

Small Ground Source Heat Pumps in the Massachusetts Alternative Portfolio Standard

The Alternative Energy Portfolio Standard (APS) provides an incentive to Massachusetts homeowners and businesses to install eligible alternative energy systems that lower greenhouse gas emissions and increase energy efficiency across the Commonwealth. The APS is a market based program that requires a portion of the electric load in Massachusetts be met via eligible technologies. Generation Unit owners receive an incentive by selling Alternative Energy Certificates (AECs), which they accrue based on their energy generation, to entities in Massachusetts with a compliance obligation.

Small (residential scale) Ground Source Heat Pumps (GSHP) are classified as any system with an output capacity less than 0.134 MMBtu/hr

GSHPs in the Alternative Energy Portfolio Standard

GSHPs that meet all eligibility requirements determined by the DOER can become qualified to receive AECs based on the energy their system generates. AECs are only generated when the system is in heating mode, however there is no restriction on the use of the system for cooling. For small systems, generation is estimated using an equation as opposed to being measured with a meter.

What are Alternative Energy Certificates (AEC)?

- AECs represent the environmental attributes of energy generated by a renewable or alternative Generation Unit
- Every AEC represents 3,412,000 British thermal units (or 1 MWh equivalent) of net useful thermal energy
- Typically through an aggregator, system owners can sell AECs generated by their system in the market to receive a monetary incentive



Key Equipment Eligibility Criteria

Both closed loop and open loop systems are eligible for the APS. A comprehensive list of eligibility criteria can be found in the APS regulations and guidelines.

All GSHP must:

- Supply 100% of a building's total annual heat load; non-renewable supplemental heat sources are prohibited
- Be certified to the International Organization for Standards
- Meet specific Energy Efficiency Ratios and Coefficient of Performance ratings based on the type of system
- Comply with MassDEP well guidelines

Specific to closed-loop systems, GSHP must:

- Have a minimum depth of 150 feet per 12,000 Btu/hr if vertically bored closed-loop systems
- Have a grout conductivity equal to or greater than anticipated earth conductivity of the drill site up to 1 Btu per hour-foot-degree Fahrenheit
- Have at least 15 feet of separation between closed-loop bore holes

How to Participate in the APS:

1. Have your system installed
2. Work with your installer and/or an aggregator to submit a Statement of Qualification to DOER*
3. Once approved, the AECs will be available to be sold into the market. An aggregator typically will sell the AECs for you and will send you a check based on the current market price for AECs

*Using an aggregator greatly simplifies the APS process and may help owners receive better prices for their AECs. Aggregators typically take a share of the AEC proceeds. Systems owners that opt to manage the APS process themselves should read the full regulations and guidelines.

Example of the APS Incentive for a Small GSHP

Area of Conditioned Space (sq ft)	Number of AECs per Year (including 5x multiplier)	Total AECs Generated (10 year value)
≤1,500	23	230
2,000	30.75	307
2,500	38.5	385
3,000	46.25	462
3,500	54	540
4,000	61.75	617

AEC prices vary based on the market conditions. As of 2017, the estimated price of an AEC is \$20. Future price of AECs is subject to change. For a more in-depth assessment, please find our AEC calculator tool on the DOER website.

Pre-Minting of AECs for Small GSHP

- While most systems qualified under the APS receive AECs on a quarterly basis, small GSHP qualify for pre-minting, which means each system owner will receive 10 years worth of AECs in the first quarter they are qualified
- The number of pre-minted AECs given to qualified systems is calculated using a formula, rather than expensive meters, and is based on the square footage of the conditioned space
- The pre-minting of AECs allows the system owner to monetize all of the AECs upfront, rather than quarterly over the 10 years

Multipliers for Small GSHP

- A “multiplier” increases the number of AECs generated and allows all renewable thermal technologies to have a meaningful incentive
- GSHPs receive a base multiplier of 5
- GSHPs in a building that meet the program’s energy efficiency requirements will receive an additional multiplier of 2 that is added to the base multiplier

For more information on the process of installing and receiving certificates for renewable thermal generation units contact: Thermal.DOER@State.ma.us or visit

<https://www.mass.gov/guides/aps-renewable-thermal-statement-of-qualification-application>

