

Leeds
Householder
Guide to
Sustainable
Design and
Construction

DRAFT

Introduction

Making a difference

Over the last 20 years there has been a growing realisation that our current development practices are unsustainable. In other words, we are living beyond our means and our way of life is placing an increasing burden on the planet. The increasing stress we put on resources and environmental systems such as water, land and air cannot go on. Real progress now will make a difference to climate change and many other issues that concern us all.

Alongside the rest of the nation, Leeds needs to reduce its 'ecological footprint'. This is the amount of land the city needs to sustain the lifestyles of its residents and visitors, given today's technologies. If everyone in the world had the ecological footprint of an average UK resident, we would need three planets to sustain us.

Leeds City Council has a longstanding commitment to achieving sustainable development and sees that everyday consumption patterns of households can add up to make a significant difference to the environment. In particular, the way that buildings are designed and constructed in Leeds can make a big contribution to reducing our ecological footprint. Whether you are building an extension or loft, adding a conservatory, or changing the external or internal appearance of buildings, there are many ways that households can make a difference to the environment.

The Government has already started to make it easier for you to make your home more sustainable, by setting in motion new planning laws that make it easier for you to install measures like wind turbines and solar panels. Building Regulations have also required new buildings to become 40% more energy efficient than those built before 2002. The Yorkshire and Humber as a region has pledged to cut greenhouse gas emissions by at least 20% below 1990 levels by 2010 and 25% below 1990 levels by 2015. To do their bit, Leeds City Council has committed to cut their carbon emissions by 15% and their water consumption by 5% from 2003 to 2008.

This Guide

This guide provides household tips for reducing your energy use which will reduce your carbon emissions. It shows how to reduce your mains water consumption. It also shows how you can make a significant difference to local wildlife simply by selecting environmentally-friendly materials and reducing light pollution.

On the next page we set out a checklist of the tips you can follow-up in modifying or extending your home. You will find that many of the suggestions contained in this guide are cheap and easy to do and will save you money in the long run. We have organised these suggestions into three categories according to their likely overall cost and impact. Many of the suggestions will also result in your home being more comfortable and pleasant to live in.

As indicated elsewhere in this House Extensions Guide, many smaller developments do not require planning consent. For example, internal alterations that do not affect the building's external appearance, small external works and most works of repair and maintenance. Listed buildings and those within conservation areas may be subject to tighter regulations. **If you are unsure if you need planning consent contact Leeds City Council on 0113 234 8080 or email planning@leeds.gov.uk.**

Householder's Checklist

- This is so easy and cheap to implement that everyone should be doing this. The small investments sometimes necessary are quickly offset by reduced bills or improved comfort.
- These may require some professional assistance and investment in the short-term, although you may be eligible for a grant. The savings to the environment with this option are substantial.
- Finally, this option puts your home at the forefront of living in tune with the natural environment, whilst retaining or improving your current standard of living. They can be expensive and where grants are available, information is given.

Household Tip	Building an extension	Loft conversion	Building a conservatory	Modifying external appearance	Room renovations /redecorating
ENERGY					
Increase the thickness of your roof insulation					
Install cavity wall insulation					
Insulate solid walls					
Insulate hot water tanks and pipes					
Use A or B rated glazing products					
Install efficient heating (a new condensing boiler, micro Combined Heat and Power or Ground Source Heat Pump)					
Install renewable energy					
WATER					
Install dual flush toilets					
Install aerated taps					
Install a water efficient shower					
Select plants that don't require as much watering to green your garden					
Install a composting toilet					
Attach a water butt to the down-pipe from your roof					

Fit a rainwater collection system					
Put in a greywater recycling system					
MATERIALS					
Use water based paints and varnishes					
Put in natural carpets made of materials such as wool					
Put in natural linoleum					
Use European soft woods for new wooden flooring.					
Re-use old bricks					
Use lime mortar					
Use sustainable structural timber					
Encourage wildlife with bird and bat boxes					
CONSTRUCTION PRACTICES					
Employ an environmentally conscious contractor					
Store construction materials in a protected area					
Separate your construction waste - recycle materials packaging and dispose of other more harmful waste properly					
Pour any water contaminated with cement down the foul drain					
Protect the roots of trees and shrubs on and near your property from the excavations					

Reducing carbon

Carbon emissions pose long-term threats to the environment through climate change which could potentially cause flooding throughout Leeds. Amazingly, nearly 30% of the carbon we emit in the UK comes from energy use in residential homes, 60% of which is used for heating, 20% for hot water and the remainder for lighting and other electrical appliances.

According to the Energy Saving Trust, UK homes are the most wasteful in Europe. The amount of energy our homes demand in the UK has risen by 32% in the last 35 years, despite better insulation in new buildings and the rise of energy efficient appliances. This is because we use more electronic goods and many older buildings are poorly insulated.

SOLUTIONS

To reduce carbon emissions there is a hierarchy of solutions:

1. Make your home as energy efficient as possible, for example by insulating, draught proofing and using more efficient appliances;
2. Make your source of energy as efficient as possible, for example by buying a new boiler or fitting a ground source heat pump;
3. Fit renewable energy sources to your home, such as a small wind turbine or solar water heating.

Anyone can reduce the carbon emissions their home is responsible for. Fuelsavers can provide advice on 0800 512 012 and there is information on energy efficiency and the grants available at www.leeds.gov.uk

However, there are certain solutions that are appropriate when building an extension or loft conversion. The best source of information is the Energy Saving Trust, which provides publications free to download. Use Energy Efficient Loft Conversions CE120, Garage Conversions CE121, Domestic Extensions CE122 and New and Renewable Technologies for Existing Housing CE102. Consider improving the energy efficiency of the whole house at the same time as your project.

Form and orientation

For extensions, consider the layout and orientation of the building to minimise the need for heating and artificial lighting.

Insulation

Reducing the overall amount of energy you use in the home is the best way to make your home more sustainable.

• Roof

As much as 50% of all energy lost may escape through the roof, as many houses have only 100mm (4") of loft insulation. By equalling the industry standard of 270mm (10.5"), it is possible to reduce your heating bill by a third. For loft conversions, remember to insulate the new roof. Dormer windows are more complicated to insulate.

• Walls

Up to 35% of total heat loss escapes through the walls. Cavity wall insulation is relatively cheap and straightforward, reducing heat loss through walls by 60%. Solid wall insulation is more costly and complicated, involving work to external walls, but reduces fuel bills significantly.

• Hot water tanks and pipes

Insulate tanks to 75mm (3") to keep water hot for longer. Simply replace the existing jacket or fit another one over the top. Pipes should be insulated to stop them freezing and bursting in winter. Many installers will lag pipes for free when fitting loft installation.

• Glazing

Use A or B rated windows and external doors.

Ventilation

A well-insulated home requires ventilation. Consider passive stack ventilation and heat recovery to reduce energy consumption.

Efficient heating

A conversion or extension may increase heating requirements so the whole house needs a new boiler. Boilers must now be A or B rated gas condensing boilers, using a programmer, room thermostats and thermostat on any cylinder. If fitting room heaters, gas heaters with time and temperature control are more efficient.

Micro-Combined Heat and Power (CHP) may be appropriate for larger homes, or homes where energy efficiency measures are not possible. They are gas powered and provide hot water and electricity at a very high efficiency.

Ground source heat pumps (GSHP) take advantage of the difference in temperature between above and below ground to provide space heating and sometime pre-heated water and in some circumstances are capable of providing the main source of heating for a house. They can also use differences in air or water temperature. They require some electricity to run, so are not officially a renewable energy, but they can be powered from a renewable electricity source. They are particularly useful for developments not connected to gas.

Lighting

Building regulations require loft conversions and extensions to have light fittings that only take energy efficient bulbs in at least one out of every three rooms. Each energy efficient light saves £50 over its life.

Renewable energy

Renewable energy is the most sustainable type of energy supply and there are many options:

- **Solar water heating**

If you have an unshaded south facing roof and use large quantities of hot water, then a solar panel could provide over 50% of your hot water – even in Leeds. Current costs are roughly £3,000, although this reduces to £1,500 if installed by DIY or with a Solar Club – ring the Council on 0113 247 8000 to find your local club. Savings equal £50 - £100 per year.

- **Photovoltaic (PV) cells**

PV converts daylight into electricity. There are many forms available, and they should be considered especially if re-roofing. However costs are high and specialist advice should be taken before considering these. It will often be advisable to invest in other carbon saving technology before considering photovoltaics.

- **Wind turbines**

Small roof mounted wind turbines may be appropriate if there are no tall buildings or large trees nearby to disrupt wind speeds. Groups of residents may be interested in working together to fund larger turbines in open space nearby.

- **Wood fuel boilers**

A stove with a back boiler that uses wood pellets can provide an efficient heat source that is considered zero carbon.

There are many organisations providing information and services in this area – the best starting point is:

- Energy Saving Trust
<http://www.est.org.uk/>

- **Alternative Technology Centre**

Resource centre in Hebden Bridge provides a range of information and services.

Tel: 01422 843141

Web: www.alternativetechnology.org.uk

FURTHER INFORMATION

Saving Water

The UK Climate Impacts Programme (UKCIP) has forecast that over this century global warming will lead to significant changes in rainfall distribution and intensity. Forecasts suggest that if we continue to emit high levels of carbon emissions, rainfall could rise by 30% in winter and drop by 50% in summer within this century.

Local rivers and lakes are becoming increasingly contaminated, which is detrimental to local wildlife. Homes, as well as industry, waste water and cause river flow patterns to change and the water table to drop.

SOLUTIONS

On average each person uses around 150 litres of water in their home per day. This can be reduced by at least a third, by using water more efficiently, collecting rainwater and recycling greywater. The first action to take is to fit a water meter, so you benefit from the savings you make. Yorkshire Water will fit meters for free.

Using water efficiently

- **Dual Flush Toilets**
If you're investing in a new toilet, fit a dual-flush toilet, which will help ensure that you only use the amount of water you need. They usually have three-litre and six-litre flushes, which can save up to 25 litres per person per day.
- **Taps**
Aerated taps on hand basins use up to 80% less water and energy compared to standard pillar taps.
- **Showers**
Avoid power showers and look for water efficient shower heads.
- **Plants**
By carefully selecting appropriate plants, it is possible to have a beautiful garden without using any mains water. 10 litres are used per day on average, although this figure rises significantly during the summer months.
- **Composting Toilets**
These save up to 50 litres of water per person per day. They are not connected to a mains sewer and do not attract flies or smell. They only produce safe, non-odorous compost via a process that's as old as the hills. European

countries have been using composting toilets for some years and a number of systems have been successfully retrofitted into UK dwellings. They are available from as little as £90 and can be established in a confined space either within or adjacent to a home.

Collecting rain water

You can collect rainwater to use in your home or garden. Also by avoiding paving your front or back garden with solid concrete, you can maximise the amount of rain that soaks back into the ground.

- **Water Butt**
By attaching a water butt to the down-pipe from your roof you can easily collect enough rainwater to water the plants in your garden.
- **Rainwater collection**
Fitting a rain water collection system may be an option, so that water can be stored and used for toilet flushing. It will probably only be worthwhile if you are building a significant new roof area.

Greywater Recycling Systems

Usable greywater sources may be water from showers, baths and washroom basins. This water can be collected, treated and used to flush toilets. Recycled greywater systems save up to 50 litres of water per person per day.

Single home systems are becoming cheaper as the market develops. Other countries such as Japan have already taken the initiative and require large buildings to recycle greywater.

OTHER WATER SAVING TIPS

- Take showers, not baths
- Buy water efficient washing machines and dishwashers
- Fill the kettle with only the amount of water you need

FURTHER INFORMATION

- Yorkshire Water – www.yorkshirewater.com
- Waterwise – www.waterwise.org.uk
- BBC – Saving Water
http://www.bbc.co.uk/gardening/basics/techniques/watering_savingwater.shtml
- Sustainable Urban Drainage Guidance – www.leeds.gov.uk

Using Sustainable Materials

We spend most of our time in buildings, and use materials in our homes that produce harmful chemicals. By using more sustainable products when altering and decorating your home you will reduce this pollution and your impact on the environment. Incorporating the ten different criteria shown below will help you choose more sustainable materials:

- Clean or non-polluting;
- Healthy;
- Renewable;
- Abundant;
- Natural;
- Recyclable;
- Energy-efficient;
- Locally obtained;
- Durable;
- Design-efficient.

SOLUTIONS

Paints

Conventional oil-based paints and varnishes are made from petrochemical materials that emit volatile organic compounds (VOCs) that harm the environment. Water-based paints and varnishes are much more environmentally friendly as they are made from natural raw materials that also help buildings absorb and regulate moisture. This aids both human and building health by reducing condensation, moulds and related problems.

Flooring

Carpets

Most synthetic carpets are made from a wide range of chemicals that pollute the environment during manufacture. Natural carpets made of materials such as wool do not have the same impacts and are as equally stain resistant as conventional carpets. They also often cost no more and don't harm the environment upon disposal.

Linoleum

Natural Linoleum is durable, flexible, antibacterial and resistant to fats and oils. Linoleum becomes

stronger over time and is capable of lasting up to 40 years.

Wooden Flooring

European soft woods from sustainably managed forests, such as pine and birch plywood are the most sustainable type of new wooden flooring. Tropical hard woods should be avoided unless they come from a sustainable source verified by the Forestry Stewardship Council (FSC). Better still, check to see if your existing wooden floors can be sanded and used, or find old floorboards to reclaim.

Building materials

Brick

A lot of energy is used in creating bricks. Reusing old bricks can be a viable alternative.

Lime Mortar

Since cement production is an energy intensive process, lime mortar can be used as it is a viable alternative that's been used for centuries. It is also possible to reuse bricks covered in lime mortar as the mortar can be cleaned off. In contrast cement mortar cannot be removed, making those bricks useful for nothing more than hardcore.

Timber

The advice for wood flooring above applies to structural timber too.

Encouraging wildlife

Various bricks and boxes are now available to encourage bats, swifts and other birds. These can be designed as part of an extension or conversion.

OTHER MATERIALS TIPS

- Avoid aluminium products if possible
- Use recycled, not new, glass if possible
- Dispose of old plumbing pipes carefully as they may contain lead

FURTHER INFORMATION

- The Forest Stewardship Council <http://www.fsc-uk.org/>
- Speak to your local supplier or builders' merchant for details about the source of your product.
- Bat Conservation Trust www.bats.org.uk
Concern for Swifts www.concernforswifts

During Construction

Building an extension or other construction jobs can have a significant impact on the neighbourhood. Dust, noise, vibrations, increased traffic, parking problems, water pollution and soil contamination are all often recorded. For example, the Environment Agency registers most incidents of water pollution as coming from construction sites. Although this statistic refers to larger construction projects, the impact of individual construction projects can be considerable.

Also the Council is keen for Leeds to become a 'zero waste' City. Construction sites can produce a lot of waste, much of which can be reused and recycled.

SOLUTIONS

If you are employing a contractor

Ask about their approach to reducing, reusing and recycling waste, avoiding water pollution and being considerate to neighbours. Find out what they normally do and whether they're prepared to take any special measures on your project.

Ask if they are a registered waste carrier and ask for their waste carrier number. Contact the Environment Agency on 08708 506 506 and ask for a Waste carrier Validation Check. You can also do this online at www.environment-agency.gov.uk). If your contractor is not registered, you should refuse their services and request that they seek advice from the Environment Agency.

DIY solutions

- Be careful with deliveries of construction materials and store them sensibly. Make sure they don't get damaged or wet. This will save you money.
- Separate your construction waste. Check if suppliers have take back schemes: for example some plasterboard manufacturers will take back waste plasterboard. Much of the packaging from construction materials will go into your household recycling, and items like pallets will often be accepted by local companies for reuse. There are useful checklists and sources of further information available at www.wrap.org.uk

- Cement and concrete are very alkaline and can cause damage to rivers. Pour any water contaminated with cement down the foul drain. If you have a water course near your property, ensure any water contaminated with cement does not go near it.
- Be careful that the roots of trees and shrubs on and near your property are not damaged by excavations.

FIND A GREEN BUILDER OR ARCHITECT

If you are looking for an environmentally-friendly builder or architect, the following organisations and associations can advise you:

Alternative Technology Centre

Resource centre in Hebden Bridge provides a range of information and services.

Tel: 01422 843141

Web: www.alternativetechnology.org.uk

The Association for Environment Conscious Building (AECB)

A membership organisation of green builders and architects.

Tel: 01559 370908

Web: www.aecb.net

The Green Register of Construction Professionals

This register is the first of its kind, listing architects, engineers and trades-people who have demonstrated commitment to sustainable building practices.

Tel: 020 7582 4888

Web: www.greenregister.org

The Royal Institute of British Architects (RIBA) Client Services

RIBA hold a database of architectural practices' expertise that includes: Energy/Environmental Expertise, Ecological Architecture and Sustainable Design. They can identify practices with these skills that also have an interest in or experience of domestic architecture, as well as advice on a large range of other services. The lists are tailor-made to client requirements and it is a free service.

Tel: 020 7307 3700

Email: cs@inst.riba.org

Additional information

AVAILABLE GRANTS

For the latest offers, phone free on 0800 512 012.

Warmfront

This grant is worth up to £2,700 towards insulation and heating measures and is available to owner occupiers or private rented tenants who get certain benefits.

Energy efficiency commitment offers

There are offers for insulation to private sector residents available to anyone, regardless of their income. Those on benefits can get the measures free of charge.

Heatlease

A Central Heating and Insulation package is available for Leeds City Council tenants living in properties that have a gas supply.

Low Carbon Buildings programme

Grants are available to owner occupiers to help with the cost of installing Renewable Energy technologies. The scheme is managed by the Energy Saving Trust and they offer funding towards the following technologies:

- Solar photovoltaic cells
- Wind turbines
- Hydro-electric
- Solar thermal hot water
- Ground source heat pumps
- Water/air source heat pumps.
- Bio-energy
- Renewable Combined Heat and Power (CHP)
- Micro CHP
- Fuel cells

For more information on the Programme, see the EST website at:

<http://www.est.org.uk/housingbuildings/funding/lowcarbonbuildings/>

MONITORING AND REVIEW

Leeds City Council is interested in what householders are doing to reduce carbon emissions, water use and other innovation. Please let the Council know what you are doing as part of your planning application or alternatively email environment.leeds@leeds.gov.uk

As legislation changes, some of the tips described in this booklet may become mandatory when homes are being extended, converted or sold. The Council will keep homeowners informed, and will update this booklet accordingly.