

4 SUSTAINABLE ENERGY

ACHIEVING OPTIMAL ENERGY USAGE

GOAL: To make the best use of the entire site's potential for optimising natural energy resources

You need to identify, early on in the design, opportunities to maximise sunlight and daylight penetration whilst not conflicting with the overall structure of the development. This will provide the maximum opportunity to incorporate active solar energy systems (either thermal or for power generation) thereby reducing energy demand. Account needs to be taken of the effects of shading where existing features such as large trees or a copse are retained.

By co-locating any major heat sinks such as large commercial buildings or care homes, you should consider the potential of heat grids or micro-grids using a centralised energy source as a supply solution. This could be a heat only or a combined heat and power (CHP) system using natural gas or biomass.

Consideration should be given to linking energy solutions with large consumers (or generators) adjacent to the site, particularly where an infill site is concerned. This may give an energy scheme sufficient scale to merit a more sustainable and economically sound approach to be realised.



Example of a roof based solar PV scheme



To inform your design:

Technical studies including estimates of energy requirements showing how these have been minimised



To communicate your design:

- An assessment with assumptions showing supply options clearly set out.



Additional useful and interesting resources:

- Sustainable Energy by Design, TCPA, www.tcpa.org.uk
- Energy efficiency in historic buildings (Historic England, 2015)



Small-scale hydro (Scotland)



Example of an extensive green roof (Maidenhead)



Example of a vertical green wall (Madrid)

☒ TEST YOUR DESIGN:

A plan has been prepared that identifies the following within and beyond the site boundaries:

- 4.1 the orientation of buildings to allow the use of solar technology on roofs and to maximise the potential for solar gain;
- 4.2 the size and relative locations of all major energy consumers within the development site and adjacent to the site;
- 4.3 areas designated for energy infrastructure including that for proposed generation showing adequate access has been created;
- 4.4 the inclusion of renewable energy technologies to reduce the site's conventional energy needs;
- 4.5 using natural or passive ventilation techniques to improve well-being and further reduce energy needs.

Meets criteria If not, reason for not meeting

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4 SUSTAINABLE ENERGY

MINIMISING ENERGY CONSUMPTION

GOAL: Making best use of energy for small developments or single properties

Using green roofs and green walls in a development can provide variety and reduce urban overheating as well as having a beneficial impact on water runoff and biodiversity. Making use of rainwater through harvesting technologies also reduces runoff and will increase overall site sustainability by reducing water demand.

An energy plan should be prepared and demonstrate how sustainable technologies might be used with, or instead of, more conventional forms of energy such as natural gas. Technologies to be considered within the plan should include (but not be limited to): solar photovoltaics (PV), solar thermal, biomass or woodfuel, heat pumps (air, ground or water if near a watercourse or river), hydro, wind and fuel cells.



Sustainable energy technologies such as wind and solar (Westmill, Oxfordshire)



To inform your design:

An estimate of energy requirements showing how these have been minimised.



To communicate your design:

- An assessment with assumptions showing supply options.



Additional useful and interesting resources:

- BRE centre of expertise on buildings www.bre.co.uk



An example of solar roof tiles (Stroud, Gloucestershire)



Wood chipping and biomass boiler as alternatives to conventional energy sources (Thames Valley and Oxfordshire)

✓ TEST YOUR DESIGN:

A plan has been prepared that shows how the following energy related matters have been considered:

- 4.6 which technologies (including renewables) are appropriate to supply heat and power to all or to a part of the development or house extension;
- 4.7 the use of passive design features such as sun pipes and atria to reduce energy demands for lighting and heating;
- 4.8 the use of materials of differing thermal mass to reduce energy demand;
- 4.9 maximise the reuse and recycling of materials including materials existing on site;
- 4.10 siting of any green or brown roofs or walls as well as rainwater harvesting to reduce overall water demand;
- 4.11 re-use grey water which can be installed in new or existing properties and have the potential to meet significant proportion of domestic demand for water.

Meets criteria If not, reason for not meeting

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