

## SEI Information – Greener Homes Scheme

### Homeowners

The Greener Homes Scheme (the “Scheme”) provides assistance to homeowners who intend to purchase a new renewable energy heating system for existing homes. The scheme is administered by The Sustainable Energy Authority of Ireland (“SEAI”) and aims to increase the use of renewable energy and sustainable energy technologies in Irish homes.

#### **Using Renewable Energy for Heating**

We, in Ireland are heavily reliant on fossil fuels which are a limited resource, cause emissions that are harmful to the environment and, as we have seen recently, can be subject to volatility of price and availability. The Irish Government wishes to reduce this reliance and move towards making greater use of our renewable energy resources. This diversification can be good for the economy because of the longer term availability and constancy of supply and good for the environment through the reduced emissions of Carbon Dioxide(CO<sub>2</sub>).

The main sources of renewable energy in Ireland are the sun (solar energy), the wind, moving water (hydropower, wave and tidal energy), geothermal (heat below the earth's surface) and biomass (wood, certain wastes and energy crops). One of the main benefits of using renewable energy is that it reduces emissions of carbon dioxide. Ireland has an abundance of several of these resources and their effective development and use will reduce emissions of harmful greenhouse gases and our reliance on imported fossil fuels.

Homeowners can play their part by choosing a renewable heating system (solar, biomass or heat pump based) that meets their particular needs in terms of heat demand, budget and environmental considerations. Doing so will help Ireland move down a path towards more sustainable energy use, ultimately benefiting the environment.

#### **Will a renewable energy heating system save me money?**

Where a renewable energy technology uses a “free” energy source like sun shine, you no longer have to worry about fuel prices increasing. On the other hand heat pumps require electricity to operate and biomass equipment requires a wood based fuel – so both of these remain vulnerable to fuel / energy price fluctuations.

The guaranteed way to reduce your energy bills is to only generate as much heat as you require, at the time you want it, and to maximise the value of that heat by preserving it within your home. We strongly advise anyone planning to invest in a renewable heat system to investigate all methods of increasing the overall energy efficiency of their homes. Effective wall and attic insulation, good time and temperature controls of your heating and high performance windows will all reduce the heat required to have a warm and comfortable home. Purchasing household electrical equipment with an 'A' energy rating e.g.

fridges, freezers, washing machines and light bulbs\* reduces electricity consumption. This approach will have a significant impact on your energy bills and will also protect you from any price variation in your primary fuel source.

### **Why offer a grant?**

Renewable energy heating systems are new technologies which, while proven and highly popular overseas, have yet to become widespread in Ireland. The Irish Government, through SEAI, wishes to encourage people over the next 5 years to green their homes by contributing to the initial investment cost of installing a renewable energy heating system. The government believes that this will help ensure a faster uptake of renewable heating systems which will underpin the development a long term market while enabling homeowners to play their part in reducing carbon dioxide emissions.

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### **Solar**

Solar Panels, also known as "collectors", can be fitted to a building's roof. They use the sun's heat to warm water, or another fluid, which passes through the panel. The fluid is then fed to a heat store (e.g. a hot water tank) and helps provide hot water or a source of hot water for central heating for the building. Solar panels work throughout daylight hours, even if the sky is overcast and there is no direct sunshine. Solar panels can also be used to contribute to space heating demand. The cost of a professionally installed solar system for heating hot water can vary greatly. If you are considering investing in this technology you should do sufficient research to ensure that you are getting the best system for your needs and value for your money.

Location - The optimum location for solar panel collectors for all year round energy collection is roughly south facing and at a tilt angle of 30°- 45° to the horizontal (however angles between 15° and 60° are also acceptable). It is also important that the collectors are positioned so there are no shadows on them during the middle of the day. Shading can be from the collectors themselves, or from trees, chimneys, part of the building or adjacent buildings.

Cylinder – An appropriately sized cylinder should be chosen for the house. The volume of your solar hot water cylinder is related to the maximum cylinder temperature. It is recommended that at a maximum cylinder temperature of 60°C, 70 litres per square metre of aperture area is supplied and at a maximum cylinder temperature of 80 – 90 °C, 50 litres per square metre of aperture area is supplied. Smaller capacities will limit the benefit from the system and may lead to frequent overheating of the solar circuit.

Generally Dual Coil cylinders should be used, having the coils at the top and bottom of the cylinder. The solar collector circuit should be connected to the bottom coil and the auxiliary circuit to the top coil, which will enable the solar system to pre-heat in bad weather. Your installer will be able to help you choose an appropriately sized cylinder.

Thermal Mixing Valve (Anti-Scald Valve) - Best practice calls for the fitting of a thermal mixing (anti-scald) valve. This applies to all hot water systems and not just solar heated water systems. With the current recommendation to store hot water at 60°C to prevent the growth of legionella bacteria it is becoming more of a consideration to install thermal

mixing valves. A thermal mixing valve mixes cold and hot water together to ensure the water temperature is safe for people to use.

Controller – After commissioning, a permanent power supply should be provided for the solar controller to ensure circulation in the solar loop.

A solar water heater is composed of:

A solar collector (flat plate or evacuated tube) which absorbs solar radiation (sunlight) and changes it into heat;

A pump which transfers the heat from the collector to hot water in a storage tank;

The storage tank accumulates the hot water produced by solar energy so that it can be stored for use when needed;

A number of accessories which ensure the regulation and the safety of the system;

A back-up heater (gas, oil, or wood fuelled boiler, immersion heater or heat pump) which will bring the hot water to the temperature required when there is not enough sunlight to do so (mostly in winter).

In Ireland, solar collectors alone cannot provide all the hot water for a household's needs throughout the year. Correctly sized they will supply 60% of heat / domestic hot water needs. They are normally installed in conjunction with a conventional back-up heating system.

Planning Permission for Solar Panels

The installation of solar panels in your home is exempt from planning permission up to 12m<sup>2</sup> or 50% of the total roof area as per Statutory Instrument No. 83 of 2007 Planning and Development Regulations signed and implemented by Dick Roche, the Minister for the Environment, Heritage and Local Government on the 28th February 2007. Contact your local planning authority if you are unsure of the local planning requirements.

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## Wood Chip or Pellet Stoves

Everyone loves a wood fire; it really turns a house into a home. But open fires and old-fashioned stoves can be polluting, inefficient (typically only 20-30% efficient) and inconvenient. Modern wood pellet stoves offer the warmth and comfort of wood heating while being highly efficient, clean burning and totally automatic, saving you time and money.

Wood burning systems do emit carbon dioxide. However, as the wood fuel is cultivated, it absorbs the exact same amount of carbon dioxide as is released when burnt. As such it does not add to the carbon dioxide in the atmosphere. An eligible system can be used for heating a single room, hot water or a whole house.

It is important that there is adequate ventilation and that a clean air source is supplied to the stove, as the combustion process uses oxygen (in the same way as any fuel fired appliance). Given that some stoves come equipped with an integral boiler for hot water and heat delivery, it is important

that these systems are correctly integrated with the existing hot water system (e.g. cylinder). (See Part J of the Building Regulations for minimum ventilation requirements – go to [www.environ.ie](http://www.environ.ie)).

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Modern wood chip or pellet boilers offer the warmth and comfort of wood heating while being highly efficient, clean burning and totally automatic, saving you time and money.

Chip or Pellet boilers are lit automatically and continue to operate without manual intervention. Automatic fuel supply and thermostat means you can relax and enjoy the comfort of chip/pellet heating at the switch of a button. Automatic ignition means that lighting the boiler is convenient and easy. Modern chip/pellet boilers are self cleaning so you can forget the daily cleaning chore of traditional solid fuel heating systems. The ash pan needs to be emptied bi-weekly, or less frequently, depending on service.

These systems must comprise the main heating system of the house and can be run on wood chips and/or wood pellets.

**Flues:** The flue is used for the exhaust of the boiler or stove. It can be installed through a chimney or outside the building. The flue must be installed to current Building Regulations. (Part J – go to [www.environ.ie](http://www.environ.ie) ). Some things to look for would be:

- It is above the eaves line by about 1metre or 600mm if coming out near the roof apex.
- It is twin walled and insulated.
- It has a cowl or hood on top to help prevent down draught.
- It should be separated from any combustible material.

**Constructional Hearth:** A constructional hearth should be placed (see Part J of the current Building Regulations – go to [www.environ.ie](http://www.environ.ie)) under a stove to separate the stove from combustible material and to provide protection from the threat of fire. The constructional hearth could be a metal or a non-combustible plate. The appliance should not be placed close to the edge of a hearth or any combustible material.

**Air Supply:** A stove or boiler must have a secure air supply for safe operation (see Part J of the current Building Regulations – go to [www.environ.ie](http://www.environ.ie)). This can be either in the form of a controlled dedicated air supply directly to the appliance, or in the form of a permanent ventilation opening to the room in which the appliance is located. Best practise is to rely upon dedicated ventilation and not on air infiltration and/or leakage in the room. The size of the opening depends on the size of the appliance. Your installer should be able to size this correctly. In addition, extractor fans may

interfere with the operation of the appliance causing smoke to spill out of the appliance into the room so please consult with your installer.

**Thermal Mixing Valve (Anti Scald Valve):** Best practice calls for the fitting of a thermal mixing (anti-scald) valve. This applies to all hot water systems and not just solar heated water systems. With the current recommendation to store hot water at 60°C to prevent the growth of legionella bacteria it is becoming more of a consideration to install thermal mixing valves. A thermal mixing valve mixes cold and hot water together to ensure the water temperature is safe for people to use.

**Bulk Fuel Storage:** All biomass boiler installations shall require the provision of bulk storage. It shall be required to meet local building and fire regulations. The ONORM M7137 Standard <http://onnorm.at/econ/> shall be used as a guideline for DIY bulk storage units. Bulk storage capacity shall be able to store a minimum of 3 tonnes of wood pellets (80% of a typical houses' requirement for one year).

**Buffer Heat Store:** It is a recommendation that a buffer or accumulator tank be incorporated as part of domestic wood pellet / chip boiler system installations where appropriate. A buffer or accumulator cylinder in a domestic biomass heating installation is a primary heat storage/distribution cylinder, which is heated by the boiler to a set temperature and can store the resulting high temperature water for long system standstill periods, until heating or hot water is required. A buffer / accumulator reduces the on/off cycling of wood boilers by “smoothing” the heat output to the dwelling. The buffer or accumulator capacity should be calculated in accordance with your manufacturer’s recommendations. A rough guideline for establishing the volume of the buffer is available from EN303-5 and from the REIA training manual and is in the region of 55 to 65 L/kW of the rated boiler size.

The use of a buffer / accumulator is noteworthy in the following situations:

- Where the boiler does not have full modulation capabilities: the use of a buffer will smooth the heat output to the dwelling.
- In situations where the boiler is not capable of supplying the full heat demand of the house, a buffer tank will allow the boiler to run for longer at optimum efficiency extracting maximum potential from the boiler and fuel.

### **Thermostats**

Thermostats are used to control the temperature of an area or space. You should consider what the optimum location of the thermostat is; usually it is the living space where you will spend most of your time. It is very worthwhile to have all main rooms “zoned” and fitted with their own thermostat.

### **Pellets**

Quality pellets are essential to ensure clean combustion and trouble-free operation of your appliance. When buying pellets, consumers should consider those that are supplied with a quality mark and with a complete fuel analysis. Often this information will be printed on the packaging.

Pellets can be purchased in bagged or bulk form. For bulk purchases, a dry covered storage area is required. Generally bulk prices are more competitive than those for bags. Wood chips are generally sourced locally. It is important that the fuel used (quality, size, moisture content) is suitable for the appliance; your supplier will provide you with these details.

Poor pellet quality can greatly interfere with the functioning of the heating system. There are various European pellet quality standards currently in operation. Some of the more common standards are:

Austria: **ÖNORM M1735**

Sweden: **SS 187120 and SS 187121**

Germany: **DIN 51731**

Europe: **CEN TS 14961**

In Canada and the US the equivalent standard is Premium grade.

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## Wood Gasification Boilers

A wood gasification boiler is a central heating boiler which produces its useful heat through combustion of wood gas. This “generator” gas is produced by the thermal transformation of wood fuel i.e. the wood fuel is first converted to gas then the resulting charcoal is then also converted to gas.

A wood gasification boiler differs from a standard wood boiler by way of the combustion process. In a standard wood boiler, direct combustion of the wood fuel takes place, whereas in a wood gasification boiler, combustion of wood-gas takes place following thermal conversion of the wood fuel to gas.

**Buffer Heat Store** - A buffer store (accumulator) will be installed in conjunction with your wood gasification boiler to ensure the efficient operation of your boiler. Buffer stores are important heat storage devices, especially for wood gasification boilers. These boilers can only be operated efficiently when combined with an accumulator since controlled operation at part load is more difficult. This is due to the nature of the fuel (generally wood logs). Once combustion takes place, the fuel will continue to burn irrespective of whether the dwellings heat load is met. Consequently the buffer or accumulator cylinder in a domestic biomass heating installation is the primary heat storage/distribution device, which is heated by the boiler to a set temperature and can store the resulting high temperature water for long system standstill periods, until heating or hot water is required. The buffer or accumulator capacity should be calculated in accordance with your manufacturer’s recommendations. A rough guideline for establishing the volume of the buffer is available from EN303-5 and from the REIA training manual and is in the region of 55 to 65 L/kW of the rated boiler size.

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## Heat Pumps

Heat is widely available in the ground, air and water around your house. These natural sources of heat are constantly replenished by the sun, wind and rain. A heat pump system will harness these free and renewable energy sources for heating your house and supplying hot water at a very low cost. The role of the heat pump is to ‘pump up’ heat from a low temperature source, for example the ground under your lawn and release it at a higher temperature into your central heating system.

There are three main types of heat pump available on the market, those that take heat from the ground, from water (rivers or wells) or directly from the air. Ground source heat pumps come in two varieties – vertical bore or horizontal loop.

**Existing Dwellings Note** - When installing a heat pump into an existing dwelling it is critical to ensure that the building is sufficiently insulated and the existing heating system is surveyed for compatibility. Many times the dwelling’s fabric will need

to be upgraded to ensure efficient operation and thus optimal electricity cost. Recommended values of average elemental U-value for insulation would be:

Roofs: 0.3 W/m <sup>2</sup> K
Walls: 0.6 W/m <sup>2</sup> K
Ground Floors: 0.6 W/m <sup>2</sup> K
Exposed Floors: 0.6 W/m <sup>2</sup> K
External doors windows/roof-lights: 2.6 W/m <sup>2</sup> K

The existing heating system should be surveyed by your installer as not all radiators are suitable for use with heat pumps; it is recommend that Underfloor Heating (with sufficient insulation) or low temperature radiators are used.

Heat pumps are very economical, for every unit of electricity used to power the heat pump, 3 to 4 units of heat are generated. They work best in conjunction with low temperature heat distribution systems e.g. underfloor heating. Because they require electricity to run, they are most cost effective when they can use night rate electricity. This requires a night rate meter. A buffer store is required to maximise efficiency as this allows the heat pump to store heat on a constant basis, releasing it as and when required.

**Ground Source Collector** - This collector is used in closed loop systems to transfer the heat from the ground to the house. The design and installation of this collector is important and your installer will be able to explain all the relevant aspects of it. It is important not to landscape or plant any trees or shrubs in the vicinity of the collector area as the roots can interfere with the operation of the heat pump. It is important that you take care to note a number of things:

- Your installer will provide a **plan** of the site showing the collector area and depth. This could prevent damage to the collector if any future work or landscaping is carried out on the grounds. In addition photographs of the collector before it is covered up would be helpful with any future work or trouble-shooting of the heat pump system.
- **Collector calculations** – Your supplier/installer will carry out tests on the soil to ensure that the most suitable collector (vertical, horizontal) will be chosen. They will provide a formal set of calculations for the collector design which will aid any future troubleshooting.

**Air-Source Heat Pump** - Air/Air heat pumps take the energy from the air and transfer it to a warm air heating system and Air/Water heat pumps take the energy from the air and transfer it to the water in a heating system.

**Water –Source Heat Pump** - Water source heat pumps work in a similar fashion to ground source systems and transfer the heat from your water source to the house. Water source heat pumps use an open loop collector. Underground water sources such as a well circulate the water through pipework that in turn transfer heat to your house.

**A Piping Schematic, Valve Chart and Wiring Diagram**– Your installer will provide you with a piping schematic, valve chart and wiring diagram. This will be very useful in helping with any future work or trouble-shooting of the heat pump system.

**Under Floor Heating System Design** – You should discuss the under floor heating system and any plans for floor coverings

with your installer as they affect the heat transfer from the floor and the overall operation of the system. Again, photographs of the under floor piping system during the installation would be helpful with any future trouble-shooting.

**NB** for the most efficient and economical operation of your system, it is important that your installer is involved (or well informed) in the above 3 points.

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## Greener Homes Scheme Grant Payment Procedure

Upon completion of the installation, and payment having been made in respect of the supply and installation of the equipment, the applicant must make a formal request to SEAI for payment comprising the following:

1. Completed Request for Payment Form
2. Invoice and receipt of payment to installer separately detailing full cost of equipment and installation\* (in instances where the total amount paid is less than the grant approved then the lesser amount will be paid)
3. Completed Standard Commissioning Report signed by the installer (downloadable here, see below)

**\*Note:** If equipment was purchased separately, please provide separate invoices and receipts for payment of full equipment cost and installation charges.

Once all documentation is in order, and a satisfactory inspection completed (see Section 10), the grant will be paid electronically to the applicant's bank account and an accompanying letter notifying payment will be sent to the applicant. While, SEAI will endeavour to minimise the period, applicants should allow an 8 to 10 week period for this process to be completed.

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### What Level of Funding is Available?

Solar Thermal Space and or Hot water heating (Evacuated Tube)	€300 per m <sup>2</sup> (to max.6m <sup>2</sup> )
Solar Thermal Space and or Hot water heating (Flat Plate)	€250 per m <sup>2</sup> (to max.6m <sup>2</sup> )
Heat Pump - Horizontal ground collector	€2,500
Heat Pump - Vertical ground collector	€3,500
Heat Pump - Water (well) to water	€2,500
Heat Pump - Air source	€2,000
Wood Chip/Pellet Stove	€800
Biomass / Wood pellet Stove with integral boiler	€1,400

Wood Chip/Pellet Boiler	€2,500
Wood Gasification Boiler	€2,000

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