



Residential and Small-Scale Ground-Source Heat Pump Program

Program Manual

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The Massachusetts Clean Energy Center (“MassCEC”) has authorized thirty-million dollars (\$30,000,000) in funding to support a suite of Clean Heating & Cooling programs through 2020. As part of this initiative, MassCEC provides rebates for the installation of small-scale ground-source heat pump (“GSHP”) systems at residential, commercial, institutional, or non-profit properties through the Residential and Small-Scale Ground-Source Heat Pump Program (“Small-Scale GSHP Program” or the “Program”).

Through the Program, MassCEC supports efficient and high-quality GSHP technologies that provide lifetime consumer cost savings while reducing greenhouse gas (“GHG”) emissions. In the interest of increasing access to these technologies to broad customer populations, MassCEC offers increased incentives for households that earn less than one hundred twenty percent (120%) of the state median income and for multifamily affordable housing.

This Residential and Small-Scale GSHP Program Manual (the “Program Manual” or “Small-Scale Program Manual”) describes the rebate application process, eligibility requirements, and rebate levels. This Program covers residential Projects, as well as small-scale commercial, industrial, institutional, non-profit, and public Projects with rated heating capacities up to one hundred twenty thousand (120,000) British Thermal Units per hour (BTU/hr) (or 10 “Heating Tons” or “Tons”). For projects with rated capacities greater than 10 Tons, please refer to the Commercial-Scale GSHP Program Manual, available on the [MassCEC website](#).

The capitalized terms used in the Program Documents (*e.g.*, the Program Manual, Participant’s Agreement, Application, and Award Letter (collectively, the “Program Documents”) are defined in Section 4 of the Program Manual. Program Documents and further Program information are located on the Program webpage (<http://www.masscec.com/get-clean-energy>).

Note: This Program aligns with the Department of Energy Resources’ (DOER) current Alternative Portfolio Standard (“APS”) regulations and guidelines. From time to time the APS regulations and guidelines may change and as a result, this Program may be impacted to reflect such changes. More information about the APS is available here: <https://www.mass.gov/service-details/alternative-portfolio-standard-rulemaking>.



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1. How to Participate in the Program

All Applications must be submitted and approved by MassCEC prior to starting Project construction, and, to be eligible for a Rebate, construction may not commence until an Award Letter is received.

Once the System Owner has decided to move forward with the Project, the Primary Installer should apply for a rebate on the System Owner's behalf.

Step 1-Ensure Project Meets Requirements: The System Owner and Primary Installer (together the "Applicant Parties") should read this Program Manual prior to submitting an Application. The Applicant Parties must determine if the Project will meet program requirements specified in Section 2 in order to qualify for a rebate, including site eligibility and project technology requirements.

Step 2-Determine Eligibility for Rebate Adders:

Residential System Owners: Determine eligibility for the Income-Based Rebate Adder and, if applicable, apply for income verification. See Section 2.3 for information on eligibility guidelines. If applying for this additional Rebate amount, residential System Owners who use MassCEC's Income Verification Portal should complete the verification process before their Primary Installer submits their Rebate Application. Those using electric bills or fuel assistance letters should submit the documents with the Application. Affordable housing developments with one to four units should see the guidelines in Section 2.3.

Non-Residential System Owners: Determine eligibility for the Public/Non-Profit Adder and the Multi-Family Affordable Housing Adder, as described in Section 2.3.

Step 3-Apply for Rebate: The Application should be completed and submitted by the Primary Installer with the assistance and approval of the System Owner. Application documents must be emailed to GSHP@masscec.com. To expedite the review, please include "GSHP Application: [System Owner Name (residential) /Site Name (non-residential)]" in the subject line. Both the Primary Installer and System Owner should review all information prior to submitting it to MassCEC.

All complete Applications must include:

1. **Application** - A completed Excel Application file;
2. **Participant's Agreement** - signed by both the System Owner and Primary Installer;¹
3. **Electric Bill** - from Project Site, clearly showing both the billing address of the installation site and the rate code;²

1 The Application may include either the entire Participant's Agreement or just the last page (the Signature and Acceptance Form). The signatures may be either scanned versions of original, handwritten signatures or electronic signatures (including electronic signatures that are signed via an electronic notepad). However, all electronic signatures and any related signing process must comply fully in all respects with the United States Electronic Signatures in Global and National Commerce Act and the Uniform Electronic Transactions Act (as each may be amended from time to time) as well as any applicable state laws, statutes and regulations. Approved electronic signature services include DocuSign or EcoSign.

2 For new construction, a request for electric service can be submitted instead of an electric bill, if an electric bill is not available within sixty (60) days of Project installation.



4. **Heat Load Calculation** - The summary report from the building heat load calculation described in Section 2.5 (Manual J for residential, Manual N for commercial facilities);
5. **AHRI Rating Certificate** - The Air-Conditioning, Heating, and Refrigeration Institute (“AHRI”) rating certificate for each heat pump model installed; and
6. **Modeling software design report** showing all system inputs.

Certain projects must also submit additional documents, as follows:

1. **Income-Based Rebate Adder eligibility verification** (if applicable) – If applying for an Income-Based Rebate Adder, one of the following should be submitted:
 - Provide an electric bill with a low-income rate code;
 - Provide a Fuel Assistance Letter of Acceptance;
 - Mass Save income verification letter; or
 - Receive approval of Income-Base Rebate Adder eligibility from the MassCEC income verification portal.
2. **Multifamily Affordable Housing Applicant** (if applicable) – Documentation demonstrating that fifty percent (50%) or more of the units are committed or deeded to households below eighty percent (80%) of the state’s median income.
3. **Tax Documentation** (if applicable) –
 - **Residential System Owners** do not need to submit W-9 forms or other tax documentation.
 - **All Non-Residential System Owners** (including all tax-exempt and government entities) must submit signed W-9 forms separately to finance@masscec.com (do not copy GSHP@masscec.com), as do any installers listed as Payees.
 - **Tax-Exempt Entities** (including government entities) must also submit tax-exemption certificate or IRS tax-exemption determination letter to finance@masscec.com.
4. **Open-loop systems** (if applicable) – Detailed estimation of well water flow rate.

Any Application to retrofit an existing GSHP system must include a narrative detailing why the retrofit is needed, how any existing project issues have or will be corrected, when the system was initially installed, who installed the system, whether the project received a MassCEC rebate, and key design and equipment selection considerations.

Step 4-Receive Award Approval: Upon receiving the Application, MassCEC program staff will send two (2) separate emails. The first email will confirm that the Application has been received; the second email will indicate one of the following statuses:

- the Application is complete;
- the Application is incomplete and further information is needed; or
- the proposed Project is ineligible and has been rejected.

Applications will be evaluated to ensure that the Project will meet the Eligibility and Project Requirements stated in this Program Manual. MassCEC reserves the right to accept, assign design



reviews, or reject Applications based on completeness, qualitative criteria, and available funding; to make no Awards; to award less than the Applicant requests; and/or to award less than the maximum amount of funds potentially available through this Program. If MassCEC elects to conduct a design review, the Primary Installer must be prepared to answer the reviewer's questions about the Project's design and must respond within seven (7) days to any information requests.

MassCEC will notify Applicants of their Application status within four (4) weeks of receipt of a complete Application, barring extenuating circumstances. If the Application meets all requirements of this Program and funding remains available, MassCEC will issue an Award Letter to the System Owner and Primary Installer via email that will provide details on the Award amount and, among other pertinent information, state which party will receive payment (the "Payee"). MassCEC will also attach a Project Completion Form, which will be submitted to MassCEC upon Project Completion.

Step 5-Complete Project: Project installation may commence only after receipt of the Award Letter. Projects must be completed within six (6) months of the Award Date on the Award Letter for Projects at existing buildings and within twelve (12) months for Projects at new construction buildings.

Upon Project Completion, the Primary Installer in cooperation with the System Owner will complete and submit the Project Completion Form and supporting documentation to MassCEC, including:

1. Project Completion Form; and
2. Completed GSHP manufacturer or distributor start-up sheet.

This documentation should be submitted by email to GSHP@masscec.com with "GSHP Project Completion: [*System Owner Name (residential) /Site Name (non-residential)*]" in the subject line.

Step 6-Receive Rebate Payment: Rebates can be paid to the System Owner or Primary Installer, provided that the System Owner provides permission in the Application. Upon approval of the Project Completion Documentation, payment will be issued to the designated Payee within four (4) weeks, barring extenuating circumstances.



2. Eligibility Requirements

The System Owner, Primary Installer, and Project must meet the following eligibility requirements:

2.1. Project Site Eligibility

New construction and existing building projects are both eligible for the Program, though the system must be used for heating (in addition to heating use, systems may provide cooling as well). Projects with a single heat pump serving multiple units in a multifamily residential building can apply jointly with one application, subject to existing caps. A single apartment or condominium can also apply individually. Projects must have rated capacity no greater than ten (10) Heating Tons.

Project installation may not commence until after the Application has been approved by MassCEC and the System Owner has received an Award Letter. Projects that have already commenced construction are not eligible for the rebate.

Project Site Utility Service Requirement

The Project Site must be located in a utility territory that contributes to the Massachusetts Renewable Energy Trust. Applicable territories include the Massachusetts service territory of National Grid, Eversource, Unitil, and municipal light plants that have elected to pay into the Renewable Energy Trust (please see www.masscec.com/municipal-lighting-plant-communities for the complete list).

Project Site Energy Efficiency Audit Requirement

All existing buildings must have an energy efficiency audit completed within the past forty-eight (48) months or have an efficiency audit scheduled to occur and completed within six (6) months of Project Completion. MassCEC highly recommends that priority recommendations from the audit are implemented before or in coordination with the installation of the GSHP. For qualifying locations, energy audits can be scheduled through Mass Save at www.masssave.com. New buildings do not require energy audits, although energy audits are still recommended.

2.2. System Owner Eligibility

Individual Project System Owners may be awarded no more than One Hundred Thousand Dollars (\$100,000) in total Awards through this Program in a fiscal year. MassCEC, at its sole discretion, will determine the applicability of the cap to a System Owner in the event that the cap is reached and may remove the cap in its discretion.

2.3. Eligibility for Rebate Adders

MassCEC offers additional incentives for Projects that meet certain criteria described below.

Income-Based Rebate Adder

In the interest of increasing access to clean heating and cooling technologies such as ground-source heat pumps to all residents of Massachusetts, MassCEC offers additional incentives for households with income below eighty percent (80%) and one hundred twenty percent (120%) of the state median income. Eligibility thresholds are determined based on household size.



Table 1. Income-Based Rebate Adder Thresholds by Household Size		
Household Size	80% of State Median Income	120% of State Median Income
1	\$45,840	\$68,760
2	\$59,944	\$89,916
3	\$74,049	\$111,074
4	\$88,153	\$132,230
5	\$102,257	\$153,386
6	\$116,363	\$174,544
7	\$119,007	\$178,510
8	\$121,652	\$182,478
9	\$124,296	\$186,444
10	\$126,941	\$190,412
11	\$129,585	\$194,378
12	\$132,231	\$198,346
13	\$134,875	\$202,312
14	\$137,519	\$206,278
15	\$140,164	\$210,246
16	\$142,808	\$214,212
17	\$145,453	\$218,180

To receive the Income-Based Rebate Adder, the System Owner must complete one of the following four income verification methods:

1. **Electric Bill:** When submitting the Application Documents, provide MassCEC with a copy of an Electric Bill with a low-income rate code from within the last six (6) months. National Grid, Unitil, and Eversource’s low-income rate code is R2.
2. **Fuel Assistance Letter:** When submitting the Application Documents, provide MassCEC with a copy of a Fuel Assistance Letter of Acceptance from the past twelve (12) months showing the date, System Owner’s name, and Project Site address. An example Fuel Assistance Letter can be found on the [MassCEC’s website](#).
3. **Mass Save income verification screening:** Provide MassCEC with a copy of a letter demonstrating that the System Owner has participated in the income verification screening process for the Mass Save Home Energy Services Program and is eligible for enhanced incentives or the Income Eligible Program. An example letter can be found on the [MassCEC’s website](#).
4. **MassCEC Income Verification:** Prior to submitting Application Documents, complete a free income verification through MassCEC’s Income Verification Portal (<http://masscecoverify.com>). The income verification process requires submission of a completed IRS Form 4506-T for each adult tax filing (single, married filing jointly, married filing separately, and/or head of a household) within the household. MassCEC’s Income Verification Portal is operated by an independent third-party that meets stringent security standards. MassCEC does not and will never have access to any Applicant’s financial information or tax documents submitted through this Income Verification Portal.



- a. System Owners that are going through [MassCEC's Income Verification Portal](#) should select "MassCEC Income Verifier Approval" as the income verification method on their Application.
- b. MassCEC's Income Verification Portal process takes approximately two weeks to verify income. Some verifications could take up to four weeks.
- c. Income verification should be completed prior to the Application and will be valid for a period of one year.
- d. Once the income verification process is completed, MassCEC and the System Owner will receive an email confirming the System Owner is eligible for the Income-Based Rebate Adder. Once the System Owner has received the email confirmation, the rebate Application can be submitted to MassCEC. MassCEC is automatically notified of all System Owners who are eligible for the Income-Based Rebate Adder.

System Owners using MassCEC's Income Verification Portal should complete the income verification process before Applications are submitted. Those using electric bills, fuel assistance letters or Mass Save letters should submit those documents with the Application.

Public and Non-Profit Adder

Public and Non-Profit projects are eligible to receive higher grant levels. Public entities are defined as instrumentalities, authorities, agencies, departments, or political subdivisions of the Commonwealth of Massachusetts, including municipalities. Non-profits are defined as organizations under Section 501(c) (3) of the Internal Revenue Code and registered with the Massachusetts Attorney General, Non-Profit/Public Charities Division. Projects serving Public Entities and Non-Profits that take federal or state tax credits for the GSHP Project (such as the Investment Tax Credit) are not eligible to utilize the Public and Non-Profit Adder.

Affordable Housing Adder

MassCEC and the Commonwealth of Massachusetts have a particular interest of increasing access to clean heating and cooling technologies to low- and moderate-income residents. As a result, MassCEC offers additional GSHP incentives to affordable housing developments in Massachusetts that are owned by commercial, non-profit, or public entities (see Section 3.2). Projects serving four or fewer units may apply for the Affordable Housing Rebate Adder if the System Owner can demonstrate that the Project's units are committed or deeded to households at or below eighty percent (80%) of the state's median income, using one of the following methods:

- 1) An eligibility letter from the Low-Income Energy Affordability Network's (LEAN) Low-Income Multifamily (LIMF) Energy Retrofits Program. See <http://leanmultifamily.org/> for more details.
- 2) A deed restriction that explicitly states the development has reserved at least fifty percent (50%) of the units for households earning eighty percent (80%) or less of AMI. If it is not explicit, then Applicants will need to provide item 1, 3, or 4 instead.
- 3) For housing shelters, a letter from the Executive Director or another individual with signatory authority stating that the property is used as a housing shelter.
- 4) Other forms of documentation as determined by MassCEC on a case-by-case basis.



Affordable housing developers taking federal or state tax credits for the GSHP Project (such as the Investment Tax Credit) are not eligible to utilize the Affordable Housing Adder.

2.4. Primary Installer and Project Requirements

Primary Installer Agreement

Prior to submitting Applications, Primary Installers participating in the Program must read and submit a signed copy of the Primary Installer Agreement (available on the [Installer Resources webpage](#)).

Primary Installer Credentials

Primary Installers participating in the Program must actively hold at least one of the following credentials:

- 1) International Ground-Source Heat Pump Association (IGSHPA) Accreditation;
- 2) Certification as a GeoExchange Designer (CGD) from IGSHPA; or
- 3) Professional Engineer (“PE”) License.

Prior to submitting Applications, Primary Installers participating in the Program must also provide MassCEC with copies of the certificate for one of the accreditations listed above.

If not currently holding one of these credentials, Primary Installers must provide references for three (3) GSHP installations, including phone numbers and email addresses for each reference, to receive conditional approval to participate in this program. Primary Installers must achieve one of these credentials within one year of submitting their first Application in order to continue participating in the Program.

Warranties

For all GSHP Systems receiving an Award under this Program, the Project must be covered by a minimum five (5)-year manufacturer’s warranty. Furthermore, the Primary Installer shall agree to fix any system defects or significant workmanship issues identified during the first year after the Project Completion date.

Design Reviews

MassCEC may submit open-loop, horizontal-loop, and direct exchange system designs to a Third-Party Inspector to evaluate a Project’s design and reserves the right to submit designs of other system types for review. Primary Installers should be prepared to work with the reviewer to answer any outstanding questions about the Project’s design and must respond within seven (7) days to any information requests.

Installation Inspections

MassCEC will send a Third-Party Inspector to inspect the first two (2) completed projects for each Primary Installer. MassCEC reserves the right to inspect subsequent Project Completions at random or due to suspected issues. If the inspector detects an issue with a system installation, MassCEC reserves the right to suspend current Applications and/or stop accepting Applications from that Primary Installer



and/or its subcontractors. Inspections conducted in the Residential Ground-Source Heat Pump Pilot Program may count towards fulfilling this Program’s inspection requirement.

Adhering to Building Code

Installed systems must meet all applicable state and local laws and ordinances, including applying for and receiving a building permit and, upon project completion, receiving sign-off from a local building authority.

2.5. Project Technology and Design Requirements

In order to be eligible for a rebate, Projects must meet the following requirements:

Equipment Requirements

1. The GSHP must be AHRI rated.
2. Eligible heat pumps must have AHRI-rated COP and EER equal to or greater than the following:

System Type	Cooling EER	Heating COP
Water-to-Air		
Closed Loop Water-to-Air	17.1	3.6
Open Loop Water-to-Air	21.1	4.1
Water-to-Water		
Closed Loop Water-to-Water	16.1	3.1
Open Loop Water-to-Water	20.1	3.5
Direct Exchange		
Direct Exchange	16.0	3.6

- a. In the Application, EER and COP must be calculated using the following equations:
 - i. $EER = (full\ load\ EER + part\ load\ EER) / 2$
 - ii. $COP = (full\ load\ COP + part\ load\ COP) / 2$
- b. EER and COP figures for the above calculations must use the AHRI rated ground loop heat pump (GLHP) figures for closed-loop systems and the AHRI rated ground water heat pump (GWHP) figures for open-loop systems.
3. GSHP systems must be designed with full-load heating capacity between ninety (90%) and one hundred twenty percent (120%) of peak heating load (BTU/hr for heating) according to the applicable heat load calculation. On a case-by-case basis, MassCEC will consider eligibility of GSHPs installed at non-residential buildings with heating capacity sized below ninety percent (90%) of peak heating load if designed to operate in conjunction with back-up or peaking heating systems. Note, however, that MassCEC will not consider electric resistance heating systems as a back-up or peaking heating system under this provision.
4. All GSHP systems must be installed by licensed contractors and/or plumbers in accordance with the National Electric Code and manufacturer’s specifications and must conform to all applicable municipal, state, and federal codes, standards, regulations, and certifications, as well as program requirements. At a minimum, a contractor must possess an EPA 608 license to handle refrigerant and an electrician license to complete the electrical work on the heat pump.



5. Blower motors must be multi-speed or variable-speed, high-efficiency motors. Motors qualify as “energy-efficient” if they meet or exceed the efficiency levels listed in the National Electric Manufacturers Association’s (“NEMA’s”) MG1-1993 publication. Single-stage water-to-water console units with a capacity less than two (2) Heating Tons are eligible to be preapproved by MassCEC, provided these types of units satisfy all of the other eligibility requirements described herein.
6. Systems must meet **ANSI/AHRI/ASHRAE/ISO Standard 13256-1** for water-to-air models, **Standard 13256-2** for water-to-water models, or **AHRI Standard 870** for DX models.
7. All compressors must use two-stage, multi-speed, or variable-speed drives, unless they are water-to-water units. Single-stage water-to-water systems are allowed, provided they include accumulator tanks with the greater of ten gallons of capacity per Heating Ton or industry/multiplier recommended best practice.

Well Requirements

8. Vertically bored closed-loop Projects must have a minimum depth of one hundred and fifty (150) feet per twelve thousand (12,000) BTU/hr of heating load served by the system (i.e., the lesser of capacity and peak load). Capacity must be determined using the method used to calculate rebate values (see Section 3). This must be sufficient to maintain a minimum entering water temperature of at least thirty degrees Fahrenheit (30°F), with a recommended best practice of at least thirty-two degrees Fahrenheit (32°F). Direct Exchange (DX) systems require a minimum of one hundred twenty (120) feet of borehole depth per Heating Ton.
9. Closed-loop bore grouting must have a grout conductivity equal to or greater than anticipated earth conductivity of the drill site up to one (1) BTU/hr-ft-°F.
10. There must be at least fifteen (15) feet of separation between closed-loop bore holes.
11. All Projects must comply with the MassDEP Bureau of Resource Protection Drinking Water Program, Guidelines For Ground Source Heat Pump Wells, and Underground Injection Control Program (December 2013, which may be amended from time to time) found at www.mass.gov/eea/docs/dep/water/laws/a-thru-h/gshpguid.pdf.

Open-Loop Project Requirements

12. All open-loop GSHP wells shall be installed in conformance with the Massachusetts Department of Environmental Protection’s (“MassDEP”)’s *Private Well Guidelines* (www.mass.gov/eea/docs/dep/water/laws/i-thru-z/prwellqd.pdf) (as amended) or MassDEP’s *Guidelines and Policies for Public Water Systems* (www.mass.gov/eea/docs/dep/water/laws/a-thru-h/glintro.pdf) (as amended), whichever is applicable. All GSHP wells shall be installed in conformance with 313 CMR 3.00: *Certification of Well Drillers and Filing of Well Completion Reports* (www.mass.gov/eea/docs/dep/service/regulations/310cmr46.pdf).
 - a. Open loop systems must register for a permit with the MassDEP’s Underwater Injection Control (“UIC”) program. The UIC registration number must be noted on the Project Completion form at the time of Project Completion. Open loop systems installed on parcels of land used for single-unit residences are exempt.



<http://www.mass.gov/eea/agencies/massdep/service/approvals/uic-application-for-closed-loop-ground-source-heat-pump.html>)

13. A standing column well must include a bleed circuit and drywell to maximize thermal efficiency based on available water production.
14. Applications for open- and horizontal-loop systems must explain the method for determining pressure and flow rate.

Horizontal-Loop Project Requirements

15. The Application must include the file from the horizontal-loop design software showing inputs and system design specifications.

Direct Exchange System Requirements

16. Direct exchange (DX) heat pumps, which circulate a refrigerant through a closed-loop copper-pipe system (whereas most systems utilize plastic pipes that circulate water or a water-antifreeze mixture), must meet the following additional conditions:
 - a. DX wells require cathodic protection ensuring a minimum expected well life of twenty (20) years.
 - b. DX System Owners must certify that they will undergo an end-of-life decommissioning that includes full refrigerant recovery.³
 - c. Each DX system must undergo a design review through MassCEC's third-party consultant.
 - d. The refrigerant must be R-410A. If the Primary Installer intends to use a different refrigerant type, MassCEC will consider it when the Application is submitted.
 - e. The entire well depth interval for DX wells shall be grouted with thermally enhanced grout that achieves hydraulic conductivity of ten (10^{-7}) centimeters per second or less (per MassDEP).
 - f. A permanent placard must be attached to the heat pump unit, detailing:
 - i. Loop field refrigerant content, type, and volume;
 - ii. loop locations description;
 - iii. loop piping material;
 - iv. required maintenance schedule on loop field, refrigerant, and heat pump; and
 - v. planned decommissioning date and process, consistent with loop field useful life.
 - g. The Primary Installer must provide a detailed operational handbook for the System Owner that provides an overview of system design, operations, and the information stated in 8.b. above.

Heat Load Calculation Requirements

³ If the system is not decommissioned at the end of its useful life, the refrigerant is ultimately likely to leak out of the pipe, causing it to evaporate and escape into the atmosphere. The most common refrigerant for modern DX systems is R-410, a greenhouse gas with over two thousand (2,000) times the global warming potential of CO₂.



17. Equipment must be sized with a building peak heating capacity (BTU/hr) calculated using the Air Conditioning Contractors of America (“ACCA”) Manual J (for residential) or Manual N (for commercial) building heat load calculation method.
18. Primary Installers must submit the summary page of the applicable heat load calculation of the building’s peak heat load at the ninety-nine percent (99%) dry bulb heating design temperature for the most relevant ACCA location. All listed Massachusetts locations and their heating design temperatures are provided below. Heating set temperatures may be between sixty-eight (68) and seventy-two (72) degrees Fahrenheit. Heat load calculations should be adjusted for increased wind chill in windy regions (e.g., Cape Cod).

Massachusetts Location	Heating Design Temperature in Degrees Fahrenheit	Massachusetts Location	Heating Design Temperature in Degrees Fahrenheit
Barnstable	14	Martha’s Vineyard	12
Boston	12	New Bedford	12
Buzzards Bay	17	Norwood	9
Chatham	16	Otis	13
Clinton	2	Pittsfield	-3
Fall River	9	Plymouth	10
Falmouth Area	14	Provincetown	18
Framingham	6	South Weymouth	10
Gloucester	5	Springfield	0
Greenfield	-2	Taunton	9
Lawrence	9	Weymouth	11
Lowell	1	Worcester	6

Monitoring

19. MassCEC strongly recommends all Projects incorporate system performance monitoring technology to help owners understand performance throughout the year.

MassCEC may choose to monitor a subset of systems installed under this Program. To be eligible for an Award under this Program, the System Owner must agree to allow metering and monitoring to be conducted on their Project for up to twenty-four (24) months after installation, if requested. The System Owner will be required to submit utility and fossil fuel bills for two (2) years prior to installation (for existing buildings) and for the duration of the performance monitoring. Monitoring equipment would be paid for and installed directly by contractors to MassCEC with no direct cost to the System Owner. Data would be collected and analyzed for program evaluation purposes and will not impact the Award received by the Grantee.

Deviation from Requirements

Although MassCEC typically does not allow deviation from these design requirements, certain site characteristics may lend themselves to alternate system designs. If for technical reasons, a design



requirement cannot be met for an installation, the Primary Installer may request a waiver. All variations must be explained in detail in the Project Notes field at the bottom of the Application, and output from geothermal modeling software must be submitted. MassCEC may send these Applications to MassCEC's Third-Party Inspector for review and consideration.



3. Rebates and Awarding

For new systems, the Rebate will be calculated based on the AHRI heating capacity and is subject to rebate limits. Additional funding is available for households meeting income-eligibility criteria, affordable housing projects, non-profits, and public entities. For Projects retrofitting existing GSHP systems, the rebate will be based on percentage of Project costs subject to Rebate limits. Rebates can be paid to the System Owner or to the Primary Installer, provided that the System Owner provides written permission in the Application. If the Application meets all requirements of this Program and funding remains available, MassCEC will issue the rebate payment to the Payee via mail.

The rebate may be combined with any other local, state or federal incentives, and Applicants are encouraged to do so where possible. MassCEC will not provide funding that would, in MassCEC’s sole determination, exceed total Project costs. Total Project costs shall include all costs presented in the Application, less all other available incentives, including any state or federal rebates, subsidies, and tax incentives, discounted to present value where necessary. MassCEC will evaluate these situations on a case-by-case basis, and reserves the right to reduce any Award projected to exceed total Project costs by an amount sufficient to prevent the excess. Grantees must declare this rebate if applying for a Mass Save HEAT Loan.

Annual funding may be limited and is available on a first-come, first-served basis. MassCEC will provide three (3) months’ notice on the [program webpage](#) if it is anticipated that funds will become unavailable in the given fiscal year. If funds are exhausted, additional funding may be added at MassCEC’s discretion. Throughout the duration of the Program, MassCEC reserves the right to modify and decrease the amount of program incentives in future iterations of the program.

3.1. New GSHP Installations

The COP of each heat pump must meet the program’s minimum COP requirement. COP is calculated based on the following equation, where closed loop systems use the AHRI “GLHP COP” values and open loop systems use the AHRI “GWHP COP” values:

$$COP = \frac{COP_{full\ load} + COP_{part\ load}}{2}$$

COP for systems with multiple heat pumps will be a weighted average (weighted by heat pump capacity) of all proposed heat pump COPs. System capacity (“Capacity”) is defined as the AHRI full load heating capacity in BTU/hr. Capacity for closed loop systems is based on the AHRI GLHP heating capacity while open loop capacity is based on the AHRI GWHP heating capacity.

Rebate Levels

Rebate levels for new GSHP systems are calculated per Heating Ton (12,000 BTU/hr). Residential Rebates are limited to the first five (5) tons of heating capacity per housing unit. Non-Residential entities can receive funding for up to ten (10) tons of heating capacity through this program. Projects with heating capacity greater than ten (10) tons should apply through the Commercial-Scale GSHP Program at



<http://www.masscec.com/get-clean-energy>. Multifamily buildings with more than two housing units that plan to install systems with greater than ten (10) tons of heating capacity may apply under the Commercial-Scale GSHP Program.

For this Program, Rebates are based on the following components:

- The base rebate for systems meeting minimum requirements is \$2,000 per Heating Ton.
- Income-Based Rebate Adders are available for qualifying Applicants:
 - \$1,500 per ton is available for the 80% Income-Based Rebate Adder; or
 - \$1,000 per ton is available for the 80-120% Income-Based Rebate Adder.
- A Public/Non-Profit Adder of \$750 per ton is available for eligible entities. Third-party-owned projects are not eligible for this adder.
- An Affordable Housing Adder of \$1,000 per ton is available for Projects at eligible facilities.

The total Rebate amount for a single-family residential system cannot exceed \$10,000 plus any Income-Based Rebate Adder. Multifamily and non-residential Projects applying under this solicitation are limited to \$20,000 plus any Public/Non-Profit or Affordable Housing Adder.

The total rebate amount for new GHSP systems is calculated using the following equations:

1. **Rebate per Heating Ton = Base Rebate + Income-Based Rebate Adder + Public/Non-Profit Adder + Multifamily Affordable Housing Adder**
2. **Total Rebate Amount = Rebate per Heating Ton * Number of Heating Tons (subject to Rebate limits)**

Rebate Component	Dollars per Heating Ton
Base Rebate	\$2,000
Income-Based Rebate Adder	\$1,000 to \$1,500 (if eligible)
Public and Non-Profit Adder (non-Residential)	\$750 (if eligible)
Affordable Housing Adder (non-Residential)	\$1,000 (if eligible)

Example: A 6-ton system installed at a residential location qualifying for the 80-120% Income-Based Rebate Adder would receive an incentive of \$15,000, which is calculated as:

$$\begin{aligned}
 & \text{Maximum Eligible Capacity: 5 tons (refer to Section 3.1)} \\
 & 5 \text{ tons} * (\$2,000 + \$1,000 \text{ per ton}) \\
 & = \$15,000
 \end{aligned}$$



The Rebate amount can be automatically calculated by entering the Project parameters into the Excel-based Application form, including the loop type, heat pump type, and capacity and efficiency of each heat pump – as well as indicating any applicable adders.

3.2. Retrofit GSHP Installations

For projects that are retrofitting existing GSHP systems, rebates will be calculated as a percentage of eligible Project Costs up to a rebate cap, as detailed in the table below. Eligible Project Costs are defined as costs associated with replacement heat pump equipment purchase, new loop piping, well modifications or additions, and any associated labor. Internal distribution system upgrades or modifications and miscellaneous costs are not considered eligible project costs. Full replacement of an existing GSHP installation may be considered a new GSHP installation.

No Rebate for a retrofit GSHP System can exceed the Percent of Eligible Costs or Rebate Cap shown in the table below. MassCEC requires detailed invoice documentation and proof of payment to verify costs.

Project Type	Rebate (Percent of Eligible Costs)	Rebate Cap
Residential	20%	\$6,250
Residential (80-120% Income-Based Rebate Adder)	30%	\$9,375
Residential (80% Income-Based Rebate Adder)	35%	\$10,938
Private	20%	\$6,250
Public/Non-Profit	27.5%	\$8,594
Private Affordable Housing	30%	\$9,375
Public or Non-Profit Affordable Housing	37.5%	\$11,719

Applications for retrofit projects require submission of additional information with the Application, including a letter detailing why the retrofit is needed, how any existing project issues have or will be corrected, when the system was initially installed, who installed the system, and whether or not the project received a MassCEC rebate.

Retrofit of Existing GSHP Eligibility Criteria

In order for a retrofit to be considered eligible for a rebate under the Program, the Project must meet at least one of the following criteria:

- The existing GSHP system is at the end of its useful life (at least fifteen (15) years old) and is required to be replaced. If the replacement will reuse the well or other system components, then it will be considered a retrofit. If the entire system is replaced, it may qualify as a new installation;
- The existing GSHP system is open loop and due to open loop issues (i.e. unforeseen water quality), the System Owner is converting the system to closed loop; or



- There are existing GSHP components, but the entire system was never completed, meaning the loops were installed but the heat pumps were not.

All other retrofit scenarios will be considered by MassCEC program staff on a case-by-case basis. MassCEC program staff has the right to request additional information, as needed, to determine eligibility.

The total Rebate amount for retrofit GSHP installations is calculated using the following equation:

Total Grant Amount = Total Eligible Costs * Applicable Percentage (based on Project Type)
(subject to Rebate Cap)

3.3. Application Evaluation Criteria and Awarding

Applications will be evaluated to ensure that they meet the Eligibility and Project Requirements stated in this Program Manual. MassCEC reserves the right to accept or reject Applications based on completeness, qualitative criteria, and available funding; to assign inspections; to make no Awards; to award less than the Applicant requests; and/or to award less than the maximum amount of funds potentially available through this Program.

3.4. Questions

If you are a homeowner or facility owner who has questions, please visit <http://www.masscec.com/get-clean-energy>. If you are an installer, please visit www.masscec.com/installer-resources-residential-ground-source-heat-pumps. Questions may also be submitted by email to the Ground-Source Heat Pump mailbox at GSHP@masscec.com or directed to (617) 315-9300.



4. Program Definitions

80% Income-Based Rebate Adder: The increased incentive level for which residential System Owners with household incomes less than eighty percent (80%) of the state median income are eligible.

80 - 120% Income-Based Rebate Adder: The increased incentive level for which residential System Owners with household incomes between eighty percent (80%) and one hundred twenty percent (120%) of the state median income are eligible.

Air-Conditioning, Heating, and Refrigeration Institute (AHRI): A trade association representing manufacturers of heating, ventilation, air-conditioning, refrigeration, and water heating equipment. AHRI provides the database of equipment performance specifications which is used in this program to determine the rebate amount.

Applicant: The Applicant is the Primary Installer who prepares and submits the Application on behalf of the System Owner with the System Owner's approval. The Primary Installer is responsible to work with the System Owner to prepare and submit the Application.

Applicant Parties: The Primary Installer and the System Owner, who together are responsible for providing the content of and signing the Application.

Application: Application submitted on behalf of System Owner by Primary Installer for an Award.

Award: Rebate funding awarded to a System Owner and to be paid by MassCEC to the Payee under the Program based on a submitted Application that has been approved by MassCEC.

BTU/hr: This common unit of thermal power capacity represents one British Thermal Unit (BTU) of thermal energy delivered per hour.

Coefficient of Performance (COP): The coefficient of performance of a heat pump is a ratio of heating provided to electrical energy consumed.

Direct Exchange: Direct exchange heat pumps circulate a refrigerant through a closed-loop copper pipe.

Driller: The Driller is the entity responsible for drilling bore holes and potentially other responsibilities.

Energy Efficiency Ratio (EER): A measure of efficiency in the cooling mode that represents the ratio of total cooling capacity to electrical energy input.

Grantee: The System Owner once the Award is made.

Ground-Loop Heat Pump (GLHP): A closed-loop ground-source heat pump, which uses conduction of heat in the ground as a heat sink for the heat pump.

Ground-Water Heat Pump (GWHP): An open-loop ground-source heat pump, which pumps water from the ground to use as a heat sink for the heat pump.



Heating Ton: A common unit of thermal energy representing twelve-thousand (12,000) British Thermal Units (BTUs) of thermal energy delivered per hour for the purpose of heating.

International Ground-Source Heat Pump Association (IGSHPA): An Association which conducts installer training and accreditation which may be used as an installer qualification for this program.

Manual J/Manual N Heat Load Calculation: The calculation of a building's heat load using the ACCA Manual J (Residential)/Manual N (Commercial) methodology. This heat load represents a building's heating and cooling capacity needed for a heating and/or cooling unit under design conditions.

Multifamily Affordable Housing Adder: The increased Rebate amount for System Owners installing GSHP systems at sites that meet the Program's criteria for affordable housing developments.

Non-Profit Entities: Non-profits are defined as organizations under Section 501(c) (3) of the Internal Revenue Code and registered with the Massachusetts Attorney General, Non-Profit/Public Charities Division.

Payee: The Payee is the designee to receive the rebate for a Project that has achieved Project Completion. System Owners may choose to have their Awards paid directly to themselves or their Primary Installers. Payment is made for the work performed on the Project and does not convey ownership rights to the installed system.

Primary Installer: The Primary Installer is the primary entity responsible for the installation of the Project. The Primary Installer is directly responsible for turnkey project management, submission of the Application, and installation work, although aspects of the installation work may be sub-contracted.

Program Documents: The Program Documents consist of the Program Manual, Application, Participation Agreement, and Award Letter.

Project: The GSHP system.

Project Site: The building being served by the GSHP Project.

Project Completion: The status of a Project at the stage when major GSHP components have been fully installed.

Project Completion Date: The date when major GSHP components have been fully installed.

Public Entity: Public entities are defined as instrumentalities, authorities, agencies, departments, or political subdivisions of the Commonwealth of Massachusetts, including municipalities.

Public and Non-Profit Adder: The increased incentive level for which public and non-profit entities are eligible. This adder is not available for third-party owned systems located at public and non-profit facilities.



System Owner: An individual, organization, business, or government entity who, together with the Primary Installer, applies to MassCEC for a Program rebate. The System Owner is the owner of the Project that is supported by the Program rebate.

Third-Party Inspector: An independent third-party engaged by MassCEC to inspect completed projects and review project designs.



5. General Conditions

MassCEC reserves the right to reject any applications or projects.

5.1. Notice of Public Disclosure

5.1.1 General Statement on Public Records

As a public entity, MassCEC is subject to Massachusetts' Public Records Law, codified at Chapter 66 of the Massachusetts General Laws ("Public Records Law"). Applicants acknowledge and agree that any documentary material, data, or other information submitted to MassCEC is presumed to be public records. An exemption to the Public Records Law may apply to certain records, including materials that fall under certain categories under a statutory or common law exemption, including the limited exemption at Massachusetts General Laws Chapter 23J, Section 2(k) regarding certain types of confidential information submitted to MassCEC by an applicant for any form of assistance. By submission of an application, Applicants acknowledge and agree that MassCEC, in its sole discretion, shall determine whether any particular document, material, data or other information is exempt from or subject to public disclosure. Thus, MassCEC urges Applicants to carefully consider what documents, materials, data and other information is submitted to MassCEC in connection with this Program.

In line with Public Records Law requirements, MassCEC generally considers the following types of information as exempt:

- Personal email addresses
- Personal phone numbers
- Electric bills
- LIHEAP Fuel Assistance Letter of Acceptance
- Eligibility letter for MassCEC's Income-Based Rebate Adders

5.1.2 C-THRU

System Owner agrees and acknowledges that MassCEC shall have the right to disclose the name of any Grantee and/or Payee, the amount of the payment under the Program and any other information it may deem reasonably necessary on C-THRU, the Commonwealth of Massachusetts' online database of state spending.

5.2. Contractual Requirements

The Participant's Agreement defines the legal terms that will govern the Award, sets forth the respective roles and responsibilities of the parties specifically as they relate to the project that is the subject of the Award and will govern the relationship between MassCEC and the Participant following the issuance of an Award. The Participant's Agreement is designed to be executed upon submitting an Application and become effective as of the "Effective Date" indicated in the final executed Agreement. The terms and conditions of the Participant Agreement are non-negotiable. Accepting the Participant's Agreement at the time of Application does not entitle the Applicant Parties to an award for funding by MassCEC.



No grant funds may be used to pay rebates for Projects that reach Project Completion prior to the program launch date.

5.3. Waiver Authority

MassCEC reserves the right, at its sole discretion, to waive minor irregularities in submittal requirements, to request modifications of the Application, to accept or reject any or all applications received, and/or to cancel all or part of this Program at any time prior to Awards.

5.4. Disclaimer

This Program Manual does not commit MassCEC to award any funds, pay any costs incurred in preparing an application, or procure or contract for services or supplies. MassCEC reserves the right to accept or reject any or all applications received, negotiate with all qualified Applicants, cancel or modify the Program Manual in part or in its entirety, or change the application guidelines, when it is in its best interests.

5.5. Changes/Amendments to the Program Manual

The requirements listed herein are subject to change without notice to potential Applicant Parties. This Program Manual has been distributed electronically using MassCEC's website. It is the responsibility of Applicant Parties to check MassCEC's website for any addenda or modifications to the Program Manual to which they intend to respond. MassCEC, the Commonwealth of Massachusetts, and its subdivisions accept no liability and will provide no accommodation to an Applicant who submits an Application based on an out-of-date Program Manual and/or related document.