

Attachment B. 2019 HeatSmart Mass: Pricing, Cost Adders, and Equipment Form - Ground-Source Heat Pumps

Instructions: GSHP Installers should fill out Tab 5: GSHP Equipment and Pricing Proposal and Tab 6: GSHP Cost Adders

Section 1: Ground-Source Heat Pump Equipment & Installer Workmanship Warranty

Warranty (Clarify standard installer Workmanship Warranty and the Equipment Warranty)

Section 2: Ground-Source Heat Pump Equipment Pricing

Residential Ground-Source Heat Pump System

Please complete the tables below detailing your proposed discounted fixed-fee costs for standard installation of ground-source heat pumps. These per-unit-installed costs should include all equipment and non-equipment costs associated with the typical installation scope of work (e.g. labor, permitting, etc.) based on the standard requirements of each heat pump. Provide costs for water-to-air systems for houses with 3-ton, 4-ton, and 5-ton heating loads. Please provide options for vertical closed loop, horizontal closed loop, and standing column well. Provide equipment options for dual- and variable-speed compressors (if applicable). Please describe any other assumptions (such as grout conductivity) used for system design in the notes box after each type of system.

For direct comparison of system pricing between installers, please assume the following in pricing provided:
-existing ductwork (upgrades to ductwork would be listed as adders)

Vertical Closed Loop Systems
-Assume one u-bend per bore hole
-Provide the standard number of bore holes, total feet of well depth, and total feet of well casing for each heat pump model offered. Projects that require more wells or deeper wells than the standard scenario can use the adders on the next tab.

Horizontal Closed Loop System
-Provide the standard length of trenching for each heat pump model offered and specify whether or not you will use a slinky configuration.

Open Loop Systems
-Standing Column Well
-Assume that there is no existing well and provide the standard number of feet of well depth for each heat pump model offered. Projects that require deeper wells than the standard scenario can use the

Vertical Closed Loop Systems

Peak Heating Load of Home	Heat Pump Manufacturer	Heat Pump Model Number	Heat Pump Type (water to air, water to water)	Heat Pump Capacity	Average COP (Full Load and Part Load)	Number of Bore Holes	Feet of total well depth	Feet of casing	Installed cost per System	Deposit Required at Contracting (if applicable)
3 ton (36,000 btu/hr) (dual)	Hydron Module	HBT048	Water to air	37300	4.15	2	600	100	\$ 41,425	\$ 10,000
4 ton (48,000 btu/hr) (dual)	Hydron Module	HBT072	Water to air	52000	3.60	2	900	100	\$ 46,350	\$ 10,000
5 ton (60,000 btu/hr) (dual)	Hydron Module	HYT036+HBT048	Water to air	66400	4.48	3	1050	150	\$ 62,785	\$ 10,000
3 ton (36,000 btu/hr) (dual)	Hydron Module	HYT048	Water to air	39900	4.60	2	600	100	\$ 38,930	\$ 10,000
4 ton (48,000 btu/hr) (dual)	Hydron Module	HYT060	Water to air	49,200	4.35	2	750	100	\$ 43,115	\$ 10,000
5 ton (60,000 btu/hr) (dual)	Hydron Module	HYT048 + HBT036	Water to air	68600	4.29	3	1050	150	\$ 62,630	\$ 10,000

Notes about Vertical Closed Loop Base Case: Assumes 40' of casing per borehole.

Horizontal Closed Loop Systems

Peak Heating Load of Home	Heat Pump Manufacturer	Heat Pump Model Number	Heat Pump Type (water to air, water to water)	Heat Pump Capacity	Average COP (Full Load and Part Load)	Feet of Trenching	Slinky configuration or not?	Installed cost per System	Deposit Required at Contracting (if applicable)
3 ton (36,000 btu/hr) (dual)	Hydron Module	HBT048	Water to air	37300	4.15	600	Yes	\$ 38,520	\$ 10,000
4 ton (48,000 btu/hr) (dual)	Hydron Module	HBT072	Water to air	52000	3.60	800	Yes	\$ 44,380	\$ 10,000
5 ton (60,000 btu/hr) (dual)	Hydron Module	HYT036+HBT048	Water to air	66400	4.48	900	Yes	\$ 56,095	\$ 10,000
3 ton (36,000 btu/hr) (dual)	Hydron Module	HYT048	Water to air	39,900	4.60	600	Yes	\$ 36,105	\$ 10,000
4 ton (48,000 btu/hr) (dual)	Hydron Module	HYT060	Water to air	49,200	4.35	700	Yes	\$ 39,510	\$ 10,000
5 ton (60,000 btu/hr) (dual)	Hydron Module	HYT048 + HBT036	Water to air	68,600	4.29	900	Yes	\$ 55,940	\$ 10,000

Notes about Horizontal Closed Loop Base Case: Assumes that native soil will be of sufficient quality to use as backfill material. Assumes no blasting or rock chipping. Assumes trenches will originate no more than 100 feet away from the residence.

Open Loop Systems (Standing Column Well)

Peak Heating Load	Heat Pump Manufacturer	Heat Pump Model Number	Heat Pump Type (water to air, water to water)	Heat Pump Capacity	Average COP (Full Load and Part Load)	Feet of total well depth	Installed cost per System	Deposit Required at Contracting (if applicable)
3 ton (36,000 btu/hr) (dual)	Hydron Module	HBT048	Water to air	45,700	4.80	430	\$ 41,275	\$ 10,000
4 ton (48,000 btu/hr) (dual)	Hydron Module	HBT060	Water to air	57,000	4.35	530	\$ 45,440	\$ 10,000
5 ton (60,000 btu/hr) (dual)	Hydron Module	HBT072	Water to air	64,800	4.10	630	\$ 49,945	\$ 10,000
3 ton (36,000 btu/hr) (dual)	Hydron Module	HYT036	Water to air	37,500	5.65	330	\$ 35,920	\$ 10,000
4 ton (48,000 btu/hr) (dual)	Hydron Module	HYT048	Water to air	49,500	5.35	430	\$ 38,570	\$ 10,000
5 ton (60,000 btu/hr) (dual)	Hydron Module	HYT060	Water to air	61,700	5.05	530	\$ 43,415	\$ 10,000

Notes about Open Loop Systems (SCW) Base Case: Assumes that the depth to water table is 30'. Assumes sufficient water yield to support geothermal system with bleed in winter.

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Instructions:

Please provide costs for the adders below and indicate whether you expect it to be a high use adder. Costs for adders can be given as a range. If you do not plan to offer an adder for a project factor, you may keep it blank. Applicants can list other adders under the "Other" section heading. If selected, an Installer may alter the list of approved cost adders during the course of the HeatSmart Mass program upon review and pre-approval by MassCEC's technical consultant.

Factors	Adder (\$)	Adder units (if applicable)	High use adder? Please indicate if over 50% of systems will require this adder (Y/N)	Notes on Cost Adder
Ground Loop				
Additional boreholes needed for a closed-loop vertical system (beyond the base scenario)	\$900+	Per Borehole	N	Adder covers cost of additional 40' of casing only.
Additional borehole depth for a closed-loop vertical system (beyond the base scenario)	\$22	Per Foot	N	
Additional SCW well depth needed (beyond the base scenario)	\$22	Per Foot	N	
Open loop diffusion/recycle (instead of the standard SCW) configuration	NA	Per Project	N	
Additional horizontal piping length needed (beyond base scenario)	NA	Per heating ton of peak heating load	N	
Standing Column Pump Upgrades	NA		N	
Trenching cost to connect Vertical-Closed-Loop, Horizontal-Closed-Loop and Standing-Column-Well from the well field to the home (beyond the base case scenario)	\$50	Per Foot	N	If distance is greater than 100' from the house.
Heat Pumps/Distribution				
Multiple heat pump types (i.e. water to water and water to air)	\$6,000 to \$10,000	each	N	Site specific.
Internal distribution upgrades (i.e. new ductwork)	\$3,100 to \$3,600	per ton	Unknown	Site specific.
Monitoring system	\$800 to \$1,600	per home	N	Price varies depending on type and quantity of equipment installed. Customer must provide wifi connection.
Desuperheater	\$550	each	Y	
Heat or Energy Recovery Ventilator	\$3,300	each	N	
General				
Removal of existing oil tank	NA			EnergySmart will assist homeowner in finding a suitable company to complete this task.
Variable speed circulator pump	NA			Only offered with Variable Speed equipment listed below.
Other				
Upgrade to Nest thermostat	\$185	each	N	
Ductwork modifications to fit new GSHP unit onto existing ductwork	\$1500 to \$3000	per air handler	Y	Varies depending on condition of existing ductwork.
Upgrade to Water Furnace Variable Speed geothermal heat pump	\$6,300	per heat pump	N	May not be appropriate for all homes.
Additional casing beyond 40'	\$18	per foot	Unknown	Casing to depth of bedrock is required for all closed loop systems
Softstart	\$422	each	N	Recommended for 060 and 072 models of heat pumps to prevent light flicker. Needs to be factory installed.
Electrical service upgrade	\$3,000+	per home	N	Where home's electrical service is not sufficient to support the proposed GSHP equipment.
Dewatering	\$2,500 plus \$0.18/gallon		N	
Silt bag disposal	\$850	per home	N	
Conservation Commission filings	\$3,500+	per home	N	May be required if drilling area is within wetland boundaries.
Sand bedding for horizontal trenching	\$100	per yard	Y	Quantity of sand depends on site conditions and distance between boreholes and house.
Payment via credit card (Visa or Master Card only)	up to 3.5%	per transaction	N	Check is the preferred method of payment but some homeowners may wish to pay with credit card.
Add zoning to new ductwork	\$3,200+	per additional zone	N	Varies by project.
Removal and dispose of existing air handlers, condensers, boiler only	\$1,100 to \$2,500	per house	Y	Does not include: radiators, steam pipes, hot water lines