Quick Tips for a Home Air-source Heat Pump Installation

Interested in an air-source heat pump? You're in the right place! This guide offers quick tips for Ontario homeowners who are considering a centrally-ducted air-source heat pump (ASHP) for an existing home.

Planning: Time it Right

If your old home heating or cooling system suddenly breaks down during extreme weather, you might get a quick fix that's not the best fit. Heating and cooling systems often last about 15 years. As your A/C or furnace gets older, it's smart to plan for an ASHP.

Planning: Check Permit Requirements

If applicable, check city permitting requirements.

Planning: Speak to Your Property Insurer

Speak to your property insurer to understand insurance implications. Shopping around may yield lower rates.

Planning: Consider Other Energy Upgrades

Additional energy upgrades may be beneficial for comfort and ASHP sizing. An attic insulation top-up and air sealing are often recommended. A Registered Energy Advisor can help spot other opportunities.

Planning: Review Incentive Guidelines

Be sure to check for government or utility incentives, or other programs available in your area, and know the requirements. Direct rebates or low-/no-interest financing options may be available.

Planning: Know the Key Terms

Heating Season Performance Factor (HSPF or HSPF2) describes the average efficiency over a heating season referenced to a specified climate region.

Coefficient of performance (COP) describes ASHP efficiency at set outdoor temperatures.

Thermal balance point temperature is the outdoor temperature when back-up heating is required. Your contractor should estimate this as part of the sizing.

Capacity describes the heating output of an ASHP. Greater incentives are available for ASHPs that maintain higher capacity in cold temperatures.

Cold-climate ASHPs meet minimum requirements for capacity and COP at cold temperatures.

Hybrid (or dual fuel) systems use an ASHP with a fossil fuel furnace as back-up.

Inverter-driven systems provide different levels of heating and cooling output to closely match the needs of the home.

Tons are also used to describe ASHP capacity; 2-ton, 3-ton, 4-ton models indicate increasing heating output.

Planning: Understand Other Heat Pump Options

This document covers centrally-ducted ASHPs but there are many types of heat pumps. Geothermal systems are the most efficient. Air-to-water options are available for hydronic heating. Ductless systems are available, as are heat pump water heaters. There are options for most homes.

Finding a Contractor: Evaluate Contractors

Get written quotes with equipment details from multiple contractors. Look for ASHP experience. Request references. Lowest cost isn't always best. Costs vary based on equipment and other factors. Ask about experience with the suggested ASHP model(s) and factory or distributor training. Contractors should ask about your needs and any existing comfort issues in your home that should be addressed.

Finding a Contractor: Check Certifications

As with A/C installs, installers need a Certificate of Qualification in the refrigeration or residential air-conditioning trades. Working with gas or oil-fired equipment requires separate TSSA certifications. Contractor businesses often need a municipal license. They should have liability insurance. Installers with proper trade certification can do limited electrical work directly related to the ASHP they are installing. All other electrical work requires a licensed electrician.

Your Home: Consider Outdoor Noise

ASHPs make outdoor noise during the heating season, but modern inverter-driven ones can be much quieter

than typical A/C units. Check ASHP noise specs (the "dB" rating), noise bylaws, and outdoor unit placement to minimize noise near neighbors or bedrooms. In denser areas, backyard installation is often best.

Your Home: Determine Outdoor Unit Placement

Ensure your ASHP will be mounted above potential snow drift heights. Use a stand, not a wall-mount, for quieter indoor operation. It should be clear underneath the ASHP. It should generally be away from pathways where condensate may freeze and create a hazard.

Your Home: Estimate Heat Loss

Your contractor or another qualified HVAC professional needs to estimate the heat loss of your home. A heat loss and gain calculation according to CSA F280 is recommended. Assessing heat loss and ASHP sizing based on the home's natural gas consumption is possible new tools (thermalpoint.ca). Energy audits also help assess heat loss.

Your Home: Evaluate Electrical Panel

Your contractor should check the available electrical capacity on your panel/service with calculations in the Canadian Electric Code. Service and panel upgrades can often be avoided for homes with 100A service when assessing the panel based on proven historical demand (see ESA Bulletin 8-3-15). New tools can help implement this calculation. Smart panels and switches, reductions in other loads, or fossil fuel back-up may also help an ASHP system work with an existing panel and service.

Your Home: Be Aware of Ductwork Airflow Capacity

Some ASHPs have a modulating indoor fan for quieter indoor operation. However, at full capacity, ASHPs need more airflow than traditional systems. To avoid faults and excessive noise, your contractor should estimate how much airflow your ductwork can handle. Ductwork upgrades may be feasible.

Choosing an ASHP: Consider Equipment Warranties

Some ASHPs have a 10-year (or better) parts and compressor warranty. Review warranty conditions.

Choosing an ASHP: Select an ASHP Model

For most applications, consider a high-performance inverter-driven model that qualifies for available incentives. Normally it should be sized to meet as much of the annual heating load as possible within the constraints of the home and budget. This often means it should be a cold-climate ASHP. ASHPs used with an *existing* furnace must be compatible.

Choosing an ASHP: Back-up Heating Selection

Back-up heating helps ensure your home stays warm during extreme cold. Electric back-up is like a space heater for your ductwork. It is a small add-on but requires space on your panel. Fossil fuel back-up involves a furnace. Systems can often be sized to minimize back-up usage. It may also be feasible to design a system that does not require back-up. Normally the backup system can be set to turn on automatically if needed.

Choosing an ASHP: Right-size the ASHP

Right-sizing means your contractor should select the best ASHP options for your needs, considering heat loss, budget, goals, issues, and constraints. They should use NRCan's ASHP Sizing and Selection Web App to help with this process.

After the Installation: Configure the Thermostat

Your contractor should commission your system and configure your thermostat based on your goals; that may include financial savings, energy reductions, and/or environmental benefits. Try to "set it and forget it" because frequent manual changes to the thermostat setpoint can inadvertently turn on the backup.

After the Installation: Take Care of the System

Contact your contractor if you suspect an issue with your system. As with traditional equipment, contractors recommend an annual inspection. Change your filter regularly. If your home is still connected to gas, you may want to submit meter readings directly to the gas utility to ensure up-to-date billing. Enjoy!

Learn More
Visit smarterhomeheating.ca for case studies, homeowner testimonial videos, and other resources.

The Sustainable Technologies Evaluation Program (STEP) is a non-profit collaborative research initiative. This document provides general tips. It is not exhaustive. It is the homeowner's responsibility to hire qualified liscensed tradespeople, follow incentive requirements, understand and abide by applicable regulations, and to take all necessary steps to ensure a successful installation. Funding support for this document from The Atmospheric Fund (TAF) is gratefully acknowledged. Base support for STEP from the City of Toronto, Region of Peel, and York Region, is also gratefully acknowledged. Note that the contents of this document do not necessarily represent the policies of supporting agencies.

Sustainable Technologies
EVALUATION PROGRAM
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