

9. Space Heating of Buildings

Several resorts and residential structures in Montana use geothermal energy for space heating. Hot springs or wells provide most, if not all, of the heating needs for these buildings, even in the coldest of Montana winters.

Almost all of the hot springs resorts in Montana use geothermal water not only to provide heat to their soaking and swimming pools, but also to provide space heating for their hotels and hot water for their laundry needs.

Space heating of an individual building with geothermal energy in Montana usually makes economic sense, provided there is a suitable geothermal resource close enough at hand.

A variety of methods are used to transfer the heat from the geothermal fluid to heat the air in a building. The most common type of space heating system used in a conventional home is a forced air heating system.

Adapting an existing forced air system to use geothermal heat, or designing a system for new construction, is a straightforward process. A finned coil (similar to a car radiator) is placed in the supply air duct, as well as a motorized valve to control the geothermal water flow in response to a signal from a thermostat. Pipes then deliver the geothermal water to and from the coil.

Other methods of space heating with geothermal water include piping the hot water through a radiant slab in the floor of a building. The Hillbrook Nursing Home located near the old Alhambra Hot Springs south of Helena uses the hot springs water for radiant heating. Pipe was laid a few inches beneath the floor surface in the concrete floor of the nursing home as it was poured. The geothermal water then flows through the pipes, warming the concrete which then heats the air in the living space above.

Domestic hot water heating often requires higher temperature water than space heating. This is because heat is being transferred to heat water to 110° F or greater rather than warming air to 70° F in a space heating application. The laundry water at Warm Spring State Hospital northwest of Butte is preheated with geothermal water, saving a considerable amount of state tax dollars that would otherwise have been spent on fossil fuel.

Major resorts in Montana using geothermal energy to heat their buildings include Boulder Hot Springs Inn and Spa, Bozeman Hot Springs, Chico Hot Springs Resort and Day Spa, Fairmont Hot Springs Resort, the Symes Hotel in the town of Hot Springs, and the Spa Hot Springs Motel and Clinic in White Sulphur Springs. Individual homes near hot springs also are heated with geothermal energy, including homes in Helena and the Bitterroot Valley north of Hamilton.

Chico Hot Springs Resort in Southwest Montana uses geothermal energy to heat its convention center.

Photo by Jeff Birkby

