CANADA GREENER HOMES GRANT

INFORMATION MANUAL FOR SERVICE ORGANIZATIONS AND ENERGY ADVISORS

January 2022

Version 2

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1 Introduction: Canada Greener Homes Grant initiative

Buildings, including our homes, account for 18% of Canada's greenhouse gas emissions. The Government of Canada wants to help Canadians make their homes more energy-efficient, use renewable power and be more resilient. This means homes will be more comfortable and more affordable to maintain while also supporting Canada's environmental objectives. The Canada Greener Homes Grant initiative will help homeowners make their homes more energy-efficient, create new jobs across Canada for energy advisors, grow Canada's domestic green supply chains, and fight climate change.

1.1 What's available through the initiative?

- ✓ **Up to 700,000 grants of up to $5,000** to help homeowners make energy efficiency retrofits to their homes, such as better insulation
- ✓ **EnerGuide evaluations (grants of to $600) and expert advice** to homeowners so they can begin to plan their retrofits
- ✓ **Recruitment and training of EnerGuide Rating System energy advisors** to meet the increased demand; this will create new jobs across Canada.

Participants are eligible for up to $5,600 total under the Canada Greener Homes Grant initiative. Updates on the initiative will be provided over its lifespan to keep service organizations, energy advisors, and homeowners informed. As part of our work, the Government of Canada is committed to ensuring the initiative reaches a broad range of Canadians, including those living in remote and northern communities, and those with limited internet access.

Energy advisors and service organizations offering EnerGuide Rating System (ERS) evaluations play an invaluable role in delivering the Canada Greener Homes Grant initiative. Energy advisor expertise, knowledge, and advice to homeowners is key to supporting Canadians' participation in the initiative, saving homeowners money and energy, and reducing greenhouse gas emissions. Service organizations play an essential role in quality assurance, energy advisor training and mentorship, and liaising with the public and the government.

Natural Resources Canada (NRCan) is committed to providing ongoing engagement and support to the energy advisor and service organization network to ensure the success of the initiative. NRCan is working on building a diverse network of energy advisors to provide career opportunities to all Canadians and to meet the needs of our communities.

This guidance manual provides service organizations and energy advisors with information and guidance on the delivery of the Canada Greener Homes Grant initiative. This manual will be updated as further information and details becomes available.

1.2 Eligibility and requirements

The Canada Greener Homes Grant initiative provides grants for home evaluations and for retrofits, to a total of $5,600 per participant or homeowner. Participants are eligible for **up to $600 towards the cost of pre- and post-retrofit EnerGuide evaluations** and for **up to $5,000 total in grants for eligible retrofits** such as home insulation, windows and doors, and air sealing.

1.2.1 How the grant process works

Homeowners follow a five step process through the retrofit journey:

1. Learn about the initiative, including eligibility criteria and requirements
2. Register and book a pre-retrofit evaluation
3. Plan, document and complete home retrofits
4. Book a post-retrofit evaluation and apply for grants
5. Receive grants

Currently, there is no time limit on the retrofit journey. Homeowners have up to six years to complete their journey.

If the homeowner already had a pre-retrofit evaluation conducted on their home prior to registering for the initiative, the date of the pre-retrofit evaluation determines their next steps:

- If a pre-retrofit evaluation was conducted **before April 1, 2020**, a new evaluation is required.
- If a pre-retrofit evaluation was conducted **between April 1, 2020 and November 30, 2020 inclusively**, the homeowner can use their evaluation for the program but will not receive a reimbursement for the evaluation cost itself. Home retrofits must have been undertaken on or after **December 1, 2020** in order to be eligible for the retrofit grants.
- If a pre-retrofit evaluation was conducted between **December 1, 2020 and June 30, 2021 inclusively**, the homeowner can receive grants for both their evaluations and retrofits if at least one eligible retrofit is completed on or after **December 1, 2020**. In this case, the retrofit does not need to have been included in the energy advisor's report.
- If a pre-retrofit evaluation was conducted on or **after July 1, 2021,** the homeowner can receive grants for both their evaluations and their retrofits if they complete at least one retrofit that is eligible and recommended by the energy advisor in their report. All retrofits must be recommended in the energy advisor's report.

For Quebec and Nova Scotia residents who believe they qualify for retroactive grants, their respective provincial entity will work directly with NRCan to identify eligible participants.

More information on the grant process is available on the Canada Greener Homes Grant website: https://www.nrcan.gc.ca/energy-efficiency/homes/canada-greener-homes-grant/start-your-energy-efficient-retrofits/23443.

1.2.2 Eligible building types

New homes or new additions to existing homes are not eligible for the initiative. Newly built homes are defined as homes that are six months old or less, based on the date of occupancy by the first homeowner. This will apply to homeowners at the time of application.

The following building types are eligible under the Canada Greener Homes Grant initiative:

- Detached houses
- Semi-detached houses/Row houses/Townhomes/Garden homes
- Mobile homes on a permanent foundation
- Permanently-moored floating homes

- Low-rise multi-unit residential buildings including mixed-use buildings (three storeys or less with a building area of 600 m^2 or less)

For more information on eligible building types, refer to the *EnerGuide Rating System—Standard* section 1.2.

Multi-Unit Residential Buildings (MURBs)

The following should be considered when evaluating MURBs:

- MURBs must either be stacked (up/down) or have a common area.
- Side-by-side attached units are considered row houses and are not MURBs.
- Two-unit MURBs, including duplexes and houses with secondary suites[1], are entitled to all the same grants as attached and detached houses (e.g. eligible for heat pumps and heat pump water heaters). The pre- and post-retrofit EnerGuide evaluation is to be conducted as per the ERS procedure for evaluating MURBs. The upgrade recommendation statements to be used in the *Renovation Upgrade Report* are the same as those for attached and detached houses.
- Retirement homes are not eligible.

Eligibility criteria:

- A single pre- and post-retrofit EnerGuide evaluation must be performed on the entire structure (including all units and common areas) and not on a unit by unit basis. Homeowners within the MURB need to organize themselves (e.g. by way of condo board) in such a way that all homeowners are aware that an evaluation will be taking place.
- Retrofits on a MURB must be agreed to by the person or persons able to make decisions about the renovations to the building.
- For MURBs that are owned by one person and of which the remaining units are rented, the owner must live within the building as their primary residence. The maximum grant amount that can be given in this case is $5,000.
- For MURBs with multiple homeowners, up to four individual homeowners within the MURB can apply for grants of up to $5,000 each based on the MURB multiplier table (e.g. maximum of two owners for a MURB with eight units). All applications must be based on the single pre- and post-retrofit EnerGuide evaluation undertaken for the entire structure.
- The MURB must have at least 50% of its total area, including the basement, as residential living space.
- The building must be habitable all year.

Calculating grant amounts

Table 1: MURB multiplier table

Number of dwelling units per MURB	2–3	4–6	7–9	10–12	13–16	17+
MURB Multiplier	1.0	1.5	2.0	2.5	3.0	4.0

The MURB multiplier table has three purposes:

(1) To determine the maximum number of homeowner participants within a MURB
(2) To determine the maximum potential total grant amount for the MURB ($5,000 x multiplier)

[1] Refer to the *ERS—Technical Procedures* for definitions of duplexes and secondary suites.

(3) To determine the maximum potential grant amount per eligible measure (insulation, air sealing, resiliency)

The MURB multiplier does not apply to windows, doors or solar panels; however, those measures are eligible for the higher grant amount applicable to the entire building as calculated in (2). The maximum grant amount that a MURB can receive is $20,000.

MURBs (excluding two-unit MURBs such as duplexes and houses with secondary suites) are not eligible for grants related to the following:

- Heat pumps or heat pump water heaters
- Thermostats
- Furnaces and boilers (in northern and off-grid communities)

Examples of grant calculations are available on the Canada Greener Homes Grant website: https://www.nrcan.gc.ca/energy-efficiency/homes/canada-greener-homes-grant/start-your-energy-efficient-retrofits/learn-about-the-initiative/multi-unit-residential-buildings-murbs/23588

1.2.3 Eligible ownership models

For a participant to be eligible for the Canada Greener Homes Grant initiative, they must be the owner of the dwelling and it must be their primary residence. Secondary residences and rental properties are not eligible. Participants are required to submit proof of ownership, normally a property tax bill number (this number can be found on municipal property documents), and proof of residence such as a driver's licence.

For condominiums, strata and co-operative housing, applicants for the Canada Greener Homes Grant initiative must own and reside in the dwelling or building. If there are multiple owners interested in applying for the initiative, they will need to coordinate amongst themselves. For applicants under these ownership models the following is required:

- Each individual home (as defined in 1.2.2) eligible to undertake retrofits under the Canada Greener Homes Grant initiative must have an EnerGuide evaluation.
- If the building is a MURB (as defined in 1.2.2), then an EnerGuide evaluation must be conducted on the entire structure. Unit by unit evaluations are not eligible under the Canada Greener Homes Grant initiative.

Businesses are not eligible for the initiative, with the exception of sole proprietor/small businesses where the owner of the home and the business is the individual who uses the dwelling as their primary residence and can prove both conditions for validation purposes. In this case, the residential living space must account for at least 50% of the building area, as per the criteria for MURBs.

Not-for-profit organizations such as community housing and places of worship and associated dwellings are not eligible for the initiative, given that the owner does not reside in the dwelling. While not eligible under the Canada Greener Homes Grant initiative, these may be eligible under provincial/territorial or municipal programs.

Indigenous home-ownership models

To ensure inclusivity and reflect Indigenous home-ownership models, the Canada Greener Homes Grant initiative provides flexibility so that the following groups are eligible applicants:

- Individual Indigenous homeowners (who may apply directly online through the portal).
- Indigenous governments or organizations (e.g. band councils, land claim organizations).
- Housing management bodies and other representatives or Indigenous service delivery organizations with formal partnerships with Indigenous governments or organizations.

These applicants may be eligible to register multiple homes, including homes that are not the owner's primary residence. The home registered must be owned by the applicant and be occupied by an Indigenous household. More information is available on the Canada Greener Homes Grant website: https://www.nrcan.gc.ca/energy-efficiency/homes/canada-greener-homes-grant/start-your-energy-efficient-retrofits/learn-about-the-initiative/23476.

1.2.4 Eligible retrofits for the grant

The Canada Greener Homes Grant initiative aims to make a significant environmental impact, stimulate the economy, and make homes more comfortable and energy-efficient. Homeowners need to complete at least one of the retrofits that is both eligible and recommended by an energy advisor in their *Renovation Upgrade Report* in order to receive a grant. They can combine eligible retrofits to receive up to $5,000.

The following is the list of eligible retrofits:

- **Home insulation** - up to $5,000
  - Attic/ceiling insulation
  - Exterior wall insulation
  - Exposed floor
  - Basement/foundation insulation
  - Crawl spaces
- **Air sealing** - up to $1,000
- **Windows and doors** - each rough opening is eligible for either $125 or $250
- **Thermostats** - up to $50 (must be combined with another energy efficiency retrofit)
- **Space and water heating** - up to $5,000
  - Ground source heat pumps
  - Air source heat pumps and cold climate air source heat pumps
  - Heat pump water heaters (max $1,000)
- **Renewable energy** - up to $5,000
- **Resiliency measures** - up to $1,000 (must be combined with another energy efficiency retrofit)

More information on the eligible retrofits is available on the Canada Greener Homes Grant website: https://www.nrcan.gc.ca/energy-efficiency/homes/canada-greener-homes-grant/start-your-energy-efficient-retrofits/plan-document-and-complete-your-home-retrofits/eligible-grants-for-my-home-retrofit/23504.

Planning for retrofits

It is recommended that homeowners have a licensed and trained professional implement their retrofits. For some retrofits, a licensed and trained professional is a requirement.

Retrofits that require a licensed and trained professional:

- Heat pumps
- Heat pump water heaters
- Furnaces (eligible for Northern and off-grid community residents only)
- Boilers (eligible for Northern and off-grid community residents only)

Retrofits for which professionals are strongly recommended (professional installation may be required in some jurisdictions):

- Renewable energy (solar photovoltaic systems)
- Air sealing
- Home insulation
- Windows and doors
- Thermostats
- Resiliency measures

If the homeowner decides to implement their own retrofits, personal labour costs are not eligible for reimbursement.

Attestation forms

It is highly recommended that homeowners obtain attestations (if applicable for their retrofits) confirming that:

- the mechanical system[2] has been installed by a trained and licensed professional
- the ground source heat pump system was installed in accordance with CSA standards
- the air source heat pump or cold climate air source heat pump system is capable of distributing heat throughout the entire home

The attestation forms are available on the Canada Greener Homes Grant website: https://www.nrcan.gc.ca/energy-efficiency/homes/canada-greener-homes-grant/start-your-energy-efficient-retrofits/learn-about-the-initiative/23476#s4

1.2.5 Special measures for northern and off-grid communities

Canadians living in northern and off-grid communities face specific challenges when it comes to completing home retrofits, including higher equipment and labour costs. All retrofit measures have been adjusted to provide an additional 30% for northern and off-grid communities. In addition to the list of eligible measures in section 1.2.4, homeowners living in northern and off-grid communities are eligible for replacements of existing fossil-fuel burning equipment. Further, homeowners living in a northern community are eligible for additional insulation measures (attic, ceiling, and exposed floor insulation).

Northern communities are located in Yukon, Northwest Territories, Nunavut, Nunavik and Nunatsiavut.

[2] Mechanical systems include: ground source heat pumps, air source heat pumps, cold climate air source heat pumps, heat pump water heaters, furnaces (eligible for Northern and off-grid community residents only), and boilers (eligible for Northern and off-grid community residents only)

Off-grid communities are those not currently connected to the North American electrical grid nor to the piped natural gas network. To confirm if a location is off-grid, consult the Remote Energy Communities Database: https://atlas.gc.ca/rced-bdece/en/index.html.

More information on special measures for northern and off-grid communities is available on the Canada Greener Homes Grant website: https://www.nrcan.gc.ca/energy-efficiency/homes/canada-greener-homes-grant/start-your-energy-efficient-retrofits/grants-for-canadian-homeowners-living-the-north-and-grid-communities/grants-for-canadian-homeowners-living-the.

2 Responsibilities of Energy Advisors and Service Organizations

In delivering the Canada Greener Homes Grant initiative, energy advisors and service organizations are partners in:

- Promoting the Canada Greener Homes Grant initiative to homeowners, including eligibility criteria, requirements, and steps in the retrofit journey
- Providing professional, respectful and courteous service to homeowners
- Adhering to local and regional COVID-19 guidelines
- Providing Canada Greener Homes Grant recommendations in the homeowner's *Renovation Upgrade Report*
- Providing information in the Canada Greener Homes Grant Portal for the homeowner
- Regularly reviewing the Canada Greener Homes Grant website and the NRCan "Members Only" Resource Centre for energy advisors and service organizations for updates and new information on the initiative

Responsibilities of service organizations include:

- Conducting quality assurance on EnerGuide home energy evaluation files prior to submission to NRCan
- Promoting the EnerGuide Rating System (ERS) and other NRCan housing initiatives when delivering ERS services
- Establishing systems and tracking to ensure that homeowners are responded to and communicated with in a timely manner
- Recruitment, mentorship and quality assurance of energy advisors and ensuring that energy advisors have successfully completed the necessary training, exams and recommended probationary files before registration with NRCan

Responsibilities of energy advisors include:

- Maintaining good client relations in a professional and courteous manner while delivering ERS services
- Understanding and applying job-site safety requirements and practices
- Ensuring the homeowner understands their *Homeowner Information Sheet*, *Renovation Upgrade Report* and EnerGuide label
- Obtaining the consent and approval of the homeowner for data collection and data sharing as outlined in the *Homeowner Authorization Form*
- Keeping up-to-date with all technical bulletins released by NRCan

2.1 Obligations

Energy advisors and service organizations must adhere to the *Code of Ethics*, *Code of Conduct and Conflict of Interest* requirements as found in the *ERS—Administrative Procedures—Version 15.10* or more recent. This includes but is not limited to:

- Exercising their duties with integrity, fairness and impartiality
- Seeking the homeowner's informed and written consent and collecting no more personal information than is required

- Complying with the provisions of their NRCan registration and license agreements, including with the regulations, codes, and standards under which they are working
- Avoiding any apparent conflict of interest and avoiding association with any enterprise of questionable character
- Ensuring that recommendations are in the interest of the customer and above those of any business or corporation

2.2 Compliance

Failure to comply with the terms and conditions of licensing and registration agreements, including the *ERS Administrative Procedures* and *Technical Procedures*, and the *Code of Ethics, Code of Conduct and Conflict of Interest* requirements shall be dealt with by NRCan under arrangements for handling complaints and appeals, including review by NRCan's ERS Compliance Review Committee.

Failure to comply may necessitate corrective measures such as the following:

- The termination of the registration process
- Requirements to retrain at the expense of energy advisors or service organizations
- Suspension or withdrawal of registration of energy advisors or licensing of service organizations
- Notification of the employer and appropriate regulatory authorities
- If appropriate, additional legal action

2.3 Service standards

As per the ERS procedures, the following timelines must be met:

- EnerGuide label, *Homeowner Information Sheet* and *Renovation Upgrade Report* must be sent to homeowners within 14 days
- ERS / Canada Greener Homes Grant files must be uploaded to the Canada Greener Homes Grant portal (for service organizations) within 30 days

There may be occasions when these timelines cannot be met due to unexpected circumstances, such as when the Canada Greener Homes Grant Portal is offline. In this and similar cases, it is recommended that the *Homeowner Information Sheet* and *Renovation Upgrade Report* be sent to the homeowner directly so that they can proceed with the planned retrofits. Once the portal is back online, the required information must be uploaded.

NRCan will consult with service organizations on additional service standards and tracking/reporting mechanisms, including for the following:

- Responding to homeowner requests for EnerGuide evaluations within 48 hours
- Scheduling EnerGuide evaluation within five business days of receipt of the request or referring to another service organization

2.4 Dispute resolution

The Canada Greener Homes Grant initiative is anticipating that there will be cases where homeowners disagree with the calculated grant amount or have complaints. The initiative will have a dispute resolution process that treats homeowners with fairness and respect, respects the roles and

responsibilities of service organizations and energy advisors, and that ensures decisions are made based on sound program management. Service organizations and energy advisors may have an important role in clarifying information related to homeowners' files.

2.5 Equity, diversity and inclusion

Equity, diversity and inclusion are key priorities for the Government of Canada in delivering the Canada Greener Homes Grant initiative. The initiative aims to build a diverse and inclusive workforce of professionals that represents and serves all of Canada by:

- Reducing barriers to participation in the energy advisor and service organization workforce for individuals from under-represented groups
- Increasing representation of members of underserved communities in the energy advisor and service organization workforce
- Delivering an initiative that is inclusive and accessible to all Canadians

Diversity and inclusion principles in hiring practices and client service can result in numerous benefits, including:

- Expanded clientele base
- Increased profit margins
- Benefits to customers
- Drawing innovation and diverse perspectives
- Safer workplaces for energy advisors and service organizations
- Enhancing reputation

This is a starting point for continued dialogue with the energy advisor and service organization network on equity, diversity and inclusion in delivering the Canada Greener Homes Grant initiative and EnerGuide services. Further learning opportunities through webinars, training and resources will be available in the coming months. Suggestions are welcome for topics or themes of interest. Please have your service organization contact your account manager with the Office of Energy Efficiency with your suggestions.

2.6 Health and safety

NRCan recognizes the challenges and constraints that the COVID-19 pandemic continues to pose. The safety of all participants of this program is a top priority for the Government of Canada. As is the case with all businesses, service organizations and energy advisors will continue to be advised to follow their provincial, territorial, and/or municipal COVID-19 guidelines.

COVID-19 Resources:
Public Health Agency of Canada: Coronavirus disease (COVID-19): Prevention and risks

https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/prevention-risks.html

2.7 Harassment free workplace for all

We strive to create and maintain a service experience where our team members are treated with dignity, decency and respect.

3 Canada Greener Homes Grant Portals

NRCan has designed three Canada Greener Homes Grant Portals: one for homeowners, one for service organizations and energy advisors, and one for Canada Greener Homes Grant administration.

Homeowners, through their portal, are able to perform the following tasks:

- register for the initiative,
- select a service organization that will assign an energy advisor to conduct an EnerGuide evaluation of their home,
- learn more about what grants they may be eligible for,
- submit their receipts and supporting documentation, and
- track the status of their payment.

Service organizations and energy advisors, through their portal, can provide information to homeowners throughout their retrofit journey. A separate guidance manual is being developed for the service organization / energy advisor portal.

The third portal is used for administrative purposes by Canada Greener Homes Grant staff.

4 Processes and Documentation

This section provides the following information for energy advisors:

- General guidance on providing recommendations to homeowners regarding the Canada Greener Homes Grant initiative
- Guidance on setting up a HOT2000 file for an EnerGuide evaluation associated with the Canada Greener Homes Grant initiative
- An introduction to the standardized "RUR statements" for the Canada Greener Homes Grant initiative

4.1 General guidance on providing recommendations to homeowners

In providing recommendations to homeowners, energy advisors should prioritize the following:

- Potential energy savings and greenhouse gas emission reductions
- Life expectancy of the home's components
- Interactions among the components in the home (house-as-a-system)
- Occupant health and safety
- Potential renovation plans
- Cost to the homeowner
- Additional considerations as provided by NRCan on a measure-by-measure basis

Only retrofits that are eligible and that are recommended by the energy advisor in the *Renovation Upgrade Report* and undertaken on or after December 1, 2020 are eligible for a grant. Exceptions for retroactivity are outlined in section 1.2.1.

The Canada Greener Homes Grant initiative does not provide grants for all possible retrofits. Some retrofits recommended may not be eligible for a grant; however, they can still help the homeowner improve the energy efficiency, indoor air quality and comfort of their home.

As per section 3.3.2 of the *ERS—Technical Procedures*, in the HOT2000 file of the post-retrofit evaluation, energy advisors must account for all upgrades or changes that have been implemented since the pre-retrofit evaluation, including those that are not eligible under the initiative.

4.2 Setting up the HOT2000 File

An Application number is generated when a homeowner registers for the Canada Greener Homes Grant initiative via the portal. The format consists of the letters "AP" followed by six numbers (e.g. AP000000). Energy advisors are to insert the Application number in the **Homeowner Authorization ID** field of HOT2000's **General** screen, as shown in Figure 1.

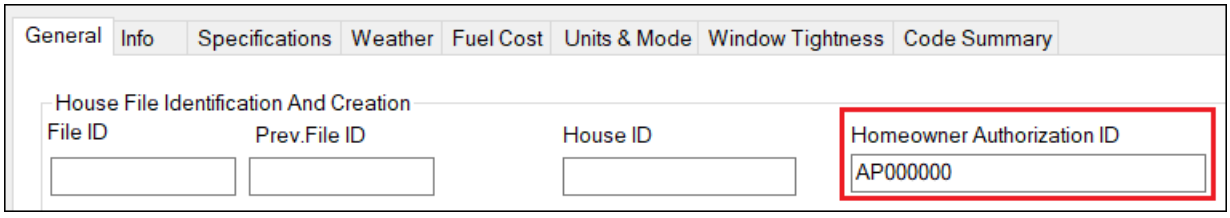


*Figure 1: HOT2000 **General** screen with **Homeowner Authorization ID** field highlighted*

In HOT2000, upon selecting the **EnerGuide Rating System** or ERS **Ontario Reference House** mode, a **Greener Homes** check box will appear in the selected mode's screen, as shown in Figure 2. This box must be checked for all HOT2000 files that are generated as part of the Canada Greener Homes Grant initiative.

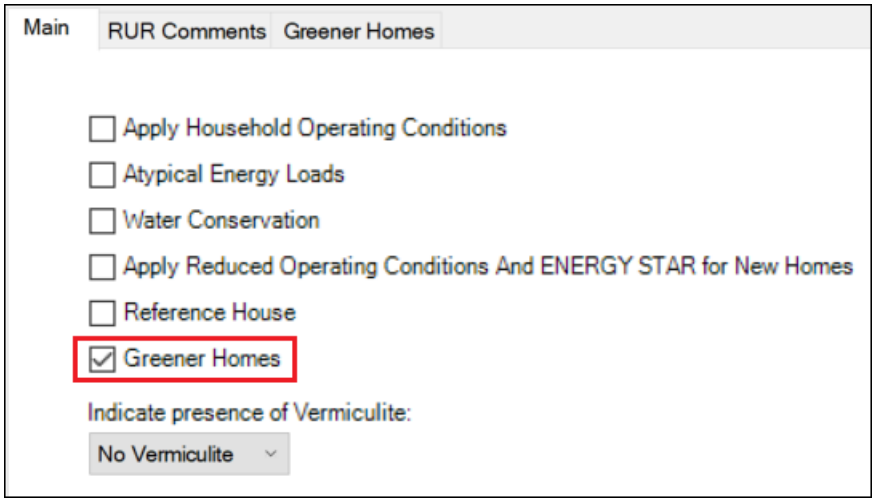


*Figure 2: **EnerGuide Rating System** screen with the **Greener Homes** box checked*

Clicking on the **Greener Homes** tab reveals the screen shown in Figure 3.

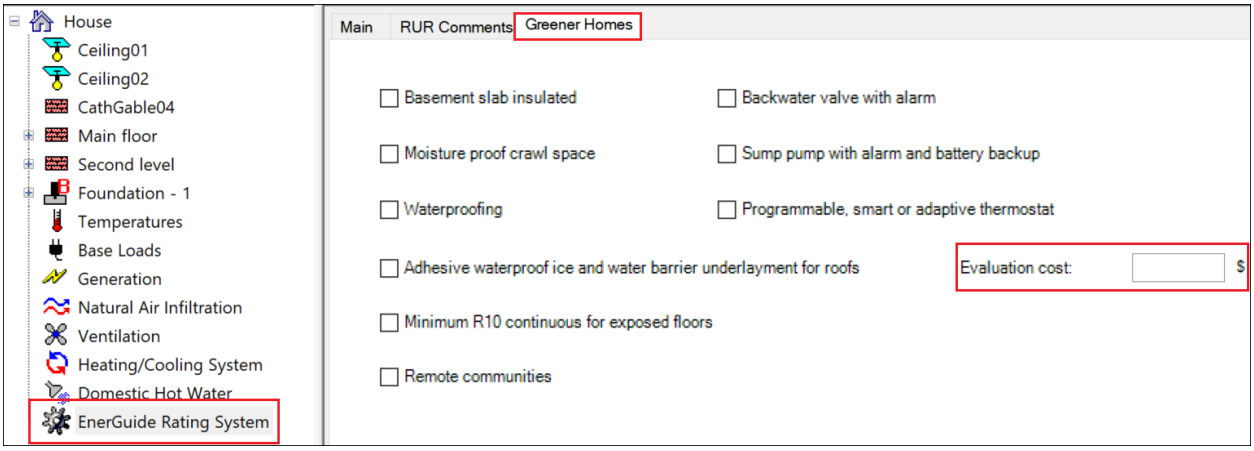


*Figure 3: **Greener Homes** screen with the **Evaluation cost** field highlighted*

In the **Evaluation cost** field, enter the cost of the evaluation in both the pre- and post-retrofit files. These entries will be used to determine the grant amount the homeowner is entitled to for the cost of the evaluations. Please note that this field accepts numerical characters only (e.g. 395.50). Enter only the amount (numerical value) and no "$" sign in the box as this will clear the amount when navigating to another screen. The use of other check boxes in this screen is discussed throughout this document.

While homeowners are responsible for uploading retrofit receipts, invoices, etc. it remains the responsibility of the energy advisor to retain copies of supporting documentation as per ERS procedures.

4.3 Renovation Upgrade Report Statements

NRCan has developed standardized *Renovation Upgrade Report* text, referred to as "RUR statements" for the Canada Greener Homes Grant initiative and eligible measures in order to provide clear and consistent information and advice to homeowners across the country. Energy advisors must copy these statements into the appropriate **RUR Comments** section in HOT2000 so that the text appears in the *Renovation Upgrade Report* for the homeowner. This is required in order for the homeowner to be eligible for a grant for the measure.

For attics and ceilings there are both general statements that apply to all attic/ceiling types and specific statements to further customize specific recommendations. For all other upgrades, there is a single block of text specific to each recommendation. It is important to note that a homeowner will only be eligible for a grant if the specific measure has been recommended by their energy advisor. NRCan relies on the expertise and best judgment of energy advisors to provide recommendations that will result in the highest possible energy savings and greenhouse gas emission reductions.

Purchased equipment such as heat pumps and windows must meet eligibility criteria and be on the Searchable product list of eligible equipment for the Canada Greener Homes Grant. The Searchable product list will be updated semi-annually, in June and December of each year. Energy advisors should inform homeowners of the Searchable product list, available on the Canada Greener Homes Grant website: https://www.nrcan.gc.ca/energy-efficiency/homes/canada-greener-homes-grant/start-your-energy-efficient-retrofits/plan-document-and-complete-your-home-retrofits/eligible-products-for-my-home-retrofit/23584.

Energy advisors should direct homeowners to the Canada Greener Homes Grant Portal or website should they have any further questions on grant amounts and eligibility.

4.3.1 General Renovation Upgrade Report Statement

If a homeowner has registered for the Canada Greener Homes Grant initiative, the following statement must be copied into the **RUR Comments** "Additional Comments" field in HOT2000 so that they appear in the "Additional Energy Advisor Comments" section of the *Renovation Upgrade Report*:

CANADA GREENER HOMES GRANT

Through the Canada Greener Homes Grant initiative, homeowners are eligible for reimbursement of up to $600 for the cost of pre- and post-retrofit EnerGuide evaluations and a grant of up to $5,000 in total for the implementation of eligible retrofits completed on or after December 1, 2020.

Hiring a contractor is required for several of the home retrofits and strongly recommended for the others. The contractor is responsible for complying with local bylaws and relevant provincial, territorial and federal legislation and guidelines.

NRCan does not endorse the services of any contractor, nor any specific product, and accepts no liability in the selection of materials, products, contractors or performance of workmanship. Before undertaking retrofits, find out about the appropriate products, safety and installation techniques, and ensure that all retrofits meet local building codes and by-laws.

ELIGIBILITY INFORMATION

For full details on eligibility requirements, eligible measures and grants for the recommended measures, please consult the Canada Greener Homes Grant website at canada.ca/greener-homes-

grant. If you have limited access to the internet, please consult the Homeowner Information Kit that was mailed to you.

Many eligible retrofit measures under the Canada Greener Homes Grant initiative have certain conditions for eligibility. These include:

- You must complete at least one retrofit that is both eligible and recommended by an energy advisor in this *Renovation Upgrade Report*
- If you wish to undertake resiliency measures or purchase a thermostat, you must also undertake another eligible energy efficiency measure in order to qualify for a grant
- Purchased equipment such as heat pumps and windows must meet eligibility criteria and must be on the Searchable product list of eligible equipment for the Canada Greener Homes Grant
- All mechanical systems (heat pumps, heat pump water heaters, furnaces and boilers) must be installed by a licensed and trained professional
- It is highly recommended that you obtain attestations (if applicable for your retrofits) confirming that the installation of a mechanical system has been completed by a trained and licensed professional, the ground source heat pump system was installed in accordance with CSA standards, and/or the air source heat pump or cold climate air source heat pump system is capable of distributing heat throughout your entire home
- All products must be purchased in Canada. Online purchases are only eligible if they are ordered from an online distributor located in Canada. The purchase price of used equipment is not eligible for a grant.

ADDITIONAL OPPORTUNITIES FOR FUNDING

You may access and combine grant funding from the Canada Greener Homes Grant initiative with funding from other retrofit grant programs in your region. The sum of the funding you receive from all sources must not exceed 100% of the total cost of the pre- and post-retrofit EnerGuide evaluations and of each eligible retrofit measure.

Participants will be required to declare funding or rebates received from other sources through the Canada Greener Homes Grant Portal.

[Include in RUR if applicable]: Programs in your region that you may be eligible for include: *[Energy advisor to insert the names of programs, as applicable].*

5 Guidance on specific measures

This section provides the following information for energy advisors:

- Guidance on providing advice and recommendations to homeowners on eligible measures through the Canada Greener Homes Grant initiative
- Guidance on HOT2000 modelling for eligible measures through the Canada Greener Homes Grant initiative (featuring new HOT2000 Greener Homes fields)
- Standardized statements that the energy advisor must include in the homeowner's RUR for the homeowner to be eligible for grants through the Canada Greener Homes Grant initiative

For the purposes of the Canada Greener Homes Grant initiative, data collection and HOT2000 modelling instructions contained in this document that differ from what is stated in the *ERS—Technical Procedures* and *HOT2000 User Guide* are to be followed.

5.1 Insulation

5.1.1 Attic / Ceiling Insulation

Guidance on providing recommendations to homeowners

Energy advisors should inform homeowners of the benefits of insulating an attic space, which is often a relatively simple, cost-effective retrofit with significant returns. RUR statements should note, based on the amount of insulation already present, whether the homeowner may be eligible for a grant up to the associated maximum found in the grant table. Adding insulation to a flat or cathedral ceiling may not be feasible unless significant renovations are planned for the interior or continuous insulation is added when shingles are being replaced.

Energy advisors should also inform homeowners that a grant is available for installing a self-adhering roofing underlayment over the entire roof surface. This measure should be recommended to homeowners who indicate they are planning to replace their shingles. More information on this measure can be found in section 5.8.2.

For more information on the benefits of insulation as well as considerations, suggestions and tips, refer the homeowner to Section 5 of *Keeping the Heat In* available on NRCan's website at https://www.nrcan.gc.ca/energy-efficiency/homes/make-your-home-more-energy-efficient/keeping-the-heat/15768.

ERS reference for data collection: *Technical Procedures* sections 3.5.3 and 4.5.

Process for HOT2000 modelling:

Model the insulation as per ERS procedures. Paste the text provided into the **RUR Comments' Ceilings** or **Cathedral Ceilings + Flats** section.

ERS reference for modelling: *HOT2000 User Guide* section 7.3.

Renovation Upgrade Report instructions

Copy the RUR general statement below and the relevant grant statement(s) into the appropriate **RUR Comments** section in HOT2000 (i.e. **Ceilings** or **Cathedral Ceilings + Flats**) along with any additional

personalized text. If the home has multiple types of ceilings/roofs, it is possible that more than one grant statement may need to be included. Enter the assessed insulation amount specifying the units as RSI or R in each **RUR grant statement**.

RUR General Statement (to be included in all attic/ceiling insulation recommendations):

ATTIC / CEILING INSULATION

The Canada Greener Homes Grant initiative offers grants of up to $1,800 for increasing home insulation in attics, cathedral ceilings and flat roofs. The amount you are eligible for will depend on factors such as what insulation is currently in your home, how much insulation you add and the type of attic/ceiling your home has. Insulation slows the rate of heat loss, resulting in improved energy use and reduced energy costs. Installing insulation in an attic, cathedral ceiling or flat roof is eligible for a grant, as long as minimum levels of insulation and coverage are achieved. If your house consists of more than one roof or roof type, the grant amount will be pro-rated or calculated based on roof type and area.

RUR statements for specific recommendations for Attic / Ceiling Insulation:

ATTIC

The insulation in your attic was assessed at _____. Because the amount of insulation in your attic has been assessed as being less than or equal to R-12, a grant of up to $1,800 is available for adding insulation to reach R-50 or more.

The insulation in your attic was assessed at _____. Because the amount of insulation in your attic has been assessed as greater than R-12 but less than or equal to R-25, a grant of up to $600 is available for adding insulation to reach R-50 or more.

The insulation in your attic was assessed at _____. Because the amount of insulation in your attic has been assessed as greater than R-25 but less than or equal to R-35, a grant of up to $250 is available for adding insulation to reach R-50 or more.

INSULATED CATHEDRAL CEILING

The insulation in your cathedral ceiling was assessed at _____. Because the amount of insulation in your cathedral ceiling has been assessed at less than or equal to R-12, a grant of up to $600 is available for adding insulation to reach R-28 or more.

The insulation in your cathedral ceiling was assessed at _____. Because the amount of insulation in your cathedral ceiling has been assessed as being greater than R-12 but less than or equal to R-25, a grant of up to $250 is available for adding insulation to reach R-28 or more.

INSULATED FLAT ROOF

The insulation in your insulated flat roof was assessed at _____. Because the amount of insulation in your insulated flat roof has been assessed at less than or equal to R-12, a grant of up to $600 is available for adding insulation to reach R-28 or more.

The insulation in your insulated flat roof was assessed at _____. Because the amount of insulation in your insulated flat roof has been assessed at greater than R-12 but less than or equal to R-25, a grant of up to $250 is available for adding insulation to reach R-28 or more.

UNINSULATED CATHEDRAL CEILING

Your cathedral ceiling was assessed as uninsulated. A grant is available for adding insulation to achieve R-20. The maximum grant amount for insulating 100% of your cathedral ceiling is $600.

UNINSULATED FLAT ROOF

Your flat roof was assessed as uninsulated. A grant is available for adding insulation to achieve R-20. The maximum grant amount for insulating 100% of your flat roof is $600.

RUR Comments: Example

This is an example of text an energy advisor has entered into the *Renovation Upgrade Report*. The homeowner is considering adding insulation to their attic. Attic insulation was assessed at R-30. Notice that the "RUR General Statement" is followed by the "RUR statement" that applies.

The Canada Greener Homes Grant initiative offers grants of up to $1,800 for increasing home insulation in attics, cathedral ceilings and flat roofs. The amount you are eligible for will depend on factors such as what insulation is currently in your home, how much insulation you add and type of attic/ceiling your home has. Insulation slows the rate of heat loss, resulting in improved energy use and reduced energy costs. Installing insulation in an attic, cathedral ceiling or flat roof is eligible for a grant, as long as minimum levels of insulation and coverage are achieved. If your house consists of more than one roof or roof type, the grant amount will be pro-rated or calculated based on roof type and area.

*The insulation in your attic was assessed at **R-30**. Because the amount of insulation in your attic has been assessed as greater than R-25 but less than or equal to R-35, a grant of up to $250 is available for adding insulation to reach R-50 or more.*

5.1.2 Exterior Wall Insulation

Guidance on providing recommendations to homeowners

If the homeowner is planning to replace exterior siding, energy advisors may recommend the installation of continuous insulation to reduce thermal bridging on the exterior, if appropriate. For uninsulated walls, recommending blown-in insulation or the installation of cavity insulation may be practical in the case of renovations where the interior or exterior wall stud framing will be exposed. If the homeowner is planning to remove and replace the interior finish, such as when electrical work is being done, recommending the installation of continuous insulation to reduce thermal bridging on the interior may be a good option.

For more information on the benefits of insulation as well as considerations, suggestions and tips, refer the homeowner to Section 7 of *Keeping the Heat In* available on NRCan's website at

https://www.nrcan.gc.ca/energy-efficiency/homes/make-your-home-more-energy-efficient/keeping-the-heat/15768.

ERS reference for data collection: *Technical Procedures* sections 3.5.4 and 4.5.

Process for HOT2000 modelling

Model the insulation in HOT2000's base and upgrade case as per ERS procedures. Paste the text provided into the **RUR Comments' Main Walls** section.

ERS reference for modelling: *HOT2000 User Guide* section 7.4.

Insulated Siding

Several Canadian manufacturers of vinyl siding offer an insulated option that includes a contoured underlayment of EPS backing of varying thicknesses. Current HOT2000 modelling procedures exclude insulated siding from grant calculations. The following is the procedure for modelling insulated siding in HOT2000 that will be included in the next version of the *Technical Procedures*.

There are two methods of modelling insulated siding in HOT2000, depending on whether or not it has been tested to ASTM standards (ASTM D7793 or ASTM C1363).

Method 1: Insulated siding has been tested

In order for the insulation component of the insulated siding to be counted towards the R-value required for the Canada Greener Homes Grant initiative, the insulated siding must be tested to either the ASTM D7793 or ASTM C1363 *Standard*. The homeowner must provide this information to the energy advisor at the time of the post-retrofit evaluation, in the form of product literature.

Model the insulated siding using HOT2000's **Code Editor**:

- Open the **Code Editor**.
- Select **Wall Codes** > New **User-defined Code** by clicking on the  icon.
- Select the **Built by Code Selector** radio button and click **New**.
- Model the wall system as assessed, but select **Hollow metal/vinyl cladding** from the **Exterior** drop-down menu.
- Click **OK**.
- In the **Code Label** field, assign the wall code a meaningful name.
- Click the on the  button in the task bar to **Add Continuous Insulation**.
- From the **Material Category** drop-down menu, select **Board stock**.
- From the **Material Type** drop-down menu, select **Type 2 expanded polystyrene**.
- Adjust the **Thickness** to achieve the **R-value** provided by the ASTM D7793 or ASTM C1363 test results.
- Close the **Code Editor** and click **Yes** to save changes.

In HOT2000's main interface, model the wall with the newly created code. Upload a copy of the ASTM D7793 or ASTM C1363 test results for quality assurance purposes.

Method 2: Insulated siding has not been tested

If the insulated siding has not been tested or information is not available, it will not be eligible for the Canada Greener Homes Grant initiative.

Model the insulated siding using HOT2000's **Code Selector**.

- Model the wall system as assessed, but select **Insul. metal/vinyl cladding** from the **Exterior** drop-down menu.

The R-value of the siding will not be accounted for when determining eligibility for the Canada Greener Homes Grant initiative.

Renovation Upgrade Report instructions

Copy the following statement into the **RUR Comments' Main Walls** section in HOT2000 along with your personalized text.

RUR statement

Through the Canada Greener Homes Grant initiative, a grant of up to $5,000 is available for adding insulation to the exterior wall area of your home. Insulation grants are based on the percentage of wall area to which the insulation has been added and the amount of insulation added. A minimum of 20% of the exterior wall area of your home, excluding foundation walls, must be insulated in order to qualify for a grant.

5.1.3 Exposed Floor Insulation

Guidance on providing recommendations to homeowners

In addition to energy savings, comfort may be a consideration if the homeowner finds that floors in rooms located above exposed floors are excessively cool throughout cold-weather seasons. These areas can be identified when the main floor extends beyond the foundation or in the case of a room over a garage. Recommend that air sealing of the area being insulated be performed at the same time.

For more information on the benefits of insulation as well as considerations, suggestions and tips, refer the homeowner to section 6.4 of *Keeping the Heat In* available on NRCan's website at https://www.nrcan.gc.ca/energy-efficiency/homes/make-your-home-more-energy-efficient/keeping-the-heat/15768.

ERS reference for data collection: *Technical Procedures* section 3.5.6.

Process for HOT2000 modelling

Model the insulation in HOT2000's base and upgrade case as per ERS procedures. Copy the text provided into the **RUR Comments' Exposed Floors** section.

ERS reference for modelling: *HOT2000 User Guide* section 7.8.

Renovation Upgrade Report instructions

Copy the following statement into the **RUR Comments' Exposed Floors** section in HOT2000 along with your personalized text.

RUR statement

Through the Canada Greener Homes Grant initiative, a grant of $350 is available for adding insulation to exposed floors. The exposed floor area must be a minimum of 11 square meters (120 square feet) and may be composed of either one large exposed floor area or multiple smaller areas. Each section of exposed floor area must be entirely insulated with a minimum additional insulation level of RSI 3.52 (R-20). Insulating exposed floors may result in energy savings and improve comfort in rooms above exposed floors.

5.1.4 Basement Insulation – Wall

Guidance on providing recommendations to homeowners

Homeowners should be informed that insulating basement walls can reduce energy costs and improve comfort. Insulating with continuous insulation on the exterior is very effective. As this method requires excavation around the perimeter of the basement, it is ideal to perform this when replacing the weeping tiles or waterproofing the foundation walls. If the homeowner plans to finish an unfinished basement, options may include cavity insulation in a newly framed stud wall or a combination of continuous and cavity insulation by installing framing away from the wall leaving space for insulation behind the framed wall.

An additional grant is available for waterproofing basement walls. Please see section 5.8.3 for guidance on advice to homeowners and HOT2000 modelling for this measure.

For more information on the benefits of insulation as well as considerations, suggestions and tips, refer the homeowner to Section 6 of *Keeping the Heat In* available on NRCan's website at https://www.nrcan.gc.ca/energy-efficiency/homes/make-your-home-more-energy-efficient/keeping-the-heat/15768.

ERS reference for data collection: *Technical Procedures* sections 3.5.8, 3.5.9 and 4.6.2.2.

Process for HOT2000 modelling

Model the insulation as per ERS procedures. Paste the text provided into the **RUR Comments' Foundation** section.

ERS reference for modelling: *HOT2000 User Guide* section 7.9.

Renovation Upgrade Report instructions

Copy the following statement into the **RUR Comments' Foundation** section of HOT2000 along with your personalized text.

RUR statement

The Canada Greener Homes Grant initiative offers grants of up to $1,500 for adding insulation to basement walls. Insulating basement walls can reduce energy costs and improve comfort. Grants are based on the RSI/R-value of the added insulation and the percentage of wall area insulated. The current amount of insulation does not affect the grant amounts. A minimum of 20% of the exterior foundation wall area must be insulated.

5.1.5 Basement Insulation – Header

Guidance on providing recommendations to homeowners

Sealing and insulating headers in an unfinished basement can be a relatively simple task. In addition to reducing energy costs and improving comfort, this measure can reduce or eliminate the transfer of odours from adjacent units in attached homes. During the air leakage location identification walk-through, pay special attention to the sill plate for air leakage.

Sealing can be accomplished by applying caulking to the perimeter of the rim joist cavity. Alternatively, installing custom-cut pieces of board insulation and applying caulking to the perimeter of each piece can create a seal. Spray foam can also create a good seal and first layer of insulation. Once sealed, board or batt insulation may be installed to achieve the desired level of insulation.

For more information on the benefits of insulation as well as considerations, suggestions and tips, refer the homeowner to section 6.2.6 of *Keeping the Heat In* available on NRCan's website at https://www.nrcan.gc.ca/energy-efficiency/homes/make-your-home-more-energy-efficient/keeping-the-heat/15768.

ERS reference for data collection: *Technical Procedures* sections 3.5.5.

Process for HOT2000 modelling

Model the applicable insulation in HOT2000's base and upgrade cases as per ERS procedures. Copy the text provided into the **RUR Comments' Foundation** section of HOT2000.

ERS reference for modelling: *HOT2000 User Guide* section 7.5.

Renovation Upgrade Report instructions

Copy the following statement into the **RUR Comments' Foundation** section of HOT2000 along with your personalized text.

RUR statement

Through the Canada Greener Homes Grant initiative, a grant of $240 is available for sealing and adding insulation to basement headers. In an unfinished basement, sealing and insulating headers can be a relatively simple task. The grant of $240 is available when RSI 3.52 (R-20) or more is added to a minimum of 80% of your entire basement header area, along with air sealing.

5.1.6 Basement Insulation – Slab

Guidance on providing recommendations to homeowners

Adding board insulation on top of the slab can significantly improve the comfort of a basement area. This retrofit requires the installation of a sub-floor to protect the insulation from damage and to provide a new surface upon which to install flooring. A slab-on-grade foundation is not eligible for a grant.

For more information on the benefits of insulation as well as considerations, suggestions and tips, refer the homeowner to section 6.2.12 of *Keeping the Heat In* available on NRCan's website at https://www.nrcan.gc.ca/energy-efficiency/homes/make-your-home-more-energy-efficient/keeping-the-heat/15768.

ERS reference for data collection: *Technical Procedures* sections 3.5.10 and 4.6.2.2.

Process for HOT2000 modelling

Pre-retrofit evaluation: Model the insulation in HOT2000's base and upgrade case as per ERS procedures. Additionally, check the **Basement slab insulated** box in HOT2000's **Energy Upgrades Greener Homes** section to recommend that more than 50% of the slab be insulated to a minimum of R-3.5. Copy the text provided into the **RUR Comments' Foundation** section.

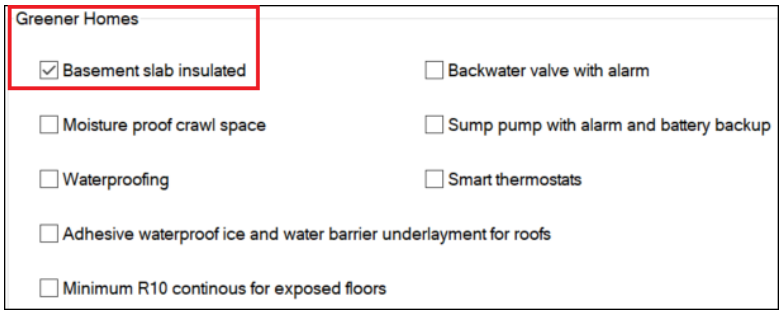


*Figure 4: Pre-retrofit file: **Greener Homes** screen with **Basement slab insulated** box checked*

Post-retrofit evaluation: Model the insulation in HOT2000's base case as per ERS procedures. If more than 50% of the basement slab was insulated with RSI 0.62 (R-3.5), also check the **Basement slab insulated** box in the **Greener Homes** screen.

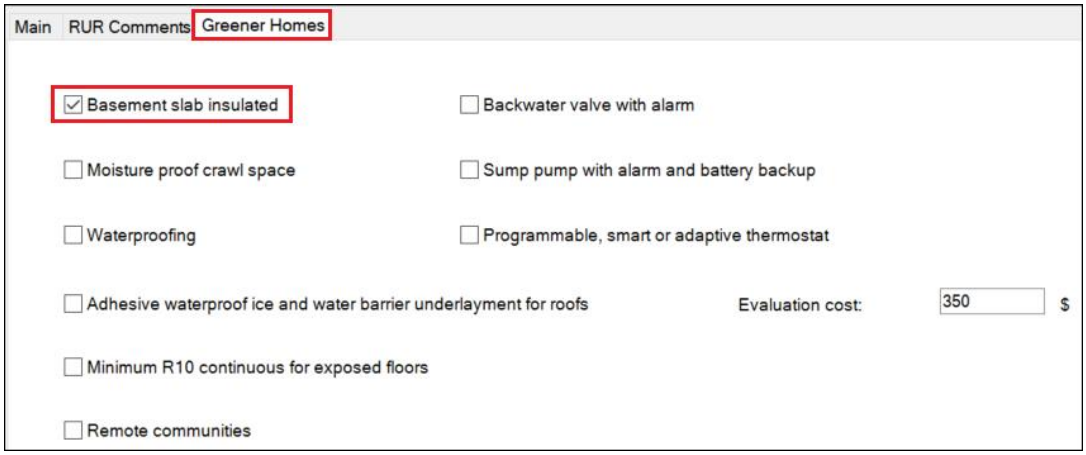


*Figure 5: Post-retrofit file: **Greener Homes** screen with **Basement slab insulated** box checked*

ERS reference for modelling: *HOT2000 User Guide* section 7.9.

Renovation Upgrade Report instructions

Copy the following statement into the **RUR Comments' Foundation** section of HOT2000 along with your personalized text.

RUR statement

Through the Canada Greener Homes Grant initiative, a grant of $400 is available for adding insulation to your basement slab. Adding board insulation on top of the slab can significantly improve the comfort of a basement area. The grant of $400 is available when RSI 0.62 (R-3.5) is added to at least 50% of the slab.

5.1.7 Crawl Space Insulation – Walls and Headers

Guidance on providing recommendations to homeowners

Insulating crawl space walls and headers can reduce energy costs and improve comfort in the occupied space above the crawl space. Increasing crawl space wall and header insulation levels can provide additional protection for plumbing piping and equipment exposed to the crawl space.

A grant is also available for moisture proofing the crawl space floor, walls and headers. Please see section 5.8.4 for guidance on advice to homeowners and HOT2000 modelling for this measure.

For more information on the benefits of insulation as well as considerations, suggestions and tips, refer the homeowner to section 6.3 of *Keeping the Heat In* available on NRCan's website at https://www.nrcan.gc.ca/energy-efficiency/homes/make-your-home-more-energy-efficient/keeping-the-heat/15768.

ERS reference for data collection: *Technical Procedures* sections 3.5.8 to 3.5.10.

Process for HOT2000 modelling

Model the applicable insulation in HOT2000's base and upgrade cases as per ERS procedures. Copy the text provided into the **RUR Comments' Foundation** section of HOT2000.

ERS reference for modelling: *HOT2000 User Guide* section 7.9.2.

Renovation Upgrade Report instructions

Copy the following statement into the **RUR Comments' Foundation** section of HOT2000 along with your personalized text.

RUR statement

Through the Canada Greener Homes Grant initiative, a grant of up to $1,300 is available for adding insulation to crawl space exterior walls and headers. Insulating crawl space walls and headers can reduce energy costs, improve comfort in the occupied space above the crawl space and provide additional protection for plumbing piping and equipment exposed to the crawl space. The grant is available if a minimum of RSI 1.76 (R-10) insulation is added to all exterior crawl space walls and headers.

5.1.8 Crawl Space Insulation – Ceiling

Guidance on providing recommendations to homeowners

Insulating the crawl space ceiling can reduce heating needs and do much to improve comfort in the living quarters above. Where feasible, suggest the installation of continuous board insulation in addition to cavity insulation.

If the homeowner insulates the floor above the crawl space and there is also a basement present in the home, the grant amount for the floor above the crawl space will be pro-rated based on the following calculation:

$$grant\ amount = \$800 \times \frac{crawl\ space\ wall\ area}{total\ foundation\ wall\ area}$$

For example, if the crawl space wall area is equal to 50% of the total foundation wall area, the grant amount for the floor above the crawl space would be $800 x 50% = $400.

For more information on the benefits of insulation as well as considerations, suggestions and tips, refer the homeowner to section 6.3 of *Keeping the Heat In* available on NRCan's website at https://www.nrcan.gc.ca/energy-efficiency/homes/make-your-home-more-energy-efficient/keeping-the-heat/15768.

ERS reference for data collection: *Technical Procedures* sections 3.5.8 to 3.5.10.

Process for HOT2000 modelling

Model the insulation in HOT2000's base and upgrade case as per ERS procedures. Copy the text provided into the **RUR Comments' Foundation** section of HOT2000.

ERS reference for modelling: *HOT2000 User Guide* section 7.9.2.

Renovation Upgrade Report instructions

Copy the following statement into the **RUR Comments' Foundation** section of HOT2000 along with your personalized text.

RUR statement

Through the Canada Greener Homes Grant initiative, a grant of up to $800 is available for adding insulation to crawl space ceilings. Insulating your crawl space ceiling can reduce heating needs and do much to improve comfort in the living quarters above. The grant is available if a minimum of RSI 4.23 (R-24) insulation is added to the entire ceiling.

5.2 Air Sealing

Guidance on providing recommendations to homeowners

There is an excellent opportunity for the energy advisor to engage with the homeowner during the air leakage location identification procedure. During the walk-through, the energy advisor should point out air leakage areas to the homeowner and suggest air-sealing methods and product types. The energy advisor should list the more significant air leakage locations identified during the airtightness test in the "Air leakage locations identified by your energy advisor" box of the RUR, and inform the homeowner so

that they have a better understanding of the areas that would benefit from air sealing. The energy advisor can also inform the homeowner that the air-sealing grant is usually achieved by doing significant renovations or air-sealing activities.

For more information on the benefits of air sealing as well as considerations, suggestions and tips, refer the homeowner to Section 4 of *Keeping the Heat In* available on NRCan's website at https://www.nrcan.gc.ca/energy-efficiency/homes/make-your-home-more-energy-efficient/keeping-the-heat/15768.

Note: If the airtightness test cannot be performed during either the pre- or post-retrofit evaluation of the home because of the presence of exposed vermiculite (amphibole asbestos), the homeowner will not be eligible for an air sealing grant.

ERS reference for data collection: *Technical Procedures* sections 4.6.2.1 and 7.

Process for HOT2000 modelling

Pre-Retrofit Evaluation: Model blower door testing results in the base case as per ERS procedures. In HOT2000, click on **Natural Air Infiltration** and click on the **Add Energy Upgrade** button to recommend achieving the base airtightness target. For the purposes of the Canada Greener Homes Grant, the base air-sealing target automatically generated by HOT2000 is always to be used and is not to be modified. Copy the text provided into the **RUR Comments' Air Seal** section.

Post-Retrofit Evaluation: Model blower door testing results as per ERS procedures.

ERS reference for modelling: *HOT2000 User Guide* section 7.13.

Renovation Upgrade Report instructions

Copy the following statement into the **RUR Comments' Air Seal** section in HOT2000 along with your personalized text.

RUR statement

> Through the Canada Greener Homes Grant initiative, a grant between $550 and $1,000 is available for improving the airtightness of your home based on the level achieved. This is one of the most cost-effective energy-saving measures you can undertake.
>
> An air-sealing grant is available if the airtightness of your home is improved to achieve or exceed the air change rate target proposed above. Achieving any of the targets defined for your home typically requires that the work be performed by an air-sealing professional.

5.3 Windows

Guidance on providing recommendations to homeowners

Replacing old, damaged or leaky windows with new ENERGY STAR certified products can help homeowners save on energy and improve comfort. New windows can also reduce the transfer of sound from the outdoors. The Searchable product list of eligible windows for the Canada Greener Homes Grant differentiates between sliding glass doors and hinged doors, with the former being considered a window. Grants for windows are per rough opening, not the number of windows installed in a rough opening. Replacement of just the glass or sash is not eligible. Skylights are not eligible for grants.

For more information on upgrading windows and doors as well as considerations, suggestions and tips, refer the homeowner to Section 8 of *Keeping the Heat In* available on NRCan's website at https://www.nrcan.gc.ca/energy-efficiency/homes/make-your-home-more-energy-efficient/keeping-the-heat/15768.

ERS reference for data collection: *Technical Procedures* sections 3.5.7 and 4.6.2.3.

Validating window installations

To be eligible for a grant, a window or window unit must be listed on the Searchable product list of eligible windows for the Canada Greener Homes Grant. All windows installed in a single rough opening must be ENERGY STAR certified and meet minimum performance levels. In the case of a multiple-window unit, the grant is based on the window with the lowest performance. For example, if three windows meeting minimum performance levels are installed in one rough opening where two are ENERGY STAR Most Efficient certified and the third is ENERGY STAR certified, the window unit in the rough opening is considered as ENERGY STAR certified and the rebate is valued at $125. If one or more windows in a window unit are not ENERGY STAR Most Efficient certified or ENERGY STAR certified and do not meet minimum performance levels, the entire window unit is ineligible for a grant.

The ENERGY STAR label is the only direct link between the level of certified performance and the window that has been delivered and installed. While some windows may include permanent marks, these markings vary in format and nomenclature across the six certification bodies recognized for certifying windows for sale in Canada.

As such, homeowners are to leave ENERGY STAR certification labels on windows until the time of the post-retrofit evaluation so that the energy advisor can take necessary window and label photos. When ENERGY STAR labels are going to be removed from windows before the post-retrofit evaluation, to be eligible for window grants the homeowner must take a minimum of two photos of each window rough opening as per the following instructions:

1. At least one photograph must show the new ENERGY STAR window installed in the building envelope with a portion of the surrounding wall assembly visible so as to tell one window apart from another. The ENERGY STAR label must also be visible in the photo. Such photos may be taken from the interior, exterior or both. For interior photos, ensure that window treatments are open and that nothing is blocking the view of the label.
2. At least one photograph must show a readable ENERGY STAR label affixed to the window. Typically, a photo sized between 300-500 KB is sufficient. This photo must clearly show the following:
    - ENERGY STAR certification mark
    - Manufacturer model code/number
    - U-factor/Energy Rating
    - NRCan reference number or a Certified Products Directory (CPD) number
    - Certified mark from:
        - Canadian Standards Association (CSA)
        - Intertek Canada
        - Keystone Certifications
        - Labtest Certification (LC)

- QAI Laboratories, or
- National Fenestration Council (NFRC)

Photos taken by homeowners must be provided to the energy advisor at the time of the post-retrofit evaluation.

In exceptional cases where labels are not affixed to windows at the time of the post-retrofit evaluation and the homeowner did not take the photos described in the preceding text, the energy advisor can accept alternate supporting documentation to ensure that the window is on the Searchable product list in the form of an invoice that includes the following details:

- Name of the homeowner and address of the house;
- Date of installation;
- Window make and model numbers;
- NRCan Reference Number;
- Indication of whether windows are ENERGY STAR or ENERGY STAR Most Efficient certified;
- Number of windows and location of each installation;
- U-factor/Energy Rating (ER);
- Itemized cost of each window and total cost of installation; and
- Itemization of any other work done as part of the installation, such as air/gap sealing and associated costs.

In the case that an invoice does not contain the above information, the homeowner will have to contact the supplier/installer to have the invoice re-issued so that all required information is included. As per existing ERS procedures, energy advisors must take wide-angle photos of elevations where windows were replaced and photos of invoices related to performed retrofits at the time of the post-retrofit evaluation. In addition, the photo requirements described in numbered bullets 1 and 2 must be adhered to by the energy advisor so that there is a minimum of two photos per rough opening.

If required documentation is not made available in time for the post-retrofit evaluation to be completed within the 30-day timeframe required under the ERS, the post-retrofit file must be submitted with the windows modelled in such a way so as to not trigger a grant under the Canada Greener Homes Grant initiative as described in the following section under “Post-retrofit evaluation”.

In cases where NRCan approves the grant based on documentation provided by the homeowner, the energy advisor must update the post-retrofit file to trigger the window grant by completing the modelling (i.e. select the confirmed **U-Value** or **ER** factor) based on the submitted documentation. These updates may require intervention through ManuEval.

Note that a window schedule (quote) cannot be used as a substitute for the aforementioned acceptable window validations.

Process for HOT2000 modelling

Pre-retrofit evaluation: In the base case, model windows as per ERS procedures. To recommend the replacement of a window, in the upgrade case check the **ENERGY STAR** box for each window, which will reveal **U-value** radio buttons and an entry field for **ER**. By upgrading a window for which the **ENERGY STAR** box was not checked and subsequently checking the **ENERGY STAR** box, the window will be eligible for a grant if the replacement window is an ENERGY STAR certified or ENERGY STAR certified

Most Efficient model. No additional specificity is required for the U-value or ER until the post-retrofit file.

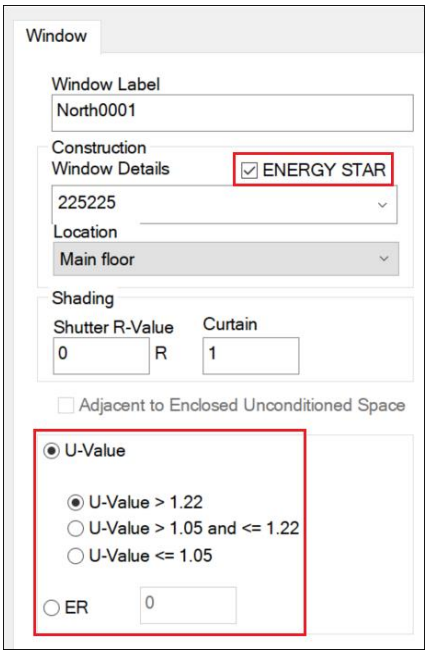


Figure 6: ENERGY STAR box checked in upgrade case to make window eligible for replacement grant

Multiple windows can be recommended for replacement in HOT2000's **Summary View** by selecting the windows, upgrading them, clicking on **EStar**, entering a **New Value** of **1** and clicking on **Change**.

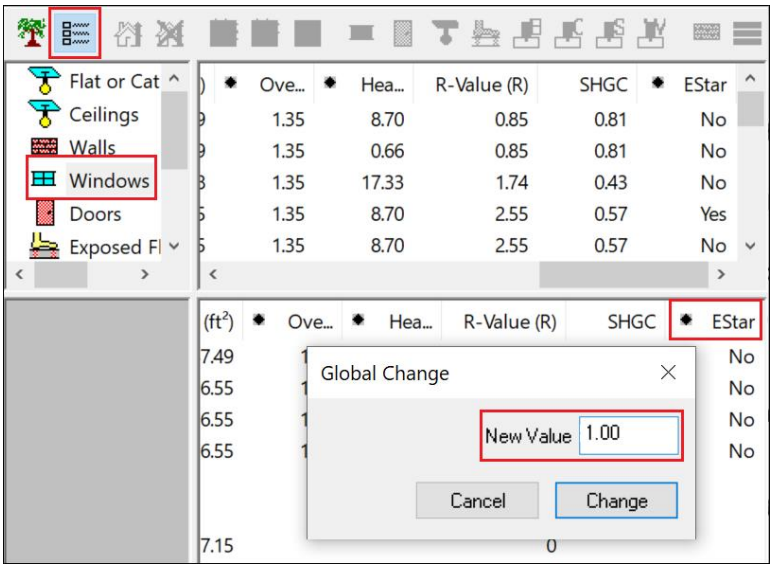


*Figure 7: HOT2000 **Summary View** with **Windows** and **EStar** selected and **New Value** field highlighted*

If a window in the base case has the ENERGY STAR box checked and is recommended for replacement, then in the upgrade case, to be eligible for a grant, either the U-value must be less than or equal to 1.22 or the ER must be greater than or equal to 34. In this scenario, the global upgrade feature cannot be

used and each window must be upgraded individually. Note that ERS procedures do not require the use of the ENERGY STAR box so this scenario need not arise.

If windows are included in the *Renovation Upgrade Report* as recommended upgrades, the energy advisor must advise the homeowner of the label and photo requirements, as outlined in the **RUR statement** provided below.

Copy the text provided into the **RUR Comments' Windows** section of HOT2000.

Post-retrofit evaluation: To determine eligibility, confirm that each new window is included on the Searchable product list of eligible windows for the Canada Greener Homes Grant. If ENERGY STAR labels are still affixed to windows, take all required windows photos as described under the heading, "Validating window installations", bullets 1 and 2 and other supporting documentation and upload these to the portal. If ENERGY STAR labels were removed, ensure that the homeowner provides all required supporting photographs as described above in the procedure for validating window installations and in the **RUR Statement**.

Photograph file names for eligible windows must use the following nomenclature:

- File number
- The word "Window"
- Window orientation as front, back, right or left including numbering if more than one window was replaced for an orientation. E.g. Left1, Left2, Left3.
- The word "Label" if the photo is showing a close-up of an ENERGY STAR label.

For example, if two windows were replaced on the left side of a house, at a minimum files with the following names would be submitted to the portal.

- 98AKEXXXXX-Window-Left1
- 98AKEXXXXX-Window-Left1-Label
- 98AKEXXXXX-Window-Left2
- 98AKEXXXXX-Window-Left2-Label

Note that left and right orientation are determined based on the energy advisor standing in front of the house and facing the house where the left side is to the energy advisor's left and right side is to the energy advisor's right.

Model the upgraded windows in HOT2000 as per ERS procedures. To indicate that windows have been replaced with ones eligible for a grant, check the **ENERGY STAR** box and select the correct **U-value** radio button or specify the **ER** in the base case of the post-retrofit evaluation file. If there are multiple ENERGY STAR certified windows within the same rough opening, select the U-value or specify the ER of the worst performing window within that rough opening. Note that the default setting of **U-value** greater than 1.22 will not trigger a grant.

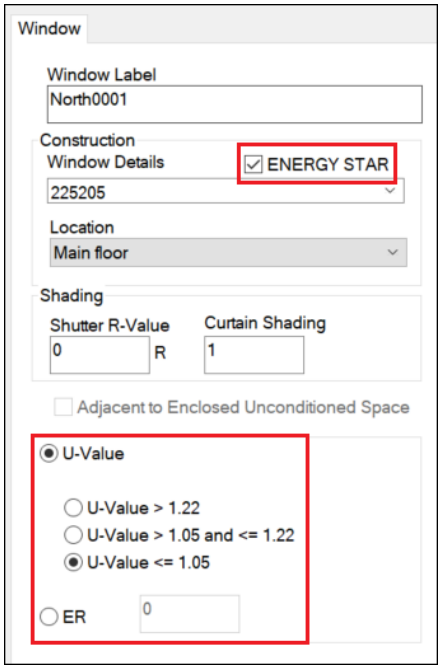


*Figure 8: Window screen with **ENERGY STAR** box checked and **U-value** of new window specified*

When labels are not affixed to windows at the time of the post-retrofit evaluation, or photos of installed windows and labels are not provided by the homeowner, and when sufficient information is not available from the invoice (e.g. NRCan reference number), the windows are considered ineligible under the Canada Greener Homes Grant initiative. However, the windows may still be eligible for grants under provincial/territorial or municipal programs.

For the Canada Greener Homes initiative, the window grant is triggered based on the selection of the **U-Value** or the entered **ER** value, in contrast to many provincial, territorial and municipal programs which use the **ENERGY STAR** box only. When no labels or pictures of them are available at time of the post-retrofit evaluation, the energy advisor may choose to check the **ENERGY STAR** box to indicate eligibility under other programs (provided that sufficient documentation is available). In this case, the default **U-value > 1.22** selection must be used to avoid triggering a grant under the Canada Greener Homes Grant initiative.

ERS reference for modelling: *HOT2000 User Guide* section 7.6.

Renovation Upgrade Report instructions

Copy the following statement into the **RUR Comments' Windows** section of HOT2000 along with your personalized text.

RUR statement

Through the Canada Greener Homes Grant initiative, grants of either $125 or $250 per window rough opening are available when an ENERGY STAR certified or ENERGY STAR certified Most Efficient window is installed to replace an existing window. Replacing old, damaged or leaky windows with new ENERGY STAR certified products can help you save energy, improve comfort and reduce noise. To

determine eligibility of the product you are seeking to purchase, confirm that it is included on the Searchable product list of eligible windows for the Canada Greener Homes Grant.

ENERGY STAR labels must be affixed to windows at the time of installation and remain in place until the time of your post-retrofit evaluation. If ENERGY STAR labels are removed prior to the post-retrofit evaluation, the following photos are your responsibility to acquire, retain and provide to the energy advisor at the time of the post-retrofit evaluation:

A photo of each newly-installed window showing a portion of the surrounding wall assembly from the inside, outside or both, AND

A photo of each ENERGY STAR label affixed to the window that clearly shows the ENERGY STAR certification mark, Manufacturer model code/number, U-factor/Energy Rating, NRCan reference number or a Certified Products Directory (CPD) number, and a Certified mark from one of the following:

- Canadian Standards Association (CSA)
- Intertek Canada
- Keystone Certifications
- Labtest Certification (LC)
- QAI Laboratories
- National Fenestration Council (NFRC)

Removed labels must be submitted and provided to the energy advisor.

Request your supplier/installer to include the following information on the invoice:

- Name of the homeowner and address of the house;
- Date of installation;
- Window make and model numbers;
- NRCan Reference Number;
- Indication of whether windows are ENERGY STAR or ENERGY STAR Most Efficient certified;
- Number of windows and location of each installation;
- U-factor/Energy Rating (ER);
- Itemized cost of each window and total cost of installation; and
- Itemization of any other work done as part of the installation, such as air/gap sealing and associated costs.

Please note that a window schedule (quote) cannot be used as a substitute for the aforementioned acceptable window validations and cannot be submitted to the portal as a standalone document to validate window installation and eligibility. However, the window schedule may be attached to the invoice provided there is a reference on the invoice to a schedule reference number to link the two documents.

5.4 Doors

Guidance on providing recommendations to homeowners

Replacing old, damaged or leaky hinged doors with new ENERGY STAR certified products can help homeowners save energy and improve comfort. Note that a sliding glass door is considered a window. In some cases, the installation of weather stripping may suffice, but in other cases full replacement may be the best energy-saving option, especially with door systems that include glazing.

For more information on upgrading windows and doors as well as considerations, suggestions and tips, refer the homeowner to Section 8 of *Keeping the Heat In* available on NRCan's website at https://www.nrcan.gc.ca/energy-efficiency/homes/make-your-home-more-energy-efficient/keeping-the-heat/15768.

ERS reference for data collection: *Technical Procedures* sections 3.5.7 and 4.6.2.3.

Validating door installations

The door grant applies to the entire door system installed in a rough opening. A door system installed in a rough opening may consist of one or more doors and may include side lights and transoms. Side lights and transoms installed in the rough opening are not eligible for individual grants. To be eligible for a grant, each unique component in the rough opening for a door system must be ENERGY STAR certified and listed on the Searchable product list of eligible doors for the Canada Greener Homes Grant.

The ENERGY STAR label is the only direct link between the level of certified performance and the newly-installed door system. As such, homeowners are to leave ENERGY STAR certification labels on each component of the door system until the time of the post-retrofit evaluation. The validation procedure for door components are the same as for windows. See section 5.3, "Validating window installations" for photo and invoice requirements.

Process for HOT2000 modelling

Pre-retrofit evaluation: Model doors in HOT2000's base case as per ERS procedures. Ensure that the ENERGY STAR box is not checked in the pre-retrofit's base case. To recommend a retrofit, in the upgrade case select the ENERGY STAR box for the door. Copy the text provided into the **RUR Comments' Doors** section of HOT2000.

Post-retrofit evaluation: To determine eligibility, confirm that each unique component of the door system is included on the Searchable product list of eligible doors for the Canada Greener Homes Grant. Ensure to collect proof of the efficiency of each component such as photos of the ENERGY STAR label. Model the upgraded door in HOT2000 as per ERS procedures. For each door system that is on the Searchable product list, in the **Door** screen, check the **ENERGY STAR** box as shown in Figure 9. Do not check the **ENERGY STAR** box for transoms, side lights and door lights to avoid triggering a separate grant (see Figure 10).

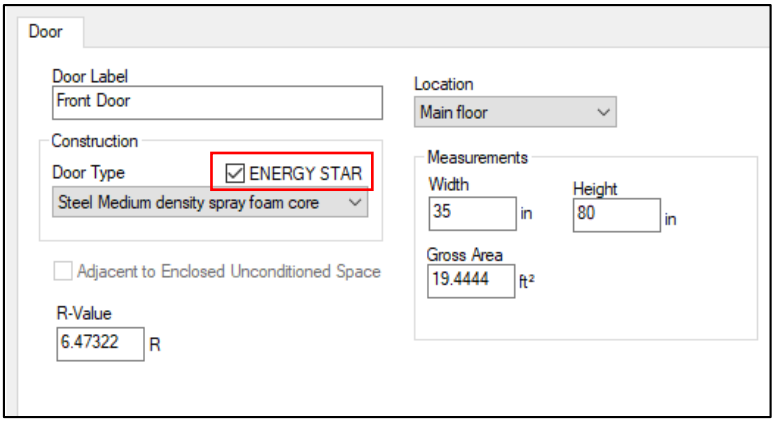


*Figure 9: **Door** screen with **ENERGY STAR** box checked*

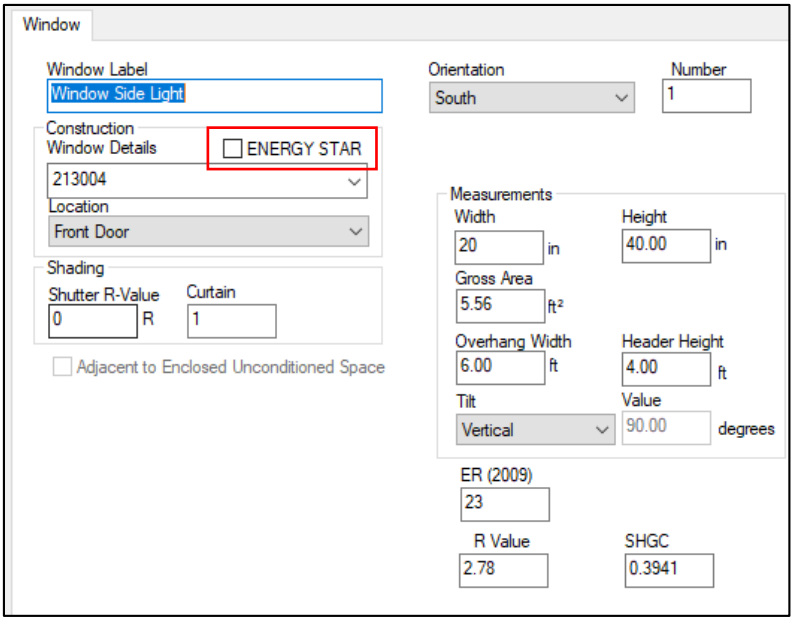


*Figure 10: Side light to be modelled as a **Window Side Light** with **ENERGY STAR** box not checked*

ERS reference for modelling: *HOT2000 User Guide* section 7.7.

Renovation Upgrade Report instructions

Copy the following statement into the **RUR Comments' Doors** section of HOT2000 along with your personalized text.

RUR statement

Through the Canada Greener Homes Grant initiative, a grant of $125 per hinged door system is available when an eligible ENERGY STAR certified door or door system is installed. Replacing old, damaged or leaky hinged doors with new ENERGY STAR certified products can help you save energy and improve comfort. The door grant applies to the entire door system installed in a rough opening. A door system installed in a rough opening may consist of one or more doors and may include side lights and transoms. Side lights and transoms installed in the rough opening are not eligible for individual grants. To determine the eligibility of the product(s) you are seeking to purchase, confirm that each product is included on the Searchable product list of eligible doors for the Canada Greener Homes Grant.

ENERGY STAR labels must be affixed to each component of the door system at the time of installation and remain in place until the time of your post-retrofit evaluation. If ENERGY STAR labels are removed prior to the post-retrofit evaluation, the following photos are your responsibility to acquire, retain and provide to the energy advisor at the time of the post-retrofit evaluation.

A photo of each newly-installed door system showing a portion of the surrounding wall assembly from the inside, outside or both, AND

A photo of each ENERGY STAR label affixed to each component of the door system that clearly shows the ENERGY STAR certification mark, Manufacturer model code/number, U-factor/Energy Rating, NRCan reference number or a Certified Products Directory (CPD) number, and a Certified mark from one of the following:

- Canadian Standards Association (CSA)
- Intertek Canada
- Keystone Certifications
- Labtest Certification (LC)
- QAI Laboratories
- National Fenestration Council (NFRC)

Removed labels must be submitted and provided to the energy advisor.

Request your supplier/installer to include the following information on the invoice:

- Name of the homeowner and address of the house;
- Date of installation;
- Make and model numbers of each door component (door leaf, side light, transom);
- NRCan Reference Number;
- Indication of whether door system components are ENERGY STAR certified;
- Number of door system components and location of each installation;
- U-factor/Energy Rating (ER);
- Itemized cost of each door system component and total cost of installation; and
- Itemization of any other work done as part of the installation, such as air/gap sealing and associated costs.

Please note that a door schedule (quote) cannot be used as a substitute for the aforementioned acceptable door systems validations and cannot be submitted to the portal as a standalone document to validate door systems installation and eligibility. However, as for windows, the door schedule may be attached to the invoice provided there is a reference on the invoice to a schedule reference number to link the two documents.

5.5 Thermostat

Guidance on providing recommendations to homeowners

The Canada Greener Homes Grant initiative offers a grant for the replacement of one manual thermostat with a programmable or smart/adaptive thermostat. This measure must be combined with another energy efficiency measure from the Canada Greener Homes Grant initiative.

Exclusions: New heat pumps are installed with new thermostats and cannot be combined with this measure. A resiliency measure and a thermostat must be combined with another energy efficiency measure in order to qualify for the grants.

Process for HOT2000 modelling

Pre-retrofit evaluation: In the upgrade case, recommend the installation of a programmable or smart/adaptive thermostat. Check the **Smart thermostats** box in the **Upgrades** screen. Copy the provided text into the **RUR Comments** section of HOT2000 where most appropriate.

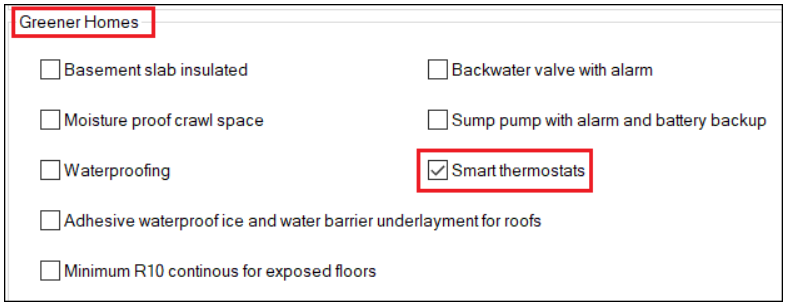


*Figure 11: Pre-retrofit file: **Greener Homes** screen with **Smart thermostats** box checked*

Post-retrofit evaluation: To satisfy eligibility requirements, document the presence of the thermostat by taking a picture of the new thermostat and invoice. To model the new thermostat, check the **Programmable, smart or adaptive thermostat** box in the **Greener Homes** screen.

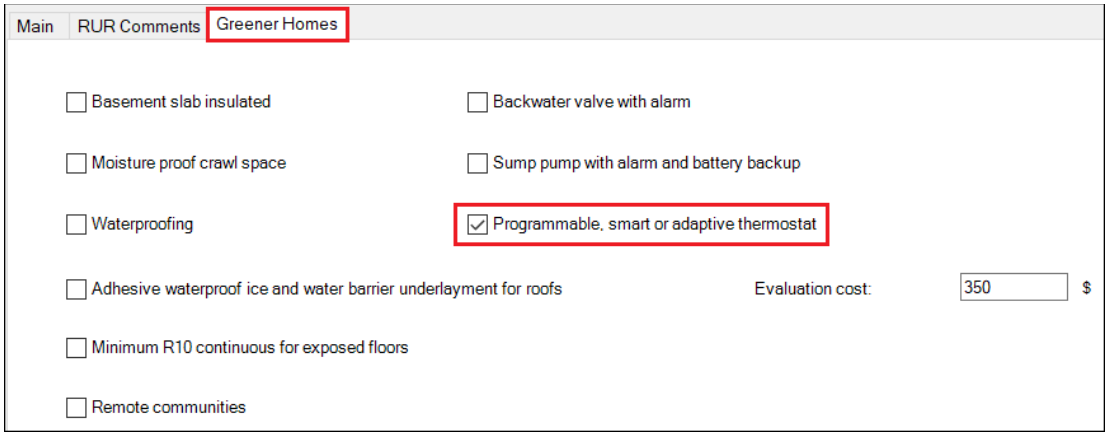


*Figure 12: Post-retrofit file: **Greener Homes** screen with **Programmable, smart or adaptive thermostat** box checked*

Renovation Upgrade Report instructions

Copy the following statement into the **RUR Comments' Thermostats** section of HOT2000 along with your personalized text.

RUR statement

Through the Canada Greener Homes Grant initiative, a grant of $50 is available for replacing one manual thermostat with a programmable or smart/adaptive thermostat.

5.6 Space and Water Heating

5.6.1 Ground Source Heat Pumps – Whole System

Guidance on providing recommendations to homeowners

A ground source heat pump system (GSHP) will reduce heating and cooling costs. These systems are expensive and installation is not always feasible depending on the location of the dwelling and other considerations. Typically, the energy advisor will recommend the installation of a GSHP system because the homeowner has done the research and is considering installing one.

ERS reference for data collection: *Technical Procedures* sections 3.5.19, 4.6.3.1 and 4.6.3.2.

Process for HOT2000 modelling

Pre-retrofit evaluation: Model the existing heating equipment in HOT2000's base case as per ERS procedures. In the upgrade case, model the ground source heat pump based on the HOT2000 default values along with the following specifications.

For open systems:

- **Heating Efficiency COP** of 3.6
- **Cooling Efficiency COP** of 4.75

For closed loop systems:

- **Heating Efficiency COP** of 3.1
- **Cooling Efficiency COP** of 3.93
- **Temp. Rating Type** of **0.0 C (32F)**

In this way, the *Renovation Upgrade Report* will provide an indication of how this upgrade will impact the house's rating. If specifications are known for a specific model that the homeowner intends to install, these may be used. An exception to these instructions is when a GSHP exists in the base case, in which case the upgrade case COP must be higher in order to trigger a grant.

As per ERS procedures, ensure that the **CAN/CSA-C448** box is checked so that the upgrade will appear in the *Renovation Upgrade Report*. Copy the text provided into the **RUR Comments' Heating System** section of HOT2000.

Post-retrofit evaluation: Model the ground source heat pump system as per ERS procedures along with the following steps. Enter the AHRI number in the new **AHRI** field that has been added to HOT2000. Figure 13 shows all required fields in boxes. Enter data in the red boxes using data extracted from the Searchable product list of eligible ground source heat pumps for the Canada Greener Homes Grant, and in the blue boxes as per regular procedures.

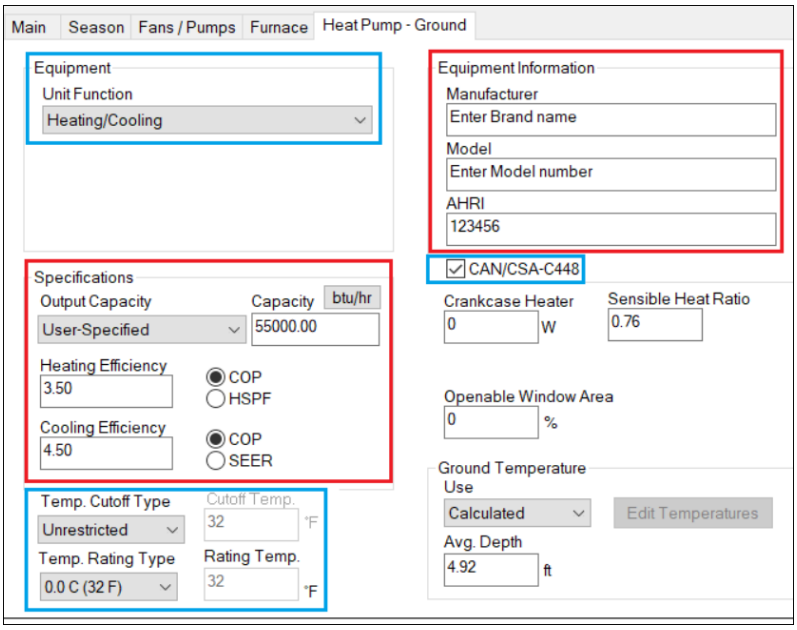


Figure 13: ***Heat Pump – Ground*** *screen*

ERS reference for modelling: *HOT2000 User Guide* section 7.14.9.1.

Renovation Upgrade Report instructions

Copy the following statement into the **RUR Comments' Heating System** section of HOT2000 along with your personalized text.

RUR statement

> Through the Canada Greener Homes Grant initiative, a grant of $5,000 is available for installing a new ground source heat pump – full system. Consult with a ground source heat pump professional to determine if this type of system is practical for you.
>
> To determine the eligibility of the product you are seeking to purchase, confirm that it is included on the Searchable product list of eligible ground source heat pumps for the Canada Greener Homes Grant.

5.6.2 Ground Source Heat Pumps – Heat Pump Replacement Only

Guidance on providing recommendations to homeowners

Recommend the replacement of a GSHP system's heat pump unit if the homeowner is considering replacing theirs.

ERS reference for data collection: *Technical Procedures* sections 3.5.19, 4.6.3.1 and 4.6.3.2.

Process for HOT2000 modelling

Pre-retrofit evaluation: Model the existing heating equipment in HOT2000's base case as per ERS procedures. Specify the **Temp. Rating Type** as **0.0 C (32 F)**. In the upgrade case, ensure that the **CAN/CSA-C448** box is checked and that the **Heating Efficiency** and **Cooling Efficiency COP** radio buttons are selected so that the upgrade will appear in the *Renovation Upgrade Report*. Also, ensure that the **Heating Efficiency** COP is greater in the upgrade case than in the base case. Copy the text provided into the **RUR Comments' Heating System** section of HOT2000. It is advisable to enter efficiencies consistent with the grant criteria. In this way, the *Renovation Upgrade Report* will provide an indication of how this upgrade will impact the house's rating.

Post-retrofit evaluation: Model the ground source heat pump system as per ERS procedures with the following exceptions. Enter the AHRI number in the **AHRI** field. Specify the **Temp. Rating Type** as **0.0 C (32 F)**. Figure 14 shows all required fields in boxes. Enter data in the red boxes using data extracted from the Searchable product list of eligible ground source heat pumps for the Canada Greener Homes Grant, and in the blue boxes as per regular procedures.

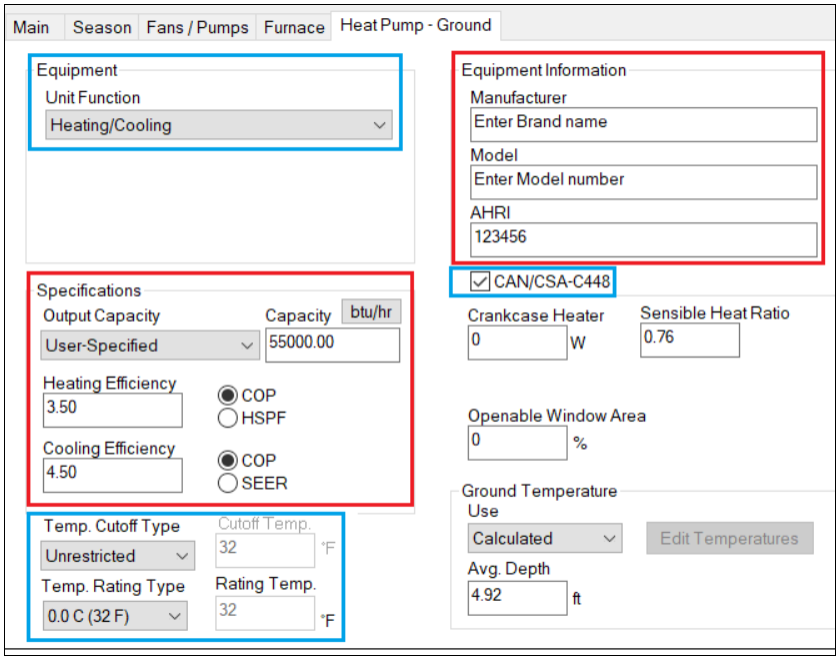


*Figure 14: **Heat Pump – Ground** screen*

ERS reference for modelling: *HOT2000 User Guide* section 7.14.9.1.

Renovation Upgrade Report instructions

Copy the following statement into the **RUR Comments' Heating System** section of HOT2000 along with your personalized text.

RUR statement

Through the Canada Greener Homes Grant initiative, a grant of $3,000 is available for replacing the heat pump of an existing ground source heat pump system. To determine the eligibility of the product you are seeking to purchase, confirm that it is included on the Searchable product list of eligible ground source heat pumps for the Canada Greener Homes Grant.

5.6.3 Air Source Heat Pumps and Cold Climate Air Source Heat Pumps

Guidance on providing recommendations to homeowners

It is the responsibility of the energy advisor to recommend the installation of an air source heat pump when appropriate. The energy advisor may recommend the installation of an air source heat pump if the homeowner has done the research and is considering installing one. However, the energy advisor is not responsible for providing advice to the homeowner on the type of heat pump that would be best suited to the home; for example, an air-source heat pump (ASHP) vs. a cold-climate air source heat pump (ccASHP). The energy advisor may consider highlighting both types of heat pumps in circumstances where the homeowner expects to operate the unit year round in very cold regions.

If the homeowner decides to pursue a recommendation to install an air source heat pump, the mechanical system contractor will assist the homeowner with the selection of a heat pump model best suited to the home.

The Canada Greener Homes Grant initiative requires that the heat pump system is capable of distributing heat throughout the entire conditioned space in the house, including the basement. This applies regardless of whether the heat pump system is a centrally ducted, mini- or multi-split ducted or ductless system.

The mechanical system contractor is responsible for specifying (including load calculations, sizing and selection) and installing the new heat pump system to meet this requirement. The mechanical system contractor is not required to submit their design documentation to the energy advisor.

The energy advisor is responsible for conducting the on-site energy evaluation, data collection and HOT2000 modelling. The energy advisor must follow the Canada Greener Homes Grant Energy Advisor Guidance Manual; unless otherwise specified in the manual, the energy advisor shall use guidance provided in the *EnerGuide Rating System Technical Procedures* and *HOT2000 User Guide* and the *ERS Program Bulletins*.

The heat pump system is not typically sized to deliver 100% of the peak heating load as this could lead to an oversized system that frequently cycles on/off. Mechanical contractors should design a system that optimizes the energy savings for a house and increases the comfort of occupants. Based on the house-as-a-system, the design should account for the anticipated reductions in heating requirements due to other planned energy efficiency upgrades to the building envelope, such as the installation of insulation, window replacement or air sealing retrofits, in order to avoid oversizing the unit. While heat pump systems can also provide air conditioning in the summer, air conditioning considerations are secondary in the sizing of system design. It is recommended that NRCan's air source heat pump sizing and selection tool be used by the mechanical contractor to determine the optimal sizing needs. The tool can be accessed at https://www.nrcan.gc.ca/maps-tools-and-publications/tools/modelling-tools/toolkit-for-air-source-heat-pump-sizing-and-selection/23558.

Heat pumps for which a grant is provided can be a first-time installation of a heat pump system or a replacement of an existing heat pump system. The heat pump system could work as a standalone system or in conjunction with an existing backup heating system (see the sections on Centrally ducted systems and Hybrid systems). Note that the backup system is not eligible for the grant; only the heat pump system would receive the grant.

A new heat pump system can be integrated into an existing heat pump system. However, only the new system is eligible for a grant, provided that it meets all eligibility requirements, and the new and existing systems together distribute heat throughout the entire conditioned space in the home, including the basement.

All components of a heat pump system (indoor and outdoor units, and furnace or air handling unit) must be compatible and listed together as an eligible product in the Searchable product list of eligible heat pumps for the Canada Greener Homes Grant. The grant amount is then based on the type of system installed (ASHP or ccASHP). For mini- or multi-split ducted or ductless systems, the grant amount is also based on the number of new warm air supply outlets (registers) or indoor heads installed.

Centrally ducted systems

In a central heat pump system, the matching outdoor and indoor units and circulating fan component are connected to the central ducting system of the house, with controls for automatic heating function.

In the case where a central heat pump will be installed, examples of eligible configurations are listed below:

- **Example 1:** Homeowner intends to replace an existing heat pump system and an existing furnace with a new heat pump system and a new furnace as a backup system in very cold temperatures (-8°C or colder)
- **Example 2:** Homeowner intends to replace an existing heat pump system with a new heat pump system or install a new central heat pump system and keep the existing furnace as a back-up system in very cold temperatures (-8°C or colder)

If the homeowner wants to use an existing furnace, it must be used in combination with the heat pump components that it was rated with, as listed in the Searchable product list. The mechanical system contractor/designer is responsible for confirming system compatibility and eligibility with the equipment manufacturers.

To determine if the existing furnace is on the Searchable product list, under "Model Criteria", select the brand of the furnace, type the model number into the "Furnace model" field, and then click "Search".

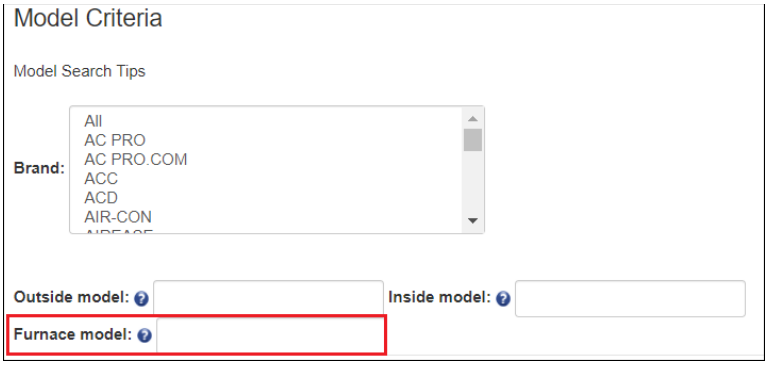


Figure 15: Screenshot of the Searchable product list webpage with Furnace model field highlighted

The complementary indoor and outdoor units of the heat pump system selected for installation should appear in the search results. If all three components are on the same row of the Searchable product list for heat pumps, the heat pump system will be eligible for a grant, provided that it meets all other eligibility criteria.

Hybrid systems

Hybrid systems are composed of a heat pump component and a backup fossil fuel component (in North America, usually a furnace), under a single optimized control strategy. The heat pump system operates as the main heating system, only switching to the backup fossil fuel system when the heat pump system has insufficient capacity and/or it is economically beneficial to do so.

Hybrid systems could be appropriate in cases such as:

- The homeowner wants to operate the heat pump during shoulder seasons and during the majority of the winter season and then operate the fossil fuel system during very cold winter temperatures;
- The homeowner is interested in heat pumps for energy efficiency, has access to low gas utility rates, and would like to have flexibility of a dual-fuel system.

In a typical (basic) hybrid system design, the heat pump is paired with a furnace component, and both are connected to an automated control system where a balance point or cut-off temperature is set (e.g. -8 °C or colder). The heat pump would distribute heat to the entire home during the bulk of the heating days, and then the furnace would distribute heat to the entire home for days when it is colder than the cut-off temperature.

In a more complex hybrid system design with a smart controller, the trigger to switch between the heat pump and the furnace depends on additional parameters, including utility costs, greenhouse gas emissions, energy consumption, and home comfort levels.

Only the heat pump component of a hybrid system is eligible for a grant.

Mini-split and multi-split systems

Multiple configurations of mini-split and multi-split systems are acceptable under the initiative:

- One or more multi-splits (one outdoor unit, multiple indoor heads)
- Two or more mini-splits (one outdoor unit, one indoor head)
- A combination of one or more multi-splits and one or more mini-splits

For the purposes of the grant calculation, combinations of mini- and multi-split systems will be considered one combined system, with the total number of warm air supply outlets and/or indoor heads used to determine the grant amount. The combined system must have a minimum combined total rated heating capacity at 8.3°C of 3.52kW (12,000 Btu/h) and be capable of distributing heat throughout the entire conditioned space in the house, including the basement.

Some mini-split units can be part of a mini-split ducted system. The grant amount for mini-split ducted systems is based on the number of warm air supply outlets that are part of the ducting connected to the newly installed mini-split ducted system. During an energy evaluation, energy advisors will need to take note of the number of warm air supply registers that are part of the ducting connected to the installed mini-split ducted system. In the HOT2000 file, mini-split ducted systems are to be modelled following the current procedures for ductless units, with the number of warm air supply outlets entered in the **Number of heads** field.

Exception: If the mini-split ducted heat pump system is determined to not be capable of distributing heat throughout the entire house as per the below procedure for validating heat pump installations, enter "1" in the **Number of heads** field to avoid triggering a grant. See the Process for HOT2000 modelling: Post-retrofit evaluation section for more details.

Validating heat pump installations

When assessing a new heat pump system during the post-retrofit evaluation, in addition to collecting all information required by the *ERS Technical Procedures*, the energy advisor needs to validate that the heat pump system meets all of the following criteria:

The newly installed heat pump unit(s)

- matches the model invoiced
- is listed in the Searchable product list of eligible heat pumps for the Canada Greener Homes Grant
- was installed in the time between the pre- and post-retrofit evaluations

- have a minimum combined total rated heating capacity at 8.3°C of 3.52kW (12,000 Btu/h)
- for a ductless heat pump system have a minimum of two indoor heads installed
    - In the case where a new heat pump has been installed in addition to an existing heat pump system, the new heat pump must have a minimum of two eligible new indoor heads installed

To validate that a heat pump is distributing heat throughout the entire house or duplex, a minimum of one warm air supply outlet and/or indoor head is required on every storey of each dwelling unit, including foundations where the distance from the top of the floor slab to the bottom of the ceiling joist is 1.8 m or higher. This applies regardless of whether or not there is an existing back up heating system. For example, in a bungalow with a basement suite (i.e. MURB duplex) where part of the basement is dwelling 1 and where the remainder of the basement together with the main floor make up dwelling 2, three heads are required. A head is required in dwelling 1, and one on each storey of dwelling 2.

For houses with multiple levels, at least one warm air supply outlet and/or indoor head is required on each level (i.e. each level of a split level, mezzanine level, etc.).

Reminder of existing ERS procedure: Energy advisors must take photos of the invoices and the newly installed equipment related to performed retrofits at the time of the post-retrofit evaluation. Pictures of the newly installed equipment will have to be uploaded along with the HOT2000 file.

ERS reference for data collection: *Technical Procedures* sections 3.5.19, 4.6.3.1 and 4.6.3.2.

Process for HOT2000 modelling

The **HeatPump - Air** screen includes a **Cold Climate Heat Pump** box that is used to recommend the installation of a cold climate heat pump in the upgrade case of the pre-retrofit file and to indicate that one has been installed in the base case of the post-retrofit file.

Pre-retrofit evaluation: Model the existing heating equipment in HOT2000's base case as per ERS procedures along with the following instructions. In the context of the Canada Greener Homes initiative, recommending the installation of a GSHP, ASHP or ccASHP will enable the homeowner to be eligible for any of these heat pumps. To recommend an ASHP, you must select either the **ENERGY STAR** or **Cold Climate Heat Pump** box. If an ASHP is present in the base case, ensure that the COP is greater in the upgrade case.

Regardless of whether the homeowner has an ASHP, ccASHP or GSHP installed at the time of the post-retrofit evaluation, as long as one of these is recommended for upgrade, the homeowner will be eligible for either grant. It is advisable to enter efficiencies consistent with the grant criteria so that they will be displayed in the RUR.

Post-retrofit evaluation: In addition to modelling the heat pump according to ERS procedures, enter the AHRI number in the **AHRI** field. Depending on the type of heat pump as shown in the Product Group row of the Searchable product list of eligible heat pumps for the Canada Greener Homes Grant (see Figure 16), check the appropriate box(es):

- If the Product Group is "ccASHP", check the **Cold Climate Heat Pump** box.
- If the Product Group is "ASHP" and thus the heat pump is ENERGY STAR certified, check the **ENERGY STAR** box.
    - If this heat pump unit is also a ccASHP (e.g. a ccASHP with HSPF ≥ 10 but COP < 1.8 and/or Capacity Maintenance < 70%), also check the **Cold Climate Heat Pump** box

- For an ENERGY STAR certified heat pump that is not listed in the Searchable product list (e.g. an ASHP with HSPF < 10), the **ENERGY STAR** box does not need to be checked unless required by a provincial/territorial or municipal program.

Brand	
Outside model	
Inside model	
Furnace model	
HSPF (Region IV)	15
Rated heating capacity (Btu/hour)	10000
Grant amount	$2,500: 2 indoor heads; $5,000: >=3 indoor heads
AHRI / Verification reference	201 xxxxxx
Product group	ccASHP
AHRI Classification	
Series name/product line (if applicable)	
SEER	42
Rated cooling capacity (Btu/hour)	9000
Coefficient of Performance (COP) at -15 °C (5 °F) (at maximum capacity)	2.01
Capacity Maintenance % (Max -15°C/5°F ÷ Rated 8.3°C/47°F)	130

Figure 16: Screenshot of the Searchable product list result webpage with the Product Group row highlighted

For a ccASHP (any heat pump listed in the Northeast Energy Efficiency Partnerships (NEEP) Cold Climate Air Source Heat Pump List), enter data in each of the **Cold Climate Heat Pump** fields as seen in Figure 17 using information from the Searchable product list when available; otherwise, use information from the NEEP List. If multiple new heat pumps are installed, enter the data for the heat pump with the highest capacity.

- In the **Heating Efficiency** field, the HSPF for Region IV must be entered as shown on the Searchable product list and not modified to reflect Region V.
- The **Capacity** field is for the rated heating capacity at 8.3 °C (47 °F) and not for cooling. When multiple units are required to meet the minimum capacity of 12,000 Btu/h, enter the sum of the eligible units. Otherwise enter the capacity of the largest unit.
- If the ccASHP is not on the Searchable product list, enter "0" in the **Capacity Maintenance** field to avoid triggering the ccASHP grant.

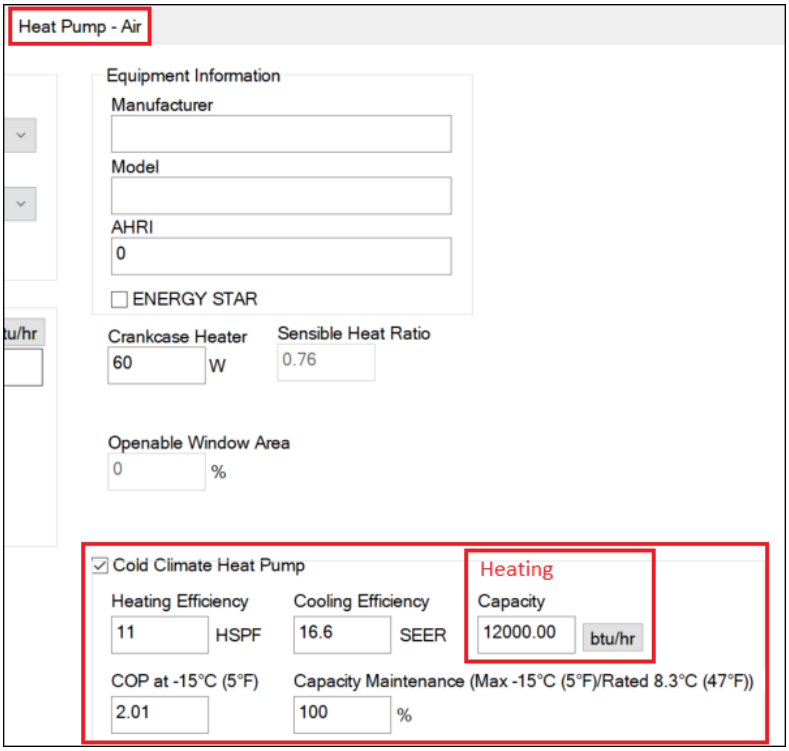


*Figure 17: **Heat Pump – Air** screen with **Cold Climate Heat Pump section** highlighted*

To model mini- or multi-split heat pumps, either ASHP or ccASHP, in addition to the preceding instructions, from the **Central Equipment Type** drop-down menu select **Mini-split ductless** and enter the number of newly installed heads in the **Number of heads** field.

If the newly installed system includes mini- or multi-split ducted units, each warm air supply outlet connected to the ducted indoor unit is considered equivalent to an indoor head. In the case of multi-split units where additional indoor heads (e.g. wall cassettes) are also connected in combination with the ducted unit, those should also be included in the final count of the total number of heads.

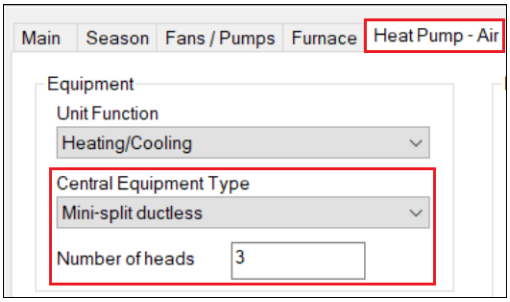


*Figure 18: **Heat Pump – Air** screen with **Central Equipment Type** dropdown highlighted*

The newly installed system could be comprised of a combination of ASHP and ccASHP mini- and multi-split heat pumps. Energy advisors will need to take note of the number of indoor heads from newly installed eligible heat pumps. In order to ensure the appropriate grant is triggered, use the following tables to determine the values that are to be entered in HOT2000 for the **Number of heads** and the **Capacity Maintenance** fields. Table 2 is for provinces and territories outside of Quebec and Nova Scotia, while Table 3 is for Quebec and Nova Scotia.

Exception: If the ductless heat pump system is determined to not be capable of distributing heat throughout the entire house as per the above procedure for validating heat pump installations, enter "1" in the **Number of heads** field to avoid triggering a grant.

Table 2: Grant amounts for combinations of heat pump systems (outside of Quebec and Nova Scotia)

# of heads from eligible ASHP systems	# of heads from eligible ccASHP systems	Grant amount	Number of heads field to be entered in HOT2000	Capacity Maintenance field to be entered in HOT2000
ASHP only systems				
1	0	$0	1	N/A
2	0	$2,500	2	N/A
3	0	$4,000	3	N/A
ccASHP only systems				
0	1	$0	1	Actual
0	2	$2,500	2	Actual
0	3	$5,000	3	Actual
Combination of ASHP and ccASHP systems				
1	1	$2,500	2	Actual
1	2	$4,000	3	0
1	3	$5,000	4	Actual
2	1	$4,000	3	0
2*	2	$4,000	4	0
2	3	$5,000	5	Actual
3	1	$4,000	4	0
3	2	$4,000	5	0
3	3	$5,000	6	Actual

* In this scenario, the homeowner installed 2 ENERGY STAR ASHP indoor heads and 2 ccASHP indoor heads. If this system is capable of distributing heat throughout the entire house as per the procedure for validating heat pump installations, enter "4" in the **Number of heads** field and "0" in the **Capacity Maintenance** field. This would trigger the $4,000 grant, as there are fewer than 3 ccASHP indoor heads, which is required for the $5,000 grant. By contrast, if this system is determined to not be capable of distributing heat throughout the entire house, enter "1" in the **Number of heads** field to avoid triggering a grant.

Table 3: Grant amounts for combinations of heat pump systems for Quebec and Nova Scotia

# of heads from ASHP systems	# of heads from eligible ccASHP systems	Grant amount	Number of heads field to be entered in HOT2000	Capacity Maintenance field to be entered in HOT2000
ASHP only systems				
1	0	$0	1	N/A
2	0	$0	1	N/A
3	0	$0	1	N/A
ccASHP only systems				
0	1	$0	1	Actual
0	2	$2,500	2	Actual
0	3	$5,000	3	Actual
Combination of ASHP and ccASHP systems				
1	1	$0	1	Actual
1	2	$2,500	2	Actual
1	3	$5,000	3	Actual
2	1	$0	1	Actual
2	2	$2,500	2	Actual
2	3	$5,000	3	Actual
3	1	$0	1	Actual
3	2	$2,500	2	Actual
3	3	$5,000	3	Actual

As per the *HOT2000 User Guide* section 7.14.9.1, if there are multiple heat pumps, enter the **Manufacturer**, **Model number**, and details of the system with the highest capacity. Enter the details of each additional heat pump into **Info 6** in the following format: manufacturer name; AHRI number; outdoor unit (condenser coil) model; indoor unit (evaporator coil) model.

Copy the text provided into the **RUR Comments' Heating System** section of HOT2000.

For more details on these procedures, as well as additional guidelines and examples, refer to Appendix A: Modelling air source heat pumps (ASHPs) and cold climate air source heat pumps (ccASHPs) in HOT2000.

ERS reference for modelling: *HOT2000 User Guide* section 7.14.9.1.

Renovation Upgrade Report instructions

Copy the following statement into the **RUR Comments' Heating System** section of HOT2000 along with your personalized text.

RUR statement

Through the Canada Greener Homes Grant initiative, a grant between $2,500 and $5,000 is available for installing a new ENERGY STAR certified air source heat pump (ASHP) or cold climate air source heat pump (ccASHP) system. The grant amount is based on the type and configuration of the heat pump system: $2,500 is available for mini- or multi-split systems with two indoor heads, $4,000 is

available for ENERGY STAR certified ASHP central systems or mini- or multi-split systems with a minimum of three indoor heads, and $5,000 is available for ccASHP central systems or mini- or multi-split systems with a minimum of three indoor heads. Speak with a mechanical system contractor/designer for recommendations on the type of heat pump system that is best suited for your home.

Depending upon the region in which you live and how you heat your home today, the installation of a heat pump may result in lower or higher utility costs. Consult with a mechanical system contractor to determine if this type of system is practical and the right choice for your circumstances.

The Canada Greener Homes Grant initiative requires that the heat pump system is capable of distributing heat throughout the entire conditioned space in the home, including the basement. This applies regardless of whether the heat pump system is a centrally ducted, mini- or multi-split ducted or ductless system. The sizing and selection of the heat pump is to be determined in consultation with the mechanical system contractor and a sizing guide tool, such as the one offered by Natural Resources Canada.

To determine the eligibility of the product you are seeking to purchase, use the AHRI number and make and model of the indoor and outdoor units provided by the mechanical system contractor to confirm that it is included on the Searchable product list of eligible heat pumps for the Canada Greener Homes Grant.

5.6.4 Domestic Hot Water Equipment

Guidance on providing recommendations to homeowners

It is the responsibility of the energy advisor to recommend the installation of a heat pump water heater when appropriate. Non-ducted heat pump water heaters require adequate airflow to operate properly, so they cannot be located in tight or confined spaces unless provision is made for adequate airflow. Heat pump water heaters transfer heat from the indoor air to the water and thereby have the potential to reduce room temperatures which increases heating requirements somewhat during the heating season. At the same time, the equipment may remove moisture from the air while cooling it, which can be beneficial during the non-heating season. If a heat pump water heater is recommended in addition to a heat pump, its presence should be considered in the sizing of the heating system. The energy advisor should take these factors into consideration along with the homeowner's input when determining whether to recommend this retrofit.

ERS reference for data collection: *Technical Procedures* sections 3.6 and 4.6.3.3.

Process for HOT2000 modelling:

Pre-retrofit evaluation: Model the existing water heater in HOT2000's base case as per ERS procedures. In the upgrade case, recommend an **Integrated heat pump**, check the **ENERGY STAR** box, enter an **Energy Factor** of 0.9 and when a heat pump water heater was modelled in the base case, ensure that the **HP COP** is greater in the upgrade case. If a hot water heat pump is already present, ensure that the COP in the upgrade case is greater than the COP in the base case. Copy the text provided into the **RUR Comments' Hot Water System** section of HOT2000.

Post-retrofit evaluation: To determine eligibility, confirm that the system is ENERGY STAR certified and included on the Searchable product list of eligible heat pump water heaters for the Canada Greener Homes Grant. Once confirmed, make note of the corresponding "ENERGY STAR Unique ID".

Brand	
Model	T*-*****
UEF	3.48
Storage volume (gallons)	75
ENERGY STAR Unique ID	1234567
Model Name	T*-*****
First hour rating (gallons/hr)	87
Draw pattern	High Usage

Figure 19: Screenshot of the Searchable product list result webpage with the ENERGY STAR Unique ID row highlighted

Model the heat pump water heater as per ERS procedures but in addition, ensure that the **ENERGY STAR** box is checked and the "ENERGY STAR Unique ID" is included in the **Model** field in the format shown in Figure 20 (i.e. ES followed by the ID number taken from the list of eligible equipment). Figure 20 shows all required fields in boxes. Enter data in the red boxes using data extracted from the Searchable product list of eligible products for the Canada Greener Homes Grant and in the blue boxes as per regular ERS procedures.

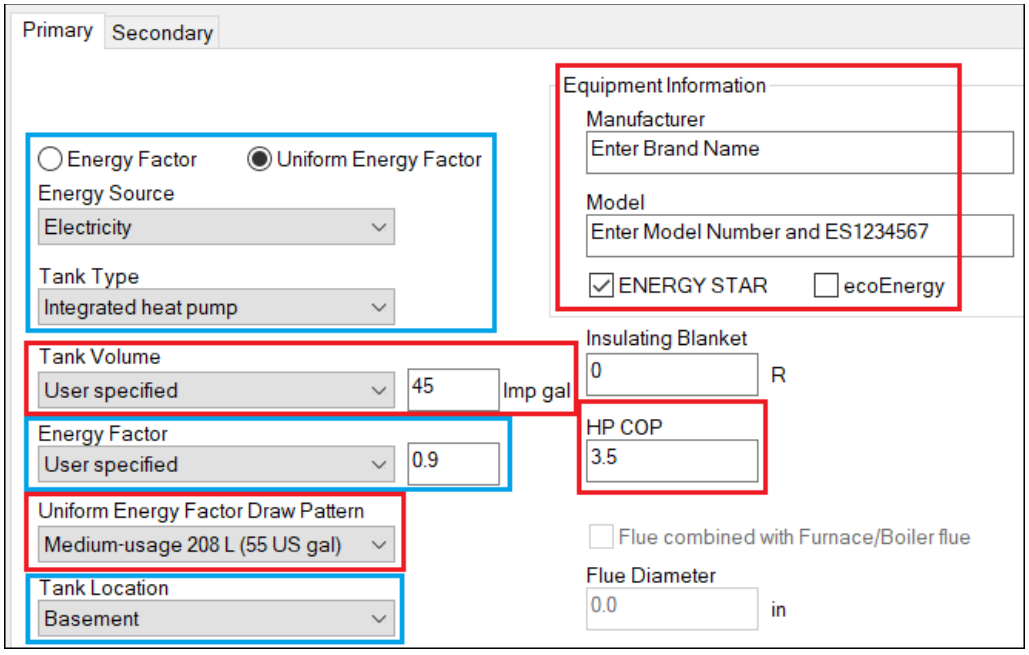


*Figure 20: Heat pump water heater – **Primary** screen*

ERS reference for modelling: *HOT2000 User Guide* section 7.15.1.1.

Renovation Upgrade Report instructions

Copy the following statement into the **RUR Comments' Hot Water System** section of HOT2000 along with your personalized text.

RUR statement

Under the Canada Greener Homes Grant initiative, a grant of $1,000 is available for installing an eligible ENERGY STAR certified heat pump water heater. Heat pump water heaters transfer heat from the indoor air to the water thereby partially reducing room temperatures which will increase heating requirements somewhat during the heating season. At the same time, the equipment will remove moisture from the air while cooling it, which can be beneficial during the non-heating season. If a heat pump water heater is recommended, its presence should be considered in the sizing of the heating system. To determine the eligibility of the product you are seeking to purchase, confirm that it is included on the Searchable product list of eligible heat pump water heaters for the Canada Greener Homes Grant.

5.7 Renewable Energy Systems

Guidance on providing recommendations to homeowners

The Canada Greener Homes Grant initiative offers a grant for installing a solar photovoltaic (PV) system, including panels and an inverter. If the homeowner wants to purchase batteries for storing the solar energy from their PV system, a grant to offset this cost is available under the Resiliency grants (see section 5.8.1).

It is important for the homeowner to consider their options and learn what is involved before making a commitment to install a PV system for their home. It is recommended that the energy advisor ask the homeowner in advance of scheduling an evaluation if the homeowner is hoping to install a PV system. If so, the energy advisor should ask if the home has been assessed by a professional or identified as "Solar Ready" and is equipped with the components required for the future installation of PV systems. If the home has not yet been assessed by a professional or identified as "Solar Ready" and the homeowner is interested in exploring options for solar PV, it may be preferable for the homeowner to arrange for an assessment of the home by a professional installer prior to their pre-retrofit evaluation. A full assessment by a professional solar PV installer, including the measuring of solar irradiance (how much sunlight falls on the roof), will provide the homeowner with detailed information on considerations for their home and specific installation recommendations, including the size and related energy production of the system.

A recommendation by the energy advisor to the homeowner for solar PV should be provided based upon the following factors:

- The homeowner's potential renovation plans
- The home has been identified as "Solar Ready" (equipped with the components required for the future installation of PV systems)
- A full assessment by a professional solar PV installer has been completed

A PV system is eligible for the Canada Greener Homes Grant initiative if it is a first-time installation or if it is an addition to an existing system. Solar panels can be mounted on the house or ground, as long as

they are on the property / land of the house associated with the application. The PV system must be designed and installed in accordance with local building and electrical codes. For rooftop installations, the homeowner is responsible for ensuring that the structural integrity of the roof will not be compromised by the added load of the PV panels.

Homeowners planning to have a PV system installed must be made aware that the installer must provide the capacity along with other specifications required for modelling. Modelling a PV system without specifying the capacity will not trigger a grant.

ERS reference for data collection: *Technical Procedures* sections 3.7.1 and 4.6.3.6.

Process for HOT2000 modelling

The **Power Generation** screen contains a new field to manually enter and specify the direct current (DC) capacity of the PV system.

Pre-retrofit evaluation: If a PV system is present at the time of the pre-retrofit evaluation, model the PV system as per ERS procedures but also enter the capacity of the PV system in the new **Capacity of photovoltaic system** field. If the capacity is unknown, then the new field is to remain blank. In the upgrade case, enter a capacity of at least 1.0 kW more than the value in the base case (e.g. 0 kW when no PV was present plus at least 1.0 kW for the upgrade equals 1 to be entered into the upgrade case) to reflect an increase based on additional PV or first-time installation.

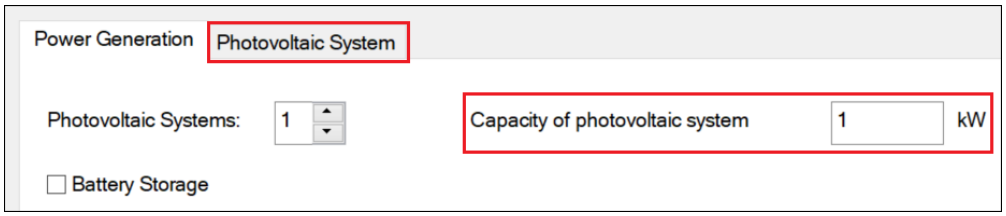


*Figure 21: **Power Generation** screen with **Capacity of photovoltaic system** field highlighted*

To cause the "Add a renewable energy system" section to appear in the RUR, add a **Photovoltaic System** with proposed specifications if known, or if unknown, enter a number in the **Array area** field. In the case of a PV system modelled in the base case, add an additional PV system in the upgrade case with proposed specifications if known, or if unknown, enter a number in the **Array area** field. Copy the text provided into the **RUR Comments' Renewables** section of HOT2000.

Post-retrofit evaluation: Model the new PV system as per ERS procedures but also enter the direct current (DC) capacity of the PV system in the **Capacity of photovoltaic system** field. Ask the homeowner for the documentation provided by the PV installer stating that the panels and inverter(s) are CSA certified and containing all data required for HOT2000 modelling, including the capacity of the new system.

If the PV system has automatic tracking (slope and azimuth is variable), model the array pointing due South and optimal slope (latitude of installation).

In HOT2000, modify the **Capacity of photovoltaic system** entry to reflect the capacity of the newly installed system or, in the case of existing PV where the existing capacity was specified in the pre-retrofit file, the sum of the capacities. Grants will be calculated based on the difference between the pre- and post-retrofit **Capacity of photovoltaic system** values.

ERS reference for modelling: *HOT2000 User Guide* section 7.11.

Renovation Upgrade Report instructions

Copy the following statement into the **RUR Comments' Renewables** section of HOT2000 along with your personalized text.

RUR Statement: Photovoltaic Solar Panels

Through the Canada Greener Homes Grant initiative, a grant of $1,000 per kW DC is available for installing a solar photovoltaic (PV) system. If you choose to install a PV system, it is strongly recommended that a full assessment by a professional solar PV installer, including the measurement of solar irradiance (how much sunlight falls on the roof) is undertaken to provide detailed information on considerations for your home and specific installation recommendations, including the size and related energy production of the system. The rated PV panel must have peak power capacity higher than or equal to 1.0 kW DC. The system must be composed of PV panels and an inverter certified to CSA Standards. Solar panels can be mounted on the house or ground, as long as they are on the property / land of the house associated with the application. Building permits may be required for both off-grid and grid-connected installations. For more information, refer to Natural Resources Canada's Solar Ready Guidelines document that can be found online.

5.8 Resiliency

Guidance on providing recommendations to homeowners

If the homeowner is in the process of making upgrades to their home, they can also consider additional retrofits that could help protect their home from environmental damages. Resiliency measures must be combined with an energy efficiency retrofit from the Canada Greener Homes Grant initiative.

Energy advisors may provide recommendations in the RUR for batteries connected to PV systems, self-adhering roofing underlayment, foundation water-proofing and moisture proofing crawl space floor, walls and headers. Energy advisors should consider the following:

- Visual evidence of water infiltration or moisture
- Information provided by the homeowner on past or present concerns regarding water infiltration or moisture
- Regional prevalence of heavy rainfall and/or high winds
- Renovation plans to coincide with resiliency measures when upgrading common areas of the home:
    - A self-adhering roofing underlayment applied to the entire roof could be recommended if the homeowner is planning to replace their shingles
    - Foundation water-proofing may be recommended along with basement wall insulation
    - Moisture proofing crawl space floor, walls and headers may be recommended with crawl space insulation
- The lifespan of the home's components

5.8.1 Batteries connected to photovoltaic (PV) systems

Through the Canada Greener Homes Grant initiative, a grant is available for the addition of a battery backup system for a solar PV system. The energy advisor should verify that the battery system meets the following criteria:

- The battery system must be connected to a permanently mounted solar PV system;
- Batteries can be for a new battery system, the replacement of existing batteries or to supplement an existing battery system;
- Battery system minimum total capacity must be rated 4500 Watt hours at 20 hours.
- Batteries must be rated for deep cycle (any technology);
- Batteries must be permanently installed (i.e. portable batteries and electric vehicles are not eligible for this grant).

Notes:

- Batteries can be added to an existing PV system, or be for a newly installed PV system that also qualifies for the Canada Greener Homes Grant initiative
- The inverter and charge controller should be certified to CSA C22.2 107.1, "Power conversion equipment" or CSA C22.2 62109, "Safety of power converters for use in photovoltaic power systems"

Process for HOT2000 modelling

The **Power Generation** screen contains a new field to indicate the presence of battery storage as a resiliency measure.

Pre-retrofit evaluation: To recommend the purchase of battery storage for a PV system, check the **Battery Storage** box in the **Power Generation** upgrade case. Copy the text provided into the **RUR Comments' Renewables** section of HOT2000.

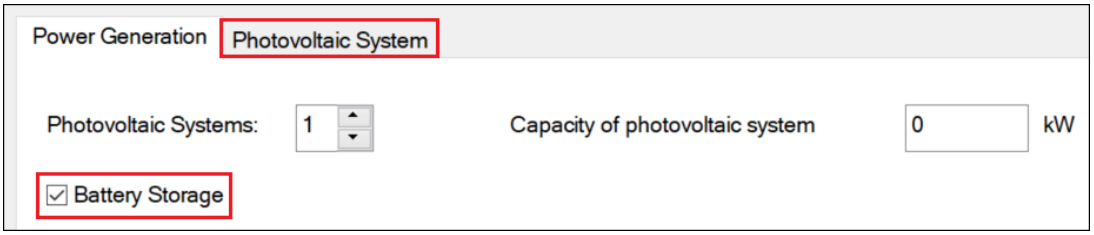


*Figure 22: **Power Generation** screen with **Battery Storage** box checked*

Post-retrofit evaluation: If battery storage was installed and meets the criteria listed above, check the **Battery Storage** box in the **Power Generation** screen.

Renovation Upgrade Report instructions

Copy the following statement into the **RUR Comments' Renewables** section of HOT2000 along with your personalized text.

RUR Statement: Photovoltaic (PV) System Batteries

Through the Canada Greener Homes Grant initiative, a grant of $1,000 is available for the installation of battery storage to connect to a solar photovoltaic system. This resiliency measure must be combined with an energy efficiency retrofit from the initiative in order to be eligible for a grant. This grant may be combined with the PV installation grant up to a maximum grant of $5,000.

5.8.2 Roofing Membrane - Self-adhering roofing underlayment applied to entire roof

Through the Canada Greener Homes Grant initiative, a grant is available for the installation of a roofing underlayment on a sloped roof. The energy advisor should verify that the roofing underlayment meets the following criteria:

- The roofing underlayment must be self-adhering;
- Roofing underlayment is applied to the entire surface area of the roof that covers enclosed spaces, including attached garages; and
- The self-adhering underlayment must be certified to ASTM D1970 / D1970M, "Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection" or CSA A123.22, "Self-adhering polymer modified bituminous sheet materials used as steep roofing underlayment for ice dam protection."

Note: Torched on membranes and flat roofs are not eligible as roofing membrane is already part of a standard flat roof installation.

Process for HOT2000 modelling:

Pre-retrofit evaluation: To recommend the installation of a self-adhering roofing underlayment applied to the entire roof, check the **Adhesive waterproof ice and water barrier underlayment for roofs** box in HOT2000's **Energy Upgrades Greener Homes** section. Copy the text provided into the most appropriate **RUR Comments** section in HOT2000 (i.e. **Ceilings** or **Cathedral Ceilings + Flats** or, if the measure is not recommended alongside attic/ceiling insulation, in the **Additional Comments** section).

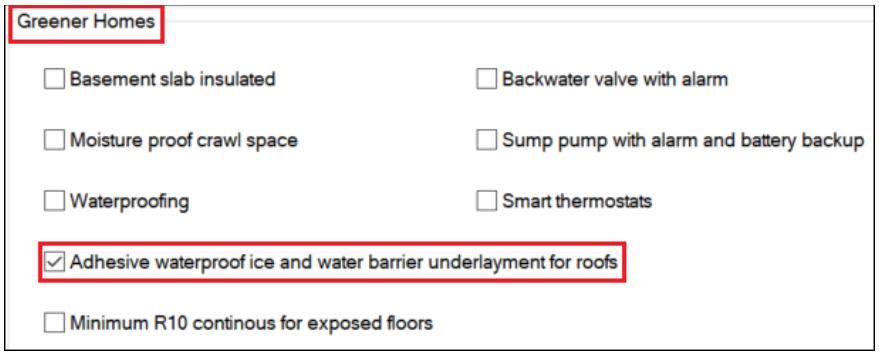


*Figure 23: Pre-retrofit file: **Greener Homes** screen with **Adhesive waterproof ice and water barrier underlayment for roofs** box checked*

Post-retrofit evaluation: Model the insulation in HOT2000's base case as per ERS procedures. If a self-adhering roofing underlayment was applied to the entire roof surface and meets the criteria listed above, check the **Adhesive waterproof ice and water barrier underlayment for roofs** box in the **Greener Homes** screen.

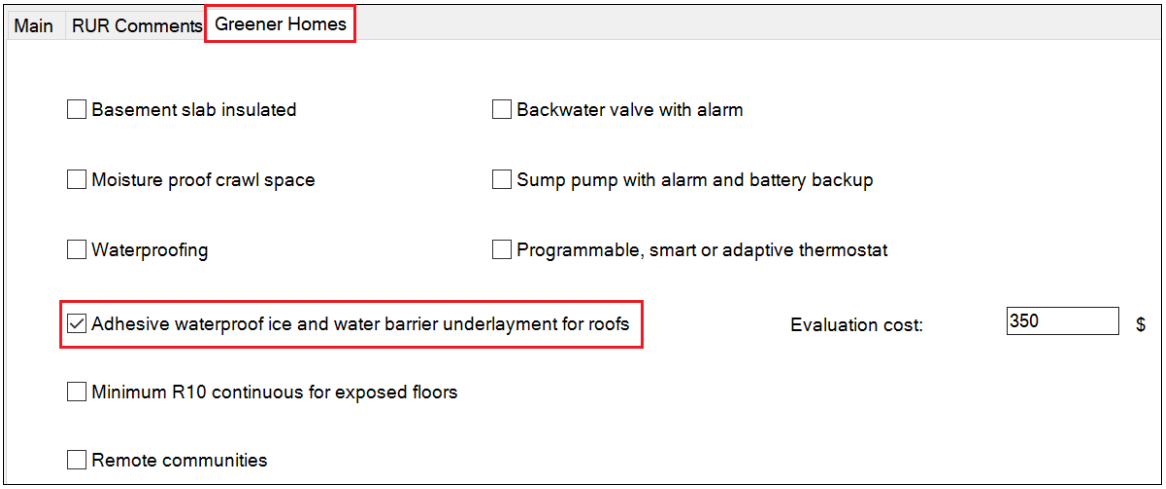


*Figure 24: Post-retrofit file: **Greener Homes** screen with **Adhesive waterproof ice and water barrier underlayment for roofs** box checked*

Renovation Upgrade Report instructions

Copy the following statement into an appropriate **RUR Comments** section (i.e. **Ceilings** or **Cathedral Ceilings + Flats** or, if the measure is not recommended alongside Attic/Ceiling insulation, in the **Additional Comments** section) of HOT2000 along with your personalized text.

RUR Statement:

Through the Canada Greener Homes Grant initiative, a grant of $150 is available for installing a self-adhering roofing underlayment applied to the entire roof surface. This resiliency measure must be combined with an energy efficiency retrofit from the initiative to be eligible for a grant.

5.8.3 Foundation Water-Proofing

Through the Canada Greener Homes Grant initiative, a grant is available for waterproofing below-grade wall sections of basements. Crawl space and slab-on-grade foundations are not eligible for this grant.

To be eligible for a grant the following requirements must be met:

- Waterproofing must be performed on the exterior side of the below-grade basement wall with rubberized or polymer membranes (e.g. waterproof-rated spray, trowel-on, roll-on and sheet materials). Ensure that a waterproofing membrane is used and not a damp/moisture-proofing membrane.
- A minimum 80% of the below-grade wall area must be waterproofed. This applies to all exterior facing below-grade basement walls but does not include party walls between homes (e.g. semi-detached homes).

Note: Simple paint brush or roller applied interior sealants are considered damp/moisture-proofing membranes, and are not eligible for the waterproofing grant as they are not rated to withstand hydrostatic pressure.

Process for HOT2000 modelling:

Pre-retrofit evaluation: To recommend basement wall waterproofing, check the **Waterproofing** box in HOT2000's **Energy Upgrades Greener Homes** section. Copy the text provided into the **RUR Comments' Foundation** section if it is recommended alongside basement insulation. If it is recommended as a separate measure, copy the following statement into the **RUR Comments' Additional Comments** section of HOT2000 along with your personalized text.

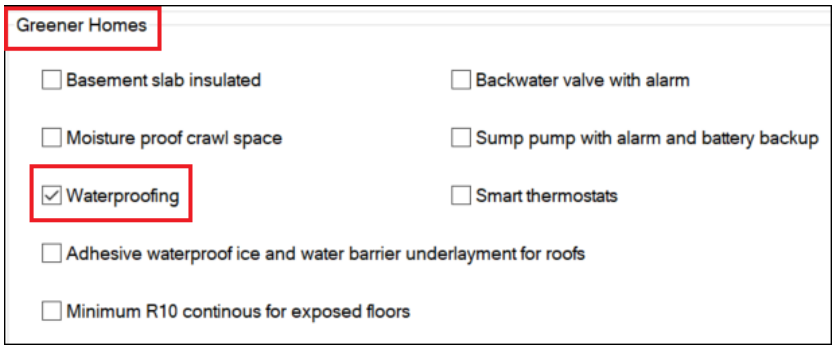


*Figure 25: Pre-retrofit file: **Greener Homes** screen with **Waterproofing** box checked*

Post-retrofit evaluation: If basement wall waterproofing was performed and meets the criteria listed above, check the **Waterproofing** box in the **Greener Homes** screen.

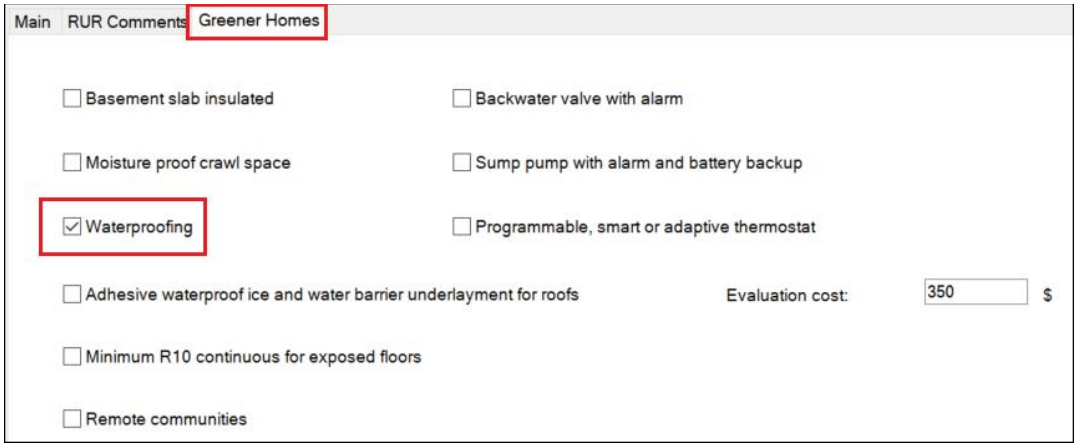


*Figure 26: Post-retrofit file: **Greener Homes** screen with **Waterproofing** box checked*

Renovation Upgrade Report instructions

If this measure is recommended alongside basement insulation, copy the following statement into the **RUR Comments' Foundation** section of HOT2000 along with your personalized text. If it is recommended as a separate measure, copy the following statement into the **RUR Comments' Additional Comments** section of HOT2000 along with your personalized text.

RUR Statement

Through the Canada Greener Homes Grant, a grant of $875 is available for waterproofing exterior foundation walls. This resiliency measure must be combined with an energy efficiency retrofit from the initiative to be eligible for a grant.

5.8.4 Moisture Proofing Crawl Space Floor, Walls and Headers

Through the Canada Greener Homes Grant initiative, a grant is available for moisture/damp-proofing all closed and vented crawl spaces. The energy advisor should verify that the crawl space moisture proofing (encapsulation) meets the following requirements:

- 100% of the floors, walls and headers of all crawl spaces must be covered by a continuous moisture barrier; for example, a minimum 6 mil polyethylene barrier on the floor and closed-cell foam on the walls and headers. Consult with your local building authority.
- All seams, edges and penetrations in the moisture barrier must be sealed with suitable materials such as tape and caulking.

Notes:

- When a crawl space is attached to a basement, the crawl space's moisture barrier must be sealed to the basement foundation junction (e.g. floors and walls). If there is a structural or full wall between the two, with or without an access hatch, then the crawl space's common wall must be moisture proofed as part of the 100% encapsulation;
- Continuous moisture barrier should be of 0.75 perms (43 ng/Pa·s·m²) or less or otherwise specified in local building code.
- If wall and header insulation such as closed-cell foam is used as the moisture barrier it may also be eligible for the crawl space insulation grant.

Process for HOT2000 modelling:

Pre-retrofit evaluation: To recommend moisture-proofing the crawl space floor, walls and header, check the **Moisture proof crawl space** box in HOT2000's **Energy Upgrades Greener Homes** section. If the measure is recommended alongside insulation, copy the text provided into the **RUR Comments' Foundation** section along with your personalized text. If it is recommended as a separate measure, copy the text provided into the **RUR Comments' Additional Comments** section of HOT2000 along with your personalized text.

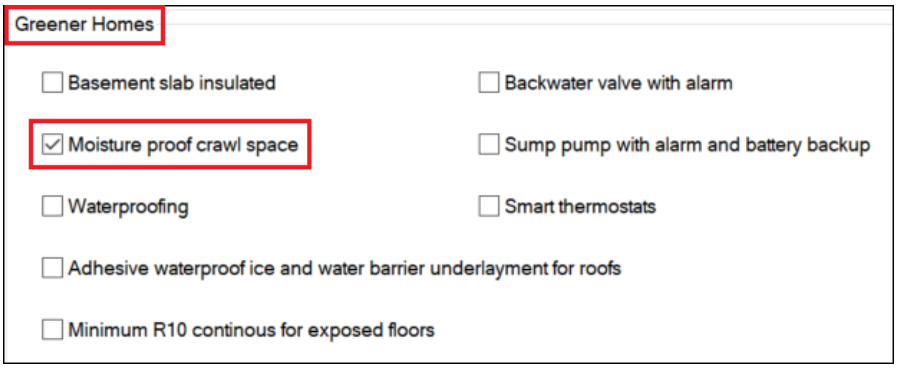


*Figure 27: Pre-retrofit file: **Greener Homes** screen with **Moisture proof crawl space** box checked*

Post-retrofit evaluation: If moisture-proofing was performed on 100% of the crawl space's floor, walls and headers and meets the criteria listed above, check the **Moisture proof crawl space** box in the **Greener Homes** screen.

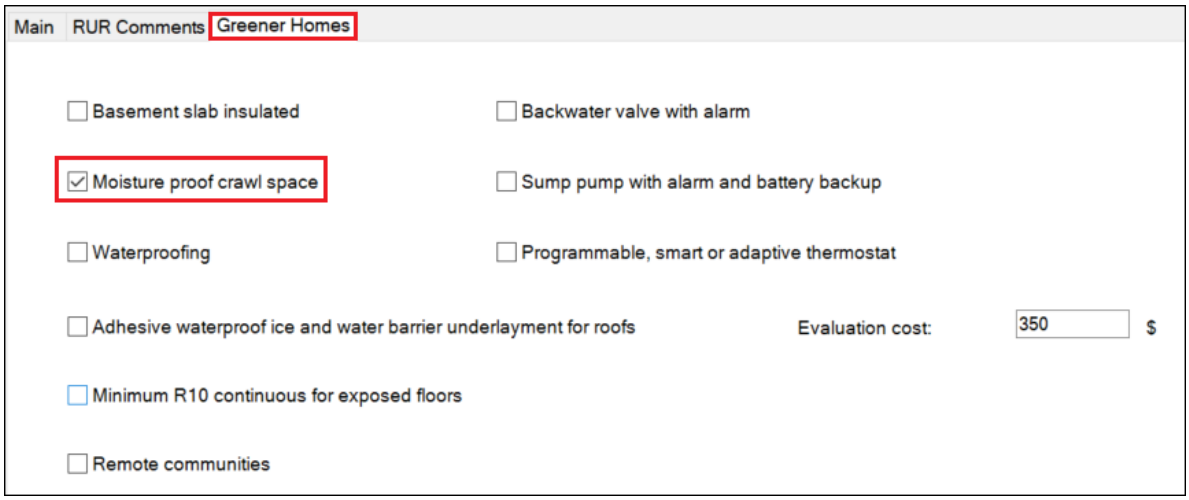


*Figure 28: Post-retrofit file: **Greener Homes** screen with **Moisture proof crawl space** box checked*

Renovation Upgrade Report instructions

If the measure is recommended alongside foundation insulation, copy the following statement into the **RUR Comments' Foundation** section of HOT2000 along with your personalized text. If it is recommended as a separate measure, copy the text provided into the **RUR Comments' Additional Comments** section of HOT2000 along with your personalized text.

RUR Statement

Through the Canada Greener Homes Grant initiative, a grant of $600 is available for moisture proofing 100% of all crawl space floors, walls and headers. This resiliency measure must be combined with an energy efficiency retrofit from the initiative to be eligible.

6 Northern and Off-Grid Communities

This section only applies to homes in communities listed as northern or off-grid.

Northern communities are located in Yukon, Northwest Territories, Nunavut, Nunavik and Nunatsiavut.

To confirm if a location is off-grid, consult the Remote Energy Communities Database: https://atlas.gc.ca/rced-bdece/en/index.html.

6.1 Setting up the HOT2000 file

If the house is located in a northern or off-grid community, the energy advisor must make the appropriate selection in HOT2000 to indicate that the homeowner is eligible for additional grants for northern and off-grid communities.

In the **Greener Homes** screen, check the **Remote Communities** box and select the appropriate community from the drop-down menu. This step is required for the homeowner to be eligible for "Northern and Off-grid Communities" grants.

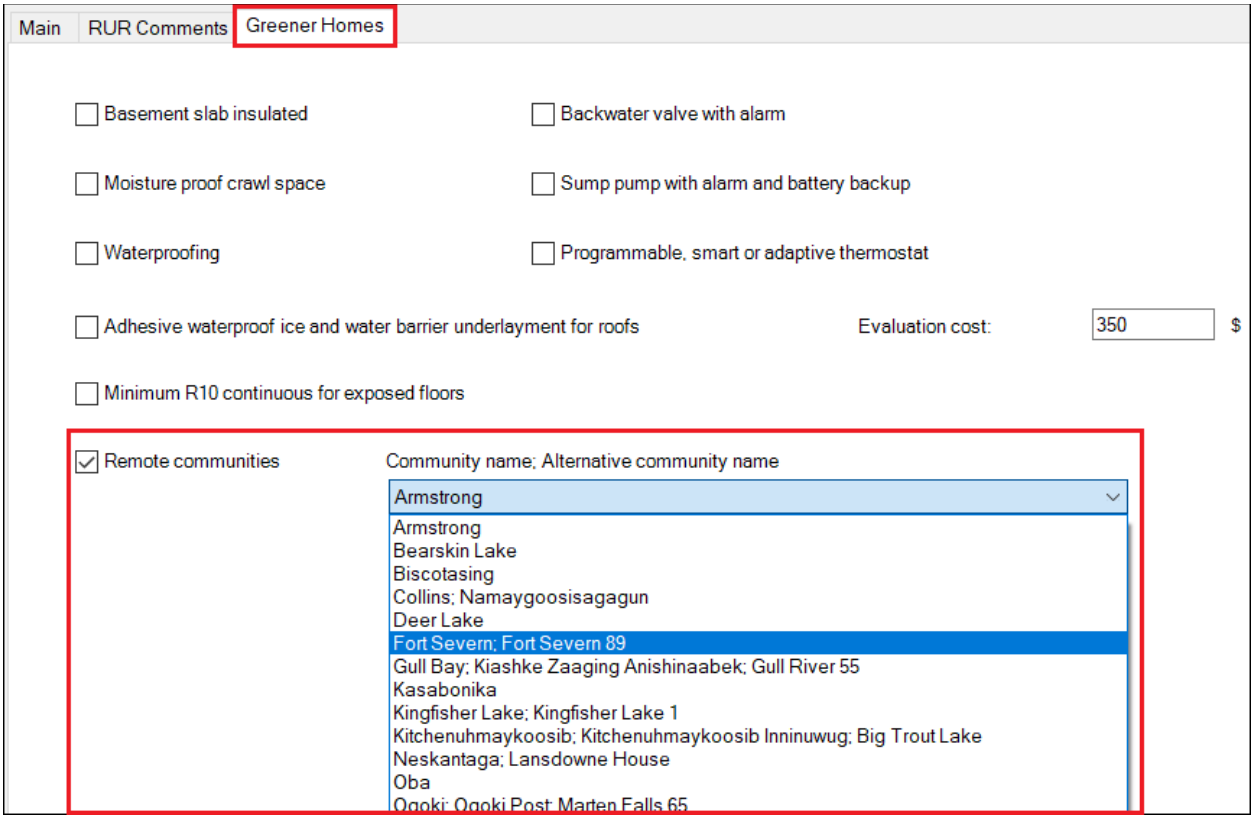


*Figure 29: **Greener Homes** screen with **Remote communities** box checked*

6.2 Additional measures for northern and off-grid communities

6.2.1 Heating Equipment – Oil to Oil

Guidance on providing recommendations to homeowners

Installing a more efficient ENERGY STAR certified furnace or boiler to replace less-efficient equipment will reduce energy consumption and heating costs. The energy advisor should recommend the replacement of oil-fired heating equipment for appliances approaching 20 years of age, as this is considered the useful lifespan by industry. New condensing equipment is considered to have a 15 year useful lifespan.

ERS reference for data collection: *Technical Procedures* sections 3.5.14, 4.6.3.1 and 4.6.3.2.

Process for HOT2000 modelling

Pre-retrofit evaluation: Model the existing heating equipment in HOT2000's base case as per ERS procedures. In the upgrade case, ensure that the ENERGY STAR box is checked and that the efficiency for an oil-fired furnace is equal to or greater than 95% AFUE or for an oil-fired boiler equal to or greater than 87% AFUE. Copy the text provided into the **RUR Comments' Heating System** section of HOT2000. If you are in an area where natural gas or propane is readily available, also recommend the potential of fuel-switching (i.e. converting from oil-fired equipment to natural gas or propane) in the **RUR statement**.

Post-retrofit evaluation: To determine eligibility, confirm that the unit is included on the Searchable product list of eligible furnaces or boilers for the Canada Greener Homes Grant. Once confirmed, make note of the corresponding "ENERGY STAR Unique ID".

Brand	
Model number	XX5
AFUE	87
ENERGY STAR Unique ID	1234567
Model Name	

Figure 30: Screenshot of the Searchable product list result webpage with the ENERGY STAR Unique ID row highlighted

Model the new furnace or boiler as per ERS procedures, but in addition, ensure that the ENERGY STAR box is checked and the "ENERGY STAR Unique ID" is included in the **Model** field in the format shown (i.e. ES followed by the ID number taken from the Searchable product list). Figure 31 shows all required fields in boxes. Enter data in the red boxes using data extracted from the Searchable product list, and in the blue boxes as per regular procedures.

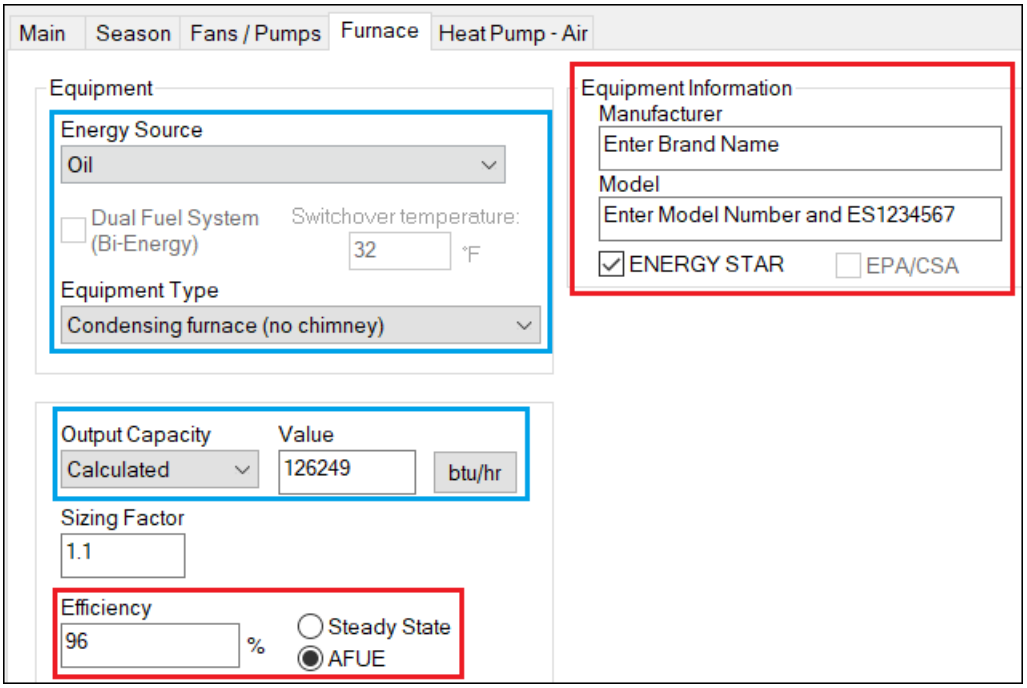


*Figure 31: **Furnace** screen*

ERS reference for modelling: *HOT2000 User Guide* section 7.14.6.

Renovation Upgrade Report instructions

Copy the following statement into the **RUR Comments' Heating System** section of HOT2000 along with your personalized text.

RUR statement

Through the Canada Greener Homes Grant initiative, a grant of $3,500 is available for replacing an oil-fired furnace or boiler with an ENERGY STAR certified oil-fired furnace or boiler. To determine the eligibility of the product you are seeking to purchase, confirm that the unit is included on the Searchable product list of eligible furnaces or boilers for the Canada Greener Homes Grant.

6.2.2 Heating Equipment – Oil or Gas-Fired to Natural Gas or Propane

Guidance on providing recommendations to homeowners

Installing a more efficient ENERGY STAR natural gas- or propane-fired furnace or boiler to replace less-efficient equipment will reduce energy consumption and heating costs. The energy advisor should recommend the replacement of oil-fired heating equipment for appliances approaching 20 years of age, as this is considered the useful lifespan by industry. If the homeowner is in an area where natural gas or propane is readily available, recommend potential fuel-switching (i.e. converting from oil-fired equipment to natural gas or propane).

ERS reference for data collection: *Technical Procedures* sections 3.5.14, 4.6.3.1 and 4.6.3.2.

Process for HOT2000 modelling:

Pre-retrofit evaluation: Model the existing heating equipment in HOT2000's base case as per ERS procedures. In the upgrade case, ensure that the ENERGY STAR box is checked and that the efficiency for a furnace is equal to or greater than 97% AFUE or for a boiler equal to or greater than 90% AFUE. Copy the text provided into the **RUR Comments' Heating System** section of HOT2000.

Post-retrofit evaluation: To determine eligibility, confirm that the unit is included on the Searchable product list of eligible furnaces or boilers for the Canada Greener Homes Grant. Once confirmed, make note of the corresponding "ENERGY STAR Unique ID".

Brand	
Model number	XX5
AFUE	87
ENERGY STAR Unique ID	1234567
Model Name	

Figure 32: Screenshot of the Searchable product list result webpage with the ENERGY STAR Unique ID row highlighted

Model the new furnace or boiler as per ERS procedures but in addition, ensure that the ENERGY STAR box is checked and the "ENERGY STAR Unique ID" is included in the **Model** field in the format shown (i.e. ES followed by the ID number taken from the list of eligible equipment). Figure 33 shows all required fields in boxes. Enter data in the red boxes using data extracted from the Searchable product list, and in the blue boxes as per regular procedures.

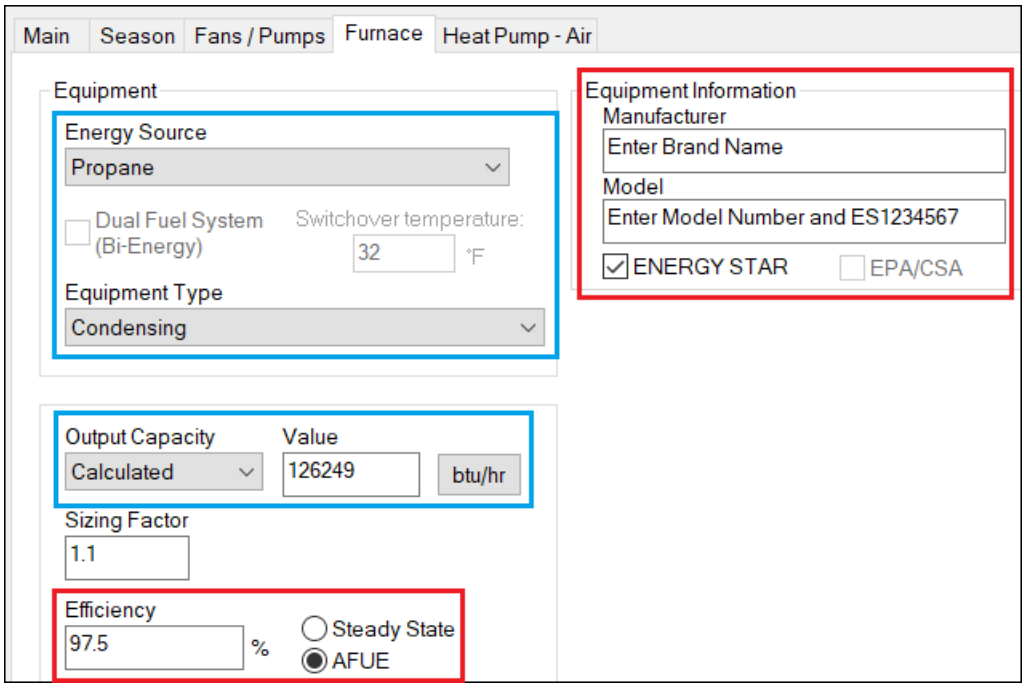


*Figure 33: **Furnace** screen*

ERS reference for modelling: *HOT2000 User Guide* section 7.14.6.

Renovation Upgrade Report instructions

Copy the following statement into the **RUR Comments' Heating System** section of HOT2000 along with your personalized text.

RUR statement

Through the Canada Greener Homes Grant initiative, a grant of $1,600 is available for replacing an oil- or gas-fired furnace or boiler with an ENERGY STAR certified natural gas- or propane-fired furnace or boiler. To determine the eligibility of the product you are seeking to purchase, confirm that the unit is included on the Searchable product list of eligible furnaces or boilers for the Canada Greener Homes Grant.

6.2.3 Attic / Ceiling Insulation (Northern Communities Only)

Guidance on providing recommendations to homeowners

Energy advisors should inform homeowners of the benefits of insulating an attic space, which is often a relatively simple, cost-effective retrofit with significant returns. RUR statements should note, based on the amount of insulation already present, whether the homeowner may be eligible for a grant up to the associated maximum found in the grant table for Northern communities. Adding insulation to a flat or cathedral ceiling may not be feasible unless significant renovations are planned for the interior or continuous insulation is added when shingles are being replaced.

Energy advisors should also inform homeowners that a grant is also available for installing a self-adhering roofing underlayment over the entire roof surface. This measure should be suggested and recommended to homeowners who indicate they are planning to replace their shingles. More information on this measure can be found in section 5.8.2.

For more information on the benefits of insulation, as well as considerations, suggestions and tips, refer the homeowner to Section 5 of *Keeping the Heat In* available on NRCan's website at https://www.nrcan.gc.ca/energy-efficiency/homes/make-your-home-more-energy-efficient/keeping-the-heat/15768.

Note that this grant is available only for houses located in Yukon, Northwest Territories, Nunavut, Nunavik (i.e. Quebec HOT2000 **Weather Locations** Kuujjuarapik, Inukjuak and Kuujjuaq) and Nunatsiavut (i.e. Newfoundland and Labrador **Weather Locations** Cartwright and Paradise River).

ERS reference for data collection: *Technical Procedures* sections 3.5.3 and 4.5.

Process for HOT2000 modelling

Model the insulation in HOT2000's base and upgrade case as per ERS procedures. For an attic, recommend the installation of at least RSI 10.57 (R-60) and for a cathedral ceiling or flat roof at least RSI 7.04 (R-40) as is realistic. As this grant is available only for houses located in the areas mentioned above, ensure that the correct **Weather Location** is selected to trigger the grant. Copy the text provided into the appropriate **RUR Comments** section in HOT2000.

ERS reference for modelling: *HOT2000 User Guide* section 7.3.

Renovation Upgrade Report instructions

Copy the following general statement followed by the applicable proposed grant statement(s) into the appropriate **RUR Comments** section in HOT2000 (i.e. **Ceilings, Cathedral Ceilings + Flats** or **Additional Comments**) along with your personalized text. If multiple types of ceilings/roofs are present, it is possible that more than one grant statement may need to be included.

RUR general statement (to be included in all Attic/Ceiling Insulation recommendations for Northern communities):

Through the Canada Greener Homes Grant initiative, a grant of up to $5,000 is available for increasing home insulation in attics, cathedral ceilings and flat roofs. The amount you are eligible for will depend on factors such as what insulation is currently in your home, how much insulation you add and type of attic/ceiling your home has. Insulation slows the rate of heat loss, resulting in improved energy use and reduced energy costs. Installing insulation in an attic, cathedral ceiling or flat roof is eligible for a grant, as long as minimum levels of insulation and coverage are achieved. If your house consists of more than one roof or roof type, the grant amount will be pro-rated or calculated based on roof type and area.

RUR statements for specific Attic/Ceiling Insulation recommendations:

ATTIC The insulation in your attic was assessed at _____. Because the amount of insulation in your attic has been assessed as being less than or equal to R-12, a grant of up to $5,000 is available for adding insulation to reach R-60 or more. The insulation in your attic was assessed at _____. Because the amount of insulation in your attic has been assessed as being greater than R-12 but less than or equal to R-25, a grant of up to $2,000 is available for adding insulation to reach R-60 or more. The insulation in your attic was assessed at _____. Because the amount of insulation in your attic has been assessed as being greater than R-25 but less than or equal to R-35, a grant of up to $1,000 is available for adding insulation to reach R-60 or more.

CATHEDRAL CEILING The insulation in your cathedral ceiling was assessed at _____. Because the amount of insulation in your cathedral ceiling has been assessed as being at less than or equal to R-12, a grant of up to $1,560 is available for adding insulation to reach R-40 or more. The insulation in your cathedral ceiling was assessed at _____. Because the amount of insulation in your cathedral ceiling has been assessed as being greater than R-12 but less than or equal to R-25, a grant of up to $750 is available for adding insulation to reach R-40 or more. The insulation in your cathedral ceiling was assessed at _____. Because the amount of insulation in your cathedral ceiling has been assessed as being greater than R-25 but less than or equal to R-35, a grant of $200 is available for adding insulation to reach R-40 or more.

FLAT ROOF

The insulation in your insulated flat roof was assessed at _____. Because the amount of insulation in your insulated flat roof has been assessed as being at less than or equal to R-12, a grant of up to $1,560 is available for adding insulation to reach R-40 or more.

The insulation in your insulated flat roof was assessed at _____. Because the amount of insulation in your insulated flat roof has been assessed as being greater than R-12 but less than or equal to R-25, a grant of up to $750 is available for adding insulation to reach R-40 or more.

The insulation in your insulated flat roof was assessed at _____. Because the amount of insulation in your insulated flat roof has been assessed as being greater than R-25 but less than or equal to R-35, a grant of $200 is available for adding insulation to reach R-40 or more.

6.2.4 Exposed Floor Insulation (Northern Communities Only)

Guidance on providing recommendations to homeowners

In addition to energy savings, comfort may be a consideration if the homeowner finds that floors above exposed floors are excessively cool throughout cold-weather seasons. Such areas may be identified when the main floor is exposed to the elements (i.e. in the case of houses on piers). The energy advisor should recommend that air sealing of the area being insulated be performed at the same time. Taking into account the cold climate, recommend that the homeowner install the highest level of insulation that is realistic for the building.

For more information on the benefits of insulation as well as considerations, suggestions and tips, refer the homeowner to section 6.4 of *Keeping the Heat In* available on NRCan's website at https://www.nrcan.gc.ca/energy-efficiency/homes/make-your-home-more-energy-efficient/keeping-the-heat/15768.

To be eligible for the grant, the following requirements must be met:

- The entire exposed floor area of the house must be insulated.
- The total exposed floor area must be a minimum of 11 m² (120 sq.ft.) and may be comprised of more than one exposed floor.
- The pre-retrofit insulation level must be equal to or less than RSI 5.28 (R-30).
- The entire exposed floor area must be insulated to reach more than RSI 8.81 (R-50) with a minimum RSI 1.76 (R-10) of continuous insulation.

Note that this grant is available only for houses located in Yukon, Northwest Territories, Nunavut, Nunavik (i.e. Quebec **Weather Locations** Kuujjuarapik, Inukjuak and Kuujjuaq) and Nunatsiavut (i.e. Newfoundland and Labrador **Weather Locations** Cartwright and Paradise River).

ERS reference for data collection: *Technical Procedures* section 3.5.6.

Process for HOT2000 modelling

Pre-retrofit evaluation: Model the insulation in HOT2000's base and upgrade case as per ERS procedures. Recommend the installation of insulation to reach RSI 8.81 (R-50) or more and check the

Minimum R10 continuous for exposed floors box in HOT2000's **Energy Upgrades Greener Homes** section. Copy the text provided into the **RUR Comments' Exposed Floors** section.

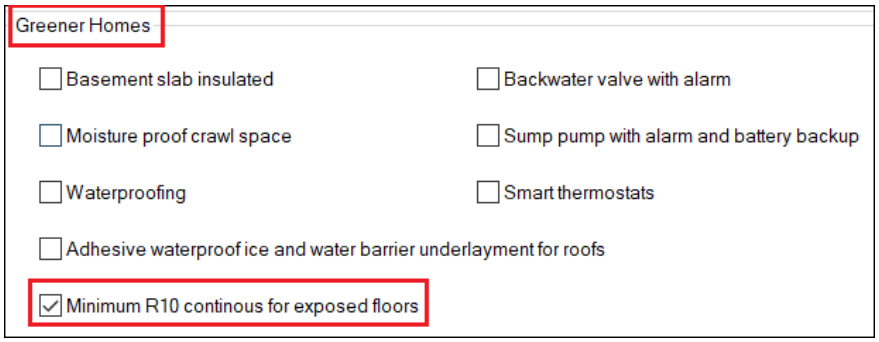


*Figure 34: Pre-retrofit file: **Greener Homes** screen with **Minimum R10 continuous for exposed floors** box checked*

Post-retrofit evaluation: Model the insulation in HOT2000's base case as per ERS procedures. If a minimum R-10 continuous insulation is present over the entire exposed surface, check the **Minimum R10 continuous for exposed floors** box in the **Greener Homes** screen.

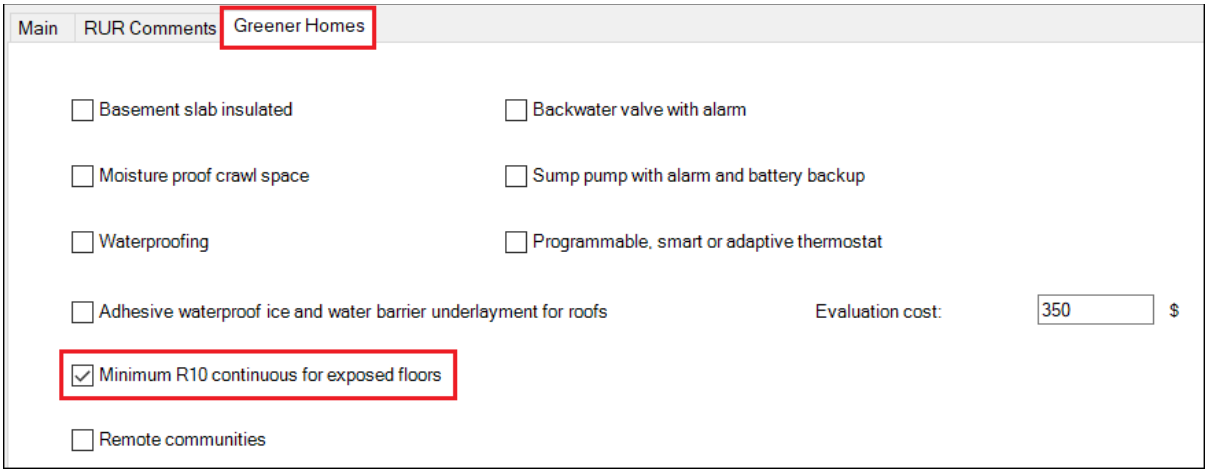


*Figure 35: Post-retrofit file: **Greener Homes** screen with **Minimum R10 continuous for exposed floors** box checked*

ERS reference for modelling: *HOT2000 User Guide* section 7.8.

Renovation Upgrade Report instructions

Copy the following statement into the **RUR Comments' Exposed Floors** section in HOT2000 along with your personalized text.

RUR statement

Through the Canada Greener Homes Grant initiative, a grant of $1,500 is available for adding insulation to the entire exposed floor area. Insulating exposed floors may result in energy savings and improve comfort in rooms above exposed floors. An example of an exposed floor is the floor of a house on piers. To be eligible for a grant, the entire exposed floor area must be insulated to reach more than RSI 8.81 (R-50) with a minimum RSI 1.76 (R-10) of the insulation being continuous.

7 Contact Information

Service organizations may contact their account manager with the Office of Energy Efficiency for questions on the Canada Greener Homes Grant initiative.

Homeowners can find more information on the initiative by visiting the Canada Greener Homes Grant website or contacting NRCan's Greener Homes Division using the following contact information:

Canada Greener Homes Grant website:

English: canada.ca/greener-homes-grant

French: canada.ca/subvention-maisons-plus-vertes

Canada Greener Homes Grant Call Centre:

1-833-674-8282 **Monday to Friday:** 8:00 am to 8:00 pm (Eastern time)

TTY: 1 800-465-7735

Email NRCan's Greener Homes Division at:

canadagreenerhomesgrant-subventionmaisonsvertes@nrcan-rncan.gc.ca

Appendix A: Modelling air source heat pumps (ASHPs) and cold climate air source heat pumps (ccASHPs) in HOT2000

Natural Resources Canada
Ressources naturelles Canada

Modelling air source heat pumps (ASHPs) and cold climate air source heat pumps (ccASHPs) in HOT2000

November 2021

Updated January 18, 2021

Canada

Agenda

- Objectives
- Heat pump basic data
- New data fields for Greener Homes
- Heat pump specifications
  - For pre-retrofit: base case and upgrades
  - Triggering grants for ASHPs and ccASHPs
  - Notes on ccASHPs (cold climate Air Source Heat Pumps)
  - For post-retrofit: adjustments to D file and modelling of E file
- Examples

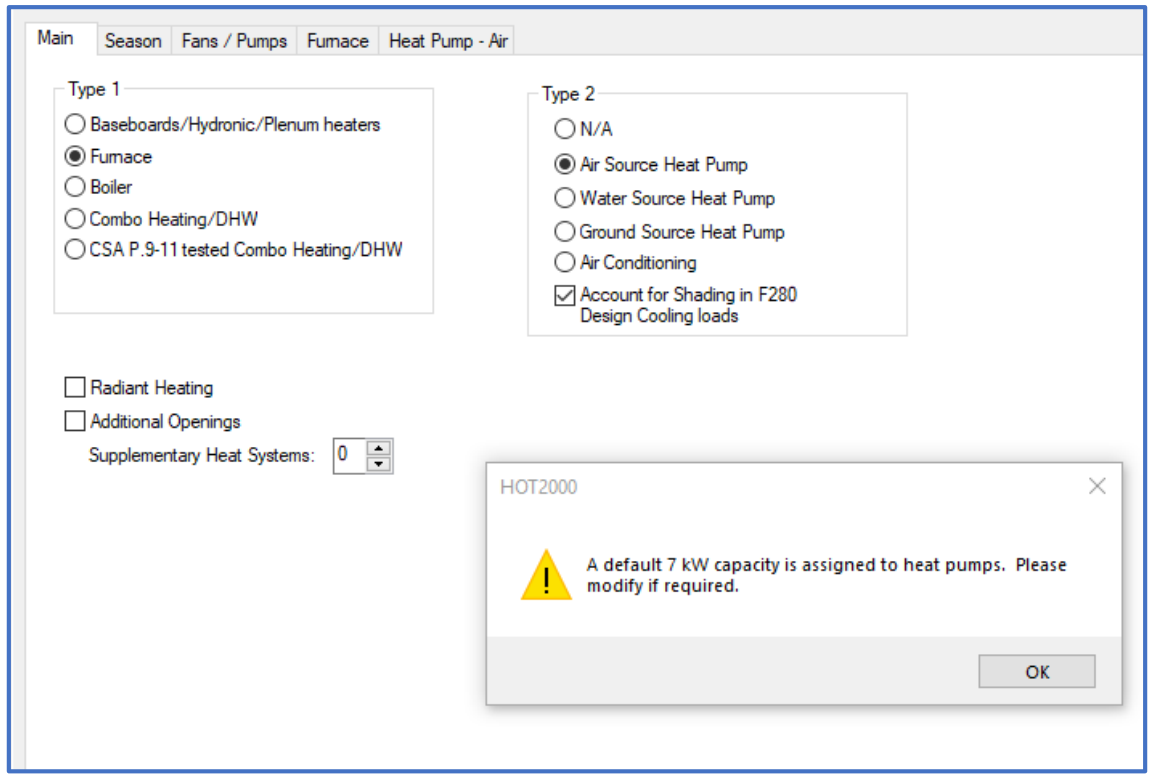
Objectives

- To explain how to model heat pumps as part of the EnerGuide Rating System and Canada Greener Homes Grant initiative.
- To describe how to model the different scenarios that may arise
  - ASHP replaced with ccASHP
  - ccASHP added to existing ASHP
  - New ccASHP installation
  - Other
- To provide energy advisors with reference tables of modeling inputs for these scenarios.
- Note: this document does not cover upgrades with a combination of ASHPs and ccASHPs
  - For guidance to model such combinations, please contact your account manager

Modelling ASHPs/ccASHPs

As per *ERS procedures*

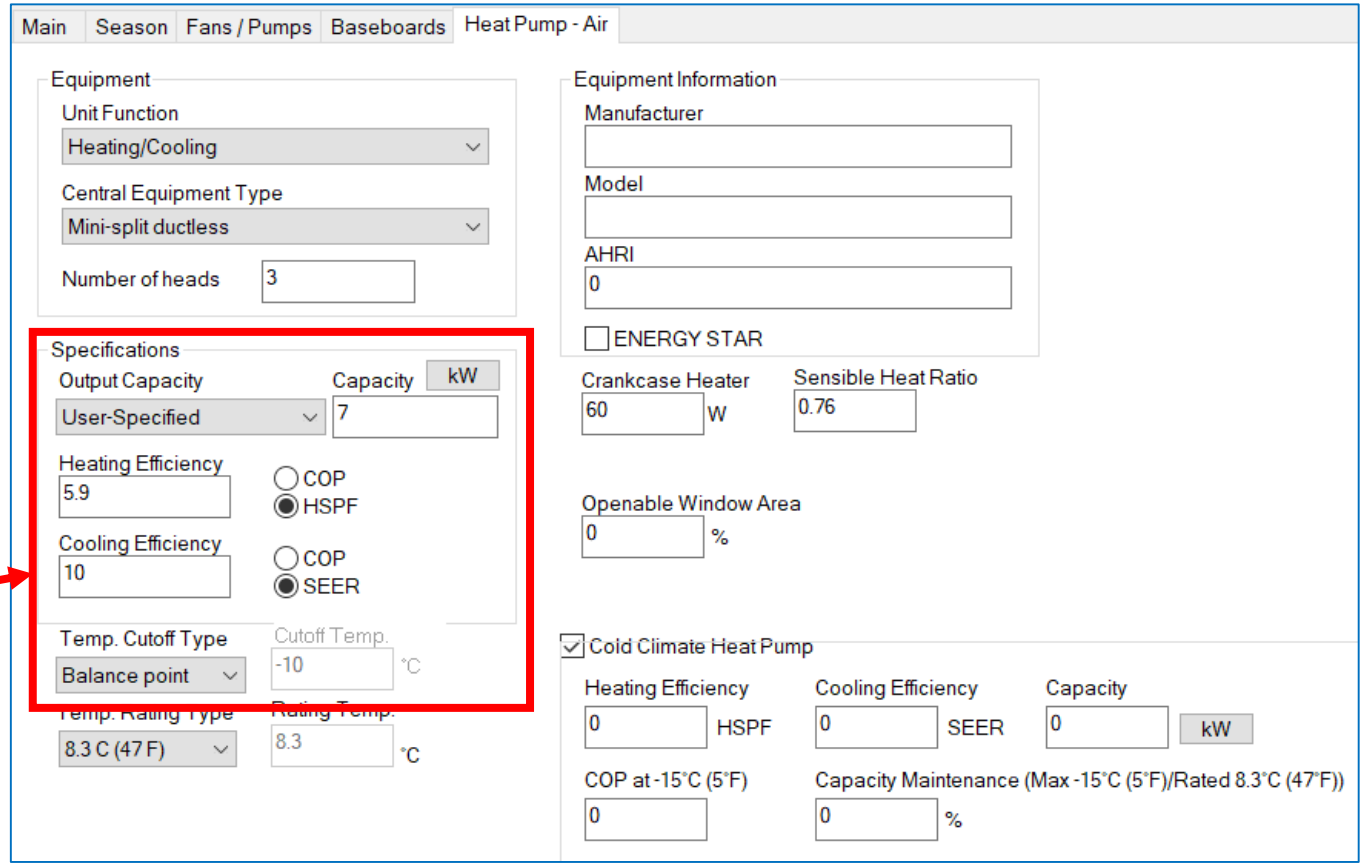
- Select **Type 1** and **Type 2** systems
- When choosing heat pump, accept a default 7 kW capacity (this can be changed in next screen)



Modelling ASHPs/ccASHPs

In the **Heat Pump-Air** screen

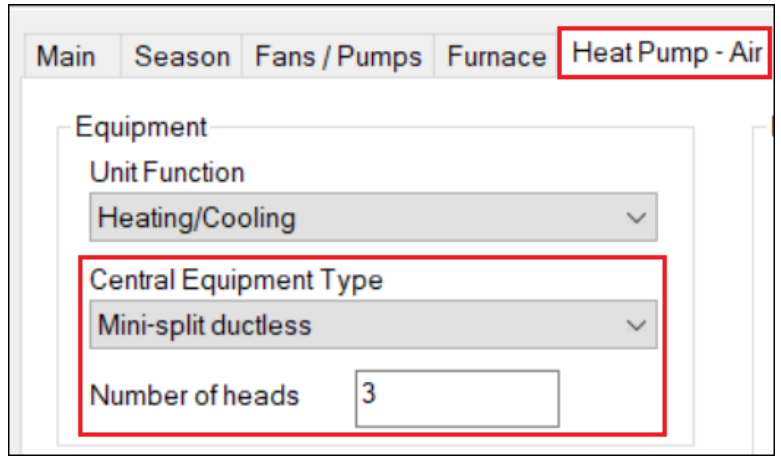
- Choose **Heating/Cooling** as the **Unit Function**
- **Central Equipment Type**
- **Manufacturer**, **Model** (including outdoor/indoor units), **AHRI** number when available (mandatory for new installations)
- Leave default values for
  - **Openable window area** (0%)
  - **Crankcase Heater** (60 W)
  - **Sensible heat ratio** (0.76)
  - **Temp Rating Type** (8.3 C)
- For specifications and cutoff, follow the guidance provided in next steps.



Other considerations for Greener Homes

Provide the number of heads for mini- and multi-split systems

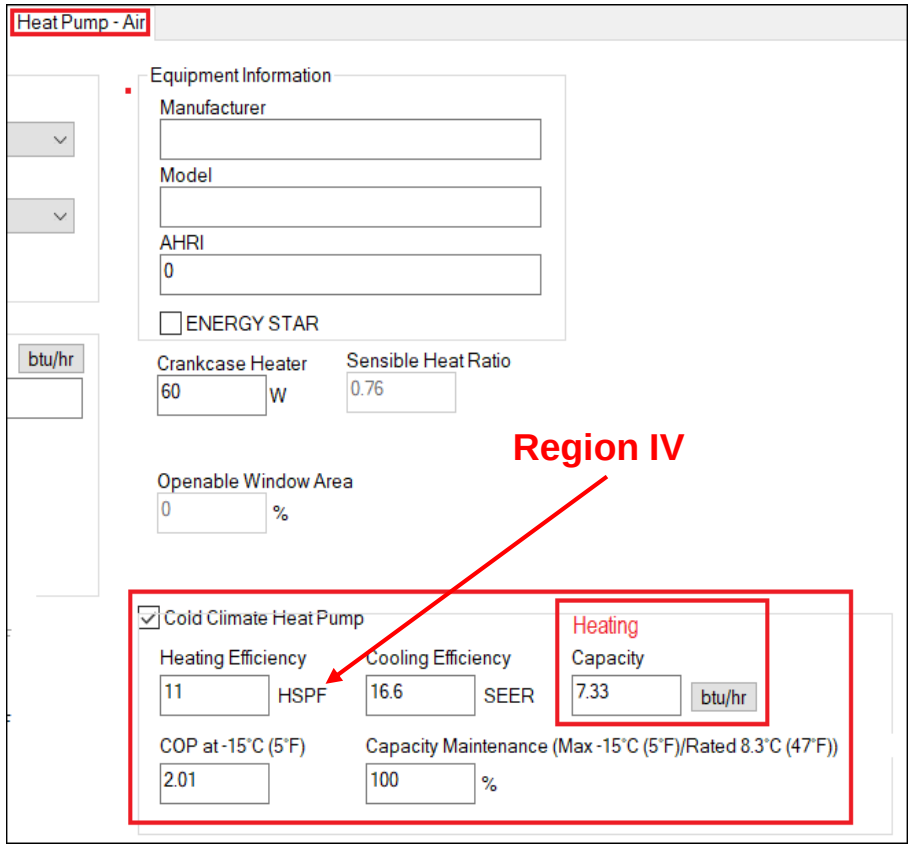
- A minimum of 2 heads is required to trigger a Canada Greener Homes grant.
- If there is a combination of newly installed eligible ASHPs and ccASHPs, refer to Table 2 and Table 3 of the *Information Manual for Service Organizations and Energy Advisors v2* for the number of heads to trigger grants.
- If the system is determined to not be capable of distributing heat throughout the entire house, enter “1” in the **Number of heads** field to avoid triggering a grant.



Procedure: To validate that a heat pump is distributing heat throughout the entire house or duplex, a minimum of one warm air supply outlet and/or indoor head is required on every storey of each dwelling unit, including foundations where the distance from the top of the floor slab to the bottom of the ceiling joist is 1.8 m or higher.

Other considerations for the ccASHP fields

- Provide additional info for ccASHPs from the Greener Homes Searchable product list:
  - Rated HSPF (Region IV), SEER, and heating capacity
  - COP @ -15°C
  - Capacity maintenance
- If multiple ccASHPs are installed, provide information for the one with the highest capacity.
  - If the highest capacity ccASHP is less than 12,000 Btu/h, sum the capacities of newly installed eligible ccASHPs but enter the other information in the ccASHP fields from the system with the highest capacity.
- If the D file was created without this info, it must be entered and the file must be updated



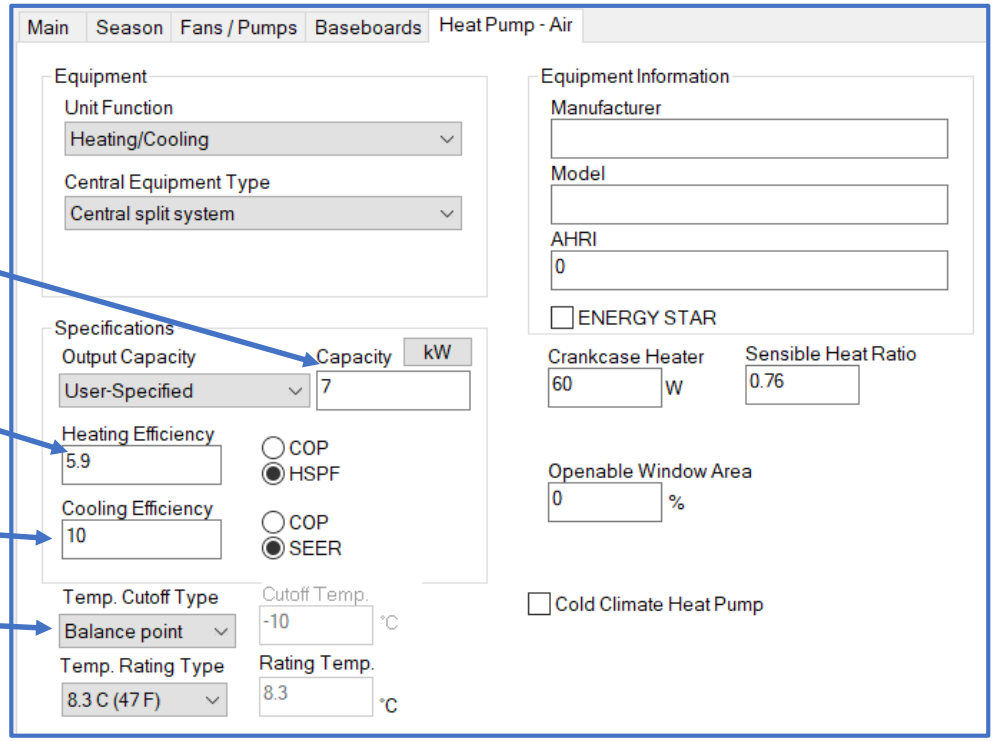
Specifications

Output Capacity

Heating Efficiency
HSPF (region V) or COP (@8.3°C)

Cooling Efficiency

Cutoff



Specifications for pre-retrofit: no heat pump in base case

D File (base case) situation	Recommendation	Inputs for D file (upgrade case)
No Heat Pump	**Output Capacity**	
	Install ASHP or ccASHP	Set to **Calculated**
	Heating and Cooling Efficiency	
	Install ASHP or ccASHP	HSPF (V) = 8.7 SEER = 10
	Cut-off type (temperature)	
	Install ASHP	Balance point
	Install ccASHP	Restricted (-22°C)

Notes:

1. IV or V in brackets after HSPF stands for region IV and V. This form is used for compactness.
2. HSPF Region IV must be converted to HSPF Region V for HOT2000 modelling by dividing the HSPF Region IV value by 1.15. The Greener Homes Searchable product list provides the HSPF for Region IV only.

Specifications for pre-retrofit: existing ASHP in pre-retrofit

Pre-retrofit situation	Inputs for D file (base case)
Output Capacity	
Unknown capacity	Min(7 kW, 1.25 × DesignCoolingLoad)
Known capacity	Use known capacity
Heating and Cooling Efficiency	
Unknown efficiency	HSPF(V) = 5.9 and SEER = 10
Known efficiency	Use known HSPF(V) and SEER
Cut-off type (temperature)	
Unknown cutoff	Balance point
Known cutoff	Use known cutoff

Recommendation	Inputs for D file (upgrade case)
Output Capacity	
Additional or replacement ASHP	Set to **Calculated**
Additional or replacement ccASHP	
Heating and Cooling Efficiency	
Additional or replacement ASHP	HSPF(V) = Max (8.7, $HSPF_{base\ case}$+0.1) SEER = Max (10, $SEER_{base\ case}$)
Additional or replacement ccASHP	
Cut-off type (temperature)	
Additional or replacement ASHP	Balance point
Additional or replacement ccASHP	Restricted (-22°C)

Specifications for pre-retrofit: existing ccASHP in pre-retrofit

Pre-retrofit situation	Inputs for D file (base case)
Output Capacity	
Known capacity	Adjusted capacity from ccASHP spreadsheet
Heating and Cooling Efficiency	
Known efficiency	Adjusted heating and cooling COPs from ccASHP spreadsheet
Cut-off type (temperature)	
For all situations	Restricted (-22°C)

Recommendation	Inputs for D file (upgrade case)
Output Capacity	
Additional or replacement ASHP	Set to **Calculated**
Additional or replacement ccASHP	
Additional or replacement ASHP	COP_{heat}= Max (4.05, adjusted $COP_{heat,base\ case}$+0.1) COP_{cool}= Max (3, adjusted $COP_{cool,\ base\ case}$)
Additional or replacement ccASHP	
Cut-off type (temperature)	
Replacement ASHP	Balance point
Additional or replacement ccASHP	Restricted (-22°C)
Additional ASHP	

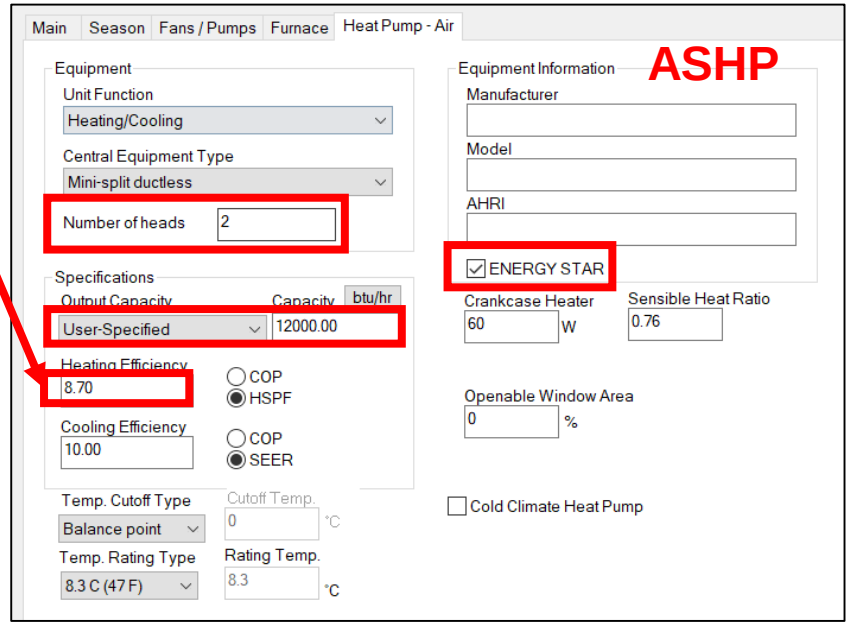
Notes:

1. In order to be considered a ccASHP in the frame of Greener Homes and ERS, a heat pump must be listed in the Northeast Energy Efficiency Partnership (NEEP) database. Its performance data is therefore known. Any heat pump not in the NEEP list must be modelled as an ASHP: i.e. following the procedure outlined in the previous slide.
2. The ccASHP spreadsheet is the most recent version of the *Heat Pump Calculator*.

Minimum requirements to trigger an ASHP grant

- A heat pump must have been recommended in the upgrades of the D file
- **ENERGY STAR** box is checked
- **Output Capacity** ≥ 12,000 Btu/hr (3.52 kW)
- **HSPF(V)** ≥ 8.7
- Number of heads ≥ 2 or central system
- In case of a replacement (heat pump modelled in the base case of the D file), the efficiency of the heat pump modelled in the E must be greater than the one in the D

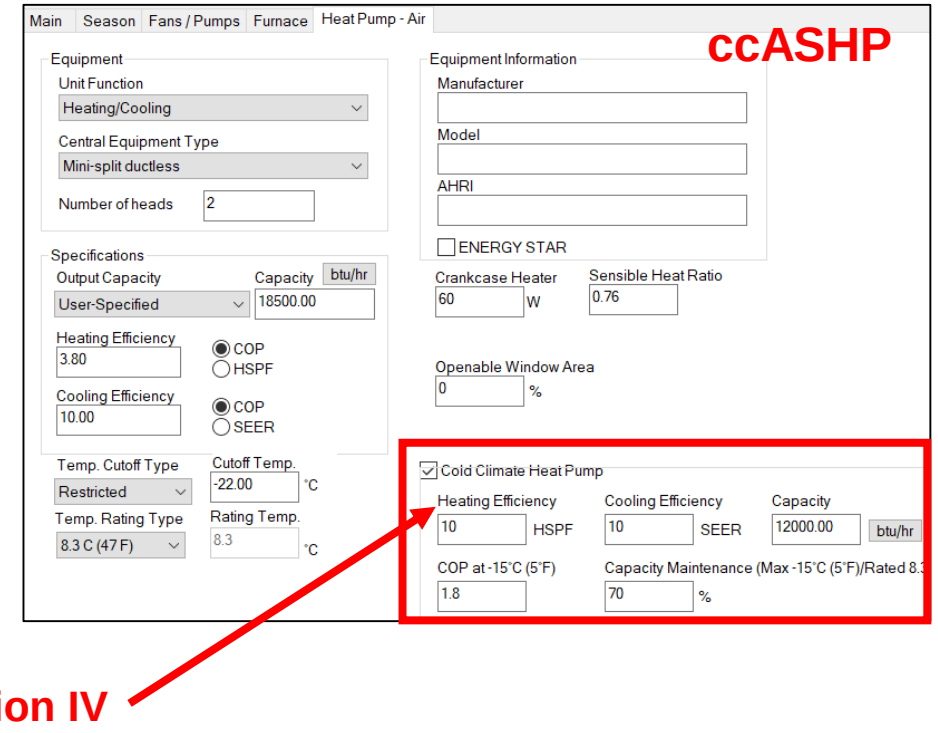
Region V



Notes:
1-Only ccASHPs are eligible for grants in Québec and Nova Scotia
2-For a non eligible ENERGY STAR ASHP, do not select the ENERGY STAR box

Minimum requirements to trigger a ccASHP grant

- A heat pump must be recommended in the upgrades of the D file
- Number of heads ≥ 2 or central system
- In case of a replacement (heat pump modelled in the base case of the D file), the efficiency of the heat pump modelled in the E must be greater than the one in the D
- **Cold Climate Heat Pump** box is selected
  - The following conditions are met
    - **Capacity** ≥ 12,000 Btu/hr (3.52 kW).
    - **HSPF(IV)** ≥ 10
    - **COP @ -15°C** ≥ 1.8
    - **Capacity maintenance** ≥ 70%



Note: For a non eligible ccASHP, ensure that 0% is entered in the **Capacity Maintenance** field to avoid triggering a grant.

Notes on ccASHPs

- Adjusted performance data calculated by the ccASHP spreadsheet is not meant to represent the real heat pump performance. It is an adjustment made so that HOT2000 provides results that are more representative of the ccASHP's energy consumption over an entire season in the climate region of interest.
- Use of the *ccASHP spreadsheet* is explained in *Program Bulletin # 78* (Nov 17, 2020).
- It is a good idea to keep a list of adjusted performances of common ccASHPs operating in the climate region(s) where you work in order to facilitate their modelling.
- Do not use adjusted data from the ccASHP spreadsheet to model a ccASHP with a temperature cutoff warmer than -22°C: e.g. a ccASHP used as part of a hybrid system with a switchover temperature of -12 or -15°C.
  - Such systems should be modelled using the procedure for regular ASHPs as illustrated in Slide 12.
  - The ccASHP check box should still be checked and all the requested data entered.

Adjustments to D file before submission of E file (existing ASHP in pre-retrofit)

Pre-retrofit situation	Upgrade for Post-retrofit (E)		Inputs for D file (base case)
Output Capacity			
Unknown capacity	Replacement ASHP		Capacity of replacement ASHP (1)
	Replacement ccASHP		Rated capacity of ccASHP (@ 8.3°C) (1)
	Additional ASHP or ccASHP		Min(7 kW, 1.25 × DesignCoolingLoad)
Known capacity	(2)		Use known capacity
Heating and Cooling Efficiency			
Unknown efficiency	(2)		HSPF = 5.9 and SEER = 10
Known efficiency	(2)		Use known HSPF and SEER
Cut-off type (temperature)			
Unknown cutoff	Replacement ASHP with known cutoff		Same cutoff as replacement ASHP (1)
	Additional or replacement ccASHP		Restricted (-10°C) (1)
	Other		Balance point
Known cutoff	Additional or replacement ASHP with	Known cutoff	Use known cutoff
		Unknown cutoff	Balance point(1)

Notes:
1. Values in red indicate a situation where the D file needs to be modified and submitted for update before submission of the E file.
2. Blank cells mean this applies to any situation: new, replacement, or additional ASHP or ccASHP.

Adjustments to D file before submission of E file (existing ccASHP in pre-retrofit)

Values in red indicate a situation where the D file needs to be modified and submitted for update before submission of the E file.

Pre-retrofit situation	Inputs for D file (base case)
Output Capacity	
ccASHP modelled without the ccASHP spreadsheet	Adjusted capacity from ccASHP spreadsheet(1)
ccASHP modelled with the ccASHP spreadsheet	Adjusted capacity from ccASHP spreadsheet
Heating and Cooling Efficiency	
ccASHP modelled without the ccASHP spreadsheet	Adjusted heating and cooling COPs from ccASHP spreadsheet(1)
ccASHP modelled with the ccASHP spreadsheet	Adjusted heating and cooling COPs from ccASHP spreadsheet
Cut-off type (temperature)	
	Restricted (-22°C) (1)

Specifications for post-retrofit ASHP upgrade

Pre-retrofit situation	Upgrade for Post-retrofit		Inputs for E file
Output Capacity			
(2)	New or replacement ASHP		Rated capacity of new ASHP
Existing ASHP	Additional ASHP		Sum of the capacities of the old and new ASHPs
Existing ccASHP	Additional ASHP		Use ccASHP spreadsheet to combine ASHPs and ccASHPs
Heating and Cooling Efficiency			
(2)	New or replacement ASHP		HSPF and SEER of new ASHP
Existing ASHP	Additional ASHP		HSPF: Capacity weighted average of the HSPFs SEER: Capacity weighted average of the SEERs
Existing ccASHP	Additional ASHP		Use ccASHP spreadsheet to combine ASHPs and ccASHPs
Cut-off type (temperature)			
(2)	New or replacement ASHP with known cutoff		Use known cutoff
No HP or Existing ASHP	New or replacement ASHP with unknown cutoff		Balance point
Existing ccASHP	Replacement ASHP with unknown cutoff		Restricted (-10°C)
Existing ASHP	Additional ASHP	Cutoffs of new and existing known	Capacity weighted average of the cutoffs
		Cutoff of new or existing unknown	Balance point
Existing ccASHP	Additional ASHP		Restricted (-22°C) (assume -10°C for ASHP if unknown when combining capacity and efficiency in the ccASHP spreadsheet)

Specifications for post-retrofit ccASHP upgrade

Pre-retrofit situation	Upgrade for Post-retrofit	Inputs for E file
Output Capacity		
(2)	New or replacement ccASHP	Adjusted capacity from ccASHP spreadsheet
Existing ASHP or ccASHP	Additional ccASHP	Use ccASHP spreadsheet to combine ASHPs and ccASHPs
Heating and Cooling Efficiency		
(2)	New or replacement ccASHP	Adjusted heating and cooling COPs from ccASHP spreadsheet
Existing ASHP or ccASHP	Additional ccASHP	Use ccASHP spreadsheet to combine ASHPs and ccASHPs
Cut-off type (temperature)		
(2)	New, replacement, or additional ccASHP	Restricted (-22°C)

Example 1

Modelling of D file

Unknown ASHP in base case of D File

Note: this will be the base case for all other examples

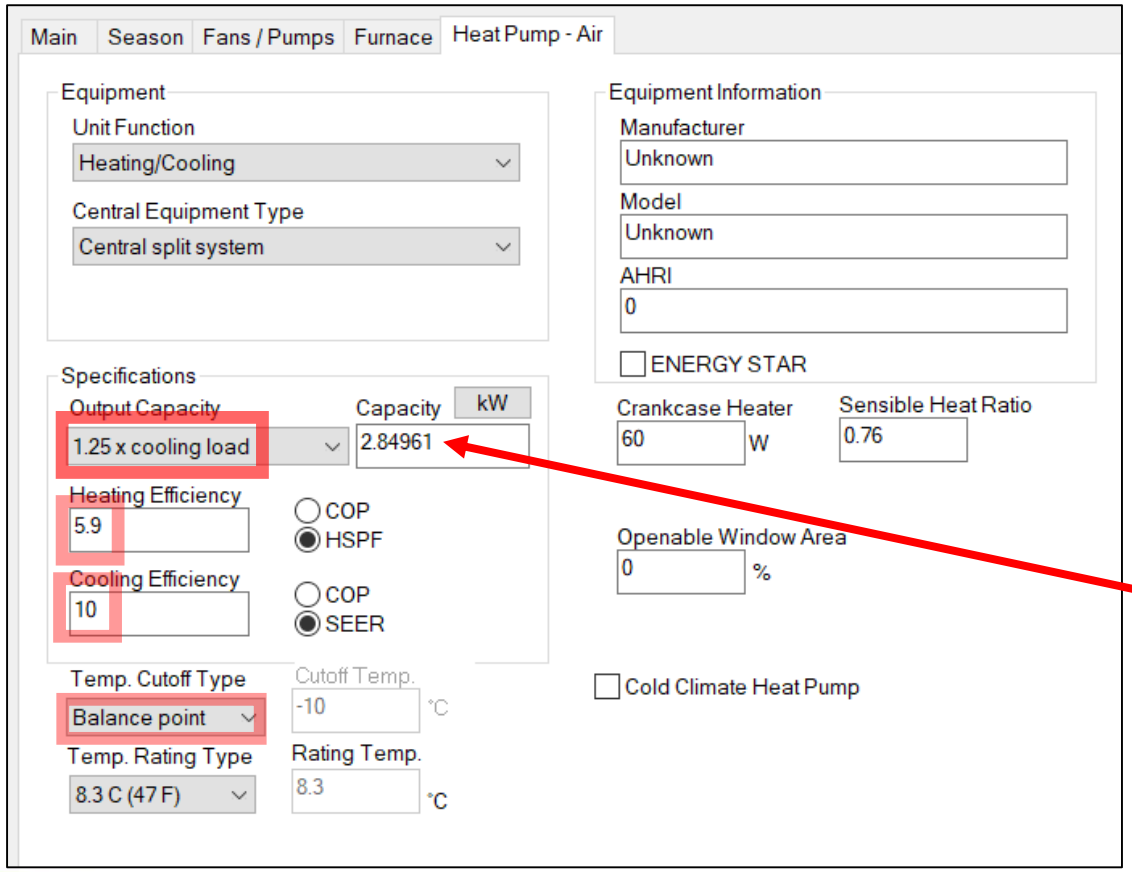
Example 1- Unknown ASHP in base case of D File

Central split system used for heating and cooling

Pre-retrofit situation	Inputs for D file (Base)
Output Capacity	
Unknown capacity	Min(7 kW, 1.25 × DesignCoolingLoad)
Known capacity	Use known capacity
Heating and Cooling Efficiency	
Unknown efficiency	HSPF(V) = 5.9 and SEER = 10
Known efficiency	Use known HSPF(V) and SEER
Cut-off type (temperature)	
Unknown cutoff	Balance point
Known cutoff	Use known cutoff

Table from p.10

Example 1: Simulation with 1.25×Cooling Load



Since 1.25 × Design cooling load (=2.85 kW) is smaller than 7 kW, the modelled capacity is 2.85 kW

Example 2

Recommended Upgrade in the D file

Replacement of existing ASHP in base case with ENERGY STAR ASHP

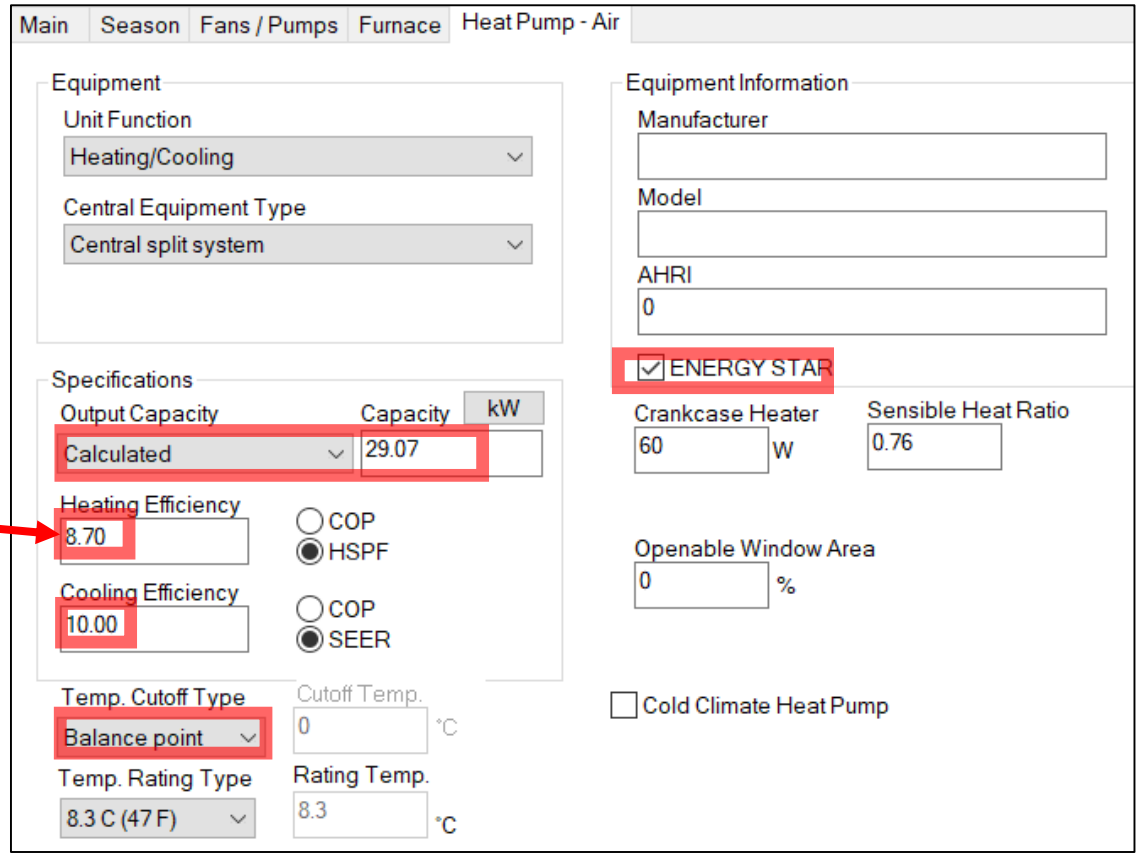
Example 2 - Replacement ENERGY STAR ASHP

Recommendation	Inputs for D file (upgrade case)
Output Capacity	
Additional or replacement ASHP	Set to **Calculated**
Additional or replacement ccASHP	
Heating and Cooling Efficiency	
Additional or replacement ASHP	HSPF(V) = Max(8.7, $HSPF_{base\ case}$+0.1) SEER = Max(10, $SEER_{base\ case}$)
Additional or replacement ccASHP	
Cut-off type (temperature)	
Additional or replacement ASHP	Balance point
Additional or replacement ccASHP	Restricted (-22°C)

Table from p.10

Example 2: Upgrade section of D file

HSPF(V) = Max(8.7, $HSPF_{base\ case}$+0.1)
= Max(8.7, 5.9+0.1)
= 8.7



Example 3

Recommended upgrade in the D file

Addition of ccASHP

to existing ASHP in base case

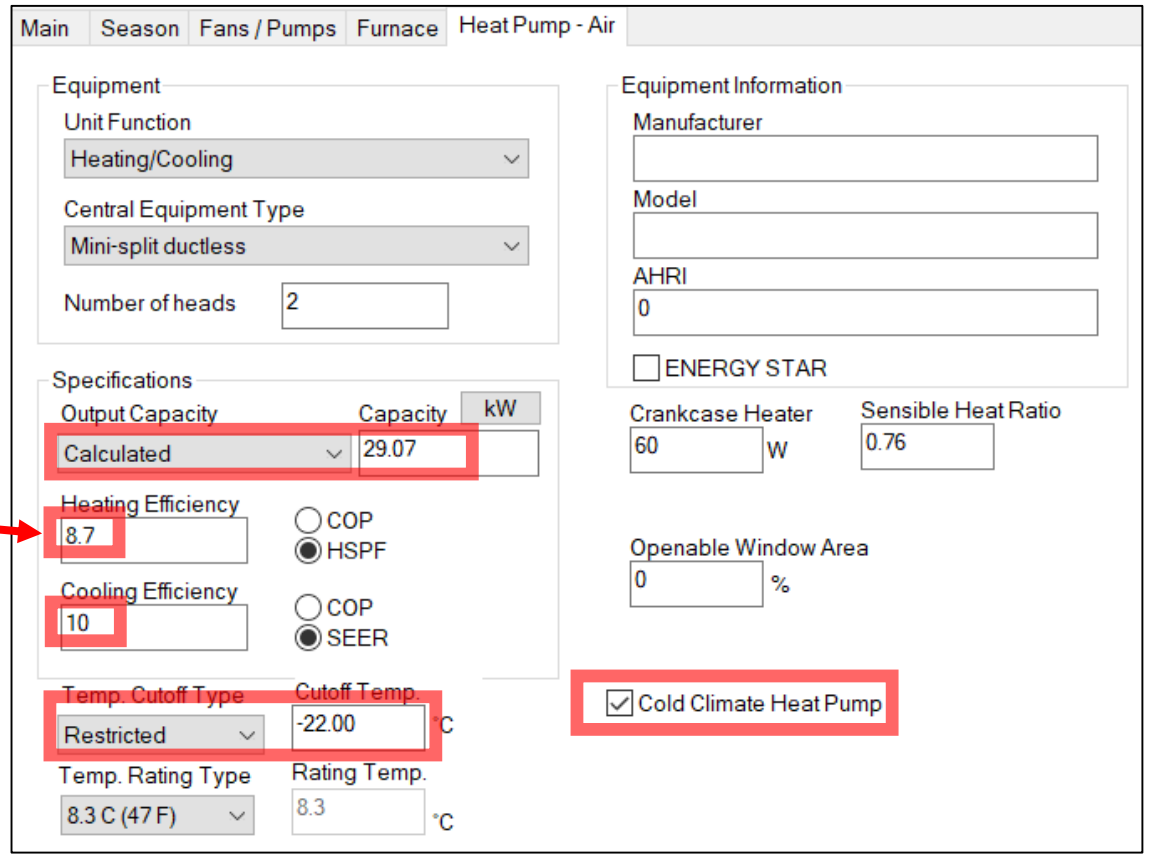
Example 3 - Additional ccASHP as upgrade recommendation in D File

Recommendation	Inputs for D file (upgrade case)
Output Capacity	
Additional or replacement ASHP	Set to **Calculated**
Additional or replacement ccASHP	
Heating and Cooling Efficiency	
Additional or replacement ASHP	HSPF(V) = Max(8.7, $HSPF_{base\ case}$+0.1) SEER = Max(10, $SEER_{base\ case}$)
Additional or replacement ccASHP	
Cut-off type (temperature)	
Additional or replacement ASHP	Balance point
Additional or replacement ccASHP	Restricted (-22°C)

Table from p.10

Example 3: Upgrade section of D file

HSPF(V) = Max(8.7, $HSPF_{base\ case}$+0.1)
= Max(8.7, 5.9+0.1)
= 8.7



Example 4

Modelling of E file
Replacement of existing ASHP with an ENERGY STAR model

Example 4

New ASHP

- **Brand**: Carrier
- **Model**: INFINITY 24 HP
- **AHRI number**: 206132694
- **System type**: Centrally Ducted
- **Outdoor unit**: 25VNA448A*030*
- **Indoor unit**: CAP**6121AL*+UI
- **Capacity (@ 8.3°C)**: 46000 BTU/hr
- **HSPF(IV)**: 11 **HSPF(V)** = 11 / 1.15 = 9.57
- **SEER**: 21
- **ENERGY STAR**: Yes
- **Cutoff temperature**: unknown

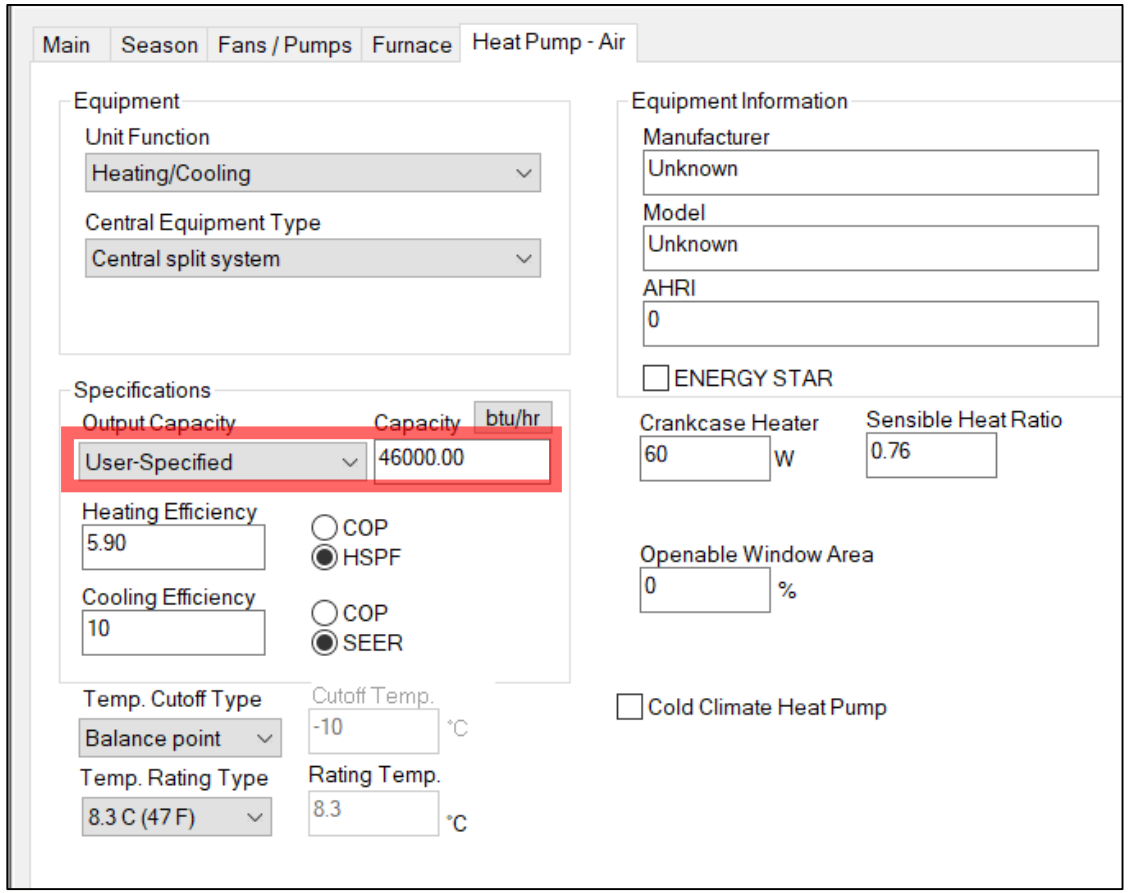
Example 4: Modification to D file (base case)

Pre-retrofit situation	Upgrade for post-retrofit	Inputs for D file (base case)
Output Capacity		
Unknown capacity	Replacement ASHP	Capacity of replacement ASHP
	Replacement ccASHP	Rated capacity of ccASHP (@ 8.3°C)
	Additional ASHP or ccASHP	Min(7 kW, 1.25 × DesignCoolingLoad)
Known capacity		Use known capacity
Heating and Cooling Efficiency		
Unknown efficiency		HSPF = 5.9 and SEER = 10
Known efficiency		Use known HSPF and SEER
Cut-off type (temperature)		
Unknown cutoff	Replacement ASHP with known cutoff	Same cutoff as replacement ASHP
	Additional ccASHP	Restricted (-10°C)
	Other	Balance point
Known cutoff		Use known cutoff

Must adjust capacity in D file and update file before submitting E file

Table from p.15

Example 4: Modification to D file (base case)

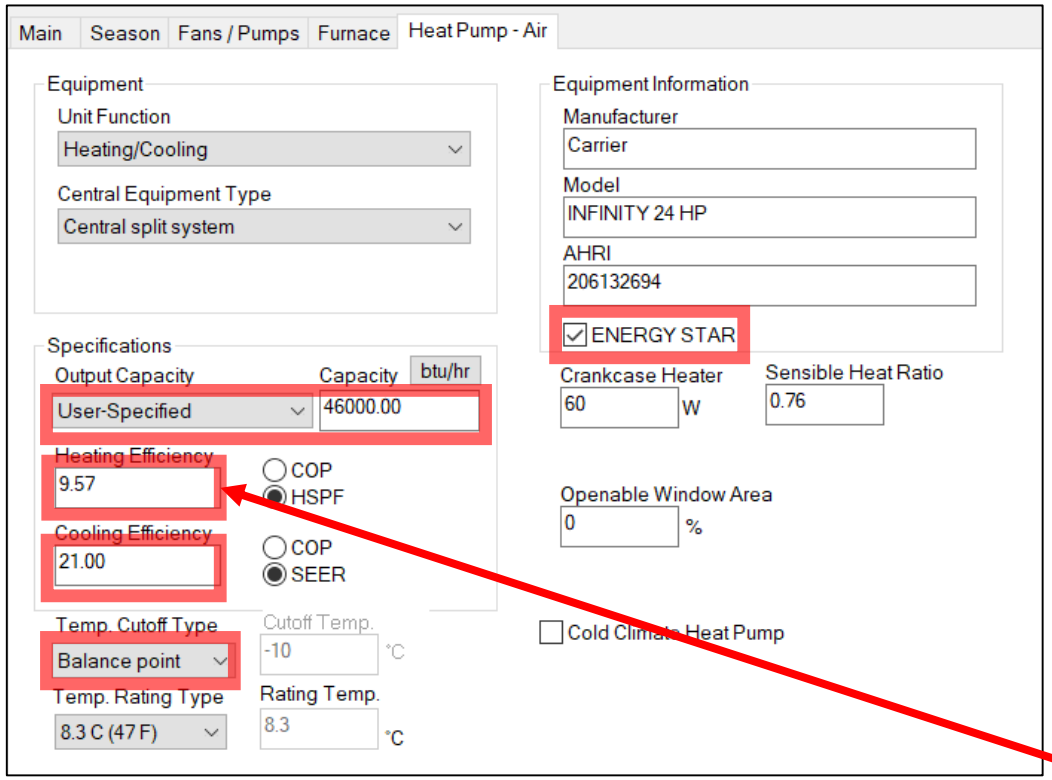


Example 4: E file

Pre-retrofit situation	Upgrade for post-retrofit		Inputs for E file
Output Capacity			
	New or replacement ASHP		Rated capacity of new ASHP
Existing ASHP	Additional ASHP		Sum of the capacities of the old and new ASHPs
Existing ccASHP	Additional ASHP		Use ccASHP spreadsheet to combine ASHPs and ccASHPs
Heating and Cooling Efficiency			
	New or replacement ASHP		HSPF and SEER of new ASHP
Existing ASHP	Additional ASHP		Capacity weighted average of the HSPFs and SEERs
Existing ccASHP	Additional ASHP		Use ccASHP spreadsheet to combine ASHPs and ccASHPs
Cut-off type (temperature)			
	New or replacement ASHP with known cutoff		Use known cutoff
	New or replacement ASHP with unknown cutoff		Balance point
Existing ASHP	Additional ASHP	Cutoffs of new and existing known	Capacity weighted average of the cutoffs
		Cutoff of new or existing unknown	Balance point
Existing ccASHP	Additional ASHP		Restricted (-22°C) (assume -10°C for ASHP if unknown when combining capacity and efficiency in the ccASHP spreadsheet)

Table from p.17

Example 4: E file



Region V

Example 5

Modelling of E file

Addition of ccASHP to existing ASHP in base case

Example 5

New ccASHP

- **Brand**: LG added to the unknown ASHP from Example 1
- **AHRI number**: 10443471
- **System type**: Mini/Multi-Split (2 heads)
- **Outdoor unit**: LMU420HHV
- **Capacity (@ 8.3°C)**: 45000 BTU/hr
- **HSPF(IV)**: 11 **HSPF(V)** = 11 / 1.15 = 9.57
- **SEER**: 20.5
- **ENERGY STAR**: Yes

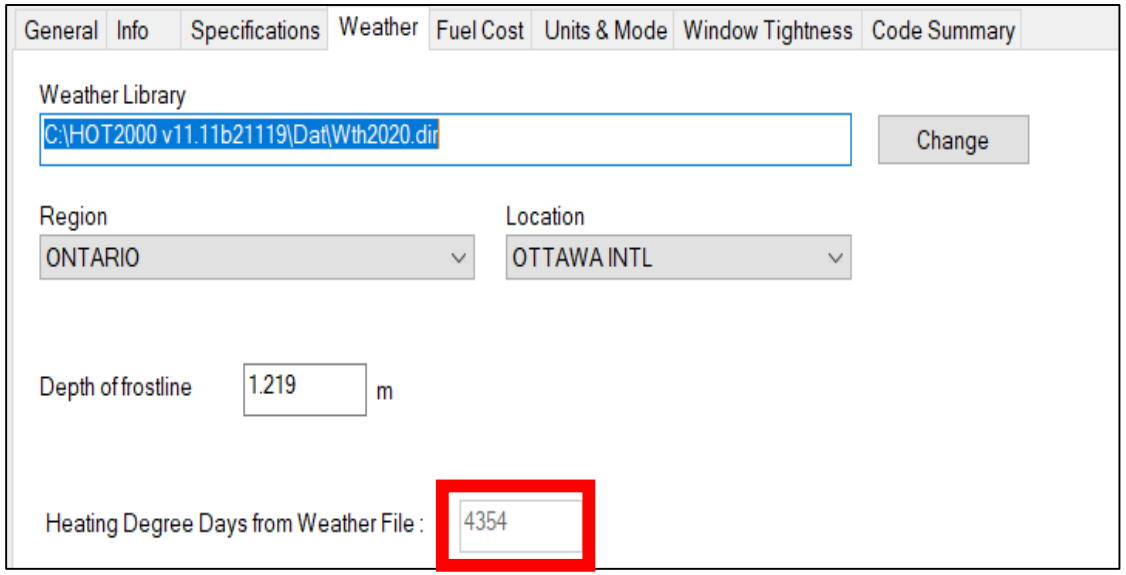
Example 5: NEEP data

- **LG (AHRI-10443471)**
- **COP @ -15°C:** 2.15
- **Capacity maintenance:** 100%

Temperature (°C)	Cap @ max (BTU/hr)	COP @ max
Heating		
8.3	55260	3.61
-8.3	49950	2.60
-15	45000	2.15
Cooling		
35	44573	3.51

Example 5: Location

- **Location**: Ottawa
- **HDD**: 4354



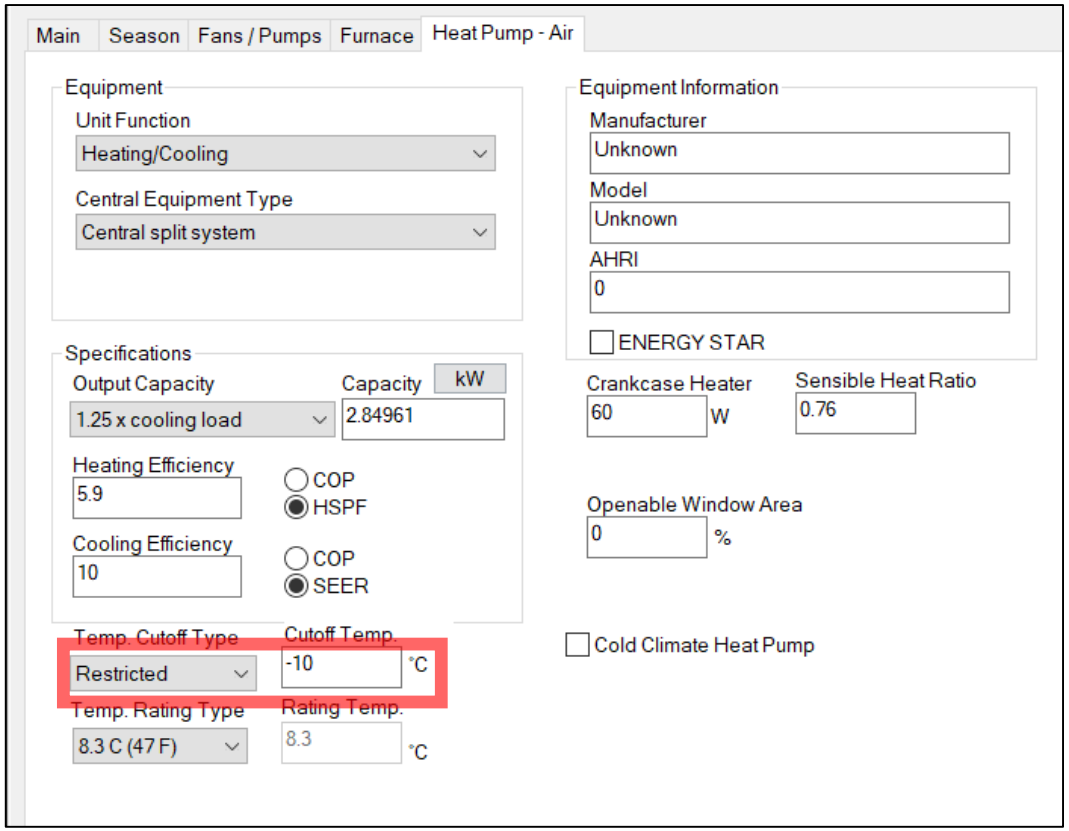
Example 5: Modification to D file (base case)

Pre-retrofit situation	Upgrade for Post-retrofit	Inputs for D file (Base case)
Output Capacity		
Unknown capacity	Replacement ASHP	Capacity of replacement ASHP
	Replacement ccASHP	Rated capacity of ccASHP (@ 8.3°C)
	Additional ASHP or ccASHP	Min(7 kW, 1.25 × DesignCoolingLoad)
Known capacity		Use known capacity
Heating and Cooling Efficiency		
Unknown efficiency		HSPF = 5.9 and SEER = 10
Known efficiency		Use known HSPF and SEER
Cut-off type (temperature)		
Unknown cutoff	Replacement ASHP with known cutoff	Same cutoff as replacement ASHP
	Additional ccASHP	Restricted (-10°C)
	Other	Balance point
Known cutoff		Use known cutoff

Table from p.15

Must adjust cutoff in D file and update file before submitting E file

Example 5: Modification to D file (base case)



Example 5: E file

Pre-retrofit situation	Upgrade for post-retrofit	Inputs for E file
Output Capacity		
	New or replacement ccASHP	Adjusted capacity from ccASHP spreadsheet
Existing ASHP or ccASHP	Additional ccASHP	Use ccASHP spreadsheet to combine ASHPs and ccASHPs
Heating and Cooling Efficiency		
	New or replacement ccASHP	Adjusted heating and cooling COPs from ccASHP spreadsheet
Existing ASHP or ccASHP	Additional ccASHP	Use ccASHP spreadsheet to combine ASHPs and ccASHPs
Cut-off type (temperature)		
	New, replacement, or additional ccASHP	Restricted (-22°C)

Table from p.18

Example 5: Combining HPs in the ccASHP spreadsheet

Data Entry

Equipment Information

Manufacturer	LG
Model	LMU420HHV
AHRI Number	10443471

Data from HOT2000

Weather Location	Ottawa
Heating degree days	4354

Results

Adjusted capacity	29.07	kW
Adjusted capacity	99196	BTU/hr

Cold Climate Air Source Heat Pump (CCASHP)

Link to NEEP Database

Temperature °C (°F)	Max Capacity (BTU/h)	Max COP
-15 (5)	45000	2.15
-8.3 (17)	49950	2.60
8.3 (47)	55260	3.61
35 (95)	44573	3.51

Adjusted Heating COP	3.59
Adjusted Cooling COP	3.37

To combine the CCASHP with an existing heat pump that is not a CCASHP fill in the boxes below

Capacity (BTU/h)	Cutoff Temperature °C
9725	-10.00
Heating Efficiency HSPF	**Cooling Efficiency SEER**
5.90	10.00

Note 1: The provided capacity must have been measured at 8.3 °C (47

Note 2: If a COP is provided for the heating efficiency, it must have be

Note 3: If a COP is provided for the cooling efficiency, it must have be
temperature and 19.4 °C (67 °F) indoor wet bulb temperature.

Note 4: If a HSPF is provided for the heating efficiency, it must corresp

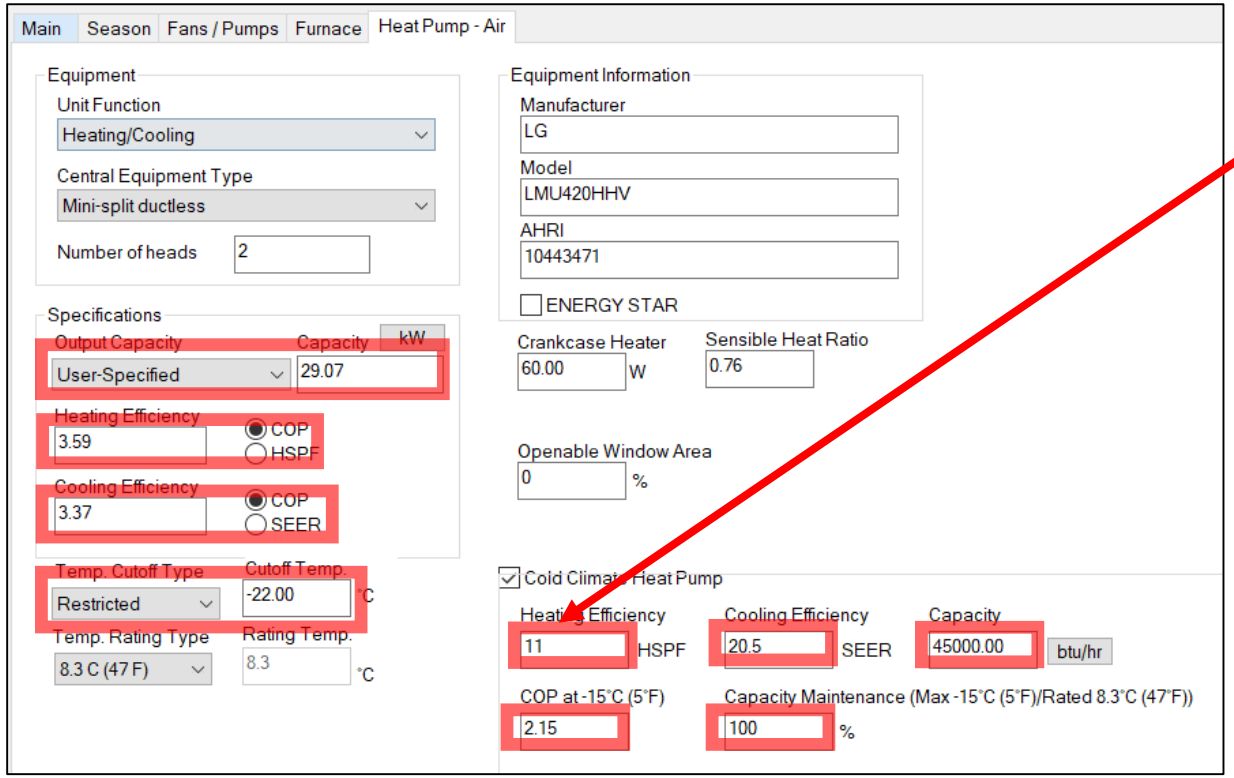
New ccASHP

Existing ASHP (data from D file)

Combined Capacities

Combined COPs

Example 5: E file in HOT2000



Specifications from ccASHP spreadsheet (slide 41)

Region IV

Information from Greener Homes Searchable product list or NEEP database (slide 35)

Note that only ccASHPs from the Greener Homes Searchable product list can receive incentives.

Thank you!