

# Innovative chiller uses solar power to heat water and cool home



## Result

- House can reclaim heat from its cooling cycle to provide hot water for the kitchen, bathrooms, pool or hot tub without using any additional energy to heat the water.
- Eliminates heat waste and greatly reduces energy usage by avoiding gas or electric use to heat water.
- Allows for use of solar power instead of grid power during peak or all the time. Home can be 100% comfort conditioned 24/7 using solar power.
- Doubles solar panel effectiveness by reclaiming and redirecting heat that is normally wasted and exhausted to the environment.
- Every watt of power used in heating or cooling is converted to between 3 and 7.9 watts of heating and/or cooling. This is called a 'Coefficient of Performance'.

## Application

Multiaqua Heat Recovery Chiller with the Copeland™ variable speed scroll compressor and motor control drive.

## Challenge

In the United States, the average energy expenditure per person is \$3,052 annually. Heating and cooling account for about 48% of all energy consumption per household, making chillers and air conditioners the best targets for energy savings.

Rather than paying to reject heat generated by cooling, homeowners can recover heat to use in their homes. Recovered heat reduces purchased heat (and cost) and also reduces the ancillary power necessary to reject the heat, while providing heated water to support showers, water from faucets, washing machines, pool heating, and other areas in the house where heated water is required.

“After 5 years of research, the Copeland variable speed scroll compressor and inverter drive made this heat recovery technology possible and applicable in residential solar applications.”

– Ralph A. Fera  
President, Multiaqua



## Solution

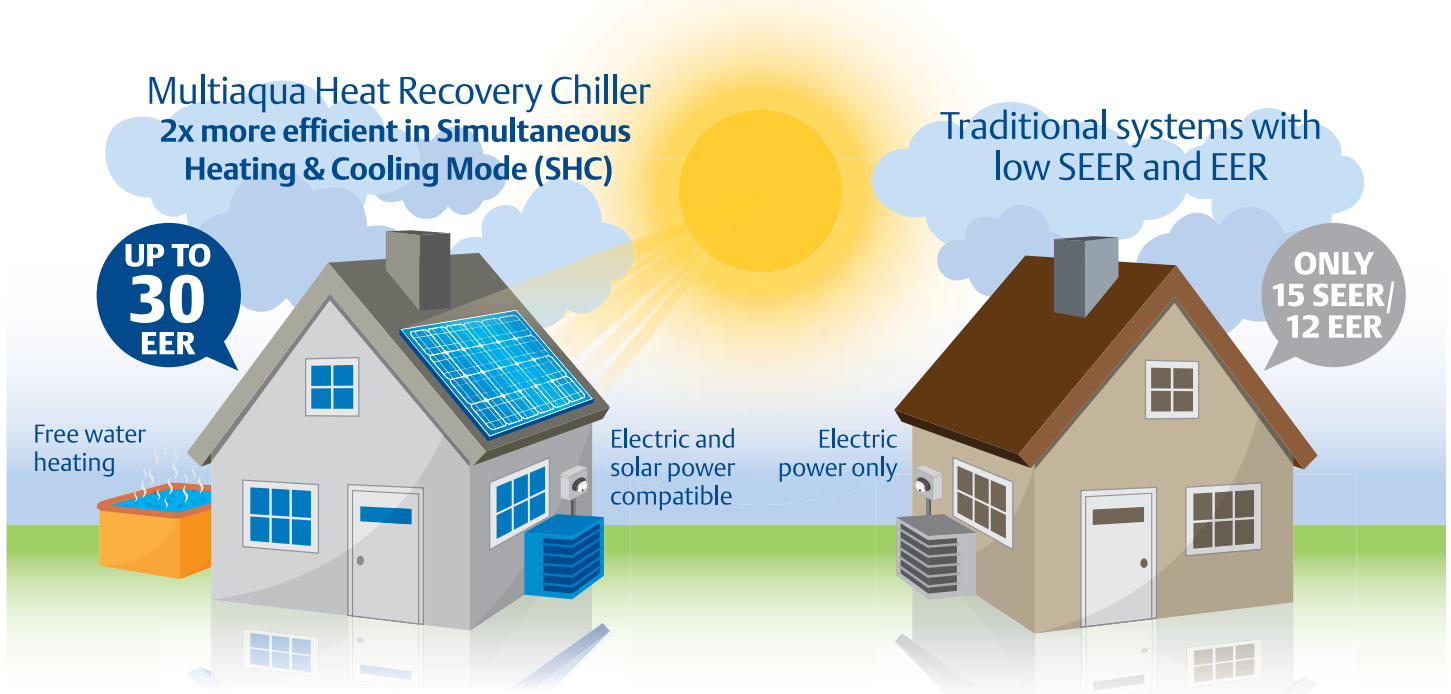
The Multiaqua Heat Recovery Chiller (MHRC) technology is unique because it has the ability to reclaim/recover 100% of the heat which would otherwise be rejected and wasted into the atmosphere. This makes the Multiaqua Heat Recovery chiller twice as effective as other systems. It can move heat from multiple sources, either from air or water, and simultaneously distribute that heat wherever it is required. The Multiaqua Heat Recovery chiller encompasses low LRA (Locked Rotor Amps), which allows solar energy to start and operate the unit. This refrigerant management system contains a Copeland variable speed scroll compressor and electronic inverter for compressor control, as well as a proprietary refrigerant control system to direct refrigerant movement seamlessly where it is needed without compressor shut-down. Copeland variable speed scroll technology is used in this chiller because of its flexible design, which is ideal for unique applications. The variable speed technology also has a slow ramp up, allowing for slow power demand on the inverter. The chiller delivers a coefficient of performance (COP) from 3 to 7.93.

“ This is another exciting opportunity where the broad performance capabilities of our variable speed compressor and drive system is providing unique design solutions to our customers. The ability to precisely match cooling demands and enable low start up power consumption makes Emerson variable speed solutions ideal for this application ”

– Brandy Powell  
Vice President – Variable Speed  
Emerson



## EFFICIENCY COMPARISON



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