

SITE INSPECTION CHECKLIST

Numerous steps are required in determining that a site is suitable for the installation of a solar system. The inspection procedures and their proper chronology are outlined below. I have attempted to make each individual step and its description as simple as possible.

The purpose of this inspection document is to provide local Weatherization Assistance personnel with some type of guidance on how to inspect and determine a site's feasibility for solar system installation.

The site inspection should be conducted in the following order:

1. Solar access inspection
2. Roof inspection
3. Water heater inspection
4. Electrical inspection
5. Plumbing inspection
6. Occupant questionnaire (WAP forms)

Solar Access Inspection

1. Determine if the residence has a south facing (or within 45° west or east of due south) or west-facing roof. The solar collector will be installed at this location.
2. Determine that there is uninterrupted winter and summer season solar at the potential solar collector mounting location between the hours of 9 am to 4 pm. There should be no shading from trees, bushes, chimneys, fire walls, fences (if ground mounted) etc. on the collector during this time period. Potential vegetation growth leading to collector shading must also be considered. Keep in mind that the sun is lower during the winter months therefore, watch for trees in the horizon that may not create a shading problem in the summer months, but could create a shading problem in the winter months.
3. Roof mounting is the standard and preferred location for mounting solar collectors. Nevertheless, ground mounting may also be acceptable in certain circumstances. If suitable solar access is unavailable for roof mounting, or if roof mounting is undesirable or impossible due to structural considerations, conduct Steps 1 and 2 for the ground mount location. (Keep in mind that ground mounting must be done with numerous factors in mind. These include making sure that they do not create a safety hazard and that the collectors must be raised off the ground enough to maintain the space around and under the collector.)

Roof Inspection

The purpose of the roof inspection is to determine whether the roof is both structurally and materially sound enough for the mounting of a solar collector. Collector weights range from approximately 80-150 pounds for flat plate collectors to 450 pounds and over for integral collector storage (ICS) systems. The ICS systems will be installed under this program.

1. Determine that the roof is structurally sound enough for the installation of a solar collector.

In addition, if the condition of the roof tiles are such that they need replacing within a short period of time, it would be unwise to install a solar collector until re-roofing has been conducted.

2. Determine the proposed location of the solar collector. Ideally, the location at which the solar collector is to be mounted should face south, but facing the collector within 30 to 45 degrees either east or west of due south is satisfactory. For this program, solar collectors may also be mounted on west facing roofs. System installed under this program will be installed flush to the roof. (Another consideration is to keep the solar collector mounting area on the roof as close as possible to the location of the conventional water heater.)

2. Determine the age of the roof and whether any previous re-roofing or repair work has been conducted in the past. This may provide valuable information on the present condition of the roof.

3. Determine if the roof is leaking.

Ask the homeowner if roof or ceiling leaks have ever occurred.

Inspect the inside of the residence for evidence of leaks.

Check the rafters and eaves to determine if water stains are evident on the rafters (Keep in mind that water damage inside the house is not always caused by roofing problems.)

4. Examine the roof visually

(Problems with any of the following could indicate serious roofing complications.)

Ridge deflection

Rafter deflection

Sheathing deterioration

Surface "springy" under load

Adequate internal support

(Note: Sagging may be due to improper support or sagging of the rafters.)

5. For specific types of roof material, check for the following (These could indicate that the overall roof may need extensive work or re-roofing - therefore negating the installation of the solar system until that has been completed.):

Asphalt Singles

Missing or broken shingles Loosing surface granules Nails loose, missing, rusted

Torn shingles Split or curled shingles Worn areas Poorly applied

Built-up Roofing on flat or low-sloped roofs

Bare spots in surfacing Separations and breaks in the felt Bubbles, blister, crack, or soft spots Water accumulation Gravel surface deteriorated

Tile roofs

Broken or missing tiles

6. Attic space

Determine if there is sufficient access for solar system installation personnel

7. Determine the distance from collector location to water tank (Once again, the intent is to keep the pipe run between the collector and the conventional water heater as short as possible.)

Horizontal run (in feet)

Vertical run (in feet)

Water Heater Inspection

NOTE: If the water heater needs to be replaced, the associated plumbing and electrical could be performed and charged as allowed for health and safety abatement (meaning that the repair was needed for the appropriate installation) through the Weatherization Assistance Program. The cost would be capped at \$300 and billed as a separate line item. This could be allowed for both revisits and new Weatherization Assistance Program candidates.

Another option, especially if no water heater is installed and the home has already been weatherized, would be Low-Income Emergency Home Repair Program (LEHRP) funds. Water heater replacement plumbing and electrical repairs could be performed without the \$300 limit.

The following electric water heater inspection should be conducted to determine the condition of the electric water heating tank.

1. Determine if there is an electric hot water heater at the residence? (Only electric water heaters are eligible for this program.)
2. Determine the age and condition of the water heater. Check around piping connections and valve connections for possible leaks. (Rust or white or greenish crusting of pipe, valves, or joints could indicate the presence of leaks.) Tanks over 10 years old will be replaced. Tanks exhibiting adverse conditions will also be replaced.
3. Determine that the water heater is accessible for replacement as well as adding additional solar system plumbing at the top.
4. Determine the gallon capacity of the water heater. (Note that defective or 10 years or older water heaters will be replaced with conventional electric 40-gallon units for ICS systems.)

Electrical Inspection

NOTE: If the water heater needs to be replaced, the associated plumbing and electrical could be performed and charged as allowed for health and safety abatement (meaning that the repair was needed for the appropriate installation) through the Weatherization Assistance Program. The cost would be capped at \$300 and billed as a separate line item. This could be allowed for both revisits and new Weatherization Assistance Program candidates.

Another option, especially if no water heater is installed and the home has already been weatherized, would be Low-Income Emergency Home Repair Program (LEHRP) funds. Water heater replacement plumbing and electrical repairs could be performed without the \$300 limit.

The following electrical inspection should be conducted to determine whether there are special electrical problems that could affect the installation of a solar water heating system. Minor problems may in some cases be corrected by the local WAP agencies.

1. Determine that there is sufficient power for the new water heater if a replacement is required.

For example, if the electrical breaker/wiring for the old tank was suitable for 20-amp capacity and the new tank requires a 30-amp capacity, the circuit will have to be upgraded.

2. Check the water heater branch circuit wiring and conduit to the electric hot water heater. Is the conduit rusty, split, etc? Is exposed wiring insulation deteriorated, damaged, brittle, or crumbly? Is there exposed electrical wiring? Is there moisture in the conduit, on wires, or in the circuit panel? Are all electrical connections secure?

3. Check the hot water heater electrical junction box. Ensure that all wiring connections are suitable.

Plumbing Inspection

NOTE: If the water heater needs to be replaced, the associated plumbing and electrical could be performed and charged as allowed for health and safety abatement (meaning that the repair was needed for the appropriate installation) through the Weatherization Assistance Program. The cost would be capped at \$300 and billed as a separate line item. This could be allowed for both revisits and new Weatherization Assistance Program candidates.

Another option, especially if no water heater is installed and the home has already been weatherized, would be Low-Income Emergency Home Repair Program (LEHRP) funds. Water heater replacement plumbing and electrical repairs could be performed without the \$300 limit.

The following plumbing inspection should be conducted to determine whether there are any special plumbing problems that could adversely affect the installation of a solar water heating system. Many discovered problems can be remedied by the local WAP agency prior to the installation of the solar system. More major problems may have to be repaired by a qualified plumbing contractor. A thorough inspection of the existing water heating tank, piping, valves, and faucets should be conducted.

1. Determine the pH of the residential water. Sites with extremely acid will not qualify for participation in this program. (Solar installers will be able to determine this before installation. This is of special concern in rural areas that may be on wells.)
2. Determine if the water system is a city water system or a well system. (Solar systems may be installed on either system. Note item 1 above – well systems may have extremely acidic waters.)
3. Determine that water pressure is adequate by checking several faucets to make sure that water flow is adequate. (Low pressure may be the result of small service lines, calcification of water lines, poor pump operation on individual pressure tank water systems, etc.)
4. Check the shutoff valves at the service water entrance to the water heater for proper operation. (It is possible that these valves could have become frozen due to age or infrequent usage.)
6. Check the plumbing fixtures and faucets throughout the house for leaks and poor connections. (Rust or white or greenish crusting around the valves, pipes or joints could indicate leaks.)

6. Front Porch Florida Sunshine Solar Program Installed System Report Form

To be conducted during the site selection process and also after the solar system has been installed.