

Implementing Structure Plan SE2

Renewable Energy and Energy Conservation



Surrey Planning Officers Association

CONTENTS

- 1. How to use this document and other sources of information**
- 2. National Policy**
- 3. Regional Policy**
- 4. Surrey Structure Plan and Surrey Design**
- 5. The aim of reducing CO₂ emissions**
- 6. Developing an LDF Policy**
- 7. Reducing Energy demand through Energy Efficiency**
- 8. Renewable Energy Options in Surrey**
- 9. Standalone Renewable Energy Generation**
- 10. Combined Heat & Power and other technologies**
- 11. Integration of Renewable Energy – the 10% target**
- 12. The Planning Application**
- 13. Assessing a planning application – some rules of thumb**

Annexe 1 – Regional Policies

Annexe 2 – Structure Plan Policy SE2

Annexe 3 – Examples of prescriptive policies from other LPAs

**Annexe 4 – Examples of conditions and S106 clauses used to date
in Surrey**

Annexe 5 – Benchmarks for energy efficiency

Annexe 6 - Frequently Asked Question

Annexe 7 - Examples of Good Practice

1 London Borough of Merton

1 How to use this document and other sources of information

This document is intended as a resource for planners and developers. It is web based and can be copied, rebadged and used without further permission. As a resource or 'toolkit' it has no status in itself and is intended to help with policy formulation, the development of SPD, the preparation of site-specific development briefs, development control decisions and design and implementation..

The document will refer to other sources of information as applicable. The issues of renewable energy generation and energy use in buildings can become complex and it is not the intention of this document to be a complete learning resource – in fact far from it! Throughout the document there is a review of the most useful alternative sources of information and advice. The following are probably the best sources (apart from policy statements and guidance). If nothing else planners should be familiar with these and they will go a long way to helping those who want, or require, a more in depth understanding of the subject.

London Renewables: www.london.gov.uk/mayor/environment/energy/london_renew.jsp various documents but see esp. **Integrating Renewable Energy into new developments: Toolkit for planners, developers and consultants** – a comprehensive document of practical use for both developers and planners which is well structured and gets into the detail.

PPS22 Companion Guide: www.odpm.gov.uk Both the big picture and local relevance. More of a focus on standalone schemes that integration. Full review of technologies

Woking Borough Climate Neutral Practice Notes www.woking.gov.uk Sustainable construction and design good practice guidance including a section on energy.

Thames Valley Energy: www.tvenergy.org A not for profit organisation. All sorts of information including all the presentations given at the SLGA Planning for Renewables event Guildford on 10 February 05. Can provide a consultancy service.

Energy Conservation and Solar Centre www.ecsc.org.uk A charity and trading company. A useful source of advice.

Energy Saving Trust Loads of guidance on energy efficiency and renewable energy www.est.org.uk - select from programmes particularly renewable energy, housing best practice, practical help

National Energy Centre www.nef.org.uk/greenenergy an independent educational charity working for the more efficient, innovative and safe use of energy and to increase public awareness

The London Plan Draft SPG: Sustainable Design and Construction. March 2005 http://www.london.gov.uk/mayor/strategies/sds/sustainable_design.jsp for a general overview of the implementation of sustainable construction including energy issues.

DTI Website www.dti.gov.uk/renewables contains a specific section on renewable energy including information on planning policy.

Centre for Sustainable Energy www.cse.org.uk is a charitable company and can provide specialist knowledge and advice in renewable energy and energy conservation issues.

2 National Policy

The drivers:

- Climate change leading to a need to reduce the emission of greenhouse gas
- Security of energy supplies – UK will soon be a net importer of energy
- Managing the cost of utilities
- New local business opportunities

For an overview of climate change impacts and design responses see **Three Regions Climate Change Group: Adapting to Climate Change: A Checklist for Development, Consultation document 2005.**

Available at www.climatesoutheast.org.uk

For information on the effects of climate change and how we should adapt see the UK Climate Impacts Programme www.ukcip.org.uk

See also www.environment-agency.gov.uk

For G8 response from Gleneagles see www.defra.gov.uk and for scientific background see www.g8.gov.uk

The UK Government Sustainable Development Strategy. Securing the future

DEFRA March 2005. www.sustainable-development.gov.uk

Chapter 4 “Confronting the greatest threat; climate change and energy”

Energy White Paper – Our energy Future – Creating a Low Carbon Economy;

DTI Feb 2003 www.dti.gov.uk

- Government accepts the need for a 60% cut on CO₂ emissions by 2050.
- The need for energy efficiency
- Support for local generation
- Target of 10% of electricity from renewable sources by 2010 with an aspiration of 20% by 2020.

PPS1: Delivering Sustainable Development; ODPM 2005 see www.odpm.gov.uk

A key principle of the planning system is to:

“ensure that development plans contribute to global sustainability by addressing the causes and potential impacts of climate change – through policies which reduce energy use, reduce emissions (for example, by encouraging patterns of development which reduce the need to travel by private car, or reduce the impact of moving freight), promote the development of renewable energy resources, and take climate change impacts into account in the location and design of development.” (Para 13)

“Regional Planning Authorities and local authorities should promote resource and energy efficient buildings; community heating schemes, the use of combined heat and power, small scale renewable and low carbon energy schemes in developments; the sustainable use of water resources; and the use of sustainable drainage systems and the management of run-off.” (Para 22)

Microgeneration Strategy and Low Carbon Buildings Programme; DTI

Consultation June 2005. See www.dti.gov.uk. The results of this consultation will

inform the development of the Government’s strategy for the promotion of microgeneration and the document gives an overview of microgeneration technology

PPS22 Renewable Energy & Companion Guide; ODPM 2004 see www.odpm.gov.uk

“Local planning authorities may include policies in local development documents that require a percentage of the energy to be used in new residential, commercial or industrial developments to come from on-site renewable energy developments.”(Para 8)

It is important to note that PPS22 contains the word “**require**” and thus supports the wording in Policy SE2 and enables LPAs to take a firm stance on implementation. It will be up to developers to demonstrate why the requirement is unreasonable or not viable.

“Local planning authorities and developers should consider the opportunity for incorporating renewable energy projects in all new developments. Small scale renewable energy schemes utilising technologies such as solar panels, Biomass heating, small scale wind turbines, photovoltaic cells and combined heat and power schemes can be incorporated both into new developments and some existing buildings. Local planning authorities should specifically encourage such schemes through positively expressed policies in local development documents.” (Para 18)

3 Regional Policy

RPG9 Chapter 10 Energy Efficiency and Renewable Energy www.go-se.gov.uk

November 2004

Chapter 10 is up-to-date (Public Examination November 2003) and therefore very useful. More or less reproduced *verbatim* in the [Consultation Draft](#) of the South East Plan (Section D5 Policies EN1-EN6).

Vision

“There will be a progressive and substantial increase in energy efficiency and deployment of renewable energy so that by 2026 there will be real progress on the reduction of CO2 emissions, and at least 16% of the region’s electricity generation capacity will be provided from renewable sources. This will be achieved through well-designed development that reflects the tenets of sustainable development and encourages new business and employment.” (RPG9 Para 10.29)

Relevant Policies (See in particular INF4 & INF5 set out in full at Annexe 1):

- INF4: Development Design for Energy Efficiency and Renewable Energy
- INF5: Combined Heat and Power
- INF6: Regional Renewable Energy Targets
- INF7: Sub-Regional Targets
- INF8: Location of Renewable Energy Development
- INF9: Development Criteria

“The objective of the policies is to promote a more sustainable pattern of energy use and generation while ensuring that development does not harm the region’s environment or the quality of life of its people. This will be achieved through promotion of greater energy efficiency and ensuring that the region contributes effectively towards the Government’s targets for increasing the generation of renewable energy and reducing greenhouse gas emissions”. (RPG9 Para 10.19)

4 Surrey Structure Plan & Surrey Design

Policy SE2 (Text at Annexe 2) must be set in the context of a national objective to reduce CO₂ emissions. This means BOTH reducing the demand for energy and increasing the proportion of energy produced from renewable resources.

There are 4 main policy objectives:

- **The reduction of energy demand through energy efficiency**
- **The encouragement of standalone development schemes for the generation of renewable energy; both large and small scale.**
- **The integration of renewable energy generation into new developments – with a 10% minimum requirement.**
- **The encouragement of combined heat and power or similar technology**

This reflects the energy hierarchy in the London Energy Strategy (www.london.gov.uk) which can be summarised as follows:

- Reduce demand – use less
- Offset fossil fuels – use renewables
- Supply efficiently – where fossil fuels have to be used this should be done efficiently

Surrey Design. A strategic Guide for Quality Built Environments; SLGA 2002.
www.surreycc.gov.uk

Sets energy conservation and the use of renewable energy clearly within the remit of good design.

In particular see Principle 4.1: **All development should be designed to be energy efficient.**

5 The aim of reducing CO₂ emissions

It is important to consider overall CO₂ emissions since this relates back to one of the main drivers of policy and the basis for most international and national targets. In assessing proposals LPAs should, therefore, not lose sight of this fundamental aim and be prepared to be flexible with renewable energy requirements where developers are demonstrating undoubted innovation and commitment to a low carbon development.

A reduction in energy requirements will reduce CO₂ emissions. Clearly a proportion of renewable energy generation will do the same. But the issue is more complex than this. The most polluting source of energy for any development is electricity from the grid (due to inefficient production and transmission and distribution losses). Thus efficient local electricity production will reduce CO₂ emissions whether or not it is from a renewable fuel source. CHP is the most efficient example since it produces heat as well as electricity (and discussed below) and in this case even natural gas-powered CHP plants can reduce CO₂ emissions by up to 40%.

Further information:

For comparative information of CO₂ emissions from different fuel sources see **Energy Efficiency Best Practice in Housing** : [Domestic heating and hot water - choice of fuel and system type](#) Nov 2003

6 Developing an LDF Policy

LDF Policy should include both a requirement to address energy efficiency best practice in the design and layout of buildings and an on-site renewable energy requirement.

It is recommended that local policy be framed in terms of CO₂ emissions rather than predicted energy requirements (See 5 above). This will bring local policy in line with national policy, targets and regulations (e.g. Building Regulations) that are moving towards a reduction in the carbon burden. This will also ensure that implementation of a percentage renewable energy target will take full account of the CO₂ pollution from different fuel types and thus maximise reductions in the CO₂ burden.

Policy EP23 of **Croydon's Replacement UDP** is a good example but is still couched in terms of energy requirements:

All proposals for development of uses that consume energy should include renewable energy facilities and/or energy saving technologies whenever possible (for example combined heat and power systems, solar water heating systems and photovoltaic cells). The Council will expect all development (either new build or conversion) with a floor-space of 1000m² or ten or more residential units to incorporate renewable energy production equipment to provide at least 10% of the predicted energy requirements.The policy contains

the 6 criteria essential for a prescriptive renewable energy policy:

1. It includes the word "Require" or "Expect".
2. It states it is for "new build or conversion" – to catch change of use in regeneration areas etc.
3. It establishes the size threshold
4. It states it is for on site renewable energy equipment – not buying in green energy from the grid. *One of the rationales of the policy is to stimulate the green economy in micro-Renewables.*
5. It sets the % target.
6. It is for the "predicted energy usage". *It is not acceptable to build and then monitor usage and then retrofit the Renewables..*This could be improved to

specify:

- On-site renewable equipment
- Remove the threshold for residential development
- The use of CO₂ emissions rather than energy requirements
- Make the residential policy a requirement

The following 'perfect' policies are suggested by Adrian Hewitt at the London Borough of Merton:

Commercial:

All non-residential developments (either new build, conversion, renovation or extension) above a threshold of 1,000 sqm will be expected to incorporate on-site renewable energy production equipment to reduce predicted CO2 emissions by at least 10%

Residential

All residential developments (either new build, conversion, renovation or extension) will be required to incorporate on-site renewable energy production equipment to reduce predicted CO2 emissions by at least 10%

There is a subtle distinction in that commercial is expected, and residential is required, to incorporate on-site renewable energy production. The word expected implies a degree of flexibility for non-residential developments that should not apply to residential where energy needs and solutions are much easier to predict (see Case Study at Annexe 7).

Further information

See Chapter 7 of [Integrating Renewable Energy into New Developments: Toolkit for Planners, developers and consultants](#)

See Paras 5.7 – 5.11 [Microgeneration Strategy and Low Carbon Buildings Programme; DTI Consultation June 2005.](#)

7 Reducing energy demand through energy efficiency

Any attempt to deliver renewable energy cannot be divorced from the need to consider energy efficiency. The debate about whether this is really the concern of Building Regulations is redundant. Building Regulations should be seen for what they are – setting minimum acceptable standards. Indeed, recent research by the BRE indicates that even these standards are not being met in a substantial proportion of new homes¹. Developers need to seriously consider the benefits of exceeding Building Regulations and to address energy efficiency as a means of reducing energy demand. Whilst specific energy efficient targets cannot be made a requirement *per se* through the planning process energy use is a relevant planning consideration in the context of Government Policy and the renewable energy requirement.

What is a low energy or low carbon building? There are a number of standard and accepted assessment methods that will provide a useful general picture about the energy efficiency of a building. See further information at Annexe 5.

¹ Assessment of energy efficiency impact of building regulations compliance

The overall energy requirements can be reduced by:

- 1) Reducing space heating requirements through insulation levels which exceed Building Regulation requirements
- 2) Reducing demand by using low energy lighting and appliances and efficient condensing boilers
- 3) Passive thermal design – both heating and cooling.
- 4) Utilising natural ventilation
- 5) Influencing the behaviour of future occupants through education and promotion

Further information:

Energy Saving Trust; Energy Efficiency Guidance for Housing & Buildings
www.est.org.uk/housingbuildings/

8 Renewable energy options in Surrey

A wide range of technical options may be suitable in Surrey. These are discussed below:

For Further information on the full range of options

The suitability and economics of different renewable technologies for types of development see **London renewables:** www.london.gov.uk/mayor/environment/energy

For an overview of technologies see: [ODPM: A Companion Guide to PPS22](#)

For an overview see: **Renewable Power Association;** www.r-p-a.org.uk

For microgeneration technologies see Annex A [Microgeneration Strategy and Low Carbon Buildings Programme; DTI Consultation June 2005.](#)

For renewable options (and barriers) for homes see: [Power to the People: Renewable Energy in Londoner's Homes London Assembly May 2005](#)

Wind Large standalone turbines (typically above 50kW) are probably the most controversial of the current technologies. There are none currently in Surrey. There is potential for viable schemes but in the more exposed locations which tend to be valued for landscape quality. There is much more potential for small-scale standalone turbines (typically 2kW – 50kW) linked to individual developments or at the micro level attached to individual buildings (typically less than 2kW). Wind is often the cheapest renewable option and the technology is relatively simple and well developed.

Further information

British Wind Energy Association; www.bwea.com

Wind Power in the UK, Sustainable Development Commission, May 2005 www.sd-commission.org.uk for a guide to the key issues surrounding onshore wind power in the UK

Yes2Wind see www.yes2wind.com for information in support of wind farm proposals

Small-scale turbines and micro wind See www.est.org.uk and case study at Brill School www.tvenergy.org. See www.bwea.com for small and micro wind system suppliers.

Solar thermal & Photovoltaics (PV) Probably the most common options for integration in residential schemes. Plenty of potential and if integrated at the design stage can be relatively cheap (for houses only £2K for solar thermal). PV is more expensive but, in that it will replace grid electricity, will produce significantly more carbon savings per KWh of energy replaced.

Further information

British Photovoltaic Association; www.pv-uk.org.uk

Solar Trade Association; www.solartradeassociation.org.uk

Biomass. Surrey is the most wooded Shire County in England. Although this fuel source has yet to be developed at a commercial scale there is vast potential particularly when linked to Community Heating.

Further information

Biomass as a Renewable Energy Source; [Royal Commission on Environmental Pollution 2004](#)

Ground source heat pumps. This technology utilises the constant temperature beneath the earth's surface. Water (or another fluid) is circulated through pipes buried in the ground to collect the heat and heat pumps can then either produce heat or cooling using the same process as refrigeration. This need not be an expensive option although this depends on ground conditions and the length and depth of pipes to be installed. It can be particularly suited to higher-density schemes where it becomes more economic. Space is required to enable pipes to be buried horizontally at a depth of approx 1 meter (unless the pipes are buried vertically)

Further information

Ground Source Heat Pump Club; www.nef.org.uk/gshp

See www.iceenergy.co.uk for an example of a company promoting ground source heating systems

Passive thermal – As the name suggests this is not an energy generating technology but a design response that utilises the structure of a building and landscaping to produce renewable heating, cooling and lighting. This is commonly through solar gain (to capture the sun's energy), thermal mass and landscaping (to moderate fluctuations in the internal temperature), natural ventilation (so that air circulates without the need for air conditioning) and natural lighting (to avoid artificial lighting during the day).

9 The Generation of Renewable Energy through standalone schemes

Much information is already available for standalone schemes. This is, in any event, not currently a major issue in Surrey but applications are likely to become more common particularly on a smaller scale where linked to new developments.

Further information:

Renewable Energy Guidelines for Local Planning Authorities; TVE Sept 2004. Available to download from www.tvenergy.org
[PPS22 and Companion Guide](#)

10 Combined Heat and Power (CHP) and other technologies

A CHP plant is an installation where there is simultaneous generation of usable heat and power (usually electricity) in a single process. CHP utilises the heat generated during the production of electricity to provide heating or cooling for buildings. Overall fuel efficiency can be increased to 70-90% compared to 30-50% with conventional heating and electricity generation.

CHP systems produce roughly twice as much waste heat as they generate electricity. To be most viable economically they require a relatively large and constant demand for heat. Greatest efficiency is therefore possible when CHP is used to serve a number of local buildings of different uses as part of a community energy scheme with community heating (CH) and private wire electricity. Residential-only schemes are nevertheless feasible and residents can benefit by lower heating/electricity costs and increased internal space through not having a boiler. Back up electricity supply is always available from the grid (and surplus electricity can be fed into the grid) so a private wire system is an extremely secure method of electricity supply.

As technology advances the scale at which CHP becomes viable is being reduced. In Woking the smallest system is a 22kWe² CHP private wire district heating system serving about 18 dwellings. Woking is also currently installing another small scale private wire and district heating system for a new development at the Brookwood Hospital development site. They are using three 4.6kWe CHP units in the small CHP station.

Single household/small business scale micro-CHP is not a new technology but has only recently been developed and marketed in the UK. Micro-CHP units act like a normal condensing gas boiler, providing heat and hot water, but also drive a generator to produce electricity for the same energy input.

More efficiency is gained if the heat generated from CHP is also used to produce summer cooling through absorption chilling to achieve a more even annual base heat demand.

CHP can generate power from either fossil fuels or biomass. Biomass is at an early stage of market development and if developers have invested in CH infrastructure this can be adapted as technology and markets advance.

² kWe kilowatts-electric (unit of measurement of CHP generation)

Fuel Cells are a form of CHP system that use hydrogen and oxygen as fuels and pure water as the only emission. This technology is very expensive but if heat (and cooling) demands are high and electricity can be exported, combined with the acceptance of a long-term pay back period, then it can become a viable solution – as demonstrated by [Woking Borough Council](#) at the Pool in the Park. At present hydrogen is not available from renewable sources and is obtained from natural gas. Oxygen is taken directly from the air.

Further information

Woking initiatives contact Mick Company on Tel: 01483 743491 or Email: mick.company@woking.gov.uk.

Combined Heat and Power Association www.chpa.co.uk

Combined Heat and Power Club; www.chpclub.com

Defra CHP information including The Government's Strategy for Combined Heat and Power to 2010; www.defra.gov.uk/environment/energy/chp/

Energy Saving Trust see info on Community Energy and CHP at:

<http://www.est.org.uk/housingbuildings/communityenergy/>

Micro-CHP See www.microchap.info with links to micro-CHP manufacturers and developers

11 The Integration of Renewable Energy generation

Structure Plan SE2 requires that a minimum of 10% of the energy requirement of all residential and commercial development should be provided from renewable resources. At its simplest level, implementation requires an assessment of the energy requirements of the building(s) proposed (something which the developer should have to hand) and the provision of 10% (or more) of this requirement by way of renewable technologies. It is better if developers demonstrate a 10% reduction in CO₂ emissions through the use of on-site renewable energy generation in order to satisfy the overall objective of Policy SE2.

Applicants should be advised that the 10% renewable requirement could more easily be achieved if energy efficiency is first addressed (see above). It is also important to emphasise that the renewable energy generation should be from on-site generation. The only situation where off-site renewable generation may satisfy SE2 is where this is local and part of a community (district) heating or private wire energy supply.

Green energy from the grid

In implementing Policy SE2 LPAs should be aware that this requirement should be taken to refer to the design of the development in question (to which there is control) and not to the purchase of renewable energy from the grid (for which there is no control). Thus a commitment to buy 'green' energy, whilst welcome, will not satisfy the requirements of this policy.

The development Control process

The aim should be to ensure that renewable energy is addressed at the beginning of the design process. However, particular at the outline application stage, it may be most practicable to impose conditions or include a provision in a S106 agreement that requires details and information to be submitted and approved prior to work commencing (See Annexe 4 for examples).

Often developers will be asked to submit information regarding predicted energy use well before detailed proposals have been worked up to the stage that accurate energy predictions can be made. However, it must be emphasised that the predicting of renewable energy contributions cannot, and does not have to be, an exact science as part of the planning process. There is enough benchmark information available for developers to predict reasonably accurately energy consumption and renewable energy contributions for all development types and sizes. Planning authorities may wish to negotiate monitoring of energy use on some developments as a means of reviewing (not enforcing) implementation procedures. The 10% minimum is not meant to be an enforceable operational target but a design objective – because of the complexity of the design issue inevitably actual performance will differ from that predicted but when averaged across all developments should be close to, or exceed, the desired outcome.

Visual impact

Some technologies, notably wind and active solar, will have a visual impact. Thus it is essential that visual implications of the technologies proposed are taken into account even at the outline stage.

Further information:

London renewables: www.london.gov.uk/mayor/environment/energy various documents but see esp. **Integrating Renewable Energy into new developments: Toolkit for planners, developers and consultants** – a very comprehensive document.
CIEF, Integrating renewables, planning, development and building design 2004 CIEF Workshop Notes available to purchase at www.ciria.org
Energy Saving Trust; Local Authorities' use of Renewable Energy in Buildings and Facilities available to download from www.practicalhelp.org.uk

12 The Planning Application

It is for the applicant to demonstrate the effectiveness of different renewable technologies measured in terms of both energy consumption (usually expressed in kWh) and carbon emissions (usually expressed in terms of kg/ CO₂ per year). Developers should not simply present set of figures without context. In order to adequately assess the feasibility of renewable technologies and their contribution to overall energy demand a design process should have been followed. The [London Renewables Toolkit](#) sets out a 'route map' for developers with comprehensive supporting information. If developers follow this route map then ample information should be available to included as part of a planning application. The following information is partly based on this 'route map'. The information should be clearly set ideally forming part of a Sustainability Report or Design Statement³:

³ **Woking Borough Council sends the following pre-application advice to applicants:**

Sustainable Development: The ODPM Good Practice Guide No: 22 'Planning for Sustainable Development: Towards Better Practice' sets out key headings for assessing the sustainability of new developments. This guidance can be seen at: www.odpm.gov.uk Applicants are requested to provide a 'Sustainability Report' explaining how their development address this topic using the ODPM headings: - Location, Density, Mixed Use, Parking, Building Techniques and Heating and Energy Initiatives that reduce CO₂ emissions. With regard to the latter, Policy SE2 of the Structure Plan aims to secure the Government's target of achieving 10% of UK electricity generation from

1. **The energy efficiency of the building.** Is this above Building Regulations minimum standards? Use benchmark information (See Annexe 5)
2. **The feasibility of CHP and or CH.** For larger developments (over 5000sq m) if CHP or CH are not being considered, explain why not.
3. **A list of renewable technologies considered.** Indicate those subject to a formal feasibility study and a brief explanation of seemingly appropriate technologies that have been ruled out.
4. **The base annual predicted energy demand of the development.** In kWh for each fuel (e.g. gas & electricity) for delivered energy *after* the application of suitable energy efficiency measures and technologies (including CHP)
5. **The baseline carbon emissions of the development** based on 4. Use the Building Regulations methodology:
 - Electric Energy – 1 kwpha = 0.43 kilograms of CO₂ per annum
 - Gas Energy - 1 kwpha = 0.19 kilograms of CO₂ per annum
6. **The contribution of each proposed renewable energy technology** to reduce the baseline carbon emissions of the development.
7. **Cost information of technically feasible renewable technologies.** Important where cost is used as a factor in ruling out technically feasible technologies.
8. **A summary of the benefits of renewable technologies included** e.g. running cost reductions or whole life benefits to building end users.
9. **The reduction in the development's baseline carbon emissions** achieved by the inclusion of renewables in the planning application.

Ideally the renewables contribution should be calculated in terms of the reduction carbon emissions (See Section 5 above). If the renewables contribution is measured in terms of kWh then stage 5 can be omitted and the subsequent calculations expressed in terms of kWh.

Further information:

See RPG 9 Policy INF4 (Annexe 1)

For much more detailed information regarding how developers and planners can calculate the renewables contribution see: **London renewables:** www.london.gov.uk/mayor/environment/energy

13 Assessing a Planning Application – Some rules of thumb

When assessing information from developers planning officers will want to have an idea re the suitability of the renewable energy technology proposed and whether the scale of the technology is likely to exceed 10% of the total energy demand or carbon savings. The best source of information is again: **Integrating Renewable Energy into new developments: Toolkit for planners, developers and consultants** www.london.gov.uk/mayor/environment/energy in particular Sections 4.2 and 4.13. The following information refers to most common building types and uses in Surrey and is based on the toolkit. For rules of thumb for other building types refer to the toolkit at Section 4.2 and use the tables in Section 4.12 and 4.13 for more information.

renewable sources; please take this into account in preparing your report. Woking Borough Council has a number of initiatives and you may wish to seek further advice from the Council's Energy Services (01483 743490). Our Climate Change Strategy is at: www.woking.gov.uk The Council's document, Summary of Good Practice, can be inspected at: www.woking.gov.uk

To assist in determining your application please complete and return the following check list www.woking.gov.uk with your application when it is submitted; please use the check list to inform the contents of your Sustainability Report.

Planners may also want an idea of average total energy consumption and carbon emissions per dwelling type to be able to assess the contribution of different energy efficient measures or renewable energy sources. The figures given at the end of this section are based on current Building Regulations (2002) together with the likely performance of buildings when the latest Building Regulation amendments are implemented later this year or in 2006. They should be used as a broad guide only since many factors will influence energy consumption and for more detailed analysis of individual proposals the source information should be used.

Town Centre buildings

Ground sourced heating is likely to be able to provide the highest renewable contribution at least cost, with ground cooling also possible. *PV cladding* could be used to replace an expensive façade. A 10% contribution to energy demand can be made by a combination of ground sourced heating and cooling at just over 3% of capital cost. Assuming PV cladding is replacing an expensive façade the increase cost on base build for the same proportion of energy demand met is calculated at 1.5% and could be even less depending on the material being replaced.

Standard Office

Biomass heating, if a suitable fuel supply and storage area available, could be the cheapest option, with *ground sourced heating* also low cost. A *wind turbine* could provide a low cost renewable source, if there is space. A 10% contribution to energy demand can be made by ground sourced heating at less than 2% above base build capital costs. Wind would be even cheaper if space available as a contribution towards the 10% target.

Industry

A *wind turbine*, if there is space and an adequate wind regime available, can be the cheapest option, alternatively *biomass heating*, if a suitable fuel supply and storage area are available, and *ground sourced heating* can be low cost. *Solar water heating* could be viable if the particular building use has high hot water demand e.g. for washing. Wind may be least cost option if available, costing just over 1% above base build for 10% of energy demand met. Biomass heating can provide nearly 20% of energy demand at 3% above base build capital costs.

Warehouse and Distribution

A *wind turbine*, if there is space and an adequate wind regime available, can be the cheapest option; alternatively *ground sourced heating* could be used at reasonable cost.

Care Homes and Sheltered Housing

Biomass heating, if a suitable fuel supply and storage area available, could be the cheapest option, with *ground sourced heating* also low cost. *Solar hot water systems*

could be cost effective but contribution to 10% target will depend on roof space available.

Medium Density Housing

Solar hot water systems on individual houses are likely to be the easiest and cheapest way of achieving the 10% target (2 – 3sq m per unit). However, a stand-alone *wind turbine* could provide the lowest overall cost renewable source, if there is space away from the houses and an adequate wind regime available. Micro wind turbines affixed to individual units could also be considered.

Higher density housing

Solar hot water systems are likely to be the cheapest option, as long as adequate roof space is available. *Ground sourced heating* systems are also a reasonable option. If communal heating is to be installed, *biomass heating* becomes viable, and should easily exceed the 10% target, as long as a suitable fuel supply and storage area are available.

Primary or Secondary School

A stand-alone *wind turbine* could provide the lowest overall cost renewable source, if there is space and an adequate wind regime available. *Biomass heating* is also a viable option if there is a suitable fuel supply and storage area available, as is *ground sourced heating*. More than 10% of energy demand is possible from ground sourced or biomass heating at 0.9 - 1.9% above base build capital costs. Wind could provide 15% of energy demand at 0.4% above base build capital costs.

Rule of Thumb energy consumption & emissions by relevant Building Regulations

2002

Property Type	Energy Use (kWh/m ² /yr)			Carbon emissions (kg CO ₂ /m ² /yr)		
	Gas	Electricity	Total	Gas	Electricity	Total
Flat	96	24	120	18	10	29
Terrace	119	21	140	23	9	32
Detached Bungalow	133	22	155	26	9	35
Semi-Detached house	109	21	130	22	9	31
Detached house	119	21	140	23	9	32

2006

Property Type	Energy Use (kWh/m ² /yr)			Carbon emissions (kg CO ₂ /m ² /yr)		
	Gas	Electricity	Total	Gas	Electricity	Total
Flat	72	18	90	13	9	22
Terrace	79	16	95	23	7	23
Detached Bungalow	99	16	115	26	7	27
Semi-Detached house	84	16	100	22	7	23
Detached house	89	16	105	17	7	24

Source: Based on: Towards Low-carbon Housing: a cumulative approach to reducing carbon emissions. Centre for Sustainable Energy March 2005. www.cse.org.uk

ANNEXE 1

RPG9 Chapter 10

See: www.go-se.gov.uk

Policy INF4: Development Design For Energy Efficiency And Renewable Energy

Local Development Documents may expect the incorporation of high standards of energy efficiency in all development, subject to economic viability considerations. This will be achieved through design, layout and orientation. Local authorities should use design briefs and/or supplementary planning documents to promote development design for energy efficiency and renewable energy.

Local authorities should also encourage the use of energy efficient materials and technologies, by using all the tools at their disposal.

A proactive approach towards the implementation of this policy may involve:

- I. Encouragement of developers to submit an assessment of a development's energy demand.
- II. Attainment of high energy efficiency ratings in all new development, where appropriate, through the use of best practice guidance such as the Building Research Establishment Environmental Assessment Method (BREEAM) and the National Home Energy Rating (NHER).
- III. 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. Active promotion of energy efficiency and use of renewable energy sources where opportunities arise by virtue of the scale of new development including the regional growth areas.

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.

Policy INF5: Combined Heat and Power

Local Development Documents and other policies should encourage the integration of combined heat and power (CHP), including mini and micro-CHP, in all developments and district heating infrastructure in large-scale developments in mixed use.

Local authorities using their wider powers should promote awareness of the benefits of mini and micro-CHP in the existing build stock.

ANNEXE 2

POLICY SE2

Renewable Energy and Energy Conservation

Development for the generation of energy from renewable resources of wind, sun and biomass as a contribution to the regional target will be encouraged. Small scale proposals to serve individual buildings, or small groups of buildings, are becoming practicable and will be supported. In areas such as the AONBs, landscape considerations may preclude larger schemes, but small scale schemes may be acceptable.

Commercial and residential development should be designed such that a minimum of 10% of the energy requirement is provided by renewable resources. The use of combined heat and power or similar technology will be encouraged, and for all developments in excess of 5,000 sq m floorspace should be regarded as the norm.

All types of development should incorporate energy efficiency best practice measures in their design, layout and orientation.

- 3.6 A long term objective in the UK is for more energy to be generated from sources which emit little or no carbon dioxide, and in particular from renewable energy resources such as solar or wind power and biomass. The Government's present target to achieve 10% of UK electricity generation from renewable resources by 2010 will only be achieved if development providing for such technology is permitted. Targets of generation capacity from renewable sources for the South East region have been developed by SEERA. The SEERA strategy proposes that planning authorities should undertake assessments of potential and collaborate on a sub-regional basis to identify how the targets are to be achieved.
- 3.7 In Surrey, SEERA's research indicates that biomass has considerable potential in the period to 2016. The England Rural Development Programme provides support for biomass projects although landowners are unlikely to commit to growing fuel crops until a local market is available. Wind power is capable of making a valuable contribution either in the form of clusters of small wind turbines and/or single large turbines. Solar power, either passive or active, is a further valuable resource although it is assumed that the contribution from active solar power (photovoltaics) will be greater after 2016. Electricity generation from landfill gas will continue to make a limited contribution to energy supply up to 2016.
- 3.8 Development of biomass processing plant and wind turbines to enable the exploitation of renewable energy resources should be encouraged where the wider benefits outweigh any local impacts on amenity and character. Particular care will need to be taken in the case of proposals within areas designated for their landscape or nature conservation quality. Technological advance is also facilitating the localised generation of energy from renewable sources to meet the needs even of individual buildings and opportunities should be taken wherever possible to adopt such technologies in smaller schemes.
- 3.9 The energy demands from new development should reflect the wider national objective of increasing supply from renewable resources by incorporating appropriate technology within the design of buildings. Larger development sites provide the opportunity to

promote innovative approaches to heat and energy, such as district heating or combined heat and power (CHP). Mixed use schemes in and around town centres offer particular opportunities to share both heating and cooling demands between different users. These technologies offer substantial benefits in terms of energy efficiency, reducing the impact of development over its lifetime.

- 3.10 Greater energy efficiency is an objective common to all forms of development and further guidance is given in *Surrey Design*. Energy efficient design and layout should be seen as the norm for new development with passive solar design being the basic starting point. Development briefs for larger schemes should establish the need to incorporate measures that go beyond the minimum requirements set out in the Building Regulations.

How the policy will be implemented

- Local development frameworks will include policies to
 - encourage renewable energy generation from wind, sun and biomass resources including supply for individual properties;
 - require new development to provide a proportion of its energy requirement from renewable resources
 - encourage the use of combined heating (and cooling) and power schemes for major developments;
 - promote energy conservation in construction of buildings (building energy ratings).
- *Surrey Design* promotes energy conservation through innovation and layout designs which make best use of natural light and energy.
- The local planning authorities will:
 - collaborate on the assessment of the local potential for renewable energy generation in the light of the regional targets to 2026;
 - identify criteria for the assessment of renewable energy proposals.
- The local planning authorities will collaborate on the assessment of the local potential for renewable energy generation and the sub-regional deployment of such resources.

Indicators of policy performance

- Energy generated from renewable sources in Surrey
- Proportion of new buildings achieving high energy conservation rating
- Take-up of energy conservation schemes within existing buildings
- Number of district heating systems and installed capacity of CHP plant

ANNEXE 3**UDP Renewable Energy Policies****List of Authorities adopting, or considering adopting, prescriptive policies – THIS LIST IS STILL BEING COMPILED**

With acknowledgements to: Adrian Hewitt, London Borough of Merton

Authority	Contact	Policy Details
Written into UDP		
London Borough of Merton	Adrian Hewitt adrian.hewitt@merton.gov.uk	Adopted All new non-residential development above a threshold of 1,000 sqm will be expected to incorporate renewable energy production equipment to provide at least 10% of predicted energy requirements.
London Borough of Croydon	Eddy Taylor EDDY_TAYLOR@croydon.gov.uk	2nd Deposit draft The Council will expect all development (either new build or conversion) with a floorspace of 1000m ² or ten or more residential units to incorporate renewable energy production equipment to provide at least 10% of the predicted energy requirements.
Haringey	Angela Smith Policy Officer Policy and Projects Team Tel: 020 8489 5590 angela.smith@haringey.gov.uk	2nd Deposit draft “require all major development schemes to provide an energy assessment with their planning application, showing an on-site provision of 10%, where feasible, of their projected energy requirement from renewable sources;” The UDP defines Major (or large) Developments as 'Residential developments (whether by conversion or new build), involving the creation of 10 or more units, or where number of units is not known, those with a site area of 0.5 hectares; or other developments with a floorspace of 1000m ² or more or with a site area of 1 hectare or more.
London Borough of Ealing	Ian Weake Planning Policy Officer ian.weake@ealing.gov.uk 020 8825 7284	2nd Deposit draft Require all major developments (above a threshold of 1,000 sq m or 10 dwellings) to incorporate equipment for renewable power generation so as to provide at least 10% of their predicted energy requirements;
Sefton	Steve Matthews steve.matthews@planning.sefton.gov.uk	All proposals for major non-residential development will be expected to incorporate renewable energy production equipment to provide at least 10% of their predicted energy requirements from renewable sources.

London Borough of Waltham Forest	Ken Bolland Principal Planning Officer Ken.Bolland@lbwf.gov.uk	From all new commercial/industrial and housing developments over 1000 sq ms and 10 units respectively, to be from renewable energy sources, through on-site generation from renewable heat and power.
Bromley	Katie Ryde katie.ryde@bromley.gov.uk	2nd Deposit draft “Proposals for any development which will result in a gross floor area of 1000_sq m or more (or 100 or more Class C3 residential units) will be expected to incorporate on site renewable power generation equipment to provide at least 10% of the projected energy requirement from one or more renewable sources. Where it is proposed not to include renewable energy generation, the applicant will be expected to demonstrate why this is not feasible.”
Lambeth	Jessica Currie Sustainable Development Policy Officer JCurrie@lambeth.gov.uk 020 7926 6210	2nd Deposit Draft “Proposals for any development which will result in a gross floor area of 1000 sq m or more (or 100 or more Class C3 residential units) will be expected to incorporate on site renewable power generation equipment to provide at least 10% of the projected energy requirement from one or more renewable sources. Where it is proposed not to include renewable energy generation, the applicant will be expected to demonstrate why this is not feasible.” <i>(identical to Bromley policy above)</i>
Barking & Dagenham	Joe Baker joe.baker@lbbd.gov.uk	All developments above 2,000 square metres will be expected to incorporate renewable energy production equipment to provide at least 20% of predicted energy requirements”
North Devon	Andrew Austen Planning Policy Officer 01271 388 409 Peter Longworth peter_longworth@northdevon.gov.uk	The expectation will be that at least 15% of the predicted annual energy requirements of a particular development should be met by means of independent renewable energy generation. Depending on the scale and nature of development, such ‘micro’ generation could include combined heat power plants, fuel cells, wood fuel boilers, heat pumps, solar panels or photovoltaics. For the purposes of Policy ECN15 major development is defined as 1000 m sq (gross) or more of employment or retail floorspace or at least 50 dwellings.
Oldham Metropolitan Borough	Sarah Barker ppr.sarah.barker@oldham.gov.uk	NR3.3 For all major new developments, including residential developments comprising 10 or more units, and non-residential developments exceeding 1000m ² gross floorspace, the Council will require 10% of total predicted energy requirements to be provided, on site, from renewable energy sources.
Southwark	Sean Connolly	Policy 3.5 - Renewable Energy

	Sean.Connolly@SOUTHWARK.GOV.UK	All new developments including conversions and changes of use must, where practical, incorporate renewable energy sources. Major developments outside conservation areas are required to incorporate renewable power generation equipment to provide 10% or more of their predicted energy requirements.
Westminster	Mike Le Roy	There is a policy

Progressing		Comments
Newcastle City Council	Colin Percy Senior Policy Officer colin.percy@newcastle.gov.uk	Will build into LDF
Leicester City Council	Alison Lea leaaa001@leicester.gov.uk	Leicester City Council is currently in the middle of adopting a revised Local Plan and has a similar policy proposed.
Belfast City Council	Hugh James Killen hjkillen@hotmail.com	Hope to be able to introduce such a planning policy in Northern Ireland.
Liverpool City Council	Mike Eccles mike.eccles@liverpool.gov.uk	Actively considering adopting a renewable energy requirement policy.
Corporation of London	Paul Kennedy Energy Manager paul.kennedy@corpoflondon.gov.uk	Expression of Interest
Havering	Mark Lowers Energy Management Officer Mark.Lowers@haverling.gov.uk	Expression of Interest
Sedgefield	Neil Barnes Energy Officer nbarnes@sedgefield.gov.uk	At Sedgefield, we are actually planning to undertake a renewables feasibility study in the very near future to pinpoint and highlight opportunities and resources of renewable energy in the Borough.
Waveney	Andrew Wells andrew.wells@waveney.gov.uk	Actively progressing
Edinburgh	Ben Wilson ben.wilson@edinburgh.gov.uk	Actively investigating the possibility of incorporating a prescriptive renewable energy planning policy into their next local plan.
Cornwall	Sarah Young Landuse Consultants Young_s@bristol.landuse.co.uk	Investigating
Brighton & Hove	Sue Paskins sue.paskins@brighton-hove.gov.uk	Actively investigating
Charnwood BC	Sarah Cromie Sarah.Cromie@charnwoodbc.gov.uk	Seeking to progress through SPG
Telford & Wrekin	Janet Southern	Possibly developing LDF policy

	Janet.southern@telford.gov.uk Rachael Taylor Environmental Management Officer rachel.taylor@telford.gov.uk	
Kirklees	Robert Clark – Renewables officer robert.clark@kirklees.gov.uk Bill Edrich – bill.edrich@kirklees.gov.uk Phil Webber - phil.webber@kirklees.gov.uk	very interested in the idea
Lewisham	Rosemary Duckworth rosemary.duckworth@lewisham.gov.uk	
Worcestershire	Liz Alston EAlston@worcestershire.gov.uk	Ambition to propose renewable energy policy
Tower Hamlets	Harley Dibble Harley.Dibble@towerhamlets.gov.uk	Looking at the inclusion of a renewable policy within our first deposit draft UDP - to be out for public consultation in May.
Greenwich	Tony Winlow Energy manager Tony.winlow@greenwicj.gov.uk	Pursuing
Chester	Matthew Rushton matthew.rushton@cheshire.gov.uk	Considering
Crawley	Patrick Vickerman patrick.vickerman@crawley.gov.uk	Considering
Exeter	Alison Eldergill alison.eldergill@exeter.gov.uk	Considering
Blackburn with Darwen Borough Council	Helen Howie Forward Planner helen.howie@blackburn.gov.uk	actively investigating
East Devon	Steve Power spower@eastdevon.gov.uk	
Manchester	j.sadler@notes.manchester.gov.uk	Looking at
Calderdale	Tanya Christensen – Solar Development Officer Mike Harford in Planning	Adopted what is rumoured to be an extremely interesting “ramped” policy.
Bolton	Barry Simons Planning 01204 336 655 barry.simons@bolton.gov.uk	Framing policy

ANNEXE 4

Examples of conditions and S106 clauses used to date

Mole Valley

PIRA site Leatherhead: Police Federation HQ 6720 sq m, 127 flats

The following S106 clause was attached to the S106 agreement
subject to the submission of a scheme to be agreed in consultation with Surrey County Council showing measures to be taken to achieve 10% of the total energy consumption of the new development by means of renewable energy sources

Reigate & Banstead

Horley NE Sector 600 dwellings + outline planning application.

The following conditions are proposed (yet to be agreed by members):

Prior to the commencement of any development transparent predicted energy use of all buildings and the generation of on-site renewable energy shall be submitted and approved by the LPA. These details will demonstrate how energy efficiency is being addressed, including benchmark data, and show the on-site measures to be taken to produce a minimum of the total energy requirements of the new development by means of renewable energy sources.

Reason: To comply with the requirements of Structure Plan Policy SE2.

Prior to the commencement of any development either:

- a) details will be submitted of a centralised CHP generating plant (or plants) and the necessary infrastructure for the distribution of heat and electricity together with the proposed long-term management arrangements through an energy services company (ESCO) , or**
- b) a feasibility study shall be submitted that demonstrates why the use of centralised CHP is not being proposed for some or all of the development on the grounds of efficiency and/or cost.**

Reason: To comply with the requirements of Structure Plan Policy SE2.

ANNEXE 5

Benchmarking Energy Efficiency

Building Regulation Compliant

In terms of demonstrating compliance with Policy SE2 a very useful benchmark is to predict energy requirements in a building regulation compliant building of the same size and function (Part L deals with energy efficiency). Be wary of any 'baseline' figures achieved assuming electricity use for space heating. These will give a very high CO₂ emission base and thus make it easy to demonstrate savings in CO₂ emissions.

The building regulations Part L is currently being revised. The 2006 regulations will require a further 25% improvement on energy performance when compared with 2002 regulations. Will also move away from elemental performance standards to a final overall performance certificate (SAP 2005) on completion giving more design freedom

BREEAM

Another useful benchmark is the Building Research Establishment's environmental assessment method (BREEAM). BREEAM assesses the environmental performance of buildings and has a number of variants for different building types such as EcoHomes for houses. BREEAM measures a whole range of environmental indicators and not just energy but any development that has a high BREEAM rating⁴ (very good or excellent) will be designed to use energy efficiently and have much reduced CO₂ emissions.

Further information

For information on BREEAM see BRE website at www.bre.co.uk

SAP Ratings

The standard assessment procedure (SAP) is the Government's approved procedure for calculating an energy rating of dwellings. There are two ratings: The SAP energy cost rating is based on energy costs for space and water heating. The carbon index (CI) is based on the CO₂ emissions associated with space and water heating.

The current SAP scale (due to be revised) runs from 1 (extremely poor) to 120 (extremely good). The average existing UK home has a SAP rating of 40-50.

To comply with 2002 Building Regulations new dwellings should achieve a SAP rating of between 93 and 101 depending on the dwelling type (detached dwellings 93 – flats and terraced houses 101). If developers are serious about energy efficiency a

⁴ "we have concerns that the standard at its most basic level of "Pass" or "Good" may be too low to offer significant environmental gains. In their memorandum [ecoSE](#), a partnership of public and private sector bodies from the South East of England, proposed that all developments in the South East should at least meet the EcoHomes "Very Good" standard because the lower standards can allow developers to cherry-pick areas of compliance and do not guarantee a high all round performance" House of Commons Environmental Audit Committee, [Housing: Building a Sustainable Future](#) Jan 2005.

SAP rating of at least 100, or above for flats and terraced houses, should be anticipated. (See [Energy Efficiency Best Practice in New Housing](#); EST 2004. This gives SAP ratings for different dwelling types based on building regulation standards, and good, better and advanced practice)

In 1995, Building Regulations changed to require a SAP rating on every new home and since 2002 builders have to post a notice in every finished dwelling stating its rating.

CI ratings range from 1 – 10 with a rating of 8 or above representing an energy efficient dwelling.

Further information:

See SAP 2001 [BRE website](#)

National Home Energy Rating (NHER)

National Home Energy Rating (NHER) is based on an estimate of a home's total annual energy costs and goes further than the standard assessment procedure (SAP) applied through building regulations. NHER has a scale of 1 to 10 and incorporates factors such as location, lighting and appliances to predict running costs. The higher the score, the more energy efficient the building.

Further information:

www.nher.co.uk

ANNEXE 6

Frequently Asked Questions:

What exactly is the 10% contribution and how do you measure it?

This is either:

The baseline is the predicted delivered energy⁵ use of the site measured in kWh after the application of suitable energy efficiency measures and technologies (e.g. CHP). The on site generation or capture of renewable energy should be predicted to substitute for at least 10% of this baseline figure.

OR

The baseline is the carbon emissions arising from the predicted use of energy. On site renewable energy should reduce the baseline carbon emissions by at least 10%. This is the preferred approach and one which policy should move towards requiring.

Should we be looking to achieve more than 10% in the future?

The 10% target is a minimum so we should be looking towards achieving more now. LPAs should decide on an appropriate target when developing LDF policies. If higher figures are used it is more important to have a carbon based approach and be more discriminatory between the type and scale of development.

Does the 10% target apply to all developments?

Yes – in theory. In practice it is being applied to larger developments. Many authorities are adopting a threshold of 10 dwellings or 1000sq m (See Annexe 3) and LPAs will need to consider any appropriate thresholds in LDF policies. The most productive approach is going to be working with the development industry and some flexibility within the context of encouraging and promoting renewable technologies may be appropriate as experience and knowledge is developed.

Can the renewable energy requirement be reduced or foregone if energy efficiency is improved to get the same 10% reduction in energy demand?

As a general rule no. Energy efficiency and renewables are interrelated but they are still separate objectives. If CHP is proposed with community heating and a private wire network and combined with high levels of insulation then it would be for the applicant to demonstrate that the additional installation of renewable technology is not appropriate due to reduction in overall system efficiency.

⁵ Delivered energy is the energy equivalent of fuels delivered to a site usually in the form of gas or electricity. This will vary for buildings of similar type and construction depending on the efficiency of heating, cooling and lighting systems.

Can the renewable target be applied to extensions or change of use?

Again in theory yes. Particularly where larger buildings are being retrofitted with new heating systems in the context of change of use. The target could also be applied to larger extensions but some flexibility over predicted baseline figures may be required.

What would be the viability of wind power in Surrey?

At the large scale there are plenty of sites where generation could be viable – but these tend to coincide with environmental and landscape designations.

At the smaller scale individual micro-scale turbines attached to buildings could be perfectly viable with short pay back periods.

Does not wind power still require excessive back up generation?

Not if linked to the grid which is designed already to cope with huge fluctuations in demand

What are differences between PV and Solar Thermal?

Solar thermal produces hot water. PV electricity.

Is solar power financially viable?

This depends on building orientation, the technology used (PV is more expensive) and the timescale used to do the financial assessment. Solar thermal will cost around £1.5K - £3K to install in new build. PV will be in the order of £12-16K.

Where can you buy biomass fuel suitable for CHP in Surrey?

See database at www.LogPile.co.uk

Is CHP or CH viable for new housing developments?

It depends very much on scale, density and mix. CHP depends needs a reasonably consistent base demand for heat to be efficient (this can be converted to provide cooling). Hence CHP becomes more viable if heat can be used to supply a mix of uses through a community heating (CH) system of hot water pipes.

How small can CHP generation be?

Single household scale micro-CHP is now commercially available.

What grants are available for renewable energy?

Clear Skies	www.clear-skies.org
Community Energy	www.est.org.uk/communityenergy
Community Renewables Initiative	www.countryside.gov.uk/communityrenewables
Solar Grants	www.est.org.uk/solar

See funding database at Energy Saving Trust:

<http://www.practicalhelp.org.uk/localauthorities/funding/fundingdb/>

Is there a list of reputable consultants who can advise on renewable energy?

For advice, services and information re energy efficiency and renewable energy contact the following not for profit organisations:

Thames Valley Energy;	www.tvenergy.org
Energy Conservation and Solar Centre	www.ecsc.org.uk

ANNEXE 7

Examples of Good Practice

London Borough of Merton

Renewable energy policy PE13 implementation briefing Sept 04 2-4 Willow Lane, Mitcham, Surrey

Introduction

Willow Lane was a 4,500sqm speculative commercial development comprising of 10 units of varying sizes that are likely to be occupied by a mixture of storage and distribution, light fabrication, partial offices, light manufacturing etc.

Planning permission was granted on 19th Aug 04

This was the first time in the UK that a developer had been compelled to respond to a prescriptive renewable energy policy. Careful consideration needed to be given to the implementation of this policy, as this component of the application ensured that the Willow Lane development was unique. A number of issues, some unexpected, arose throughout the process and Merton liaised closely with many other boroughs, the GLA/LDA. Agencies, working parties, businesses and organisations etc.

Because of the renewable energy policies in the London Regional Government Spatial Development and Energy Strategy, and the new PPS22 guidance that establishes the legality of such policies, Merton was aware that there was considerable interest in this particular case, and as such, LBM considered both the site specific and wider strategic issues involved.

Scope of policy

The policy wording is: "ALL NEW NON-RESIDENTIAL DEVELOPMENT ABOVE A THRESHOLD OF 1,000 SQM WILL BE EXPECTED TO INCORPORATE RENEWABLE ENERGY PRODUCTION EQUIPMENT TO PROVIDE AT LEAST 10% OF PREDICTED ENERGY REQUIREMENTS. "

Calculation methodologies

When implementing the policy it is reasonable to assess the energy/carbon requirements for the basic building services such as lighting and heating. It is also realistic to include office equipment such as computers, photocopiers, kettles, fridges, fax machines etc (BRECSU stuff). However, it is clearly impractical to include energy required for manufacturing or mechanised processes. There are three reasons for this:

1. In most cases it would be impossible to generate the required energy needed to meet the 10% target from on-site renewable sources.
2. The only on-site renewable technology that could remotely begin to generate enough power to run machinery would be medium scale wind turbines, and it is extremely unlikely that planning permission would be granted. The only place that such turbines could possibly be sited would be on industrial sites and this would then penalise commercial development in these areas.
3. It would penalise manufacturers to a far greater extent than low energy businesses such as car show rooms or storage facilities. This would be divisive and potentially compromise commercial development in Merton (and anywhere).

Energy/Carbon - Clarification of policy interpretation

LBM and Cadogan agreed (in line with Gov & GLA thinking) that the policy should be interpreted through carbon emissions rather than raw energy usage. The London Plan, relating to the Mayor's strategy is also being interpreted as referring to the total "*Primary energy demand*" of a development and that this will be measured in terms of the "*Carbon burden of the energy demand and use*". This interpretation will ensure that the market is not distorted, electric heating is not encouraged, and the strategy gives due credit to reductions in CO₂ emissions from the use of renewable energy resources.

Energy/Carbon calculation data is based on the Building Regulations methodology:

- Electric energy - 1 kWhpa = 0.43 kilograms of CO₂ par annum
- Gas energy - 1 kWhpa = 0.19 kilograms of CO₂ par annum

As a speculative development, it is impossible to establish a baseline energy/carbon footprint. As such it rules out water heating renewable technologies that might normally be used to pre-heat water for central heating and showers etc. Without knowing how many people will be occupying the commercial units, and for what purpose, it isn't possible to determine how much hot water might be needed, or how many solar thermal panels would be required to generate it. This logic also applies to Ground Source Heat Exchange systems and Combined Heat & Power Units. Unlike electricity generating technologies it is impossible to sell the hot water on to a third party - unless there is a district heating infrastructure available. The result is that only electricity generating technology can be used to meet the policy in this specific case.

However, the developer will not be installing heating (water boilers), or lighting systems in the individual units, leaving the option of installing these to the final occupant. As such this confirms that the only energy/CO₂ baseline is for electrical energy usage.

In implementing Policy PE13/E11 LBM were in agreement with Cadogan Consulting Engineers (and the GLA) to establish the baseline energy usage of the proposed development through the Government's "Energy Efficiency in Industrial Buildings", Sites Guide 18 and Benchmarking Tool for Industrial Buildings Guide 81.

Merton has agreed with Cadogan that the original carbon footprint = 108,200 kilograms of CO₂ emissions per annum.

Therefore (in theory) LBM expected the developer to cut that carbon footprint by 10% (10,820 kilograms of CO₂) through the use of renewable energy equipment. If however, the predicted CO₂ emissions were reduced through the use of energy saving measures in the design of the building, then the CO₂ reduction required through the use of renewable energy to meet the 10% would fall proportionately.

Water

Although water usage is not normally factored into a building's carbon footprint, it is an issue of increasing importance. Carbon is the accepted cause of global climate change, with water shortages one of the results of it. The Environment Agency is keen to see water saving measures incorporated into new building developments, and the installation of dual flush toilets, efficient taps and showers in the Willow Lane development will save around **700,000 litres** per year.

The current Building Research Establishment data on CO₂/water is: 1 kWhpa per 1,000 litres of purified water. However, the projected increase in this ratio will triple by 2020 to 3 kWhpa per 1,000 litres (data source Ove Arup). With reference to the lifecycle of the Willow Lane development I have settled on a (conservative) ratio of: **2 kWhpa per 1,000 litres of water.**

Infrastructure implementation proposal

- Install wind turbines x 10
- Install 5kW of PV solar panels
- Use passive stack ventilation for the 12 toilets
- Install water saving taps, toilets and showers
- Install custom designed recycling facilities
- Use recycled construction materials

Issue of unit occupation and energy usage

It is impossible to determine how many, and which of, of the 10 units will ultimately install water boilers. If some of them do not, then the wind turbines and PVs will generate more than the policy expectation of 10%.

If all the units are heated then the proposal above will deliver a CO₂ reduction of 6.2%. This is clearly not sufficient for LBM to claim that they have successfully implemented the policy. This can only be done if the final occupant's installs energy efficiency measures, in this case, condensing boilers instead of conventional ones, and energy efficient lighting systems.

Therefore LBM should require the developer to provide a cash fund as part of a section 106 agreement, that can be accessed by the final occupier to cover their additional costs of upgrading from conventional to condensing boilers, and from conventional to energy efficient lighting systems. Subject to final unit cost clarification the fund will need to be approximately £6,000.

If this approach is progressed then the minimum level of overall CO2 reduction will be 17.6% of which 7.5% will come from on site renewable energy equipment. *(This figure was collectively agreed by LBM as being acceptable at a corporate and political level. It should be stressed however, that the flexibility allowed in this specific case does not set a precedent that allows developers to assume that the 10% target has been abandoned. In any future cases 10% is the initial expectation. A developer will have to present a very robust argument as to why this target is not realistically achievable.)*

The realistic maximum achievable is a total CO2 reduction of 21% of which 15% would come from renewable energy. Taking into consideration the average number of units likely to be used for storage and distribution, and therefore not requiring heating systems, it is reasonable to speculate that the most likely result will be a CO2 reduction of 19% of which 11.2% will come from renewable energy equipment.

Advantages of this proposal

1. It provides an opportunity to possibly exceed the 10% renewable energy target if not all the units install heating systems.
2. If some of the units do not ultimately have heating systems, then the developer could claim that they were being forced into providing more than 10% from renewables.
3. Wind turbines are a very efficient way of generating electricity. They are a technology that has limited application potential in urban areas, and the proposal to install 10 of them on an industrial park, one of the few urban locations currently acceptable, should be welcomed. The units to be installed are referred to as micro-wind turbines. They are 1.5 meters in diameter and are sited on 4 meter high supports. They are extremely quiet (silent at a distance of 20 meters), and unobtrusive.
4. Only 5 of the 10 units are orientated to suit PVs. The installation of 5kW of (Poly-crystalline) photovoltaic panels will cover about 50sqm. It is likely therefore that the developer will install the complete 5kW system on only one of the 5 units possible as this would cost less than installing 1kW on each of the 5 units. This may raise the possibility of generating excess electricity if the unit is ultimately occupied by a low energy user.
5. Water. Although the incorporation of water use into the carbon "footprint" has little effect on the overall figures, the issue is nevertheless of increasing importance.
6. Recycled construction materials. Construction materials are not factored into the CO2/energy emissions footprint. However, if the developer uses recycled materials then this will set a good example for the future and help stimulate the demand for such products.
7. It delivers an interesting range of measures, and can be promoted as an exemplary renewable energy/energy saving development.
8. It proves that the policy can be successfully implemented in collaboration and partnership with a developer without confrontation and bad feeling, thus alleviating one of the key concerns of the ODPM, DTI, GLA and other local planning authorities.

Disadvantages

1. Considering the location of the site, and the current economic circumstances of London and the SE, it is reasonable for LBM to maintain that requiring additional photovoltaics at a cost of approx £70,000, might not compromise the commercial viability of this particular development.
2. Because this is the first time the policy has been responded to in the UK, LBM should take the opportunity to prove that it is possible to implement the policy without compromising the viability of the development.

Development Control Report

The Principal Environment Officer (who had responsibility for implementing the policy) submitted the following to the DC officer dealing with the case.

Merton's UDP Policy PE13/E11 states that: "ALL NEW NON-RESIDENTIAL DEVELOPMENT ABOVE A THRESHOLD OF 1,000 SQM WILL BE EXPECTED TO INCORPORATE RENEWABLE ENERGY PRODUCTION EQUIPMENT TO PROVIDE AT LEAST 10% OF PREDICTED ENERGY REQUIREMENTS."

"This is the first time that a developer has been required to respond to a prescriptive renewable energy policy in the UK. In view of this LBM has consulted widely with technical experts, the Greater London Authority and with officers, councillors and interested individuals in Merton.

In line with GLA and Central Government thinking, LBM is interpreting the policy in terms of carbon emissions rather than raw energy usage. The London Plan, relating to the Mayor's strategy is being interpreted (by GLA officers) as referring to the total "**Primary energy demand**" of a development and that this will be measured in terms of the "carbon burden of the energy demand and use". This interpretation will ensure that the market is not distorted, electric heating is not encouraged, and the strategy gives due credit to reductions in CO₂ emissions from the use of renewable energy resources, (*Faber Maunsell Energy Consultancy report on behalf of GLA and DTI*).

In response to PE13/E11 the developer proposes to incorporate a combination of micro wind turbines, photovoltaic solar panels, passive stack ventilation, and water saving taps and toilets, custom designed recycling facilities, and to liaise with London Remade on the possibility of using recycled construction materials, (*water saving and recycling contribute to CO₂ reduction*). However, the above measures alone will not completely deliver sufficient CO₂ savings.

Therefore, the developer should be required to set aside a cash fund for 2 years as part of a section 106 planning agreement, that can be accessed by the final occupiers of the 10 commercial units, to cover their additional costs of upgrading from conventional to condensing boilers, and from conventional to energy efficient lighting systems.

The developer should also be required to liaise with LBM to ensure that only condensing boilers and energy efficient lighting systems are installed in any units that intend to install any form of water based heating or mains powered lighting.

It is the view of the Business and Environmental Partnerships Unit that the proposed infrastructure measures, along with the set aside fund, adequately meets the expectations laid out in policies PE13/E11 of the adopted UDP."

Partnership approach

PE13/E11 should not be a policy that costs businesses sizable sums of money. Many in the business community possess the same environmental concerns that Government and society have, but if they feel that the cost of addressing these concerns is going to unreasonably fall on their backs, then they will understandably complain. With this in mind the best approach is to work in close collaboration with developers and the business community to establish a partnership approach to the implementation of this new and evolving policy concept.

Viability

There are five possible issues that developers could raise in defining “viability”. Points 2, 3 & 4 might provide grounds for going to appeal. Point 4 is an issue for future discussion at a national level, but should, nevertheless be factored into LBM’s decision as it will be relevant in the future implementation of the policy. It should be remembered that Justification clause 4.166 of UDP Policy PE13 states that: *“Where incorporating renewable energy production equipment is shown (by the applicant) to make the development unviable, it would not be expected.”* It does not say “commercial viability” – just “viability”.

1. A basic site appraisal mechanism whereby the expenditure is balanced against the income and an assessment made as to whether the cost of meeting the policy cuts into the profits sufficiently to compromise the overall “commercial” viability.
2. The developer may interpret the clause in relation to the “commercial” viability and logic of the renewable energy equipment. This could be legitimately argued if the capital payback timeframe exceeds the lifespan of the infrastructure.
3. The developer may consider that the Willow Lane development is inextricably linked to their corporate development portfolio, and conclude that the wider financial ramifications of this policy compromise the commercial viability of this, and future, developments. This could be particularly relevant when such policies are implemented in more economically deprived regions.
4. That it is impossible to determine what constitutes “viability”. A large national company would be able to absorb a greater capital cost outlay than a smaller consortium or individual developer. This would also be a relevant issue in more economically deprived regions. The boundary between viability and profitability is a matter of speculation.
5. That “viability” could be determined not just by commercial concerns but also by infrastructure management, architectural, marketing, etc. For example: it might be that a potential end use is suspicious of renting premises partially powered by a wind turbine on the roof, and choose not to take up occupancy. If this were the case then the developer could easily claim that the policy rendered the development unviable. *With this in mind it is essential to implement the policy in collaboration with the developer from the outset.*

Benefit to local businesses

One of the initial rationales for adopting Policy PE13/E11 was to help make local businesses more competitive by lowering their monthly fossil fuel bills. However, this is only realistic when the infrastructure payback timeframes are within commercially realistic time-scales.

If the cost of the renewable infrastructure is, for example, 5% of a developer’s profit, then they must be reasonably sure that they can recuperate this capital outlay by marketing the premises at a premium using the reduced monthly fuel bills as a selling point. However, this approach will only work if the occupier can see a return on their additional outlay within a reasonable time. This would not be the case if the energy came from large-scale PV installations that have a payback time of between 25 to 40 years. It is true that these payback times will fall as the cost of fossil fuel rises and hopefully the cash value of selling back into the national grid rises, but it is currently unrealistic to expect occupiers of speculative commercial development units to factor such an unfamiliar and complex issue into their business plans.

Therefore, there is the real possibility that either the developer or the landowner (or both) might have to carry (grudgingly) the 5% cut in profits. It is this prospect that has so concerned the Government, and many local planning authorities around the country.

It should be noted that this issue will only be relevant when electricity generating renewable technology is the only option for meeting the policy. Systems used for heating water for radiators & showers etc are much cheaper, often with payback times of less than 7 years.

Technical appraisal and associated costs

Because the developer has been the first in the UK required to respond to a renewable energy policy it was necessary for them to commission a detailed technical appraisal examining the renewable and energy saving options available. This report has cost them several thousand pounds. The GLA/DTI have since contracted Faber Maunsell to produce a similar, though more detailed, "toolkit" manual to be available free of charge for future developers. Therefore, it is also reasonable that this unique expenditure by the developer should be included into LBM's assessment of the costs that the developer have incurred in order to respond to the policy.

Flexibility issues

Whilst it might have been reasonable for LBM to maintain that the capital costs for the developer to meet the full 10% would not have compromised the commercial viability of this particular development, *and that the energy saving measures proposed are relatively inexpensive and would most likely have been progressed as a means of reducing the amount of renewable energy equipment required*, this should not necessarily be the most important consideration when implementing the policy for the first time. As has already been mentioned, this was a unique situation.

The idea of renewable energy planning policies is still fragile in the collective conscious of Gov Depts, the GLA and other boroughs. Many individuals and organisations in the business community are either openly hostile to, or understandably cautious of, such policies, arguing that they could compromise economic growth. With this in mind LBM should resist adopting a "demanding" or confrontational approach with respect to the Willow Lane (or in the short term, any other) development.

Such thinking is in line with the LBM UDP inspector's guidance that asked for the word "require" to be replaced by "expect". At the risk of engaging in semantics it is accepted that the word "expect" provides a degree of flexibility on the 10% target for both the developer and the planning authority. Although the Mayor's SDS uses the word "require" – no percentage target has been set, and in the absence of that it amounts to the same thing.

LBM must accept however, that by adopting a flexible approach it could be perceived as having relinquished 2.5% of possible renewable energy generation (if all the 10 units ended up being heated), and thus expose itself to the accusation of having been "weak". It is also possible that if it appears LBM are letting the developer "off the hook" by not requiring full compliance, it could set a precedent for other boroughs that could possibly result in the 10% target being abandoned for something lower, ultimately reducing carbon savings in the long term.

Despite these reservations, LBM concluded that by adopting a flexible, and holistic approach, it would be able to implement the policy successfully despite the uncertainties surrounding the occupation and energy usage/carbon emissions of a speculative commercial development.

Consultation

One of the rationales for adopting the policy was in response to the Government's commitment to seek a reduction in CO₂ emissions of 10% by 2010. Also that a reduction in CO₂, and other gas emissions, would result in better health and environmental conditions for Merton residents.

However, atmospheric conditions do not remain static over the geographical area of Merton, and therefore the potential benefits to Merton residents are inextricably linked to the widespread adoption of similar policies by other Local Authorities and Regional and National Governments. Because of this LBM consulted widely before reaching any final decision on the first implementation of the policy.

Below is a list of these partners and organisations that have been consulted:

Some of the consultees were interviewed at length, whilst some only had the opportunity to convey their views in brief. The basis of the consultation question is simple: If confronted with the two following (colloquially phrased) options which would you proceed with?

- a) Reduce the overall carbon emissions by at least **17.7%** of which **7.5%** would come from renewables. That this is complemented by water saving infrastructure, custom designed recycling facilities and the use of recycled construction materials.
This is mutually agreed with goodwill and in collaboration with the developer.

Or

- b) Reduce the overall carbon emissions of the building by **19%** by requiring the developer to meet the full 10% target by installing photovoltaic panels at an additional cost of approx £70,000 over and above the cost of option a).
This would be achieved without the goodwill and collaboration of the developer.

The overwhelming, almost unanimous, response was for option a)

Establishing long term success

1. If the policy concept is challenged, either at Inquiry or through concerted lobbying, then there is a risk that the policy could be undermined or the 10% target reduced. Whilst the Mayor's SDS states an expectation that large developments should incorporate renewable energy equipment, there is no percentage threshold quoted, though the Mayor's Energy Strategy does establish the 10% target.
2. Merton has a responsibility to ensure that the policy is implemented in a way that does not alienate other boroughs from following our lead. In these first few cases success should be determined not simply by the percentage target of renewable energy negotiated, but also by the developer's perception of success. The long term success of renewable energy planning policies in delivering significant carbon reduction and stimulating the micro-renewable economy will come partly from the "perceived" success during this initial implementation phase.
3. From a strategic long-term perspective, the mainstreaming of energy efficiency and micro-renewable technology will be an evolutionary process. New factors will soon come into play that will drive the process such as increases in the cost of fossil fuels, carbon trading through Renewable Obligation Credits (ROCs), changing policy, and advances in technology.
4. As more boroughs adopt these policies then the economies of scale will grow. Conversely as unit prices fall then more boroughs will feel secure in actively implementing such policies and percentage targets can subsequently rise. This is the symbiotic relationship between the economy and the policy - they will feed off each other.
5. One of the key barriers to mainstreaming electricity generating micro-renewables is the lack of a secure legal and financial mechanism for selling excess power back into the nation grid system. It should be noted that other European countries have addressed this issue by introducing "feed-in" legislation that compels national distributors to buy this excess micro-renewable power at a commercial sales rate. Such legislation was past in Germany over 10 years ago, and in Spain in 2003. This has brought the PV capital cost payback timeframe in these countries down to below 10 years.

The future

The lessons learned from the implementation of the policy, and the national debate that has surrounded it, are now being factored into Merton's new Local Development Framework and other development plans. The force with which such policies are designed and implemented are significantly determined by the capital infrastructure overheads. In respect to new-build residential properties, particularly low rise, the additional costs for a solar thermal system is likely to be approx 2%, and therefore Merton may adopt a separate LDF policy that will require every new home to install one. It will retain the existing policy for commercial development that uses the word "expect" to ensure a necessary degree of flexibility. A third policy is being examined that may expect residents investing in their properties through loft conversions, division to rent or extensions, to also install micro-renewable equipment.

Conclusion

The internationally recognised Sustainable Development orthodoxy is to adopt the precautionary principle in relation to issues like climate change and carbon emissions. In practice this means that whilst there is still a great deal of debate about the science, it is prudent to adopt remediation measures in the event that the worst-case scenario proves to be the reality. Similarly, the same principle should be adopted with respect to the implementation of this local renewable energy policy, at least until it is embedded more securely into the mainstream. To use a colloquialism - it's always best to go easy on a first date!