize dual-fuel RTUs as a pragmatic, low-risk option. • Highlight incentives create cost parity. • Assure that incentives will be available and easily accessed.

Stable Midstream Supports for Owners/Managers

Inputs	Outputs	Resource Needs	Success Metrics
Policy direction to coordinate an inter-agency funding design working group and approve a multi-year framework. Utility and provincial commitment to harmonize eligibility rules. Program and market intelligence from existing pilots and programs. Communications, IT, and legal resources to develop a single application portal, standardized participation agreements, and clear public guidance.	A published "Vancouver Retrofit Funding Pathway" for key building types, showing step-by-step funding sources and stacked incentive ranges for typical projects. A streamlined intake channel (web portal and coaching) that screens projects once and routes them to appropriate programs and stacked funding packages. Multi-year agreements with BC Hydro, FortisBC, and CleanBC defining stacking rules, cost-share targets, and communication protocols when budgets or rules change. Standardized documentation sets (studies, design packages, contractor attestations) accepted by all participating funders.	City staff for inter-agency coordination, program design, and monitoring, plus communications and digital support. Financial: Dedicated multi-year capital envelope for top-ups. External: In-kind contributions and co-funding from BC Hydro, FortisBC and CleanBC for program supports and incentives. $$$$$ **Timeline** Medium Term	Market and Program Indicators: year-over-year increase in dual-fuel RTU rebate applications, increased share of permit applications for RTU replacements that specify dual-fuel, relative to conventional gas. Decrease in failed or abandoned projects due to incentive complexity or last-minute program changes. Qualitative feedback from Key Partners reporting improvements in owner confidence, reduced perceived cost risk, and clarity regarding the predictability of funding.

Stable Midstream Supports for Owners/Managers

Key Partners	Existing Resources Alignment
The City should convene a compact "funders table" anchored by the Province and utilities, with federal and municipal capital programs at the same table and supported by technical/market partners who can quantify impacts and align rules. 1. Core Funding and Program Owners: control the main commercial dual fuel RTU incentives and complementary retrofit funding streams. (Province of BC / CleanBC, FortisBC, BC Hydro, Zero Emissions Innovation Centre (ZEIC) / BC Retrofit Accelerator) 2. Municipal and Local Implementation Partners: ensure the funding pathway fits Vancouver's policy, permitting, and building-owner experience. (City of Vancouver – Green & Resilient Buildings / Energize Vancouver), LandlordBC and BC Non-Profit Housing Association (BNHPA)	• FortisBC Dual-Fuel RTU Rebate Program • CleanBC Commercial Express Program • Natural Resources Canada "Retrofit Hub" • Provincial Sales Tax on Fossil Fuel Combustion Systems and Heat Pumps • Canada Greener Affordable Housing program • CIB Building Retrofits Initiative • Build Canada Homes • Center for Energy and Environment: Overcoming the Market Barriers for Rooftop Unit (RTU) Retrofit Enhancement (2023) • US DOE RTU Challenge (2011 – 2019)

Controls/ Commissioning Training for Contractors

Issue Statement	Intervention Description	Key Messages
Dual fuel RTU retrofits are at risk of higher operational costs, call-backs, and lost emissions savings from control overrides if contractors lack applied skills in dual-fuel RTU controls, sequencing, and cold-climate operation.	Introduce targeted incentives (or co-investment) for manufacturers that develop and deliver contractor training on dual-fuel RTU controls integration and cold-climate operation and for contractors to attend. Deliver training through a mix of manufacturer-led labs, job-site mentoring, and modular online content focused on common failure modes (improper dual-fuel switchover logic, outdoor air damper position, poor sensor placement, defrost and lock-out errors). Promote manufacturer training on the City's website, and through manufacturers, suppliers and industry associations. Use market signals, such as program rules and communications to clearly tie access to certain incentives or opportunities to proof of contractor training completion.	• Proactively addressing common failure modes reduces call-backs and improves customer satisfaction. • Communicating with owners and managers and training them on the equipment operation reduces call-backs and improves customer satisfaction.

Controls/ Commissioning Training for Contractors

Inputs	Outputs	Resource Needs	Success Metrics
Funding to support training development. Partner manufacturers and distributors: subject-matter experts, curriculum content, demo equipment, learning platforms, and in-field technical support. Funding for contractor participants.	Manufacturer-specific courses on dual-fuel RTUs controls and optimization. Sample sequences of operation, and cold-climate operating guides.	City staff or consultant time to manage the training development, coordinate partners, ensure curriculum quality, and integrate with market signals. $$$ **Timeline** Medium Term	Participation and coverage: number of manufacturers offering dual-fuel RTU controls courses, number of local HVAC contractors and technicians completing training. Quality and performance: reduction in dual fuel RTU-related inspection deficiencies, call-backs, and customer complaints, measured improvement in seasonal COP, gas backup runtime, and load coverage for retrofitted RTUs relative to baseline projects. Climate and market outcomes: verified GHG and energy savings persistence for dual fuel RTU retrofits, increased share of replacement RTUs that are dual-fuel.

Controls/ Commissioning Training for Contractors

Key Partners	Existing Resources Alignment
The City should engage funders/program owners, technical/market actors, and manufacturer channels that already work on advanced RTUs, controls, and workforce development. 1. Core Funding and Policy Partners: provide the dollars and policy frameworks for tying incentives to training outcomes. (Province of BC / CleanBC Better Buildings, FortisBC, BC Hydro) 2. Market-Transformation and Technical Partners: ensure the training content and incentive design are technically credible and drive measurable performance improvements. 3. Manufacturer and Training-Channel Partners: direct recipients of incentives or co-investment and need to be engaged early to co-design program rules. (Major RTU manufacturers, manufacturer-run training centres (Trane, Carrier, York, Lennox, etc.), HRAI and other trade training bodies)	• CSA Z5000:26 - includes dual fuel commissioning guidelines and example checklists • Trane Education Center (TEC) • Johnson Controls Training • York HVAC Education • Manufacturer Literature and Training • Natural Resources Canada "Retrofit Hub" • SaveOnEnergy • Better Buildings Solution Center • NW Energy Efficiency Alliance

Ensuring Long Term RTU Performance for Owners and the City

Issue Statement	Intervention Description	Key Messages
Dual Fuel RTUs may underperform in Vancouver winter conditions due to incomplete start-up, controls misconfiguration, and lack of post-install verification under cold-weather loads. This creates comfort complaints, excessive gas run-hours, and missed GHG reduction. Poor commissioning practices can remain hidden until the first heating season, or longer if there are no central monitoring systems.	Develop an offer that aims to improve winter performance by tying financial and/or permitting-style incentives to two required deliverables: (1) commissioning completed at installation, and (2) a 6–12 month "optimization and verification" check timed to capture at least part of the first heating season. The second visit is the key control: it uses measured runtime, lockout setpoints, and heating capacity indicators to flag units that were "signed off" but are actually defaulting to gas, short-cycling, or failing to meet space temperature in heat-pump mode.	• "Installation is not performance": paying for verified winter operation prevents incentives from funding underperforming systems. • Two-stage incentives protect building owners: the holdback ensures contractors return to tune controls when real heating-season conditions reveal issues.

Ensuring Long Term RTU Performance for Owners and the City

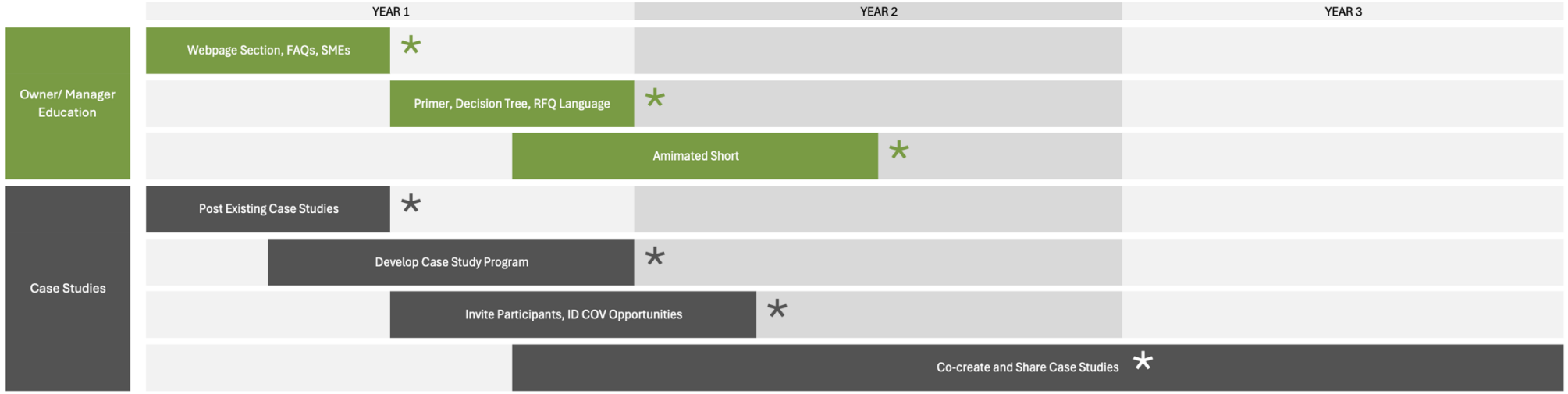
Inputs	Outputs	Resource Needs	Success Metrics
Offer rules: eligible equipment, minimum submittals, seasonal timing requirements, and holdback structure (e.g., % paid at start-up vs. after optimization). Technical requirements: standardized commissioning checklist for heating mode, controls sequences, and cold-weather verification tests (including heat-pump enable/disable logic and gas switchover). Incentives to contractors to cover cost of 2nd visit: 2 hours per unit + travel time.	Commissioning guidance with a standardized checklist. 6–12 month optimization report that is shared with the owner/manager and installation contractor. Building/portfolio insights: anonymized findings on common failure modes (e.g., lockout too high, defrost/controls errors, poor airflow) that inform future program design and contractor capability-building.	City staff or consultant time to develop the offer and manage the program administration: intake, eligibility screening, payment processing, and quality assurance audits. Modest M&V budget: portable loggers where BAS trends are not available, spot-check audits, and complaint-driven investigations. $$$$ **Timeline** Medium Term	% of installations passing commissioning on first submission; % passing 6–12 month verification without corrective work. Reduction in winter gas runtime per RTU (normalized by outdoor air temperature) and improved heat-pump heating runtime share. Increased number of installations with ongoing service contracts and/or extended warranty contracts.

Ensuring Long Term RTU Performance for Owners and the City

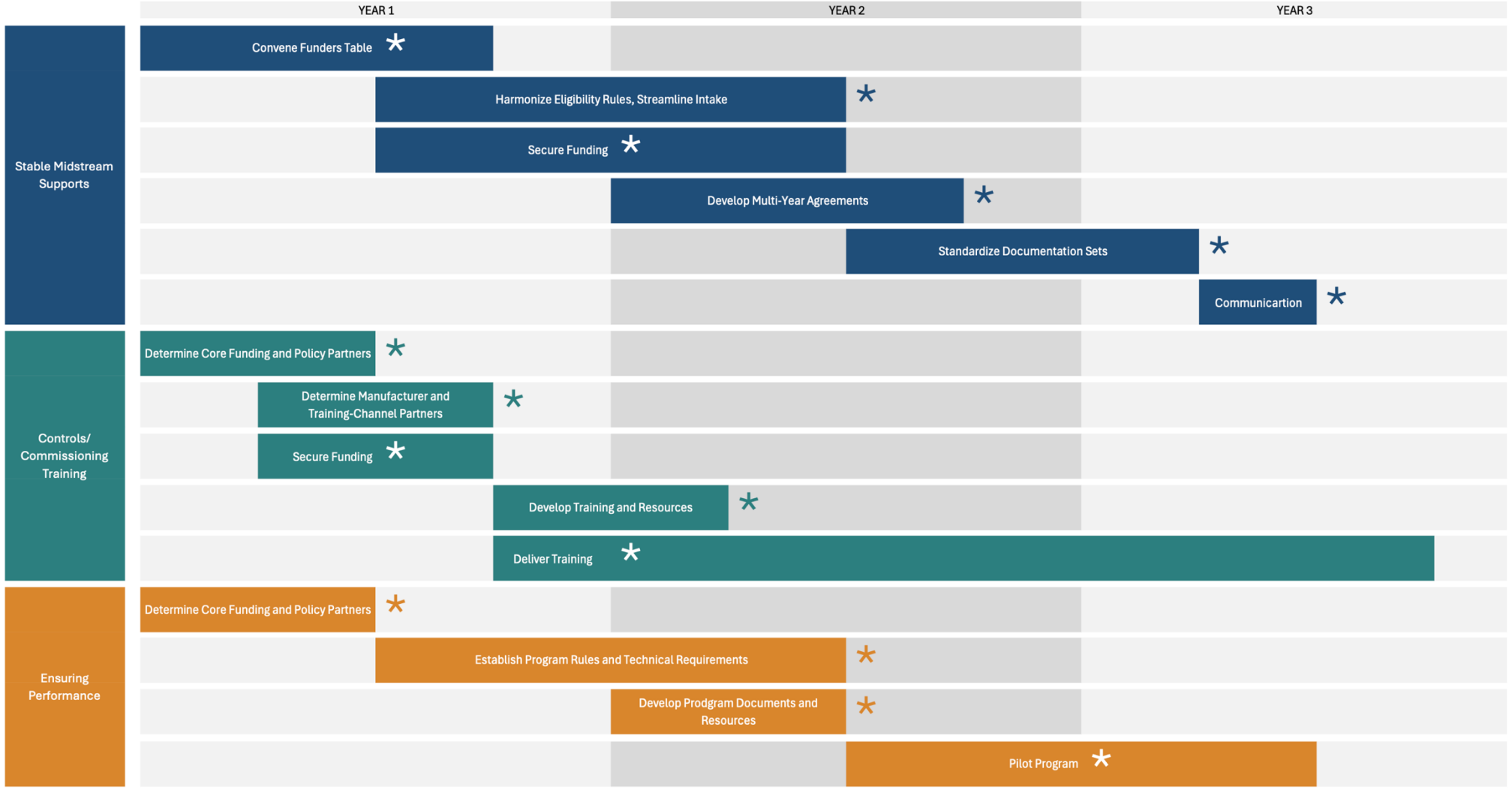
Key Partners	Existing Resources Alignment
The City should align regulators, funders, and technical/market actors. 1. City Regulatory and Compliance Partners (Permitting Tools): allow the City to embed the two required deliverables into permits, occupancy, and green-building requirements. • Development, Buildings and Licensing (DBL) – Mechanical Permits and Inspections • Planning, Urban Design & Sustainability – Green Buildings Policy and Commissioning • Energize Vancouver team 2. Provincial and Utility Incentive Partners (Financial Levers): condition rebates/top-ups on proof of commissioning and first-season optimization. (Province of BC / CleanBC Better Buildings, BC Hydro, FortisBC) 3. Technical, Commissioning, and Market-Implementation Partners: ensure requirements are technically credible and deliver real winter performance gains. Help ensure the deliverables fit real operations and do not slow project delivery.	• BCNPHA Operator Training Manual • Trane Education Center (TEC) • Johnson Controls Training • York HVAC Education • Manufacturer Literature and Training • Natural Resources Canada "Retrofit Hub" • SaveOnEnergy • Better Buildings Solution Center • NW Energy Efficiency Alliance • FortisBC Dual Fuel RTU Incentive Program

Roadmap

The Roadmap below presents the major steps and sequencing needed to implement the recommended supports. In practice, the starts may be staggered to better match priorities and resource availability.



Roadmap


YEAR 1
YEAR 2
YEAR 3
Stable Midstream Supports
Convene Funders Table
Harmonize Eligibility Rules, Streamline Intake
Secure Funding
Develop Multi-Year Agreements
Standardize Documentation Sets
Communicartion
Controls/ Commissioning Training
Determine Core Funding and Policy Partners
Determine Manufacturer and Training-Channel Partners
Secure Funding
Develop Training and Resources
Deliver Training
Ensuring Performance
Determine Core Funding and Policy Partners
Establish Program Rules and Technical Requirements
Develop Prodgram Documents and Resources
Pilot Program

Recommendations For Additional Follow Up

- Keep apprised of developing technologies:
  - inverter compressors in RTUs (Lennox (available as of February 2026), Carrier).
- Follow up on:
  - Dual Fuel RTU Program Evaluations (Fortis BC, NRCan)
  - Guideline Specifications/ Best Practice Guidelines for heat pump RTUs (Province)
- Get an opinion from a structural engineer(s) regarding unit weight implications over time.
- Continue to advocate with suppliers to stock Dual Fuel RTUs to ensure availability for emergency replacements.
- Advocate for a competitive program that targets electric cold climate RTUs technologies once they become more available.

HEAT PUMP & DUAL FUEL RTU CONTRACTOR READINESS ROADMAP

Appendix A: Catalogue of Existing Supports

PREPARED FOR THE CITY OF VANCOUVER

BY HARBOURGREENE CONSULTING INC.

APRIL 17, 2026

Introduction

- This catalogue provides details on current available training, guidance, and incentive resources available to contractors and decision makers as it relates to the retrofit of small commercial package heat pump or dual fuel RTUs.
- Note that U.S.-developed dual fuel and heat pump RTU training is broadly applicable in Canada for core topics such as refrigeration cycles, control strategies, commissioning steps, and general O&M practices. However, to perform reliably in Canadian markets and climates, this content typically needs adaptation for colder design temperatures, Canadian efficiency metrics and codes, local utility programs, and region-specific guidance on cold-weather switchover settings, defrost management, and backup heat use. U.S.-developed training is marked by US .

Industry Training Programs

Refrigeration Trades Programs

- Organizations: Skilled Trades BC, BCIT
- Link: https://skilledtradesbc.ca/refrigeration-air-conditioning-mechanic, https://www.bcit.ca/programs/heating-ventilation-air-conditioning-and-refrigeration-technician-certificate-full-time-2958cert/
- Description:
  - Heat pump RTUs are formally covered for Red Seal Refrigeration Mechanics as part of the standard curriculum in BC.
  - Dual fuel (hybrid) RTUs are addressed through modules on hybrid HVAC systems and via hands-on training involving both electric and gas heating components, preparing students for service and commissioning in commercial buildings.

HRAI Post-Trades Training

- Organization: Heating, Refrigeration and Air Conditioning Institute of Canada (HRAI)
- Link: https://www.hrai.ca/training-courses
- Description: Certification programs and virtual workshops focused on ventilation, air system design, heat loss/gain, and heat pump adoption. Delivered by expert instructors, with course completion recognized by Canadian building officials. Includes guidance on energy performance and incentives for heat pump programs.
- Cost: Varies by course (fees apply per session/module).
- Pre-requisites: Intended for HVAC technicians, contractors, and professionals with basic field experience.
- Core Competencies: Air system design, energy efficiency, heat pump technology, customer engagement, and adoption of new HVAC solutions.

HVACRedu.net

- Organization: HVACRedu.net
- Link: https://hvacredu.net
- Description: Accredited online training with a focus on small commercial and residential systems, HVAC fundamentals, load calculations, and equipment selection. Includes specific modules on air handlers and RTUs as well as quality installation and maintenance practices aligned with ACCA/ASHRAE standards. Deep coverage of heat pump operation, installation, and retrofits.
- Cost: Fees per course or full program; continuing education credits available.
- Pre-requisites: Requires prior working knowledge of HVAC fundamentals or equivalent field experience.
- Core Competencies: System analysis, equipment selection, RTU installation, maintenance, ACCA/ASHRAE quality standards.

HVAC School: For Techs, By Techs

- Organization: HVAC School (Independent, Bryan Orr)
- Link: https://www.hvacrschool.com
- Description: Online resource and professional podcast publishing detailed training content and guides on commercial HVAC/R, including heat pump RTUs. Content includes troubleshooting tips, controls, and sequence of operations.
- Cost: Free educational podcasts, articles, and guides.
- Pre-requisites: Suitable for both entry-level and experienced technicians.
- Core Competencies: Practical field troubleshooting, maintenance, system controls, ongoing technical education for techs.

Trane Education Center (TEC)

- Organization: Trane
- Link: https://www.trane.com/commercial/north-america/us/en/education-training.html
- Description: Offers self-paced and instructor-led courses, webinars, and hands-on learning covering technical service, installation, and optimization of Trane commercial systems, including heat pump RTUs. Training includes design, installation, energy modeling, and advanced controls for RTUs.
- Cost: Both free and fee-based courses (cost varies by course).
- Pre-requisites: Some advanced courses require prior technical experience; open registration for foundational material.
- Core Competencies: System installation, load and energy modeling, Trane controls, troubleshooting, maintenance, and commercial RTU operation.

Johnson Controls Training

- Organization: Johnson Controls
- Link: https://www.johnsoncontrols.com/search#q=training&t=coveo81ff335f
- Description: Hands-on and classroom/lab courses in HVAC mechanical equipment operation, including RTUs and building automation systems (BAS). Teaches system fundamentals, operational best practices, and advanced troubleshooting.
- Cost: Approx. $3,300 per student for comprehensive courses (may vary by session/topic).
- Pre-requisites: Designed for technicians, building maintenance staff, and engineers responsible for HVAC/BAS operation.
- Core Competencies: HVAC mechanical systems, advanced troubleshooting, BAS integration, preventive maintenance.

York HVAC Education

- Organization: York (Bosch Home Comfort Group)
- Link: https://www.york.com/search#q=rtu%20training&t=coveo81ff335f
- Description: Offers training and certification on York commercial RTUs, focusing on advanced heat pump technology, DOE performance standards, decarbonization, and system integration in commercial buildings.
- Cost: Varies by course and format.
- Pre-requisites: HVAC professionals, engineers, and installation contractors (prior field experience recommended).
- Core Competencies: RTU technology, all-electric heat pumps, energy efficiency, decarbonization, BAS integration.

Guidance Documents and Toolkits

BCNPHA Operator Training Manual: Dual Fuel RTU and Make Up Air Units

- Organization: BC Non-Profit Housing Association
- Link: https://bcnpha.ca/wp-content/uploads/2025/12/BCNPHA-OpTraining-DualFuel-RTU-MUA-2025.pdf
- Description: A guide for building operators designed to make sure that once a dual fuel rooftop unit (RTU) or makeup air unit (MUA) installation is complete, they have all the information they need to operate and maintain it effectively and confidently. It includes references and checklists operators can use directly, as well as items they should request from the contractor before the project is finished.
- Cost: Free.
- Pre-requisites: Geared to Canadian building owners and operators..
- Core Competencies: System Design, Equipment Specification, Commissioning, Troubleshooting, Maintenance, Operation

Natural Resources Canada "Retrofit Hub”

- Organization: Natural Resources Canada (NRCan)
- Link: https://cietcanada.com/news/introducing-nrcans-retrofit-hub-your-resource-for-energy-efficient-building-retrofits/
- Description: The Retrofit Hub is a centralized online portal offering tools, guidance documents, and resources to support owners and professionals in planning and implementing energy-efficient commercial retrofits—including those involving heat pump RTUs. Provides information on eligible systems, incentive programs, training opportunities, best practices, and regulatory/market considerations.
- Cost: Free.
- Pre-requisites: Geared to Canadian building owners, operators, and energy professionals.
- Core Competencies: Retrofit project planning, eligibility for grants/incentives, code compliance, sustainable technology adoption, and leveraging federal support.

SaveOnEnergy - Commercial Heat Pump & RTU Guidance

- Organization: SaveOnEnergy (Ontario IESO)
- Link: Electrifying Heating with Heat Pumps in Commercial Buildings (PDF)
- https://saveonenergy.ca/en/For-Business-and-Industry/Resources/Rooftop-Units-Buying-Guide
- Description: Provides a comprehensive summary of best practices, technology pathways, and financial case studies for deploying heat pump RTUs in commercial buildings. The document covers electrification strategies, retrofit considerations, cost/benefit modeling, and technical decision points for efficient space conditioning.
- Cost: Free.
- Pre-requisites: Suitable for facility managers, HVAC contractors, energy consultants, and decision-makers in Ontario.
- Core Competencies: Technology comparison/selection, building electrification planning, economic analysis, retrofit implementation, and incentive utilization.

Better Buildings Solution Center - High-Efficiency RTU Replacement Toolkit

- Organization: U.S. Department of Energy, Better Buildings Solution Center
- Link: https://betterbuildingssolutioncenter.energy.gov/toolkits/high-efficiency-rooftop-unit-rtu-replacement, https://knowledgelibrary.ifma.org/download-file/?record_id=recz6DFrFdtbUd9SB&file=0
  - Tools at https://web.archive.org may be used to access content that is no longer active.
- Description: A comprehensive toolkit with best practices, step-by-step guidance, technical resources, and success stories from the Advanced RTU Campaign to accelerate replacement of existing RTUs with high-efficiency or heat pump RTUs. Includes consideration guides, procurement checklists, energy/emission comparison tools, and technology case studies to support upgrades in commercial buildings.
- Cost: Free access.
- Pre-requisites: Intended for building owners, facility managers, and HVAC professionals familiar with RTU systems.
- Core Competencies: Equipment selection for climate zone/application, procurement planning, energy/emissions analysis, commercial project management for RTU retrofits, specifying advanced RTU/heat pump solutions.

NW Energy Efficiency Alliance – Efficient RTU Program

- Organization: Northwest Energy Efficiency Alliance (NEEA)
- Link: https://neea.org/product-technology/rooftop-units/
- Description: Provides technical specifications, market transformation strategies, and performance requirements for commercial high-performance and dual-fuel heat pump RTUs in the Northwest region. Focuses on rapid adoption of efficient RTU technologies and supporting utility/industry programs to drive down HVAC energy consumption in commercial buildings.
- Cost: Free.
- Pre-requisites: Targeted at utility program staff, engineers, HVAC professionals, and building managers.
- Core Competencies: Technology specification, system energy modeling, demand management, utility program participation, and project ROI evaluation.

Live Events and Workshops

ZEBx Decarb Lunch

- Organization: Zero Emissions Building Exchange (ZEBx)
- Link: https://www.zebx.org/zebx-decarb-lunch-series/
- Description: A recurring, free monthly event that delivers leading-edge presentations, industry case studies, research findings, and live Q&A about decarbonizing commercial buildings. Recent sessions specifically addressed decarbonizing RTUs, barriers to electrification, best practices for effective heat pump RTU retrofits, fuel-switching pilot projects (e.g., Vancity Credit Union), and local policy drivers. Hosted online, supported by BC Hydro and the City of Vancouver.
- Cost: Free.
- Pre-requisites: Best suited for building owners, project managers, consultants, HVAC contractors, and policy/utility representatives; open registration.
- Core Competencies: Applying retrofit best practices, understanding policy/regulatory context, overcoming electrification barriers, evaluating decarbonization pathways, and peer learning on hybrid/dual-fuel heat pump RTU systems

Slipstream Research Webinars

- Organization: Slipstream
- Link: https://slipstreaminc.org/research/rtu-electrification-market
- Description: Live and recorded webinars for researchers, program managers, designers, and HVAC professionals that present Slipstream's market research and field study results on commercial heat pump RTUs. Sessions include deep-dives into market barriers, technical performance, electrification policy support, case studies, energy modeling, and strategies to boost adoption of heat pump RTUs in new and retrofit projects.
- Cost: Free to access past and upcoming webinars.
- Pre-requisites: Designed for HVAC engineers, research analysts, program administrators, and energy efficiency advocates; no formal prerequisites.
- Core Competencies: Market research interpretation, technical analysis for RTU retrofits, incentive planning, ROI calculations, and stakeholder engagement in RTU electrification.

Centre for Community Energy Transformation

- Organization: Centre for Community Energy Transformation (Mississauga, Ontario)
- Link: https://www.communityenergy.ca/events/
- Description: Regular workshops, webinars, and networking sessions that support commercial and institutional energy transition—including sessions on commercial heat pump technologies, RTU retrofit strategies, and regulatory/market incentives in Ontario. Topics also include building-level heat load assessments, utility incentive program info, and hands-on equipment selection.
- Cost: Most events are free or low-cost; registration required.
- Pre-requisites: Targeted at facility operators, municipal staff, energy consultants, and commercial building decision-makers.
- Core Competencies: Local incentive navigation, load calculation/reporting (F280-12), heat pump selection for commercial retrofits, and practical peer networking for project delivery.

Communication and Sales

HRAI: Reduce Your Customers Risk And Increase Your Sales

- Organization: Heating, Refrigeration and Air Conditioning Institute of Canada (HRAI)
- Link: https://www.hrai.ca/newsletter/reduce-your-customers-risk-and-increase-your-sales
- Description: This article discusses strategies for HVAC contractors to address customer concerns about financial and operational risks associated with adopting heat pump RTUs.
- Cost: Free
- Pre-requisites: Recommended for contractors and HVAC professionals with field experience.
- Core Competencies: Customer engagement, benefit communication, responding to objections, leveraging net zero goals in sales, incentive utilization.

HRAI: The Heat Pump Advantage: Leverage Net Zero Goals to Drive Your Business

- Organization: Heating, Refrigeration and Air Conditioning Institute of Canada (HRAI)
- Link: https://www.hrai.ca/hrai-training-courses
- Description: Training focused on identifying energy efficiency opportunities, understanding how to present the case for heat pumps, and boosting contractor confidence in explaining the operational and financial benefits of heat pump RTUs. Emphasizes customer conversations and provides sales tactics relevant for small-to-medium commercial markets.
- Cost: Fee per course (variable).
- Pre-requisites: HVAC trade experience recommended.
- Core Competencies: Positioning heat pumps vs. other systems, communicating financial and comfort benefits, responding to customer objections, leveraging incentives in sales conversations.

Next Gen RTUs: Contractor Education Series

- Organization: NextGenRTUs (US DOE and national partners)
- Links: https://nextgenrtus.org/kicking-2025-training-series-successful-first-session-heat-pump-rtus-and-ervs, https://nextgenrtus.org/dual-fuel-heat-pump-rooftop-units-rtus
- Description: A dedicated series of sales-focused trainings, webinars, and downloadable resources to help contractors advocate for and demonstrate next-generation RTU benefits. Topics include ERV integration, energy/cost calculators, customer-facing case studies, and how to communicate dual-fuel advantages.
- Cost: Free.
- Pre-requisites: Intended for contractors, distributors, and HVAC sales professionals.
- Core Competencies: Customer education on RTU options, sales conversation skills, presenting operational advantages, using case studies and calculators to support proposals.

Advanced RTU Campaign & Better Buildings Solution Center

- Organization: U.S. Department of Energy (DOE) Better Buildings
- Link: https://betterbuildingssolutioncenter.energy.gov/alliance/technology-campaigns/advanced-rooftop-unit-campaign
  - Tools at https://web.archive.org may be used to access content that is no longer active.
- Description: Offers sales, technical, and decision-support resources to help contractors and building owners collaboratively assess and implement high-efficiency and heat pump RTUs. Supplies case studies, mobile apps for RTU evaluation, success metrics, and customer handouts for communicating benefits.
- Cost: Free.
- Pre-requisites: Open to contractors, facility managers, and energy consultants.
- Core Competencies: RTU benefit explanation, building owner communications, project scoping with customer, application of best-practice sales strategies.

Slipstream Research and Field Demonstrations

- Organization: Slipstream
- Link: https://slipstreaminc.org/research/rtu-electrification-market, https://slipstreaminc.org/videos
- Description: Provides contractors with research-based resources and real-world case studies showing successful commercial heat pump RTU installations, energy and emissions outcomes, and guidance to overcome barriers when communicating benefits to building owners. Webinars and demonstration findings address common misconceptions about cost, cold climate performance, and payback.
- Cost: Free.
- Pre-requisites: Designed for HVAC professionals, contractors, sales and technical teams.
- Core Competencies: Using field data to bolster sales, communicating technical and financial results, addressing skepticism, presenting client-specific success stories.

Trane Commercial Education & Contractor Solutions

- Organization: Trane Commercial
- Link: https://www.trane.com/commercial/north-america/canada/en/about-us/roles/contractor.html
- Description: Offers both contractor technical training and customer-facing tools, including product comparisons, energy savings calculators, comfort benefits, and sustainability case studies. Training supports technicians in confidently educating and selling advanced heat pump RTUs.
- Cost: Some resources free, advanced training fee-based.
- Pre-requisites: None for basic modules; field or trade experience suggested for advanced.
- Core Competencies: Explaining RTU features and advantages, connecting product benefits to customer goals, using tools to demonstrate ROI and sustainability.

Financial Incentives

FortisBC Dual-Fuel RTU Rebate Program

- Organization: FortisBC
- Link: https://www.fortisbc.com/rebates/detail/dual-fuel-rooftop-unit-rebates
- Description: This program offers generous financial incentives for the installation of dual fuel (gas and electric heat pump) RTUs in commercial and institutional buildings. Rebates support replacement of older RTUs with new units combining a high-efficiency gas furnace and electric heat pump, controlled by a thermostat that automatically selects the heating source for optimal energy use and GHG savings. Includes increased top-ups for northern, Indigenous, and income-qualified customers.
  - The rebate typically covers up to 30% of total project cost, up to $100,000 per premise. For certain non-profit / social housing retrofit streams, FortisBC has offered up to 50% of total project cost.
- Pre-requisites: Install must be completed by a contractor qualified under Technical Safety BC or the Home Performance Contractor Network (HPCN). Eligible only for customers with existing natural gas service through FortisBC. Installations must meet TECA sizing guidelines and be on the qualified products list.

CleanBC Commercial Express Program

- Organization: CleanBC (Better Buildings BC / BC Hydro)
- Link: https://betterbuildingsbc.ca/incentives/cleanbc-commercial-express-program/
- Description: A streamlined capital incentive program offering fast-track funding for electrification measures in commercial and institutional buildings, including air-source heat pump RTU installs and upgrades. The program supports GHG emissions reduction, with incentives for the installation of eligible packaged heat pump RTUs, high efficiency HRV/ERVs, and more. Includes special provisions for northern and rural customers.
  - Up to $100,000 per project in incentives; project-dependent, with measurable and verifiable energy/GHG reductions required.
- Pre-requisites: Applicants must be commercial customers within the BC Hydro service territory; buildings must be eligible as per the BC Building Code (Part 3 commercial); measures must be pre-approved before purchase and comply with program technical criteria.

Natural Resources Canada "Retrofit Hub”

- Organization: Natural Resources Canada (NRCan)
- Link: https://cietcanada.com/news/introducing-nrcans-retrofit-hub-your-resource-for-energy-efficient-building-retrofits/
- Description: The Retrofit Hub is a robust digital platform providing comprehensive information, best practices, and tools for commercial and institutional retrofit projects, including heat pump RTUs. It features grant/incentive details, regulatory compliance guides, case studies, and access to planning resources such as RETScreen and ENERGY STAR Portfolio Manager. Designed to help stakeholders plan, finance, and implement retrofits that support Canada’s climate and efficiency goals.
- Cost: Free access.
- Pre-requisites: No formal prerequisites; intended for building owners, operators, professionals, and consultants seeking to advance energy-efficient commercial retrofits.

Provincial Sales Tax on Fossil Fuel Combustion Systems and Heat Pumps

- Organization: Province of BC
- Link: https://www2.gov.bc.ca/assets/gov/taxes/sales-taxes/publications/notice-2022-003-provincial-sales-tax-on-fossil-fuel-combustion-systems-and-heat-pumps.pdf
- Description: In April 2022, the BC government increased the PST on fossil fuel heating systems; however, heat pumps, including those used in dual fuel configurations, are PST exempt or receive a substantially reduced PST rate when compared to conventional fossil fuel-only systems. For dual fuel systems, the portion of the equipment corresponding to the heat pump is PST exempt, resulting in an effective tax rate substantially lower than the conventional all-gas RTU.

Provincial Sales Tax on Fossil Fuel Combustion Systems and Heat Pumps

- Organization: Province of BC
- Link: https://www2.gov.bc.ca/assets/gov/taxes/sales-taxes/publications/notice-2022-003-provincial-sales-tax-on-fossil-fuel-combustion-systems-and-heat-pumps.pdf
- Description: In April 2022, the BC government increased the PST on fossil fuel heating systems; however, heat pumps, including those used in dual fuel configurations, are PST exempt or receive a substantially reduced PST rate when compared to conventional fossil fuel-only systems. For dual fuel systems, the portion of the equipment corresponding to the heat pump is PST exempt, resulting in an effective tax rate substantially lower than the conventional all-gas RTU.

Canada Greener Affordable Housing

- Organization: Canada Greener Affordable Housing (CGAH) – Canada Mortgage and Housing Corporation (CMHC).
- Link: https://www.cmhc-schl.gc.ca/professionals/project-funding-and-mortgage-financing/funding-programs/all-funding-programs/canada-greener-affordable-housing-program
- Description: Provides contributions for pre-retrofit studies and low-cost financing (including forgivable loans) for deep energy retrofits in affordable multi-unit residential housing, targeting large reductions in energy use and GHG emissions. Heat pump RTUs can be funded when they are part of a whole-building retrofit package that achieves major energy and emissions reductions.
- Prerequisites: Building must be primarily residential with at least 5 units or beds and must meet age requirements (e.g., multi-unit buildings typically ≥20 years). Project must meet affordability criteria (e.g., community/affordable housing providers or other defined low-/moderate-income thresholds) and be designed as a deep energy retrofit rather than an isolated equipment swap.

CIB Building Retrofits Initiative

- Organization: Canada Infrastructure Bank (CIB).
- Link: https://cib-bic.ca/en/building-retrofits-initiative/
- Description: Provides long-term, low-cost financing for energy efficiency and low-carbon retrofits in existing commercial, institutional, and multi-residential buildings, often via “aggregators” that bundle multiple sites. Eligible work typically includes mechanical and electrical upgrades, fuel switching, and HVAC improvements; this can encompass commercial heat pump RTUs as part of a broader decarbonization or energy-savings project.
- Prerequisites: Projects typically must demonstrate at least roughly 30% GHG reduction at the building or portfolio level, documented through credible energy and emissions modelling. Building owners or aggregators must have sufficient project scale and credit quality; RTU scope must be embedded within a comprehensive retrofit business case that meets CIB’s investment and climate criteria.

Build Canada Homes

- Organization: Federal housing agency under the Government of Canada.
- Link: https://housing-infrastructure.canada.ca/bch-mc/index-eng.html
- Description: New federal agency mandated to build and finance affordable housing at scale, provide low-cost financing, and catalyze innovative, sustainable construction (including factory-built housing). While focused on new and large-scale projects, BCH's emphasis on affordability, sustainability, and modern building methods creates opportunities to specify heat pump RTUs in mixed-use or community housing projects and in retrofits of transferred federal lands where commercial HVAC is required.
- Prerequisites: Priority focus on large affordable, mixed-income, and supportive housing developments, often on federal or partner lands, in collaboration with provinces, municipalities, Indigenous partners, and non-profit providers. RTU or other HVAC designs must align with BCH's goals for rapid delivery, affordability, and sustainable, high-performance buildings, and must integrate with factory-built or prefabricated systems where used.

Clean Technology Investment Tax Credit (CT ITC)

- Organization: Administered by the Canada Revenue Agency (CRA) under the federal Clean Economy Investment Tax Credits framework
- Link: https://www.canada.ca/en/revenue-agency/services/tax/businesses/topics/corporations/business-tax-credits/clean-economy-itc/clean-technology-itc/about-ct-itc.html
- Description: The Clean Technology Investment Tax Credit (CT ITC) is a refundable federal tax credit for eligible businesses that invest in new clean technology property located and used in Canada. It applies to capital invested in the acquisition and operation of qualifying clean technology assets that become available for use between March 28, 2023 and December 31, 2034. The credit rate is up to 30% of the capital cost for eligible property that becomes available for use from March 28, 2023 to December 31, 2033, and up to 15% for qualifying property that becomes available for use in 2034; it is not available after 2034.
- Prerequisites: The claimant must be an eligible taxable entity (for example, a corporation subject to Canadian income tax) investing in qualifying clean technology property. The clean technology property must be new, classified as prescribed clean technology under the Income Tax Act regulations, and must be acquired for use in Canada. The property must be capital property, and must become “available for use” for the eligible business between March 28, 2023 and December 31, 2034, with the applicable rate depending on the year it becomes available for use.

For Building Owners, Managers and Engineers

Advanced RTU Campaign (ARC)

- Organization: U.S. Department of Energy (DOE) Better Buildings Initiative
- Link: https://betterbuildingssolutioncenter.energy.gov/alliance/technology-campaigns/advanced-rooftop-unit-campaign
  - Tools at https://web.archive.org may be used to access content that is no longer active.
- Description: The ARC accelerated the adoption of high-efficiency and advanced RTU technologies, including heat pump RTUs, through technical guidance, best practice case studies, technical reports, specification templates, and performance data. The Campaign supported building owners and operators with decision-making tools, technical assistance, and recognition for excellence in RTU retrofits.
- Cost: Free.
- Pre-requisites: Open to building owners, operators, facility managers, energy consultants, and contractors.
- Core Competencies: RTU technology selection, retrofit project planning, energy and GHG reduction analysis, specification writing, project management for RTU replacement, technical troubleshooting.

BC Retrofit Accelerator (ZEIC)

- Organization: Zero Emissions Innovation Centre (ZEIC)
- Link: https://www.zeic.ca/programs/bc-retrofit-accelerator/
- Description: A province-wide market transformation initiative providing technical, financial, and project development support for commercial and residential retrofits, with a strong focus on electrification and upgrading to heat pump RTUs. The Accelerator helps building owners and managers navigate project planning, incentive stacking, contractor connection, and workforce training, aiming for deep carbon and energy savings.
- Cost: Support services are free; project costs are the responsibility of owner/manager (some funding support may be available).
- Pre-requisites: Commercial or multi-unit residential building in BC; readiness to commit to retrofit planning or execution.
- Core Competencies: Decarbonization strategy, RTU/electrification project scoping, incentives navigation, contractor and workforce training connection, energy planning.

Building Performance & Decarbonization Guide

- Organization: ASHRAE, industry partners
- Link: https://www.ashrae.org/about/cebd-technical-resources
- Description: An in-depth guide offering actionable steps, technical standards, and detailed case studies for building decarbonization, retrofit planning, and HVAC system upgrading (including RTUs and heat pumps). The guide covers technologies, project phasing, energy/carbon tracking, and best practices for designing and implementing deep energy retrofits in commercial and multifamily buildings.
- Cost: Often free or available via ASHRAE; check current access details from ASHRAE.
- Pre-requisites: Recommended for building professionals, engineers, retrofit program participants, and facility managers.
- Core Competencies: Strategic retrofit planning, HVAC (RTU/heat pump) upgrade best practices, case evaluation, emissions tracking, energy benchmarking, and implementation monitoring.

Next Gen Rooftop Units Tools & Resources

- Organization: NextGenRTUs (multi-stakeholder/DOE collaboration)
- Link: https://nextgenrtus.org/test-toolsresources
- Description: Offers a curated collection of resources and evaluation tools for understanding, specifying, and implementing dual-fuel and high-performance heat pump RTUs. The platform includes technology summaries, product listings, cost calculators, performance comparisons, and decision-support guides tailored to commercial and institutional stakeholders.
- Cost: Free.
- Pre-requisites: Targeted at facility managers, contractors, designers, and decision-makers evaluating new or replacement RTUs.
- Core Competencies: Technology evaluation, HVAC retrofit planning, product/performance comparison, cost-effectiveness analysis, technology adoption support.

BOMA Canada Low-Carbon Training Program

- Organization: Building Owners and Managers Association (BOMA) Canada, in partnership with Canada Green Building Council (CAGBC) and partners
- Link: https://bomacanada.ca/low-carbon-training-program/
- Description: A free professional education program for Canadian building operators, energy managers, and related professionals focused on the concepts, strategies, and practicalities of low-carbon building operations—including the selection, retrofit, and management of heat pump RTU systems. The curriculum features virtual workshops, case studies, and practical coaching for energy-efficient operations and deep carbon retrofits. On October 29, 2025 BOMA hosted an "Introduction to Dual Fuel RTUs" webinar.
- Cost: Free (funded by federal and industry partners).
- Pre-requisites: Designed for building operators, engineers, contractors, and facility professionals across Canada; open registration.
- Core Competencies: Decarbonization planning, low-carbon retrofit execution (incl. RTU upgrades), GHG tracking/reporting, and operational best practices for energy and emissions reductions.

HRAI Building Officials Guide – Inspecting Heat Pumps

- Organization: HRAI
- Link: https://www.hrai.ca/hrai-training-courses
- Description: While focused on helping building officials inspect heat pump installations, this course helps contractors build knowledge and credibility in compliance and code, giving owners greater confidence in contractor recommendations when retrofitting or installing heat pump RTUs.
- Cost: Fee per course.
- Pre-requisites: Trade experience recommended.
- Core Competencies: Regulatory knowledge, installation compliance, explaining permit/code requirements to customers.

ACEEE

- Organization: American Council for an Energy-Efficient Economy (ACEEE)
- Link: https://www.aceee.org/publications, https://www.aceee.org/sites/default/files/proceedings/ssb24/assets/attachments/20240722163155375_99d20e11-4f94-4b97-a280-cb2a4409538d.pdf
- Description: ACEEE provides technical research, policy guidance, webinars, and action forums focused on facilitating the adoption, proper sizing, installation, and smart controls of commercial heat pump RTUs. Their supports include in-depth reports (such as “Drop-in Decarbonization with Smart Fuel-Switching RTUs”), webinars highlighting field demonstrations, recommendations for advanced RTU controls, strategies for cost savings and decarbonization, collaborative forums including their annual “Hot Water and Hot Air” sessions, and summaries of successful implementations across various settings. They also offer best practices for overcoming installation and operational barriers, with an emphasis on utilities, controls vendors, building owners, and contractors working together for wider deployment and optimized performance.
- Cost: Most reports, articles, and forums are free; event registration may be required for webinars or forums.
- Pre-requisites: Materials are intended for HVAC professionals, utilities, engineers, building owners, and policy/program managers involved in commercial building decarbonization and retrofit projects.
- Core Competencies: Guidance on RTU heat pump selection and smart controls, market research interpretation, field performance assessment, project/utility collaboration, decarbonization strategy, and best practices for installation, commissioning, and ongoing performance optimization.

Commercial Heat Pump RTU Replacement Case Studies

Atrium Building Retrofit – Victoria, BC

- Organization: SES Consulting
- Link: https://sesconsulting.com/case-studies/the-atrium/
- Description: The Atrium Building, a 7-story Class A office building, replaced outmoded gas-fired systems with a high-performance heat pump RTU retrofit. The project was part of a broader decarbonization effort and achieved significant GHG and operating cost reductions while providing improved climate control.
- Result: Reduced GHGs, lower operating costs, demonstration of effective heat pump RTU retrofit in a complex commercial property.

Choice Properties RTU Financing Program

- Organization: Choice Properties
- Link: https://www.choicereit.ca/upgrade-your-rooftop-units/#:~:text=Choice%20Properties%20is%20rolling%20out,%2C%20and%20long%2Dterm%20performance, https://www.choicereit.ca/wp-content/uploads/2026/04/Choice-Properties-HVAC-Upgrade-Program.pdf
- Description: Choice Properties is rolling out a financing program in upgrading rooftop units with modern dual-fuel systems designed to improve efficiency, reliability, and long-term performance.

Walgreens Proactive RTU Replacement Program (Pacific Northwest/USA)

- Organization: Walgreens, Better Buildings Solution Center
- Link: https://betterbuildingssolutioncenter.energy.gov/technology-navigation/replacing-and-retrofitting-rooftop-units, https://betterbuildingssolutioncenter.energy.gov/sites/default/files/attachments/Walgreens-ARC-Case-Study.pdf
  - Tools at https://web.archive.org may be used to access content that is no longer active.
- Description: Walgreens developed a portfolio-wide, planned RTU replacement model to retire aging RTUs and install new, high-efficiency units across multiple locations, including stores in the Pacific Northwest. The program reduced RTU energy consumption by over 50% at some sites and delivered $1 million+ in energy and maintenance savings across 150 stores. The initiative prioritized right-sizing and properly matching capacity with building needs, demonstrating significant operational and financial benefits.
- Result: More than 5,000 RTUs replaced over 3 years; average store saw 50%+ energy savings with improved equipment reliability.

Bonneville Power Administration (BPA) & PNNL Field Tests (Pacific Northwest/USA)

- Organization: Bonneville Power Administration (BPA), Pacific Northwest National Laboratory (PNNL)
- Link: https://www.pnnl.gov/publications/advanced-rooftop-control-arc-retrofit-field-test-results#:~:text=Abstract,as%20required%20by%20building%20code.
- Description: BPA and PNNL ran a landmark field test evaluating the performance of variable-capacity heat pump RTUs, advanced heat recovery ventilation, and advanced controls at commercial sites in the Pacific Northwest. Results showed up to 70% energy savings vs. baseline RTUs, with field validation confirming efficiency improvements even in cold climates and multi-zone buildings.
- Result: Annual electricity savings between 24% and 60% were recorded, showing the strong benefit of advanced heat pump RTUs in the regional climate.

Aggregate Studies

- NREL: Impact Analysis of Transitioning to Heat Pump RTUs for the U.S. Commercial Building Stock
  - Large-scale pilot projects, modeling, and demonstration sites across Oregon and Washington validate heat pump RTU retrofits in supermarkets, retail, and office buildings, with positive technical and economic outcomes.
  - https://docs.nrel.gov/docs/fy23osti/85390.pdf
- Minnesota Center for Energy
  - https://www.mncee.org/case-study-prg-inc-dual-fuel-rtus
  - https://www.mncee.org/sites/default/files/2024-10/One-Stop_HVAC%20Case%20Study_PRG.pdf
- Redwood Energy
  - https://cdn.prod.website-files.com/62b110a14473cb7777a50d28/6377e7c7fd6f8cc30f88afa7_Redwood%20Energy-s%20Pocket%20Guide%20to%20All-Electric%20Commercial%20Retrofits.pdf

Residential

ENERGY STAR "Finding Success as a Contractor"

- Organization: ENERGY STAR (U.S. EPA/DOE)
- Link: https://www.energystar.gov/partner-resources/products_partner_resources/retailer-resources/air-source-heat-pumps-essential-resources-contractors/finding-success
- Description: Guides contractors through best practices for optimizing heat pump RTU performance, illustrating how proper installation, certification, and ENERGY STAR partnership can improve sales and customer satisfaction. Highlights contractor success stories and recommends participating in manufacturer and ENERGY STAR training.
- Cost: Free.
- Pre-requisites: HVAC contractor status, interest in expanding sales and technical capability.
- Core Competencies: Quality installation practices, sales positioning using ENERGY STAR branding, communicating value of third-party recognition, leveraging peer success stories.

NRCan Resources: Tools and Marketing for Contractors

- Organization: Natural Resources Canada (NRCan)
- Link: https://natural-resources.canada.ca/energy-efficiency/home-energy-efficiency/canada-greener-homes-initiative/heat-pump-resources-tools-hvac-professionals
- Description: Collection of fact sheets, installation videos, and technical guides designed to help HVAC professionals communicate with clients and building owners about the performance, cost savings, and available funding for heat pump RTUs. Includes “Find the facts” and “Heat Pump Basics” materials to support proposals and customer education.
- Cost: Free.
- Pre-requisites: Intended for HVAC professionals, home energy advisors, and contractors; no minimum requirements.
- Core Competencies: Explaining financial, operational, and environmental benefits; using government resources in client conversations; providing technical clarity and countering misconceptions. Explaining sizing and product benefits, government program/incentive navigation, using consumer-friendly resources, building contractor credibility.

HEAT PUMP & DUAL FUEL RTU CONTRACTOR READINESS ROADMAP

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Appendix B: Interview Summaries

PREPARED FOR THE CITY OF VANCOUVER

BY HARBOURGREENE CONSULTING INC.

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End