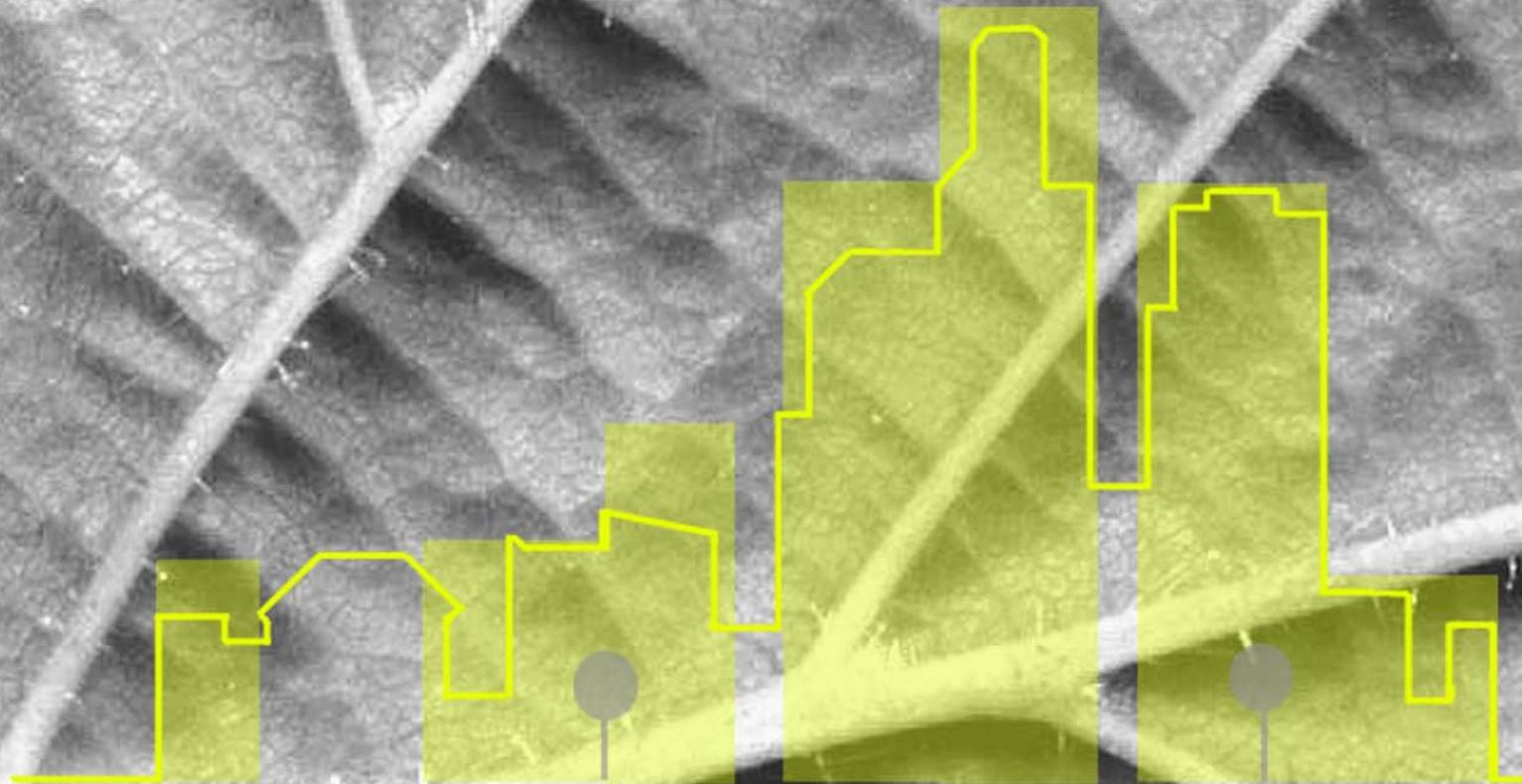


advice for applicants

extensions



What kinds of things can I do to save water and energy?

There are three areas to consider:

Energy Conservation

1. **Reduce the amount of energy** that is needed in your home to support your lifestyle. This can be done by:
 - Following energy saving tips
 - Fitting low energy lighting
 - Purchasing appliances that use less energy

2. **Reduce the amount of heating or cooling** that is needed to make your home comfortable. This can be done by:
 - Reducing draughts
 - Increasing insulation levels
 - Adding double/triple glazing
 - Shading the building
 - Making use of natural ventilation

3. **Reduce the amount of materials** that you use on your project and choose *low embodied energy, durable, natural, recycled and recyclable materials*.

Water Conservation

1. **Reducing** water consumption can be achieved by:
 - Following water saving tips
 - Using water saving devices
 - Using low flush toilets
 - Installing low water showers which draws in air to create pressure for a power shower without using electricity for a pump.
 - Using low water washing machines
 - Installing composting toilets

2. **Recycling** water
 - Collect rainwater and use it to water the garden.
 - Collect grey water (it is waste water from sinks, baths and showers) and recycle it to flush toilets.

Energy Generation

1. **Direct generation of heat**
 - Efficient boilers (80% efficiency minimum)
 - Wood burning boilers (renewable fuel)
 - Heat pumps – heat generated from the earth
 - Solar water heaters – using the sun to heat water

2. **Direct generation of electricity**
 - Combined heat and power boilers – using the steam from heat generation to make power
 - Solar panels – using the sun's energy
 - Wind turbines – using wind's energy

By saving energy and water you will save money and increase the value of your property.



Building sustainably will make your home more comfortable, save you money, help protect the environment and make your property more valuable.

Is an extension necessary?

Before you consider extending your home you should make sure you are using all your existing space first.

- Look to see if there is any unused space within the confines of the existing walls that could be converted.
- Explore the different options for storage, since this can save space and money.

If you have carried out these measures and are still **sure you need to increase your accommodation without moving house**, then a suitable sustainable extension is the next option to consider. Here are the key issues you need to consider while planning your extension:

Choosing the Location and Position

With good orientation the need for heating and cooling in the building is reduced, resulting in lower energy bills and reduced greenhouse emissions.

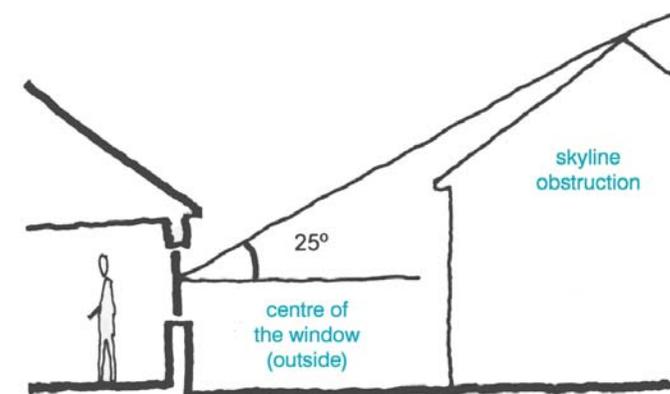
- Position an extension so it doesn't block the natural sunlight of surrounding buildings.
- Keep the main orientation of the building within 30° of south, this brings more light and free warmth into your building.
- Place the most frequently used rooms – therefore requiring the most heating – on the south side of the dwelling (e.g. living room)
- Rooms used less often or those that do not benefit from sunlight should be placed to the north of the building (i.e. hallways, bathrooms, utility rooms, stores). They should also have smaller windows to minimise heat loss.

Making the most of sunlight

Placing Windows

Windows are the principle means of gaining energy to warm the home as well as providing daylight and ventilation to buildings.

- Use larger windows on the south facing sides to bring more free light and warmth into the building.
- Shade south facing windows with external blinds to prevent overheating during the summer months.
- Windows should be large enough to provide adequate day lighting - at least 15% of a room's floor area should be lit.
- Where it is not possible to get enough natural light into a room from a window, think about using skylights or light steals.
- Let light in but stop the heat escaping by using double glazing.
- To allow for natural ventilation windows should be capable of being opened at high and low levels of the building. There should also be secure opening fanlights or trickle vents for background ventilation.



The closest you can get to obstructions, whilst still getting sufficient day light

Simple Additions

PVC-u or Timber frames?

PVC-u - a lot of energy is used in its production and PVC-u is hard to dispose of at the end of its 20-25 year lifetime. The frames degrade and discolour over time and are difficult to repair.

Timber – it is a natural material and can be obtained from a sustainable source. A well maintained timber frame can last longer than PVC-u. Overall it has a better appearance and offers greater value over the lifetime of the window.

To further improve the insulating properties of your windows:

- Use glass with **low emissivity (low E)** coating on the inner side of the pane, which reflects the heat back into the room.
- **Argon or krypton filled** double glazing which adds a layer of insulation between the panes.
- Add **secondary glazing** to windows.

Insulation

Ensure the roof, walls, floors and windows of your home are well insulated so heat losses are reduced. Insulation prevents overheating during the summer and avoids cold conditions during the winter.

- Insulated to building regulation standards or even higher to minimise heating and cooling requirements.
- To reduce the environmental impact use a natural or recycled insulation material, such as sheep's wool or cellulose (made from recycled paper).
- The smaller the external surface area of a building the less opportunity there is for the heat to escape. The exposure of the external surface of the building can be reduced by setting the building in the ground, or by having unheated intermediate spaces such as a conservatory, garage or lobby, which act as an extra layer of insulation to the building.

All prices quoted in the leaflet are 2006 published

Insulation	Installation Cost (£)	Saving (£/yr)	Payback (yrs)	DIY installation (£)	DIY Payback (yrs)
Cavity Wall	£260-380	£70-100	3-5	-	-
Solid wall (external)	£45-65/sqm	£140-170	9-11	-	-
Solid Wall (internal)	£37/sqm	£140-170	-	£15/sqm	-
Roof (250mm where none)	£300-350	£80-100	2-3	£170	Approx 2yrs
Roof (200mm where existing)	£200-230	£20-30	7-12	£140	5-7
Floor	-	£15-25	-	£100	4-7
Draught Stripping	£85-110	£10-15	6-11	£40	3-4



Which Materials to Use?

Where ever possible you should aim to use **recycled, recyclable or natural materials** in the construction of your project. It reduces the amount of waste going to landfill and relieves the demand for new 'energy hungry' construction materials.

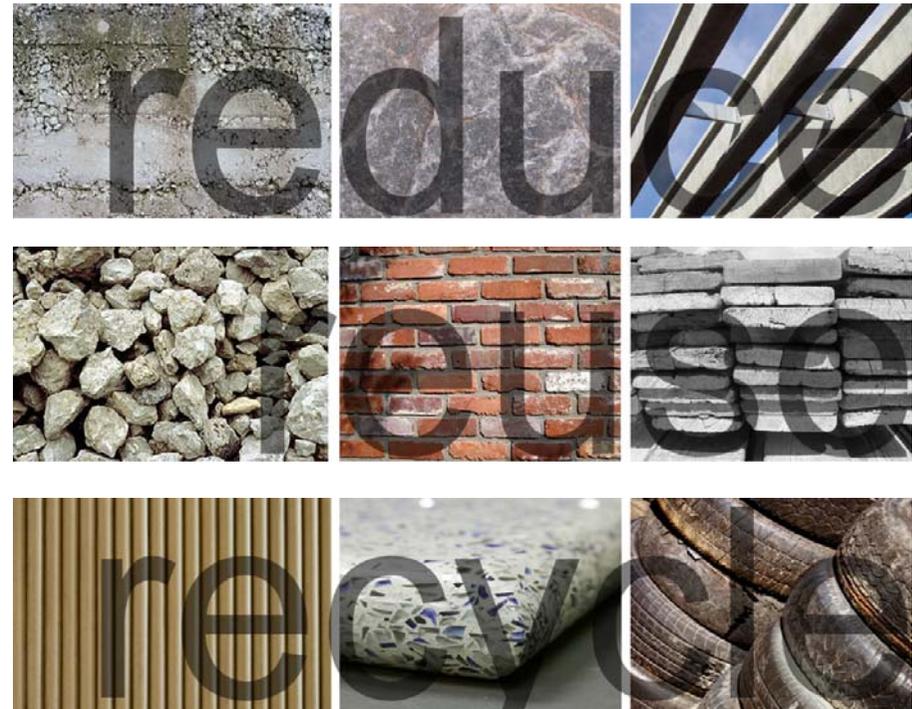
- **Reduce** the amount of materials that you use as much as possible and carefully calculate the quantities required, so there is little waste.
- **Use recycled and recyclable materials.**
- Choose **durable materials**, with long life expectancy
- **Use natural and renewable materials** (wool, timber, natural paints, etc.)
- Look for **Product Quality marks** (BSI Kitemark, BBA, etc)
- **Reuse construction or demolition waste** (reuse timber studwork, use reclaimed steel, reuse old bricks, Lime mortar is reusable)
- Use **Unfired clay products** (bricks, blocks, plasters, paints, etc.)
- If you are using **timber products** make sure its from a well managed forest, look for the Forest Stewardship Council's Trademark (FSC) or PEFC council logo.
- Avoid materials that have to be transported long distances, make use of **local suppliers and products.**

Materials to be used sparingly:

- Steel
- Concrete and Reinforced concrete
- Quarried Stone
- Cement
- Fossil fuel-based materials, petrochemicals, plastics
- PVC (Polyvinylchloride)

Avoid:

- CCA (Copper Chrome Arsenic) Treated softwood
- Creosote treated timber
- Materials containing halogens, formaldehydes and other VOCs (Volatile Organic Compounds e.g. drying agents in paints)
- Materials containing Chlorine



Finding materials for your project

Links to materials resources:

www.constructionresources.com

- Britain's first ecological builders' merchant, and a centre for ecological building.

www.greenbuildingstore.co.uk

- Specialises in environmentally sensitive building products.

www.greenspec.co.uk

- An Internet-based resource for people involved in 'Sustainable Construction'.

www.recycledproducts.org.uk

- Database of consumer products made from recycled materials.



Things you should know if you are...

Building a Conservatory

Conservatories and sunspaces can improve the energy efficiency of your home by:

1. Adding an extra layer of insulation to external walls and windows.
2. Acting as an air lock when external doors are open, preventing heat loss from the main building.
3. Allowing fresh air to be heated in the sunspace before entering the building.
4. Providing warmth by storing and radiating heat stored in the solid wall.

Requirements for an Efficient Conservatory

A conservatory:

- Needs to be separate from the main building.
- Works best if its on the southern aspect of the building.
- Needs to be free from over-shading by trees and other structures.
- Build a long, narrow conservatory, covering as much wall as possible.
- Should be insulated and double glazed.
- Should not be heated, to avoid frost damage.
- Requires opening windows for ventilation.
- Needs shading to minimise overheating.

Note: Choose environmentally friendly materials when building and decorating the conservatory.



Diagram to show how a conservatory provides warmth by radiating heat.

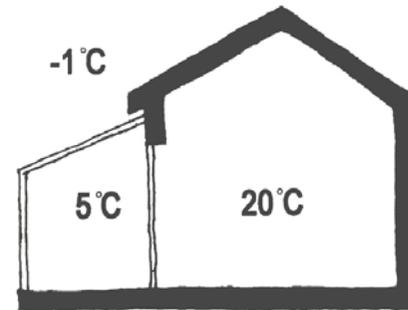


Diagram to show how a conservatory pre heats the fresh air that enters the building

Converting a Loft

When converting a loft space:

- Add at least 250mm extra layer of insulation to the roof in the loft space, preventing heat loss from the main building.
- Insulate pipes in the loft to stop them freezing and bursting in cold weather. Your hot water tank should also be fitted with an insulating jacket.
- Use windows/rooflight or light pipes to provide natural daylight and ventilation to the space. Optimise south facing natural light.
- If replacing roof tiles consider solar PV tiles.
- Windows should be double glazed.
- Choose environmentally friendly materials when building and decorating the space.

Building a garage extension

- Position garages to the north side of the house.
- Only build to the size you require, don't oversize it.
- Choose environmentally friendly materials.
- Consider a green roof – less maintenance.
- Consider installing a rainwater recycling system.

www.planningni.gov.uk

www.tameside.gov.uk/corpgen/new/planfaq.htm



Further developments

Further steps can be taken to improve the efficiency of your new extension. Answer the questions and find out what technologies are suited to your project.

Further advice and information is available on each of the topics, in the 'glossary and technical details document', available as part of this package.

All prices quoted in the leaflet are 2006 published

	Cost (Domestic scale)	Payback incl. grant	Lifetime	Grant available % of cost
Solar PV panels	£6000 - £20000	10-20yrs	30+ yrs	50%
Solar water heating	£2000 - £5000	10-20yrs	30+ yrs	35%
Wind turbines	£2500 - £5000	2-5yrs	20+ yrs	25%
CHP boiler	£3,000	2-3yrs	30+ yrs	n/a
Low flush toilets	£ 250	3-5yrs	n/a	n/a
Rain water recycling	£ 2,000+	n/a	n/a	n/a
Grey water recycling	£ 1,000+	n/a	n/a	n/a

1

Is your house in a smoke free zone?

No (see information below)
Yes (go to next question)

Consider a combined heat and power boiler (CHP) or a wood burning boiler or stove if your home is not in a smoke-free zone.

CHP use the heat normally lost from the boiler to drive a generator to provide free electricity.

Wood burning systems are connected to central heating and hot water systems and can be combined with oil, gas systems or with solar technology. It requires a dry storage space for renewable bio-fuels, either wood pellet, logs or chips.

Refer to glossary on:

Micro CHP
Communal CHP
Biomass/wood pellet fuel

2

Does your house face towards the south?

Yes (see information below)
No (go to next question)

The sun travels from east to west in a southerly path, so a south facing house will obtain plenty of sunlight throughout the day.

To prevent rooms from overheating it is a good idea to shade windows from direct sunlight in the summer months.

External blinds (louvres) are more effective than internal blinds or roof overhangs as they prevent the sun's heat entering the room.

If the site is not heavily shaded, consider installing solar electric (PV) panels and/or solar water heating.

- You can use solar systems for a building with a roof or wall that faces south, as long as no other buildings or large trees overshadow it.
- The minimum surface area required for a solar water system is 3m² and 10m² for a solar electric (PV) system.
- Solar PV requires access to mains electricity, so that excess electricity can be sold back to the grid.
- Solar electric (PV) systems can increase your property value by 10%.

Refer to glossary on:

Solar shading
Solar electric (PV) panels
Solar water heating

Useful Links:

CHP boiler www.chpa.co.uk

Wood burning systems www.r-p-a.org.uk/home.fcm

Solar PV (electric) panels www.greenenergy.org.uk/pvuk2

Solar water heating www.greenenergy.org.uk/sta



3

Will sufficient natural light be available to all rooms?

No (see information below)
Yes (go to next question)

It is important to have adequate day lighting in all of the rooms in your house, especially living and working areas.

This saves you energy and money by not having to artificially light rooms during the day, and improves your enjoyment of the building.

If it is impossible to add windows to a room consider installing light steals or roof lights to let light in.

Refer to glossary on:

Light steals

4

Is your house in a windy location?

Yes (see information below)
No (go to next question)

Consider a micro/small wind turbine

- You need a site which is clear to the prevailing wind.
- Your local wind speeds needs to be at least 10 miles per hour (a gentle breeze) to make installation worthwhile.
- Requires access to mains electricity so excess can be sold back to the grid.

Refer to glossary on:

Wind turbines

Useful Links:

Wind Turbines

- www.britishwindenergy.co.uk/
- www.bwea.com
- www.freerain.co.uk
- www.rainharvesting.co.uk
- www.waterbuttsdirect.co.uk

Water recycling

5

Have you considered minimising and recycling water in your home?

Yes (see information below)

Rainwater collection or grey water recycling systems help to minimise your water consumption.

Rain water collection systems can be as simple as collecting rainwater in a butt or more advanced tank systems. The water can be used to water the garden or wash the car, more advanced systems use recycled water to flush toilets too.

Grey water recycling is the reuse of already used washing water, this can be recycled for use in the garden and to flush toilets.

Minimise your water consumption with water saving devices.

If a new bathroom or kitchen is involved in your development, consider low flush toilets, composting toilets, low water showers and aerated/spray taps. Mains drainage is not required for composting toilets.

Refer to glossary on:

- Rain water recycling
- Grey water recycling
- Water saving devices
- Low flush toilets

glossary & technical details

Providing information on technologies, materials and further sources of help and information.

www.plan4nottingham.com

