SOLAR WATER HEATERS

Perhaps the best way for the average person to save money by using solar energy is installing a solar water heater. These self contained systems can be retrofitted onto almost any dwelling, and because of the rise in utility rates over the years, the "payback time" for a modern solar water heater is actually shorter than it was with the tax credits back when they were available. Unfortunately, solar water heaters are not currently fashionable; to most people, heating water is just a prosaic thing that happens automatically without any thought or work. There were also quite a number of poorly designed, over-expensive solar water heaters installed in the last days before the tax credits expired. These systems have left a legacy of abandoned rooftop collectors and the impression that solar never really worked. We at MESEA have been attempting to counter this misconception by offering workshops where the participants come for a Saturday and build several solar hot water collectors as well as the heat exchanger and other parts necessary for a complete system. These systems typically cost about $1200 for the parts, plus your own labor to install. Below is a calculation of the expected performance of a two collector system; big enough for a small family. The following diagrams are based on this workshop kit, which we have developed for Maine's more rugged climate. The same system would work quite well elsewhere in New England and in Maritime Canada.

Filename: SOLARDHW
Version 2.0
CITY ROCKPORT
STATE ME
COUNTRY USA
Latitude: 45 degrees
Collector Tilt: 45 degrees
Collector number 2
Collector length 78 inches
Collector width 34 inches
Collector area 54 sq. ft.

These calculations are just approximations based on the average weather in the area. The final savings will depend on your habits.

<table>
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<tr>
<th>Month</th>
<th>Day</th>
<th>Temp.</th>
<th>Percent</th>
<th>Sun</th>
<th>Collector Efficiency</th>
<th>Gal. HW per day</th>
<th>BTU per mo. Output Value</th>
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Note: Protect ml. closed cell insulation from UV light.

Insulate all exposed tubing w/closed cell foam pipe insulation.

Cap-off union

Union between collectors

4-Way vent

Hot out

Roof mounts (see below)

30° to 50° Slope

45° angle best for year-round operation

South

Sloping roof mount

Lag bolt through bolt to roof - preferably to rafter - caulk bolt.

Lift shingles and slide under mounting hardware.

Stainless steel screws

Aluminum 3° x 3° angle, cut flange w/hacksaw

Solar collector

Note: Orientation best at due south. 85° efficiency at up to 30° to east or west.

- 45° slope best for year-round use at this latitude.
- Slant collectors slightly off horizontal to ensure complete drainage of antifreeze from panels.

Solar collectors

Steel or wood frame to support collectors

Roof, ground, deck or other flat surface

Flat surface mounting
PLUMBING SYSTEMS  MeSEA Solar Water Heater Kit

COLLECTOR PANEL MANIFOLD

ALL 1/2" TYPE "M" COPPER TUBE & FITTINGS

A) (4) 6 3/4"
B) (10) TEES
C) (8) 57/16"
D) (5) 74/3"

SECTION OF COLLECTOR PLATE

DO NOT SOLDER CAP!

4 WAY VENT & SYSTEM FILL

(MOUNT VERTICALLY)

(1) 2" END CAP
(1) 15/32" x 2" TUBE
(1) 2" x 1" TUBE
(1) 1" x 1/2" COUPLE
(1) 2" x 1/2" TUBE

HEAT EXCHANGER MANIFOLD

1/2" 4 3/4" TYPE "M" COPPER TUBE & FITTINGS AS INDICATED.

FOR 2 PANEL EXCHANGER:

(3) 4 1/2" x 1 1/4" TUBE
(1) 36" x 3/4" "
(4) 1 1/2" x 3/4" "

MAINE SOLAR ENERGY ASSOCIATION
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DRAWN BY CLEVELAND CRAWFORD
COLLECTOR ASSEMBLY

Our Workshop Kit

EXPLODED VIEW OF COLLECTOR BOX

SECTION THROUGH COLLECTOR BOX

MESEA SOLAR WATER HEATER KIT

MATERIALS PER PANEL

- (2) ALUM EXTRUSION - SIDE 77 3/4" END 35 3/4"
- (2) " SIDE TOP 77 3/4" BOTTOM 35 3/4"
- (1) GLASS PIECE 34"x76" (TEMpered)
- (1) SHEET RIGID INSULATION 1" X 35 3/4"x77 3/4"
- 2" UNBENTED FIBERGLASS BATT INSULATION
- 20 LF 4" ALUMINUM FLASHING PAINTED BLACK ON ONE SIDE
- BLACK HIGH TEMPERATURE PAINT
- (4) RUBBER GROMMETS
- (2) 1"x1"x3/4" ALUM ANGLES 1/4" THICK
- 20 LF RUBBER GASKET
- (1) COLLECTOR PLATE MANIFOLD ASSEMBLY
- (25) #8 x 5/8" SS ROUND HEAD SCREWS
- CLEAR SILICON SEALANT

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