

Energy Saving at Home

A practical handbook

This booklet was put together by PEDAL – Portobello Transition Town with funding from the Scottish Government's Climate Challenge Fund. It is for anyone who would like to save energy at home. It answers some frequently asked questions, and suggests some new ways you can make your home more energy efficient.

Transition towns are a community-led response to climate change, fossil fuel depletion and economic pressures. They are led by, and involve, local people who want to use their talents and time in tackling these issues within their own community. During 2010-2011, PEDAL received funding from the Scottish Government's Climate Challenge Fund to help local people work together to reduce carbon emissions in the Portobello community, focussing on the energy we use at home and the food we eat.

Why save energy?

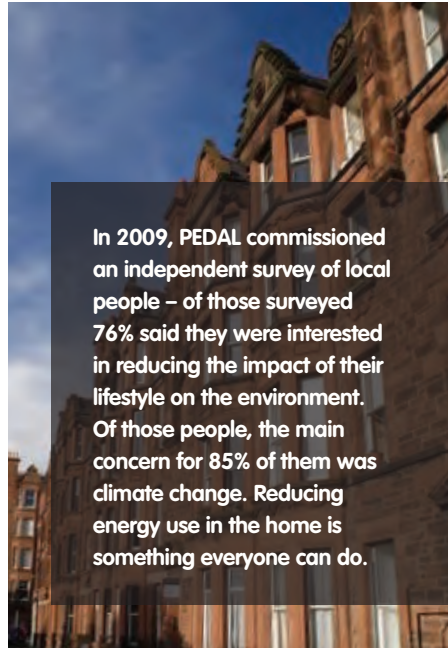
There are lots of good reasons why you might want to make your home more energy efficient. It can lower your energy bills, make your home warmer and, by reducing the energy you use around the home, you can also reduce carbon emissions and so do your bit to act on climate change. Your home will also become better protected against rising fuel prices and you will be helping to conserve fossil fuel supplies which are becoming scarcer.

How to use this handbook

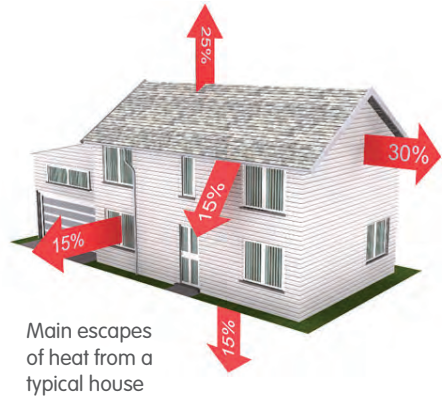
There are lots of tips with checklists in this booklet for you to record what you've looked at and done to save energy in your own home. Some ideas may be suitable for your house or lifestyle and some not, but the more you can do the bigger a difference it could make. We've included actions that are appropriate for older houses and tenements, as well as newly built houses.

We've included a handy reference table on the next page showing the approximate costs of the main energy saving actions you can take, as well as the amount of money and carbon dioxide (CO₂) these could save you each year. To put these figures into perspective, average carbon footprints in Edinburgh are about 7.3 tonnes CO₂ per person each year*.

*Department of Energy and Climate Change, 2008



In 2009, PEDAL commissioned an independent survey of local people – of those surveyed 76% said they were interested in reducing the impact of their lifestyle on the environment. Of those people, the main concern for 85% of them was climate change. Reducing energy use in the home is something everyone can do.



Before you get started, it's a good idea to identify how much energy your household is currently using. This way you can go back and look at your energy use again in six months or a years time, and see how much energy – and money – your actions are saving you. The key is to find out your average daily energy use in kilowatt hours (KWh). Some suppliers will help you work this out or provide the information on your bill. Remember your energy use will also change with the seasons. You can compare your home energy use with others, for example the national or local average, at sites like www.energyaverage.co.uk.

Meter readings

Date:	Date:
Electricity reading:	Electricity reading:
Average daily use (KWh):	Average daily use (KWh):
Gas reading:	Gas reading:
Average daily use (KWh):	Average daily use (KWh):

Savings from key actions

Measure	Average cost	Savings (per year)	CO ₂ savings (tonnes/year)
Draft-proofing windows & doors	£200	£23	0.12
Cavity wall insulation	£350	£103	0.54
Loft top-up insulation (100mm)	£200	£41	0.16
Virgin loft insulation	£350	£206	1.09
Internal insulation	£50 - £70/m ²	£332	1.86
Secondary glazing	£200 - £500 per window	n/a	n/a
Reflective panels behind radiators	£5 per radiator (DIY)	£60-80*	n/a
Insulating hot water tank & pipes	£120 - £150	£53	0.28
Using an energy monitor	Free - £50	£14 - £140	0.07 - 0.7
Reducing shower time from 10 mins to maximum 5 mins**	Free	£102	0.38

* Based on eight radiators fitted to outside walls

**Based on each person in a four person household using a 6KW rated electric shower every day. For gas heated water, figures will be around one-third of those shown.

Draught proofing

Draught proofing can make a really big difference to comfort levels in your home if you live in an older house. It is worth draught proofing any gaps where you can feel the cold air coming in, or suspect warm air is escaping. You can do it yourself or have it done professionally, but if you do it yourself make sure you allow for adequate ventilation.

- » Windows to investigate action completed
- » Internal doors to investigate action completed
- » External doors to investigate action completed
- » Unused chimneys - block with a chimney balloon or similar to investigate action completed
- » Letterboxes to investigate action completed
- » Gaps in the building e.g floorboards to investigate action completed

Over 400 households took part in PEDAL energy projects in 2010-2011, carrying out many of the actions in this booklet. As a result, Portobello will have saved over 93 tonnes of CO₂ in a year as a community!

Cavity wall insulation

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Most properties built before 1920/30 are stone or brick built, without a cavity that can be filled with insulating material. If you are in a traditional tenement then there won't be one. Filling the wall cavities of properties that do have them can make a big difference to the heat lost from a house. The cavities can be filled with beads, foam or blown fibres. Blown cellulose fibre is mainly recycled so requires less energy to manufacture.

Solid wall insulation

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This is an option for houses and flats where other measures are difficult to install, and for rooms which are very hard to heat. Solid wall insulation can make a big difference to the amount of heat lost, however it does require a significant amount of work to install.



Wall insulation can be internal, putting an insulated plasterboard type layer inside the room. This increases the wall thickness, and so often requires alterations to window sills, plug sockets, switches etc. For this reason, if possible, it's best to incorporate this into any renovations you're already planning. Thermal wall lining can also be used to insulate walls internally. This is applied to the plasterwork like wallpaper, making it easier to install. However, it is made from a spongy foam and so can be more prone to damage by impact. It is important to prevent condensation forming, by making sure there is enough ventilation.

External insulation can also be applied to solid walls, and then needs to be rendered or clad. You may need planning permission for this type of insulation, and it is not suitable for properties such as tenements due to planning restrictions. To find out more about solid wall insulation visit:

www.energysavingtrust.org.uk/Home-improvements-and-products/Home-insulation-glazing. To find an installer visit:

www.inca-ltd.org.uk/register-members.htm.

Loft insulation

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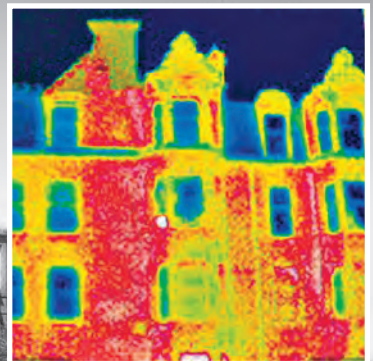
Getting loft insulation can make a huge difference to how much heat stays in your home, and will quickly pay for itself in savings on heating bills. There may be grants you can get to pay for this if you are in receipt of certain benefits. See: www.energysavingtrust.org.uk or call 0800 512 012 for more information.

Standard loft insulation is made from mineral fibre, but there are more eco-friendly fibres on the market that are also biodegradable - such as cellulose fibre (recycled newspaper), which is also cheap and easily available.

Wool insulation or recycled polyester fleece are alternatives, but can be more expensive and it can be harder to find an installer who will provide them. If you are installing the insulation yourself however, then these eco fibres have the added benefit of being completely safe to handle, unlike mineral wool types which require masks and gloves.

Not all homes are suitable for loft insulation. If you have a flat roof, consider internal insulation (see previous page) or incorporate extra insulation into the roof covering when the roof surface needs replacing.

Both of these options are best carried out when there is already work being done on the roof or ceiling, so as to minimise disruption and expense. If you are in a top floor tenement flat, you should ideally get agreement from the other upstairs neighbours before you go ahead with insulation work.



Windows

A large percentage of heat in the home is lost through the windows.

- » Double glazing can help prevent this, but is only really cost effective if you need to replace your windows already. It will have to be of a specific kind if you live within a conservation area or a listed building. to investigate action completed
- » Secondary glazing can be effective, is permitted in conservation areas and costs less than double glazing. There are several DIY secondary glazing options, from magnetic strips with Perspex panels, to heat sealed film which sticks directly on to the window glass. to investigate action completed
- » Using existing shutters or reinstating shutters to your home is extremely effective at keeping heat in, as is installing heavily lined curtains or thermal blinds. to investigate action completed
- » Make sure you shut curtains, blinds or shutters at dusk to get maximum insulation benefit. to investigate action completed

Radiators

- » Use/fit radiator valves, so you can turn them up in rooms you're using and down in rooms you're not. This can save on average 0.66 tonnes CO₂ each year. to investigate action completed
- » Fit reflective radiator panels (e.g. tin foil) behind each radiator, so the heat is reflected back into the room. to investigate action completed
- » If the radiator is under a window, it's worth considering fitting a shelf above the radiator, to direct the heat back in to the room rather than out of the window. to investigate action completed



Heating system

Just a few simple changes to the way you use your current heating system can make it work more efficiently.

- » Ask for advice if you're unsure how to use timers and thermostats - this can help you keep your house warm when you need it without wasting energy when you don't. Contact Energy Saving Scotland advice centre for more information 0800 512 012.
- » If you don't have a timer or thermostat, think about installing one so you have more control over when you're heating your home and by how much.
- » Try setting your heating to go off half an hour before you leave and go on half an hour before you need it, to allow for warming up and cooling time. If your timer has daily settings, remember to set it differently for the weekend if you are in at different times.
- » Make sure your hot water is set at 60°C – it should be at least 60°C to be safe from Legionnaires Disease, but it doesn't need to be higher than this.
- » If you have a hot water tank, insulate both the tank and the pipes.
- » If your boiler is older than ten years, it may be running inefficiently, so it may be worth installing a new efficient one. See here for a list of boilers and their energy ratings: www.sedbuk.com.
- » Insulate yourself – wear a warm jumper if you're cold.

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Appliances

Appliances that heat up or cool down use a lot of energy, so these are a good place to start when thinking about saving energy. When buying new appliances try to buy those with A+ energy ratings as well as low water consumption ratings.

Oven/cooker

- » Check the seals.
- » Use a toaster instead of the oven grill.
- » Try to avoid opening the oven door unnecessarily when the oven is in use.
- » When cooking, put lids on your pans to keep the heat in.

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Fridge and freezer:

- » Check the temperatures – if they are set too low you could be using more energy than you need to. They should be 0°C to 4°C for a fridge and -6°C to -18°C for a freezer.
- » Keep fridges and freezers three quarters full. Their contents retain the cold better than the air, so when you open the door of a full fridge or freezer, it doesn't have to work so hard to cool everything down again.
- » Check the door seals – if they're not working then you are spending money cooling your kitchen!
- » Defrost freezers regularly as frost buildup increases the amount of energy needed to keep it frozen.
- » Think about a new A+ rated fridge, which can use around half the electricity of one that is 5-10 years old.
- » Keeping the back coils clean allows heat to escape more easily.
- » Site fridges and freezers away from heat sources.
- » Switch them off when you're away for long periods.

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Washing machine and dishwasher

- » Do full loads – one full load uses less energy than two half loads.
- » Wash on the low temperature/eco settings as often as possible.

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Kettle

- » Only boil as much water as you need - heating water unnecessarily wastes a lot of energy.

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TVs, music systems, computers & games consoles

- » Switching these appliances OFF at the wall saves energy. Different appliances use different amounts of energy at standby, but the combined amounts can be high.
- » The newest generation of games consoles use a lot of energy while switched on. Many have an automatic 'powerdown' function though, so make sure you have this function switched on. This means you're not using as much energy between playing games.
- » If the switch at the wall is difficult to get to, then try using 'powerdown switches' which stop a computer's or tv's peripheral appliances (e.g. DVD player, modem, printer) drawing power when the main appliance is switched off.

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Lighting

The technology of energy saving lightbulbs has much improved, and there is now a huge range of different Compact Fluorescent Lightbulbs and halogen lights to choose from. CFL's give one of the best 'savings per pound' spent of any energy saving measure.

- » Fitting just one low energy lightbulb can save £2.50 per year. to investigate action completed

Energy monitors

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Energy monitors can help you work out where you're wasting energy around your home, and so take action to cut back. The basic components are a transmitter, which clips onto a wire feeding into your electricity meter, and a monitor - usually a hand held screen that you can take anywhere in the house. By turning appliances on and off you can work out how much energy each one is using. Energy monitors can be borrowed from any library in Edinburgh. Many energy suppliers also supply them free.

Saving water

Although water doesn't seem like something we need to conserve in Scotland, a huge amount of energy is used in its processing, purifying and pumping (to maintain mains pressure). If you are heating water then this is using even more energy. Using less hot water saves money, CO₂ and water.

- » If you have a garden, fit a water butt to collect rainwater. As it's free of chemicals such as chlorine, it's even better for your garden than tap water! to investigate action completed
- » Limit your shower times. Using an electric shower for more than 10 minutes can use more energy than a bath! Contact ESSac and ask them for a shower timer - 0141 552 0799. to investigate action completed
- » Use a 'water hippo' or a 'save a flush' in an old toilet cistern to prevent wasting excess water in flushing! to investigate action completed
- » Wash your car with a bucket and sponge rather than a hose. to investigate action completed
- » Turn the tap off while brushing your teeth, washing your face, shaving etc. to investigate action completed
- » You can calculate the costs of using water in different ways, from washing up to using different types of shower, using the Energy Saving Trust's on-line water calculator. See www.energysavingtrust.org.uk/scotland/In-your-home/Water/Water-Energy-Calculator. to investigate action completed

Green energy suppliers

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Switching to a supplier of green energy can make a major difference to your CO₂ emissions. Most utility companies offer a green energy or 'eco' tariff. These invest in renewable electricity generation, or provide a percentage of electricity from renewables as part of the mix of electricity you pay for, which can vary considerably. However, all energy companies should already source a percentage of their energy from renewable sources by law, so it's worth finding out if their eco or green tariff goes beyond this obligation.

There are also a growing number of suppliers that specialise in providing a high percentage of renewable energy. To compare options see: www.greenelectricity.org and www.green.energyhelpline.com.

Some companies are certified under the Green Energy Scheme - a new independent scheme that verifies the claims of those suppliers taking part. See: www.greenenergyscheme.org. Suppliers may charge different rates for electricity and/or gas.

Renewable energy generation

It is best to install all possible energy saving measures (as outlined on the previous pages) before you think about generating any of your own energy from renewable sources, otherwise you are heating or powering an inefficient house and wasting energy and money. The type of renewable energy technologies most suitable for your home will depend on your specific circumstances. Visit www.energysavingtrust.org.uk/renewableselector/start to find out more.

Solar water heating

There are several kinds of solar water heating panels, but essentially energy from the sun heats water via heat exchange from a liquid or metal in the collector. Up to 70% of your home's annual hot water can be generated (depending on the size of panel and your water usage). The system can provide much of your hot water needs on a sunny day, but a lot less when it is overcast.

A system for an average family home* could cost around £4,000 and save you up to £300 per year on your bills. If you install before 31st March 2012, you may also be eligible for a payment through the Renewable Heat Premium Payment scheme** to cover part of the installation costs.

Solar water or solar PV (see next section) both require the sun as an energy source, so need to be on a sunny east, west or preferably south facing roof. In a conservation area they will probably need to be hidden to meet planning regulations. Planning permission is necessary if it is a listed property.

* An average 3-bedroom house using gas as a primary heating source. Figures based on current prices and dependent on your current heating system, water use and roof orientation.

** See www.energysavingtrust.org.uk/Generate-your-own-energy/Financial-incentives for more information on the Renewable Heat Premium Payment scheme.

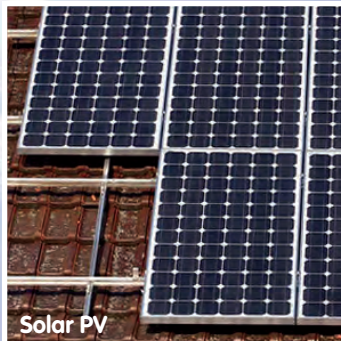
Solar panels for electricity (also called photovoltaic/PV panels)

- » These can come in varying sizes, but a 2.7KWp system can generate around 40% of the average household's yearly electricity needs.
- » You need a large suitable roof space (roughly south facing and unshaded) and be prepared to invest money in the panels.
- » Panels should last up to 25 years, and are quite low maintenance, but should be inspected fairly regularly and cleaned. If they are not clean it can affect performance.
- » At current (2011) prices a 2.7KWp system could cost around £7,000. However, in addition, to saving money on your bills, your system may be eligible for payments under the Feed in Tariff*.

*The Feed In Tariff is a government scheme which gives a payment per unit of electricity generated from renewable sources. It is in fact more of a generation tariff, as you don't have to be feeding power into the national grid to benefit from it. At the time of going to print the feed in tariff rates for solar PV were being reviewed. For information on rates payable and how it works see www.fitariffs.co.uk.



Solar Thermal



Solar PV

Wood burning stoves

These use wood or wood pellets to heat a room, and some models are also connected to a back boiler, which can heat water and radiators too. It is important to secure a reliable and sustainable source of fuel - although wood can be 'carbon neutral' this is only the case if new trees are being planted to replace the wood you are using. Make sure your supply is from a sustainable (and ideally local) supply. For FSC certified fuel suppliers search here: www.fsc-uk.org/products/search.aspx and here: www.usewoodfuel.co.uk/using-woodfuel/find-a-woodfuel-supplier.

If you are thinking of installing a stove, make sure you source a model which is allowed in a smoke control area (all of City of Edinburgh). These will generally be more efficient too. Systems linked to your boiler may also qualify for the Renewable Heat Premium Payment scheme (see previous page).

Wind turbines

Micro wind turbines (1KWp – 2KWp capacity) are not viable in terms of cost or carbon savings. It is also not usually recommended to fit them to buildings because the vibration they create when operating can cause damage. Wind turbines, of 10KWp rated capacity and more, can be viable and are installed on the ground. However, the amount of electricity they can generate in an urban environment is usually too low due to turbulence created by surrounding structures.

Heat pumps

Ground and air source heat pumps work by extracting heat from the air or the ground. A heat exchanger uses this to heat rooms via radiators or underfloor heating. Neither type of system is recommended to replace a gas central heating system, and both require very well insulated and draughtproofed houses to work effectively. Where heat pumps are installed in newer homes that are not gas connected, they can be very effective. Systems may also qualify for the Renewable Heat Premium Payment scheme (see previous).

Other Actions...

Don't forget all the other things you can do to reduce your personal energy use and carbon footprint:

- » Buy local and organic food or grow and make it yourself. to investigate action completed
If 50% of your food is sourced this way you could save 0.46 tonnes CO₂ per year.
- » Eat more vegetarian and vegan food. Reducing the amount of meat you eat by 50% could save 0.36 tonnes CO₂ per year. to investigate action completed
- » Leave the car at home - walk, cycle and take the bus more, especially for trips of under 5 miles. to investigate action completed
- » If you need to drive, use eco driving techniques, which can save on average 0.35 tonnes CO₂ per year. You can find out more about eco driving from the Energy Saving Trust website or by calling 0800 512 012. to investigate action completed
- » Repair broken items and look out for second hand goods rather than buying everything new. to investigate action completed
- » Consider holidays in the UK that don't involve flying (saving 0.87 tonnes CO₂ per year). to investigate action completed