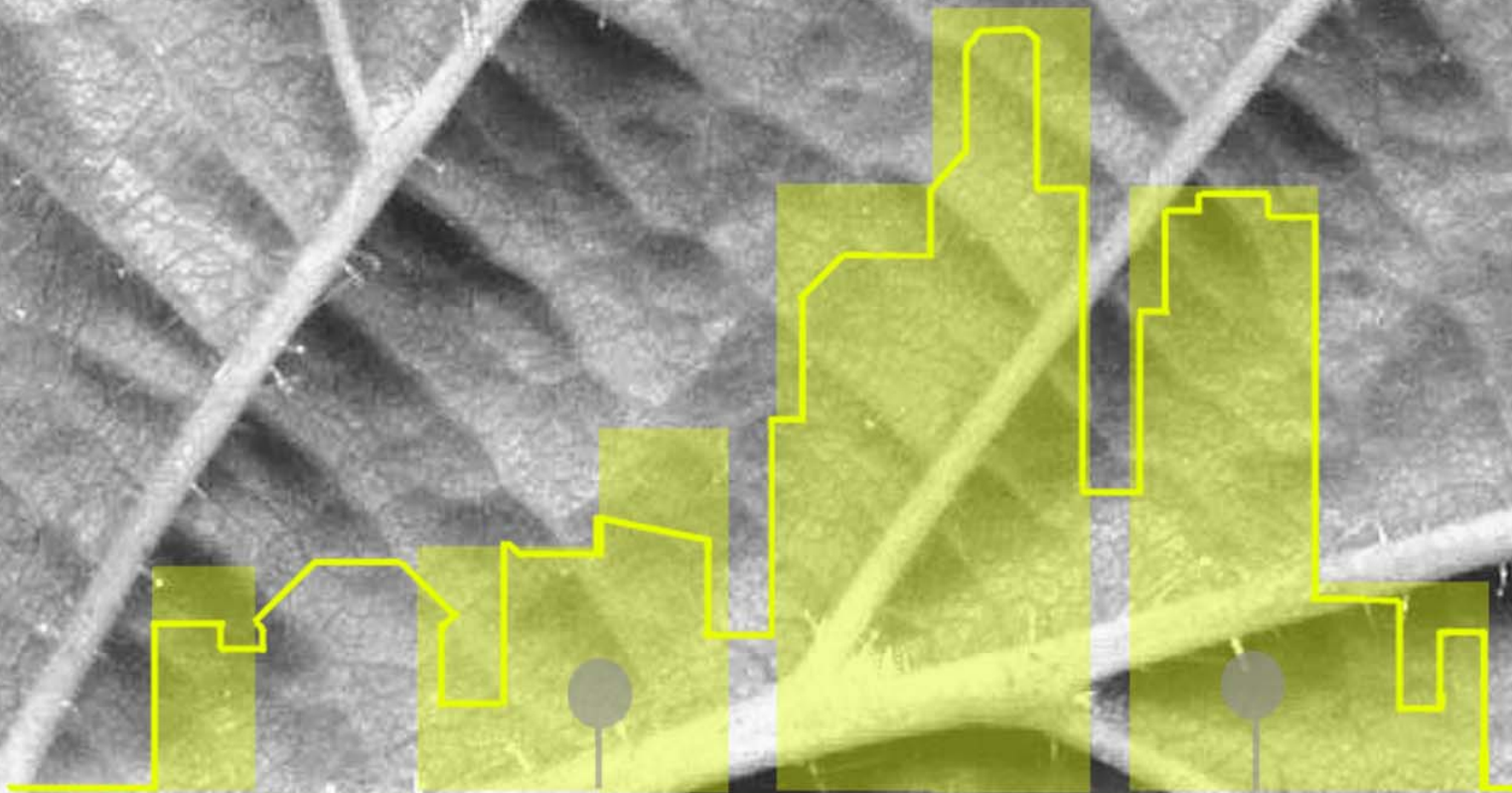


# advice for applicants

new build





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.*

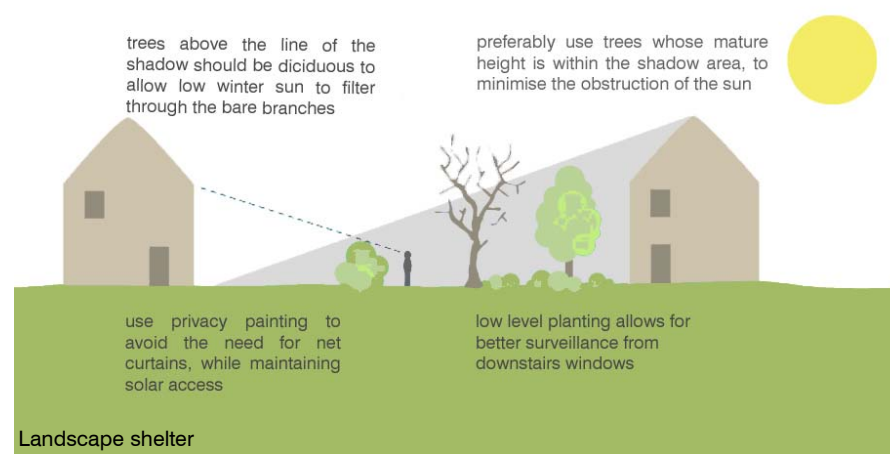
## Choosing a Location

- **Will the site provide you with sufficient space?** choose a size suited to your needs. A large home occupied by one person would not be energy efficient.
- **Is the site fit for habitation?** Find out if it the site is on a flood plain, or close to a landfill site. Visit [www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)
- **Is the site located near to public transport links and close to shops and your place of work?** By being less dependant on your car you can save time, energy and money.

## Position and Layout of Your Building

*If the building has the right layout, the need for heating and cooling is reduced, resulting in lower energy bills and reduced greenhouse emissions.*

- Position a new build so it doesn't block the natural sunlight of surrounding buildings.
- Keep the main orientation of the building within 30° of south as this will allow more light and free warmth into your building.
- The layout of the site should make use of landform and landscape as shelter, to help minimise heat losses.



- Place the most frequently used rooms - requiring most heating – on the south side of the building (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 ( e.g. hallways, bathrooms, utility rooms, stores). They should also have smaller windows to minimise heat losses.
- Locate car parking and garage facilities to the north side of the house/housing.



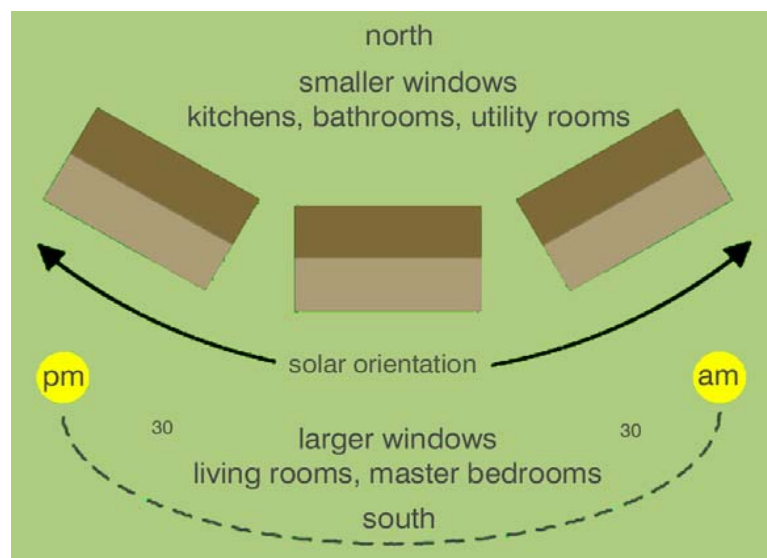


## Making the most of sunlight

### Windows

*Windows are the principal 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 light - 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.



### 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** – 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 double or triple glazing.
- 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.

### 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.*

- Insulate 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 an extension, conservatory, garage or lobby, which act as an extra layer of insulation to the building.



## Design and Construction

*Design and build to the size you require; do not oversize your building.*

*You should aim to design a long life durable structure with replaceable shorter life building fabric and secondary components. The shorter life components need to be robust enough to dismantle and recycle or reassemble.*

### Methods of construction:

- Offsite prefabrication: Factory produced components are preferred because often they result in better quality, due to a shortage of on-site skilled workers.
- On-site temporary factory production: Set up an on-site factory production under a weatherproof enclosure on a solid base, aim to create factory conditions for better quality work and less waste. The benefits are that less vehicles are needed to deliver materials.



### Recovered materials:

WRAP The waste and resources action programme - creates new markets for the additional materials which would be collected and recycled as part of the drive to reduce the volume of waste which is sent to landfill.

[www.wrap.org.uk](http://www.wrap.org.uk)

### 1. Design for deconstruction not demolition

*Design for low cost, efficient deconstruction, consider the compatibility of material mix, to increase the quality of the 'deconstructed' materials for reuse or recycling purposes.*

- Assemble steel framed buildings with clamps and bolts in preference to welding: this allows simple on-site work and minimises off-site prefabrication.
- Assemble timber buildings with bolts, screws and other fasteners in preference to nailing and adhesives

### 2. Design to reduce material and minimise waste

- Salvage and reuse demolition and construction materials
- Design to reuse second hand, reclaimed and recycled materials: find the materials then design the building around them.
- Acknowledge brick sizes when designing wall lengths. This applies to blockwork and timber constructions too.
- Check all deliveries and reject defective material and return it to the supplier, they should send replacements and recycle the faulty material.
- Provide on-site storage for materials to prevent deterioration and the need for future maintenance.
- Return all packaging to its source

### 3. Design buildings to allow for future adaptations:

This means, if you can't afford to invest in renewables, you might investigate the implications on your design on installing renewables at a later date. This might mean things such as: Designing any potentially south facing roof so that it can easily be retrofitted with solar panels.



## Which Materials to Use?

- **Reduce** the amount of material that you use as much as possible and carefully calculate the quantities required, so there is little waste.
- Choose **durable materials**, with long life expectancy
- Look for Product Quality marks (BSI Kitemark, BBA, etc)
- **Reuse construction or demolition waste** (reused timber studwork, use reclaimed steel, reuse old bricks, Lime mortar is reusable)
- **Use recycled and recyclable materials.**
- **Use natural and renewable materials** (wool, timber, natural paints, etc.)
- Use **materials found** on site
- Use **unfired clay products** (bricks, blocks, plasters, paints, etc.)
- If you are using **timber products** make sure it is from a well managed forest, look for the Forest Stewardship Council's Trademark (FSC) or PEFC council logo.
- Earth construction- building with simple techniques, using **natural materials** that have low embodied energies for their manufacture and transportation.
- 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](http://www.constructionresources.com)

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

[www.greenbuildingstore.co.uk](http://www.greenbuildingstore.co.uk)

- Specialises in environmentally sensitive building products.

[www.greenspec.co.uk](http://www.greenspec.co.uk)

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

[www.recycledproducts.org.uk](http://www.recycledproducts.org.uk)

- Database of consumer products made from recycled materials .



Further developments

Further steps can be taken to improve the efficiency of your new home. 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	Payback	Lifetime	Grant available
	(Domestic scale)	Incl. grant		% of cost
Solar PV panels	£6000 - £20000	10-20yrs	30+ yrs	50%
Solar water heating	£2000 - £5000	10-20yrs	30+ yrs	30%
Wind turbines	£2500 - £5000	2-5yrs	20+ yrs	25%
GSHP	£9,600 to £13,600	n/a	40+ yrs	20%
CHP	£3,000	2-3yrs	30+ yrs	n/a
Composting toilets	£500 - £5000	3-5yrs	n/a	n/a
Low flush toilets	£ 250	3-5yrs	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 the site 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 the site 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 PV (electric) 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 3sqm and 10sqm for a solar electric system.
- Solar PV requires access to mains electricity, so that excess electricity can be stored or sold back to the grid.
- Solar electric (PV) systems can increase the value of your property by 10%.

Refer to glossary on:

- Solar shading
- Solar PV panels
- Solar water heating

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 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 the site 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 10miles per hour (a gentle breeze) to make installation worthwhile.
- Requires access to mains electricity so excess can be stored or sold back to the grid.

Refer to glossary on:

Wind turbines

5

**Does the site have outdoor space which is able to accommodate either a 10m long trench or 60 – 150m deep bore hole?**

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

**Ground source heat pumps (GSHP)** providing space heating and, in some cases, pre-heats domestic hot water.

They work by transferring energy from the ground and moving it into your home (essentially a refrigerator working in reverse)

Heat pumps can save you up to 70% of your heating costs.

Types of ground source heat pump:

**Horizontal coil** - which requires space for a 10m long, by 2m deep trench in the garden.

**Bore hole** - which is drilled 50m – 100m deep in to the ground. If you have more than one, they have to be 5m apart.

Refer to glossary on:

Ground source heat pump – horizontal coil

Ground source heat pump – vertical bore hole

6

**Have you considered minimising and recycling water on your project?**

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

Composting toilets

**glossary & technical details**

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

www.plan4nottingham.com

