



## Residential Solar Thermal Panels

*How to get them installed and what to expect*

### 1. Site Analysis

- a. It is ideal to have unobstructed solar access year round from 10 am to 3 pm. Solar thermal panels (STP's) can tolerate some shadows (unlike most type so of solar photovoltaic panels that generate electricity).
- b. The roof should have a form that lends itself to south facing panels. Solar panels are typically 4' wide and can be 6', 8' (most common) or 10' long. They typically are mounted at an angle equal to our latitude (42°N) plus 5°. Therefore, the optimal angle is 47°. They can be off of that exact angle by few degrees with little impact on performance.
- c. Review current City of Evanston zoning code for zoning ordinances related to solar panels. Currently, the code is not very specific about solar panels, but there has been periodic discussions about modifying the code relative to that issue. Evanston Zoning Department 847 866-2930.

### 2. Figure out Appropriate Type of System

- a. Double walled heat exchanger system is currently required by the City of Evanston
- b. A system sized for residential domestic hot water usage is usually two or three 4'x8' panels.
- c. A system that additionally integrates into either the forced air HVAC system or a boiler system requires additional panels. Usually a total of five or six panels, depending on the house size and system loads.

### 3. Contact Bidders – there are two primary bidders for STP's

- a. Earth Wind and Solar Energy, LLC at 312 473-6251.
- b. Solar Service, Inc. at 847 677-0950.

### 4. Required Permits

- a. A solar water heater permit from the City of Evanston is required. The permit fee for the system is '\$X' or is determined by x.
- b. The City of Evanston will inform you if a structural engineering analysis of the loads that the panels are putting on the roof is required. Evanston Building Department 847 866-2930.
- c. If the home is located in an Evanston Historic District or is a listed historic home, the panel location will need to be reviewed and approved by the Evanston Preservation Committee. Carlos Ruiz in Historic Preservation at 847 866-2928 ext. 2265.

## **5. Rehab Issues**

- a. Make sure there is sufficient space in the mechanical room. A relatively large (usually 120 gallons) solar water holding tank is added to the mechanical room. There needs to be room for additional smaller tanks and piping.
- b. Running the new closed loop plumbing line from the mechanical room to the solar panels may require opening up walls to run the piping through.

## **6. Estimated Costs and Incentives**

- a. Solar panel installation
- b. Permit fees
- c. For a list of current financial incentives, go to <http://www.dsireusa.org/> and click on Illinois. Currently, the State of Illinois provides a 30% tax rebate with a maximum incentive of \$10,000.

## **7. Estimated Payback Period**

- a. Request that this information be detailed by the solar thermal installer when bids are provided. Generally, the payback period will be in the six to ten year range, but that fluctuates with the cost of natural gas, the actual hot water demand usage, and the material cost of panels and piping.

## **8. Anticipated Performance**

- a. Typical anticipated annual performance for a correctly sized system would provide in the range of 70% - 80% of the domestic hot water demands for a single family home.
- b. There are very few moving parts in a solar thermal system. The primary moving part is a pump or two. Required maintenance is relatively low.
- c. Amount of CO<sub>2</sub> abatement is as follows; Natural gas emits 11.64 pounds of CO<sub>2</sub> for every therm produced according to the US EPA. Per panel, based on the SRCC rating and the Chicagoland typical climate, on an annual basis, the CO<sub>2</sub> reduction is .68 metric tons per 4'x8' panel. Therefore, for an assumed three panel single family residential system, 2.04 metric tons of CO<sub>2</sub> are abated and for a five panel installation, 3.40 metric tons of CO<sub>2</sub> are abated.