seai SUSTAINABLE ENERGY AUTHORITY OF IRELAND | power of one

efficient home heating

your options

power of one

If each of us becomes aware of our own power when it comes to energy efficiency, and use it properly, we can collectively make a big difference to ourselves, to our pockets, and to the environment. By taking individual responsibility and changing our behaviour in small ways every day, we'll help save energy while we save money too.

All we have to do is recognise our power, and use it.
That's what the Power of One is all about.

For more information check out www.seai.ie/powerofone

change.ie

The change campaign is a vital part of Ireland's plan of action on climate change. The campaign's overriding goal is to engage the nation on the issue and to drive the significant behavioural changes that will be required to lower greenhouse gas emissions. At the core of the campaign is the change.ie website and carbon calculator which helps people identify real savings you can make because when you cut carbon, you cut costs.

For more information visit www.change.ie

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Content

About the Sustainable Energy Authority of Ireland

The Sustainable Energy Authority of Ireland (SEAI), established by Government under the Sustainable Energy Act 2002, has a mission to play a leading role in transforming Ireland into a society based on sustainable energy structures, technologies and practices.

Its key objectives are implementing strong energy efficiency actions, accelerating the development and adoption of technologies to exploit renewable energy sources, supporting innovation and enterprise for our low-carbon future and supporting evidence-based responses that engage all actors.

SEAI's activities can be divided into two main areas:

- Energy Use – SEAI can help to reduce the amount of energy we use in Ireland by assisting our homes, businesses and industries to be more energy efficient.
- Renewable Energy – By promoting the development and wider use of renewable energy in Ireland, SEAI can help to further reduce the threat of climate change and benefit the environment.

SEAI is here to help every energy user in Ireland – homeowners and businesses, farmers and food outlets, schools and hospitals. We do this by raising awareness and providing information, advice and publicity on best practice; stimulating research and development; advising on energy policy and publishing energy statistics.

You'll find up to date information about our activities, as well as advice and tips, on our website at www.seai.ie

Contact us, engage with us, ask for advice, put forward your ideas. We're here to listen and to help. By working together, we'll create a greener, cleaner, sustainable future for Ireland.

How this booklet can help you

This booklet is designed to give you clear, impartial advice about how best to maximize the efficiency of your home heating system, whether a new build or a retrofit. It will show you how to do this in ways that are cost effective, sustainable and environmentally friendly.

It examines the practical ideas and the various heating technologies you should consider for your home and offers clear, concise advice.

Your home and your heating requirements

Home is where the hearth is

We live in a world of ever growing energy-awareness. Increasing home heating costs driven by fluctuating fuel prices mean we must try to use energy as efficiently and sustainably as possible, without compromising the comfort of our homes, workplaces and public buildings.

The aim of this leaflet is to give householders an informative guide to the various home heating systems available, and their relative merits. Perhaps you want to improve the efficiency of your existing heating system? Or maybe you wish to learn about the most up to date home heating technologies? If so, this booklet will give you clear, concise guidance on how to create warmth and comfort in your home, in ways that will help the environment and your pocket.

Wrap up well

Before examining your heating system, it is important to review how well your house is insulated. For example, fitting draught excluders around windows and doors, where no draught protection is in place, can cut heat loss by as much as 20% in winter.

Investing in high-grade insulation does more than cut down on heat loss. It also means that once your home is heated to the required temperature, it is easier for your heating system to maintain this temperature, so it uses less energy. Insulating your home can give long term benefits through reduced running costs. Capital investment in your heating system will also be reduced, as a smaller, more efficient heating unit will be required.

For further information on how to effectively seal your home consult SEAI's Guide to Insulating Your Home.

Fuel – choose the sustainable option

There are a number of factors to consider when selecting the type of fuel for your home. For example, availability, storage and cost all have to be taken into account. But just as important are the environmental impacts your choice of fuel will have.

Most of the energy we use in Ireland comes from fossil fuels - oil, coal, peat and gas. These are not renewable – once they are gone, they cannot be replenished. Burning fossil fuels releases carbon dioxide (CO_2) into the atmosphere. This is a major contributor to climate change.

The sustainable alternative to fossil fuels is renewable energy and this will never be exhausted. Renewable energy is available to us in many forms. The main ones are:

- Solar energy (the sun) – for space and water heating;
- Geothermal (heat from below the surface of the earth) – heat pumps for space and water heating;
- Biomass (woodchip and pellets) – boilers and stoves for space and water heating;
- Wind powered turbines (the wind) – for electricity generation;
- Hydro-electric power (moving water in streams) – for electricity generation.

Heat – meet your annual heat demand

The total amount of heat required for a dwelling is called its Annual Heat Demand. This is a factor of:

- heat lost from inside to outside through the roof, windows, doors and walls;
- heat required to offset the loss of warm air escaping through windows, doors, chimneys and other openings and heat to warm up the cold fresh air that replaces the lost air and provides ventilation;
- heat required to provide adequate hot water; and
- free heat from the sun, from occupants and household appliances.

The Annual Heat Demand for a house will determine the required power output of the heat generator to be installed. It can be met from two main types of heating systems:

- Central heating systems: oil, gas, solid fuel (coal or biomass) or biomass boilers, or heat pumps are used to heat water or air and distribute it throughout the house in pipes or ducts;
- Localised heaters: open fires, electric heaters, closed gas fires or stoves are used to provide heating and, where equipped with a back boiler, hot water.

The types of central heating generators available to deliver the Annual Heat Demand for your home are detailed in the following sections. Information about localised heat generators that produce heat separately in each room can be found in the Heat Emitters section on page 14.

Practical advice for heating systems in new homes

There are a number of areas where you can optimise the heating system when you are building your new home. These will help to minimise the load on the heating system, and ensure it operates as efficiently as possible over the building lifecycle:

- ➔ Site and design the most sustainable building possible
  Locate the living areas to the southern aspect, so that most use can be made of available light and solar energy. Also, shelter the building from the external elements in a suitable manner.
- ➔ Ensure the building is insulated and sealed efficiently
  Ensure the building is insulated to as high a specification as possible. The minimum requirement set out in Part L of the Building Regulations is air permeability of $10m^3/m^2/h$. Best Practice is considered to be $5m^3/m^2/h$. Air tightness should also be discussed with your building contractor to ensure that good construction practices are used during the build. You can also refer to Good Practice Guides 224 and 268 on ventilation, visit **www.seai.ie**
- ➔ Size and select the most efficient heat generation system possible
  Part L of the Building Regulations requires all new dwellings to have 10kWh per m^2 per year thermal or $4kWh/m^2/yr$ electrical energy supplied by renewable technologies. So choose a heating system that will meet this requirement, using sound engineering and best practice principles. Take energy efficient designs into consideration in sizing the most efficient heat generation system for the dwelling. Also balance long-term running costs against short-term savings.
- ➔ Select the most efficient and practical heat emission system
  Make sure the heat emission system (radiators, etc.) is as efficient as possible, taking into consideration the type and location of units specified.
- ➔ Ensure efficient control of both space heating and Domestic Hot Water (DHW)
  Make sure that once the most efficient heating system has been chosen, good control systems are also employed.

Practical advice for heating systems in existing homes

There are a number of areas where you can optimise the performance of your heating system when renovating your home, or replacing an existing heating system:

- ➔ Ensure the building is insulated, sealed and draught-proofed
  There is little point in incorporating the most energy efficient generation and distribution system, if the building is leaky and un-insulated - allowing the unrestricted flow of energy from the dwelling. A poorly insulated house could be losing up to 30% of its heat through its roof alone – costing you money and contributing to global warming.
- ➔ Ensure the heating system is in good working order
  Ensure the good performance of your heating system through regular maintenance via a qualified boiler service engineer.
- ➔ Replace defective equipment with an energy efficient and/or renewable technology alternative
  Only once the building fabric and ventilation heat loss have been minimised, and you are sure the current heating system is operating inefficiently, should investment in a new technology be considered.
- ➔ Ensure system control is as efficient as possible
  Make sure your present control system operates efficiently, and if possible, enhance it in line with the suggestions in this booklet.

Whatever your decision check **www.seai.ie/grants** as grants may be available.

Finding out an appliance's efficiency – HARP

SEAI's Home-Heating Appliance Register of Performance (HARP) is a performance database of the majority of home heating appliances used in Ireland. This very helpful tool will help you identify the most efficient appliances available, including renewable appliances, for heating your home.

It can be found online at **www.seai.ie/harp**

Renewable heat generation options – the sustainable alternative

We are rapidly depleting our supplies of non-renewable energy (oil, gas, coal and peat). We also need to reduce our emissions of greenhouse gases. This means it makes sense to adopt sustainable energy solutions wherever possible. Indeed, current building legislation means we must address these issues – Part L of the Building Regulations states that all new dwellings receiving planning permission after 1st July 2008 must use renewable technologies.

The good news is that there now are a range of efficient renewable energy technologies we can use to heat our homes. These energy systems include:

- Solar energy
- Biomass systems
- Heat pump systems

We shall examine each of these technologies in more detail:

Solar energy

Even in Ireland's temperate climate, solar energy can still contribute significantly to our domestic heating requirements. Current technology allows heat to be gained in a passive or active way.

Passive solar energy

Passive solar energy involves capturing heat from the sun via windows and other glazed surfaces. Modest levels of passive solar heating can reduce building auxiliary heating requirements from 5% to 25%. Planning the use of passive solar heating can reduce heating energy use from between 25% to 75% compared to a typical structure.

In Ireland, glazing should be concentrated on the south façade to make best use of solar energy (windows on the north façade should be minimised to limit heat loss). Passive solar energy can also take advantage of the thermal mass of building materials, such as masonry walls or concrete floors. These can absorb and store energy during the day and release it gradually during the evening.

However, south-facing glazed areas should not be increased too dramatically. Otherwise additional measures will be required to avoid overheating in summer and excessive heat loss at night and on overcast days in winter.

Active solar energy

Active solar energy systems use solar collectors positioned on south-facing roofs to harvest heat from the sun and distribute it using an air or water network. Solar systems can provide on average 60% of a family's annual hot water requirement.

Solar heating is best contemplated when building a new house. However, while retrofitting of an existing house can be difficult and expensive, convenient solar heating 'packages' are now available which can produce a sizeable volume of a typical house's annual hot water demand.

However, whether new or retrofit, a cost analysis of solar heating systems should be completed prior to installation, in order to determine the possible payback period on investment based on operational cost saving.

Biomass systems

Biomass boilers burn wood from managed forests to produce hot water for heating and domestic use. The wood matter is chipped or compacted into small pellets of uniform size and moisture content. Some models offer up to 90% efficiency. Chips are slightly less energy efficient but are cheaper to buy.

Biomass boilers can be fully automatic once installed. In order to keep them topped up with fuel, some boilers have special 'hoppers' (storage tanks) which provide enough fuel for months of operation. Capacities of up to three tonnes are typical and this may last the average dwelling for a year. Storage conditions of the chips/pellets are important, as their moisture content affects the efficiency of the boiler.

Chips and pellets produce ash after burning. This can be easily removed and spread in the garden as it contains nutrients.

Pellets and wood chips are bulky products and do require a lot of storage area. This should be a consideration in your decision. Typically an average year's supply of pellets (3 tonnes) will need at least 6m^3 of storage volume, while wood chips (approximately 4.5 – 5 tonnes) will require between 8 and 10m^3.

Heat pump systems

Heat pumps release heat that is stored in air, ground or water and make it usable for domestic heating applications. Although they have higher installation costs than conventional fossil fuel heating systems, heat pump systems offer a very energy-efficient way of providing heat.

As heat pumps typically exploit low grade temperature sources, they will be more efficient when supplying heat to low temperature emitters (e.g. under floor heating, low temperature / large area radiators). It is also very important that the house is very well insulated and draught-proofed. You will need to ensure that this is the case if you are considering using these systems in an existing house.

Heat pumps exploit their heat sources in one of two ways:

- Open systems
  Water from vertical boreholes, rivers, streams, lakes, etc. is pumped up into the heat pump where useful energy is transferred to the heating system water, and the extracted water is then pumped back into the ground. A similar principal applies to air source heat pumps – see next section.
- Closed systems
  These use a loop of buried plastic pipe as a heat exchanger. They are particularly appropriate for underfloor heating in a house, as the typical distribution temperature is 30°C to 40°C.

Air source heat pumps

Air source heat pumps heat the interior of a building using air from the outside. There are two types of air-source heating systems.

- Air-to-air systems
  Provide warm air, which is circulated to heat the building.
- Air-to-water
  heat water to heat a building through radiators or an underfloor system.

Ground source heat pumps

Energy from the sun is stored in the soil. As the heat pump system extracts this energy, the sun constantly tops it up to maintain a constant temperature all year round.

Heat is extracted from pipes buried horizontally or vertically in the soil, a metre or more deep to ensure that frost cannot damage them. The ground above the pipes cannot be planted with large trees or shrubs and care must be taken to ensure it is used in a manner which does not adversely affect the piping system.

A geo-thermal heating system may be used if the dwelling has a large enough area with a suitable soil type around it.

Water source heat pumps

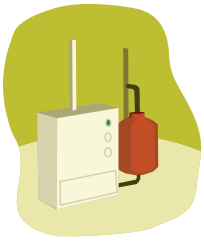
Where there is a sufficiently large body of ground water available close to a house, it may be used as a heat source, using either an open or closed system.

For detailed Buyers' Guides for renewable technologies visit:
www.seai.ie/renewables

Grants

Whatever your decision check **www.seai.ie/grants** as grants may be available.

Choosing your conventional space heating system



Conventional boiler

Gas, oil or solid fuel boilers, located inside or outside the house, heat water which is then distributed by pump or gravity circulation to heat emitters (radiators) in each room. New boilers can achieve good efficiencies (minimum seasonal efficiency of 86%) when installed, commissioned and serviced effectively. Distribution pipes for all boilers should be well insulated and waterproofed to minimise heat loss.

Condensing boiler

Condensing boilers burn gas or oil and condense their flue gases to achieve efficiencies of 91% or higher. Although more expensive than conventional boilers, their lower running costs mean the price difference will be recovered over the boiler's lifetime. They emit a harmless plume of water vapour to the atmosphere during operation.

Please note that as of March 31st, 2008, installation of condensing boilers is mandatory in all new dwellings and, where practical, as a replacement boiler in existing dwellings.

Cooker and boiler

Suitable for large kitchens, these appliances burn solid fuel, oil or gas to provide cooking ovens and to supply hot water for heating. When using solid fuel, the flue/chimney should be cleaned twice annually and the appliance itself should be cleaned as often as twice weekly, particularly if bituminous (i.e non-smokeless) coal is used. This type of coal produces a lot of slag deposits when burnt. These can stick to the boiler surfaces and reduce efficiency.

Back boiler

Open fires are very inefficient, perhaps as low as 20%, with most heat being lost up the chimney stack. By trapping more of the fire's heat energy and using it to provide domestic hot water and space heating, a high output back boiler increases the efficiency to approximately 40–50%. Solid fuel back boilers must be cleaned frequently (as often as twice weekly).

Open fires

Solid fuel and gas open fires, while a visually attractive form of heating for Irish homes, are extremely inefficient. Typically they offer only 15% to 20% efficiency, meaning that up to 80% of the heat literally goes up the chimney. Open fires require air for combustion, and cause an increased ventilation rate in rooms. Draughts can be avoided if the air supply is located close to the fire, (e.g. ducted in directly from outside). A damper that closes the chimney when not in use will help to avoid unnecessary heat loss. Fully sealed gas fuelled fires with back boilers offer an alternative to open fires - most models comply with current building regulations.

Choosing your water heating system

Systems for meeting Domestic Hot Water demand (DHW) fall into three main types:

- Centrally stored systems – these store hot water in a cylinder, tank or thermal store
- Locally stored systems – these store hot water for a specific appliance
- Instantaneous water heating – these heat water when it is required

Centrally stored systems

- **Boiler systems**
  The central boiler heats water in a hot water storage vessel such as a cylinder or thermal store. The hot water is then distributed to the taps on demand as required. There will be heat losses from the cylinder / storage vessel from the hot water stored there, and it is recommend to lag or insulate this as much as possible to minimise this loss.There is also some heat loss through the primary pipework from the boiler to the hot water storage vessel.
- **Room heater systems**
  Heat exchanger in the room heating unit, such as a back boiler in an open fire, heats water for domestic use. This system incurs both storage and distribution losses. These should both be minimised to enhance system performance.
- **Immersion heater systems**
  These systems use the electric heating elements installed in hot water storage cylinders. These typically have two electric elements: (i) a low rated element to supply small quantities of hot water for sinks or showers, and (ii) a higher rating element to heat sufficient water for larger demands, such as baths.

Locally stored systems

- **Larger storage type**
  A range of gas fired or electric wall or floor mounted domestic water storage heaters are available for baths and multi-outlet applications.
- **Over-sink type**
  Gas fired or electric hot water storage heaters of this type are available for single outlet sinks or basins.
- **Under-sink type**
  Electric under-sink hot water storage heaters are available for single outlet applications and work in much the same way as over-sink types.

Instantaneous systems

- Gas fired instantaneous water heater
  A suitable natural or liquid petroleum gas supply and a minimum water supply pressure of 1 bar or 10 metre head is required to operate this type of water heater.
- Electric instantaneous water heater
  An electricity supply of 30 amps and a minimum water supply pressure are required to operate this type of water heater.

Heat distribution systems – the options

Once generated, heat is distributed throughout the house by means of water or air, using a network of pipes or ducts.

Water distribution

Hot water from a boiler is pumped around a circuit to the heat emitters/radiators at a required flow rate to meet the heating demands. The water circuit may be open or closed to the atmosphere:

- Open systems
  Open systems (e.g. solid fuel systems) use a small feed and expansion tank located in the attic to fill the system and to allow for the expansion of water during the heating process. A vent pipe from the heat generator provides a safety outlet in the event of water boiling.
- Closed systems
  These systems are closed to the atmosphere (pressurised systems), which means they can operate at slightly higher temperatures than open systems. Closed systems must incorporate a small expansion tank and air safety release valve. The system is filled by an automatic valve instead of a feed tank.

Air distribution

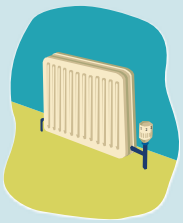
- Warm air generators
  Use ducting to distribute heat throughout a dwelling. Ducting is usually made of metal and is hidden in the ceiling void. Warm air systems are particularly suitable for thermally lightweight buildings, i.e. buildings in which the walls floors and ceilings of the rooms are constructed of plasterboard or timber.
- Warm air recovery systems
  These systems incorporate a ventilation system and an air-to-air heat exchanger in the attic space. They are designed to work in conjunction with passive solar design and heat recovery ventilation in newer, more sustainably designed homes.

Heat emitters – the options

Heat gets into your room via a heat emitter. They fall into three distinct types:

- Centrally generated heat emitters
- Underfloor heating
- Localised heat emitters

All types offer advantages and disadvantages, which are examined in turn.



Radiators (centrally generated)

Radiators are flat, sealed metal containers through which hot water flows from the heat generator e.g. boiler or heat pump. They normally operate at temperatures of between 60º and 65ºC (depending on the boiler thermostat setting). However, low temperature radiators are available for use in conjunction with heatpump or condensing boiler systems.

Advantages of radiators:

- Fast response (heating up) time
- Can be situated near cold surfaces, e.g. single glazed windows, thus reducing down-draughts
- Individual room control possible using TRVs
- Relatively low installation costs
- Retrofit possible in older homes

Disadvantages of radiators:

- Subject to leaks and require maintenance
- Some systems (condensing boiler/geothermal heat pump) require larger radiators to operate efficiently
- Can create uneven heating, particularly in larger rooms
- Unsightly and interfere with positioning of furniture

Underfloor heating

This is a means of distributing heat throughout a home via a network of hot water pipes built into the floor, through which flows heated water.

Advantages of underfloor heating:

- No radiators, so easier decoration and improved room appearance
- Lower temperature, radiant heat provides a stable comfortable environment
- Provides a background level of heating
- Ideal for use with heat pumps or condensing boilers
- More uniform heat distribution throughout the room
- Intelligent/self-learning controls can improve response times

Disadvantages of underfloor heating:

- Up to 20–25% more expensive to install
- Slow response time is less suited to the Irish climate
- Controls and design must be of high standard to ensure satisfactory operation
- Limited flexibility – considerable building work is required to change the system
- Room furniture may impede the emission of heat from floors
- Low temperature surface of floor may be inadequate to heat poorly insulated spaces
- Generally only appropriate for new homes/new buildings
- Need higher levels of insulation in the floor than for conventional building. Building regulations require a U-value better than 0.15 W/m^2/K

Localised heat emitters (room heaters)

These are heat emitters which generate and emit heat into the space they occupy, independent of a central heating system. The main types are:

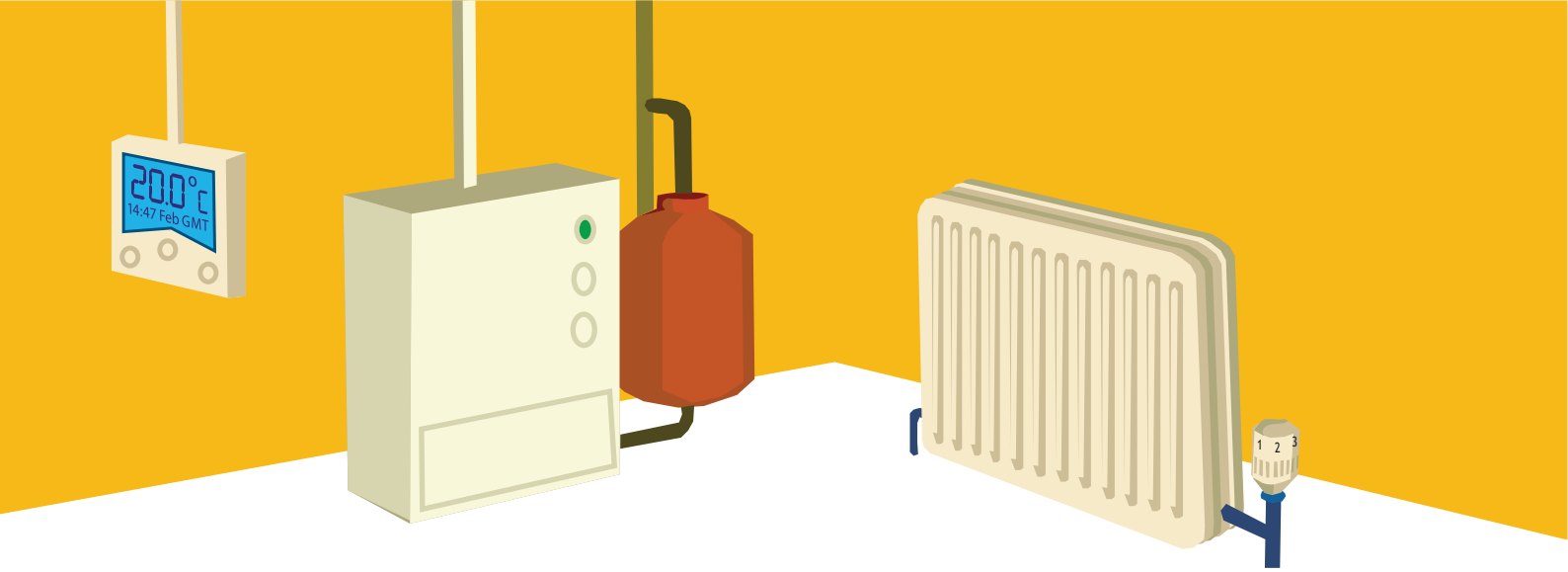
- Wood pellet/solid wood stoves
  A wood burning stove can easily power many radiators as well as providing hot water.
- Gas or oil fired room heaters
  operate at 100% efficiency by burning LPG or kerosene, but release CO_2 and water vapour, so require adequate ventilation.
- Electric heaters
  radiant, blow heaters, convectors, oil filled radiators and storage heaters. Costly, but nearly 100% efficient
- Open Fires
  visually attractive but highly inefficient form of heating (only 15-20% in terms of heat output).
- Enclosed gas fires
  Aesthetically pleasing and highly efficient, with no draught effect.

Advantages of localised heat emitters

- Provide instant and convenient heat
- No distribution network required
- Can be very efficient, depending on type used
- Can provide a quick, reliable and cost-effective heating solution

Disadvantages of localised heat emitters

- Some use non-sustainable fuels. Greenhouse gas emissions much higher compared to alternative energy sources.
- No storage capacity
- May pose a safety risk
- Controls limited
- Usually have little or no water heating facility



Control systems – take charge of your heating

Under current Irish legislation, it is a necessary requirement to manage the output of space and water heating via control systems. Whether it is for a new build, or the upgrade of an existing system, as many as possible of the relevant energy saving control measures shown in this guide should be included. By implementing these measures, you will not only reduce your heating bill, but also reduce the carbon footprint of your home.

It is worthwhile noting that the Home Energy Saving (HES) scheme, administered by SEAI, provides grants to homeowners seeking to improve the energy efficiency of their home in order to reduce (i) energy use, (ii) costs and (iii) greenhouse gas emissions. This national scheme is open to all owners of houses built before 2006. The types of measures currently eligible under HES include the installation of high efficiency (> 90%) gas or oil fired boilers and heating control upgrades, as well as roof and wall insulation. For further information visit **www.seai.ie/hes**

This section will examine the four key areas where control measures can be implemented to improve the efficacy of your home heating system:

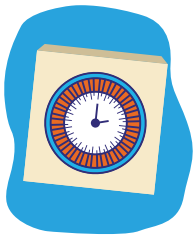
- Control of the heat generator
- Control of the heat distribution system
- Control of the heat emitters
- Control of the hot water system

Control of the heat generator

Where economically viable, as many as possible of the following control options should be included for the efficient and safe operation of a fuel burning heat generator.

Time switch

A time switch enables the boiler to provide heat to either the space heating and/or the domestic hot water supply circuits when required. This means, for example, that domestic hot water can be provided in the summer when heating is not required. The provision of separate space heating and domestic hot water supply circuits is a requirement for new buildings.



Delayed start thermostat

This control device uses a time switch to monitor internal and external temperatures and delays the boiler start. In this way, it reduces the number of hours per day that the heating system runs, without creating any discomfort.

Programmer

This device controls both the space and water heating systems, allowing you to choose when you want the system to operate (usually on a daily/weekly schedule). There are three types of programmers, offering varying degrees of control.

- A mini-programmer which allows (i) space heating and hot water to be provided simultaneously, or (ii) hot water alone, but not space heating alone.
- A standard programmer which uses the same time settings for space heating and hot water.
- A full programmer which allows the time settings for space heating and hot water to be fully independent.

Programmable room thermostat

This device combines a time-switch and room thermostat and allows you to set different time periods with different target temperatures for space heating.

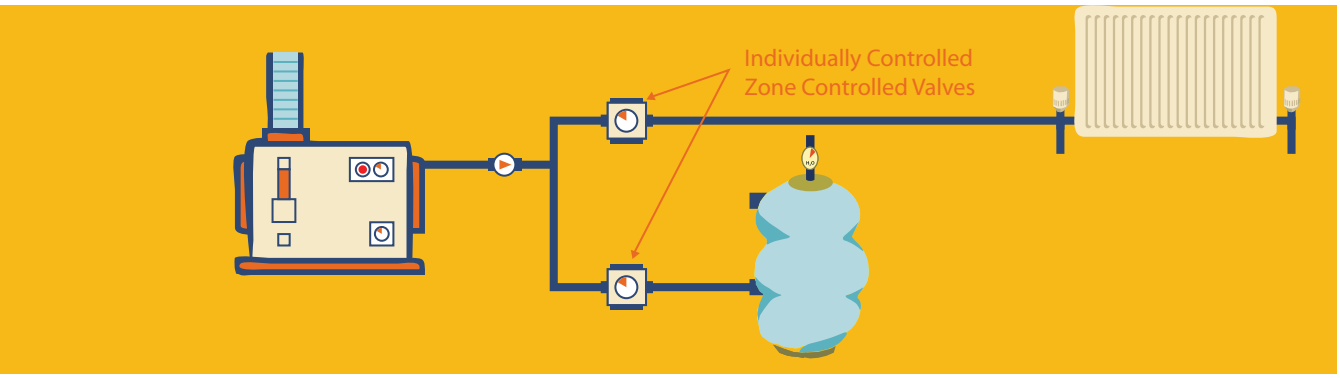
Boiler interlock

This is an arrangement of the system controls which your electrician can undertake to ensure that the boiler does not fire when there is no heat demand.

Control of the heat distribution system

Distributing heat efficiently around your home is just as important as generating it efficiently. This section discusses the options available for controlling the distribution of heat.

Zone control



Dividing the heating system into separate zones allows it to operate independently in different parts of your house. Typical zones might be (i) the living room, (ii) the rest of the ground floor, (iii) the first floor, and (iv) the domestic hot water storage cylinder. Each zone will be switched on only at the times when there is a demand for heat in that area.

All heating systems should have a separate hot water circuit to allow for the heating of hot water without needlessly heating the home. This is a legal requirement of all new buildings. Additionally, current regulations suggest that for homes over 100m^2 the heating system should be split into at least two zones – namely the bedrooms (cooler) and living areas (warmer).

Load compensator

This device regulates the water temperature in the DHW circuit in direct relation to the temperature measured inside the dwelling.

Weather compensator

Designed for larger installations, a weather compensator control helps reduce energy use and associated utility costs by linking the temperature inside a dwelling to that outside. This means, for example, that when outside temperatures rise, the demand for space heating in the house is reduced, thus saving on heating costs. Weather compensation is particularly beneficial in conjunction with condensing boiler systems as it can help the boiler run more efficiently for longer.

Boiler energy manager

This device improves boiler control by using a selection of features previously detailed, such as load and weather compensation, boiler interlock, zone control, etc. It is an extremely efficient way to operate the heating system in your home.

Flow switch

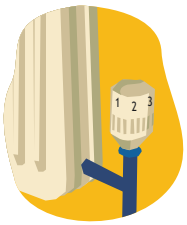
A flow switch detects when there is no water flow through the Domestic Hot Water (DHW) system, for example, when all TRVs are in the fully closed position and there is no heating requirement.

Control of heat emitters

Water is the most common distribution medium in heating systems and heat is generally emitted to rooms via radiators or convectors (fan assisted radiators). When heating is not required in a particular part of your home, you can isolate heat emitters in this area either manually or automatically.

Manual control

Most radiators and convectors are fitted with a hand wheel valve. This is essentially an on-off switch which allows the heat emitter to be isolated from the heating circuit.



Thermostatic Radiator Valves (TRVs)

A thermostatic radiator valve (TRV) may be installed instead of the hand wheel valve. The TRV has a number of settings which adjust the flow of heating water to the heat emitter, according to the temperature of the room. So, for example, in rooms where a high level of heating is required, the TRV will be set at the top setting. Conversely, if only background heating is desired, then the valve will be at its lowest setting.

A motorised valve may be used along with the hand wheel valve. It is activated by a thermostat located in the room. However, while motorised valves may offer more effective heat control than a conventional TRV, they are also more expensive.

Control of the hot water system

As has been previously outlined, domestic hot water supply may be provided from a central storage cylinder, from local storage or from an instantaneous source. There is scope for energy saving in the way hot water is produced and used.

Control of central storage cylinder

The hot water cylinder should be supplied with heating water from the boiler via a separate circuit from the space heating circuits. Two aspects of a hot water cylinder that should be controlled are (i) the times that heating water is circulated from the boiler to the coil heat exchanger and (ii) the temperature at which the hot water in the cylinder is stored.

Point of use control

It is recommended that domestic hot water should be stored at 60°C. However, water at this temperature is too hot for showers. The process of mixing hot water from the storage cylinder with cold water from the cold water cistern can be automated by installing a Thermostatic Mixing Valve. Once set at the desired temperature, the shower water temperature always remains the same, provided the water in the storage cylinder is at or above the desired temperature. This minimises energy and water wastage.

Instantaneous DHW at isolated users

In large houses, distributing heat energy and water from a central storage cylinder causes wastage. Installing a local hot water system at points of usage eliminates this waste. Local systems may be either (i) storage or (ii) instantaneous. They use natural gas, liquid petroleum gas or electricity.

Problem solving

Heat generation and distribution systems are prone to a number of issues which can affect their performance. It is therefore recommended that your heating system is serviced regularly.

For a list of the issues, problems and answers that may affect your heat generation and distribution systems, please refer to the Question and Answer section in the SEAI website: **www.seai.ie/yourhome**

Maintenance

An annual boiler safety check and boiler service, carried out by a professional service engineer ensures that your boiler is functioning properly. If your oil or gas boiler hasn't been serviced recently, then you could be wasting money. In fact, by servicing your boiler, you could improve your overall efficiency by 10%.

The benefits of servicing your boiler

- Saves you money - reducing your heating costs
- Reduces CO_2 emissions - benefiting the environment
- Gives you peace of mind - improving your boiler's reliability and safety

For more information on servicing an oil or gas boiler visit **www.seai.ie/boilers**

All heating systems including those fuelled by renewable energy will perform more efficiently, and therefore more economically, if they are well maintained and serviced on a regular basis. Your system will come with a user's manual and a service schedule. These are set out by the manufacturer and we would recommend that you follow these to ensure that your heating system works at its optimum level all the time.

The BER Scheme

What is a BER?

A Building Energy Rating or BER is similar to the energy label on your fridge with a scale of A-G. A-rated homes are the most energy efficient and G the least efficient.

From 1st January 2009, a BER certificate became compulsory for all homes being sold or offered for rent. If you are buying or about to rent a house or apartment now, you are entitled to a BER – so ask the seller/landlord or their agent for it.

What are the benefits of a BER?

A BER makes the energy performance of a home visible to prospective buyers and tenants and enables them to take energy performance into consideration in their next house purchase or rental decision.

For more information on BER please visit **www.seai.ie/ber**

Home heating is the major contributor to domestic energy use, so adopting the recommendations in this SEAI booklet will reduce the amount of energy used to heat your home, and produce a better BER for your property. It is imperative that all of us put these actions in place now. Not only will this help the environment through lower CO_2 emissions, it will also benefit homeowners through greater home comfort levels and reduced home heating costs.

Read our other publications, visit **www.seai.ie/yourhome**

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Ireland's EU Structural Funds Programmes 2007 - 2013
Co-funded by the Irish Government and the European Union

EUROPEAN UNION STRUCTURAL FUNDS

The Sustainable Energy Authority of Ireland is financed by Ireland's EU Structural Funds Programme co-funded by the Irish Government and the European Union.

design by Penhouse www.penhouse.ie