UNIVERSITY OF MINNESOTA
Driven to Discover℠

Hybrid Geothermal and Fuel Cell System

Technology ID
z04147

Category
Engineering & Physical Sciences/Sustainable Technology

View online page

Heat Pump Uses Fuel Cell to Increase Efficiency

A hybrid energy system that includes a fuel cell and geothermal heat pump has been developed that improves the efficiency of a ground-source heat pump by using low-grade heat from the fuel cell. The system takes the waste heat from the fuel cell and incorporates the waste heat into the geothermal heat exchange system. The fuel cell provides electricity to the geothermal system and the digital control unit, allowing the system to operate off the grid. The fuel cell can also provide electrical power to the building. The temperature of the fuel cell is regulated by a digital control unit. Fuel cells are more efficient than generators. However, fuel cells typically waste about 50% of the input energy in the form of heat. In the heating mode, the waste heat from the fuel cell is pumped into the building for heating purposes. In the cooling mode, the waste heat is pumped into the ground where it is absorbed by the earth.This technology can improve the efficiency of the heating and cooling systems in the building and also has applications in remote or backup power generation systems for homes and commercial buildings.

MN-IP Try and Buy

Try

- Trial fee is $5,000 for a six month license

Buy

- $30,000 conversion fee (TRY to BUY)
- No patent costs
- Royalty rate of 3% (2% for MN company)
- Royalty free for first $1M in sales

FEATURES AND BENEFITS OF THE HYBRID GEOTHERMAL AND FUEL CELL SYSTEM:

- The geothermal heat exchange recovers the heat loss by the fuel cell and increases efficiency of the geothermal heat pump
- By using the fuel cell, the system can be operated either on or off the grid

Phase of Development Scale model demonstrated in a small commercial building.

Researchers: Jim Licari, PhD Assistant Director for Industrial Liaison, Digital Technology Center,Hal Ottesen, Phd ProfessorElectrical and Computer Engineering, University of Minnesota Rochester