HPSC

Residential HVAC Workforce Certifications Roadmap

dunsky Energy + Climate

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Outline

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3. **Challenges & Objectives**
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4. **Actions**
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Background

About this Project

About the Home Performance Stakeholder Council

- The Home Performance Stakeholder Council (HPSC) is a not-for-profit society that supports the growth of the home performance industry in British Columbia (BC), Canada. HPSC's mission is to increase the supply and demand of qualified home performance service providers by supporting market growth, capacity building, and quality work.
    - This includes supporting quality residential HVAC systems installations.

About this project

- HPSC retained Dunsky to develop a *Residential HVAC Workforce Certification Roadmap* ("the Roadmap").
- The Roadmap is intended to align key stakeholders on how to update requirements for certifications to perform HVAC work in smaller residential buildings in BC (e.g. often, though not exclusively, "Part 9" buildings).
- The Roadmap will guide the HPSC and partner organizations as they pursue changes to residential HVAC workforce certifications and related systems.
- The HPSC envisions this Roadmap as a living document that will be updated in the future as activities progress.

Process to develop the Roadmap

- The table below summarizes the process to develop the Roadmap.
- A separate *Residential HVAC Workforce Certification Research Phase 1 Interim Report* summarizes background research conducted for this project.

Milestones	Description
Background research - *Jan – Apr*	Literature review, interviews & case studies
Stakeholder engagement workshops – *May - Jun*	Share perspectives on workforce certifications between stakeholders
Comment Period – *June 8th to Aug 30th*	Stakeholder comments on draft Roadmap Potential for engagement on key issues with individual organizations
Final stakeholder engagement workshop – *Nov*	Review updated workshop & share perspectives
Final Roadmap - *Dec*	HPSC publishes the Roadmap

Organizations that participated in Stakeholder Engagement

- The HPSC hosted a series of workshops with invited expert stakeholders. Stakeholders discussed perspectives on the future of workforce certifications for residential HVAC work.
- The tables below note organizations that participated in the workshops that informed development of this Roadmap. We are grateful for their participation.
  - Not all organizations participated in all workshops.
- Note that a group's participation does not mean they necessarily endorse actions noted in the Roadmap.

Government
BC Ministry of Advance Education and Skills Training – Trades Training Policy
Ministry of Energy Mines & Low Carbon Innovation – Built Environment Group
Skilled Trades BC – External Relations
Technical Safety BC
City of Vancouver
Vancouver Economic Commission, Economic Transformation Unit

Civil Society, Educators & Utilities
Thermal Environmental Comfort Association of BC
Heating Refrigeration & AC Institute of Canada
Mechanical Contractors Association of BC
Refrigeration Workers Union Local 516
BC Building Trades
Construction Foundation of British Columbia
BC Hydro
FortisBC
BCIT Zero Emission Building Centre
HVAC Designers of Canada
Building Officials Association of BC

Vision

Vision

By late 2028 (five years following finalization of this Roadmap):

1. HVAC design and installation in residential buildings will typically be high quality. Poor quality systems will largely be a thing of the past.

2. Most residential HVAC systems installed in new and existing buildings will feature heat pumps for space conditioning and domestic hot water. Some hybrid systems (i.e. those using electricity as well as other fuels such as methane gas, propane, or wood) will also be installed to address peak heating requirements, particularly in colder parts of the Province. Dozens of leading local governments will have already adopted similar requirements, notably the highest steps of the Zero Carbon Step Code. Stakeholders will be confident in the success of the upcoming 2030 province-wide transition to 100%+ equipment efficiency standards and zero carbon new construction requirements. Industry will be prepared to implement the lowest global warming potential (GWP) refrigerants.

3. All residential HVAC installations in new construction will be designed by a licensed HVAC designer. Likewise, licensed HVAC designers will be required to perform design in suitable replacement/retrofit applications involving all fuel types. These designers will usually be HVAC contractors, dedicated designers, wholesalers, or manufacturers.

4. Residential HVAC work that involves refrigeration work (e.g. split heat pump & AC systems; but not e.g. a self-contained unitary refrigeration system) will be performed by those with appropriate training and associated certifications to work with residential refrigeration equipment. Many of the people who currently work in residential HVAC and have other trade designations (e.g. gasfitter; sheet metal; electrician; etc.) will have acquired the requisite training and credentials to perform residential HVAC work with refrigerants; many will be able to do work with both gas and heat pump HVAC systems. Additionally, a new generation will increasingly enter the residential HVAC workforce having earned the appropriate credentials; the clear requirements for appropriate certifications will serve as the basis for people launching their HVAC careers.

   Different stakeholders have different visions for what are the appropriate certifications to require; ultimately, it will be a decision of the Province of BC. Certification options include:

   - New micro-credentials that provide the necessary upskilling and confirm qualifications to install and maintain residential HVAC systems with refrigeration equipment.
   - The current Refrigeration & AC Mechanic (RACM) Trade (Red Seal), with updated standards to better reflect residential heat pump work.
   - A new Residential Credential as part of the RACM Trade.
   - A Residential HVAC Trade (potentially with its own Residential Refrigeration credential).

   These options could exist in combination, and change over time. For example, micro-credential(s) may be required at first, followed later by trade requirements.

Vision (continued)

By late 2028 (five years following finalization of this Roadmap):

5. Permitting for HVAC work to comply with the relevant requirements of Part 9 of the BC Building Code (BCBC) will be required in a consistent manner province-wide. Permitting will apply at time of occupancy (new construction); replacement (existing buildings); and potentially at listing for resale (change of ownership). Permitting and compliance systems will be designed to ensure expedient and low-cost issuance of permits (e.g. potentially same day online / "over the counter" systems). Permitting will apply to all fuel types (e.g. electric, methane gas, propane, wood-fired, and multi-fuel/hybrid systems). To ensure effective performance, permitting will require design by a licensed designer (exceptions may exist for certain types of equipment replacements) and installation by a person with appropriate certifications. Verification/inspection regimes will be in place to ensure compliance with relevant sections of Part 9 of the BCBC.

6. Excellent training programs will be available across the Province to prepare the workforce to successfully install and service heat pumps and other low carbon building HVAC equipment. Most residential contractors will believe that trades programs and micro-credentials excellently convey the knowledge and skills to work in residential HVAC.

7. The workforce with the requisite skills to install heat pumps and implement other low carbon building HVAC systems will have increased to meet demand associated with zero carbon new construction and rapidly accelerating retrofits. Industry and government will feel confident that they can further accelerate policies and programs that decarbonize the building sector, while maintaining high standards.

8. Heat pump deployment will not be dependent on rich government incentives. Heat pumps will be cost-effective given the multiple values they provide to households, including cooling, air quality and operating costs.

9. Various provincial ministries, agencies, utilities and industry organizations will have a long history of coordinating together to ensure the success of the transition to heat pumps and other low carbon HVAC systems.

Challenges & Objectives

Challenges

Several key challenges were articulated by stakeholders during interviews during the research for this project, and subsequently in workshops. Key themes are detailed in the *Phase 1 Interim Report* summarizing findings from baselining research for this project. In brief, the key challenges can be summarized as follows:

- **Poor quality HVAC installations are too common.** There is empirical evidence from some utility studies, as well as anecdotal evidence from stakeholders engaged as part of this process, that there are too many poor-quality residential HVAC installations.
    - Quality training and certifications in HVAC design and installation are available; however, it is usually not required as a condition of permitting. Likewise, there are limited inspection/verification processes for compliance with Part 9 of the BCBC, particularly in retrofit/replacement contexts. As a result, compliance with the BC Building Code is often not achieved.
    - HVAC equipment is habitually over-sized. Heat loss / heat gain calculations (CSA F280) are rarely performed despite being required in the BC Building Code Section 9.33. This applies to both new construction as well as equipment replacements in existing buildings.
    - A variety of other design and installation issues are likewise prevalent (e.g. improper duct design; poor siting of indoor and outdoor units; poor commissioning; lack of capacity to service; etc.).
    - Heat pump installations are particularly problematic, exacerbated by the lack of workforce certification requirements to date. However, design issues prevail in HVAC installations using electric heat pumps, gas combustion equipment, and other HVAC equipment.
- **Many people working with heat pumps do not possess appropriate trades training nor certifications. Likewise, many people performing HVAC design do not have certifications. People will only pursue certification requirement if the certification is required and the skills it conveys are valued.** The lack of demand for certifications stems from a lack of regulatory oversight:
    - Until recently (January 2023), Refrigeration was not a compulsory trade in BC.
    - The *Power Engineers, Boiler, Pressure Vessel and Refrigeration Safety Regulation* is not applicable to refrigeration plants (including heat pumps) containing non-toxic and non-flammable substances in residential buildings of up to four units; thus, most residential heat pump and AC system installations are not regulated by TSBC as refrigeration plants, and there is no associated demand for certifications as a requirement of licensing or permitting.
    - The performance and efficiency requirements for HVAC installations in Part 9 of the BC Building Code (BCBC) are rarely enforced (see below).
- **Many stakeholders believe trades training programs do not adequately prepare people for residential HVAC work.** Several industry stakeholders believe that current trades training (e.g. Refrigeration & AC; Gasfitter; etc.) do not convey the appropriate knowledge and skills to understand the design and sizing of HVAC systems for residential buildings.

Challenges (continued)

Challenges (continued)

- **The performance and efficiency requirements for HVAC installations in Part 9 of the BCBC are rarely enforced.** Local governments are typically the authorities having jurisdictions (AHJs) for the BCBC. However, most local governments make a *de facto* policy decision to not enforce the requirements relating to HVAC performance and efficiency in the BCBC (e.g. sections 9.33 and 9.36). Permitting practices in new construction vary, but often design and sizing of HVAC systems are not reviewed, nor are installations verified/inspected. In retrofit applications, permitting is rarely required; additionally, several stakeholders reported that most work is unpermitted even where permits are technically required for equipment replacement/retrofits.

- **There are inconsistent HVAC permitting processes across the province.** Variations in permitting processes cause confusion and transaction costs. Many stakeholders noted the need for a consistent, effective permitting system province-wide to drive compliance with the performance and efficiency requirements in Part 9 of the BCBC.

- **The province-wide transition away from incentives and towards regulations for low carbon equipment that will occur by 2030 requires different quality assurance regimes and ways to require trades certifications**. Demand for many residential HVAC certifications are driven by the Home Performance Contractors Network (HPCN). The HPCN is a database of home energy retrofit contractors in British Columbia (BC) that meet specified trade designation and training qualifications and are subject to ongoing review and quality assurance checks. To be eligible for Provincial and utility HVAC incentives, work must be performed by a contractor in the HPCN. Currently there are significant incentives for heat pump installations. However, over the course of the next six years incentives are likely to decrease (on a per unit basis). Instead, regulations will compel heat pump installation; these regulations will include the 100%+ HVAC equipment efficiency requirements and Zero Carbon new construction requirements, both of which are commitments in the Province of BC's *CleanBC Roadmap to 2030* climate plan. Accordingly, requirements for certifications and quality assurance regimes must transition from the voluntary HPCN to regulatory mechanisms.

- **The heat pump workforce must grow**. Despite the challenges currently associated with workforce certifications and skill, to meet climate commitments and improve indoor environmental health we need to increase the size of the workforce capable of properly designing, installing and servicing heat pump-based HVAC systems.

Objectives

To respond to the challenges identified, the Roadmap actions must ensure that certification(s):

1. Support **quality work & careers.**
    - The scope of certification(s) must provide the knowledge & skills necessary for residential HVAC work.
    - People working in residential HVAC design & installations require a strong appreciation of zero carbon HVAC systems and excellent standards of practice.
2. Are **attainable and timely.**
    - People with other trade certifications (e.g. gasfitter Class B; etc.) need viable pathways to continue to work in residential HVAC as the volume of gas and heating oil systems implemented in the residential sector decreases, and the volume of work with heat pumps and other low carbon systems grows.
    - Certification requirements must be compatible with an expanding workforce for heat pump installation. Certification requirements should not be unnecessarily onerous – The skills necessary to implement residential heat pumps should be conveyed without including extraneous content that increases costs for learners and that could impede the labour market for heat pump installations.
3. Are **mandatory & enforced**.
    - Demand for credentials will only materialize if they are mandatory and effectively enforced.
    - Over the coming years, certification requirements for HVAC design & installation must transition from incentive program requirements to regulatory requirements.
    - Effective regimes to improve compliance with the performance and efficiency elements of Part 9 of the BCBC and other regulations must be in place province-wide.

Actions

1. Summary
2. Further description of actions

DRAFT

Overview of Actions

Four main themes…

- HVAC Solutions Council
- Part 9 HVAC Design License
- Trades' Capacity to Install & Service Future HVAC Equipment
- Permitting & Enforcement

… Comprising 13 Actions…

Roadmap Summary

Action	*Potential* Lead Orgs.	Anticipated Outcomes	24	25	26	27	28
HVAC Solutions Council							
1. Establish HVAC Solutions Council (HVAC SC)	HRAI, TECA-BC, and/or HPSC	HVAC SC coordinates between members to implement Roadmap actions					
Part 9 HVAC Design Licensing							
2. Develop detailed *Part 9 HVAC Designer Licensing Framework* & subsequent licensing system	HVAC SC; HVAC-DC; BOABC/ASTTBC / BC Housing	The Framework determines what organization will administer Licensing; the detailed criteria for the License; and for what type of work (e.g. new construction; what type of replacements) a Licensed Designer should be required Introduction of the License					
3. Require HVAC Design by Licensed Designer in HPCN	HPSC	Drive demand for License					

Roadmap Summary

Action	*Potential* Lead Orgs.	Anticipated Outcomes	24	25	26	27	28
Trades' Capacity to Install & Service Future HVAC Systems							
4. Review current Refrigeration & AC Mechanic Trade standards for opportunities to better meet needs of residential sector	CCDA & STBC	Review and update program content necessary for residential HVAC work with refrigerants					
5. Develop a detailed plan for trainings & associated credentials that can enhance skills & enable workforce to have appropriate certifications to install and service heat pumps in residential	HVAC SC	Plan will identify training & certification needs to meet requisite residential HVAC competencies; options for phasing of requirements (e.g. micro-credential & trade); necessary resources & potential funding streams; etc. Inform funding requirements (#9 below)					
6. Conduct study & documentation to support proposal for a Residential Credential as part of RACM Trade (Residential Credential modeled off similar systems in ON & MN)	HVAC SC	STBC's New Trade Request Process requires study and documentation to inform proposal of a new trade (#7 below). This will include a Needs Assessment that will further document issues with quality of installation, amongst other matters.					
7. Formally propose a Residential Credential as part of RACM (Pending #6 above)	HVAC SC	STBC & HVAC SC initiate evaluation of the case for the credential					
8. Industry & Skilled Trades BC coordinate to evaluate the case for a Residential Credential as part of RACM (Pending #7 above)	STBC; HVAC SC	STBC & industry determine whether to establish the Credential					
9. Devote significant increase in funding for credential development/expansion, trades training, recruitment & retention.	Province of BC	Sufficient resources to ensure expansion in workforce with adequate training & certifications to install & service heat pumps.					

Roadmap Summary (continued)

Action	Potential Lead Orgs.	Anticipated Outcomes	24	25	26	27	28
Permitting & Enforcement							
10. Establish best practice permitting & verification regime to support compliance with Part 9 (e.g. 9.33 & 9.36) of BCBC for all HVAC work (e.g. electric, gas, propane, wood, fuel oil, hybrid & other systems) in new & existing buildings. Include: • **Design by a licensed designer (where applicable)** • **Appropriate trade certification / micro-credentials** • **Appropriate submission documents (e.g. designs; sizing calculations; etc.)** • **Inspection & verification processes**	HVAC SC; Leading LGs; BOABC/ASTTBC	Articulation of the appropriate permitting process to support compliance with BCBC requirements for HVAC systems in new & existing Part 9 buildings Identify how different licenses and credentials (e.g. HVAC Design License; trade certifications; micro-credentials) can be referenced in permits over time					
11. Introduce HVAC Permitting for all HVAC work consistent with Best Practice Permitting & Verification Regime (Action #10 above).	Leading LGs; HVAC SC; BOABC/ASTTBC	Leading local governments establish permitting processes that will support higher quality HVAC work, and build demand for HVAC Design License and workforce credentials Permitting applies to all system/fuel types, achieving a "level playing field"					
12. Refine options for province-wide processes to ensure workforce has requisite certifications, including potential provincial-scale permitting, licensing and/or contractor auditing systems; request Province require province-wide permitting, or similar system.	Province of BC (e.g. BSSB & EMLI); HVAC SC; UBCM;	Detailed articulation of the different options available to ensure province-wide demand for certifications and appropriate permitting processes The Province leads in establishing a consistent province-wide system to better ensure compliance of HVAC work with Part 9 of the BCBC					
13. Require HVAC certifications, and implement consistent permitting and verification regimes, province-wide	Province; local governments; HVAC SC; others	Province-wide systems to ensure 1) demand for design license & appropriate trade certifications, and 2) appropriate permitting and verification systems for residential HVAC work					

HVAC Solutions Council

Actions

1. Establish an HVAC Solutions Council

- The HVAC SC will be comprised of different stakeholders in BC's HVAC sector, including industry organizations, Provincial ministries, utilities, local government representatives and training providers.
- HVAC SC members will coordinate on issues relating the residential HVAC sector, including implementation of other actions in this *Roadmap*.
- HPSC and other leading stakeholders will coordinate to identify and secure requisite funding.

Part 9 HVAC Design Licensing

Context

- Stakeholders broadly agreed on introducing a Part 9 HVAC Designer License, which will reference appropriate certifications.
- A variety of appropriate certifications for HVAC design already exist (e.g. those offered by HRAI; TECA BC).
- HVAC Designers of Canada (HVAC DC) are working with stakeholders across Canada to support HVAC Designer licensing, and establish a registry of certified HVAC designers.
- It remains unclear what organization is best suited to administer the license in BC.

Actions

2. **Develop a detailed *Part 9 HVAC Designer Licensing Framework* & subsequent licensing system.** The Framework will:
   - Describe the detailed criteria for an HVAC designer to hold the license. This is anticipated to include:
     - *Reference to appropriate pre-existing design certifications (e.g. those offered by HRAI, TECA BC).*
     - *Demonstrated competency with the BC Building Code (similar to Ontario Building Code Identification Number certification). A new training & certification may be necessary.*
     - *Appropriate errors & omissions insurance.*
   - Recommend circumstances in which BC Building Code AHJs should require a Licensed Designer, and what design documentation should be required – e.g. in new construction; what types of renovation / equipment replacement; etc.
   - Determines what organization will administer Licensing, and the detailed criteria for the License.

Part 9 HVAC Design Licensing

Actions

3. Require HVAC design by licensed designer in HPCN

- Requiring licensed designers as part of participation in the HPCN can help drive early demand for the license.
- Consider under what retrofit/replacement circumstances requirement for design is appropriate.

Trades' Capacity to Install & Service Future HVAC Systems

Context

- Most stakeholders agreed that some form of refrigeration trade certification should ultimately be required to work with refrigerants, including installing and servicing split heat pump systems. There are different perspectives regarding what trade should ultimately be relied on:
  - Some stakeholders support a **Residential Credential as part of the broader refrigeration trade.**
    - *Precedent from other Provinces – e.g. Ontario, Manitoba. See summary in Appendix 1.*
    - *Enables those holding the credential to work with residential refrigeration systems. Could be combined with other trades designations, and HVAC Design Licensing, to allow individuals to work other HVAC systems (and not just refrigeration work).*
    - *Entails fewer classroom and apprenticeship hours. Attainment of the Residential Credential counts towards portion of the classroom training for Refrigeration & AC Mechanic designation.*
    - *Could help alleviate concern that the current Refrigeration and AC Mechanic trades training discourages work in residential sector.*
    - *Those possessing other trade certifications may be better able to challenge a Residential Credential than the current Refrigeration & AC Mechanic trade certification.*
  - Some stakeholders support the **current Refrigeration & AC Mechanic (RACM) trade** being required for residential heat pump installations.
    - *Avoids concern that standards for refrigeration work would be watered down and that a contractor only qualified with a Residential Credential will take work away from fully certified RACM trade.*
- However, some stakeholders are not convinced it is possible, nor necessary, to rapidly increase the number of people with refrigeration trade certification(s) to the level that will be required to meet rapidly growing demand for heat pumps.
  - These stakeholders support **new micro-credential(s)** that provide the necessary upskilling and qualifications to tradespeople (i.e. those without RACM but another trade, e.g. gasfitters, sheet metal, etc.) to install and maintain residential HVAC systems with refrigeration equipment.
  - They noted that micro-credentials can serve as an important interim measure.
- Finally, some stakeholders believe a **new compulsory Residential HVAC certified trade** should be introduced, which would be required to perform *any* residential HVAC work. This is not necessarily mutually exclusive of introducing a Residential Credential as part of RACM, nor of interim micro-credential(s).

Different Visions for Installation/Servicing Credentials

	Current RACM Trade	New Graduated Residential Credential in RACM	New Residential HVAC Trade	Any trade designation w new micro-credential(s)
Stakeholder support	**UA Local 516 – Refrig. Workers, MCABC**	**HRAI, TECA BC, BCIT**	**TECA BC**	**BCIT, TECA BC**
Notes	• Concern other options will "de-value RACM trade". • "Establishing a new trade while the industry deals with already low rates of unemployment is counterintuitive to meeting industry needs."	• Precedent from other Provinces (e.g. ON, MN). • "The creation of a 2-year Residential A/C HP credential would not 'water down' any existing refrigeration standards. Rather, it would remove from the residential marketplace many under trained and unskilled individuals that are currently practicing refrigeration."	• In early 2000s, TECA BC led development of a Certified Heating Tech trade with ITABC. • Adopting this model will "Address the need for a professional capable of understanding, designing, installing and managing all the mechanical systems in a home as well as all potential interactions. E.g. forced air; hydronic; the range of heating supply sources; ventilation, HRV/ERV; smoke mitigation; different fuel types; etc." • No other jurisdiction has this trade.	• This option would involve a micro-credential for any tradesperson (e.g. gasfitters, etc.) to install heat pumps. • BCIT note they believe the trades training system will not have sufficient capacity to quickly scale up for reliance on RACM or Residential Credential. • Some stakeholders do not believe RACM, or a new trade credential, are necessary to ensure quality heat pump installation.
	• Options are not necessarily mutually exclusive. • Some options could serve as interim measures. E.g.: • Initially rely on micro-credentials for residential refrigeration work for ~5 years, until sufficient trade system capacity exists for other options.			

Trades' Capacity to Install & Service Future HVAC Systems

Actions

4. Review the current Refrigeration & AC Mechanic (RACM) Trade standards for opportunities to better meet needs of residential sector

- Provides opportunity to identify gaps in trades training *vis a vis* residential work.
- Skilled Trades BC's review would encompass trades training standards. STBC will engage with industry to inform the Canadian Council of Directors of Apprenticeship (CCDA) regarding updates to Red Seal RACM trade standards.

5. Develop a detailed plan for trainings & associated credentials that can enhance skills & enable workforce to have appropriate certifications to install and service heat pumps in residential buildings

- The Plan will include a detailed labour market assessment and associated workforce development strategy to enable a sufficiently trained and certified workforce to meet the future demand for heat pump installation and servicing. It will:
  - *Consider and compare the implications of the different workforce certification requirements envisioned by different stakeholders.*
  - *Forecast labor needs.*
  - *Inventory existing training and certifications.*
  - *Identify opportunities to update and increase enrollment capacity in existing programs, as well as develop new certifications.*
- The Plan should consider training and associated resourcing needs under three scenarios for the certifications required for heat pump installations: RACM, Residential Credential, and mandatory micro-credential(s).
- The Plan could further support Provincial consideration of what is the optimal system of certifications for residential HVAC work with refrigerants.
- It is anticipated that the Province of BC could support development of this plan, in coordination with HVAC Solutions Council.
- The Plan will inform Provincial resourcing (see #9 below).

Trades' Capacity to Work with Residential Heat Pumps

Actions (cont)

6. **Conduct study & documentation to support proposal for a Residential Credential as part of RACM Trade**
   - STBC notes that proposing a Residential Credential requires initiating a **New Trade Request Process** (NTRP). Under the NTRP, the industry/applicant must provide information and rationale, including:
     - *Documenting scale of demand for the credential*
     - *Demonstrating investment in apprenticeship by employers (e.g. demonstrating a culture of apprenticeship will be supported)*
     - *Demonstrating there are technical training providers to deliver, or see a business case to deliver, technical training*
     - *Addressing any existing training and certification available via an industry association or other governing jurisdiction*
   - Include a Needs Assessment, with more fulsome investigation & documentation of issues with quality of residential heat pump installations.

7. **Formally propose a Residential Credential as part of the RACM Trade (Contingent on #6 Above)**
   - Would introduce a shorter Residential Credential as part of the broader RACM trade.

8. **Industry & Skilled Trades BC coordinate to evaluate the case for a Residential Credential (Contingent on #7 Above)**
   - Following initial formal proposal, Skilled Trades BC would coordinate with industry (e.g. the HVAC SC) on the requisite elements of the evaluation.
   - Industry tends to conduct much of the work to document the case for trades/credentials. Members of the HVAC SC will coordinate closely with Skilled Trade BC to help establish the scope of a the credential, document demand, and otherwise document whether and how a new program meets the criteria in Operations Policy PP1000 or other appropriate documents.
   - STBC's consideration requires a thorough Industry Needs Analysis (INA). An External Relations Advisor would be assigned by SkilledTradesBC to support this process.
   - *It is recommended that additional budget and resources be allocated to Skilled Trades BC* so that it can expediently work with industry to evaluate the case for the Residential Credential, without sacrificing other investments in the trades system. Without additional funding over and above current budgets, there is a risk that Skilled Trades BC's review could be compromised, or other work could be impacted.

Trades' Capacity to Work with Residential Heat Pumps

Actions (cont)

9. **Devote significant increase in funding for credential development/expansion, trades training, recruitment & retention.**
    - The plan for trainings and associated credentials (Action #8) is likely to find significant need for provincial funding for trainings.
    - Ideally, the plan can be completed in time for the 2024 Provincial budget.

Permitting & Enforcement

Context

- Demand for certifications is predicated on compliance systems requiring these certifications.
- Many stakeholders noted the importance of introducing (near) province-wide permitting and enforcement of Part 9 of the BCBC, and/or contractor licensing and associated auditing systems. Province-wide permitting or licensing systems were recognized by stakeholders as necessary for there to be sufficient demand for workforce certifications, as well as to ensure quality. However, the most appropriate regulatory regime to achieve province-wide compliance with the BCBC requirements for HVAC design and performance remains unclear.
- Stakeholder noted the importance of assuring:
  - Appropriate design and trade certifications are held by personnel involved in residential HVAC work.
  - The requirements of the BC Building Code for HVAC design, performance and efficiency are enforced.
  - Consumer protections for errors & omissions in design, and faulty workmanship, are better assured.
- Most local governments have made the *de facto* policy decision to not have HVAC permits to support compliance with Part 9 of the BCBC; there is particularly little enforcement in retrofit applications.

Actions

10. Establish a best practice permitting and verification regime to support compliance with Part 9 of BCBC for all HVAC work

- The HVAC SC will coordinate development of a detailed best practice permitting and verification regime, articulating the appropriate permitting process to support compliance with BCBC requirements for HVAC systems in new & existing Part 9 buildings. It will identify how different licenses and credentials (e.g. HVAC Design License; trade certifications; micro-credentials) can be referenced in permits over time. Likewise, it will articulate requirements for submissions (e.g. heat loss/heat gain calculations; HVAC design documents; etc.). This will include consideration of what certified individuals are needed for different types replacements/retrofits (e.g. what scope of replacement requires involvement of an HVAC designer?). Finally, it will include appropriate verification/inspection processes and certifications.
- The best practice regime will serve as a model for leading local government AHJs interested in introducing permitting for HVAC work. It will also support development of options for province-wide permitting.
- It is imperative that permit requirements for existing buildings apply equally to heat pumps and other mechanical system types (e.g. gas combustion), and entail similar costs. Otherwise, introduction of permitting could have the unintended consequence of driving greater demand for more polluting equipment.

Actions (continued)

11. Leading local governments introduce HVAC Permitting for all HVAC work

- In the absence of (near) province-wide requirements, leading local governments can opt to require HVAC permitting.
- This will support Energy Step Code and Zero Carbon Step Code compliance. It will also support efforts to decarbonize existing buildings, and make them healthier and more efficient.
- HVAC SC will work with leading local governments to adopt consistent best practice permitting regime (see Action #8).
- Leading local governments will help build demand in the near-term for HVAC Design License and workforce credentials.

12. Refine options for province-wide processes to ensure workforce has requisite certifications, including potential provincial-scale permitting, licensing and/or contractor auditing systems

- The HVAC SC, relevant Provincial ministries, and leading local governments will coordinate to identify and compare the different options for province-wide permitting, licensing and/or contractor auditing systems. Options suggested by different stakeholders as part of this Roadmap process include:
  - *The Province requiring all local governments to administer HVAC permitting.*
  - *The Province changing the mandate of Technical Safety BC to encompass Part 9 HVAC design and performance.*
  - *Licensing of HVAC contractors by BC Housing or another suitable entity (similar to Residential Building licensing).*
  - *Provincial auditing of HVAC contractors to ensure necessary workforce credentials and design practices (perhaps aligned with enforcement of energy efficiency regulations.*
- This process will develop detailed description and systematic comparison of these options.
- The HVAC SC is recommended to work with the Province to support consideration of this. If necessary, the HVAC SC could also work with leading local governments to encourage the Union of BC Municipalities to pass a resolution calling for province-wide HVAC compliance systems with Part 9 of the BCBC.

Actions (continued)

13. Require HVAC certifications province-wide; implement HVAC permitting and/or other systems (e.g. licensing, contractor auditing, etc.) to ensure efficacy

- Informed by the analysis noted in Action #10, the HVAC SC will work with stakeholders to have province-wide compliance systems adopted, including:
  - *Requirements for design license & appropriate trade certifications.*
  - *Appropriate permitting systems for HVAC work.*
- The HVAC SC, the Province and Technical Safety BC (TSBC) will coordinate to consider the implications of TSBC regulating refrigeration plants (including heat pumps) containing non-toxic and non-flammable substances in residential buildings of up to four units and <5kW prime mover capacity.
  - *This would require updating the Power Engineers, Boiler, Pressure Vessel and Refrigeration Safety Regulation.*
  - *Stakeholders will assess whether this mechanism could allow TSBC licensing & permitting to ensure appropriate workforce certifications.*
  - *Even if TSBC could effectively require workforce certifications, it would not enable TSBC to actively enforce the quality of installation; doing so would be a significant shift in TSBC's legislative mandate, and require changes beyond its current capacity. The efficacy of TSBC in such a role should be evaluated, compared to other options such as enforcement by another provincial-scale entity or all local governments.*

Roadmap Summary

Action	Notes	Annual Budget (Thousands)				
		24	25	26	27	28
HVAC Solutions Council						
1. HVAC Solutions Council (HVAC SC)	Annual hosting costs	$30	$20	$20	$20	$20
Part 9 HVAC Design Licensing						
2. Develop detailed *Part 9 HVAC Designer Licensing Framework* & subsequent licensing system		$30				
3. Require HVAC Design by Licensed Designer in HPCN	N/A					
Trades' Capacity to Install & Service Future HVAC Systems						
4. Review current Refrigeration & AC Mechanic Trade standards	N/A – Existing CCDA /STBC					
5. Heat Pump Install Training & Credential Plan		$60				
6. Conduct study & documentation to support proposal for a Residential Credential	Dovetails with #5	$20				
7. Formally propose a Residential Credential as part of RACM	N/A					
8. Industry & Skilled Trades BC coordinate to evaluate the case for a Residential Credential	TBD – STBC should quote					
9. Increase in funding for credential development/expansion	TBD – Provincial budget					
Permitting & Enforcement						
10. Best practice permitting & verification regime	$30k	$30				
11. HVAC permitting by AHJs	TBD – AHJ budgets					
12. Refine options for province-wide processes	$20k (dovetails with #10)	$20				
13. Consistent permitting and verification regimes, province-wide	TBD					
	2024 Total	**$190**				