



E³A: Solar Hot Water Applications for the Home, Farm, or Ranch

Steps in the Solar Hot Water Series

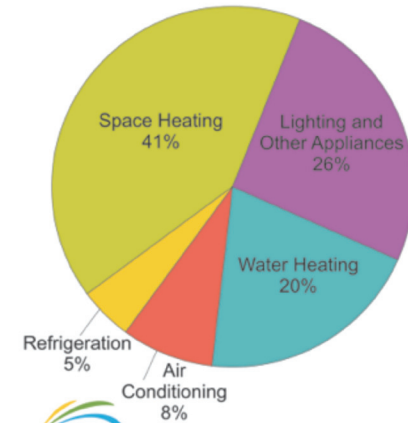
1. Building and Site Assessment
2. Conservation and Efficiency
3. System Options
4. System Sizing
5. Costs
6. Installation
7. Operation and Maintenance
8. Solar Hot Water Collector Sizing Worksheet

Introduction

In the United States, water is typically heated using natural gas, electricity (generated from coal, natural gas, or hydro-power), or propane. Water heating can account for up to 20 percent of a home's total utility bill. Agricultural buildings and processes can use large amounts of heated water. For some dairy farms, water heating can account for 25 percent of the total energy used.

An alternative is to use the sun's energy as the fuel. Solar hot water systems are designed to capture the sun's energy to heat water. Solar hot water systems are also called solar thermal (heat) water systems and solar domestic (for homes) hot water systems.

How Energy is Used in Homes (2005)

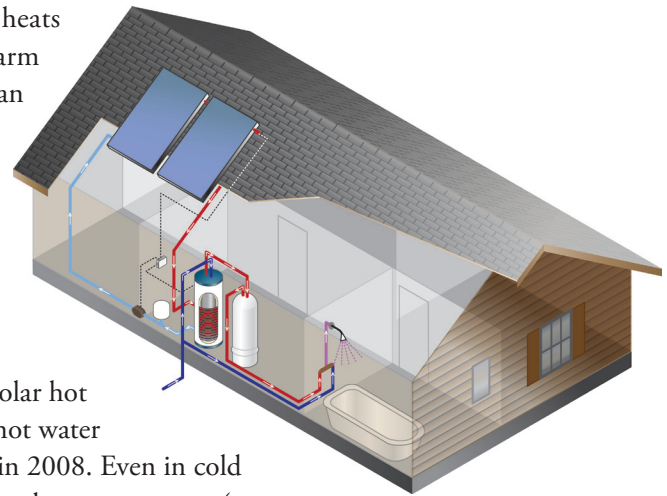


 Source: U.S. Energy Information Administration, Residential Energy Consumption Survey 2005.

How do solar hot water systems work?

Simply put, the sun's energy is absorbed by a south-facing "collector" that heats a fluid (water or antifreeze). In warm climates, collector-heated water can be used directly. In cold climates, the fluid transfers its heat to potable water stored in a tank.

While some areas are sunnier than others (Miami, Florida has more sunny days than Seattle, Washington), all states in the U.S. receive enough sun for operating solar hot water systems. Over 20,000 solar hot water systems were installed in the U.S. in 2008. Even in cold climates, these systems can provide a large percentage (up to 80+%) of hot water needed. The rest can be provided by a tankless (on-demand) water heater or a conventional storage tank system.



Courtesy Rheem Manufacturing Company

Benefits

Today's solar hot water systems are reliable, efficient, adaptable, and affordable. The purchase and installation cost of a residential solar hot water system can range from \$4,000 to \$10,000. When considering the "second price tag" of operating costs, solar hot water systems can be especially cost-effective compared to electric and propane water heaters. Average water heating bills often drop 50 to 80 percent. Systems can pay for themselves quickly. Payback time decreases when fuel costs increase; and, government and utility tax incentives and rebates can significantly reduce the final system cost further decreasing payback time. A properly designed and installed system can last up to 40 years.

While solar hot water systems can be used for radiant floor heating and indoor and outdoor swimming pools, the following factsheets only address agricultural-based buildings and processes and residential systems used to heat water for bathroom and kitchen fixtures and appliances.

Process

Use the folder's factsheets to determine if a solar hot water system will work for you. The information is basic and will help you discuss solar hot water systems knowledgeably with a company or installer. The sheets can be used separately or together for a step-by-step decision-making process.

1. Building & Site Assessment: Montana and Wyoming have ample sun for solar hot water systems, but there are building and site conditions to be considered.
2. Conservation & Efficiency: Conserving and using water and energy efficiently allows for a smaller, more efficient, and affordable system.
3. System Options: For Montana and Wyoming's cold climate, there are several systems that work well and do not freeze.
4. System Sizing: Proper sizing is important for a resource-efficient and cost-effective system.
5. Costs: System and operation and maintenance costs depend on various factors. Rebates and incentives lower the final purchase and installation cost.
6. Installation: Considerations for doing-it-yourself or hiring a contractor.
7. Operation & Maintenance: Routine inspections and maintenance will result in efficient and long-lived systems.
8. Solar Hot Water Collector Sizing Worksheet

Notes

References

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