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NEW EMERGING TECHNOLOGIES AND APPLICATIONS

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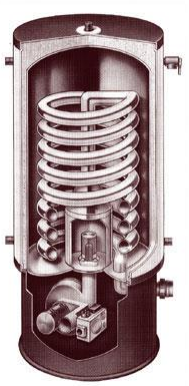
Recap

- Condensing HW Heaters



- Fixtures

- Instantaneous Water Heaters

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Legionella

- pathogenic group of Gram-negative bacteria, that includes the species *L. pneumophila*, causing Legionellosis[1] (all illnesses caused by *Legionella*) including a pneumonia type illness called Legionnaires' disease and a mild flu like illness called Pontiac fever
- Control of *Legionella* growth can occur through chemical or thermal methods. The most expensive of these two options is temperature control—i.e., keeping all cold water below 25 °C (78 °F) and all hot water above 51 °C (124 °F). The high cost incurred with this method arises from the extensive retrofitting required for existing complex distribution systems in large facilities and the energy cost of chilling or heating the water and maintaining the required temperatures at all times and at all distal points within the system.
- Disinfection through
  - Chemicals (chlorine, chlorine dioxide, monochloramine)
  - Heat Sterlization (140°F) every 3-5 weeks
  - Copper Silver Ionization

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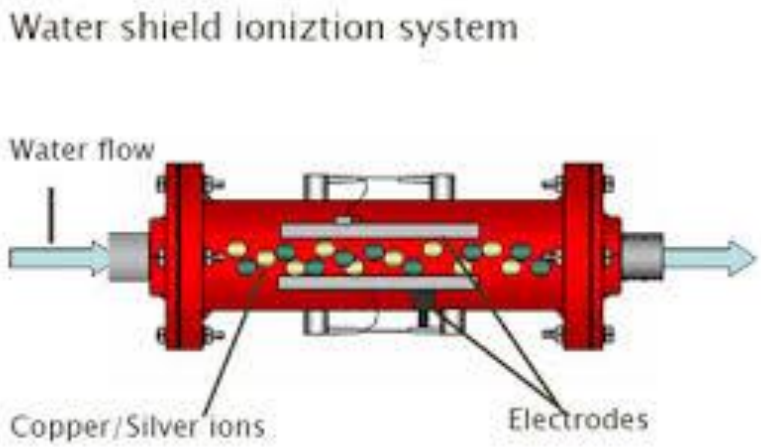
Copper Silver Ionization

- Inline cell
- Disperses Copper & Silver Ions
- Release of the ions is through the monitoring system



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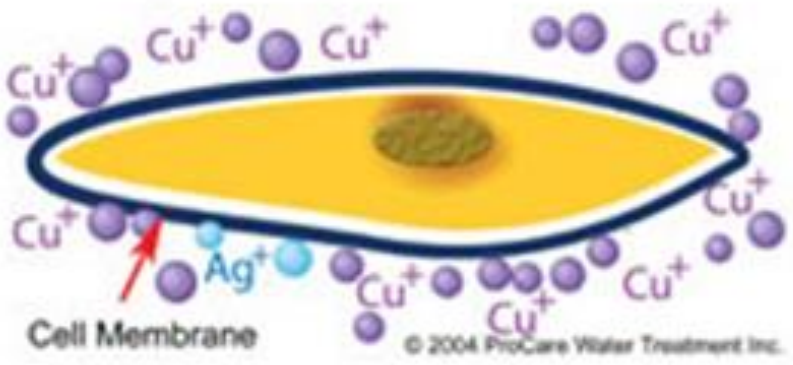
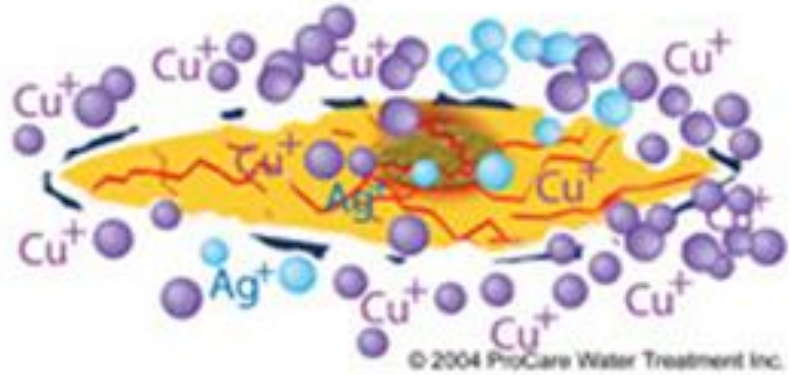
How it works





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Maintenance

- Inspection (every 3 months)
- Water Testing
- Copper and Silver Testing
  - Through Cleaning Kit
- Flow Cell cleaning (around 4-6 weeks)
  - Cleaning kit available

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Typical Installation

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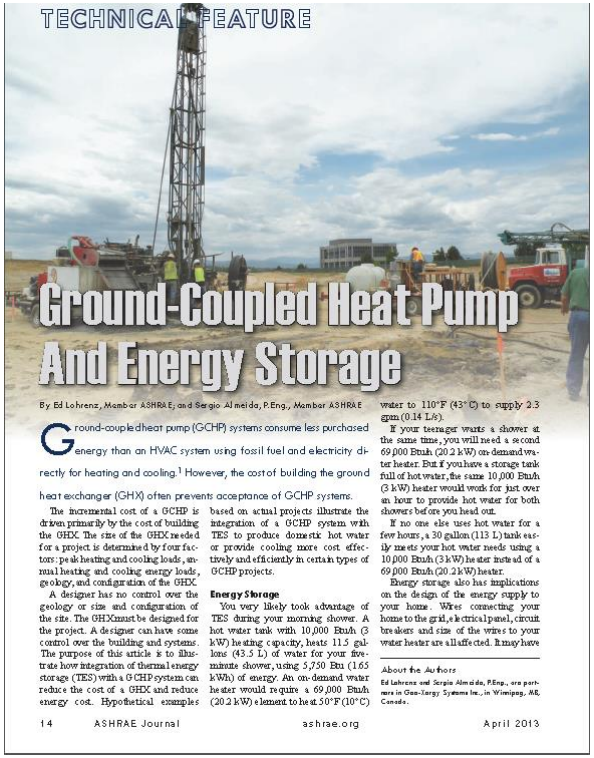
ASHRAE Article

- In April 2013 magazine
- Using thrermal storage from Ground Source loop
- Written by ASHRAE Mb Chapter Members
  - Ed Lohrenz
  - Sergio Almeida



TECHNICAL FEATURE

Ground-Coupled Heat Pump And Energy Storage

By Ed Lohrenz, Member ASHRAE, and Sergio Almeida, P.Eng., Member ASHRAE

Ground-coupled heat pump (GCHP) systems consume less purchased energy than an HVAC system using fossil fuel and electricity directly for heating and cooling.[1] However, the cost of building the ground heat exchanger (GHX) often prevents acceptance of GCHP systems.

The incremental cost of a GCHP is driven primarily by the cost of building the GHX. The size of the GHX needed for a project is determined by four factors: peak heating and cooling loads, annual heating and cooling energy loads, geology, and configuration of the GHX.

A designer has no control over the geology or size and configuration of the site. The GHX must be designed for the project. A designer can have some control over the building and systems. The purpose of this article is to illustrate how integration of thermal energy storage (TES) with a GCHP system can reduce the cost of a GHX and reduce energy cost. Hypothetical examples based on actual projects illustrate the integration of a GCHP system with TES to produce domestic hot water or provide cooling more cost effectively and efficiently in certain types of GCHP projects.

Energy Storage

You very likely took advantage of TES during your morning shower. A hot water tank with 10,000 Btu/h (3 kW) heating capacity, heats 11.5 gallons (43.5 L) of water for your five-minute shower, using 5,750 Btu (1.65 kWh) of energy. An on-demand water heater would require a 69,000 Btu/h (20.2 kW) element to heat 50°F (10°C) water to 110°F (43°C) to supply 2.3 gpm (0.14 L/s).

If your teenager wants a shower at the same time, you will need a second 69,000 Btu/h (20.2 kW) on-demand water heater. But if you have a storage tank full of hot water, the same 10,000 Btu/h (3 kW) heater would work for just over an hour to provide hot water for both showers before you head out.

If no one else uses hot water for a few hours, a 30 gallon (113 L) tank easily meets your hot water needs using a 10,000 Btu/h (3 kW) heater instead of a 69,000 Btu/h (20.2 kW) heater.

Energy storage also has implications on the design of the energy supply to your home. Wires connecting your home to the grid, electrical panel, circuit breakers and size of the wires to your water heater are all affected. It may have

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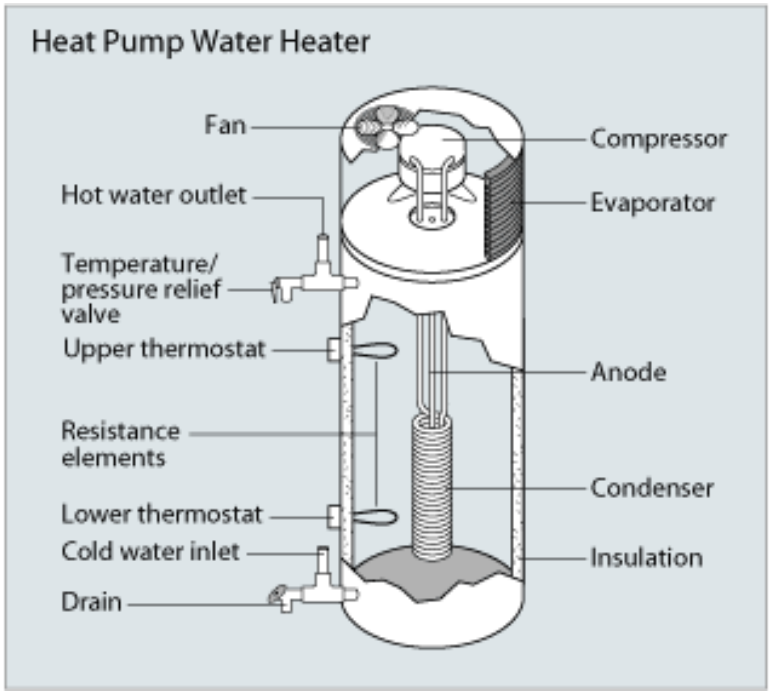
Domestic Hot Water Heat Pumps

- Similar operation to HVAC HP's
- Can have a built in storage tank
- Can be retrofitted with existing storage tank
- Less performance in Winter
- More Noise
- Some additional Maintenance
  - Filter



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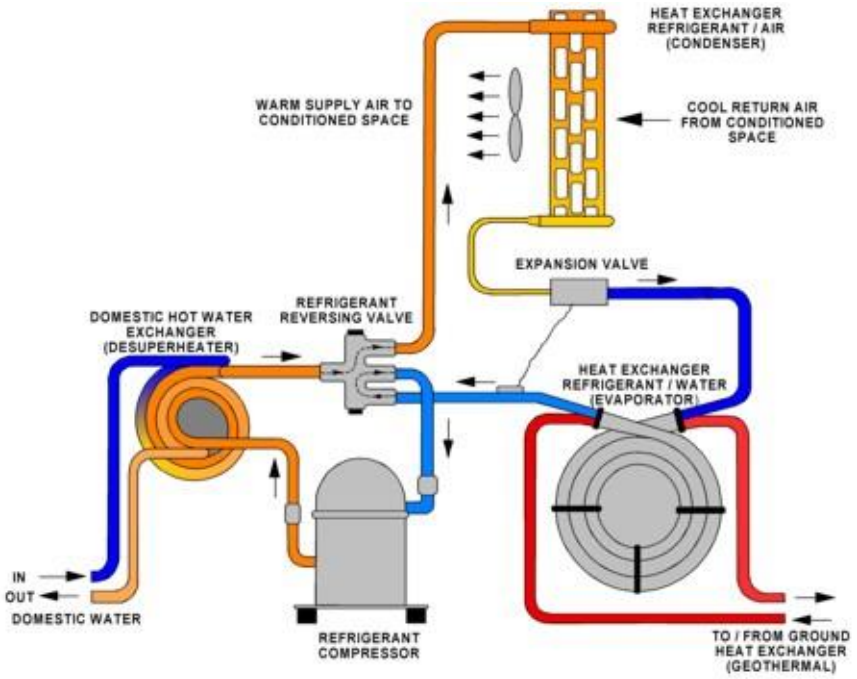
Heat Pump Desuperheater

- Accessory to HVAC Heat Pump
- Supplement domestic water system
- Great for Condos/Apartments/ Residential



MISCELLANEOUS RENEWABLE SYSTEMS

- Greywater Recovery
- Solar Heat
  - Thermal
  - Photovoltaic

GUNDERSEN HOSPITAL

- Use Solar Heat for hot water system in Day Care (85%)
- Use Solar Heat for Renal Dialysis Center
- Not always reliable source
- Long paybacks