

# Radiant Showcase



# Residential Home

Presented by:



## THE OWNERS REVIEWED SEVERAL HEATING OPTIONS

Energy Efficiency and Minimal Floor Buildup Requirements Give STEP Warmfloor an Advantage Over Other Heating Systems



### THE OWNERS REVIEWED SEVERAL HEATING OPTIONS

#### Baseboard Heaters

To enjoy the scenic view outside, the house has many windows, several of which are floor length. As a result, there was insufficient wall space to properly install enough baseboard heaters to suitably heat the entire living space

#### Traditional Heating Cables

The home contained several types of floor coverings, including hardwood, carpet, tile and natural stone. Because of this, installation of constant wattage heating cables would have included a variety of installation methods with undesirable increases to the floor thickness.

#### Forced Air System

With no central gas or propane to burn in a furnace, a forced air heating system wasn't an option. Additionally, at an altitude of 8,000 feet, burning fuel is 40% less efficient.

#### Hydronic Tubing

Without central gas or propane, a hydronic heating system wasn't ideal. An electric water heater would have been very inefficient for the perpetual demand required to heat the system. In addition, significant changes to the thickness of the floor would have been an issue with some of the various installation methods required.

#### STEP Warmfloor™ Advantages

STEP Warmfloor™ is safe for almost all non-conductive floor coverings because of its self-regulating properties.

The elements work like a floor sensor, drawing more energy when they are colder and less when they are warm. As a result, STEP Warmfloor™ radiant heating elements cannot overheat and are very energy efficient.

STEP Warmfloor™ is low voltage (24V), making it safe for wet areas like bathrooms and under tubs and shower pans.

With a thickness of only 3/64" (1.2 mm), there is very little change in the thickness of the floor.



## STEP Warmfloor™ - The primary heating system in the 7500 sqft Butera residence

### LOCATION

The Butera Residence is a 7,500 sqft. home on a beautiful property next to a river and surrounded by trees in Aspen, Colorado, at an altitude of approximately 8,000 feet.



### SPECIAL CONSIDERATIONS

With no central gas and the owners not wishing to have a propane tank on the property, electric heat was essential. In addition several other special considerations were to be addressed:

- In-floor electric radiant heat with minimal changes to floor thickness under multiple types of flooring.
- Local building energy efficiency requirements had to be respected.

### HEATING SOLUTION

After extensive research, the homeowners decided to use STEP Warmfloor™ as their primary heat source inside the house. STEP Snowmelt™ was installed in seven areas outside, along paths and walkways.

In the end, the results were amazing, and all requirements were made to the full satisfaction of the home owners. They now enjoy safe, comfortable, even heat, with low energy consumption and almost no change in the floor's height.

### APPLICATIONS

A total of 5,714 feet of element was installed at the residence: 4,878 feet on the ground level, and 836 feet on the upper level with a variety of applications. Installation methods included:

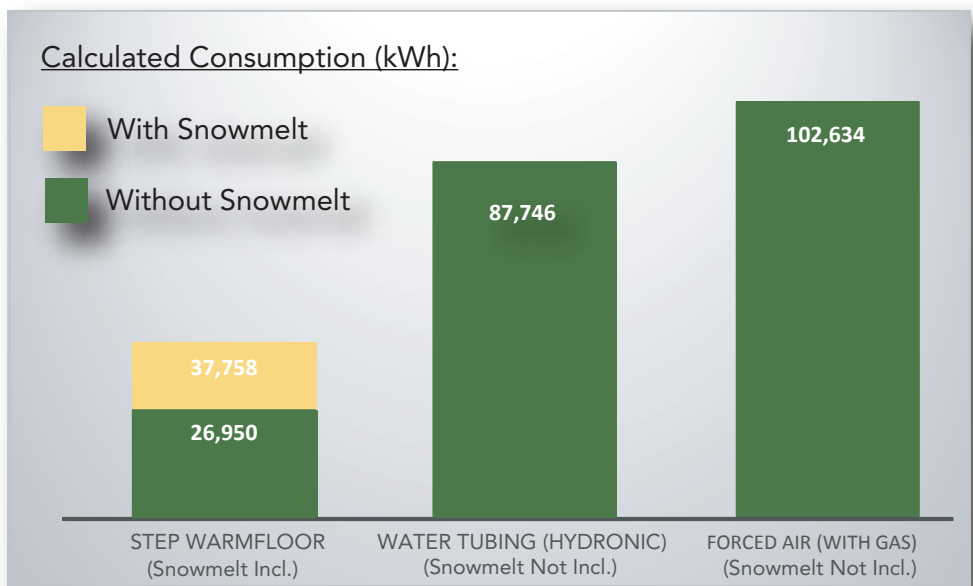
- Stapled between joists under the wood sub-floor.
- Thin set on a concrete slab, with tile laid on top.
- Installed in the walls and behind bathroom mirrors in a few select locations to generate additional heat and to keeping the mirrors from fogging.
- Outside, 2,219 sqft. of STEPSnowmelt™ was embedded in concrete with stone pavers laid on top.



# ENERGY REPORT - The total energy consumption to heat the home for the first year measured at 3.6 kWh/sqft

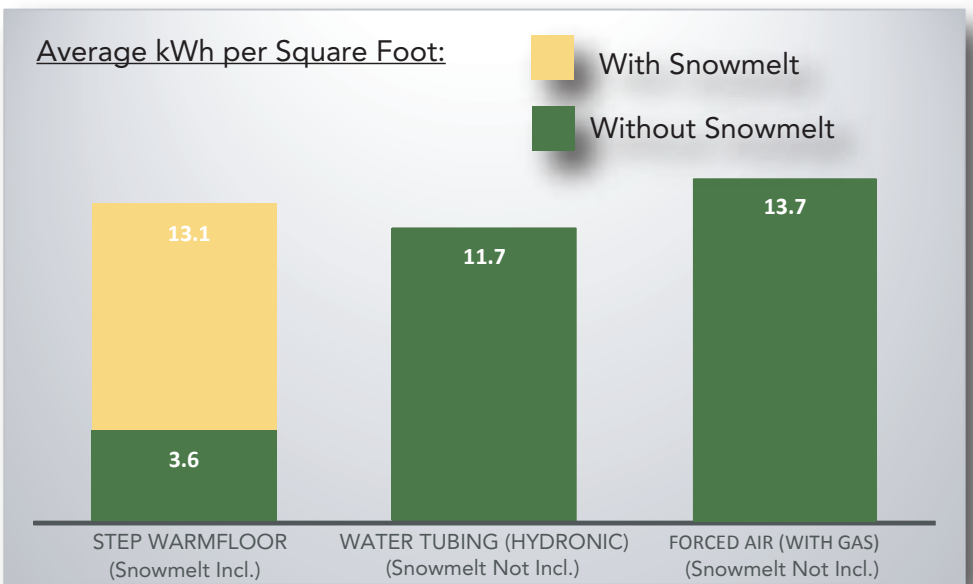
## CONSUMPTION AND COSTS

The house was monitored for energy consumption for one year. The electricity was measured by two permanently installed watt-meters, and the total reading on the meters was 64,708 kWh – 3.7% more kWh than calculated. This was due to: construction period (opened doors and windows, unfinished thermal insulation, etc.), drying time of the building materials, and regulators installed at a later time. The Snowmelt™ system accounted for 37,758 kWh.



## INSTALLED WATTAGE

To ensure sufficient heat output during cold peak periods, a total of 44,569 watts was installed inside providing a maximum capacity of 5.9 w/sqft, which far exceeded the actual consumption of 3.08 w/sqft.



## ENERGY SAVINGS

By choosing STEP Warmfloor™ as the primary heating source, the homeowners significantly reduced energy consumption.

**Note:**

- Radiant heated floors have a better heat distribution than forced air systems.
- At an altitude of 8000 feet, burning of fuel is 40% less efficient.
- A 50/50 mixture of antifreeze and water reduces the heat capacity approximately 20%.