



Citizens' Greener Evanston

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Residential Solar Thermal Panels

How to get them installed and what to expect

Residential solar thermal panels (STPs) are generally mounted on the roof and use the sun's energy to heat water (or air) for household use. Because they are powered by the sun, STPs reduce the homeowner's monthly utility bill. Flat panel and evacuated tube are the two most common types of panel and either one is suitable for Evanston's climate.

1. Site Analysis

- a. It is best to have unobstructed solar access year round from 10 am to 3 pm. Solar thermal panels can tolerate some shade (unlike solar photovoltaic panels that generate electricity).
- b. The roof should have a form that lends itself to south facing panels. Solar thermal panels are typically 4 ft. wide and can be 6 ft., 8 ft. (most common) or 10 ft. long. Panels typically are mounted at an angle equal to our latitude (~42°N), but can be off this angle by a few degrees with little impact on performance.
- c. The City of Evanston zoning code delineates where, how, what kind, etc., solar panels may be installed on ones' property. A permit is required and drawings of the proposed improvement must be submitted to the Evanston Zoning Department (847 866-2930) for review/approval.

2. Figure out Appropriate Type of System

- a. The City of Evanston requires a double walled heat exchanger system.
- b. A typical residential domestic hot water system employs two or three 4'x8' panels.
- c. A system that also 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 – two well known primary bidders for STP's are

- a. Earth Wind and Solar Energy, LLC at 312 473-6251.
- b. Solar Service, Inc. at 847 677-0950.
- c. www.findsolar.com offers a listing of solar professionals by zip code.

4. Required Permits

- a. A solar water heater permit from the City of Evanston is required. The permit fee for the system is determined by the cost of the improvement (~\$12 per \$1k of improvement) plus inspection fees and site analysis fees.
- 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 80-120 gallons) solar water holding tank is added to the mechanical room, plus additional smaller tank(s) 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.

Citizens' Greener Evanston (CGE) acts to improve community control of our greenhouse gas emissions. We promote community awareness, advocate public policies, and make connections to support a regional sustainability agenda.

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6. Estimated Costs and Incentives

- a. Solar panel installation: \$10,000-\$20,000+ range before incentives
- b. Permit fees: varies based on system (likely range ~\$200-\$300)
- c. For a list of current financial incentives, go to <http://www.dsireusa.org/> and click on Illinois. Frequently Illinois provides a 30% tax rebate that is capped at \$15k per install (discuss availability with installer/apply early). Solar thermal systems also qualify for a 30% federal investment tax credit.

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 CO₂ abatement is as follows; Natural gas emits 11.64 pounds of CO₂ 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 CO₂ reduction is .68 metric tons per 4'x8' panel. Therefore, for an assumed three panel single family residential system, 2.04 metric tons of CO₂ are abated and for a five panel installation, 3.40 metric tons of CO₂ are abated.