

Attachment A. 2017 HeatSmart Mass: Pricing Proposal - Ground-Source Heat Pumps

Revised July 16, 2018 to reflect price increases for contracts signed after July 31, 2018. These equipment cost increases affect base price by <2% and select adders by approx. 3-5%.

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

Warranty (Clarify standard installer Workmanship Warranty and the Equipment Warranty)	<p>WaterFurnace Geothermal Units- 10 years parts with 5 years labor allowance.</p> <p>Zoning, humidifiers, etc.- varies on a case-by-case basis.</p> <p>WaterFurnace Loop Warranty- 55 years- available at additional cost of \$1,950.</p>
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Section 2: Ground-Source Heat Pump Equipment Pricing

Residential Ground-Source Heat Pump System

ASSUMPTIONS INCLUDED IN BASE PRICING ARE DESCRIBED BELOW. ANYTHING OUTSIDE THE SCOPE OF THESE ASSUMPTIONS CAN INCUR ADDITIONAL COSTS.

Base System Equipment

-where applicable, grout conductivity greater of 1 BTU/hr-ft-F
-existing ductwork

Vertical Closed Loop Systems

-2 bore holes
-One u-bend per bore hole
-600 feet of well depth for closed loop options
- 50 feet of casing

Horizontal Closed Loop System

-4 pipe trench, 600 feet long or a slinky configuration

Open Loop Systems

-Standing Column Well
-non-existing well, 400 ft. well depth
-bleed

We have also made the following standard assumptions:

- A.) Bedrock is greater than 5 feet and less than 40 feet below grade.
- B.) No Conservation Commission Permitting required.
- D.) Standing Column Wells have adequate groundwater yield to support required bleed.
- E.) Home electrical service does not require upgrade to support the GSHP installation.
- F.) NSW and NEW hydronic GSHPs are assumed to be connected to a radiant source only. Pricing herein does not include air handler/ducting connections which are not anticipated.
- G.) SCW Scenarios assume 0.75 HP submersible pump set at 150' BGS and return line set at 480' BGS.
- H.) Symphony Web-enabled Comfort/Monitoring System is included on each installed system.
- I.) 3 Series closed-loop heat pumps do not have internal controls for Variable Speed Flow Centers and are therefore not going to be installed. Price reflects that. (Variable speed flow centers are an assumed inclusion for all of the other base prices below.)
- J.) Open-loop heat pumps have Variable Speed Flow Centers included in the well

Vertical Closed Loop Systems

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)	Loop Configuration (Closed Loop Horizontal, Closed Loop Vertical, Vertical Open Loop-Standing Column)	Installed cost per System	Deposit Required at Contracting (if applicable)	Eligible for MassCEC Rebate (Meets Efficiency Requirement)? Y/N
WaterFurnace	3 Series LD072	Water-to-Air	52,000 Btu/hr at AHRI/ISO Rating Conditions	3.6	Vertical Closed Loop	\$39,560 Plus Local Permit Fees	If Direct Purchase: \$10,000; If financed through Achieve \$0.	Y
WaterFurnace	5 Series NDV064	Water-to-Air	47,100 Btu/hr at AHRI/ISO Rating Conditions	4.2	Vertical Closed Loop	\$42,138 Plus Local Permit Fees	If Direct Purchase: \$12,500; If financed through Achieve \$0.	Y
WaterFurnace	7 Series NVV060	Water-to-Air	51,000 Btu/hr at AHRI/ISO Rating Conditions	4.3	Vertical Closed Loop	\$48,492 Plus Local Permit Fees	If Direct Purchase: \$15,000; If financed through Achieve \$0.	Y
WaterFurnace	5 Series NSW 060	Water-to-Water	50,100 Btu/hr at AHRI/ISO Rating Conditions	3.1	Vertical Closed Loop	\$40,752 Plus Local Permit Fees	If Direct Purchase: \$12,500; If financed through Achieve \$0.	Y

WaterFurnace	5 Series NEW 066	Water-to-Water	56,500 Btu/hr at AHRI/ISO Rating Conditions	3.2	Vertical Closed Loop	\$40,888 Plus Local Permit Fees	If Direct Purchase: \$12,500; If financed through Achieve \$0.	Y

Horizontal Closed Loop Systems

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)	Loop Configuration (Closed Loop Horizontal, Closed Loop Vertical, Vertical Open Loop-Standing Column, Open Loop-Diffusion/Recycle)	Installed cost per System	Deposit Required at Contracting (if applicable)	Eligible for MassCEC Rebate (Meets Efficiency Requirement)? Y/N
WaterFurnace	3 Series LD072	Water-to-Air	52,000 Btu/hr at AHRI/ISO Rating Conditions	3.6	Horizontal Closed Loop	\$42,680 Plus Local Permit Fees	If Direct Purchase: \$10,000; If financed through Achieve \$0.	Y
WaterFurnace	5 Series NDV064	Water-to-Air	47,100 Btu/hr at AHRI/ISO Rating Conditions	4.2	Horizontal Closed Loop	\$44,248 Plus Local Permit Fees	If Direct Purchase: \$12,500; If financed through Achieve \$0.	Y
WaterFurnace	7 Series NVV060	Water-to-Air	51,000 Btu/hr at AHRI/ISO Rating Conditions	4.3	Horizontal Closed Loop	\$50,602 Plus Local Permit Fees	If Direct Purchase: \$15,000; If financed through Achieve \$0.	Y
WaterFurnace	5 Series NSW 060	Water-to-Water	50,100 Btu/hr at AHRI/ISO Rating Conditions	3.1	Horizontal Closed Loop	\$43,862 Plus Local Permit Fees	If Direct Purchase: \$12,500; If financed through Achieve \$0.	Y
WaterFurnace	5 Series NEW 066	Water-to-Water	56,500 Btu/hr at AHRI/ISO Rating Conditions	3.2	Horizontal Closed Loop	\$45,018 Plus Local Permit Fees	If Direct Purchase: \$12,500; If financed through Achieve \$0.	Y

Open Loop Systems (Standing Column Well)

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)	Loop Configuration (Closed Loop Horizontal, Closed Loop Vertical, Vertical Open Loop-Standing Column, Open Loop-Diffusion/Recycle)	Installed cost per System	Deposit Required at Contracting (if applicable)	Eligible for MassCEC Rebate (Meets Efficiency Requirement)? Y/N
WaterFurnace	3 Series LD060	Water-to-Air	56,500 Btu/hr at AHRI/ISO Rating Conditions	4.1	Standing Column Well	\$38,748 Plus Local Permit Fees	If Direct Purchase: \$10,000; If financed through Achieve \$0.	Y
WaterFurnace	5 Series NDV064	Water-to-Air	58,000 Btu/hr at AHRI/ISO Rating Conditions	4.85	Standing Column Well	\$41,686 Plus Local Permit Fees	If Direct Purchase: \$12,500; If financed through Achieve \$0.	Y
WaterFurnace	7 Series NVV048	Water-to-Air	55,000 Btu/hr at AHRI/ISO Rating Conditions	5.1	Standing Column Well	\$44,510 Plus Local Permit Fees	If Direct Purchase: \$15,000; If financed through Achieve \$0.	Y
WaterFurnace	5 Series NSW 050	Water-to-Water	54,200 Btu/hr at AHRI/ISO Rating Conditions	3.7	Standing Column Well	\$39,600 Plus Local Permit Fees	If Direct Purchase: \$12,500; If financed through Achieve \$0.	Y

Group Reward: If Achieve Renewable contracts with at least 40 projects, then Achieve Renewable will install one free 300' closed-loop boring at a location selected by the Community Coaches.

Notes:

**Attachment A. 2017 HeatSmart Mass:
Cost Adders - Ground-Source Heat Pumps**

Factors	Adder (\$)	Adder units (if applicable)	High use adder? Please indicate if over 50% of systems will require this adder (Y/N)	Description of Cost Adder / Scope of Work
Ground Loop				
Additional boreholes needed for a closed-loop vertical system (beyond 2)	\$19.25	Per Foot	N	We assume that less than half of projects in the communities will have peak heating loads in excess of the assumed 48,000 Btu/hr. Actual additional boring cost will depend on the total boring amount required and configuration. Here, for purpose of comparison, we present per foot pricing that assumes the design in the example scenario.
Additional borehole depth for a closed-loop vertical system (beyond 600 ft.)	\$18.50	Per Foot	N	We assume that less than half of projects in the communities will have peak heating loads in excess of the assumed 48,000 Btu/hr. Assumes two borings from the example scenario drilled deeper than 300 feet each.
Additional SCW well depth needed (beyond 400 ft.)	\$15.50	Per Foot	N	Cost for drilling only. Pump set upgrade may be required at site-specific cost.
Open loop diffusion/recycle (instead of the standard SCW) configuration	Requires Site-specific Cost	Per Project	N	Availability of this option is dependent upon the local Geology. It is not likely that this alternative will frequently be viable in the communities that have included GSHP. If this option is viable for a specific project, Achieve will provide a site-specific proposal.
Additional horizontal piping length needed (beyond baseline)	\$2,550	Per heating ton of peak heating load	N	We assume that less than half of projects in the communities will have peak heating loads in excess of the assumed 48,000 Btu/hr. Both additional well depth and a homeowner desire to configure for dual-use geothermal and irrigation can require pump set upgrades. The pumping system should be designed for well-specific conditions. Cost will be bid on a case-by-case basis.
Earth conductivity greater than 1 BTU/hr-ft.-F (increase in grout material/cost)	\$1.75	Per Foot	Y	Not required but likely to be selected. Clients normally desire the added borehole performance afforded by higher grout conductivity. Achieve can provide grout mixes up to approximately 1.4 to 1.6 BTU/hr-ft.-F
Standing Column Pump Upgrade to 1.0 Horsepower	\$1,170	Per Well	N	We assume that less than half of projects in the communities will have peak heating loads in excess of the assumed 48,000 Btu/hr. Both additional well depth and a homeowner desire to configure for dual-use geothermal and irrigation can require pump set upgrades. The pumping system should be designed for well-specific conditions. Cost will be bid on a case-by-case basis.
Standing Column Pump Upgrade to 1.5 Horsepower	\$2,380	Per Well	N	We assume that less than half of projects in the communities will have peak heating loads in excess of the assumed 48,000 Btu/hr. Both additional well depth and a homeowner desire to configure for dual-use geothermal and irrigation can require pump set upgrades. The pumping system should be designed for well-specific conditions. Cost will be bid on a case-by-case basis.
Other Standing Column Pump Upgrades	Requires Site-specific Cost	Per SCW Pump	N	Should clients require SCW Pump Upgrades beyond those specified herein, a project-specific cost will be proposed.
Trenching cost for Vertical-Closed-Loop, Horizontal-Closed-Loop and Standing-Column-Well over 50 foot offset	\$7	Per Foot	N	Most ground-source installations are within 50 feet of the house.
WaterFurnace 55-Year 'No Leak' VCL or HCL Warranty	\$1,950	Per Project	N	Not a required option. Selected less on less than half of Achieve projects.
Heat Pumps/Distribution				
Multiple heat pump types (i.e. water to water and water to air)	\$5,775 to \$16,800	Per Additional GSHP	N	We assume that less than half of projects in the communities will have configurations requiring multiple GSHPs. Approximately range provided. Range does not include additional ground-source which is priced elsewhere. Cost of additional heat pumps will depend on the model line, size and configuration. Additional heat pumps will be bid on a case-by-case basis.
Increase in GSHP size within Same Product Line	\$525 to \$1,155	One Ton Increase	N	Need for this option dependent on heating load and distribution configuration.
Heat pump substitution	5-10%	Per GSHP	N	If needed, substitution of new WaterFurnace products that supercede existing products will be made after approval. Also, documented price increases by the manufacturer will be allowed.
Internal distribution upgrades (i.e. new ductwork)	\$2,000-\$4,500	Per Nominal Ton	N	Estimated range only. Pricing of new ducting installation is dependent on site conditions, zoning requirements and other factors that cannot be generalized.
Desuperheater for 3, 5 or 7 Series	\$1,885	Per GSHP	N	Not required but often selected.
Addition of 2nd Comfort Zone to 3, 5, or 7 Series	\$1,653	Second Zone	N	Not required but often selected. Also requires ducting and electrical modifications that will be priced based on site-specific conditions.
Addition of 3rd Plus Zone to 3, 5 or 7 Series	\$619	Zones Three +	N	Not required but often selected. Also requires ducting and electrical modifications that will be priced based on site-specific conditions. Zoning capacity up to 4 zones for 3 and 5 Series and up to 6 zones for 7 Series. Requires ducting and electrical modifications that will be priced based on site-specific conditions.
Substitution of 'Split' GSHP-AHU for 5 Series 'Packaged' GSHP.	\$4,098	Per GSHP	N	Price is in addition to base price of 5 Series GSHP. Fewer than half of projects use split GSHP/AHUs.
Outdoor Temperature-based Set Point Control for Hydronic GSHPs	\$520	Each	N	We expect hydronic GSHPs to be a small percentage of projects. Most of the hydronic projects will use a set point controller.
Heat or Energy Recovery Ventilator	\$2,400 to \$6,000	Per HRV/ERV	N	Likely required for new construction. Assumes HRV or ERV up to 200 CFM.
General				
Removal of existing oil tank	\$1,300	Per Project	N	Assumes one 275- or 300-gallon aboveground tank located in basement or garage. Removal of other tank configurations will be quoted based on site conditions.
Removal of existing HVAC equipment	\$0-\$1,200	Per Project	Y	Estimated range provided. Cost dependent on type of existing equipment to be removed and site-specific conditions. Will be bid on project-specific proposals.
Central Humidifier - Rotating Disc Type	\$600	Each	N	Not required but likely to be selected.
Electrical Service Upgrade 100 to 200 AMPS	\$3,250	Each	N	Less than half of projects typically require an electrical service upgrade. Assumes overhead wires into home. Underground service to be quoted on a case-by-case basis. Cost of local permit fees will be added.
Municipal Permit Fees	\$200-\$800	Per Project	Y	Permit fees can vary by municipality. All projects assumed to require permits. Approximate range of fees for Electrical and Mechanical Permits. The cost of special permits such as Wetlands or Zoning are in addition to the range specified.