

Tim Cutler and his team at TJ's Plumbing & Heating applied their skills in hydronics, radiant heating, and geothermal for a new home that now sits "comfortably" in Quincy, MA.

# Hybrid Heroics

PHOTOS BY PHILLIP FRINK, PHILLIP FRINK PHOTOGRAPHY

Tim Cutler and his installation team at TJ's Plumbing & Heating, Inc., Attleboro, MA are masters of hydronics and geothermal systems. This QHCA winning project in a new home in Quincy, MA shows the skill and commitment that's required to be among the best in the business.



A section of radiant flooring in the home's master bedroom.

Construction of the 4,000 sq. ft. home overlooking a section of Boston Harbor began in October 2012 and was finished in June 2013.

If there's such a thing as "perfection" in the hydronics trade, this winner in our "hybrid" category is it. The arrangement of its components, the obvious pipefitting expertise, and the team's attention to every detail shine as brightly as the diamond plate that lines the wall of the home's state-of-the-art mechanical room. Solar technology also plays a part, to substantially reduce the homeowner's reliance on fossil fuels.

The home was originally specified to use a gas-fired absorption chiller, but Cutler was certain geothermal would provide more value.

"The cost of geothermal was at first prohibitive," the homeowner recalls. "But Tim felt tax credits could bring the number in line with where it needed to be, and reduce my annual cost of heating and cooling the home. That was helpful in Tim being awarded the job. And, their work was done meticulously."

"Geothermal systems have the lowest life cycle cost (25-50% less than conventional systems)," Cutler says. "De-



Tim Cutler is an exceptional hydronics craftsman.

BY TERRY MCIVER, EXECUTIVE EDITOR



pending on your climate and the system design, you can save up to 70% on your energy bill. Our client will receive a 30% tax credit on our system"

The home's main heating and cooling functions are channeled through a Bosch geothermal heat pump, which provides heating for the radiant floors and also cooling to the chilled water air handlers. A solar energy tank provides heat to the radiant floor and hot water in times of sufficient sunlight. The entire system is backed up with a Viessmann Vitodens 200 gas-fired condensing boiler, which has an AFUE of over 90%. Finally, a Zehnder ComfoSystem is employed for heat recovery, ventilation, and air exchanges, with a balanced air flow system throughout the entire home. Solar Skies solar panels were placed on a section of the roof facing south.

"This was a very interesting project, due to its various heat transfer and energy aspects. It fit right into our business model," Cutler says.

"The home's heating system is based around the in-floor radiant system that uses the geothermal heating and solar to provide heating at the lowest possible water temperatures," Cutler explains. "Because the house was built to be so energy-efficient, we needed to exchange the air using a heat recovery ventilator. We chose the

Zehnder Comfosystem, which allows the house to be completely even and balanced allowing perfect temperatures throughout."

"For this installation we made custom-made radiant transfer panels, so we can run half-inch tubing through the panels and achieve a very high transfer rate, even with wood," he adds. "It allows us to send very low water temperatures through the panels and still heat the house."

For the six-ton, 74,000 BTU geothermal system, two, 510-ft. vertical bore closed loops were drilled by Skillings & Sons, Amherst, NH. The loop fields that are piped reverse return in the yard. Two, 1.5-in. pipes enter the home through the foundation wall. Four zones of air conditioning are provided by chilled water running through the geothermal system.

Two technicians devoted

#### PRODUCTS KEY TO SUCCESS

- Bosch 6-ton, two-stage water-to-water heat pump
- Boiler Buddy 120-gallon chilled water storage tank
- Caleffi zone valves
- Caleffi flow meters
- Energy Labs drain back tank
- Grundfos Alpha circulators
- Solar Skies flat panel solar collectors
- Taco solar circulator
- Taco i series mixing valve
- Triangle Tube energy tank
- Viessmann Vitodens 200 gas-fired condensing boiler
- Webstone isolation flanges
- Webstone purge valves
- Webstone separation valves
- Webstone geothermal purge valves
- Webstone draw-offs
- Wirsbo radiant tubing and manifolds
- Zehnder Comfosystem

#### INSTALLATION TEAM

Tim Cutler, Kevin Cutler, Ryan Hampton, Darryl Instasi, Taylor Kuietauskas.



**QualityHome  
Comfort  
AWARDS**

The Boiler Buddy tank and Bosch water-to-water heat pump, with controls assembly.



The sparkling mechanical room features the Triangle Tube Smart indirect water heater (left) and Boiler Buddy chilled water tank.

three weeks to installing, sealing, and testing ductwork. This was followed by the rough-in for the radiant system, which involved stubbing up the manifolds located in various closets throughout the home. The backwalls of these closets are the designated locations for the radiant manifolds. Manifolds for the ground floor are located in the basement.

The diamond plate metal-framed mechanical room is designed for aesthetics and serviceability. The system was designed with the highest equipment efficiencies and energy standards in mind. All loads were calculated using ACCA Manual J8 Standards

Worthy of mention is Tim Cutler's patience in working with minimal ductwork clearances, and the usual work-arounds that a new home construction and geothermal drilling entail. That's right in line with the company's stated goal of providing the highest quality material and workmanship. For TJ's Plumbing & Heating, a job is not complete until the customer is completely satisfied.

So let's count this job "complete." 