Developers Guidance Note for the 10% Renewable Energy Requirement of South East Plan Policy NRM11

Companion Document to the Sustainable Design and Construction Supplementary Planning Document

Adopted 28 May 2010

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WOKINGHAM BOROUGH COUNCIL

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This guidance note is a companion document to the Council's Sustainable Design and Construction SPD.

1.0 INTRODUCTION AND THE REQUIREMENTS OF POLICY NRM11

1.1 The Secretary of State published the Regional Spatial Strategy for the South East of England (The South East Plan) on 6 May 2009. The South East Plan forms part of the Wokingham Borough Development Plan. Planning applications received by the Council from 6 May 2009 have to be assessed against the South East Plan. The Council's Development Plan Documents (DPDs) and Supplementary Planning Documents (SPDs) also have to be consistent with the South East Plan.

1.2 The South East Plan can be viewed at:

http://www.gos.gov.uk/gose/planning/regionalPlanning/815640/?a=42496

What is Policy NRM11?

1.3 Policy NRM11 (Development design for energy efficiency and renewable energy) of the South East Plan requires residential development of **more than 10 dwellings** and **non-residential development of 1000m^2** or greater to secure at least **10%** of their energy from decentralised, renewable or low-carbon technologies. Non-residential development of 1000m^2 criteria applies to all proposals outside use class order C3. This means that nursing homes and residential institutions are caught. Policy NRM11 is as follows:

Policy NRM11 of the South East Plan:
Local authorities should:

i) promote and secure greater use of decentralised and renewable or low-carbon technology energy in new development, including through setting ambitious but viable proportions of the new energy supply for new development to be required to come from such sources. In advance of local targets being set in development plan documents, new developments of more than 10 dwellings or 1000m^2 of non-residential floorspace should secure at least 10% of their energy from decentralised and renewable or low-carbon sources unless, having regard to the type of development involved and its design, this is not feasible.

ii) use design briefs and/or supplementary planning documents to promote development design for energy efficiency, low carbon and renewable energy.

iii) work towards incorporation of renewable energy sources including, in particular, passive solar design, solar water heating, photovoltaics, ground source heat pumps and in larger scale development, wind and biomass generated energy.

iv) actively promote energy efficiency and use of renewable and low carbon energy sources where opportunities arise by virtue of the scale of new development including regional growth areas, growth points and eco towns.

Local authorities and other public bodies, as property owners and managers, should seek to achieve high levels of energy efficiency when refurbishing their existing stock.

Is the requirement applicable to gross or net level of development?

1.4 Policy NRM11 sets out the 10% minimum target in terms of new development, but does not stipulate whether more than 10 dwellings or 1000m non-residential thresholds should be taken as a net or gross level of development. Wokingham Borough Council will apply this policy in terms of the **gross** level of development.

Is the policy applicable to conversions, subdivisions and changes of use?

1.5 Wokingham Borough Council applies the minimum 10% renewable energy element to new residential development that results in new residential units of 10 or more including conversions, subdivisions and changes of use. With regard to non-residential development, Policy NRM11 relates to new buildings but not extensions to existing buildings. Temporary buildings will need to comply with the minimum 10% requirement where they are proposed for a period of 5 years or more.

At what stage in the process should Policy NRM11 be considered?

1.6 The Council may **refuse** planning applications, which do not, on submission, contain information as to how the requirements of Policy NRM11 will be met. Guidance on what information should be submitted with your planning application can be found on page 19 of this document.

Pre-application

1.7 The developer should initially consider the advice in this Guidance Note, and contact the Council with any queries this may raise.

Outline application (with all matters reserved)

1.8 Planning for energy efficiency and renewable energy is more cost effective at the design stage. It is therefore fundamental that energy efficiency measures through design, orientation, layout and renewable energy are considered at the earliest opportunity. Further information on energy efficiency can be found in the Sustainable Design and Construction SPD.

1.9 It is appreciated that it will be difficult to calculate the 10% energy requirement for outline applications as specific development information may be limited at this early stage. However, an outline planning application will still need to set out a framework to show how the proposal will achieve the requirements of Policy NRM11. Best estimates of energy use at outline application stage will be acceptable. This information can be included within the Design and Access Statement.

Outline application (with layout and scale to be approved)

1.10 If submitting details for layout and scale as part of an outline application, the Council will expect more detailed information on how the requirements of Policy NRM11 will be met. The renewable energy and efficiency measures should be considered at a site-wide level in order to form the framework for considering reserved matters. Best estimates of energy use at outline application stage (with layout and scale to be approved) will be acceptable. This information can be included within the Design and Access Statement. The Council will impose planning conditions to ensure that reserved matter applications follow the same route and provide the same documentation that is expected for full applications.

Full/ Reserved Matters application

1.11 A detailed energy statement will be required at full and reserved matters application stage.

Post Adoption of the South East Plan

1.12 If the site has a previous outline permission post the adoption of the South East Plan the details being proposed as part of the full application should be inline with previous proposal(s). If different, a justification should be provided to the Council setting out any differences and reasons for change.

Before adoption of the South East Plan

1.13 If a site has a previous outline permission prior to the adoption of the South East Plan, the full or reserved matters application will be expected to accord with Policy NRM11 where appropriate.

1.14 Table 1 below summarises when an Energy Statement is required.

Table 1: Summary of when an Energy Statement is required

Development Type	Energy Statement Required	
	Outline	**Full or Reserved Matters**
Residential Development – of more than 10 dwellings (major development) – including conversions, subdivisions and changes of use.	Design and Access Statement to set out framework to show how the proposal will achieve the requirements of Policy NRM11 of the South East Plan. Best estimates of energy use at outline application stage will be acceptable.	Yes – detailed Energy Statement required
Non-residential development – of 1000m^2 or greater – only new buildings and not extensions to existing buildings.	Design and Access Statement to set out framework to show how the proposal will achieve the requirements of Policy NRM11 of the South East Plan. Best estimates of energy use at outline application stage will be acceptable.	Yes – detailed Energy Statement required
Householder extensions	No	No

Will the Council use planning conditions?

1.15 Yes. For outline applications with some reserved matters and full applications, planning conditions will be imposed to achieve the outcomes of the sustainable design and construction standards including sustainable energy commitment and their implementation.

Is there national planning guidance and practice guides?

1.16 Yes. Planning Policy Statement (PPS) 1 (Sustainable Development) sets out the over arching planning policies on the delivery of sustainable development through the planning system. PPS1 Supplement (Planning and Climate Change) sets out how spatial planning should contribute to reducing emissions and stabilising climate change (mitigation) and take into account the unavoidable consequences (adaptation). PPS22 (Renewable Energy) sets out the Government's policies for renewable energy. Further information on these PPS's can be found in Appendix 1 of the Council's Sustainable Design and Construction SPD or on the Communities and Local Government website at www.communities.gov.uk. The draft PPS: Planning for a Low Carbon Future in a Changing Climate (March 2010) will replace the PPS1 Supplement and PPS22. It will become a consolidated supplement to PPS1.

What planning policy is within the Council's development plan i.e the Wokingham Borough Core Strategy?

1.17 Policy CP1 (Sustainable Development) - and supporting text - of the Core Strategy is most relevant for this companion document. A summary of other relevant planning policies can be found in the Sustainable Design and Construction SPD – Appendix 2 includes an extract of Policy CP1 and supporting text.

1.18 The Wokingham Borough Submission Core Strategy and supporting evidence can be viewed on the Council's website at:
http://www2.wokingham.gov.uk/environment/planning/ldf/core-strategy

Will there be further local planning guidance and/ or policy?

1.19 Yes. The Development Briefs (Masterplan) SPD's for the Strategic Development Locations (as identified in the Wokingham Borough Core Strategy) include specific guidance for the sustainability requirements for the Strategic Development Locations. The Council may also include further policy guidance within the subsequent Managing Development Delivery Development Plan Document (DPD). There remains scope to encourage further prudent use of energy and adaptation to climate change. There are also opportunities associated with the development of renewables in other policy areas, such as rural development (particularly biomass), transport (use of biofuels), economic development (opportunities for new markets, industries and employment) and improving the quality of built environment and urban renaissance (energy efficiency as part of high quality design).

1.20 Further information on the subsequent DPD can be found in the Council's approved Local Development Scheme:
http://www2.wokingham.gov.uk/environment/planning/ldf/local-development-scheme

2.0 IMPROVING THE ENERGY EFFICIENCY

2.1 According to the Energy Saving Trust, around 27% of the UK's total carbon emissions come from the domestic housing sector through energy use in the home for heating, hot water, lighting and appliances. New homes and buildings provide a real opportunity to deliver substantial cuts in carbon emissions.

Should I include energy saving measures in the development?

2.2 Yes. Incorporating energy saving measures into the design and construction of a building can significantly reduce the amount of energy consumed, the CO_2 emitted and the running costs of the building over its lifetime. Energy efficiency measures expected in new development are controlled by Part L1 of the 2006 Building Regulations.

2.3 Further guidance on energy efficiency can be found in the Sustainable Design and Construction SPD.

What methods can be used to improve the energy of efficiency of the development?

2.4 Incorporating energy efficiency principles in the early design of new development can considerably reduce the demand for energy, heating/ cooling and lighting and as a result reduce carbon dioxide emissions. Some of the potential areas for consideration when seeking to improve the energy efficiency of buildings (both at the development and use stage) are:

- Building design - Passive solar design
- Landscaping
- Internal layout
- Thermal mass
- Insulation
- Energy efficient appliances
- Natural lighting
- Natural ventilation

Detailed guidance on the areas above can be found within the Sustainable Design and Construction SPD.

<u>Are there national design and construction codes/ assessments?</u>

2.5 **Yes**, these are the Code for Sustainable Homes, Eco Homes and the Building Research Establishment's Environmental Assessment Method (BREEAM). Please see the Sustainable Design and Construction SPD for further information

3.0 CALCULATING THE RENEWABLE OR LOW CARBON ENERGY REQUIREMENT

3.1 The 'total energy consumption of the site' is also known as the baseline and is used to establish what amount of energy the (minimum) 10% actually relates to. Typical energy requirements for new development will arise from space heating, hot water, lighting, appliances, cooking and specialist equipment for commercial uses. The Building Regulations only consider performance in terms of regulated energy, that is, energy for space heating, hot water and internal lighting. However, total energy consumption of the development will also include cooking and appliances as a well as features such as outdoor lighting. Policy NRM11 is based on total energy consumption.

What methodologies and benchmark data can I use to calculate the energy requirements?

3.2 There are different methodologies that can be used to calculate the energy requirements of development. Some of the following methodologies and benchmarking data could be used:

Dwellings

1. The National Home Energy Rating (NHER) is available at www.nher.co.uk and the Standard Assessment Procedure (SAP) is available at http://projects.bre.co.uk/sap2005/. These can be used to calculate requirements. However, neither the Standard Assessment Procedure (SAP), nor the National Home Energy Rating (NHER), can be used in isolation, as these do not include calculations for cooking or appliances. However, an additional 20% can be added to the initial SAP calculation to account for the excluded items.

2. BREDEM 12 Model. This is a model for estimating energy consumption in dwellings, including space heating, water heating, lighting, electrical appliances and cooking. This is available at www.bre.co.uk

3. Energy Saving Trust has produced 'Meeting the 10% target for renewable energy in housing – a guide for planners and developers'. Please note that this document has now been archived. The technical information in this publication is now out of date but is still very good for reference. Available at:

http://www.energysavingtrust.org.uk/Global-Data/Publications/Meeting-the-10-per-cent-target-for-renewable-energy-in-housing-a-guide-for-developers-and-planners-CE190

Non-residential uses

1. The Carbon Trust produces a variety of documents that include energy efficiency and benchmarking data:

   - ECG019 – Energy Use in offices http://www.carbontrust.co.uk/publications/publicationdetail?productid=ECG019

   - ECG073 – Saving energy in schools http://www.carbontrust.co.uk/publications/publicationdetail.htm?productid=ECG073

- ECG078 – Energy use in sports and recreation buildings http://www.carbontrust.co.uk/Publications/publicationdetail.htm?productid=ECG078&metaNoCache=1

- ECG081 – Benchmarking tool for industrial buildings http://www.carbontrust.co.uk/publications/publicationdetail.htm?productid=ECG081

2. The London Renewables toolkit provides benchmarking data for various non-residential uses. However, whilst much of the information is out of date, calculations can be made to reflect current Building Regulations standards. The document can be found at:

   http://www.london.gov.uk/mayor/environment/energy/docs/renewables_toolkit.pdf

Multi-use application

3.3 Where a multi-use application is proposed (i.e use class B1, B2 or B8), then the worst-case baseline should be established (i.e B2). This will ensure that no matter what the use, the (minimum) 10% requirement is met (i.e if permission were granted the initial use could be B8 followed by a B2 use – by calculating to the B2 use it would cover both users and the development would continue to comply with the policy.

Do the calculations relate to carbon emissions or energy?

3.4 Whilst at the international and national level carbon emissions are considered to be the most appropriate method for calculations, Policy NRM11 is related to energy usage. The Council is aware that this has implications when comparing the usage from gas and electricity. However, the applicants should continue to make calculations in terms of energy i.e kilowatt-hours per year (kWh/yr).

STEP BY STEP GUIDE ON HOW TO CALCULATE AND PRESENT YOUR INFORMATION

3.5 The following provides a step-by step guide on how to calculate and present your information to show compliance with Policy NRM11. It will not be sufficient to rely on a condition requiring compliance with Policy NRM11 as an afterthought.

STEP 1: How do I calculate the (minimum) 10% amount?

3.6 The total energy demand for development (baseline) figure should only be calculated after allowances have been made for energy efficiency measures. The baseline should take into account the predicated annual energy demand for space heating, hot water, lighting, appliances and cooking. The baseline figure is equal to the total energy consumption of the site after energy efficiency measures have been taken into account (over and above the Building Regulation requirements 2006). The Council considers the 10% a rolling requirement i.e 10% over any updated Building Regulations standard. The 10% requirement for decentralised, renewable or low carbon technology can be calculated by using the following:

Baseline x 0.1 = 10% requirement for renewable technology

STEP 2: How should I present the baseline and 10% requirement calculations?

3.7 The calculations should be clearly set out, and summarised. Table A1(i) in Appendix 1 includes an example of how to present your calculations for total energy demand of the development and the 10% requirement.

STEP 3: What decentralised, renewable or low carbon energy technology is suitable for my development?

3.8 Once the (minimum) 10% figure has been calculated, applicants will need to decide which decentralised, renewable or low carbon technology is suitable for their site in terms of:

- Ability to deliver a minimum of 10% of the sites energy demand after energy efficiency measures have been incorporated;
- Ability to be integrated into the development including any design issues;
- Cost effectiveness of technologies.

3.9 There are a range of renewable or low carbon technologies that can be considered. It is for the applicant to explore the different types of technologies available and calculate which of these will meet the (minimum) 10% target. Wokingham Borough Council is not prescriptive about which technologies are included within a development so long as they are capable of delivering the 10% minimum target and do not cause other planning problems such as design issues, impact on character, noise pollution (loss of amenity) or impacts to protected trees. The Council appreciates that some sites/ buildings may have only limited scope for on site decentralised, renewable or low-carbon technologies.

3.10 Information on the different types of decentralised, renewable or low carbon technologies can be found in Section 4. Section 4 also includes information on design issues associated with each sustainable energy technology which should be taken into consideration when assessing their feasibility and viability. Section 4 also includes guidance on the approach for large developments.

3.11 Policy NRM11 relates to the provision of decentralised, renewable or low carbon energy technologies in new development and therefore the supply of energy from a green tariff scheme (i.e renewable energy from the grid) does not meet the requirements of the policy.

STEP 4: What should the assessment of decentralised, renewable or low carbon energy technologies cover?

3.12 It is recommended that each technology be considered in turn and a short analysis undertaken to explain why it is/ is not suitable for the site. It may be the case that one technology alone cannot deliver the (minimum) 10% target, in which case it may be necessary to combine technologies.

3.13 The calculations for the total energy yield from the technology should be clearly set out, and summarised. Table A1(ii) in Appendix 1 includes an example of how to present your calculations for total energy yield from the technology. Table A1(ii) indicates that the estimated energy yield of the technology should be presented as KWh per year.

STEP 5: Calculating the percentage from renewable or low carbon energy

3.14 To calculate the percentage from renewable or low carbon energy and to establish if the (minimum) 10% requirement has been met you can use the following:

Percentage from renewable or low carbon energy

= total energy from technology / total energy demand of development x 100

NB: This should be at least 10%

STEP 6: The Energy Statement

3.15 The information in Steps 1 to 5 could all be presented in an Energy Statement. This can be submitted with a planning application perhaps as part of the Sustainability Statement (which is a requirement of the Sustainable Design and Construction SPD) to demonstrate how schemes comply with Core Strategy Policy CP1 (Sustainable Development) criteria (12). The Energy Statement should also include detailed information on the selected technology e.g layout plan, floor plans and elevations and visual impact etc. Further guidance on what information is required to submit with a planning application for each type of technology selected can be found in Section 5.

What if I think my site is not suitable for renewable or low carbon energy?

3.16 The Council recognises that on some sites the standards required by Policy NRM11 may be more difficult to achieve, such as small scale brownfield and infill developments, development in conservation areas or small scale development of constrained sites.

3.17 Where the applicant has identified a potential shortfall they will need to submit a sound and fully justified case alongside an open book viability analysis for why the policy requirement cannot be met. The Council will expect clear evidence and justification to be presented on why a development cannot achieve either part, or the whole of the requirement. The Council will expect a full explanation of why 10% target would render the development unviable or that standards cannot be achieved for technical reasons. This should also include the details of any rejected options. The Council appreciates that some very high energy consumers such as data centres may have only limited scope for on site decentralised, renewable or low carbon provision.

3.18 The onus is on the developer to demonstrate why meeting the standards set down in the policy is not viable based on reasonable market assumptions. A high purchase price for development land will not be regarded as sufficient justification. The likely timescale for the completions of the development will also be taken into account. Large schemes that will be built over several years will need to demonstrate a realistic viability case over the whole build period in order for the Council to consider any relaxation of the standards for those schemes, as these are the developments that will make the largest contributions to achieving the carbon and energy reduction objectives of the policy. Any viability assessment will need to take account of other requirements of the development plan (including affordable housing under Core Strategy CP5). Therefore viability assessments for 10% renewable should use the same assumptions underpinning the affordable housing levels (i.e development costs

and professional fees. The Affordable Housing Viability Study (June 2008) undertaken by Levvels on behalf of Wokingham Borough Council can be viewed at:

http://www2.wokingham.gov.uk/index.asp?pgid=72582

Will the Council consider a lower target if it is justified that the 10% minimum target cannot be met?

3.19 The Council will consider applying a maximum possible target (up to 10%) in the first instance before applying a 0% target. If viability is to be a determining factor then the site location and site characteristics will be considered by officers when determining the planning application. The sustainable design aspects of planning applications must be balanced with other Council design guidance. The Council appreciates that viability may also need be considered alongside technically feasible and deliverable solutions. All sites are capable of achieving energy efficiency beyond the minimum Building Regulation requirements, whether through site layout, improvements to the building fabric, insulation and modern methods of construction and air tightness and should aim to reduce energy demand and resulting carbon emissions as much as possible even if full compliance cannot be achieved.

3.20 If full policy compliance cannot be provided then the developer will:

- Need to justify why the whole or part of the policy cannot be met.
- Be expected to set out and install measures that are viable and provide the relevant assessment required.
- Demonstrate that all options have been explored and appraised.
- Set out the sustainable design proofing measures to be incorporated, so to facilitate the future installation or conversion to higher standards.

Are grants available for renewable or low carbon energy technologies?

3.21 It may be possible to receive a grant towards the provision of renewable or low carbon energy technologies. The Low Carbon Buildings Fund programme was launched in 2006 and is open to households, public, charitable and non-profit organisation. The programme is managed for Department for Energy and Climate Change (DECC) by the Energy Saving Trust. The DECC's low carbon buildings grant will fund a number of technologies including solar thermal, photovoltaics, wind turbines, ground source heat pumps, air/water source heat pumps, bioenergy and micro hydro.

3.22 To be eligible to receive a low carbon buildings grant you must use a certified installer and a certified product. For further information on products, please refer to:
http://www.microgenerationcertification.org/
www.eca.gov.uk/etl/find
www.estif.org/solarkeymark/productsandcertificates.php

3.23 There are two phases running for the Low Carbon Building Programme:

Phase 1 – for householders

3.24 Householders can apply for grants of up to £2,500 per property towards the cost of installing a certified product by a certified installer. To find out more about the programme, the technologies that are funded and how to apply, please go to:

http://www.lowcarbonbuildings.org.uk/home/

3.25 Following the Budget announcement on 22 April 2009 an additional £45 million has been allocated to the Low Carbon Buildings Programme (LCBP). LCBP Phase One will receive an additional £10 million of funding. This sees the current programme extended from July 2010 to April 2011. The new funding will continue to support household applications and technologies offered under the current scheme.

Phase 2 – for public sector applications

3.26 Funding under Phase 2 of the Government's Low Carbon Buildings Programme for the installation of microgeneration technologies is available to public sector projects (including schools, hospitals, housing associations and local authorities) and charitable bodies. Funding for the following technologies is available: solar thermal hot water, wind turbines, ground source heat pumps, biomass and solar photovoltaics (PV).

3.27 LCBP Phase Two has received an additional £35 million of funding. The new programme deadline for grants to be made and installations to be completed extends from 1 July 2009 until April 2011. The following provides information on Phase 2 from 1 July 2009:

Phase 2: From 1 July 2009

- The extended programme will continue to provide grant funding to charitable organisations, community groups and the public sector.
- Organisations may apply for up to 50% of the cost of installing approved technologies up to a maximum of £200,000 (though maximum grant levels may depend on the nature of the organisation).
- There will be a £9 million pot for solar PV.
- All other technologies will benefit from the remaining £21 million.

3.28 For more information on Phase 2 funding please go to:

http://www.lowcarbonbuildingsphase2.org.uk/

4.0 DECENTRALISED, RENEWABLE OR LOW CARBON TECHNOLOGIES

What is the difference between decentralised, renewable or low carbon technologies?

Decentralised energy

4.1 Decentralised energy[1] is a broad term used to denote a diverse range of technologies, including micro-renewables, which can locally serve an individual building, development or wider community and includes heating and cooling energy. Decentralised energy supply is from low-carbon sources on a small or community scale (i.e on-site and near-site but not remote off-site) and including electricity generation that is connected to a local distribution network rather than directly to the national grid.

Renewable energy

4.2 Renewable energy covers those energy flows that occur naturally and repeatedly in the environment (i.e wind, water, sun and biomass).

Low-carbon energy

4.3 Low-carbon technologies are those that can help reduce carbon emissions.

What renewable or low carbon technologies energy technologies are available?

4.4 Sustainable energy can be defined as renewable (zero) and low carbon energy sources. There are various renewable and low carbon technologies. The Council considers low carbon technologies to meet the requirements of Policy NRM11.

Renewable technologies

Solar thermal (solar water heating)

4.5 Solar water heating systems use heat from the sun to warm domestic hot water. A conventional boiler or immersion heater is then used to provide hot water when solar energy is unavailable. There are two main types of collector, flat plate or evacuated tube.

4.6 Solar water heating systems can be either open or closed. In a closed system, a heat transfer fluid is heated at the collector or plate and then is transferred to a hot water tank. In an open system, the water is directly heated at the collector or plate.

4.7 Further information on solar thermal is available at:

http://www.energysavingtrust.org.uk/Generate-your-own-energy/Solar-water-heating

Photovoltaics (PV)

4.8 Solar electricity systems capture the sun's energy using photovoltaic (PV) cells. The cells convert the sunlight into electricity, which can be used to run household appliances and lighting. The PV cells consist of two layers of semi-conducting material, so that when solar radiation hits the cell an electrical current is produced.

[1] Local renewable energy and local low-carbon energy usually but not always on a relatively small scale. Decentralised energy is a broad term used to denote a diverse range of technologies, including micro-renewables, which can locally serve an individual building, development or wider community and includes heating and cooling energy (CLG, 2010).

The higher the intensity of light hitting the cell the higher the flow of electricity. PV cells require daylight to work, but not direct sunlight, however the efficiency of the cells are diminished in low light levels such as on overcast or if the cell is shaded.

4.9 Further information on PV's is available at:

http://www.energysavingtrust.org.uk/Generate-your-own-energy/Solar-electricity

Wind turbines

4.10 Wind turbines harness the power of the wind. When the wind blows the blades are forced round, driving a turbine which generates electricity. Small systems known as "microwind" turbines can produce enough electricity for the lights and electrical appliances in a typical home.

4.11 There are a variety of models and designs for stand alone and roof mounted turbines. Wind speed is critical to the performance of wind turbines. The BERR (Department for Business Enterprise and Regulatory Reform – now the Department for Business Innovation and Skills) wind speed database is a useful starting point to examine speeds, but this only gives average speeds at different turbine heights above ground level.

4.12 The Companion Guide to Planning Policy Statement 22 (Planning for Renewable Energy) provides guidance on wind turbines – see pages 155 to 183 of the document:

http://www.communities.gov.uk/documents/planningandbuilding/pdf/147447.pdf

Paragraph 32 of PPS22 Companion Guide recommends that in order to fully assess wind speeds a site wind survey should be undertaken covering a period of minimum 12 months. This is to demonstrate that wind speed at a given site can support the use of a wind turbine. The BERR windspeed database can be found at

http://www.berr.gov.uk/energy/sources/renewables/explained/wind/windspeed-database/page27708.html

Paragraphs 41 to 45 (pages 167 to 170) of the Companion Guide provide guidance on noise issues. 'The Assessment and Rating of Noise from Wind Farms' (ETSU-R-97) may also be of use:

http://webarchive.nationalarchives.gov.uk/+/http://www.berr.gov.uk//energy/sources/renewables/explained/wind/onshore-offshore/page21743.html

Paragraphs 52 to 57 (page 171 to 172) provides guidance on the proximity of turbines to roads, railways, public rights of way and powerlines. Paragraph 53 states:

"Although a wind turbine erected in accordance with best engineering practice should be a stable structure, it may be advisable to achieve a set-back from roads and railways of at least fall over distance, so as to achieve maximum safety."

4.13 Further information on wind turbines is available at:

http://www.energysavingtrust.org.uk/Generate-your-own-energy/Wind-turbines

Ground source heating/ cooling

4.14 Ground source heating/ cooling works by extracting heat from the ground. Beneath the surface, the ground stays at a constant temperature which is warmer than mean winter air temperature and cooler than mean summer temperatures. A heat pump extracts solar thermal heat from the ground and moves it to an area of lower or higher temperature. Ground source heat pumps are usually used to warm water for radiators or underfloor heating systems. It can also be used to pre-heat water before it goes into a more conventional boiler. The technology can be used to cool a building during the summer months removing the need for artificial air conditioners.

4.15 However, transferring heat from the ground to a building requires a heat pump which itself requires electricity. The technology is therefore considered as low carbon, unless the pump can be powered from a renewable resource such as PV cells.

4.16 The efficiency of a ground source heat pump is measured by a coefficient of performance (CoP) - the amount of heat it produces compared to the amount of electricity needed to run it. A typical CoP for a ground source heat pump is around 3.2 without any reductions for the type of distribution system.

4.17 Access to suitable ground is required for the ground pipe systems. They can either be horizontal trenches or vertical boreholes. A license may be required for vertical boreholes. It is important that the system avoids tree rooting zones.

4.18 Further information on ground source heating/ cooling can be found at:

http://www.energysavingtrust.org.uk/Generate-your-own-energy/Ground-source-heat-pumps

Air/ Water Source Heat Pumps

4.19 Air source heat pumps absorb heat from the outside air. An air source heat pump extracts heat from the outside air in the same way that a fridge extracts heat from its inside. It can extract heat from the air even when the outside temperature is as low as minus 15° C. There are two main types:

- **An air-to-water system** uses the heat to warm water. Heat pumps heat water to a lower temperature than a standard boiler system would, so they are more suitable for underfloor heating systems than radiator systems.

- **An air-to-air system** produces warm air which is circulated by fans to heat your home.

4.20 As with ground source heating/ cooling systems, electricity is needed to power the pump, and therefore a supplementary technology would be required (such as PV's) to be considered renewable.

4.21 The efficiency of air source heat pump systems is measured by a coefficient of performance (CoP) - the amount of heat they produce compared to the amount of electricity needed to run them. A typical CoP for an air source heat pump is around 2.5.

4.22 Further information on air/water source heat pumps can be found at:

http://www.energysavingtrust.org.uk/Generate-your-own-energy/Air-source-heat-pumps

Biomass

4.23 Biomass technology uses organic materials, either directly from plants or indirectly from industrial, commercial, domestic or agricultural products to generate heat. Biomass does not include fossil fuels. Biomass products can include:

- Woody biomass – such as logs, wood chips, wood pellets and energy crops.
- Non woody biomass – such as animal waste, industrial and biodegradable products from food processing.

4.24 Biomass is considered to be carbon neutral as the energy released from biomass on burning is the same as that absorbed during its production.

4.25 The most common forms of biomass technology are biomass boilers, where the fuel can be fed manually or automatically. Internal or external storage areas will be required to store biomass products.

4.26 Any biomass fuel used for biomass boilers should be smoke free, or ensure that it complies with the latest legislation and guidance to ensure that air quality and amenity is not adversely impacted. This will also ensure that Borough does not generate harmful effects upon those Natura 2000 sites within 15km of the Borough that could be affected by such pollution – further information on this issue can be found in the Core Strategy Habitat Regulations Assessment:

http://www2.wokingham.gov.uk/sys_upl/templates/assetbrowser/assetbrowser_disp.asp?page=2&basketPage=&basketItem=&pgid=71734&tid=178&resultsOrdering=titleAsc#

4.27 Wood stoves and individual fireplaces are not considered to be forms of renewable energy technology, unless fitted to the energy system such as a back boiler for general space heating and hot water requirements.

4.28 Policy W11 (Biomass) of the adopted South East Plan encourages the separation of biomass waste and consider its use as a fuel in biomass energy plants, where this does not discourage recycling or composting.

4.29 Further information on biomass can be found at:

http://www.energysavingtrust.org.uk/Generate-your-own-energy/Wood-fuelled-heating

Energy from water – hydroelectricity/ micro-hydro

4.30 Hydroelectricity systems generate electricity from running water - usually a small stream - to turn a small turbine which generates electricity. The faster the water flows and the more water there is the more electricity can be generated. According to research conducted by TV Energy, there is limited potential to use hydro technology for electricity generation within the Thames Valley. Small or "micro" hydroelectricity

systems can produce enough electricity for lighting and electrical appliances in an average home.

4.31 Like PV and wind turbines, hydro systems can be connected to the grid. The systems need to be sited close to the point of use or to a suitable grid connection.

4.32 If these systems are considered for a river or stream, it is likely that some form of consent or license may be required from the Environment Agency. Riparian ownership issues may also have to be considered.

4.33 Further information on hydroelectricity/ micro-hydro can be found at:

http://www.energysavingtrust.org.uk/Generate-your-own-energy/Hydroelectricity

Low carbon technologies

Combined Heat and Power (CHP) and District Heating

4.34 CHP uses the heat generated from traditional fossil fuel boilers to increase efficiency. The heat can be exported to both residential and non-residential schemes.

4.35 CHP can achieve efficiencies in excess of 70%, compared to 38% for conventional coal-fired power stations and 48% gas-fired power stations. CHP systems can be run on traditional fossil fuels or as preferred on biomass. There are various sizes of CHP systems ranging from single homes to whole districts and towns. Similar to CHP, district heating can provide space heating and hot water for residential and non-residential developments.

4.36 In the home, a micro CHP unit resembling a gas-fired boiler will provide both heat for space and water heating but also electricity to power domestic lights and appliances. Micro CHP units are a very new technology only recently appearing in the UK market. Micro CHP is applicable at a street scale or for large buildings and can be a replacement for conventional domestic boilers. Homes and buildings fitted with CHP are usually also connected to the mains electricity grid, and may also retain back-up boilers. This is so that they are never short of an energy supply, during maintenance of the CHP plant, for example, or during periods of unusually-high energy loads.

4.37 CHP deployment will be most effective where the generation plant is relatively close to the users of the heat where this includes a mix of uses to even out the pattern of demand for electricity and heat through the day and where the density and layout of development reduces the cost of installation of the necessary infrastructure and distribution of heat. The main design criterion is that, to make the investment worthwhile, there must be a need for both the heat and electricity produced by the CHP unit.

4.38 Large scale mixed use developments would benefit the most from CHP and/or district heating systems. It may also have the potential for use in remote rural areas that do not have access to mains gas supplies. District systems can also supply cooling, as well as heating and electricity, to buildings. Large scale energy-generation or distribution facilities should be located away from residential areas, and environmental impacts will need to be taken into account. In particular, developers are encouraged to investigate the potential for an Anaerobic Co-digestion facility in association with sewage treatment works.

4.39 Policy NRM12 (Combined Heat and Power) of the South East Plan encourages the integration of combined heat and power, including mini and micro-CHP, in all developments and district heating infrastructure in large scale developments in mixed use. It also states that the use of biomass fuel should be investigated and promoted where possible. In line with paragraph 9.67 of the South East Plan, district heating should be interpreted as including cooling, and that the term 'cooling' includes absorption cooling. Consideration should also be given to setting up community-owned or public-private partnership structures such as Energy Service Companies (ESCO) or Multi-utility Service Companies (MUSCO) to deliver energy. These structures can install, finance and manage community energy systems more efficiently and cheaply and reduce carbon emissions.

4.40 Further information can be found on the Combined Heat and Power Associations (CHPA) website:

http://www.chpa.co.uk/index.htm

The London Energy Partnership has produced guidance on ESCO's titled 'Making ESCOs Work: Guidance and Advice on Setting Up & Delivering an ESCO (February 2007)'. This can be viewed at:

http://www.london.gov.uk/mayor/environment/energy/partnership-steering-group/docs/making-escos-work.pdf

4.41 Under guidance from the Energy Saving Trust, Wokingham Borough Council do not accept heat recovery systems or fossil fuel powered CHP's as coming from a renewable resource – these are considered to be an energy efficiency measures aimed at reducing energy consumption. If you are proposing to use either of these technologies, the savings made can only be accommodated when calculating the baseline. It cannot be used towards achieving the 10% amount.

For further details on these technologies, their design and costs please consult the Energy Saving Trust.

Design Issues

4.42 There are a number of design issues associated with each sustainable energy technology which should be taken into consideration when assessing their feasibility and viability. Many of these are set out in Planning for Renewable Energy: A Companion Guide to PPS22. While they are usually specific to each technology in general, design issues include:

- For individual buildings where micro-renewable technologies may be employed these can include siting, efficiency (e.g pitch of solar PV panel or viable wind speed), colour and appearance, noise, connection, safety and potential ecological and landscape impacts.
- For groups of buildings where CHP and heat networks are employed these can include access (for fuel provision i.e biomass), visual intrusion, location of plant, noise from traffic and plant operations, health and local ecology, mix of uses to balance the demand for energy, installation and transmission costs, adjoining developments and heat networks and potential ecological and landscape impacts.

4.43 The opportunity for developments to contribute will vary, as the potential for integrating sustainable energy technologies will differ greatly between different developments and sites. Suitable sustainability installations are likely to be affected by the physical nature of the development such as aspect, building height, amount of on-site open space and the ecology of the area.

4.44 Applicants should include design considerations of installing sustainable energy technologies within their Design and Access Statement/ Sustainability Assessment. The sustainable design aspects of planning applications must be balanced with other Council design guidance.

Large Developments

4.45 The Council encourages developers of large sites to consider the opportunities for district heating networks (Policy NRM12: Combined Heat and Power of the South East Plan) and more localised energy generation solutions. The Council also encourages co-operation between developers on larger sites where two or more separate development schemes are proposed. Opportunities for connection to a decentralized, renewable or low-carbon energy supply, where available, is encouraged as are opportunities for working together to benefit from the economies of scale related to the amount of development. In particular for large developments, the Council will encourage developers to build some technically challenging homes to Code for Sustainable Homes levels 5 and 6 within their development.

5.0 REQUIRED INFORMATION FOR THE SELECTED TECHNOLOGY

5.1 The technologies themselves and energy efficiency should be considered as part of the planning application process, so that Officers can fully assess impact and viability. Sometimes the best solution can be a mix of renewable energy technology. The following website can help create a low carob/ renewable energy system design and explains how it will work:

www.systemdesinger.co.uk

Do I have to provide information on the selected renewable energy technology?

5.2 The information below will be required as part of the planning application. Information is required for each technology selected i.e the technology that delivers the 10% minimum target.

Technology	Information Required
Combined Heat and Power	• Description of technology • Capacity, e.g electrical output, heat output • Capacity as percentage of total site energy demand • Layout plan showing site size, boundary and location of infrastructure (e.g location of boiler house, CHP units and boilers) • Floor plans and elevations • Connection to a distribution network • Noise and visual impact • Fuel type to be used • Details of operation and management of installations
Solar thermal	• The design of collector, flat plate etc • Capacity, e.g 8 panels, 40 tubes, total area • Capacity as a percentage of total site energy demand • Elevations to show the proposed location of the module • Orientation/ roof pitch • Detail of roof mounting arrangement, if applicable • Roof plans to show the location of the module • Potential shading i.e trees and other buildings • Visual impact
Photovoltaics	• Description of technology • Capacity • Capacity as a percentage of total site energy demand • Calculation to show it meets the 10% requirement • The design of the module or array • Elevations to show the proposed location of the module • Orientation/ roof pitch • Detail of roof mounting arrangement, if applicable • Roof plans to show the location of the module • Potential shading i.e trees and other buildings

	• Visual impact
Wind turbines	• Description of technology • Capacity e.g electrical output • Capacity as a percentage of total site energy demand • Layout plan showing the site size, boundary and location of infrastructure (e.g location of turbines, sub-station, access tracks) • Elevation plan • Roof plan to show location of wind turbine (if roof mounted) • Average site wind speed (minimum 12 months data) • Grid connection • Proximity to dwellings • Noise, vibration and visual impact
Ground source heating/ cooling	• Description of technology (horizontal or vertical) • Capacity (for heating and cooling) • Capacity as a percentage of total site energy demand • Number and location of boreholes • Location of pipework • Plan showing tree locations and their potential rooting zones • Connection details to the building
Air source heat pump	• Description of technology – air-to-air, air-to-water system • Capacity e.g kW per dwelling • Capacity as a percentage of total site energy demand • Location of equipment • Elevations to show location and design of air source heat pump • Visual impact, e.g equipment on external wall • Noise report (should be available from the manufacturer)
Biomass	• Size and description of technology • Capacity e.g kW • Capacity as a percentage of total site energy demand • Floor plans and elevations showing the location and design of the plant, flue and storage facilities • Details of vehicle access to and from the plant • Source of fuel supply and principle transport routes to and from the supply • Landscaping and visual impact of plant • Details of noise emissions • Details of air pollution
Micro-hydro	• Layout plan showing location of turbine • Elevations of turbine • Capacity e.g kW • Capacity as a percentage of total site energy demand

APPENDIX 1 - CALCULATION SUMMARY TABLES (that can be incorporated into your Energy Statement)

Table A1(i): Calculating total energy demand of development (and 10% requirement)

Type of unit	**Predicted annual energy demand (kWh/yr):**					**Total Predicted Energy Consumption for unit**	**Number of units**	**Total**
	Space Heating	Hot water	Lighting	Appliances	Cooking			
Type 1 e.g 4 bed detached								
Type 2 e.g 3 bed semi-detached								
Type 3 e.g 1 bed apartment								
(add lines as required)								
Communal areas in apartments								
Infrastructure i.e external lighting								
							Total Energy Demand of development (baseline)	**(1)**
							10% requirement = (1) * 0.1	

Table A1(ii): Calculating total energy from decentralised, renewable or low carbon technology

Proposed Technology	Energy from technology (kWh/yr)	Number of technology units (i.e biomass boilers)	Total Energy (kWH/yr)
Technology 1			
Technology 2			
Technology 3			
		Total energy from technology	**(2)**

Table A1(iii): Calculating the percentage from decentralised, renewable or low carbon energy

Percentage from decentralised, renewable or low carbon energy

= total energy from technology (2) / total energy demand of development (1) x 100

NB: This should be at least 10%

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