Dr. Gregory Kettering, a popular Colorado veterinarian was looking to build his home on a plot nestled in one of the Rocky Mountain’s most picturesque landscapes with views of 14,000 foot mountain peaks. He desired to make the home green so in addition to using earth friendly construction materials; he wanted to minimize dependency on heating fuel. He consulted with Infloor, one of Colorado’s first companies to specialize in radiant flooring.

Infloor designs heating systems and manufactures specialized components as well. They have a long history of successfully combining multiple heat sources in a system. Owner Michael Willburn recommended Kettering’s home incorporate solar collectors and radiant heat. Said Willburn, “Radiant and solar are a great match especially in areas with high solar fraction like Colorado. The low water temperature a radiant floor requires keeps my collectors working efficiently and reduces fuel consumption by the back-up source. And using radiant floors to distribute heat is allot more energy efficient than other choices”.

Added Willburn “Dr. Kettering’s home design choice was a very tight, energy efficient, two-story with a main floor plan compatible with installing pex. And with this part of the country having an average 264 clear days a year, the argument for solar is a strong one. By using 4 evacuated tube collectors, we calculated the majority of his hot water would be heated via solar, and that solar would also make a sizable contribution to his space heating. And by going with radiant, dividing the 3,600 square foot house into multiple heat zones was easy and helped our minimal fuel consumption goal”.

To distribute heated water to the zones, a Caleffi TwistFlow manifold was selected. Said Willburn, “I’ve designed hundreds of systems using Caleffi manifolds. The built-in balancing valves with sight gauges make setting the loop flow rates simple and connections never leak no matter what type of tubing I need”. Michael chose to use zone valves that mount directly onto the manifold. “Those twist type actuators have a pop-up visual indicator when the zone calls – which is very helpful. And the valves can be opened manually by twisting the top - other brands require putting power to the actuator which frankly is a time waster at start-up”.

Nearly 3,000 feet of pex tubing is used to heat the 1st floor which is divided into 4 zones. The 2nd floor is much smaller and is heated as just one zone using 5 panel radiators. “I sized the upper floor radiators to run at the same temperature as the radiant. This simplified our design by eliminating the need to use multiple mixed temperatures.”

Two Triangle Tube SmartLine 600 multi-energy tanks are used to store heat produced by both the solar and boiler. Each tank holds 60 gallons of domestic hot water and 100 gallons of space heating water. “It is important to have ample buffer capacity when using solar in space heating” said Wilburn. A solar loop coil is built inside the tanks to harvest heat produced by the collectors. An electric boiler acts as back-up heat source due to problems and expense of bringing gas or propane to the home.

Several other key control components were selected from Caleffi including air separator, air vents, flow switch, fill valve, back-flow preventer and zone valves. Said Willburn, “I believe Caleffi is one of the best made products on the market today. I’ve had almost zero issues with any of their components and now use them almost exclusively.”