



COLD CLIMATE HOUSING RESEARCH CENTER

CCHRC

Ground Source Heat Pumps

CCHRC is studying the performance, state of the industry, and economic viability of ground source heat pumps in Alaska.

There are roughly 50 heat pumps in the state, including high-profile commercial installations at Weller Elementary School in Fairbanks and the Juneau Airport Terminal as well as several residential installations around the state. A heat pump transfers energy from the earth or water to use for heating or cooling. The system consists of underground tubing filled with heat-transfer fluid, an electric pump and a heat distribution system.

CCHRC partnered with the UAF Alaska Center for Energy and Power to complete an economic analysis of GSHP in Alaska. We looked at the technology in five cities--Fairbanks, Anchorage, Juneau, Bethel and Seward—and compared the cost and performance of heat pumps with traditional heating systems, such as oil-fired boilers and natural gas furnaces. We found that heat pumps can potentially compete with other heating systems in Fairbanks, Juneau, and Seward—where heating oil is expensive and electricity costs are low. They are not economical in Anchorage, which has inexpensive heating and power costs, or rural Alaska, which has extremely high electricity costs.

We focused on the unique impacts that GSHP could have in cold climates, as extracting heat from the earth could create more permafrost if the ground temperature doesn't recover in the summer. Researchers plan to install a pump at the CCHRC next year to further study the efficiency and effects of the system.