

Comprehensive Assessment of Hot Water System

The production and delivery of hot water in the CUSD home is technologically advanced, economical, and simple. Hot water is produced primarily by the evacuated solar thermal tube collectors on the roof of the house. The solar thermal tube array was sized to take care of the majority of our heating and hot water needs throughout the course of the year in the Washington, DC climate. The solar thermal tube array also provides heating to the radiant floor. The hot water and radiant floor systems are tied independently to the solar thermal tube array, preventing the radiant floor from robbing the water heater of much needed thermal energy. In case the solar thermal tubes are not able to provide hot water to our system, the hot water tank contains an electric heating element. The tank is lined with R-19 insulation to prevent dissipative heat loss.

The hot water tank is located in a water wall between the bathroom and kitchen, and across the hall from our laundry machine, providing immediate and plentiful hot water for every application. The CUSD home's layout was designed around the plumbing core, which minimizes pressure and thermal losses in the pipes. Copper piping with ½" of pipe insulation supplies the hot water to each of the fixtures throughout the CUSD home, further decreasing thermal losses.

Once hot water is used and drained, it is collected and stored in a grey water tank. The grey water and rainwater is filtered and used to supply our landscape with water. The grey water is not used for interior applications because the landscape watering requirements are greater than our estimated grey water production.

We designed the hot water system to provide thermal energy without inconveniencing guests of the CUSD home. There is no noise anticipated from the hot water delivery system. The hot water system is located mostly in the wet wall separating the kitchen and bath and can be accessed through the bathroom wall, if necessary. We have also built in a large access panel next to the toilet, in case the hot water tank requires servicing. Otherwise, the hot water system is completely concealed and does not disturb the occupants' living experience. The hot water system is state of the art and is fully integrated into the CUSD building. The energy that our hot water system provides is invaluable and contributes greatly to the comfort and quality of our home.