

A Homeowner's Guide To Solar Thermal For Hot Water

HOW YOU CAN BENEFIT FROM INVESTING IN SOLAR THERMAL

- Reduce your hot water bills by improving your energy efficiency
- Increase your home comfort levels
- Support the climate by reducing your own greenhouse gas emissions

Do you know that you are entitled to a grant through the SEAI Better Energy Homes programme to help improve your home energy efficiency?

ABOUT THE SOLAR THERMAL GRANT

Thermal Solar hot water systems are designed to meet a percentage of your overall hot water requirement over the year. This is usually 50-60% of your annual hot water requirement, but this can vary depending on your requirements.

Under the Better Energy Homes programme, a grant is approved for a measure being applied to the full home. This means that if you live in a 3 bed home, you will need solar water collectors and a storage tank to heat enough water for the average amount of people that could live in the home, rather than the number of people that actually live in the home. The solar thermal installation must contribute a required amount of renewable energy per square metre of floor area in order to be eligible for the grant, therefore the size of the house will determine the number of solar thermal panels required.

If you do not install enough collectors the grant may be declined, so it is important that this compliance check is carried out by the Contractor before work begins.

CHOOSING A SOLAR HOT WATER SYSTEM

There are two main types of solar collector array on the market:

1. Flat Plate (Panel):

- Can be mounted both "on-roof" or "in roof"
- Heavy, rigid, robust box-like structure

2. Evacuated Tube:

- Can only be mounted "on-roof"
- Lightweight structure, individual tubes on frame



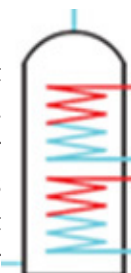
1. Flat Plate



2. Evacuated Tube

THE HOT WATER STORAGE CYLINDER

The hot water cylinder (calorifier) provides efficient storage for heat produced by the solar collectors. A dual coil cylinder is normally required for a solar hot water system. The dual coil cylinder contains two coils which act as heat exchangers for each heat source; one coil for the solar collector, the other for the alternate heat source.



Twin Coil Cylinder

Insulation of pipework is important between the solar collector and the cylinder. The control of the system (sensors, pumps etc.) and security of the system (expansion vessel, safety valves etc.) is vital for an efficient system.

This guide refers mainly to "pumped" solar hot water systems with dual coil hot water cylinder. Other systems are available on the market, such as drainback systems, solar heating / hot water combination systems etc.

A Homeowner's Guide To Solar Thermal For Hot Water

USE OF SOLAR SYSTEMS FOR SPACE HEATING

Some solar thermal systems can be designed to heat both hot water and space. However, the contribution from solar thermal to space heating is typically very small and achieving a larger contribution requires a large number of solar panels. The resulting payback periods may be very long. The table below provides some indicative figures for the energy savings that can be achieved with solar space heating for an average detached house:

BER Rating	Area of Solar collector [m ²]	Annual Space Heating Requirements* [kWh/y]	Delivered Space Heating Energy Saved* [kWh/y]	Percentage of Energy Saved for Heating
C3	8	18,653	350	2%
C3	10	18,653	717	4%
D2	8	24196	197	1%
D2	10	24196	530	2%

**Based on Appendix Q of the BER/DEAP Methodology*

When considering installing this type of solar system, it is important that the homeowner requests an indication of the energy savings based on the Appendix Q of the BER/DEAP Methodology for the proposed installation.

QUESTIONS TO ASK YOUR SUPPLIER OR CONTRACTOR

1. Is my house suitable for solar collectors?

Collectors facing south will receive the optimum amount of energy due to exposure to the sun. Generally, anywhere between 30-45 degrees is optimal for the tilt angle of the collectors. Where it is not possible to have collectors facing directly south, you may face them southeast/southwest and this will only affect output by approximately 5%. East / west systems are also feasible, i.e. where collectors are located on both east and west facing surfaces of the roof. Where collectors are not located in an optimal position, or where there is shading, it is important that the collector area is increased to compensate for the expected reduction in energy.

2. Which type of solar collector should I install?

FLAT PLATE vs EVACUATED TUBE: Flat plate collectors will generally not produce as much hot water per square metre as evacuated tubes. However, this can be compensated for by simply increasing the collector area. In a situation where you have restricted roof space, then evacuated tubes are more commonly used in order to get the maximum amount of hot water from a smaller area of collector. The location and positioning of the solar collectors (including shading considerations) are also important during the design stage.

3. What are the planning procedures for solar?

The key point is that the total collector area must not exceed 12m² or 50% of the total roof area. Some solar measures have planning exemptions. S.I. 83 (2007) lists all the planning exemptions for renewable technologies in dwellings. Any planning procedures applicable to Better Energy Homes grants will be under the 'Domestic' headings and will give you an idea of the conditions.

4. Costs / Payment / Payback

Thermal Solar hot water systems generally cost between €800 and €1,300 per square metre. The cost of a system has a significant effect on the payback period. It is therefore important to investigate a number of options, until you are happy with the price, payback period and the service agreement. If a company suggests using solar thermal to heat your home or to reduce your oil/gas bills, ask them for proof on the payback period as this might be too long.



A Homeowner's Guide To Solar Thermal For Hot Water

I NEED SOLAR THERMAL...WHAT DO I DO NEXT? EQUIPMENT SPECIFICATIONS CHECKLIST:

1. You can get more information on the Better Energy Homes programme in one of three ways:
 - Request more information by ringing 1850 927 000
 - Contact the programme team directly at info@betterenergyhomes.ie
 - Visit: <https://www.seai.ie/grants/home-grants/better-energy-homes/>
 2. Contact a registered contractor for solar thermal from the SEAI Registered Contractor list at <https://hes.seai.ie/GrantProcess/ContractorSearch.aspx>
 3. It is recommended you contact a number of registered contractors to ensure you receive the best quality available, at a competitive price.
 4. Once you have selected a suitable contractor, follow the steps to complete the Better Energy Homes programme online application form: <https://www.seai.ie/grantshome-grants/better-energy-homes/how-to-apply/>
 5. The next step is to have the works carried out. It is in your best interest to make sure you are satisfied that all your questions are answered. If an answer seems too complicated, then ask for a simpler explanation. If someone is selling you a thermal solar system they will be happy to provide an explanation to your satisfaction.
 6. Learn more about Solar Energy at: <https://www.seai.ie/sustainable-solutions/renewable-energy/solar-energy/>
- **HARP (Heating Appliance Register of Performance):** The solar collectors should be listed on the HARP database. Go to <http://www.seai.ie/energy-in-business/ber-assessor-support/harp-database/>
 - **SIZED CORRECTLY:** The system must be sized in relation to your dwellings area. Your contractor should be able to provide details of the calculation to show compliance with the Better Energy Homes Grant.
 - **QUALITY:** Your system should come with quality assurance labels: for example, the Solar Keymark is a quality label for solar collectors, further information at: <http://www.estif.org/solarkeymarknew/certification-bodies/sk-certified-products>
 - **INSULATION:** The cylinder needs to be sufficiently insulated. A pre-insulated cylinder is recommended, with a minimum of 50mm thick insulation. The pipework between the solar collectors and cylinder should also be well insulated.
 - **PRV (Pressure Relief Valve):** The solar pipework should be protected against overheating and excessive pressure. A correctly sized solar expansion vessel will ensure safety during periods of high solar gain. PRV's will ensure that the pressure will never reach unsafe levels in the system.
 - **TMV2 (Thermostatic Mixing Valve):** Installation of the TMV2 is recommended to ensure water temperatures are kept within safe levels.

Once your Better Energy Homes Solar Thermal grant application has been approved, the next step is to have the works carried out by a registered contractor.

The following is some information, which may prove useful when having your thermal solar heating system designed and installed.

- **CONTROLLER:** Sensors are mounted on the solar collector array and in the cylinder. When the controller detects that there is heat to be gained from the collectors, it switches on the circulating pump and allows the available heat into the cylinder. When heat is used up, it switches the pump off again. Controllers also display the amount of heat produced over a period of time.

A Homeowner's Guide To Solar Thermal For Hot Water

INSTALLATION/COMMISSIONING/OPERATION/ AFTER-SALES AND SERVICE CHECKLIST:

- Do your research – find out what qualifications and experience the supplier/ installer has. Important considerations include are references available for both the supplier and installer; and is the installer registered with SEAI to install solar hot water systems? Check: <https://hes.seai.ie/GrantProcess/ContractorSearch.aspx>
- Temperature Control - How will the Contractor ensure the temperature of water from the cylinder will not be too high at the showerhead and taps? It is recommended that a thermostatic mixing valve (TMV 2) be fitted at the outlet of the cylinder. This valve mixes cold water with the hot water from the cylinder to produce a lower temperature hot water "mix", which can safely be used in taps and showers. Your Contractor must discuss the temperature controls with you. Refer to our Solar Technical Guidance supports: <http://www.seai.ie/energy-in-business/contractor-supports/>
- User Instructions - Has the supplier / installer set up the system to operate optimally and have they provided you with all the necessary instructions to understand the system and monitor it? Has the installer provided a full run-through of the operation of the system?
- Warranty - What is the warranty on parts/labour and whom do I contact for service / maintenance/ troubleshooting/emergencies? Collectors should have a minimum warranty of 5 years.

NOTES:

- To qualify for a grant, all works must be undertaken by an SEAI registered Contractor in accordance with the technical requirements set out in the Contractor Code of Practice, Quality Assurance & Discipline Procedures (QADP) and Additional Information for Contractors. For more information visit: <https://www.seai.ie/energy-in-business/contractor-supports/>
- In accordance with the Better Energy programmes Code of Practice and Technical Specifications, contractors must only install products listed on the Solar Thermal SEAI Registered List. Please note that even if the solar collector is listed on the Solar Thermal SEAI Registered List, this does not mean that a specific product will meet the sizing requirement of the grant. Contractors are required to select the appropriate product that will meet the required specifications of the grant programme.
- The applicant shall have a formal contract in place with each of their chosen registered Contractors before works commence.
- The contract of works agreed is between the Homeowner and the Contractor only. SEAI accepts no liability or responsibility for any breach of contract between the Homeowner and the Contractor.
- For the full list of Terms & Conditions please refer to the Better Energy Homes Programme Application Guide, available at: <https://www.seai.ie/grants/home-grants/better-energy-homes/how-to-apply/>

