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

Steps in the Solar Hot Water Series

Building and site assessment

Answering these questions will help you determine whether a solar hot water system will work for your building or site.

Do you have a south-facing roof?

Roof-mounted solar hot water collectors.

Because Missouri is in the northern hemisphere, solar hot water collectors need to face south to work as efficiently as possible. This placement allows collectors to take full advantage of the sun's path in the sky because the sun shines longest on a building's south side. A slightly southeast or southwest placement will not result in significant loss in system performance.

- Yes — Move to question two.
- No — A solar hot water system might not work well in this case.

You can add a south-facing extension onto your roof or another structure if it can safely support a collector. Collectors can be mounted on a wall or the ground, but shading, snowdrifts, lawn care and vandalism might pose problems for a ground-mounted collector.

Collectors can be mounted on east- or west-facing roofs to face south, but they are highly visible and can be unsightly, as they stick up off the roof. Architects and builders can address this by designing solar-ready buildings and integrating solar technology components into the design.

Does your roof have enough space for collectors?

If your roof is not large enough for collectors, consider installing them on the ground.

For a residential system, 20 square feet of collector surface area are needed per person for the first two people in a household. Add 12 to 14 square feet of area for each additional person in the household.

- Yes — Move to question three.
- No — If your roof is not large enough for the collectors, consider a smaller system, extending your roof or mounting collectors on a wall or the ground.

Is your roof unshaded?

Solar hot water systems are most efficient when collectors receive direct sunlight and are not shaded. When making an evaluation, consider possible shading from nearby buildings and the mature height of landscape plants such as trees.

- Yes — Move to question four.
- No — If the shade is from landscaping, consider removing the plants. If a structure is to be built that will shade your solar system, check local and state codes to see if you have solar access rights. Refer to the *Installation* guide for more information.

What's the angle of your roof?

Solar collectors need to be oriented to the south at an angle equal to latitude.

If possible, use your latitude (38 degrees for Columbia, 37 degrees for Springfield and 40 degrees for Trenton) as the collector tilt angle to maximize the solar energy collected. Collectors can be installed at various angles, depending on your hot water needs. Installers can mount collectors flush with the roof or tilt them at an angle that sheds snow easier or produces more hot water in a particular season.

Flat Roofs

Collectors can be angled on flat roofs but should not be placed flat because they will not receive enough sun, especially in winter, to make installation cost effective. Also, snow will accumulate and block the sun, which makes the building more dependent on a backup system typically powered by natural gas, electricity or propane.

Is your roof in good condition?

Most roofs can safely support collector weight — about 160 pounds for two residential-scale collectors. Although innovative roof flashing can make collector removal easy, it is less expensive and less labor intensive to make roof repairs before collectors are installed.

- Yes — Move to the next question.
- No — If your roof needs to be replaced or repaired, do so first and make sure it can handle the collectors' weight. If considering a new roof, contact a solar hot water company for recommendations that might make system installation easier or less expensive.

What's next?

If you answered yes to every question or can make adjustments where you answered no, your site might be a good candidate for a solar hot water system. A supplier or installer can provide a detailed assessment. Next, consider how conservation and efficiency measures can result in a more efficient and affordable system.

Original work created by Montana State University Extension and the University of Wyoming.
Adapted with permission by University of Missouri Extension.

UNIVERSITY OF MISSOURI Extension

■ Issued in furtherance of the Cooperative Extension Work Acts of May 8 and June 30, 1914, in cooperation with the United States Department of Agriculture. Director, Cooperative Extension, University of Missouri, Columbia, MO 65211 ■ an equal opportunity/ADA institution ■ 573-882-7216 ■ extension.missouri.edu

em401

New 9/14/POD