



A New Level of Energy Efficiency

Energy efficiency has always been one of the key reasons for building a home with radiant heat. Given the rapidly escalating cost of energy, the efficiency of radiant has never been more important. Here's how energy use differs between technologies.

LOW CEILING TEMPERATURES

When hot air is pumped through a duct, it is typically between 120–140°F (49–60°C). This hot air rapidly rises and creates a heated layer of air near the ceiling. Stratification increases as the ceiling height increases, and temperature differences can be easily felt by those living in a two-story home, with the downstairs too cool and the upstairs too hot. When ceilings are hot and just below a cold roof, heat loss increases dramatically. This is precisely why ceiling and attics require so much insulation.

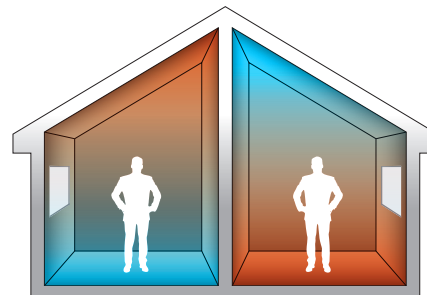
Radiant floors stratify much less for two reasons. First, at least 50% of the heat is infrared, a form of invisible light. Like all lighting, its effect is greatest the closer you are to the source. In other words, it concentrates much of its output beneath the floor, where you are, not above you near the ceiling. Second, because the temperature of a radiant floor is quite mild (75–80°F / 24–27°C), it only warms air into the mid-70s, far less than the 120–140°F (49–60°C) temperatures of a forced air system. It is not unusual for the ceilings in a radiant home to be 10–20 degrees cooler than a forced air home.

PARASITIC HEAT LOSS

“Parasitic loss” refers to energy lost due to the inherent inefficiencies of a system. One good example of this is duct work. As hot air blows through ducts, heat is absorbed through its walls and released into unheated areas of the house, such as crawl spaces.

Additionally, when hot air is blown into a room with a door closed, air pressure increases, and eventually is released outside through weakened weather stripping on windows and door frames.

Blowers used in forced air systems typically require 9x as much electricity as the pumps in a radiant system. All of these parasitic losses add up, making the traditional forced air system up to 30% less efficient than radiant floor heating.



LOW AIR TEMPERATURES

On a sunny spring day we may feel comfortable outside in a t-shirt and shorts even if the air is only 60°F (15°C). This is because radiant warmth from the sun allows us to be comfortable at lower temperatures. The same is true in a radiant home. With the warmth of the infrared “shining” on us from the floor, the same comfort can be achieved with the thermostat set a couple of degrees lower than what would be needed in a home heated with forced air.

Interestingly, when outside on that same mild spring day we may be comfortable until the wind picks up. Even though the air temperature has not changed, air moving rapidly across our skin causes evaporative cooling. Paradoxically, blowing hot air from a duct can cause you to set the thermostat to a slightly higher temperature to maintain the same comfort achieved in a radiant home at a lower set point.



ZONING REDUCES ENERGY USE

Most forced air heated homes have a single thermostat, and therefore a single zone. Forced air systems are inherently difficult (and expensive) to zone, while radiant homes have numerous zones which are easy and inexpensive to create. Keep bedrooms at 65°F (18°C), the family room at 70°F (21°C), or even turning off the heat in a guest room until needed. Directing the right amount of heat to the right rooms is be a big energy saver.

INCREASE SAVINGS

Warmboard-S and Warmboard-R radiant panels are the most conductive on the market, coated with thick (0.025") 1060 aluminum alloy. This continuous aluminum plate maximizes the contact area with the hydronic tubing and ensures rapid transfer of heat.

Every 3°F that you lower the water temperature is a 1% savings on heating costs. Warmboard often uses water that is 30-60°F lower than other systems, and yet produce the same amount of heat. That adds up to a huge savings!

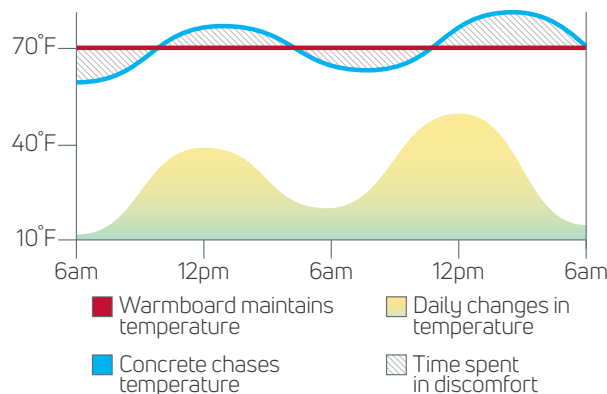
MAXIMIZE BOILER EFFICIENCY

Most modern, high-efficiency boilers are called "condensing boilers" because when they operate below 140°F (60°C). Because Warmboard systems typically operate well below 140°F (60°C) they can increase the efficiency of these boilers by up to 8% when compared to other radiant systems.

TEMPERATURE SET BACK

Many states require thermostats with a "setback" function which allows energy savings at night when occupants are sleeping. High mass radiant systems are unable to make use of this feature because it takes them many hours to change their heat output. The slow performance of high mas radiant is also problematic in a vacation home where it may take an entire day to warm up the house.

In contrast, Warmboard works great with nighttime setback, and if on vacation, you can be comfortable in an hour or two after returning home.



PREVENT OVERSHOOT

High mass systems have been known for producing too little heat in the morning and too much in the afternoon. This overshoot problem is generally resolved by opening windows to dump the excess heat – heat that you just paid for. Warmboard quickly and accurately adjusts its output, providing your desired temperature regardless of the time of day.

ALTERNATIVE HEAT SOURCES

There are a number of innovative means of heating water, from ground source heat pumps and solar to fuel cell cogeneration, etc. All of these methods are highly efficient, but they are only able to heat water up to 120°F (49°C) – insufficient for most radiant systems. However, Warmboard's high conductivity make it a perfect match for these technologies.

SAVE THOUSANDS ON FUEL

Modern homes are well insulated, have excellent glazing, low energy lighting and a variety of other energy saving features. Adding Warmboard to your home takes savings to a whole new level. We say this not only because of the items detailed above, but because we have many homeowners who report lowering their heating bills by 50-60% in similar sized homes in the same community.

Imagine lowering your heating bills from \$5000 to \$2000, year over year, while being more comfortable than ever before. This is the power of Warmboard.