Summary of Field Test of EarthLinked® GeoExchange
Residential Water Heating System by Florida Solar Energy Center

Project Year: 1984

Location: Cape Canaveral, Florida U.S.A.

In June, July and August of 1984, the Florida Solar Energy Center conducted a 3-part test of a nominal 8,500 BTUH/Hour EarthLinked® water heating system using a compressor with R-12 refrigerant, rated at 6,150 BTUH, and a 82-gallon water storage tank. Hot water usage was simulated to represent residential usage.

During the first phase, the daily draw for seven consecutive days averaged 70.57 gallons. The output water temperature averaged 124°F, and the average rate of BTUH delivered was 8,832, resulting in an average COP of 3.08, which may be compared to the COP of 0.8 for the then typical resistance element water heater.

In the second phase of testing, the average daily water draw for seven days was increased to 156.1 gallons per day, with average delivered water temperature at 125°F. The average BTUH delivered was 9,570, with an overall COP of 3.48.

In the third and final phase, the water heating system was allowed to run 21 consecutive days, with an average daily water draw of 102.8 gallons. The BTU/hr. rate, which averaged 10,457, increased slowly and steadily from 10,092 on the first day to 10,824 on the last day, and the average COP increased to 3.67. The improvement of the BTUH rate may have resulted from gradually improving earth contact between the earth loop and the borehole backfill.

[It should be noted that a smaller and/or better insulated storage tank would have resulted in a system with a significantly higher COP, a reduced volume of stored hot water, and an improved recovery rate.]