Cool Way to Heat Homes

Incremental Cost of Installing a Central Heat Pump Instead of a Central Air Conditioner

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Building Decarbonization Alliance
pour la décarbonation des bâtiments

Introduction

Last summer, the Building Decarbonization Alliance (BDA), in collaboration with Efficiency Canada, the Canadian Climate Institute, and the Greenhouse Institute, released a report entitled the Cool Way to Heat Homes. The report outlines the potential benefits of implementing a policy which would require all newly installed central air conditioners (ACs) in Canada to be central heat pumps (HPs) instead. Benefits include operational cost savings and emission reductions (from displacing heating using fossil fuels).

While the proposed policy is being well received, stakeholders have raised concerns about the incremental cost to the homeowner of installing a central heat pump system in place of an air conditioning system.

We reached out to BDA partners and other HVAC installers to better understand the incremental cost to a homeowner. We received 12 responses (see Table 1 for a selection of those respondents[1]), representing a total of 24 HVAC companies (one respondent summarized the feedback from their member companies). These companies install units in BC, ON, and NS, and collectively installed more than 2,300 HPs in 2023. As a reference, HRAI estimated that 38,000 HPs were shipped in 2022. Assuming consistent sales in 2023, this indicates that we've received responses from ~5% of the market.

Table 1: Survey respondents included HVAC installers from BC, ON, and NS.

Province	HVAC Installer
British Columbia	Quality Air Care
	Schmidt Bros Mechanical Ltd.
	XR Industries Ltd.
Ontario	Abode Home Comfort
	Bertrand Plumbing & Heating
	Carleton Refrigeration
	ClimateCare Co-operative
Nova Scotia	Comeau Refrigeration Ltd.
	Kings Refrigeration and AC Ltd.
	Mackenzie electrical services Ltd.

[1] This list includes only the companies who agreed to share publicly that they have been consulted for this report.

Findings

Incremental Installed Cost

We asked HVAC installers what the installed cost (including labour and materials) were for four different scenarios:

1. Installing a HP that is replacing an existing AC unit.
2. Installing an AC that is replacing an existing AC unit.
3. Installing a HP that is providing new cooling to the home.
4. Installing an AC that is providing new cooling to the home.

We also requested they assume the equipment meet the specifications of lower-end units, as follows:

- 2.5-ton unit,
- SEER2 in the 14.3 range, and
- HSPF2 in the 7.5 range (for the heat pump only).

We removed the outliers (i.e., the two responses containing the highest and lowest cost of the HP installation) prior to conducting our analysis. We then did a weighted average of the remaining responses based on number of HPs installed in 2023. This resulted in a roughly **$2,000 incremental cost** for installing a HP over an AC (see Table 2) in an existing home.

Table 2: Weighted average cost of installation (including materials and labour) yields to a roughly $2,000 incremental cost

Scenario	Installation Cost		Incremental Cost
	HP Unit	AC Unit	
Replacing cooling of an existing AC	$8,503	$6,546	$1,958
Installing new cooling	$9,325	$7,353	$1,973

In our survey, we asked for the installation cost to both install equipment that would replace an existing air conditioner unit and to install equipment that adds cooling capacity to a home for the first time (i.e., add to an existing central furnace system with preexisting ductwork). As noted in the table above, while the unit cost is greater when installing new cooling, the incremental cost between a HP and AC unit does not vary much between the two scenarios.

We also looked at the range of incremental costs between respondents, which varied from $0 to $4,000 depending on the respondent. As noted in Figure 1 below, there is no clear correlation between the total cost of installing the HP and the incremental cost of installing the HP (i.e., a lower cost HP did not necessarily have a lower incremental cost to install, just like a higher cost HP did not necessarily have a higher incremental cost to install). While we requested lower-end specifications, some respondents noted that they only work on the high-end market, and thus provided installation costs that are representative of those more expensive units.

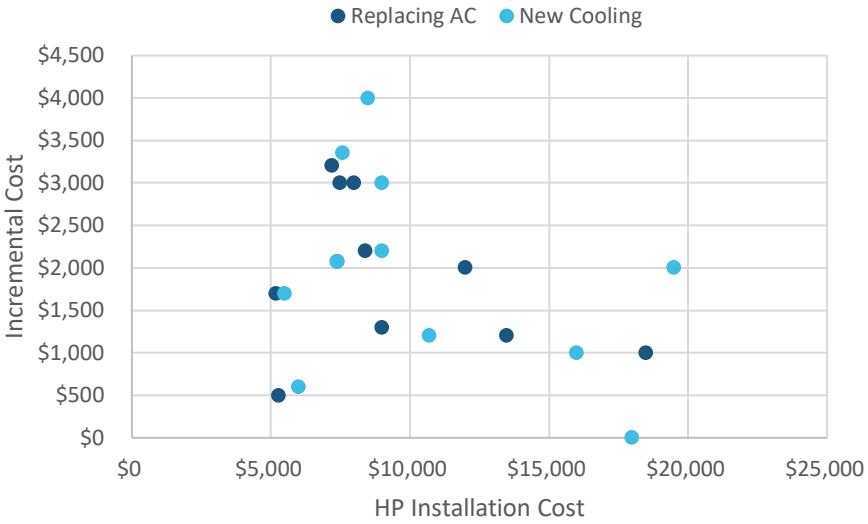

Figure 1: No clear correlation exists between the total installed cost of a HP and the incremental installation cost.

Additional Feedback

In addition to the data provided, respondents noted the following considerations:

a. The **top factors influencing the cost differential** between an HP and an AC include (in order of most to least important):

   i. **Equipment Costs** (*identified by 8 responses*): The difference in price of the equipment (HP vs AC) and materials (e.g., heat pump stand, extra insulation for line set). A respondent noted the average cost difference is approximately $1,500 between HP and AC equipment.

   ii. **Controls** (*6 responses*): The additional set up and configuration required to ensure proper operation of the HP (e.g., installation of additional control wires, installation and configuration of an upgraded thermostat, configuration of integrated controls to automatically changeover from the HP to the existing central heating system, testing heating and cooling modes).

   iii. **Electrical Work** (*5 responses*): The additional cost that may be required to get sufficient power to the equipment. A respondent noted that when installing central cooling capacity for the first time, the cost for the electrical upgrade can range from $400 -$1,000 depending on the new breaker and the length of the wire (and assuming there is room in the electrical panel).

   iv. **Installation Labor** (*2 responses*): Additional labour to ensure proper commissioning of the system. While two respondents noted this as a significant additional cost, two others noted that labor is essentially the same in the vast majority of installations.

v. **Refrigerant Handling** (*1 response*): Ensuring appropriate refrigerant charging, leak testing, vacuuming, and sealing of the system.

b. **Additional costs** may exists depending with respect to a heat pump installation:

i. **Electrical Panel**: The cost to upgrade an electrical panel can be significant. One respondent noted that an existing panel may not meet the new load of a central HP system. Indeed, they noted that moving from oil, wood, or propane forced air to a HP to cover the heating load requires an electrical panel upgrade 80% of the time. Another respondent noted a potential need to upgrade when encountering 100 amp or less panels. An electrical panel upgrade was estimated as $6,500.

ii. **Ductwork Upgrades**: One respondent noted that if the existing ductwork is poorly done, they will not install a heat pump without upgrading the ducts. Duct modifications can add $2,000 – $5,000.

iii. **Repairs**: One respondent mentioned not only considering the up-front cost, but also the cost of typical repairs. They noted that repairs can have significant costs (e.g., "some can be over 50% of the replacement cost").

Discussion

This analysis finds a roughly $2,000 incremental cost. Based on the data received, this seems indicative of the average costs of moving to a HP from an AC unit with similar specifications. While we requested costs for lower-end models (to best understand the impact on a homeowner who was interested in a central cooling system at the lowest cost), some respondents noted that they only work on the high-end market, and thus provided installation costs that are representative of those more expensive units. In addition, eligibility requirements for programs like the Greener Homes Grant have led to many heat pump installations in the past few years being mid- to high-tier units. Combined with equipment costs being noted as the primary driver for incremental cost, it is possible that the incremental cost for lower-end units is somewhat less than this analysis' findings.

Additionally, the incremental cost may decrease as familiarity with HPs becomes more common among installers and contractors. When looking at the survey responses from Nova Scotia, which has a much higher heat pump share than British Columbia or Ontario,[2] the weighted average incremental cost is only around $1,200. It's possible that increased market penetration would lead to lower incremental costs.

[2] The figure "Heat pump share of residential heating systems, 2021" notes NS with a 21% share, while BC and ON have 7% and 2%, respectively. Accessed at: https://novascotia.ca/finance/statistics/news.asp?id=18413

It is also important to note that the additional costs related to electrical panel or ductwork upgrades would not be applicable when considering a like-for-like replacement focused on meeting cooling needs. If the existing electrical panel can accommodate an AC unit, it could also accommodate an HP with similar specification for the same cooling needs. Installing the HP in a dual fuel configuration allows for supplemental heating, reducing the impact on electricity demand. The dual fuel configuration also means the existing ductwork can accommodate heating on cold days as the backup source would supply sufficient heat.

Even with the greater incremental cost, there continue to be many **benefits** for this proposal, including:

- A policy promoting HPs instead of ACs can help drive the **market transformation** that is required to meet our climate objectives (i.e., priming contractors and homeowners into the capabilities of HPs).
- The incremental cost ($2,000) is **still paid back within the lifetime of the equipment** for all back up fuel types, though installation with a higher efficiency natural gas heating back up would require 15+ years to payback in some provinces (Saskatchewan, Manitoba, and Ontario).
- We estimate that implementing such a policy in 2025 would result in **$6.8B in net benefits** across Canada by 2035.[3]
- The ability to heat in shoulder seasons with either a HP or a back up fuel system will allow homeowners **more flexibility in lowering their utility costs**. Fossil fuel prices can fluctuate greatly from season to season, allowing homeowner to take advantage of the relatively stable cost of electricity.
- **Emission reductions** will still materialize by offsetting fossil fuel heating in the shoulder seasons.

This analysis and the associated incremental cost premium underscores the need for supporting this type of policy with a program to **support lower-income households** so that they too can reap the benefits of HPs.

As such, we continue to believe that installing HPs instead of ACs is a rare **"win-win" opportunity**; decarbonizing homes while providing benefits to all those across the value chain (e.g., manufacturers, distributors, contractors, and consumers). Governments of all levels can seize the opportunity with a clear commitment to this transformation.

[3] Based on the net present value of energy bill benefits and the monetized climate benefits of avoiding GHG emissions. This calculation assumes a $2,000 incremental cost and a 3% discount rate.