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South Cambridgeshire District Council

2 July 2008

To: Members of the Climate Change Working Group – Councillors AN Berent, Mrs VG Ford, R Hall, Dr SA Harangozo, JA Hockney, Dr DR de Lacey, CR Nightingale, PW Topping and Dr SEK van de Ven

Quorum: 3

Dear Councillor

You are invited to attend the next meeting of **CLIMATE CHANGE WORKING GROUP**, which will be held in **MONKFIELD ROOM, FIRST FLOOR** at South Cambridgeshire Hall on **THURSDAY, 10 JULY 2008** at **10.00 a.m.**

Yours faithfully
GJ HARLOCK
Chief Executive

The Council is committed to improving, for all members of the community, access to its agendas and minutes. We try to take all circumstances into account but, if you have any specific needs, please let us know, and we will do what we can to help you.

AGENDA

PAGES

1. Election of Chairman

2. Appointment of Vice-Chairman

3. Apologies for Absence
To receive apologies for absence from committee members.

4. Declarations of Interest

5. Minutes of Previous Meeting **1 - 4**

6. Upper Cambourne Planning Application - Update
The current outline planning application for 950 extra homes at Upper Cambourne is currently under discussion and potentially subject to amendment and a master-planning process. As requested at the previous Working Group meeting, the New Village / Special Projects Officer (Cambourne) will supply members with an update on progress.

7. Utilising Renewable Energy Resources within South Cambridgeshire **5 - 70**
At the last meeting of the Working Group, members considered the emerging direction and draft content of the Enviros report that was

commissioned earlier this year to review and analyse South Cambridgeshire's renewable energy resources. The objective of this report is to prioritise appropriate Council and Local Strategic Partnership (LSP) activities that will help ensure that the district can make the best use of its renewable energy resources in directly and tangibly steering itself towards low-carbon living in a low-carbon economy. The brief for the report placed a particular emphasis upon community-focused options at the village/parish level. The final report has now been completed with a presentation made to Council and LSP members and partners at a seminar on 4th July 2008.

Members are asked to consider what should be the key substantive content and format of a detailed phased and resourced implementation plan which takes account of:

i.) the report's conclusions;
ii.) the output of the recent seminar, and;
iii.) the current Local Public Service Agreement (LPSA) Reward Grant submission (£250k community-focused capital bid – considered and approved by members 17th January 2008).

The full Enviros report is attached for members' consideration (and for reference a copy of the LPSA reward Grant bid). The relevant findings and outputs from the 4th July seminar will be presented verbally.

Maps enclosed with the paper copy of the agenda in black and white can be viewed in colour on the Council's website by following the links from www.scambs.gov.uk/meetings > Committees

8. Consultation on a UK Renewable Energy Strategy **71 - 100**

The Department for Business Enterprise and Regulatory Reform (BERR) has recently (26th June 2008) opened consultation on a *UK Renewable Energy Strategy*. This is potentially a very important document and members are asked to review the attached Executive Summary with a view to considering how best to draft a Council response to the consultation process. The list of consultation questions is also attached. A 'sifting' of this list for those areas of particular interest and relevance to the Council could make a useful starting point for consideration. The consultation will close on 26th September 2008 with responses helping to shape the new strategy which will be published in spring 2009. The full document and further details can be found at: http://renewableconsultation.berr.gov.uk/ .

9. Date of next meeting

18 September 2008 at 10.00am

Agenda Item 5

SOUTH CAMBRIDGESHIRE DISTRICT COUNCIL

Minutes of a meeting of the Climate Change Working Group held on Thursday, 15 May 2008 at 10.00am

PRESENT:	Councillor Dr SA Harangozo – Chairman	
Councillors:	AN Berent	R Hall
	Dr SEK van de Ven	
Officers:	Richard Hales	Strategic Sustainability Officer
	Ian Senior	Democratic Services Officer

Apologies for absence were received from Councillors NN Cathcart, Dr DR Bard, JA Hockney, CR Nightingale and MP Howell.

44. DECLARATIONS OF INTEREST

Councillor SA Harangozo declared a personal interest as Chairman of the Comberton Renewable Energy Group.

45. MINUTES OF PREVIOUS MEETING

The Climate Change Working Group approved, as a correct record, the Minutes of the meeting held on 13 March 2008.

In connection with Minute no. 40 (Melbourn Village College – drame project), Members asked that the Strategic Sustainability Officer consider how best to build on the enthusiasm of those involved with the production.

In connection with Minute no. 41 (Energy saving in schools and community buildings), Members asked that the Strategic Sustainability Officer explore the possibility of partnership working with Cambridgeshire County Council.

46. UTILISING RENEWABLE ENERGY RESOURCES WITHIN SOUTH CAMBRIDGESHIRE

Gareth Ellis, Project Leader with Enviros, was in attendance to assist Members with this matter.

Further to Minute no. 39, Members considered a draft report prepared by Enviros Consulting Ltd in March 2008.

The Chairman highlighted the need for the Climate Change Working Group to

- Identify its objectives in respect of renewable energy resources
- establish its role as a reference group for the Local Strategic Partnership (LSP) on such matters
- arrange a workshop, as early as June 2008, directly involving the LSP and a number of identified stakeholders

Those present discussed the following:

- the need to highlight community projects
- showcasing the concept of community wind power
- financial aspects of encouraging energy efficiency, the use of match funding opportunities and the possibility of using LSP Award monies

- multipliers
- the social structure of South Cambridgeshire
- the leadership and publicity roles of the District Council
- a holistic approach to the subject

The Chairman said that the Council should target its support in the first instance and, in particular, encourage and promote individual green villages and schools. It could then build on its successes.

The Strategic Sustainability Officer suggested that the Council should be seeking to address a broad cross-section of South Cambridgeshire residents, requiring it to devise methods and arguments that would command wide appeal not only amongst those who aspired to reducing their carbon footprint but also those for whom the most important issue was to reduce costs in the context of rapidly increasing fossil fuel prices.

47. NORTHSTOWE

The Chairman observed that there was ongoing convergence of views as held by the Climate Change Working Group and Local Planning Authority. The important issue now was to persuade the joint promoters of Northstowe to acknowledge the concerns expressed and work with the Council to secure a development that embraced as many council expectations as possible on the issue of climate change mitigation and adaptation.

The Climate Change Working Group agreed that the Council's Director of Joint Planning should be invited to its next meeting to discuss progress of the Northstowe planning application.

48. CLIMATE CHANGE WORKING GROUP - DRAFT FORWARD PLAN 2008-09

The Climate Change Working Group considered a forward plan for 2008-09, drafted in May 2008.

As priority areas, the Climate Change Working Group identified the following:

- Business and commercial carbon reduction (Theme C – Community leadership)
- Community Renewables (a South Cambridgeshire District Council-led Local Strategic Partnership project) (Theme C – Community Leadership)
- Northstowe (Theme A – Growth Areas and Land Use Planning)
- Procurement (Theme B – Own estate and operations)
- Website (a South Cambridgeshire District Council-led LSP project) (Theme C – Community leadership)
- Working with parishes and schools (Theme C – Community Leadership)

Members approved as additional items on the forward plan

- Energy conservation of Listed Buildings
- National Indicators relating to climate change
- Secure bike areas at bus stops
- Sheltered housing energy audit

The Climate Change Working Group suggested that the Scrutiny and Overview Committee might wish to review the issue of recycling, focussing (in conjunction with Cambridgeshire County Council) on initiatives in schools.

As part of the agenda for the Climate Change Working Group meeting in July 2008, the Chairman instructed the Strategic Sustainability Officer to arrange for a Cambourne

presentation to be made and for Members to be given the opportunity to consider appropriate revisions to the Council's climate change policy. He stressed the importance of the Working Group strengthening its engagement with the Local Strategic Partnership process, and remaining strategically focussed.

49. DATES OF FUTURE MEETINGS

Members noted that, during 2008-09, the Climate Change Working Group was scheduled to meet at 10.00am on 10 July 2008, 18 September 2008, 13 November 2008, 8 January 2009, 12 March 2009 and 14 May 2009.

The Meeting ended at 12.15 p.m.

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A REPORT BY ENVIROS CONSULTING LIMITED: JUNE 2008

SOUTH CAMBRIDGESHIRE DISTRICT COUNCIL

UTILISING RENEWABLE ENERGY RESOURCES WITHIN SOUTH CAMBRIDGESHIRE

QUALITY CONTROL SHEET

Publication title	Utilising Renewable Energy Resources within South Cambridgeshire
CAN	SO0790002
Volume number	Volume 1 of 1
Version	Final Report
Date	June 2008
File Reference	South Cambs Renewable Energy Report.doc

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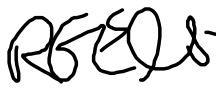

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GLOSSARY

APPENDICES

1. Energy and CO_2 data for South Cambridgeshire
2. Existing Renewable energy installations in South Cambridgeshire
3. Grant and Funding Schemes
4. Regional Renewable energy installers and suppliers

EXECUTIVE SUMMARY

This study investigates the options for encouraging renewable energy development in South Cambridgeshire. The focus is on how to stimulate community involvement and encourage more community and household scale projects.

The three central objectives of this study are:

- Inform and support development of policy, for the Local Strategic Partnership
  - Identify and justify actions South Cambridgeshire District Council (SCDC) can take, using their own resources, to support renewable energy development.
- Provide an evidence base for development of planning policy in the Local Development Framework.
- Provide guidance on how the district council can provide leadership in the implementation of renewable energy technology.

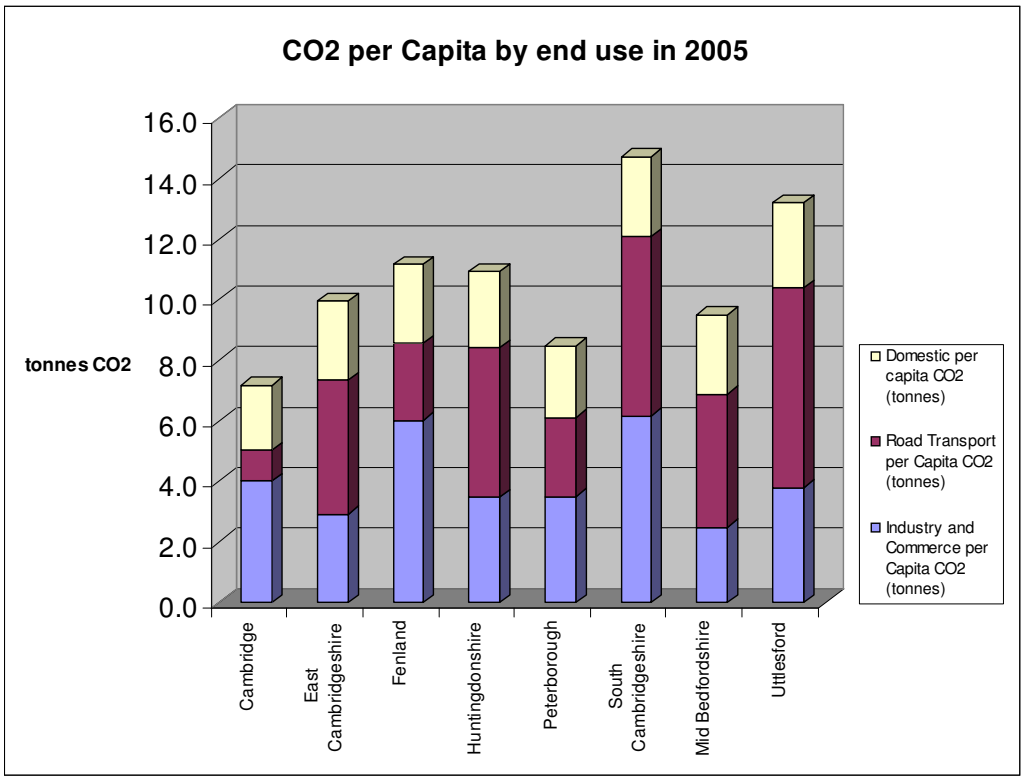
To achieve these objectives, this study has carried out the following tasks:

1. Establish current energy consumption and carbon emissions baselines for South Cambridgeshire
2. Identify existing renewable energy installations and review the current status of the local renewables market in South Cambridgeshire
3. Assess the availability of renewable energy resources in South Cambridgeshire
4. Review policies and schemes for supporting renewable energy development, and identify those appropriate for South Cambridgeshire.
5. Recommend practical actions that SCDC can take to support the use of the district's renewable energy resources, with a focus on the areas where they can have most influence - through supporting local community groups and through local planning policy.

Energy use in South Cambridgeshire

The current use of energy in South Cambridgeshire is higher than in neighbouring districts. This is likely to be due to the rural nature of the District combined with high levels of commercial and industrial development around Cambridge with the consequent high transport and commercial energy use. The higher use of energy results in higher CO_2 emissions. These will need to be tackled by a combination of energy demand reduction, energy efficiency and the deployment of renewable energy.

Comparing energy use in terms of CO_2 emissions per Capita



Renewable energy resource in South Cambridgeshire

The renewable energy resource across South Cambridgeshire is mixed with some windy areas (in the North, West and Southeast), a significant concentration of buildings (likely to provide easy access for solar energy) and major arable production (providing the possibility of biomass production). There are a number of recent renewable energy projects but the overall capacity is low. The greatest potential for local use of large scale wind is in the West and South East of the District. The District has a significant biomass resource in the form of straw, which in energy terms equals the amount of gas consumed by industry and commerce.

Key renewable energy resources readily accessible in South Cambridgeshire include

- **Wind**
- **Solar**
- **Biomass**
- **Ground Source**

Prioritising Community Renewables

There are a wide range of options and opportunities for developing renewable energy projects in South Cambridgeshire. These need to be prioritised to ensure limited resources and funding have the maximum impact in the short term. A short term strategy should focus on funding community projects which are quick to implement and have a demonstration value which will multiply the impact.

When comparing the technologies it is relatively easy to judge which give the greatest impact in CO_2 reduction terms for a given investment. However, it is not so easy to take into account the potential multiplier effect, which a community scheme may have. The following tables attempt to make this comparison.

Comparison of Community Renewables by payback and CO_2 savings costs

	kW				tonnes CO_2	
Photovoltaics	2	£12,000	£210	57	0.8	£15,929
Roof mounted wind	1	£3,000	£79	38	0.3	£10,619
Mast mounted small wind	6	£21,000	£946	22	3.4	£6,194
Medium scale wind	15	£45,000	£2,628	17	11.3	£3,982
Medium scale wind	50	£125,000	£8,760	14	37.7	£3,318
Large scale wind	2,000	£2,400,000	£350,400	7	1,883.4	£1,274
Small scale hydro power	10	£50,000	£4,380	11	18.8	£2,655
Solar thermal	2.5	£3,000	£84	36	0.5	£6,554
Ground Source Heat Pump	10	£10,000	£329	30	4.2	£2,403
Air source heat pump	10	£6,000	£183	33	4.2	£1,442
Wood pellet stoves	8	£2,400	-£26	-91	1.7	£1,384
Domestic scale wood boilers	15	£7,500	£123	61	5.4	£1,384
Larger scale wood boiler	300	£90,000	£9,444	10	108.4	£830
Wood fuelled CHP	150	£350,000	£60,293	6	179.0	£1,955

* * Assuming electricity 8 p/kWh (plus 4 p/kW ROC) heat 3.5 p/kWh; wood pellets 2.5 to 3 p/kWh, wood chip 1.25 p/kWh

Note the payback calculation is based on capital cost without grant. Also the fuel costs have been included but maintenance costs have not.

Table 3 compares the technologies in terms of payback and in terms of CO_2 saving per capital investment. It is clear that large scale applications such as wood heating and wind turbines have the quickest payback and the best CO_2 saving against capital investment. However, the capital investment required for just one large wind turbine runs in to millions.

Given a limited amount of capital to invest, say £100,000, it is interesting to see how far that goes and whether there is the potential for a multiplier effect. In other words, will a demonstration project help to inform and encourage others to invest in the same applications?

Comparison of technologies by "multiplier effect"

	Unit size kW	Cost per installation	CO_2 saving tonnes	Community demonstrations which can be funded with £100k*+	Overall saving tonnes CO_2	Multiplier to equal CO_2 saving from large scale wood boiler	Is this multiplier effect likely for this technology
Photovoltaics	2	£12,000	0.75	17	12.8	16	No
Roof mounted wind	1	£3,000	0.28	67	18.9	10	No
Mast mounted small wind	6	£21,000	3.39	10	33.9	5	No
Medium scale wind	15	£45,000	11.30	4	45.2	4	No
Medium scale wind	50	£125,000	37.67	2	75.3	2	?
Large scale wind	2,000	£2,400,000	1,883.40	0.08	157.0	0	?
Small scale hydro power	10	£50,000	18.83	4	75.3	2	No
Solar thermal	2.5	£3,000	0.46	67	30.7	6	Yes
Ground Source Heat Pump	10	£10,000	4.16	20	83.2	2	No
Air source heat pump	10	£6,000	4.16	33	137.3	1	Yes
Wood pellet stoves	8	£2,400	1.73	83	144.0	1	Yes
Domestic scale wood boilers	15	£7,500	5.42	27	146.3	0	Yes
Larger scale wood boiler	300	£90,000	108.41	2	216.8	-	Yes
Wood fuelled CHP	100	£350,000	179.03	0.57	102.3	1	?

* Assuming have £100,000 fund which provides 50% funding for demonstrations

+ Assumes large wind tubine receives £100k partial investment

In table 4, the number of typical installations of each technology, which could be funded with £100,000 is calculated. The resultant total CO_2 savings are then calculated. £100,000 is enough to fund two large wood boiler installations (such as for a school) assuming 50% of the cost can be funded from elsewhere (Government grants for example). This results in 216.8 tonnes of CO_2 savings each year.

The same investment in photovoltaics results in 17 community installations (of 2 kW each) (such as for a village hall roof). However the CO_2 savings from this investment are only 12.8 tonnes of CO_2 each year. The next column shows how many further private installations would be required to reach the same CO_2 saving as the wood boiler investment. This is 16 household size photovoltaics installation inspired by each community installation. Even with other grants and incentives, this figure seems unlikely.

By comparison, the same £100,000 could fund 67 small scale solar water schemes (for a school, or a village hall or a pub). This achieves CO_2 savings of 30.7 tonnes of CO_2, better than the Photovoltaics but still a long way short of the wood boiler. However if just 6 installations are then inspired or prompted by each these 67 then

the overall CO_2 savings are the same as the wood boiler. This does seem achievable. Solar thermal systems are more affordable than Photovoltaics and there is greater availability of installers and suppliers.

The technologies most likely to have a multiplier effect are solar thermal, wood heating and air source heat pumps installed in community buildings such as village halls and schools.

This "multiplier effect" could be encouraged by asking community groups seeking funding for their community projects to set out in their applications how they will promote and disseminate information on the project and also how they will capture information on further installations and CO_2 results achieved. The new EEDA Cut Your Carbon Programme incorporates this approach.

Key technologies to promote in Community Projects, which will also encourage uptake by householders, include:

- **Solar thermal**
- **Wood heating**
- **Air source heat pumps**

Supporting Community Renewables

There are a number of new and continuing funding options for renewable energy projects. These include the government's Low Carbon Buildings Programme, EEDA's Cut Your Carbon programme and a new lottery fund managed by the Building Research Establishment called Community Sustainable Energy Programme.

Accessing funding and establishing projects can be daunting for community groups made up of volunteers often without relevant expertise. Establishing a network, supported by the council, would help facilitate a community approach by attracting support from private sector companies and by encouraging the sharing of ideas and support between communities.

Key Short Term Actions

- **Establish support network and help communities access other funding and support**
- **Target funding at whole village/community approach and encourage a "multiplier effect" from demonstration projects (link in with or use EEDA Cut Your Carbon methodology)**

Longer term development of Renewable Energy in South Cambridgeshire

There is a significant resource for larger scale renewable energy projects in the District. There include large wind turbines which could be installed to supply local industry/commercial customers and/or developed as a community projects. There is also a significant biomass resource in the form of straw which is a by product of

cereal production. Large scale projects can take several years to develop and require significant funding during the development stages, often a barrier to local community development of such schemes.

A longer term strategy should focus on developing planning policies and funding structures to support the development of community scale projects but also larger scale schemes such as large scale wind and biomass schemes. The Merton Rule policy in the Local Plan could be extended to apply more widely and or deeply in its requirements for renewable energy associated with new development. This could include refurbishments and extensions.

Apart from grant schemes, there are other more innovative funding support mechanisms such as Kirklees Councils “RECharge” scheme. This scheme proposes a second charge or an interest-free loan, secured against the value of the property, to be repaid to the authority when the property is sold. Therefore, the consumer does not need to pay upfront costs and there are no monthly loan repayments.

Key Long Term Actions

- **Develop or extend planning policies to widen scope of Merton Rule approach**
- **Investigate innovative funding options such as the Kirklees ReCharge scheme**
- **Develop support for large scale community renewable schemes such as large scale wind energy projects**

1. INTRODUCTION AND OBJECTIVES

The generation of energy from renewable energy sources is promoted in the UK by a range of central and local government policies and schemes: such as the Renewables Obligation (on electricity suppliers), grant schemes, and planning policies which support renewable energy. The main drivers for this Government support of renewables are currently a 2001 European Commission (EC) Renewable Energy Directive [1], and various policies aimed at reducing greenhouse gas emissions.

January 2008 saw the EC put forward a package of ambitious measures for reducing greenhouse gas emissions across the European Union. This includes targets for generation of 20% of all energy from renewable sources by 2020, which has been translated into an expected 15% target for the UK. The proposals will still need to be approved by the European Parliament, but it can be expected that a new Renewable Energy Directive will be introduced in the near future, pushing the UK Government to provide greater support for renewable energy.

Recent increases in the price of oil and concerns about supply highlight the need to take action. This is not just to combat climate change but also to deal with security of supply of energy issues. The current increase in the price of oil seems to be due to a surge in demand from growing economies such as China. Supply is not keeping up with demand and this has led to price increases. An increase in supply may well bring prices back down again. However, if the world has reached a situation of "Peak Oil" where supply will decrease in the future then the current level of oil prices may well be set to continue for some time.

There is also a need to address rural fuel poverty where hard to treat homes cannot easily be insulated. Renewable energy technologies can be a solution where fossil fuel prices are high. This is particularly the case off the gas network.

In order for these issues and targets to be met in the UK, community level and local authority support is likely to be essential. It is therefore very timely that South Cambridgeshire District Council (SCDC) on behalf of the South Cambridgeshire Local Strategic Partnership (SCLSP) has commissioned this study, with the objective of carrying out a detailed survey and analysis of potential renewable energy resources within South Cambridgeshire.

The results of this analysis provide an evidence base to inform the SCLSP partners (with a particular focus upon SCDC) how to make the most efficient and effective use of their local renewable energy resources in reducing local carbon emissions. This can then be translated into concrete policy measures to support renewable energy development and facilitate support and enthusiasm for the technologies in the South Cambridgeshire region.

As a summary, the three central objectives of this study are:

- Inform and support development of policy, for the Local Strategic Partnership
  - Identify and justify actions SCDC can take, using their own resources, to support renewable energy development.
- Provide an evidence base for development of planning policy in the Local Development Framework.

1 COM 2001/77/EC: Directive on Electricity Production from Renewable Energy Sources.

- Provide guidance on how the district council can provide leadership in the implementation of renewable energy technology.

To achieve these objectives, this study has carried out the following tasks:

6. Establish current energy consumption and carbon emissions baselines for South Cambridgeshire (SC)

7. Identify existing renewable energy installations and review the current status of the local renewables market in SC

8. Assess the availability of renewable energy resources in SC

9. Review policies and schemes for supporting renewable energy development, and identify those appropriate for SC.

10. Recommend practical actions that SCDC can take to support the use of the district's renewable energy resources, with a focus on the areas where they can have most influence - through supporting local community groups and through local planning policy.

2. ENERGY USE AND LOCAL GENERATION BASELINE

2.1 Local energy use and CO_2 emissions

The following graphs detail recent CO_2 data (largely resulting from energy use) for South Cambridgeshire district.

Figure 1 CO_2 emission by end use for South Cambridgeshire and neighbouring authorities

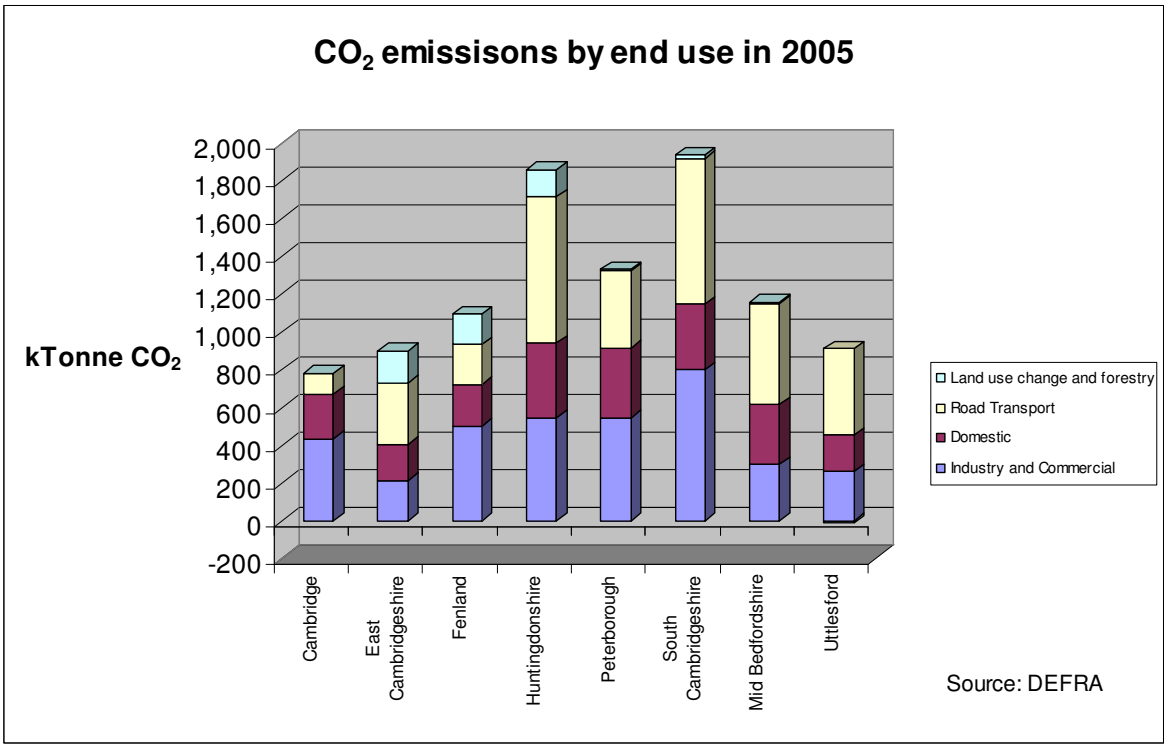
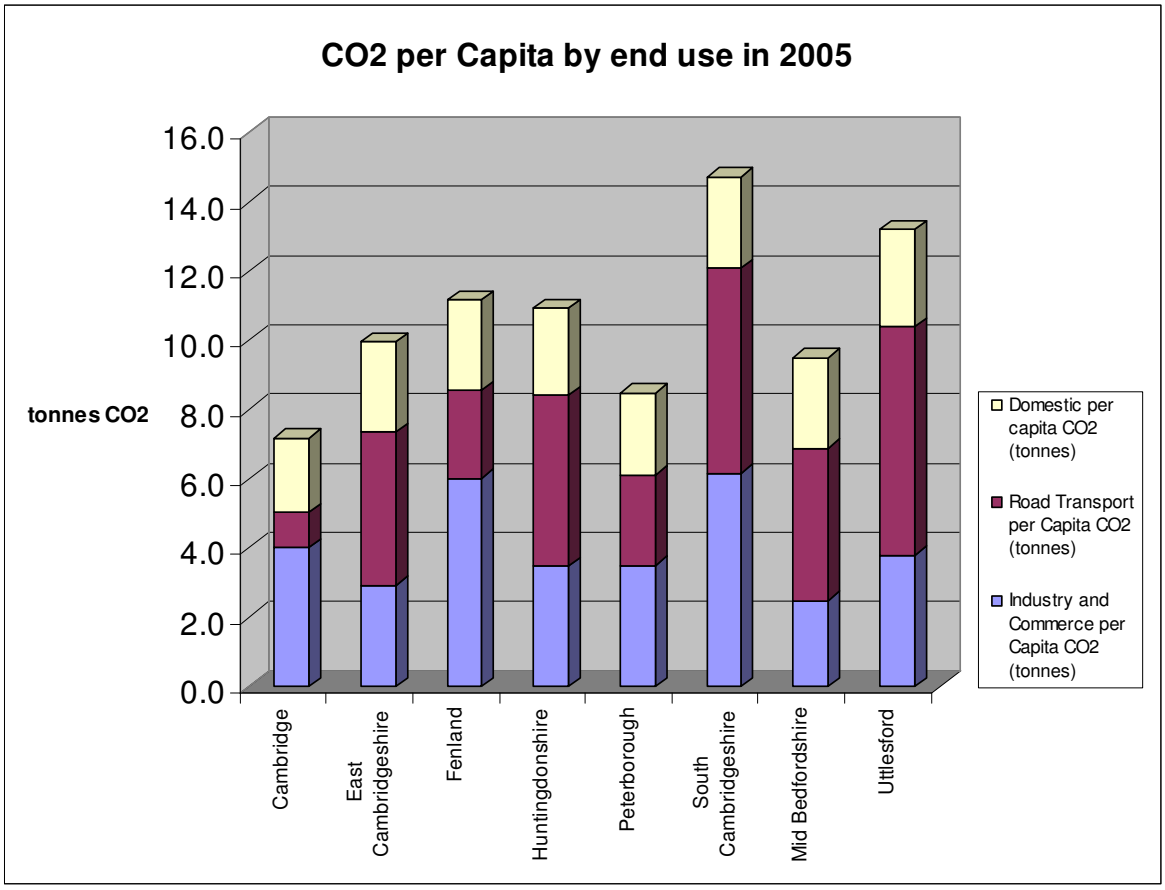


Figure 1 shows that South Cambridgeshire has higher CO_2 emissions than any of the other local authority areas in Cambridgeshire or of any of its neighbours in Bedfordshire and Essex. Primarily this relates to the high Industry and Commercial emissions and the high road transport emissions. When looking at these figures in relation to the population (see figure 2 below) the same picture emerges. South Cambridgeshire has higher Industry and Commercial emissions and higher road transport figures than its neighbours.

It is noticeable when making this comparison that Cambridge has much lower figures. It is perhaps not surprising that an urban area will have lower transport emission and a rural area higher. Perhaps more surprising are the Industry and Commercial CO_2 emissions although much of the industrial and commercial activity associated with Cambridge is on the outskirts of the City, actually in South Cambridgeshire District.

Figure 2 Carbon dioxide emissions per capita by end use in 2005



The per capita domestic CO_2 figures for South Cambs also appear high. At 2.7 tonnes/capita they are higher than the national average of 2.5. The higher per capita CO_2 emissions in rural areas may be partly explained by the larger house sizes and more detached houses in rural areas.

The overall impression is that South Cambridgeshire has more potential than many of its neighbours to reduce CO_2 emissions whether it be in the household, road transport or in industrial commercial sectors.

More detail on the energy and CO_2 emission for South Cambridgeshire can be found in Appendix 1.

2.2 Existing renewable energy schemes

Some 50 recently installed renewable energy installations have been identified in South Cambridgeshire. The most widespread technologies are solar thermal and photovoltaics, many associated with the recent Energy4Good programme (an initiative of The National Energy Foundation in partnership with SCDC and Cambridge City Council and part funded by the Energy Saving Trust).

Table 1 Recent renewable energy installations in South Cambridgeshire

Technology	Total kW	Installations	Notes
Landfill gas	4,264	2	
Small wind	37.5	9	2 of the installations have been assumed to have capacities of 2.5kW, so the total may in fact be higher.
PV	n/a	11	
Solar thermal	n/a	29	
GSHP	n/a	1	As we are not aware of a register of heat pump installations, this is likely to be an under estimate.
Large scale wind	*29,900*	*1*	*In planning- Wadlow Farm*
Large scale wind	*450*	*2*	*Consented- 225kW turbines at Bourn and Swavesey*

While the above data is a reasonable indicator of the current status of the market, we feel that there are likely to be several more renewable heat installations- solar thermal, heat pumps and biomass, which have not been captured in the above registers and recent programmes.

The full list of installations is presented in Appendix 2

3. REVIEW OF RENEWABLE ENERGY TECHNOLOGIES

Renewable energy is a term, which covers a range of energy sources and technologies. Typically, these technologies harness energy available in the environment and deliver it in a useable form resulting in zero or low carbon dioxide emissions without depleting finite fossil fuel resources. We need energy for heating, for the generation of electricity and for transport. Renewable energy is available for all these requirements.

So far, in the UK the main applications of renewable energy have been for electricity generation such as large-scale biomass power stations and large scale wind farms. However smaller scale renewable heating technologies such as solar thermal for water heating and wood heating are also well established in the UK. More recently, biodiesel and bioethanol is being produced in the UK and also imported, typically to be blended in small proportions into diesel and petrol.

Combined Heat and Power (CHP) is not covered in this study except where it uses a renewable fuel such as biomass. CHP is a more energy efficient way of producing electricity and heat from a fuel (often gas but sometimes oil). However its efficiency is very dependant on its use and having a constant demand for both electricity and heat. The latter is not usual for the majority of domestic or community applications.

3.1 Drivers for renewable energy development

The main drivers on a national level for the growth of renewable technologies are:

- Government Policy – European Governments have recently agreed to provide 20% of Europe's energy requirements from renewable technologies by 2020. The UK has a target of 15% of its electricity needs to be met from renewable sources by 2015. The UK government has a domestic target of increasing renewable electricity generation to 10% of electricity by 2010. In 2006 electricity supplied from Renewables Obligation eligible sources stood at around 4% of the UK's total.

- Grants – A range of national, local and European funding is available for individuals, communities and business. A review of the current funding schemes is provided in Appendix 3.

- Planning Policy – Planning on a national, regional and often local level is driving the use of renewable technologies often by specifying a proportion of energy to be provided from renewable sources.

    - On national level, the recently published Planning Policy Statement 1 (PPS1) on Sustainable Development and Supplementary Guidance to this document on Climate Change 'Expects a proportion of energy supply to new development to be secured from decentralised and renewable or low carbon sources' and requests that 'Local Planning authorities should set a target percentage [to be produced from renewable sources]'.

    - On a regional level, the East of England Regional Spatial Strategy will replace the Cambridgeshire and Peterborough Structure Plan. When it is published in its final form by the Secretary of State, it is likely to specify renewable targets for large developments.

- On a local level Policy NE/3 of the Development Plan Documents (DPD) within the emerging Local Development Framework (LDF) requires the provision of technology for renewable energy to provide at least 10% of predicted energy requirements.

- Gas and electricity prices – Rising gas and electricity prices are making the implementation of renewable energy technologies increasingly attractive.

3.2 Small scale community renewable energy technologies

The majority of renewable energy development in the UK is large scale requiring millions of pounds of investment for individual projects. However, there are plenty of small scale applications, which can be developed by communities or even individual householders. The table below outlines the main characteristics of smaller scale community renewable technologies.

Table 2 Community Renewable Energy Technologies

Technology	Requirements		Typical cost of one unit	Typical size in kW	Typical physical dimensions	Comments
Photovoltaics	roof or space facing south of east/west	can export electricity if connected to grid, more cost effective if high on site demand	£5k to £25k upwards	1 to 4 upwards	8m^2 to 30m^2 domestic scale, much larger possible	size limited by roof/space. Avoid shading
Roof mounted wind	roof exposed to prevailing wind	can export electricity if connected to grid, more cost effective if high on site demand	£2k to £20k	1 to 6	2 m diameter to 5 m diameter rotor	siting is crucial; very easy for buildings to reduce wind speed
Mast mounted small wind	location exposed to prevailing wind	can export electricity if connected to grid, more cost effective if high on site demand	£10k to £50k	1 to 20	2m diameter to 10m diameter rotor, 6m to 15m mast	siting is crucial; site at least 10 times height of obstacle away from obstacle
Medium scale wind	location exposed to prevailing wind	can export electricity if connected to grid, more cost effective if high on site demand	£50k to £500k	20 to 250	10m to 30m; 15m to 30m	siting is crucial; will begin to incur increased issues with planning
Large scale wind	location exposed to prevailing wind	can export electricity if connected to grid, more cost effective if high on site demand	£500k to £3Million	250 to 2,500	30m to 90m ; 30m to 100m	siting is crucial; will incur increased issues with planning
Small scale hydro power	location on fast moving river with at least 2 m of head	can export electricity if connected to grid, more cost effective if high on site demand	£15k to £100k	5 kW to 50 kW	often accommodated in old mill, otherwise need small building to house	very site specific
Solar thermal	roof or space facing south of east/west	hot water demand on site	£2k to £5k	2 to 3	3 m^2 to 4 m^2 for domestic scale, larger possible	size limited by hot water demand. Avoid shading
Ground Source Heat Pump	land area for ground collector or a water source	building with a space heating (and possibly cooling) demand and low temperature heating system (e.g. underfloor heating)	£5k to £25k upwards	3.5 kW to 15 kW upwards	one 50 m borehole or 140 m^2 of damp soil for a horizontal collector to three 75 m boreholes or 600 m^2 of land; larger systems possible	damp soil for horizontal collectors tends to be best and solid stone for boreholes
Air source heat pump	space outside the building to place unit where it will not cause a noise nuisance	building with a space heating (and possibly cooling) demand and low temperature heating system (e.g. underfloor)	£3k to £15k	3.5 kW to 15 kW upwards	vary compact similar to but larger than traditional air conditioner and more efficient	need planning permission because of potential fan noise issue
Wood pellet stoves	space in building for stove and flue	large rooms which require heating	£2k to £5k	6 kW to 15 kW	larger than log boilers as incorporate hopper for automatic feed of pellets	need to check has necessary clearance if in smokeless zone
Domestic scale wood boilers	space for boiler room and wood store	building with a space heating requirement	£5k to £15k	10 kW to 30 kW	similar in size or slightly larger than an oil boiler	will need fuel store, usually pellet boiler at this scale but log boiler also an option
Larger scale wood boiler	space for boiler room and wood store	building with a space heating requirement	£15k to £200,000	30 kW to 1,000 kW and upwards	space required for boiler and fuel store with automatic handling equipment	can be pellets but usually wood chips at the larger scale as cheaper than pellets but take up much more storage space

3.3 Barriers to market growth

A number of barriers have been identified to the growth of the small scale renewable technology industry. These include:

- Cost – Renewable technologies have long paybacks and are often only affordable or cost effective with significant grants. The size of assistance will differ for each technology.

- Financial return – In some countries such as Germany customers receive a guaranteed high price for grid exported electricity (feed-in tariff). This is currently not the case in the UK.

- Planning – Implementing some renewable energy technologies can be a lengthy process. Improvements are being made with changes to Permitted Development rights in the offing. However, this is unlikely to extend to Conservation Areas and so planning is likely to remain a barrier to renewable implementation in a number of cases.

3.4 Manufacturing and Skills

Manufacturing of small-scale renewable technologies in the UK is limited. However, there is a long established manufacturing base for solar thermal and a growing base in the small-scale wind sector. Most microgeneration technologies are produced outside the UK, often in countries where the technology is already well established – such as ground source heat pumps from the USA, Sweden and Germany.

It is considered that the UK has most of the technical expertise required for a market in small-scale renewable technologies (BERR 2005a).

There are number of benefits of the Government assisting and taking a leading role in training programmes to ensure consistency, quality and sustained growth in skills in the relevant renewable technologies. The Skills Sector is currently undertaking an assessment of the skills and training requirements needed to feed and provide confidence in a growing renewables market.

At a national level, small scale renewables could provide 30-40% of the UK's electricity needs by 2050, reducing household carbon emissions by 15% per annum (BERR 2005a).

3.5 Local Renewable Energy Technology Market

A review of the local and regional renewable technology market has been undertaken. This involved:

- Identifying the local installers, suppliers and manufacturers of the technologies (details of which can be found in Appendix 4)

- Consultation with a selection of local and regional renewable technology companies

3.6 Market Consultation

Interviews were undertaken to provide a qualitative understanding of the views of the companies in the South Cambridgeshire district and surrounding area on the state of the market, potential future growth, barriers to the market and potential ways that the local government could assist the industry in the future.

A list of questions and respondents to the consultation can be found in Appendix 4. The responses have been used to inform this document, with reference to the consultation made where appropriate.

A summary of the key responses and some conclusions to the analysis are presented below. Note that this analysis may not be representative of all the views of the renewable sector in the South Cambridgeshire and surrounding region, but the responses may be helpful in developing new or more targeted renewable policies in the future.

3.6.1 Market State and Potential

Responses differed depending on the company and technology. Overall it was felt that across all the technologies there was significant capacity and potential for growth, though recent sales have been low.

A number of the suppliers consulted it was felt that business had either stagnated or reduced in the last year. There hasn't necessarily been less interest in the technologies, but sales are down. The reasons for this were given as confusion over the grant process, and competitors who provide cheaper but inferior quality work and products. It was also felt by some that there had been a reduced public perception of some technologies, such as solar thermal and domestic wind turbines, due to reduced quality of work by some competitors, and some negative press.

Some respondents specifically quoted a lack of awareness of renewables technologies among the public as a major barrier to growing their business. However, it was mentioned that the population of South Cambs is generally better informed than the national average.

3.6.2 Feedback on national policies and schemes

Erratic grant schemes were identified as key barriers across all technologies, to the uptake of renewable technologies. It was felt that the Low Carbon Building Programme (LCBP) grants were too small and the process too convoluted for customers to undertake..

The UK Microgeneration Certification Scheme (UK MCS) has also proven controversial among the industry. Accreditation under this scheme is now required for access to the LCBP grants. However, several respondents reported their frustration with the relatively high, additional costs of joining the scheme.

3.6.3 Feedback on local policies and schemes.

A number of respondents expressed strong support for a planning requirement for renewable energy, such as the 'Merton Rule'. In short, this planning policy requires a minimum amount of energy to be generated (or emissions reduced) onsite from renewables, in order to gain planning permission. It is a measure that can be implemented at the local or regional level. It was viewed by respondents as a very successful tool for promoting renewables and providing a consistent demand for the technology.

In general, there was positive feedback on the previous Energy4Good scheme. The majority of the companies surveyed noted the benefits of marketing and promotional support from the council, and would be keen to receive similar support in future. This can be explained to an extent by the fact that most of the companies surveyed are small, or even family businesses, so struggle to market their businesses widely.

3.6.4 Recommendations from respondents

Most of the respondents were able to provide specific suggestions and requests for support from SCDC:

- Introduce (or start enforcing) a planning policy which actively favours and promotes onsite renewables in new developments. This could be in the form of a minimum requirement, such as the 'Merton Rule', or more inventive measures such as allowing larger developments if they incorporate onsite renewables.
- Introduce a local grant or funding scheme that is more accessible and offers increased sums than the LCBP.
- Provide an incentive to householders, such as reduced council tax bills for a limited period
- Repeat the seminars and solar fair run by the Energy4Good programme.
- Assist local suppliers and installers gain accreditation to the UK MCS
- Assist with promotion and advertising campaigns

3.7 Local renewable energy advice

The Energy Saving Trust Sustainable Energy Centre based in Peterborough provides resources for renewable education and promotion across Norfolk, Suffolk and Cambridgeshire including in the South Cambridgeshire District. The main programmes to promote renewables are:

- Renewable Energy Showcases – events held in towns and villages for public to educate on renewable energy technologies. Installers on the BERR accredited installers list are invited to demonstrate products.
- Village Green project – from an initial competition, three villages Ashill, Thurton and Filby in Norfolk were chosen as the focus of attention for energy efficiency and renewable promotion. The winning villages will have a carbon footprint calculated, will receive education on suitable renewable technologies and will be given help with improving the energy efficiency of buildings.

3.8 Local skill base

Smart Life Centre provides a new location for sustainable construction training and education. The centre provides a large training area where students can practice new skills in house construction. The building course provides hands-on training and insights into the construction industry. With energy coming from an array of renewable energy technologies and the building designed to include passive design

measures, it provides a demonstration of low energy design for both students and those attending events and conferences.

Bedford College has achieved Centre of Vocational Excellence (CoVE) in Skills for Energy Services. This course provides training in Renewable Energy Technologies and Sustainable Built Environments. It is possible that partnerships could be developed between this course and local installers to aid the growing renewable technology market.

4. MAPPING RENEWABLE RESOURCES

The renewable energy resource for South Cambridgeshire, which could be utilised, depends on a number of factors some of which we have attempted to map. These include areas of high wind speed, existing woodlands, energy crop potential and the by product of cereal production namely straw. The utlisation of this resource is best effected locally so an attempt to illustrate where energy demand and resource has been made.

The following maps are show data according to Statistical areas called Middle Layer Super Output Areas (MLSOA). These are based on Ward and Parish groupings. The areas are numbered and don't have names. The table below lists some of the main settlements in each area. The data contained in the maps is also produced as tables in Appendix 1.

Table 3 Middle Layer Super Output Areas

MLSOA Number	Main Settlements
1	Willingham, Oyer
2	Cottenham
3	Swavesey
4	Waterbeach
5	Bar Hill, Boxworth
6	Histon
7	Fen Ditton
8	Cambourne
9	Girton, Grantchester
10	Comberton, Harwick
11	Fulbourn
12	Great Shelford
13	Gamlingay
14	Haslingfield, Foxton
15	Sawston
16	Linton
17	Duxford
18	Melbourn
19	Bassingbourn

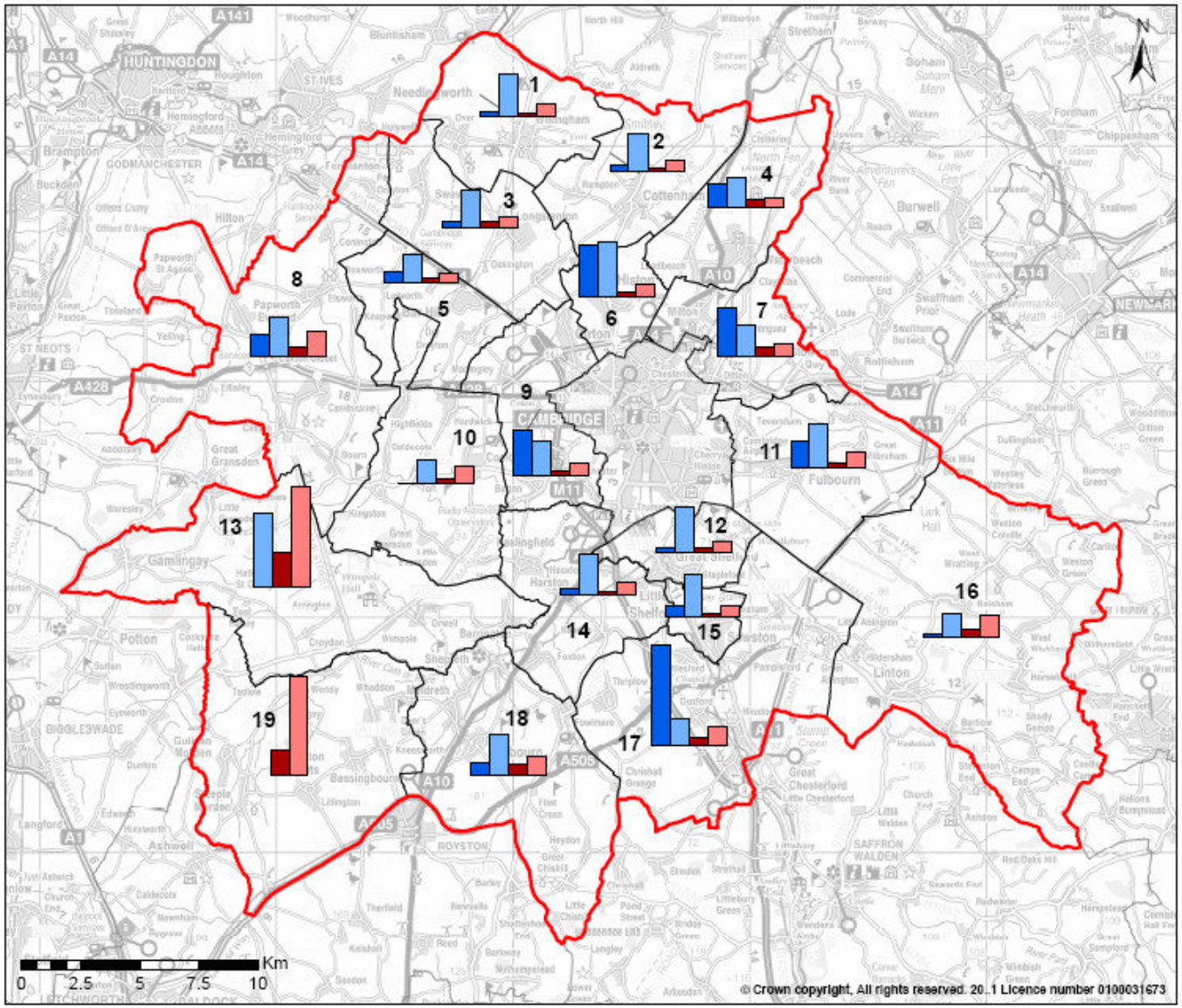
The following three maps show the following:

Figure 3: The variation in energy consumption across the District

Figure 4: The variation in average wind speed across the District and the electricity consumption

Figure 5: The potential biomass resource across the District and the proportion of households not connected to the gas mains.

Note the data is not complete and that Industrial Gas consumption in areas 8 and 9 is aggregated together in the official statistics. For the purposes of this report we have disaggregated it in proportion to electricity use in these locations. This has not been possible in areas 13 and 19.



ENVIROS

Renewable Energy Resource Survey

Figure 3: Energy Data

Key:

- South Cambridgeshire District
- MLSOA Area Numbers 1-19

Energy Consumption (kWh)

- Total Industry Gas
- Total Domestic Gas
- Total Industry Electricity
- Total Domestic Electricity

Note: There is an absence of information for industry gas for area. Similarly, area 19 is missing both the industry and domestic gas data. In addition to this, only a combined value for areas 008 and 009 was available and so it has been split using a ration of 1:2, as per electricity values of the same areas.

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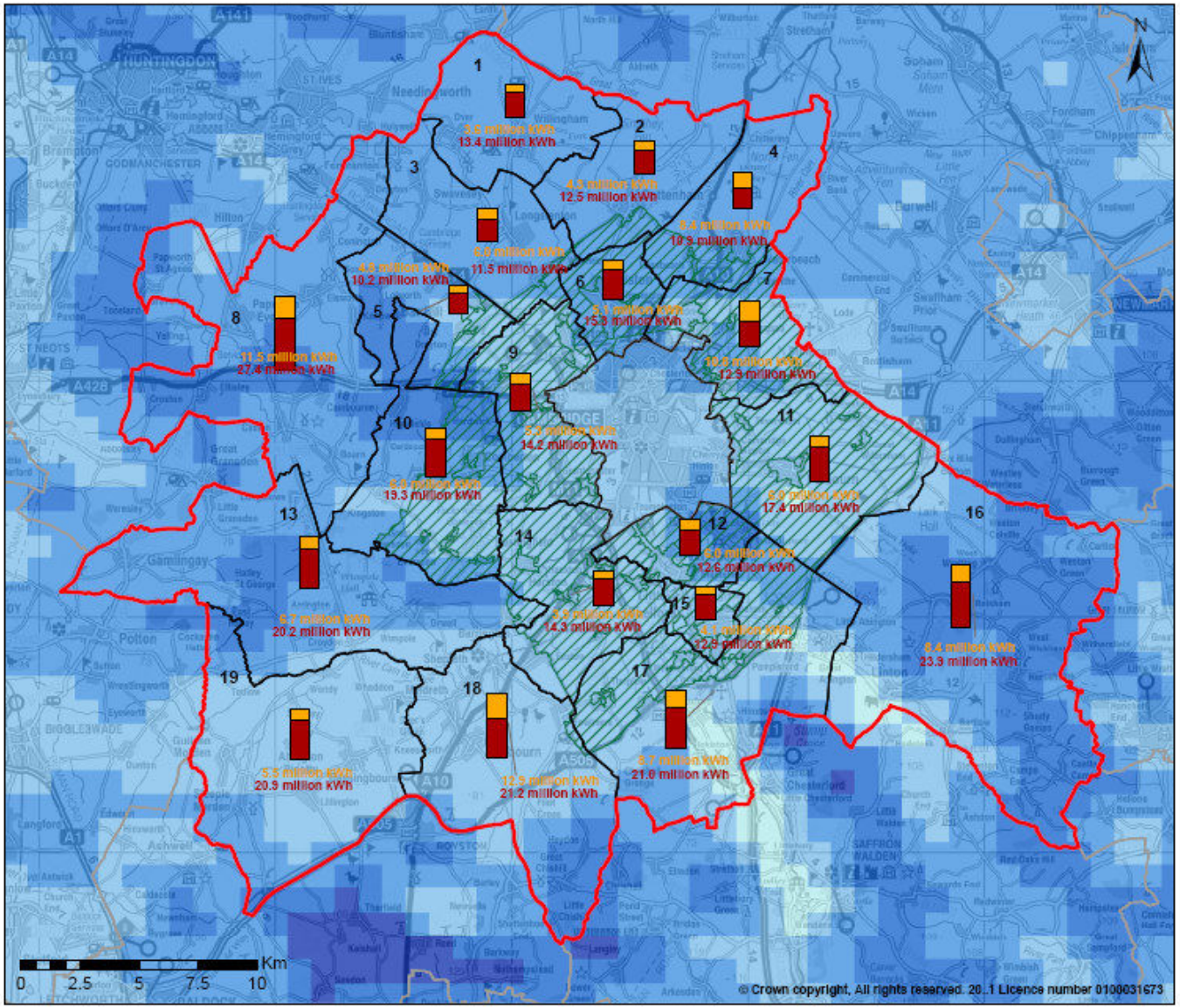
Scale: 1:150,000 (at A3)
Drawn: FJ
Edinburgh Office
June 2008



ENVIROS

Renewable Energy Resource Survey

Figure 4: Estimated annual mean wind speed and electricity consumption

Key:

- South Cambridgeshire District
- MLSOA Area Numbers 1-19
- Designated Green Belt Region

Electricity Intensity (kWh)
Calculated Middle Layer Super Output Area level

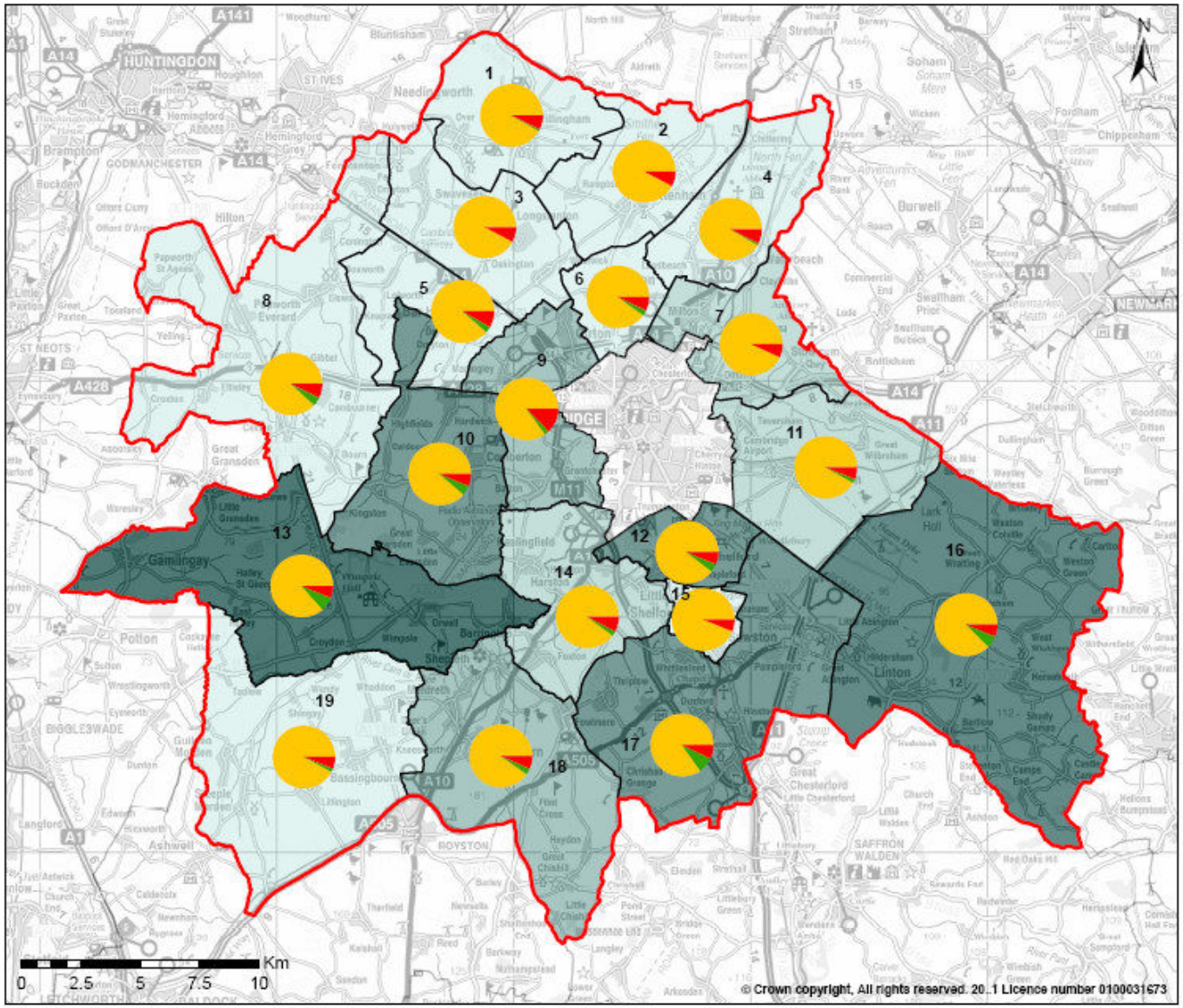
- Industrial / Commercial
- Domestic

Estimated windspeed (m/s)
45m above ground level (agl)

- 5.5 - 5.7
- 5.8 - 6.0
- 6.1 - 6.3
- 6.4 - 6.6
- 6.7 - 6.9
- 7.0 - 7.2

Wind speed data acquired from the Department for Business, Enterprise & Regulatory Reform's (BERR) database online.
www.berr.gov.uk

CAN: SO0790002
Scale: 1:150,000 (at A3)
Drawn: FJ
Edinburgh Office
June 2008



ENVIROS

Renewable Energy Resource Survey

Figure 5: Biomass and Off Gas Grid

Key:

South Cambridgeshire District

MLSOA Area Numbers 1-19

Biomass Type

Straw
Wood Fuel
Energy Crop

Off Gas Grid (Percent)*

0 - 10
11 - 20
21 - 30
31 - 40
41 - 50
51 - 60
61 - 70

** Off gas grid (percent) based on domestic properties not connected to gas grid compared with domestic electricity connections.*

CAN: SO0790002
Scale: 1:150,000 (at A3)
Drawn: FJ
Edinburgh Office
June 2008

4.1 Energy consumption

The consumption of gas and electricity[2] varies considerably across the District. The former is partly due to a lack of gas network as illustrated in figure 5. However, there is clearly a heavy consumption of gas by the industrial/commercial sector in areas 6, 7 and 17 (these include the settlements of Histon, Fen Ditton and Duxford respectively). There is also a high consumption of electricity by the industrial/commercial sector in areas 7, 8 and 18 (including the settlements of Fen Ditton, Cambourne and Melbourn).

4.2 Average wind speed and electricity consumption

The map showing wind speeds[3] at 45 m height clearly indicate that the areas of greater wind speed are in the South East and the West of the District. Wind speeds of over 6 m/s at 45 m height are of interest to Wind Farm Developers assuming that all other requirements for a project were ideal (such as ease of connection to the grid, planning issues and access).

The wind resource does not appear to correlate very well with electricity with low consumption in the North of District were much of the wind resource is. However areas 8 and 16 in the West and South East (including Cambourne and Linton respectively) do appear to have higher electricity consumption, including industrial, and also suitable wind resource. This suggests there may be some potential to look at wind generation for local consumption in these areas. Just four or five wind turbines would be required to produce the same amount of electricity as is consumed by industry in these two areas.

4.3 Potential biomass production and proportion of households without gas connections

The biomass potential[4] is calculated for the following three sources:

- Straw – based on 2.5 tonnes/annum per ha of cereal production
- Wood fuel – based on 2.5 tonnes/annum of wood fuel from managed woodland (assuming all existing woodland is brought into management)
- Energy crops – assuming 1% of land is set aside for energy production and a 10 tonne/annual yield is achieved

South Cambridgeshire farmland is very arable and as a result the straw resource is fairly evenly distributed across the whole District. The woodland resource is distributed more across the south of the District. Energy crops potential exists again across the whole district. In total the straw resource (approx 490 Million kWh) exceeds the current gas consumption by Industry (456 Million kWh) in energy terms.

2 Data taken from 2006 Local Authority consumption statistics from BERR Energy Trends December 2007 http://www.berr.gov.uk

3 Data taken form BERR windspeed database http://www.berr.gov.uk/energy/sources/renewables/explained/wind/windspeed-database/page27326.html

4 Based on data taken from DEFRA statistics for 2004 http://farmstats.defra.gov.uk/cs/farmstats_data/DATA/soa_data/repop_results.asp

5. PLANNING POLICY

This section discusses the existing planning policies affecting renewables in SCDC, with a focus on building integrated and on-site renewable energy technologies.

5.1 New development

5.1.1 Central government

The Government's recently published Supplementary Guidance on Climate Change to Planning Policy Statement (PPS) 1 on Sustainable Development outlines that planning authorities should expect 'a proportion of energy supply to new development to be secured from decentralised and renewable or low carbon sources'. It also states that in specific sites where there may be greater potential for renewables than specified in the target proportion, increased targets should be put in place to secure this potential.

There is a requirement with this PPS that local authorities should have an "evidence-based understanding of the local feasibility and potential for renewable and low-carbon technologies, including microgeneration, to supply new development in their area." The targets should be set with this feasibility assessment in mind.

5.1.2 Regional Spatial Strategy

The draft Regional Spatial Strategy for the East of England, the 'East of England Plan', expected to be published in Spring 2008, contains specific references to renewable energy. There is a target to ensure at least 10% of energy in new developments is supplied from renewable sources (ENG2). This should be expected to result in a requirement for planning authorities to include a similar planning regulation.

5.1.3 Local authority policy

The SCDC Local Development Framework (LDF) already contains provisions in accordance with the central and regional Government guidance- policy NE/3, adopted in July 2007. This requires all development proposals greater than 1,000 m^2 or 10 dwellings to provide at least 10% of their predicted energy requirements from onsite renewable energy, in accordance with policy NE/2. This type of policy was first implemented in the London Borough of Merton, and has since become known as the "Merton Rule".

Policy NE/2 of the SCDC LDF, a general policy on all types of renewables development, states that planning permission will be given to all applications for renewable energy installations, providing they are viewed to be in accordance with policy DP/1 to DP/3. These set out the council's requirements for developments to be consistent with the principles of sustainable development, with specific requirements including conservation of biodiversity, landscape and neighbourhood character, and minimisation of flood risk. The interpretation of policy NE/2, with its requirement to comply with policies DP/1 to DP/3, is very important for deciding whether major renewable energy installations, such as wind farms, are given planning permission.

Policy NE/2 has a clause which requires all renewable energy installations to be efficiently connected to national grid infrastructure. Commentators, such as the Town and Country Planning Association, have specifically noted that this

requirement may preclude the installation of renewables in off grid, on site and private wire situations, and seems to exclude district heat. This issue warrants further attention.

From consultation with renewable energy suppliers operating in the region, it was apparent that there is poor awareness amongst the renewables sector of the existence of LDF policy NE/3 in South Cambridgeshire. This may be because there have not yet been any high profile projects to highlight that renewables are now required on developments of a certain size.

This type of policy has proven to be very popular among the renewable energy industry, as it provides a steady demand for building integrated installations. It has also been demonstrated to be an effective, if somewhat inflexible, tool for reducing carbon emissions from new developments.[5] Greater promotion of the policy, and potentially increasing the percentage requirement of policy NE/3 or lowering the thresholds at which it applies should be seriously considered by SCDC as a relatively short term means of accelerating the uptake of renewables in the district.

SCDC could also consider the feasibility of stronger, more prescriptive regulations. For example, there may be a case for regulating that all new dwellings are built to incorporate solar thermal and/or photovoltaic technology, unless not feasible for the site. A pioneering new regulation is now written into Spanish national building regulations. It states that all new and refurbished buildings must include solar thermal systems to meet between 30-70% of the building's hot water requirements- the amount varying with the Spanish region, and the hot water demand of the building.[6]

Alternatively, SCDC could consider increasing the percentage requirement for renewables, as well as the range of developments captured. For example, policy 4A.7 of the London Plan, implemented in February 2008, places an increased requirement for 20% carbon reduction from onsite renewables.

5.1.4 Development specific planning

The volume of new housing to be developed in South Cambridgeshire in the near future is very significant. Planning applications for large developments that are currently being considered are:

- Northstowe – Proposed new town encompassing approximately 9,500 dwellings, a town centre, open space and a wide range of community and sports facilities
- Cambourne – Outline planning application for 950 new homes
- Arbury Camp – being developed – 900 homes
- Cambridge Southern Fringe – 1,200 new homes, a primary school and a 60 hectare country park

These developments all represent excellent opportunities to implement a range of renewable energy technologies. The implementation and enforcement of district wide, and potentially development specific pro-renewable energy policies are probably the most significant influence that SCDC can have to exploit this

5 South Bank University has estimated that the London Plan's requirement for renewable energy in new buildings reduced CO_2 emissions by around 6% in 2004 to 2007. This is set to increase as higher requirements are being introduced. http://www.london.gov.uk/mayor/planning/docs/lsbu-research.pdf

6 See note by European Solar Thermal Industry Federation http://www.estif.org/fileadmin/downloads/CTE_solar_thermal_sections_ENGLISH.pdf

opportunity. That is not to say that action is not already being taken. For example, the Northstowe Area Action Plan sets a target of 20% of predicted energy needs to be generated from renewable energy, and announces a feasibility study for a renewable Energy Services Company (ESCO) at Northstowe, which could provide green energy on a town wide scale.

5.2 Current policies- existing buildings

5.2.1 Permitted development rights

Householders have normally had to consider the need for planning permission when installing any external renewable energy technologies. However, central Government has announced its intention to give permitted development rights to solar thermal, solar photovoltaics, ground source heat pumps and biomass heating systems, provided they fit within a certain size limit[7], and are not within certain heritage and conservation areas. These rights are expected to be written into secondary legislation by mid 2008. Permitted development rights are also expected for small wind turbines and air source heat pumps, once noise and vibration standards have been established. Though there are still financial and feasibility barriers, this ruling is a small but significant help to householders wanting to install renewable energy technology.

5.2.2 Planning regulations for existing buildings

It is worth noting that the renewable energy requirements that can be placed on new developments could also be applicable to extensions and conversions- essentially any activity requiring planning permission. For example, the London Borough of Croydon's existing Unitary Development Plan requires the installation of renewable energy systems to offset at least 10% of a development's carbon emissions, be it a brand new development, or a conversion (over 1000m^2 or 10 or more units). This captures developments such as changes of use in industrial units which require planning permission, and sizable extensions.

It is currently intended that the new Local Development Framework for the London Borough of Merton, due in mid 2009, will include a specific requirement for a proportion of renewable energy in *all* developments requiring planning permission, from eligible house extensions and flat conversions, to major new developments.[8]

7 "Permitted Development Rights for Householder Microgeneration: Government response to consultation replies" (December 2007) http://www.communities.gov.uk/documents/planningandbuilding/pdf/565952

8 Personal Communication, April 2008 with Adrian Hewitt, Principal Environment Officer, Merton Council.

6. COMMUNITY RENEWABLES PROJECT DEVELOPMENT

The suitability of renewable technologies for a particular application will depend on a number of factors. Here are some of the issues a community organisation will have to address:

1. Determine aims and objectives:
    a. CO_2 reduction – zero carbon will usually require a combination of renewables
    b. Cost saving – larger scale wind and biomass give the best paybacks
    c. Self sufficiency – will require combination of renewables and storage for the energy produced – can be very expensive
    d. Promotion – solar panels and wind turbines are very visible
2. Assess capability to carry out project
    a. Ownership and management of site – owner may be required to submit funding applications
    b. Necessary permissions – planning, grid connection
    c. Project team – need a mix of skills
3. Assess renewable resources
    a. Roof space facing south – ideal for solar thermal and PV
    b. Open space to the south west – exposed to prevailing wind
    c. Large garden or open space – room for a ground collector for GSHP
    d. Building new or replacing boiler or roof – time to consider solar thermal, PV, GSHP.....
    e. Nearby woodland or arable area – biomass may be available at reasonable cost
4. Seek further information and suppliers of equipment
    a. Householders and communities - EST Helpline 0800 512012
    b. Businesses – Carbon Trust 0800 085 2005
    c. Finding equipment – Accreditation scheme: www.UKMicrogeneration.org; Trade Associations : Renewable Energy Association, Solar Trade Association, British Wind Energy Association, Ground Source Heat Pump Association
5. Access funding and grants
    a. Grants - Low Carbon Building Programme, Cut Your Carbon, Community Sustainable Energy Programme

b. Renewables Obligation – ROCs funding for electricity generated

c. Other sources – Energy Companies, Local Council, Carbon Trust

6.1 Prioritising investment in Community Renewables

Community Renewables are a means of reducing carbon emissions in the community. They are also a means of raising awareness about the viability of the technologies encouraging others to invest and to also reduce carbon emissions.

When comparing the technologies it is relatively easy to judge which give the greatest impact in CO_2 reduction terms for a given investment. However, it is not so easy to take into account the potential multiplier effect, which a community scheme may have. The following tables attempt to make this comparison.

Table 4 Comparison of Community Renewables by payback and CO_2 savings costs

	kW				tonnes CO_2	
Photovoltaics	2	£12,000	£210	57	0.8	£15,929
Roof mounted wind	1	£3,000	£79	38	0.3	£10,619
Mast mounted small wind	6	£21,000	£946	22	3.4	£6,194
Medium scale wind	15	£45,000	£2,628	17	11.3	£3,982
Medium scale wind	50	£125,000	£8,760	14	37.7	£3,318
Large scale wind	2,000	£2,400,000	£350,400	7	1,883.4	£1,274
Small scale hydro power	10	£50,000	£4,380	11	18.8	£2,655
Solar thermal	2.5	£3,000	£84	36	0.5	£6,554
Ground Source Heat Pump	10	£10,000	£329	30	4.2	£2,403
Air source heat pump	10	£6,000	£183	33	4.2	£1,442
Wood pellet stoves	8	£2,400	-£26	-91	1.7	£1,384
Domestic scale wood boilers	15	£7,500	£123	61	5.4	£1,384
Larger scale wood boiler	300	£90,000	£9,444	10	108.4	£830
Wood fuelled CHP	150	£350,000	£60,293	6	179.0	£1,955

* * Assuming electricity 8 p/kWh (plus 4 p/kW ROC) heat 3.5 p/kWh; wood pellets 2.5 to 3 p/kWh, wood chip 1.25 p/kWh

Note the payback calculation is based on capital cost without grant. Also the fuel costs have been included but maintenance costs have not.

Table 3 compares the technologies in terms of payback and also in terms of CO_2 saving per capital investment. It is clear that large scale applications such as wood heating and wind turbines have the quickest payback and the best CO_2 saving against capital investment. However, the capital investment required for just one large wind turbine runs in to millions.

Given a limited amount of capital to invest, say £100,000, it is interesting to see how far that goes and also whether there is the potential for a multiplier effect. In other words, will a demonstration project help to inform and encourage others to also invest in the same applications?

Table 5 Comparison of technologies by "multiplier effect"

	Unit size kW	Cost per installation	CO_2 saving tonnes	Community demonstrations which can be funded with £100k*+	Overall saving tonnes CO_2	Multiplier to equal CO_2 saving from large scale wood boiler	Is this multiplier effect likely for this technology
Photovoltaics	2	£12,000	0.75	17	12.8	16	No
Roof mounted wind	1	£3,000	0.28	67	18.9	10	No
Mast mounted small wind	6	£21,000	3.39	10	33.9	5	No
Medium scale wind	15	£45,000	11.30	4	45.2	4	No
Medium scale wind	50	£125,000	37.67	2	75.3	2	?
Large scale wind	2,000	£2,400,000	1,883.40	0.08	157.0	0	?
Small scale hydro power	10	£50,000	18.83	4	75.3	2	No
Solar thermal	2.5	£3,000	0.46	67	30.7	6	Yes
Ground Source Heat Pump	10	£10,000	4.16	20	83.2	2	No
Air source heat pump	10	£6,000	4.16	33	137.3	1	Yes
Wood pellet stoves	8	£2,400	1.73	83	144.0	1	Yes
Domestic scale wood boilers	15	£7,500	5.42	27	146.3	0	Yes
Larger scale wood boiler	300	£90,000	108.41	2	216.8	-	Yes
Wood fuelled CHP	100	£350,000	179.03	0.57	102.3	1	?

* Assuming have £100,000 fund which provides 50% funding for demonstrations

\+ Assumes large wind tubine receives £100k partial investment

In table 4, the number of typical installations of each technology, which could be funded with £100,000 is calculated. The resultant total CO_2 savings are then calculated. £100,000 is enough to fund two large wood boiler installations (such as for a school) assuming 50% of the cost can be funded from elsewhere (Government grants for example). This results in 216.8 tonnes of CO_2 savings each year.

The same investment in photovoltaics results in 17 community installations (of 2 kW each) (such as for a village hall roof). However the CO_2 savings from this investment are only 12.8 tonnes of CO_2 each year. The next column shows how many further private installations would be required to reach the same CO_2 saving as the wood boiler investment. This is 16 household size photovoltaics installation inspired by each community installation. Even with other grants and incentives this figure seems unlikely.

By comparison, the same £100,000 could fund 66 small scale solar water schemes (for a school, or a village hall or a pub). This achieves CO_2 savings of 30.7 tonnes

of CO_2, better than the Photovoltaics but still a long way short of the wood boiler. However if just 6 installations are then inspired or prompted by each these 66 then the overall CO_2 savings are the same as the wood boiler. This does seem achievable. Solar thermal systems are more affordable than Photovoltaics and there is greater availability of installers and suppliers.

This "multiplier effect" could be encouraged by asking community groups seeking funding for their community projects to set out in their applications how they will promote and disseminate information on the project and also how they will capture information on further installations and CO_2 results achieved. The new EEDA Cut Your Carbon Programme incorporates this approach.

6.2 Role of Renewable Energy in Tackling Fuel Poverty

Renewable energy can help tackle the problem of fuel poverty[9], particularly in homes that are not connected to mains gas, have solid walls or have a non-traditional construction[10]. Before considering renewable energy in a fuel poor household, it is important to minimise energy use through energy efficiency measures. National Energy Action (NEA) also suggests that any renewable energy system must provide whole-house heating, must use a proven technology and must be user friendly. This would seem to seem to favour the application of heat pumps.

Renewable energy heating systems are particularly useful in tackling fuel poverty in homes off the gas network because heating and hot water costs can be over double those in areas that have a connection to mains gas[11]. Approximately 16% of homes are off the gas network and most use solid fuel for heating. Even in areas on the gas network, with gas prices more than doubling in the last three years[12] and set to continue increasing, renewable energy is becoming more important in tackling fuel poverty.

The impact that renewable energy can have on fuel poverty depends on the technology being considered and the current pattern of energy use in the home. For example, solar hot water will have more of an impact in reducing fuel poverty if it is installed in a family property where hot water use represents a high proportion of the overall fuel bill, where hot water is used throughout the day and where water was previously heating by a fuel other than gas.

NEA is currently researching the impact of renewable energy on fuel poverty by installing and monitoring the performance of air source heat pumps in 100 homes , and by installing and monitoring the performance of multi-fuel burning stoves in 10 homes. NEA has combined air source heat pumps with fan-assisted convector radiators to produce a cost-effective and controllable heating solution. Initial data suggests that running costs are comparable to main gas, with the additional benefit of the systems being suitable for locations off the gas network. For example, when installed on a park home in Peterborough, the heat pumps resulted in a 70% saving on fuel bills[13].

It is clear that renewable energy technology can help eradicate fuel poverty, but to ensure it has maximum impact, the technology must be appropriate to the energy demand, to the building in which it will be installed and to the client who will be using the system[14].

9 http://www.dsdni.gov.uk/idg_group_report_fuel_poverty.pdf
10 http://www.nea.org.uk/Policy_&_Research/Policy_Briefings/New_Energy_Technologies
11 http://www.nea.org.uk/Policy_&_Research/Policy_Briefings/Renewable_Energy_Technologies
12 ibid
13 ibid
14 ibid

The Centre of Sustainable Energy host a Fuel Poverty Indicator website http://www.fuelpovertyindicator.org.uk/. This provides more information on the likely prevalence of fuel poverty across the country.

6.3 Short term strategies for developing Community Renewables

Renewable energy projects can take a long time to develop. The experience of the Community Renewable Initiative set up by DTI in 2003 suggested that 18 months was typical for most projects and 5 years not unusual for the larger or more complex projects.

In the short term, the focus should be on delivering current national and regional policies and opportunities for the uptake of renewable technologies. This coupled with picking technologies and projects, which can be implemented quickly, will ensure that the maximum impact is gained.

6.3.1 Technologies

Renewable energy technologies, which can be quickly deployed, include building integrated renewables such as small-scale wind, biomass (biofuel) boilers, solar thermal technology, ground source heating and photovoltaics.

6.3.2 Promotion / advertising

One of the key areas identified in the market survey was the potential benefit of marketing and education assistance provided by the SCDC. Some respondents felt that consumer confidence in renewable technologies has reduced recently- due to a number of poor quality installations and complicated, erratic grant schemes. There is also recognition that the majority of the general public still have a limited understanding of the technologies and the opportunities they can offer. Some ideas on promoting renewable technologies are outlined below:

Demonstration – Installation of high profile demonstration projects on public buildings or other high profile buildings and schemes would provide useful advertising for renewable technologies.

Publicity and Education – Changing public perception of renewable technologies through a week-long publicity and education campaign. (comparable to energy efficiency week organised by the Energy Saving Trust) where a host of activities, commercials and events are organised focusing on the renewable technologies.

6.4 Longer term strategies for developing Community Renewables

A longer term strategy could look at projects likely to take 3 years or more to implement. These include larger scale renewable projects with a more complicated funding arrangement, such as a number of partners and sponsors, a lengthy development process and those that involve innovative renewable technologies or fuels.

6.4.1 Council led projects

Kirklees MBC has identified significant potential for using biomass, such as wood fuels, to meet local energy requirements and contribute towards the borough's

carbon emissions reduction targets. Around £1.5m of start up funding has been committed to the council's Environmental Unit, which is in the process of developing the following initiatives, as part of an innovative and notably integrated bioenergy strategy:

- Create a management plan for harvesting and planting additional trees in local woodland.
- Assess the sustainable harvest potential, in energy terms, of local woodland
- Create a biomass fuel supply chain that will give the local private sector confidence to invest in biomass heating systems
- Install biomass heating systems in several council buildings, including offices and schools, to be fuelled by locally produced wood chips
- Ensure the RECharge scheme is compatible with domestic scale biomass heating (see below)
- There are also strong aspirations to install:
  - A district heating system, supplied by a waste wood fuelled CHP plant. (WID compliant)
  - Obtain regional funding assistance to construct a wood pellet production plant.

6.4.2 Community projects

Empowering community groups whilst making use of existing community structures and organisations can be one of the key vehicles to fostering sustainable practices, such as renewable technologies. The new EEDA Cut Your Carbon Campaign aims to build on this to deliver carbon savings through a variety of measures including renewable energy projects.

The renewable energy industry is also recognising the importance of achieving community involvement in their projects. For example, wind farm developers will now typically establish a community fund which in essence directly pays the local residents an annual fee as long as the wind farm is in operation.

An example of community action includes Ashton Hayes Parish Council who voted in 2005 to take steps towards becoming the first carbon neutral village. The community aims to determine energy consumption for the village and make reductions where possible. Carbon offsetting will be employed through local renewable energy projects and forestry planting schemes to further lower emissions, after energy demand measures have been addressed.

The Dyfi Valley community energy project is a good example of where leadership and access to funding has led to real progress in the community. The project aimed to encourage local people to engage with energy issues and to establish community based renewable energy installations. It aims to benefit the community's 12,500 residents.

Sixty-five scheme proposals were carried through to 28 grant offers. Schemes completed to date include:

- a 112kW grid-connected hydro-electric unit, installed by a farmer

- three 800–1000W (domestic) solar electric installations, one of which powers a ground-source heat pump
- a 1.4kW solar electric array at Dyfi Eco Park and two 690W solar electric arrays at schools
- 124m^2 solar thermal array, plus a 'heat main' (carrying heat between buildings), installed at the Centre for Alternative Technology
- 14 solar hot water systems in the Dyfi Valley and ten more in the rest of Powys.
- A 75kW V17 community wind turbine was installed through the Bro Dyfi Community Renewables Ltd.
- A PV system has been installed in a social housing development of ten flats and in a semi detached property.

Two factors have been identified that have led to the success of the scheme:

- each scheme had access to grant aid, officer support, technical expertise and assistance
- the involvement of keen individuals and leadership

Funding: The European Commission provided 35% of the funding from the European Regional Development Fund through the Objective 5b structural funding programme. The Welsh Development Agency, Powys County Council, Dulas Ltd and the Shell Better Britain Campaign all contributed. Funding was also provided by private sector investors. Local councils and development agencies also helped fund feasibility studies.

Management: Several organisations came together to enable local people to carry out small-scale schemes using various renewable energy technologies. The Dyfi Eco Valley Partnership, a company limited by guarantee now known as ecodyfi, managed the project. It was created by Powys and Gwynedd county councils, Dulas Ltd, the Centre for Alternative Technology, the Welsh Development Agency and Snowdonia National Park.

Use existing structures

A range of community groups, such as religious groups and neighbourhood community schemes, already have existing structures that can facilitate the introduction of renewable energy projects. It may also be the case that these groups are currently working on sustainable schemes.

It is recommended that these community structures are contacted and advice provided on the possibilities for renewable energy in their community.

The community areas that SCDC is currently working in is presented below:

- Community development grants for local projects
- Funding for village consultation initiatives

- Ongoing support for parish councils and young people through various initiatives
- Involvement in local democracy initiatives, including e-democracy
- Information sharing and signposting.

Information on local authority grant initiatives for renewable energy technologies is provided in Section 6.4 below.

6.4.3 Schools

Schools provide an excellent focal point for demonstrating renewable energy technologies to the local community. The current Low Carbon Building Programme Phase 2 (see Appendix 3) aims to support small-scale renewable energy projects in schools. Promoting renewable energy in schools in South Cambridgeshire requires the cooperation of Cambridgeshire County Council. There are already two examples of Photovoltaic's in schools in Cambridgeshire. The response from contacting the County Council was that it is up to individual schools who have the budget but that they would support decent proposals as it is in line with their environmental policies. There is already a Sustainable Procurement policy and handbook, which allows local public sector bodies to buy microgeneration technologies, amongst a whole range of other items, at favourable prices. http://www.espo.org/index.asp?CMD=SDS .

6.4.4 Innovative renewable energy schemes

With SCDC backing, it may be possible to deliver innovative, larger scale and longer term renewable energy projects. Some examples are provided below of potential projects that could be undertaken in SCDC relevant to the local resources – physical, geographic and economic.

Anaerobic Digestion

Being a rural area the use of medium to large scale anaerobic digestion could be a feasible option. It is considered that small-scale facilities similar to those found across south and south-west rural China would not be viable for the majority of residents in South Cambridgeshire. This technology is relevant to the rural population of China as in many cases there is no formal waste management systems, especially for human wastes. In the UK, if waste management system for human wastes is available the Environment Agency is unlikely to allow permission to take the waste to an alternate waste stream. This technology would therefore only be relevant on the domestic level if the household was not connected to the sewage system.

Anaerobic digestion may be viable at a medium to large scale on farms with significant quantities of animal and agricultural wastes. These could be built for individual farms or could be developed at a community level, taking waste from a number of farms and generating electricity for export to the grid and potentially generating heat for local communities.

Anaerobic digesters can be used on farms utilising waste from animals and agricultural waste. Due to the energy content, AD plants are most viable on farms with animal wastes. It is recommended that farmers are contacted and given information on the potential benefits of on-site AD plants.

A large regional anaerobic digestion plant may require assistance and resources from SCDC and other partners. Methods of developing these partnerships are discussed in the next section.

An example of a medium scale anaerobic digestion plant is the Greenfinch Site in Ludlow run in partnership with Greenfinch and South Shropshire District Council. Funding was secured from the Defra New Technology Demonstration Programme and Advantage West Midlands.

This facility utilises household waste from kitchens and gardens across South Shropshire. The Greenfinch site is currently considering options to make use of the heat generated from the CHP generator. If this technology is considered viable for South Cambridgeshire, the site should be located close to a proposed new town or major development so that the heat generated can also be utilised.

Walford College Farm -Anaerobic Digestion Case study

A farm run by Walford Agricultural College installed an Anaerobic Digester plant to environmentally dispose of waste manure from approximately 300 cows and pigs on the farm. Approximately 3,000 tonnes of manure waste feeds a 35 kWe CHP unit (58 kWth) CHP unit. This unit in reality produces about 18 kWe for 20 hours a day. Electricity is used in the farm and the heat is used to run the AD plant and for hot water generation.

Capital costs were £134k, with funding from the college and the EU LIFE grant programme. Savings in the first year were calculated at over £20,000.

Biodiesel projects

On a community level, there may be scope to introduce additional biodiesel fuels into the transport sector. This can be undertaken in several ways:

Community purchase: Members contribute to pay for a community tank that is accessible to those who are members of a 'biodiesel club'. The tank is filled with 100% biodiesel (or alternative blend) by an external supplier providing members with a supply of fuel to use in their road or farm vehicles. The National Energy Foundation operate such a scheme for their staff.

Community production: It may be possible to produce biodiesel at a community, village or parish level. Waste cooking oils could be collected from homes and restaurants and processed into biodiesel in a central location.

A number of regulations relate to the production of biodiesel from cooking oils, adding to administration and costs, so making the process prohibitively bureaucratic and expensive. The producer of biodiesel has to notify HM Revenue and Customs (HMRC) and provide evidence that their product meets all aspects of the legal definition of biodiesel with tests required to prove that the specification is met. HMRC must all be notified of how much fuel is used so that sufficient duty is paid.

If the fuel meets the required standards, it is eligible for a 20p discount on fuel duty, although the 2008 budget stated that this would be withdrawn in 2010. If a product does not meet all aspects of the definition, it is a fuel substitute and will attract a higher rate of duty. As a result, producing biodiesel from cooking oils may not be particularly viable.

Sundance Renewables - biodiesel cooperative case study

Sundance Renewables initiated a small scale biodiesel production facility in 2004. It has been set up as a cooperative which aims to assist community regeneration through renewable energy projects. Sundance Renewables works closely with New Ventures Panel and Sustainability Working Group of Co-operatives UK and is a member of the Good Fuel Cooperative whose members are other co-operatives producing and supplying biodiesel and other low carbon fuels in their local area.

Sundance Renewables makes biodiesel from locally sourced used vegetable oil at its small chemical plant in South Wales. They offer a local collection service to businesses and organisations for used vegetable oils. They run training courses and can assist other communities in developing their own biodiesel production.

Further information can be found at:

http://www.sundancerenewables.org.uk/biodp/index.html

6.4.5 Larger scale renewable technologies

Wind

At least three large scale wind farms have been proposed in South Cambridgeshire, so it is evidently an attractive region for wind energy development. A number of constraints determine the suitability of a particular location. The key variable is wind speed as the higher the wind speed the more energy a wind turbine will produce (a map of the wind resource is presented in Section 2 above).

Large wind turbines could be viable for farmers, businesses or communities without additional capital support, as output is subsidised effectively with the Renewables Obligation. However, especially at the community or farm level, support may be required with education, development stage costs and planning proposals.

In the example of the Dyfi Valley community energy project outlined in Section 6.3.2 above the community formed a company called Eodyfi to manage the project. Communities elsewhere in the UK have formed co-operatives to develop wind turbines or wind farms and divided the profits amongst the members. In some cases this has become so profitable that the co-operative has undertaken further projects in other parts of the country.

For a potential wind farm developer – business, community or individual - there are physical, planning and financial constraints that need to be overcome for a successful project.

In summary, large scale wind projects can be the most economically viable of the renewable technologies. Resource mapping can be used to identify sites and then consultation can begin with local community groups or land owners.

Cambridgeshire County Council looked into the development of wind turbines on council property, and carried out a feasibility study about 8 years ago. The Red Tile wind farm was built on council owned farm land, for example. Cambridgeshire has the largest county owned land estate in the UK.

6.5 Examples of funding initiatives

See Appendix 3 for a selection of the major grants and funding opportunities currently identified for renewable energy projects for communities and individuals.

In order to determine the most appropriate new funding scheme or suite of funding mechanisms, it is helpful to consider what other councils, communities and businesses around the country are doing.

6.5.1 Council – Kirklees Metropolitan Borough Council

RECharge Scheme

To assist home owners with funding for renewable technologies, Kirklees Council, assisted by the Renewable Energy Association, has developed the RECharge scheme. This scheme proposes a second charge or an interest-free loan, secured against the value of the property, to be repaid to the authority when the property is sold. Therefore the consumer does not need to pay upfront costs and there are no monthly loan repayments.

There is a maximum loan of £10,000 which allows for some of the more costly renewables to be incorporated. Funding is cycled back into the pot to finance new installations. The average house is sold every seven years so money would move in and out of the pot quite quickly. It is hoped that the lack of time restriction will increase investor confidence in the sector.

The Council will invest £3million into the scheme. There will be interest to pay. The REA believes interest on the loans could either be paid by the government, by the fund itself, or by gas and electricity companies, for whom it would be a relatively cheap way for them to meet their commitments on energy efficiency. The scheme has just started, and a number of organisations will be monitoring its success to see if it can be more widely implemented.

6.5.2 Council - Merton Borough Council

To help small businesses install renewable energy systems, Merton recently ran a grant scheme. The total funding was limited, but while it ran in late 2007 the scheme filled the gap left by the Low Carbon Buildings Programme, which no longer offers grants to the commercial sector.

6.5.3 Communities – East of England Development Agency 'Cut your Carbon' Campaign

East of England Development Agency (EEDA) is running a competition for grants for communities to cut carbon. SCDC can assist communities in the area developing project ideas and proposals for the competition.

Communities can seek between £5,000 and £200,000 for capital assets that will cut their carbon emissions. They are taking a broad approach as to what this could include, but some examples are:

- renewable / sustainable energy solutions
- reducing waste or water usage
- cutting carbon from transport

7. POSSIBLE ACTIONS FOR SOUTH CAMBRIDGESHIRE DISTRICT COUNCIL

This report has identified a number of strands that South Cambridgeshire could bring together in order to drive renewables growth in the district. These include funding (including local support), grants, local renewable technology promotion, technical support, planning policies, leadership, partnerships, market stability and local support.

7.1 Capital funding

Renewable energy projects can take a long time to develop particularly large scale projects such as large wind or biomass schemes. Timescales of 3 to 5 years for such projects would not be unusual. Small scale microgeneration projects such as solar or small scale wind are more likely to be implemented in a 6 month to 18 month timeframe. To make an early impact, it is recommended that initial capital funding is directed at smaller scales schemes which can demonstrate the potential to be developed quickly.

Focusing on smaller schemes would have the advantage of spreading the funding more widely, maximising the promotional impact and encouraging more community groups. The downside would be the lack of initial impact on CO_2 emission reduction. However if the capital funding can be targeted at technologies which can be easily taken up by others and can also be part of a longer term strategy with early projects facilitating and encouraging more projects then the cumulative impact will build. A revolving fund would fit with such a longer term strategy and enable an initially small pot of funding to lead to significant CO_2 savings in the long term.

7.2 Planning

As discussed in sections 5.1 and 5.2, local development and planning policies have a significant impact on renewable energy development. The actions that SCDC's planning department could take, while still complying with the current Local Development Framework, are:

- Promote the existing requirement for 10% onsite renewable energy, as stated in policy NE/3, and consider extending its scope either in terms of the size or type of development to which it applies.
- Consider increasing the percentage requirement, as is being implemented in the London Plan, where policy 4A.7 states that 20% of carbon emissions must be offset by onsite renewables, in new developments where feasible. It could be argued that a mainly low density, highly residential district such as South Cambridgeshire could aim for an even higher target.
- Explore the feasibility of routinely implementing large development-specific targets for renewables and district energy, such as that included in the Northstowe Area Action Plan.
- Comply, as early as feasible, with the soon to be implemented Permitted Development Rights for certain microgeneration technologies.

- Ensure all planning officers who will be exposed to planning applications for renewable energy facilities have been trained to a level that allows them to fully understand the benefits of renewable energy technologies.

- Consider introducing more innovative measures for incentivising onsite renewables through the planning process, permitting greater development if renewables requirements are exceeded.

- Identify technologies for which in depth planning guidance should be developed.

- Establish whether policy NE/2 is precluding development of onsite generation, district heating, off grid and private wire networks. If so, adapt NE/2 in order to avoid precluding these potentially beneficial solutions, while still achieving the original policy intent. If the policy intent was to preclude these solutions, urgently consider whether this is still appropriate.

One of the biggest barriers to the development of renewable energy is a lack of awareness and information. It is also important that local efforts are coordinated to ensure that limited resources are used efficiently. The council is well placed to address these issues if sufficient resource is available.

7.3 Organisational support – establishing a Renewable Energy Network

One of the key factors for successful renewable projects and growth within the UK has been strong and organised leadership at the local level.

It is therefore recommended that if SCDC is to succeed in utilising the resources available in the South Cambridgeshire District and drive the growth of renewable technologies – both supply and demand – the Council should consider developing a network to facilitate the further introduction and growth of the market. This would be a powerful way of bringing together the factors outlined in 7.1 to 7.3 above.

It is envisaged that this network would act as a meeting place for partnerships to be developed, an education and information centre for individuals, communities and businesses, whilst assisting to provide and leverage funding for renewable projects in the area.

7.3.1 Key Partners to involve in a Renewable Energy Network

There need to be strong linkages with other Agencies promoting renewable energy. These include:

- EEDA (Cut Your Carbon Campaign)
- Cambridgeshire County Council
- Cambridgeshire ACRE
- EST Anglia Sustainable Energy Centre

It is also important not to forget the Business Community and local Educational and Training providers, so the network should also develop links with:

- Smart Life Centre

- University of Cambridge
- Cambridge Energy Forum

Community groups and parish councils will be key partners in the delivery of community projects and should also be represented and linked into the network.

7.3.2 Supporting the development of projects

Building on this report, the SCDC Renewable Energy Network (REN) would take on implementing a vision for the short term and long term renewable energy projects and market in the District.

Some of the key areas that the REN should focus on include:

- **Facilitate local partnerships:** The key to successful renewable energy projects will be a facility to bring together partners interested in developing community projects that meet the expectations of all involved. The key partnerships that are likely to be forged are between:
  - Business and communities and/or schools and villages;
  - Communities/villages and schools;
  - Different community groups
  - Parish councils
  - Local land owners and communities and villages

  Within each of these areas, there could be a role for the Council to play in providing information, guidance and access to funding. By acting as a central facilitator the Council could be a focal point to leverage funding from business and national and European governments.

- **Education and information:** Has been raised by a number of installers as a barrier to the uptake and growth of the renewables market in the district. Roadshows, talks, leaflets, promotional advertising are all areas where the Council could assist. Examples of actions include:
  - Organising promotion days/events for local renewable industries
  - Facilitating community/village education and promoting renewable ideas at community meetings, parish councils

- **Use centres of learning:** The REN could include the activities of local centres of learning Smart Life and Bedford College to assist in the development of renewable energy projects.

- **Disseminate lessons learnt from previous projects:** Being involved in a number of different schemes that potentially have a wider range of funding sources and partners across a spectrum of renewable technologies will provide the REN with important information to assist with the successful of similar schemes in the future.

- **Develop plan of action:** This project has identified short term and longer term renewable energy projects. SCDC, possibly through the REN should develop a short and long term plan of action. This Renewable Action Plan could set targets for renewable capacity installed in the District and allocate finances to achieve this target.

8. CONCLUSIONS AND RECOMMENDATIONS

The main conclusions are:

1. South Cambridgeshire has a pressing need and also the opportunity to develop renewable energy projects. As the District is largely rural, its energy consumption is higher than surrounding areas. Larger houses and greater transport distances than in an urban environment are the main explanation for this. However, the rural context provides a greater access to renewable energy resource compared with urban areas.

2. Renewable energy resources, which are available locally, include wind, solar, biomass and ground source energy. Large scale wind is a commercially viable proposition in the windier parts of the District but proximity to housing and impacts on landscapes will make obtaining planning difficult. The productive agricultural nature of the district provides ample potential for energy crops or crop residues to be utilised as biomass. The large number of buildings provides opportunities for solar and ground source energy to be exploited.

3. There are a wide range of options and opportunities for developing renewable energy projects in South Cambridgeshire. These need to be prioritised to ensure limited resources and funding have the maximum impact in the short term.

4. A short term strategy to focus on funding projects with a demonstration value will have the greatest impact as it will encourage others to also install similar systems. These projects include technologies such as solar thermal, wood heating and air source heat pumps being installed in community buildings such as village halls and schools.

5. The focus should be on whole community or whole village schemes with individual community building projects only being supported as part of a parish-wide project to reduce CO_2 emissions. Parish councils will be key partners in the delivery of this approach. The EEDA Cut Your Carbon campaign provides a ready-made structure for delivering this approach.

6. Establishing a network, supported by the council, would help facilitate this community approach by attracting support from private sector companies and by encouraging the sharing of ideas and support between communities.

7. A longer term strategy should focus on developing planning policies and funding structures to support the development of community scale projects but also larger scale schemes such as larger scale wind. The Kirklees ReCharge scheme shows tremendous potential to encourage the adoption of micro renewables. This should be monitored and adopted if successful. The Merton Rule policy in the Local Plan could be extended to apply more widely and or deeply in its requirements for renewable energy associated with new development. It could be expanded to include refurbishments and extensions.

GLOSSARY

Biomass: Biomass is organic material, produced directly from plants or indirectly from industrial, commercial, domestic or agricultural products. It is also called bioenergy or biofuel. Biomass can be used to provide space heating and hot water heating. Biomass is not a zero carbon technology as the CO_2 released during production, transportation and combustion is slightly higher than to the CO_2 absorbed during growth of the wood, and therefore it is a low carbon fuel.

Ground souce heat pumps: Heat pumps upgrade heat from one source and deliver it to another location using electricity to create the driving force. Ground source heat pumps (GSHP) use a buried ground loop to transfer heat between the ground and the building. They can be used for space heating, space cooling and hot water heating. The efficiency of a GSHP is measured by the coefficient of performance (COP), which is the ratio of units of heat output for each unit of electricity input. Typical GSHPs are very efficient with 4 to 5 units of heat produced for each unit of electricity used.

Air source heat pumps: Air source heat pumps are similar to ground source heat pumps, but they absorb heat from the outside air rather than from the ground.

Solar thermal: Solar water heating uses roof-mounted panels to collect heat from the sun to pre-heat water. It works alongside conventional water heating and can provide up to 60% of a dwelling's annual hot water requirement.

PV: Photovoltaic (PV) cells use energy from the sun to generate electricity for consumption in the building or for export to the grid. The panels can be roof or wall mounted or integrated into the façade.

Low Carbon Buildings Programme: The programme provides grants for the installation of microgeneration technologies in a range of buildings including households, community organisations, public, private and the non-profit sectors.

EEDA's Cut Your Carbon Programme: This programme is a regional initiative, led by the East of England Development Agency (EEDA), with the goal of helping communities respond to climate change by reducing their carbon emissions. Groups taking part will be able to: measure their carbon footprint online, take action to become more energy efficient and seek up to £200,000 for carbon cutting projects in the £2.5 million funding competition

Community Sustainable Energy Programme: This programme will provide £8 million to community-based organisations to install microgeneration technologies, such as solar panels or wind turbines and energy efficiency measures including loft and cavity wall insulation. It will also provide £1 million for project development grants that will help community organisations establish if a microgeneration or energy efficiency installation is feasible.

Merton Rule: The Merton rule was named after the London Borough of Merton, which became the first local authority in the UK to include a policy in its Unitary Development Plan that requires new non-residential developments, above a certain size threshold, to generate at least 10% of their energy needs from renewable energy.

Kirklees ReCharge: This scheme helps finance the initial costs of installation of renewable energy in the home and allows for this cost to be paid off when the property is sold, permitting residents to get the benefit of solar panels and other clean energy technology with no upfront costs.

Renewables Obligation: This is the Government's main mechanism for supporting the generation of renewable electricity. The obligation requires licensed electricity suppliers to source a specific, and annually increasing, percentage of the electricity they supply from renewable sources. The current level is 15.4% for 2007/08, rising to 15.4% by 2015/16. The BERR website provides details of what technologies are counted as renewable under the obligation [15] .Since 2002, the Renewables Obligation has stimulated the renewables market, resulting in a more than doubling of the amount of renewable electricity generated

Renewables Obligation Certificates (ROCs): A Renewables Obligation Certificate (ROC) is a green certificate issued to an accredited generator for eligible renewable electricity generated within the UK and supplied to customers within the UK by a licensed electricity supplier. One ROC is issued for each megawatt hour (MWh) of eligible renewable output generated. Suppliers meet their Renewables Obligation by presenting sufficient ROCs. Where suppliers do not have sufficient ROCs to meet their obligations, they must pay an equivalent amount into a fund, the proceeds of which are paid back on a pro-rated basis to those suppliers that have presented ROCs.

Energy4Good: This programme aimed to encourage the uptake of energy efficiency measures and renewable energy technologies by households and organisations in the Cambridge area. The project team offered free technical advice and assistance with procuring low-energy systems and provided grants through the city and district councils, as well as facilitated access to other grants, subsidies and discounts.

Combined Heat & Power (CHP): Combined Heat and Power (CHP) is the simultaneous generation of usable heat and power (usually electricity). It takes advantage of waste heat generated when electricity is produced. The heat can be used for space heating and hot water. This is more efficient than the process used in conventional power stations, where the waste heat is simply discharged to the atmosphere

Microgeneration: Microgeneration is defined in section 82 of the Energy Act 2004[1] as the small-scale production of heat and/or electricity from a low carbon source. The technologies covered by this definition include PV to provide electricity and solar thermal to provide hot water, micro-wind, micro-hydro, air source and ground source heat pumps, biomass, micro combined heat and power (micro CHP) and small-scale fuel cells.

Energy Services Company: An energy services company supplies a comprehensive energy package, from equipment procurement through to implementation and maintenance, rather than just (one of) the separate components. For example, an ESCo may provide: an appliance, the financing required to purchase it, the expertise needed to maintain it, advice on operating it properly and the energy required to operate it

15 http://www.berr.gov.uk/energy/sources/renewables/policy/renewables-obligation/what-is-renewables-obligation/page15633.html

UK Microgeneration Certification Scheme: This scheme run by the department for Business, Enterprise and Regulatory Reform (BERR formerly DTI), is designed to evaluate products and installers against robust criteria for microgeneration technologies, providing greater protection for consumers and ensuring that the Government's grant money is spent effectively.

Community Renewable Initiative: This initiative was a five year programme, which closed in April 2007. It was coordinated by the Countryside Agency and aimed to improve community energy security, local skills, livelihoods, and education. The CRI stimulated community action on renewable energy and delivered over 150 exemplar community projects across England.

European Regional Development Fund: This fund aims to promote regional development. It provides funding to create and safeguard sustainable jobs, to invest in infrastructure to diversify, revitalise, improve access and regenerate areas. The target areas are economic sites and industrial areas suffering from decline, depressed urban areas, rural areas and areas dependent on fisheries.

APPENDICES

1. ENERGY AND CO_2 DATA FOR SOUTH CAMBRIDGESHIRE

Table 6 CO_2 Figures for South Cambs and neighbouring areas

Local Authority and Government Office Region CO_2 figures 2005	Industry and Commercial	Domestic	Road Transport	LULUCF	Total
Cambridge	437	234	110	0	781
East Cambridgeshire	214	192	323.7	170	899
Fenland	503	220	210.8	161	1,094
Huntingdonshire	547	393	774.6	142	1,856
Peterborough	546	370	407.9	7	1,331
South Cambridgeshire	**801**	**345**	**770.6**	**19**	**1,936**
Mid Bedfordshire	300	316	534.6	7	1,157
Uttlesford	262	194	455.1	-8	903
EAST OF ENGLAND	17,306	13,430	15,468.1	605	46,808
UK TOTAL	248,511	149,504	149,816.1	-2,056	545,775

LULUCF refers to land use emissions

Table 6 is derived from DEFRA CO_2 data for 2005

Table 7 CO_2 Figures per Capita for South Cambs and neighbouring areas

Local Authority and Government Office Region CO_2 figures 2005	Per capita Total CO_2 (tonnes)	Industry and Commerce per Capita CO_2 (tonnes)	Road Transport per Capita CO_2 (tonnes)	Domestic per capita CO_2 (tonnes)
Cambridge	7.2	4.0	1.0	2.1
East Cambridgeshire	12.3	2.9	4.4	2.6
Fenland	13.1	6.0	2.5	2.6
Huntingdonshire	11.8	3.5	4.9	2.5
Peterborough	8.5	3.5	2.6	2.4
South Cambridgeshire	**14.9**	**6.2**	**5.9**	**2.7**
Mid Bedfordshire	9.6	2.5	4.4	2.6
Uttlesford	13.1	3.8	6.6	2.8
EAST OF ENGLAND	8.7	3.2	2.9	2.5
UK TOTAL	9.3	4.2	2.5	2.5

Using 2001 Census data for population

Table 7 is derived from Table 5 and the 2001 Census population figures.

Table 8 The distribution of energy consumption across the district

MLSOA Name	Domestic electricity kWh	Industry/Commerce Electricity kWh	Domestic gas kWh	Industry/Commerce Gas kWh
South Cambridgeshire 001	13,468,873	3,614,482	46,823,942	3,690,980
South Cambridgeshire 002	12,526,247	4,374,718	41,964,252	7,295,520
South Cambridgeshire 003	11,504,569	6,070,342	42,297,025	6,896,781
South Cambridgeshire 004	10,904,734	8,407,903	32,265,079	25,393,799
South Cambridgeshire 005	10,279,836	4,834,944	32,136,186	12,554,277
South Cambridgeshire 006	15,321,217	5,127,872	62,260,654	59,097,421
South Cambridgeshire 007	12,965,592	10,822,672	34,021,392	53,756,453
South Cambridgeshire 008	27,402,409	11,538,254	43,364,323	0
South Cambridgeshire 009	14,262,206	5,336,529	38,657,010	0
South Cambridgeshire 008 and 009	0	0	0	74,707,639
South Cambridgeshire 010	19,379,958	6,083,004	26,815,518	966,612
South Cambridgeshire 011	17,425,587	6,055,402	49,909,816	30,581,250
South Cambridgeshire 012	12,620,486	6,045,910	50,366,487	6,105,900
South Cambridgeshire 013	20,229,534	6,744,580	14,828,195	0
South Cambridgeshire 014	14,386,156	3,941,642	44,852,056	6,755,338
South Cambridgeshire 015	12,941,788	4,173,662	48,296,580	13,310,257
South Cambridgeshire 016	23,914,784	8,400,823	26,766,620	2,750,430
South Cambridgeshire 017	21,057,566	8,725,214	29,279,893	111,259,816
South Cambridgeshire 018	21,202,486	12,962,270	44,708,722	13,622,266
South Cambridgeshire 019	20,912,065	5,541,179	0	0
South Cambridgeshire 013, 019 and Unallocated	0	0	0	27,492,071
Unallocated	764,102	2,857,429	15,662,920	0
Total	313,470,194	131,658,829	725,276,670	456,236,810

Table 8 is derived from BERR Energy Statisitics2006

Table 9 Potential biomass yield and access to gas

MLSOA Name	Straw	Wood fuel	Energy crops	Households not connected to gas
	tonnes	tonnes	tonnes	
South Cambridgeshire 001	3,950	45	308	
South Cambridgeshire 002	3,743	23	314	10%
South Cambridgeshire 003	2,673	25	225	
South Cambridgeshire 004	3,970	45	320	10%
South Cambridgeshire 005	2,770	100	206	10%
South Cambridgeshire 006	1,855	60	147	
South Cambridgeshire 007	1,775	5	130	20%
South Cambridgeshire 008	8,918	465	725	5%
South Cambridgeshire 009	3,063	90	452	25%
South Cambridgeshire 010	5,425	303	381	50%
South Cambridgeshire 011	5,395	123	359	20%
South Cambridgeshire 012	1,880	88	132	50%
South Cambridgeshire 013	10,848	943	766	70%
South Cambridgeshire 014	2,240	63	191	15%
South Cambridgeshire 015	843	-	54	
South Cambridgeshire 016	14,603	1,040	1,007	60%
South Cambridgeshire 017	7,445	723	609	50%
South Cambridgeshire 018	6,320	215	461	30%
South Cambridgeshire 019	9,765	203	640	no data

Notes: Straw yield based on 2.5 t/ha; Wood fuel on 2.5 t/ha; and Energy crops on 10 t/ha

Table 9 is derived from DEFRA agricultural statistics from June 2004. The straw yield is taken as 2.5 t/ha for the cereal area in each MLSOA area. The wood fuel is taken as 2.5 t/.h for all the woodland in each area and energy crops is taken as 10 t/ha for 1% of all land area.

2. EXISTING RENEWABLE ENERGY INSTALLATIONS IN SOUTH CAMBRIDGESHIRE

This is the full list of recent renewable energy installations in South Cambridgeshire:

Technology	Address	Capacity (kw)	PostCode/ Grid Ref	Status	Data source
Ground source heat pump	Cambrige Regional College, Kings Hedges Road, Cambridge	0	CB4 2QT	Operational	South Cambs planning
Landfill gas	Butt Lane, Milton, Cambridge	2136	CB4 4DG	Operational	Ofgem/ Restats
Landfill gas	Milton Landfill Site, Butts Lane, Milton, Cambridge	2128	CB4 6DQ	Operational	Ofgem
Solar PV	Horseheath Road, Linton		CB21 4LU	Operational	Energy 4 Good
Solar PV	See post code (Bullrush Lane, Cambourne)	2	CB23 6BG	Operational	Ofgem/ Renewables East
Solar PV	See post code (Hines Lane, Comberton	3	CB23 7BZ	Operational	Ofgem
Solar PV	Waterbeach (Long Drove)		CB25 9LW	Operational	NEF
Solar PV and Solar thermal	Back Lane, Cambourne		CB23 6FY	Operational	Energy 4 Good
Solar PV and Solar thermal	New Hall Lane, Cambourne		CB23 6GE	Operational	Energy 4 Good
Solar PV and Solar thermal	New Hall Lane, Cambourne		CB23 6GE	Operational	Energy 4 Good
Solar PV and Solar thermal	Sackville Way, Cambourne		CB23 6HL	Operational	Energy 4 Good
Solar PV and Solar thermal	Sackville Way, Cambourne		CB23 6HL	Operational	Energy 4 Good
Solar PV and Solar thermal	Sackville Way, Cambourne		CB23 6HL	Operational	Energy 4 Good
Solar thermal	Weston Green (Common Road, Weston Coalville)		CB21 5NS	Operational	NEF
Solar thermal	Great Wilbraham		CB21 5JF	Operational	NEF
Solar thermal	Kings Mill Lane, Great Shelford		CB22 5EN	Operational	Energy 4 Good
Solar thermal	Stonehill Road, Great Shelford		CB22 5JL	Operational	Energy 4 Good
Solar thermal	Whittlesford Road, Newton		CB22 7PH	Operational	Energy 4 Good
Solar thermal	Lawrence Lea, Harston		CB22 7QR	Operational	Energy 4 Good
Solar thermal	Great Shelford		CB22 5JL	Operational	NEF
Solar thermal	Kentings, Comberton		CB23 7DT	Operational	Energy 4 Good

Solar thermal	Green End, Comberton		CB23 7DY	Operational	Energy 4 Good
Solar thermal	High Street, Harlton		CB23 1ES	Operational	Energy 4 Good
Solar thermal	Comberton		CB23 7DT	Operational	NEF
Solar thermal	Telegraph Street, Cottenham		CB24 8QU	Operational	Energy 4 Good
Solar thermal	Over (Mill Road		CB24 5PY	Operational	NEF
Solar thermal	Saxon Way, Willingham		CB24 5UR	Operational	Energy 4 Good
Solar thermal	New Road, Cottenham		CB24 9RF	Operational	Energy 4 Good
Solar thermal	Waterbeach (High Street)		CB25 9JU	Operational	NEF
Solar thermal	Thornton Close, Girton		CB3 0NF	Operational	Energy 4 Good
Solar thermal	Girton (Woodlands Park)		CB3 0QB	Operational	NEF
Solar thermal	Cambrige Regional College, Kings Hedges Road, Cambridge		CB4 2QT	Operational	South Cambs planning
Solar thermal	Over		CB4 5PY	Operational	NEF
Solar thermal	Histon		CB4 9LR	Operational	NEF
Solar thermal	High Street, Orwell		SG8 5QN	Operational	Energy 4 Good
Solar thermal	Bassingbourn		SG8 5LG	Operational	NEF
Wind	Mill Way, Swavesey	225	CB24	Awaiting construction	Renewables East/ South Cambs
Wind	0	29900	CB21	Under appeal since 12/07	Restats/ S Cambs
Wind	Primary School Site, Arbury Camp, King Hedges Road, Cambridge	6	CB4	Approved 14.5.07	South Cambs planning
Wind	See post code (N End Road, Bassingbourn)	5	SG8 5PD	Operational	Ofgem/ Renewables East
Wind	Rockery Farm, Broadway, Bourn	225	533065 258036	Approved, awaiting construction	Restats/ S Cambs
Wind	Land adj. to Back Lane and Country Park Lane, Cambourne	2.5	531500 259200	Operational	South Cambs planning
Wind	Cambridge Regional College, Kings Hedges Road, Cambridge	6	545000 261000	Operational	South Cambs planning
Wind	37 Kingfisher Way, Cottenham	6	544888 268210	Approved 22.1.07	South Cambs planning
Wind	74 Angle End, Great Wilbraham	2.5 (estimated)	544932 257823		South Cambs planning
Wind	169A St Neots Road Hardwick	1	537480 259580	Approved 11.9.07	South Cambs planning

Wind	Site at junction of Sackville Way and Back Lane, Cambourne	6	532245 259686	Submitted 10.8.07	South Cambs planning
Wind and Solar PV	Cambridge Road (A1301)	2.5 (estimated)	CB22	Operational	Energy 4 Good

These sources were consulted for evidence of local renewable energy installations:

- Ofgem- list of Renewables Obligation accredited installations
- RESTATS- list of operational and planned renewables projects
- Renewables East- online list
- South Cambridgeshire planning department- in house records
- National Energy Foundation- in house records
- Energy4Good- installations from online map

Local large scale renewables installations

There are currently only two significant renewable power installations in South Cambridgeshire, both of which are generators at the Milton landfill site, with a combined capacity of around 4MW. Our research also found that there are at least two medium scale (225kW) turbine installations with planning permission in the district, at Swavesey and Bourne.

There have recently been two planning applications by renewable energy developers to construct large scale wind farms in South Cambridgeshire. One of the projects, Wadlow Farm Wind Farm, is discussed below. In addition, there is a proposal by Enertrag UK for an 8 turbine, 24MW wind farm near Linton, south of Cambridge. A planning application has not yet been submitted.

Case Study: Wadlow Farm Wind Farm

Renewable Energy Systems (RES), a major wind farm developer based in Hertfordshire, submitted their planning application for a 29.9 MW, 13 turbine wind farm in May 2006. The intended location is in a rural location, south east of Cambridge city.

After detailed consultation, in mid 2007 South Cambridgeshire Council decided to refuse planning permission for this development, because of concerns that the wind farm would dominate the character and quality of the landscape. It was ruled that these impacts outweigh the benefits gained from increased renewable energy generation.

RES has since lodged an appeal, and the decision has yet to be announced at the time of writing.

Sources: www.wadlow-farm.co.uk , South Cambs. Planning App no. S/1018/06/F

Cambridge Wind Farm was a proposal by Your Energy, for 16 turbines of approximately 2MW each, located near Boxworth, NW of Cambridge. This planning

application was refused, after appeal, in December 2006, for much the same reason as the above case study.

It is notable that both the above wind farms have been refused, or are facing difficulty obtaining planning permission because of their impact on the landscape. Along with the Linton wind farm, they have been subject to vociferous local opposition, for similar landscape reasons. While there will always be a need for detailed consideration of the impacts of large wind turbines on the local environment, it is clear that community support is vital in the success of such a development. Schemes such as that described in Section 7.3 may help to foster greater community support.

3. GRANT AND FUNDING SCHEMES

One of the key funding streams available to the renewable industry is the Renewables Obligation.

The Renewables Obligation (RO) is a certificate-based market mechanism, which sets a rising quota of renewable electricity that must be supplied to consumers by Licensed Electricity Suppliers. The existing target is for around 15% of electricity to be provided by renewables by 2015/16. The certificates are called Renewable Obligation Certificates (ROCs) and they are traded separately to the electricity produced. Like the electricity, they have a value per MWh.

Currently, all types of eligible renewable electricity generators receive one ROC for each MWh produced. However, the Government is proposing that the amount of ROCs earned by generators will change, depending on the fuel or technology used. Reform of the Obligation is intended to provide additional incentive and support for technologies not yet fully established in the market and to provide additional support for small scale technologies. These changes are due to come into force from April 2009. A summary of the modifications in presented in the Table below.

Table 10 Summary of Reform of Renewables Obligation

Technology/ fuel	ROCs per MWh
Landfill gas	0.25
Sewage gas, co-firing of non-energy crop biomass	0.5
Onshore wind; hydro-electric; co-firing of energy crops; EfW with combined heat and power; geopressure; other not specified	1.0
Offshore wind; dedicated regular biomass	1.5
Wave; tidal stream; fuels created using an advanced conversion technologies (anaerobic digestion; gasification and pyrolysis); dedicated biomass burning energy crops (with or without CHP); dedicated regular biomass with CHP; solar photovoltaic; geothermal, tidal Impoundment (e.g. tidal lagoons and tidal barrages (<1GW)); Microgeneration (<50kW)	2.0

Additionally, there are a number of grant and funding schemes available for renewable technologies. Outlined in the table below is a summary of a selection of the current national and local funding schemes.

Table 11 A summary of a selection of current national and local funding schemes

Grant Name	Funding Source	Description	Coverage	Eligibility Criteria	Funding available and status
Low Carbon Building Programme	BERR Phase 1 managed by EST	Provides capital grants towards the cost of purchasing and installing a wide range of renewable energy generation equipment.	National	Stream 1 – for home owners Stream 2 – for medium and large scale microgeneration projects. Available to public, not for profit and commercial organisations Stream 2A - retro-fit installations and smaller new build projects Stream 2B - Exemplar, major projects Now closed	Stream 1 – differs for each technology (still open)
Low Carbon Building Programme	BERR Phase 2 managed by BRE	Provides capital grants towards the cost of purchasing and installing a wide range of renewable energy generation equipment. Cannot be used in conjunction with other grants from nation or devolved administration	National	Public sector organisations (including schools, hospitals, housing associations and local authorities) and charitable bodies only	Upto £1m Open until mid 2009. Public sector organisations (including schools, hospitals, housing associations and local authorities) and charitable bodies
Bio-Energy Capital Grants	Defra Managed by AEA technology	Promotes the efficient use of biomass for energy, by stimulating the early deployment of biomass fuelled heat and biomass combined heat and power projects	National	Community and public bodies	£25,000-£1m Will shortly open again for this financial year
Anaerobic Digestion demonstration	DEFRA	To establish commercial scale anaerobic	National	To be confirmed	2008 – Details to be

programme		digestion plants			confirmed £10 million overall fund
Biofuel Subsidy	HMRC	Biofuel transport fuel subsidy	National	Transport	20p/litre fuel subsidy – to be withdrawn Spring 2010
Biogas for transport subsidy	HMRC	The fuel duty incentive for biogas, which is a duty reduction.	National	Transport	40p per litre, will remain at its current level until spring 2012.
Awards for All	National Lottery	Promote education, the environment and health in the local community.	National	Communities	£300-10,000
Ashden Awards for Sustainable Energy	Ashden Awards	Awards for the promotion of renewable energy at the community level	National	Communities	3 x £30,000 awards (Annual)
Cut your Carbon	East of England Development Agency	Funding for capital assets that will cut community carbon emissions	National	Communities	£5,000 and £200,000
E.Source	E.ON	Offers grants to community groups and not for profit organisations to implement sustainable energy and energy efficiency projects in their buildings.	National	Communities	£30,000 Subscribe by - 25 April 2008 -3 October 2008
Scottish Power Green Energy Trust	Scottish Power	Assistance and awards for community based renewable energy projects	National	Communities	Not stated
Energy 21	Energy 21	Energy 21 Trust is a registered educational charity (number 1082482) who unites local actions and groups that are driving change towards the use of renewable energy at a local and community level.	National	Communities	Not stated

Community Project Grants	South Cambridgeshire District Council	Community Project Grants are aimed at enabling local community groups and organisations to plan, develop and implement Community Development based projects and activities.	Local	Communities	75% of local community development project. Max to date £3000

4. REGIONAL RENEWABLE ENERGY INSTALLERS AND SUPPLIERS

In order to carry out the consultation discussed in Section 3.5, we identified and contacted a number of renewable energy technology suppliers and installers based in the East of England. These companies are listed in Table 12.

Table 12 Renewable energy companies consulted

Company	Town	County	Technologies supplied	Contact notes
Aran Services Ltd	Bury St. Edmunds,	Suffolk	Solar Thermal	Phone interview done
Bowller Solar Energy	Cambridge	Cambridge City	Solar thermal & PV	Phone interview done
Carbon Free Energy Solutions Ltd	Ely	Cambridgeshire	Wind, Heat Pumps, Solar thermal, PV, Biomass	
David Roitman Heating & Plumbing	Newmarket	Suffolk	GSHP	Phone interview done
Econergy	Sandy	Bedfordshire	Biomass heat	
Ecowarm Solar Ltd	Bury St Edmunds	Suffolk	Solar Thermal	Phone interview done
Energy Innovations (UK) Ltd	Woodbridge,	Suffolk	Biomass heat, solar thermal	Responded
FBC	Royston	Hertfordshire	Biomass boilers	Phone interview done
I C Rumbold Solar Hot Water Systems	Melbourn	South Cambridgeshire	Solar Thermal	Phone interview done
Micro-Generation Systems Ltd	Hertford,	Hertfordshire	Biomass, wind, PV, solar thermal, Heat pumps, Hydro, Gas CHP	Phone interview done
Mint Solutions Limited	Northampton,	Northamptonshire	Wind, PV	
Mosscliff Environmental Ltd	Earl Soham,	Suffolk	Wind, PV	Phone interview done
P J Brown Plumbing & Heating Ltd	Cottenham	South Cambridgeshire	Solar Thermal	Phone interview done
RD Associates Ltd	Biggleswade	Bedfordshire	Biomass boilers	
Renpower Ltd	Wellingborough	Northamptonshire	Wind turbines	
Roland Amey Heating & Plumbing Services	Babraham	South Cambridgeshire	Solar Thermal	Phone interview done
Solar Home	Bury St Edmunds	Suffolk	Solar Thermal	

Technologies Ltd				
Solaris Free Energy Ltd	Bedford,	Bedfordshire	Biomass, solar thermal	Phone interview done
SRE Technologies Ltd	Wellingborough	Northamptonshire	Wind, PV	Phone interview done
Viridian Solar,	Bassingbourn	South Cambridgeshire	Solar Thermal	Phone interview done
W.A.T.M. Services	Luton	Bedfordshire	Solar thermal	
West Anglia Insulation	Bury St Edmunds	Suffolk	PV, Solar thermal, GSHP	

The consultations with the above companies were carried out in an informal phone interview style. The topics covered are listed below.

- How many installations have you carried out or supplied to in South Cambridgeshire, and/or Cambridgeshire?
- Have you observed any contrasts between the market in South Cambs and the market in general? E.g.
  - More or less competition or customers- now and in future
  - Is South Cambs notably more or less attractive for your business than other parts of the country or region?
  - Is it an area you have identified for significant future growth? For example, the new housing developments in Northstowe, Cambourne, Arbury Camp and Cambridge Southern Fringe
- What are the barriers to market growth in the region, and generally e.g. planning, funding, competition?
- What would help to promote or grow your business ?
  - In South Cambridgeshire
  - Nationally

Case Study: Viridian

Viridian is independently owned company founded by a group of engineers and scientists from Cambridge University. Viridian market solar thermal panels called 'Clearline' that are thinner than conventional systems and can form an integrated part of the roof.

Viridian has developed a simulation solar house to study different patters of hot water use and storage and to measure the energy contribution from the solar panel. This research will help to identify optimum use and solar storage parameters.

- Do you have any other comments on the opportunities or limitations for market growth of your business and renewables in general in the area?

TEMPLATE FOR LPSA PERFORMANCE REWARD GRANT PROPOSALS

Lead Organisation: South Cambridgeshire District Council

Lead Officer: Richard Hales (Strategic Sustainability Officer)

Partnership (s) delivering / managing project (if any):

LPSA reward grant requested **£250,000 capital (over three years)**	**Geographical area (s) project will cover (please circle areas covered by project)**					
£	**Countywide**	**Cambridge City**	**East Cambs**	**Fenland**	**Hunts**	**South Cambs**

Project details and evidence of need: (including planned interventions, what these will achieve and by when; and any targets associated with this project)

Directly delivering carbon reduction: implementing and installing community-based renewable energy schemes.

The objective of this grant proposal is to secure the pre-requisite financial resources to deliver significant carbon saving in the heart of Cambridgeshire through the effective deployment of community based renewable energy technologies across existing villages and parishes.

South Cambridgeshire's LSP (SCLSP) and South Cambridgeshire District Council (SCDC) have recently commissioned a detailed study to identify and quantify local renewable energy assets and other sources which have a realistic potential to generate viable supplies of low carbon energy for domestic and commercial consumption within South Cambridgeshire, including a feasibility and prioritisation assessment of how best to go about realising the areas of potential identified.

This study was specifically designed to generate focused evidence which would then, with the funds applied for here, act as a 'spring-board' to effective delivery of the right projects in the right places to maximise carbon saving and community benefit.

The funding applied for would be disbursed (principally as match-funding) over a three year period (picking up on immediate and medium-term proposals) to bring forward and implement a clutch of installations which will:

1. realise significant measurable carbon savings;

2. explicitly demonstrate what can be achieved in terms of community benefit - affordable secure energy supplies which promote self-sufficiency, co-operation and partnership working whilst illustrating on the ground that major steps towards genuine low-carbon living can be effectively realised through local agency and commitment;

3. actively develop a low-carbon economy – bringing investment, enterprise and business opportunity into Cambridgeshire in a commercial sector that is destined to attain unprecedented growth.

South Cambridgeshire as a geographical area has significantly underperformed in terms of renewable energy installations. Large scale commercial wind-farm projects have failed to win support whilst the district is one of the highest carbon dioxide emitters in the East of England. Evidence from Beacon Councils and other local authorities points towards the carbon-saving success of less extensive projects with genuine community buy-in, local commitment and co-operation. Technologies with proven track-records in this field would include single wind turbines or biomass heating.

SCDC have already established enthusiasm and commitment for partnership working with parish-based community groups promoting low-carbon living and who are keen to take advantage of options on viable renewable energy technologies. These groups include Sustainable Girton, Histon and

Impington Climate Change Action, and the Dry Drayton Green Group.

Following completion of the current study into the assessment, quantification and feasibility of drawing upon local renewable energy resources a detailed Community Renewable Energy Delivery Plan will be drawn up. This will act as the key evidence-based template for bringing forward and implementing locally-owned projects with essential financial support from the LPSA Performance Reward Grant funds.

Key targets would be:

1. delivery of all installations flagged as immediately achievable and where local support/commitment has been secured from the relevant community(ies)/parish councils within 12-18 months of grant monies being available

2. delivery of medium-term installations offering the best returns in terms of carbon saving and community benefit from the balance of the funds available within 18moths-3 years).

In prioritising projects, replicability, carbon-saving value and extent of community return will be important defining factors.

Link to LAA / Sustainable Community Strategy (ies) priorities

Direct, primary:

- Promoting sustainability for the benefit of the local and global environment
- Supporting the delivery of low carbon growth and promoting low carbon lifestyles
- Seeking to minimise climate change through promoting a low energy future and minimising waste
- Taking account of climate change in all activities promoted or delivered through the South Cambridgeshire Local Strategic Partnership

Indirect, supporting:

- Engaging with the local community, including children and young people and other hard-to-reach groups, parish councils, voluntary organisations and neighbourhood forums to improve services
- Supporting the start-up and development of new businesses and social enterprises

Performance reporting / management arrangements (and any specific performance indicators – if any)

Management, monitoring and evaluation:

Day-to-day project management: SCDC Strategic Sustainability Officer

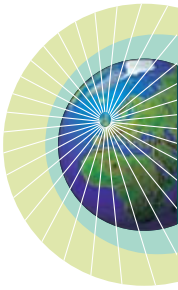
Project Team: representatives from principal delivery partners

Monitoring and evaluation reference group: SCDC Climate Change Working Group

Indicators:

- Tonnes of CO_2 saved per capita of South Cambs population (explicitly improves National Indicator 186: Per capita CO_2 emissions in the LA area)
- Tonnes of carbon saved per installation
- Kg of carbon saved/£ of LPSA reward grant awarded
- Value of community benefit (£saved/revenue generated)
- Cost of generation (£/kwh produced)
- Rate of generation. (kwh/month)

Executive Summary



We face two key energy policy challenges: to tackle climate change and ensure security of energy supply. To meet these challenges, we are already acting to develop a diverse low-carbon energy mix including renewables, nuclear power and carbon capture and storage, and to promote energy efficiency and demand reduction.

Renewable sources of energy are a vital part of this strategy. They provide low-carbon energy, increase the diversity of our energy mix, and bring key business and employment opportunities. We therefore agreed with our EU partners last year to a binding target that 20% of the EU's energy consumption must come from renewable sources by 2020. The European Commission has proposed that the UK's contribution to this should be to increase the share of renewables in our energy mix from around 1.5% in 2006 to 15% by 2020. This would be a very challenging target. It will be important to meet it in the most cost-effective way possible.

In this document we are consulting on a range of possible measures to deliver our share of the EU target. Together they could lead to almost a ten-fold increase in our use of renewable energy – across electricity, heat and transport – by 2020. This will affect consumers, businesses and the wider environment. Indeed, everyone in the UK will have a role to play in this endeavour.

We already have a wide range of policies in place to deliver increased renewable deployment in the UK. We want to hear your views about the additional measures that we will need to employ. These could include:

- extending and raising the level of the Renewables Obligation to encourage up to 30-35% of our electricity to come from renewable sources by 2020;
- introducing a new financial incentive mechanism to encourage a very large increase in renewable heat;
- delivering more effective financial support for small-scale heat and electricity technologies in homes and buildings;
- helping the planning system to deliver, by agreeing a clear deployment strategy at regional level similar to the approach established for housing;
- ensuring appropriate incentives for new electricity grid infrastructure and removing grid access as a barrier to renewable deployment;
- exploiting the full potential of energy from waste, by discouraging the landfilling of biomass as far as is practical;

- requiring all biofuels to meet strict sustainability criteria, to limit adverse impacts on food prices, or other social and environmental concerns;
- promoting the development of new renewable technologies, through effective support particularly where the UK has the potential to be a market leader;
- maximising the benefits for UK business and jobs, by providing a clear long-term policy framework, working with Regional Development Agencies to tackle key blockages, considering support for specific technologies and addressing skills shortages.

Introduction

Renewable energy in the UK

1. Energy policy in the UK faces two very serious challenges: tackling climate change by reducing emissions both here and abroad, and ensuring that our energy supply remains secure. The Energy White Paper 2007 set out the Government's response to these challenges.

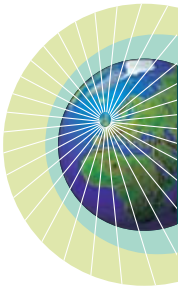
2. As well as strongly supporting international action to address climate change at EU, G8 and UN level, we have set ourselves the ambitious target of reducing the UK's carbon emissions by at least 60% by 2050. Under the Climate Change Bill our emission reduction goals for 2020 and 2050 will become statutory, with the introduction of five-year 'carbon budgets' (total emission limits). The Government will be required to produce plans to meet its carbon budgets, and to report to Parliament on how it is doing so.

3. Our main policy for achieving carbon reductions involves putting a price on carbon, notably via the EU Emissions Trading Scheme, which caps emissions in the power and other heavy industry sectors in the EU. However, in line with the principles of the Stern Review into the economics of climate change, we also encourage behavioural change to reduce energy use, and we provide support for specific low-carbon technologies.

4. Ensuring security of energy supply is essential to climate and energy policy. Fundamental to securing our energy supplies is to ensure that we are not dependent on any one supplier, country or technology. By increasing the level of energy we generate domestically, we will be less dependent on imports of fuel from abroad. Investment in more renewable energy in the UK, alongside other low carbon sources such as nuclear power and carbon capture and storage, can contribute to a more diverse mix of technologies and lower levels of fossil fuel imports. Our Renewable Energy Strategy (RES) can make an important contribution to this – we estimate that increased investment in renewables in the UK to meet a 15% renewable energy target in 2020 will reduce UK gas imports by 11-14% in 2020.

5. It will be very important that this diverse, low-carbon energy mix is achieved at competitive prices. We believe that the best way to ensure this is through

independently regulated markets, with the right interventions to correct specific market failures.



6. This document focuses on renewable energy. Since 2002, the chief policy mechanism to encourage the deployment of renewables has been the Renewables Obligation (RO), which requires electricity suppliers to obtain a specified and increasing proportion of their electricity from renewable sources or pay a buy-out price. Since its introduction, the RO has increased the level of RO-eligible renewable generation in the UK from less than 2% in 2001 to around 4.4% in 2006. This year we will overtake Denmark as the country with the highest operating offshore wind capacity in the world at over 400 MW. We have also recently introduced the Renewable Transport Fuel Obligation (RTFO) to bring forward biofuels in the transport sector.

7. The 2007 Energy White Paper set out proposals to reform the Renewables Obligation to make it more effective and efficient. It also suggested policies to address key stumbling blocks for renewable deployment, arising from planning controls and difficulties with grid connection. Many of these reforms are now being enacted through the Energy and Planning Bills currently before Parliament.

8. At the end of 2007, we launched a Strategic Environmental Assessment on a draft plan for up to 25 GW – nearly a third of our current total electricity generating capacity – of new offshore wind development rights in UK waters. In June 2008 The Crown Estate launched Round 3 of the offshore wind leasing programme, with bids expected in early 2009. In January this year we also announced the terms of reference for a cross-Government feasibility study into a barrage or other tidal power scheme in the Severn Estuary.

9. However, we will need to go much further. As part of our long-term support for renewables, in spring 2007 we helped secure agreement in the EU to an ambitious target to source 20% of the EU's total energy use – a combination of electricity, heat and transport – from renewable sources by 2020. This compares to around 8.5% across the EU in 2005. Member State contributions to this overall target have yet to be agreed, but the European Commission has proposed that the UK should provide renewable sources for 15% of its total energy use by 2020.

10. This is a very challenging target. In 2006 only around 1.5% of our final energy consumption[1] came from renewable sources, and under current policies[2] we expect this to rise to 5% by 2020. To meet the proposed EU target by 2020 we will have to increase the proportion of our energy coming from renewables ten-fold from 2006 levels, three times more than current policies are designed to achieve.

11. Delivering this level of change in renewable energy in such a short time will need action at all levels. Government – central, devolved, and local – will need to set the overall policy framework, as well as increasing its own use of renewable energy. This document is drafted from the perspective of UK policy, but the Welsh Assembly and the Scottish and Northern Ireland Ministers all recognise the importance of renewable energy, and they will

1 This is equivalent to 25 Terawatt hours (TWh), out of a total 1,800 TWh consumed in the UK.
2 Policies set out in the Energy White Paper 2007.

be essential in meeting the target. The market will also need to provide the necessary investment, and businesses and individuals will have to play an important role, for example by using less energy and supporting increased renewable deployment. This document sets out initial ideas of how each group could contribute. We want to hear your views on the proposals it contains, as well as any other ideas for achieving our ambitious goal in the most cost-effective way.

A new strategy

12. To meet the EU Renewable Energy target, we will need a far-reaching new strategy to increase the contribution of renewable sources in the three main energy-consuming sectors – electricity, heat and transport.

13. This document contains a range of possible additional measures to encourage deployment of renewable energy in the UK. These measures are designed to achieve a 15% renewable energy target for the UK by 2020. However, in a market economy policy alone cannot guarantee outcomes. How much these measures will deliver will depend on how energy companies, developers and investors in the market, and the supply chains which serve them, respond to the signals we provide. It will also depend on how successful we are in overcoming the constraints on development. Indeed, because renewable deployment depends on decisions by governments, businesses, communities and individuals in all parts of the UK, it will depend to some extent on how committed we are as a country to achieving our goals.

14. If all the options set out in this document were successfully implemented (and if no cost constraints were applied in deciding the measures we should take), our scenarios suggest that it will be possible to reach 15% renewable energy in the UK by 2020. This is at the top end of the range of possible outcomes and would require a very rapid response from suppliers, with a step change in the rate of building renewable technologies. We would need to develop a completely new approach to renewable heat: providing a substantial incentive to jump-start this new market, developing supply chains and encouraging large numbers of households to find renewable ways of heating their homes. We would also need to develop a new sustainable biomass market. The country's current wind generation capacity, on and offshore, would have to increase by a factor of ten.

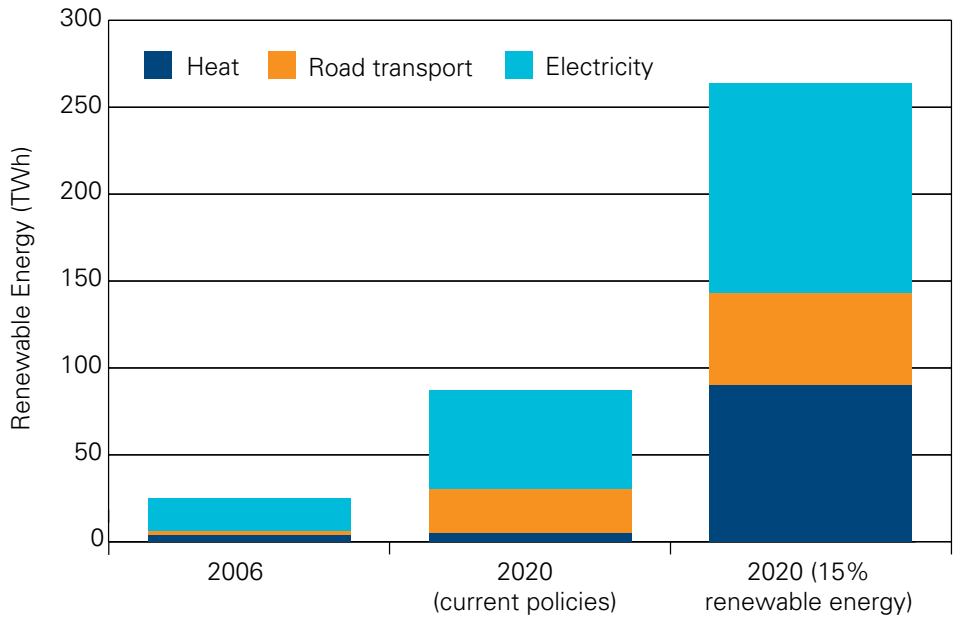
15. Achievement of the target will also depend on the extent to which we can reduce overall energy demand. The renewable target is a percentage of total energy consumed: the lower that figure, the easier it will be to achieve the required share. Reducing energy demand is of course also important for other reasons: it is cost-saving to households and businesses, it reduces greenhouse gas emissions, and it contributes to security of supply. That is why the starting point for our Renewable Energy Strategy is energy saving. All of us have a role in this. We seek views on how this can be achieved.

16. This document does not set out a definitive division of the renewables target between electricity, heat and transport. That will depend on how markets react to the incentives and opportunities provided. There are particular uncertainties over the contribution which can be made by renewable transport. In line with the draft EU Renewable Energy Directive, this document assumes a 10% renewable share of transport fuel. In the light

of the increasing concerns raised in recent months about the indirect effects of biofuels, we commissioned Professor Ed Gallagher of the Renewable Fuels Agency to carry out a review of evidence on this issue. Gallagher's findings will be important to the development of the Government's biofuel policies and targets. We are committed to meeting both our and the EU's renewable energy goals in a sustainable way. We also need to explore how far other renewable transport strategies, such as the development and use of electric-powered cars, can contribute to the renewable transport fuel target by 2020.

17. To understand how the 15% target might be shared between electricity, heat and transport, we have modelled different scenarios, using estimates of cost, practical feasibility (such as 'build rates' for onshore and offshore wind) and technology development. This analysis suggests that – if 10% renewable transport is feasible and sustainable – then one possible scenario to deliver 15% renewable energy in the UK in 2020 might be: 10% renewable energy in transport (compared with less than 1% today), 14% in heat (less than 1% today) and 32% in electricity (less than 5% today). If sustainability concerns meant that the transport sector could not contribute 10%, and the same overall renewables target were retained, then the contribution from the other sectors would have to be higher. In this circumstance it is unclear how we could meet the target domestically without making use of other options such as trading with other countries.

Figure 1: The size of the challenge – a potential scenario to reach 15% renewable energy by 2020

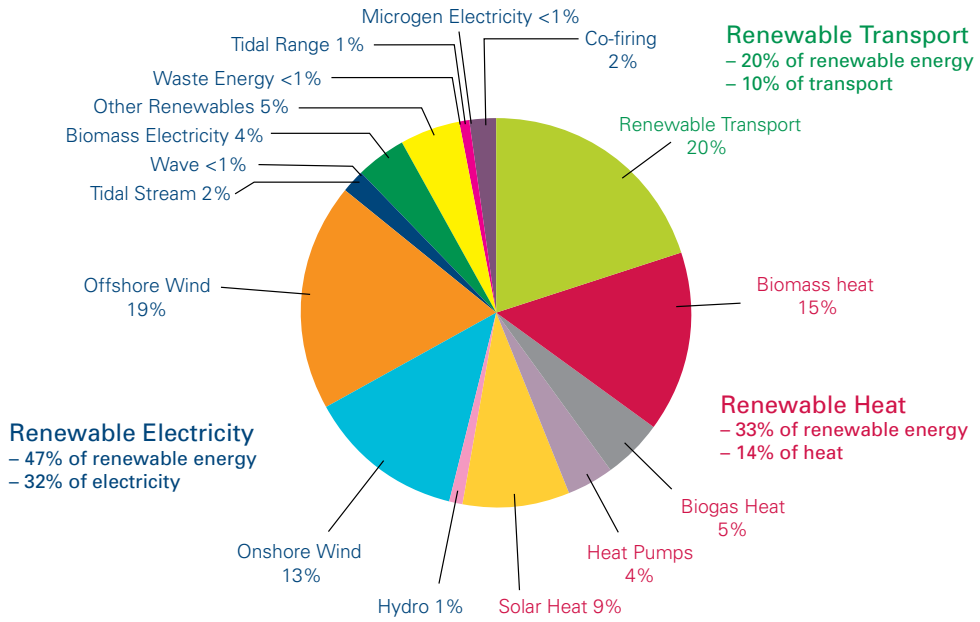


Source: BERR analysis

18. Within the overall framework the Government puts in place, the market will need to determine which technologies should be used, and then to deploy them. Initial analysis based on our current understanding of relative costs and constraints suggests that the key growth areas will be the currently commercial technologies of wind (on and offshore) and biomass. Figure 2 provides one possible scenario of what the final shares of different types of renewables

in 2020 might look like. Other, less-established technologies such as marine power generation may have more of a part to play over the longer term.

Figure 2: Illustrative renewable technology breakdown to reach 2020 target



Source: Redpoint et al (2008), NERA (2008), Department for Transport estimates.[3]

19. We do not underestimate the challenge of delivering this scale of renewable deployment in a little over a decade, although we note that the rate of building needed for offshore wind could be similar to the rapid rates of building that took place for coal in the 1970s and gas and onshore wind in the 1990s. However, to meet our target, we have no choice but to face this challenge head-on. This document seeks views on the measures we need to take to achieve it.

How much will it cost?

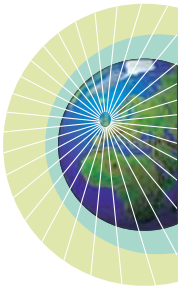
20. Meeting the UK's share of the renewable energy target will involve difficult trade-offs and costs. Providing companies with incentives to make the necessary investments will require an increase in the amount of consumer subsidy. So there will be an effect on fuel prices for all energy users over the longer term, although further energy efficiency measures, and changes in our use of energy could reduce the impact on bills, as discussed below.

21. How far it will involve additional cost for the economy and consumers will depend on the relative costs of renewables and alternative sources of energy. Our initial research, which is set out in the impact assessment attached to this document,[4] suggests that a central estimate of the cost to the UK of meeting a 15% target could be around £5 to £6 billion a year in 2020 (at

3 The chart shows the split of total renewable energy in 2020 between the three sectors: 20% coming from renewable transport sources; 33% from heat; and the remaining 47% from electricity.

4 www.berr.gov.uk/renewableconsultation

today's prices).[5] This is based on a range of projected prices for oil and other commodities by 2020 which are inherently uncertain: it assumes oil, for example, at $70 a barrel in 2020. If oil and other energy prices were higher than this, at $150 a barrel, the cost of the renewable strategy could fall by 35 to 40%. Similarly, these figures assume that demand for energy is at the level projected in the 2007 Energy White Paper; if demand could be reduced below this, the costs would fall.



22. The costs will also depend on the final design of the EU Renewable Energy Directive. A particular issue under discussion is whether trading with other EU member states or investment in renewable projects outside the EU should be allowed to count towards the target. The measures set out in this document relate to increasing renewable deployment in the UK. But because the cost of renewables projects in some other countries (both within and outside of the EU) are lower than the cost in the UK, allowing a specified and limited proportion of our target to be delivered abroad would make the task significantly less expensive – we estimate that trading one percentage point of the target could save 15 to 20% of the costs of meeting the target domestically, with a correspondingly lower impact on energy prices. Supporting the deployment of renewables outside the EU could also provide investment in clean energy technology in poorer countries. We want to hear your views about the extent to which we should seek to use such opportunities.

23. If we are to drive up renewables deployment in the UK to this degree and within this timescale, these costs will have to be incurred. But it is important to recognise what these costs are paying for: a reduction in the risk of catastrophic climate change and dangerous energy insecurity. These risks carry real and much higher costs. The Stern Review showed that the damage caused by global climate change could cost five times more than the cost of actions to stabilise global emissions by 2050. So the Government believes strongly that the cost of meeting our renewables target should be seen as an investment to avoid much higher costs to the economy in the longer term.

24. We want to hear your views about how we can make the step change transition to using renewable energy in the most cost-effective way.

Saving energy

25. The starting point for our energy policy is to save energy. If we can reduce the amount of energy we use, this will reduce carbon emissions, reduce the need for additional energy supplies and reduce costs. Saving energy can also reduce the amount of renewable energy needed to meet our target by reducing our overall energy consumption; and it is cheaper than investing in new generation plant.

5 These estimates are based on economic modelling by Redpoint et al (2008), Nera (2008) and Department for Transport estimates. Resource costs are net of the value of ETS allowances saved from carbon abated by additional renewable generation in the ETS sectors. Valued at forecast carbon price. Estimates are based on central fuel price estimates.

26. We have already introduced a range of measures to reduce energy use. In the business sector the EU Emissions Trading Scheme, the Climate Change Levy and Climate Change Agreements all provide incentives for greater energy efficiency. In 2010 we will introduce the Carbon Reduction Commitment, a mandatory trading scheme for large non-energy intensive businesses and public sector organisations. In the domestic sector the new Carbon Emission Reduction Target sets obligations on energy suppliers to deliver energy efficiency improvement measures to households. After 2011, as set out in the 2007 Energy White Paper, the Government's aim is to introduce a Suppliers Obligation which aligns the incentives of energy companies with a reduction in demand through the development of 'energy services' markets. Building on already tougher building regulations, we intend that all new homes in England will be zero-carbon from 2016, and all new buildings by 2019. In the transport sector we are negotiating new compulsory emissions targets for new cars.

27. These policies will deliver considerable reductions in projected energy demand over the coming years. However, the EU 2020 renewable energy target changes the context, making more radical measures to reduce energy use more economically attractive than previously considered. Because energy efficiency measures are generally lower cost than building additional renewable supply, our analysis suggests that it will be economically worthwhile to introduce such measures by comparison with marginal electricity options, up to a cost of around £45/tCO_2.

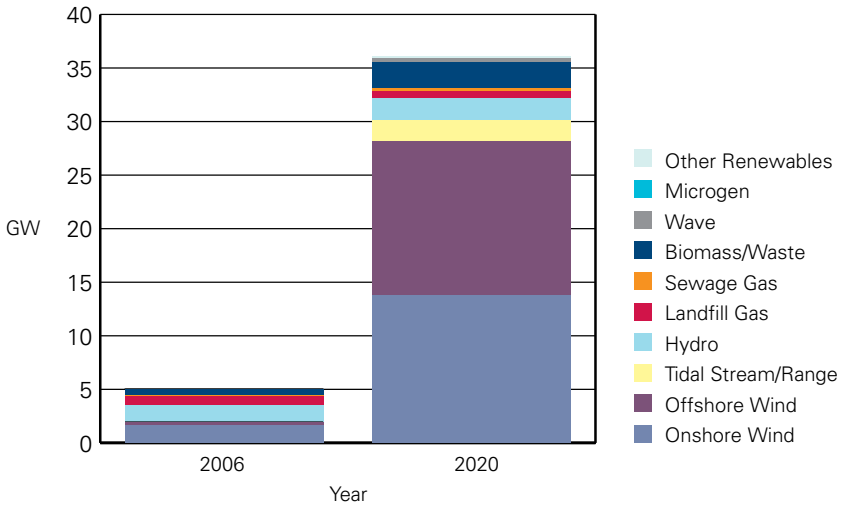
28. This suggests that in this context there is still scope for significant further increases in energy efficiency across the household, business and public sectors. We are not consulting specifically on these issues in this document. However, later this year, we will consult separately on a range of new and enhanced energy efficiency policies that will help promote cost-effective savings across the economy.

29. Using every unit of energy as efficiently as possible has to be our ultimate ambition. This may lead to an absolute reduction in energy demand in the longer term. To achieve this, our intention is to introduce policies so that every sector of the economy benefits from energy efficiency, that where possible all economic opportunities to save energy are realised, and that our energy efficiency policies are integrated so that links can be exploited. Improving the energy performace of people's homes will play a particularly important role in this, reducing emissions and helping us all to manage our energy bills. We will consult on a new strategy to achieve a step change in household energy efficiency, including a Suppliers Obligation, later this year. All this will be closely linked with our work to develop a low-carbon heat strategy.

Centralised electricity

30. As outlined above, if we are to meet our 2020 goal, up to 30-35% of our electricity may need to come from renewable sources. Today that figure is less than 5%, made up mostly of biomass, hydro and wind.

Figure 3: Renewable electricity generation capacity – comparison between 2006 and projected 2020



Source: DUKES 2007

31. As shown in Figure 3, we expect the key growth area to be wind power, both on and offshore. Analysis on electricity constraints suggests that up to 33 GW of offshore wind might be achievable by 2030.[6] However, our initial modelling suggests that by 2020 deployment may be closer to 14 GW, compared to less than 1 GW today. This would equate to around 3,000 extra offshore turbines of 5 MW. Others have suggested that higher levels might be achievable – for example, RAB estimated that around 18 GW of offshore wind could be deployed by 2020.[7] BERR is undertaking a Strategic Environment Assessment (SEA) to assess the feasibility (economic, technical and environmental) of proposals for up to a further 25 GW of offshore wind on top of the 8 GW already planned. We want to make full use of the potential for offshore development.

32. Our initial modelling suggests that we might need approximately 14 GW of onshore wind too, compared to 2GW today – equating to around 4,000 new 3 MW onshore turbines in addition to the approximately 2,000 turbines already installed. Others have estimated a slightly lower level of onshore deployment, for example, RAB estimated that around 13 GW of onshore wind could be deployed by 2020. Subject to planning permission, we would expect that a large proportion of onshore wind development will take place in Scotland. Tidal barrages and lagoons, such as the options being discussed in Severn Estuary, could also make a key contribution if they are able to meet environmental assessment, economic and other criteria.

33. The level of renewables deployment in the UK has historically been low, largely due to the availability of cheap alternative energy sources, particularly North Sea oil and gas. While the Renewables Obligation has provided a strong financial incentive mechanism since 2002, several non-financial constraints have inhibited and slowed renewables deployment. These include, in

6 SKM (2008a)
7 RAB (2008)

particular, planning issues (including conflict with other Government policies); access to the electricity grid; and supply chain constraints. In this consultation we would like to hear your views on our proposals to address each of these issues, as set out below.

Financial incentives

34. The current financial incentive to produce renewable electricity comes from the Renewables Obligation,[8] by which electricity suppliers must obtain a specified and increasing proportion of their electricity from renewable sources. Since it was introduced in 2002, the RO has increased the level of RO-eligible renewable generation in the UK from less than 2% in 2001 to around 4.4% in 2006. Under measures set out in the Energy Bill, it is estimated that the RO will lead to around 14% of our electricity being generated from renewable sources by 2015-20.

35. To meet the EU 2020 renewable energy target, however, we will need to at least double this figure. This consultation examines various alternative ways to provide the financial incentive for this, including strengthening the RO or introducing a new scheme such as feed-in tariffs (which guarantee renewable generators a fixed sum per unit of electricity generated). Our analysis indicates that, while feed-in tariffs could in some circumstances have theoretical financial advantages, these benefits could be within the margin of modelling error and would be small for the scale of deployment required. More significantly, it is less likely that a new system of feed-in tariffs could achieve the target by 2020, due to the delay and uncertainty that a change of support scheme (which could take several years to introduce) would necessarily entail. There could also potentially be difficulties in the operation of feed-in tariffs in the UK's market-based system. This document therefore concludes strongly in favour of maintaining the RO for large-scale electricity while recognising that we need to continue to improve its efficiency. The RO will nevertheless need modifying, including significantly increasing the level of the Obligation (e.g. 30–35%), and extending its end date. On the assumption that the RO is maintained, we would like your views on any further changes required.

36. This document also considers the most appropriate financial incentive for microgeneration of electricity (see below).

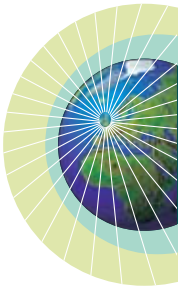
Planning issues

37. A robust planning regime is vital to ensure that the national, regional and local economic benefits; environmental and social objectives; and the interests of individuals, communities and society as a whole are all taken properly into account in reaching decisions about new developments. We are firmly committed to maintaining the democratic, participatory values of our planning system.

38. We know there are potential tensions between local concerns and wider national policy and needs. Renewable developers often complain that the balance between them is not always struck correctly; that the planning system takes too long, costs too much and, in some cases, does not consistently reflect national policy. This can block new generation and the

8 The Renewables Obligation covers England and Wales. Scotland and Northern Ireland have their own renewables obligations.

extensions to the electricity grid which are necessary for it to become operational, adding delay and cost to investment.



39. We are already seeking powers to address some of these concerns through the Planning Bill and the Marine Bill, notably by ensuring that all onshore wind developments above 50 MW and offshore wind developments above 100 MW in England and Wales are considered by a new Infrastructure Planning Commission (IPC) on tight timeframes and on the basis of a new National Policy Statement for renewables.

40. To achieve the 15% target all parts of the UK, in particular the Devolved Administrations, English Regions, Local Authorities and local communities, will have to play their part in contributing to the achievement of the target. We would like to hear your views on a range of potential additional measures to support onshore renewable developments within the context of the reformed planning regime. These could include:

- development of a suite of stronger National Policy Statements for renewables and electricity networks that would set a clear, comprehensive, national policy framework for local planning authorities;
- helping the planning system to deliver, by agreeing a clear deployment strategy at regional level similar to the approach established for housing;
- the creation of an expert body to provide specialist advice on renewable energy to local planners and developers;
- further extension of Permitted Development Rights for domestic microgeneration to include wind turbines and air source heat pumps, extension to smaller-scale non domestic renewables and using Local Development Orders to speed up the re-powering of existing wind turbines.

41. We also need to create the conditions in which communities are able to see local benefits in renewables developments. Sometimes it is only the disadvantages they see. We would also like to hear your views on how this could be achieved. Measures could include:

- establishing a single benchmark for the local community benefits that renewable developers are expected to provide and producing best practice guidance;
- considering the particular needs and circumstances of the renewables sector in developing the detailed design of the Community Infrastructure Levy (CIL), which secures contributions from developers towards funding for local infrastructure;
- providing mechanisms that will enable communities to benefit financially from the development of community energy assets.

42. A significant number of planning applications for new renewable developments, notably wind farms, are blocked as a result of conflict with other Government policies. This reflects legitimate policy concerns – notably to avoid degradation of radar that could have adverse effects on national security; to protect the local environment; and to secure adequate space for

sea transport. We would like to hear your views on how to resolve such policy conflicts, potentially through:

- implementation of the new Memorandum of Understanding between the Government and the wind industry, and the development of an aviation action plan to identify workable solutions to mitigate the impact of wind turbines on radar systems;
- extending the Vessel Traffic Service (VTS) – a system for assisting shipping movements at sea – to allow offshore wind farms to be built closer to shipping lanes;
- providing clarity on the scope and application of UK and EU environmental regulation – relating in particular to the Birds and Habitats Directives – to help renewable development proposals to comply with environmental legislation.

43. The Marine Policy Statement, proposed under the draft Marine Bill, will also help to address planning issues in relation to offshore renewable developments by integrating the Government's existing and new policies on marine issues, and identifying and resolving conflicts of this type.

44. The Devolved Administrations are also working on these issues in the light of their responsibilities for planning outside England and Wales. The Government seeks to work collaboratively with the Scottish, Welsh and Northern Ireland administrations in achieving our UK renewables target.

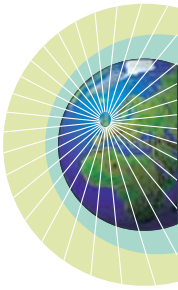
Grid issues

45. New renewable electricity needs secure connection to the national grid to gain access to the electricity market in order to sell its output. Some new grid infrastructure will be needed to meet our target. For example, new offshore wind projects will need sub-sea cables to take the electricity generated onshore, and further upgrades to the onshore network may be needed to transport that power to the end users (businesses and homes).

46. We have already taken the major decisions on the shape of a new Offshore Transmission Regime which will ensure swift and cost-effective grid connections for offshore generation. Measures will include the licensing of offshore transmission through competitive tenders run by the Gas and Electricity Markets Authority (Ofgem).

47. In the Transmission Access Review (TAR), published at the same time as this document, we have announced a number of measures that should, over time, remove the constraints on grid access for onshore generation. We aim to ensure that all generators, not just of renewables, who want to connect to the electricity grid can do so when they need to. We are announcing short-term measures in the TAR to speed up the grid connection of projects that already have planning permission through a form of 'connect and manage', for an interim period. We have also concluded that fundamental changes are needed to the rules that govern access to the grid. Ofgem and the industry have been tasked with delivering that change. However, the Government will review progress at the end of the year and if it is insufficient we will consider further options, including legislation, to bring about the changes we believe are

needed. Ofgem also intends to review the incentives on network operators to build the necessary infrastructure in a timely fashion, and to review with National Grid the system planning standards to allow the connection of more generation to a given network.



48. We are also consulting separately on revised statutory social and environmental guidance for Ofgem, the energy regulator. Ofgem must have regard to such guidance, which sets out the Government's expectations of how it can make a contribution to the achievement of social or environmental policy goals appropriate to its remit and functions. We are seeking views on whether the proposed revised guidance is sufficient and appropriate.

Supply chain issues

49. Delivering the proposed increase in renewable electricity generation will put considerable strain on supply chains in the energy sector. The drive to increase renewable deployment elsewhere in the EU and around the world will increase these pressures. Our core approach to reducing supply chain constraints is to provide a clear, long-term policy framework which will give investors and suppliers confidence in future demand. We will also be working with Devolved Administrations, Regional Development Agencies and business to tackle specific blockages, identify key gaps in the supply chain, and encourage those best able to fill them to the benefit of UK jobs and the economy.

Impacts on the electricity generation market

50. We would like to hear your views on the potential impacts that a large increase in renewable deployment might have on the electricity generating market. One important area is the relationship between renewable and fossil fuel plants. The intermittency and variability of wind and some other renewable generation will have implications for the rest of the electricity generating fleet, as well as presenting challenges to the system operator in the vital task of ensuring instantaneous balance on the national grid. Our initial analysis suggests that these challenges can be met through back-up generation from fossil fuel plants. Even though meeting the European target would mean a large share for renewable generation in the UK electricity mix, the need for back-up plants, along with the large numbers of conventional plants due to close in the next two decades, means that the next decade will also require considerable new build of fossil fuel generation. On these assumptions, including the impact of new measures to meet the renewables target, we would expect to need over 45 GW new generating capacity by 2020 – of which around 30 GW will be renewable.

51. New techniques of 'dynamic demand management', utilising new technologies such as commercial-scale electricity storage and smart meters, may also be able to play a role in addressing the intermittent nature of some renewable technologies. The future widespread use of electric vehicles could provide distributed energy storage capacity via batteries and could potentially improve the efficiency of the electricity grid by smoothing power demand between day and night. Smart metering is likely to have a particularly important role in dynamic demand management. It could also help with optimising network operation, for instance through the provision of far more data on energy usage than is available at present. The Government recently announced that it will proceed with a rollout of advanced metering for larger business sites from early 2009, and a call for evidence on smart or advanced

metering for other business customers will follow this summer. Decisions will be made after the second report from the Energy Demand Research Project, which is due in November 2008.

Heat

52. Heating accounts for the largest single proportion of the UK's final energy demand at approximately 49%, and also the largest proportion of our carbon emissions at 47%. Increasing renewable heat is therefore crucial for delivering the UK target. However, deployment is presently at a very early stage, and only about 0.6% of heat is generated from renewable sources. Unlike electricity, heat cannot travel for long distances without significant losses and expense so most deployment is decentralised and local. Because heat is typically generated on site, the existing market consists of fuel, equipment and services. There is thus no heat unit price or traded sector as there is for electricity. The fragmented nature of the heat market, compared to electricity, means it is more difficult to develop renewable heat policies that encourage efficient and cost-effective deployment of these technologies and fuels.

53. The main technologies to increase renewable heat in the UK are likely to be biomass-based technologies (such as heat from biomass waste) and microgeneration technologies (such as solar water heating and ground and air source heat pumps). Other possibilities include biogas and biomass-fuelled Combined Heat and Power (CHP) plants, which would generate both heat and renewable electricity.

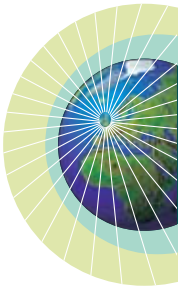
54. Building on responses to the Heat Call for Evidence which the Government published in January 2008, we would like to hear your views on how to increase renewable heat generation in the UK. Measures proposed in this document include:

- introducing a new heat incentive mechanism, such as a Renewable Heat Obligation or a Renewable Heat Incentive, akin to a feed-in tariff, to provide the financial stimulus for new renewable heat deployment;
- improving the regulation of biomass heating systems to ensure that their rollout minimises the impact on air quality standards;
- providing regulatory incentives to install renewable heat technologies in new buildings through the implementation of the zero-carbon homes and non-domestic buildings initiatives;
- providing better information to consumers, businesses and Local Authorities on the potential of renewable heat, including for the planning process.

Distributed energy

55. Households, businesses and communities can play an important role in reducing carbon emissions by generating their own electricity or heat from renewable or fossil fuel energy sources. Such distributed energy can be

an important tool in tackling the carbon impact of the built environment, particularly when combined with energy efficiency measures. The Government is putting in place ambitious policies to harness this potential, including our zero-carbon new building policies. Furthermore, most of the renewable heat to be brought forward by a new heat incentive mechanism is likely to be produced at local level.



56. Many of the non-financial barriers to increased take-up of distributed energy are being addressed by policies in place or under development. However, the complexity and novelty of some of the technologies, together with their need to be integrated into the built environment, often by players new to the energy business, means there is a significant gap between potential and delivery. Moreover, many of the technologies are not yet cost-competitive at their current state of development and with current fuel and carbon prices. This document proposes a range of possible measures to overcome these cost and information barriers, on which we would like to hear your views. These include:

- delivering more effective financial support for small-scale heat and electricity technologies in homes and buildings (including considering whether a move to a feed-in tariff system may have advantages);
- establishing a decentralised energy 'information hub' under the Government's Act on CO_2 advice service, to bring together and signpost information for households, businesses, communities, developers and others wanting to generate their own energy;
- supporting outreach activity to identify the potential for retrofit of distributed energy in the community.

Transport

57. The EU's draft Renewable Energy Directive includes a binding target for all Member States to source 10% of their transport energy consumption (excluding aviation and shipping) from renewable sources by 2020.[9] At present the main source of renewable energy available for transport is biofuels. However, vehicles powered through the electricity grid using renewable energy may have a growing part to play.

58. In 2006, biofuels accounted for less than 1% of the UK's road transport fuel. However, the Renewable Transport Fuel Obligation, which was introduced in April this year, now requires fuel suppliers to ensure that their road transport fuel contains 2.5% by volume of biofuels, rising to 5% in 2010.

59. It is essential that our biofuel use is sustainable – environmentally, socially and economically. We therefore commissioned Professor Ed Gallagher to carry out a review of evidence on this issue. Gallagher's findings will be important to the development of the Government's biofuel policies and targets.

9 The proposed target requires renewable energy to make up 10% of the energy consumption in transport excluding petroleum products other than petrol and diesel. This effectively excludes aviation and shipping, except that any renewable energy in these sectors would count towards the target.

60. Over the next few years, motor manufacturers have committed to developing electric and, potentially, hydrogen-powered vehicles. In widespread use, such vehicles would have the potential to contribute to the EU renewable transport target. Since electric vehicles may be charged at night (when not in use), and would entail a system of battery replacement, they could have other benefits too. They could improve the returns to renewable energy generation, and through vehicle-to-grid technologies could help smooth electricity demand. They would have the ancillary benefits of reducing air and noise pollution. The Government is keen to promote all options for future technological development (including electric and hydrogen) and is interested in examining now how the development of electric vehicles and an appropriate charging infrastructure could be accelerated in the UK.

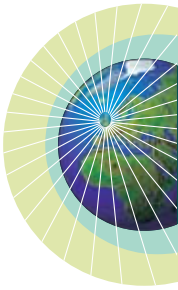
61. We would therefore like to hear your views on potential measures for increasing renewable transport in the UK, including:

- agreeing robust sustainability criteria for all biofuel use;
- adapting the Renewable Transport Fuel Obligation (RTFO) to provide incentives for greater levels of renewable energy in transport with safeguards to ensure these levels are sustainable, and ensuring our support provides the greatest greenhouse gas savings;
- facilitating the development of second and third-generation biofuels, which are made from non-food sources and therefore avoid many of the sustainability concerns around current biofuels;
- extending the use of biofuels in rail transport and shipping so far as is sustainable;
- exploring the potential contribution of alternative vehicle technologies such as electric or hydrogen cars to meeting our renewable energy targets, taking into account the possible impact on electricity demand, and the potential for vehicle-to-grid technologies to help smooth electricity demand.

Bioenergy

62. Bioenergy is produced either directly, by burning biomass material such as forestry products, or indirectly, such as through the conversion of food wastes to biogas, generating heat and electricity. Currently, biomass accounts for about 2.3% of our electricity generation and for less than 1% of our heat needs. To meet our share of the EU 2020 renewable energy target our analysis suggests that biomass-fuelled technologies, including biogas, may need to provide around 30% of the UK's renewable electricity and heat generation. An increase on this scale means we will have to make the best possible use of UK-produced biomass resource, including waste, as well as meeting some of the increased demand through sustainable imports.

63. This document seeks views on a range of measures for maximising our biomass resources, including:



- ensuring the sustainability and fuel quality standards for biomass, both domestic and imported;
- supporting research into new energy crops and the development of local supply chains via the existing Bio-Energy Infrastructure Schemes and the Bio-Energy Capital Grants Scheme;
- discouraging the landfilling of biomass as far as is practical, thereby maximising its availability as a renewable fuel;
- considering the scope for Local Authorities to collect and separate organic food waste, so that it can be broken down to biogas through anaerobic digestion;
- encouraging Waste Incineration Directive compliant infrastructure and support for anaerobic digestions as a means of generating energy from waste;
- a biomass communications programme to raise awareness about the benefits of bioenergy including energy from biomass waste.

Innovation

64. The development of new and emerging renewable energy technologies will be important for meeting our 2020 target and vital for our longer term climate change goals. Innovation can make improvements to existing renewable technologies and reduce costs, as well as create new technologies. The Government has many ways of supporting innovation – including regulatory and market-based measures, as well as direct funding for research, development and demonstration of new technologies.

65. We would like to hear your views about how we can most effectively encourage innovation in renewable technologies, including technologies such as electricity storage and smart metering which can help support increased renewable deployment. In particular:

- Should we adapt the Renewables Obligation to ensure that it better supports emerging as well as existing technologies? Are there more effective mechanisms to achieve this?
- Is there evidence that specific emerging renewable and associated enabling technologies are not receiving appropriate support?
- Are there other barriers to the development of renewable and associated enabling technologies that are not addressed by current or proposed support mechanisms, particularly in areas where the UK has the potential to be a market leader?

Business benefits

66. Dealing with climate change by reducing carbon dioxide emissions will require a major change in the way the world's economies are powered, as all countries move from high-carbon fossil fuels to renewable or low-carbon fuels and resource-efficient products and services. This rapid expansion in clean technology offers considerable business opportunities. For example, the Carbon Trust estimates that UK annual revenues from offshore wind alone could reach £2 billion per year by 2020, around half of which would come from exports, while revenues from marine renewables could range from £300-900 million by 2020.[10] Our own analysis suggests that the expansion in renewable energy in the UK has the potential to generate 160,000 new jobs in the sector by 2020. There is no guarantee that all these jobs will be sited in the UK, but we want to ensure that we secure as many of them as possible for the UK by putting in place an appropriate policy framework.

67. To maximise the benefits for UK business, the core need is to provide a clear, long-term policy framework within which British companies can invest in renewables. This is what the policy proposals in this document are designed to do. But we also want to take further steps specifically to maximise the UK business and employment benefits of these policies. So we will work closely with our key delivery partners, UK Trade and Investment and the Regional Development Agencies, to encourage investment in the UK from overseas renewables companies, and to encourage UK businesses to turn to renewable technologies. Subject to State Aids clearance, BERR expects to launch a new offshore wind capital grant scheme in 2009. We also intend to ensure that the right economic conditions exist for entrepreneurial growth and spin-out companies for supporting technologies, and to encourage markets that can help to introduce dynamic products to meet renewable targets at competitive prices. We would like your views on how best we can support UK businesses in these ways.

Wider impacts

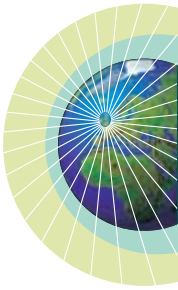
68. Delivering such an ambitious shift to renewable energy in just over a decade will involve trade-offs and create some additional challenges and costs in the short to medium term to our economic, social and environmental goals. Our renewables strategy will be underpinned by the principles of sustainable development, integrating social, environmental and economic objectives. We will seek to ensure that we strike the right balance between the contribution of renewable energy to tackling climate change and its potential impacts on other sustainable development priorities. This document sets out our initial analysis of the key impacts.

Carbon savings

69. Emissions from large-scale electricity and a small part of the heat sector are covered by the EU Emissions Trading Scheme (ETS), which sets a Europe-wide cap on emissions in those sectors and provides incentives for firms

10 EEF (2008)

to seek least-cost emissions reductions by creating a carbon price. Our Renewable Energy Strategy will therefore not reduce overall emissions in Europe in the large-scale electricity sector.



70. This strategy will, however, also considerably increase renewable energy use in the heat and transport sectors, most of which are not covered by the ETS. We estimate that the measures in this document will provide additional savings of around 20 $MtCO_2$ from heat and transport outside the ETS in 2020 (around 4-5% of our projected 2020 emissions).

71. By requiring an increased use of renewable technologies within the EU ETS cap, one effect of the EU renewables target will be to reduce the EU-wide carbon price. The Commission has estimated that the carbon price will be around €39/tCO_2 across 2013-20, compared with €49 if there were no renewables target.

72. However, as the Stern Review demonstrated, carbon pricing alone is not enough. We will also need policies to support the development of more costly technologies to deliver effective carbon reduction in the longer term. By 2050, we expect renewables, along with other technologies such as nuclear and carbon capture and storage, to be playing a very significant part in delivering a largely decarbonised electricity mix.

Security of supply

73. A diversity of energy sources – ensuring that we are not dependent on any one supplier, country or technology – is fundamental to managing the risks to the UK's security of supply. Energy from diverse renewable sources across the electricity, transport and heat sectors will play an important role in this regard. Meeting our targets could reduce gas imports by between 12-16% in 2020, with increasing benefits as these become more scarce and expensive. The challenges presented in the electricity sector by an increase in largely intermittent renewable generation are discussed above.

Energy prices

74. In recent years, as in other countries, we have seen increases in prices for electricity, gas and oil as the cost of fossil fuels on the world markets has increased. Our existing policies to reduce carbon emissions have contributed a small amount to such price increases: about 7% of current domestic energy bills arises from climate change policies. Our measures to incentivise renewable energy deployment will also have an effect on energy prices. Because of the time it will take to accelerate investment, in the short term, up to 2010, the impact on bills will be close to zero. Small increases will then occur in the period 2010-15. By 2020, we estimate that the measures set out in this consultation document, taken together, could result in increases in electricity bills of 10% to 13% for domestic and 11% to 15% for industrial customers; increases in gas bills of 18% to 37% for domestic and 24% to 49% for industrial customers; and increases in petrol and diesel prices of 2% to 4% and 1% to 3% respectively. The distribution of these costs will partly depend on the policy instruments used and how the market responds to them. We are interested in your views on how these costs will and should be distributed across the economy.

75. All things being equal, greater use of renewables should reduce upward pressure on fossil fuel prices. These estimates are based on our central projections of fossil fuel prices in the future (consistent with a projected oil price of $70/barrel in 2020). If fossil fuel prices were higher (in line with an oil price of $150/barrel in 2020) the percentage increase in electricity bills could fall by three-quarters. The percentage increase in gas bills could fall by around a half.

76. Further energy efficiency measures could also reduce the impact of these price increases on bills, and will be a focus of further consultation later this year. As far as domestic consumers are concerned, we remain committed to supporting, through our Fuel Poverty Strategy, those households disproportionately affected by energy prices. We will consider these issues further within the context of the Fuel Poverty Strategy in England and Wales. The Welsh Assembly Government will also be reviewing its Fuel Poverty Commitment as part of its work on developing a National Energy Efficiency and Saving Plan. The impact of high energy prices on business and competitiveness will depend partly on actions taken by other EU Member States to meet their targets.

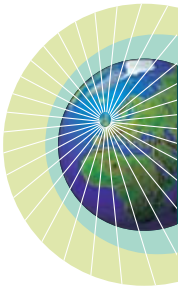
Next steps

77. We are inviting views on this consultation by **26 September 2008**. We will provide a summary of responses towards the end of the year. In the autumn we will also be consulting on the potential for further energy efficiency measures and considering other low-carbon heat solutions. We will publish our full Renewable Energy Strategy in spring 2009, once the EU Directive has been agreed, along with the UK's share of the target, and the framework in which we can deliver it. The Strategy will set out a clear framework to provide certainty and detail on the policies we will introduce and actions we will undertake to reach our 2020 target and to promote renewable energy in the UK for the long term.

78. We will develop any measures and further work set out in this consultation document in accordance with the principles of better regulation to ensure that the regulatory burden on business is kept to a minimum.

79. Some of the potential measures discussed in this document, for instance the introduction of new financial incentives, would require primary legislation. Following publication of the Strategy, we will introduce any such legislation in England and Wales as soon as Parliamentary time allows.

How to respond



This consultation seeks views on how to drive up the use of renewable energy in the UK, as part of our overall strategy for tackling climate change, and to meet our share of the EU target to source 20% of the EU's energy from renewable sources by 2020.

Responses to this consultation will help shape the UK Renewable Energy Strategy, which will be published in spring 2009, once the UK's share of the target has been agreed.

We want to hear from members of the public, industry, non-Governmental organisations (NGOs) or any other organisation or public body.

The consultation began on 26 June 2008 and will close 26 September 2008.

There are a number of ways to let us know your views.

Online

Visit our website at www.berr.gov.uk/renewableconsultation. The online consultation has been designed to make it easy to submit responses to the questions. If you decide to submit your response through the website you will be provided with a user name and a password to enable you to edit or update your submission as many times as you wish whilst the consultation is open.

By letter, fax or e-mail

A response can also be submitted by letter, fax or e-mail to:

Renewable Energy Strategy Consultation
Ropemaker Court
11 Lower Park Row
Bristol
BS1 5BN
E-mail: renewableconsultation@opinionsuite.com
Fax: 0117 3169 512

Additional points about this consultation

When responding please state whether you are responding as an individual or representing the views of an organisation. If responding on behalf of an organisation, please make it clear who the organisation represents and, where applicable, how the views of members were assembled. The website registration form provides space to do so.

After the consultation has closed, all responses (including respondents' names) will be published unless respondents specifically request that their responses be kept confidential. This will apply to all responses whether submitted online, posted, faxed or emailed. Please indicate on your response if you want us to treat it as confidential. You should also read the section on confidentiality and data protection below.

Confidentiality & Data Protection

Information provided in response to this consultation, including personal information, may be subject to publication or disclosure in accordance with the access to information regimes (these are primarily the Freedom of Information Act 2000 (FOIA), the Data Protection Act 1998 (DPA) and the Environmental Information Regulations 2004).

If you want other information that you provide to be treated as confidential, please be aware that, under the FOIA, there is a statutory Code of Practice with which public authorities must comply and which deals, amongst other things, with obligations of confidence.

In view of this it would be helpful if you could explain to us why you regard the information you have provided as confidential. If we receive a request for disclosure of the information we will take full account of your explanation, but we cannot give an assurance that confidentiality can be maintained in all circumstances. An automatic confidentiality disclaimer generated by your IT system will not, of itself, be regarded as binding on the Department.

The Department will process your personal data in accordance with the DPA and in the majority of circumstances this will mean that your personal data will not be disclosed to third parties.

Additional Copies

You may make copies of this consultation document without seeking permission. Further printed copies of the consultation document or copies of the response form can be obtained from:

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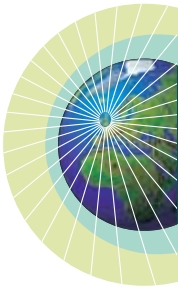
Copies of the document in Welsh, Braille, large print and audio are also available on request from the orderline. An electronic version can be found at www.berr.gov.uk/renewableconsultation

Help with queries

Questions about the policy issues raised in the document can be addressed to:



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Information about the relevant Devolved Administration policies is available from:

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If you have comments or complaints about the way this consultation has been conducted, these should be sent to:

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A copy of the Code of Practice on Consultation is attached at Annex 5.

Related documents, including the Impact Assessment, can be found at: www.berr.gov.uk/renewableconsultation.

Annex 1 Consultation Questions

Chapter 1

Q1: How might we design policies to meet the 2020 renewable energy target that give enough certainty to business but allow flexibility to change the level of ambition for a sector or the level of financial incentive as new information emerges?

Q2: To what extent should we be open to the idea of meeting some of our renewable energy target through deployment in other countries?

Chapter 2

Q3: In the light of the EU renewable energy target, where should we focus further action on energy efficiency and what, if any, additional policies or measures would deliver the most cost-effective savings

Chapter 3

Q4: Are our assessments of the potential of different renewable electricity technologies correct?

Q5: What more could the Government or other parties do to enable the planning system to facilitate renewable deployment?

Q6: What more could the Government or other parties do to ensure community support for new renewable generation?

Q7: What more could the Government or other parties do to reduce the constraints on renewable wind power development arising from:

a. marine navigation;

b. environmental legislation;

c. aviation and radar;

d. any other aspects of regulation?

Q8: Taking into account decisions already taken on the offshore transmission regime and the measures set out in the Transmission Access Review, what more could the Government or other parties do to reduce the constraints on renewable development arising from grid issues?

Q9: What more could the Government or other parties do to reduce supply chain constraints on new renewables deployment?

Q10: Do you agree with our analysis on the importance of retaining the Renewables Obligation as our prime support mechanism for centralised renewable electricity?

Q11: What changes (if any) should we make to the Renewables Obligation in the light of the EU 2020 renewable energy target?

Q12: What (if any) changes are needed to the current electricity market regime to ensure that the proposed increase in renewables generation does not undermine security of electricity supplies, and how can greater flexibility and responsiveness be encouraged in the demand side?

Chapter 4

Q13: Assuming financial support measures are in place, what more could the Government do to realise the full potential of renewable Combined Heat and Power?

Q14: Are our assessments of the potential of renewable heat deployment correct?

Q15: Have we captured the key features of a Renewable Heat Incentive and a Renewable Heat Obligation as they would apply to the heat sector correctly? Would both of these schemes be workable and are there alternative ways of structuring the schemes to ensure they can operate effectively?

Q16: Do you agree with our assessment that a Renewable Heat Incentive would work better in the heat market?

Q17: What more could the Government or other parties do to encourage renewable heat deployment with regard to:

a. awareness raising;

b. air quality;

c. building regulations;

d. planning;

e. anything else?

Q18: How far should the Government go in focusing on areas off the gas grid as offering the most potential for renewable heat technologies?

Chapter 5

Q19: Do you agree with our analysis of the mechanisms for support of small-scale renewable electricity?

Q20: Given the analysis on the benefits, costs and potential, in what way and to what extent should we direct support to microgeneration electricity?

Q21: If you agree that better information will aid the development of distributed energy, where should attention be focused?

Q22: Do you agree with the Government's current position that it should not introduce statutory targets for microgeneration at this stage in its development?

Q23: What more could the Government do to incentivise retrofit of distributed energy technologies?

Chapter 6

Q24: How can we best incentivise renewable and low-carbon transport in a sustainable and cost-effective way?

Q25: What potential is there for the introduction of vehicles powered through the electricity grid in the UK? What impact would the widespread introduction of these kinds of vehicles have on:

a. energy demand and carbon emissions;

b. providing distributed storage capacity;

c. smoothing levels of electricity demand on the grid?

What factors would affect the scale and timing of these impacts?

Q26: Over what timescales do you think electric vehicles could plausibly contribute to our renewable energy and carbon reduction targets and what could the Government most effectively do to accelerate the introduction of such vehicles in the UK?

Chapter 7

Q27: How can we best ensure that our use of biomass is sustainable?

Q28: How do you see the market for biomass developing to 2020? What are the implications for:

a. imports;

b. longer-term prices and costs?

Q29: Should the Government take further regulatory measures to discourage biomass waste, including food waste, from going to landfill? If so, which types? What, if any, other measures should be taken to encourage its use to generate bioenergy?

Q30: What more could the Government or other parties do to help to ensure the provision of sufficient Waste Incineration Directive-compliant combustion capacity to burn available waste wood alongside other biomass, and what else might constrain the development of this capacity?

Q31: What further actions will improve supply chain efficiency, consumer confidence and sustainable growth of the biomass supply chain?

Q32: What barriers exist to the cost-effective deployment of anaerobic digestion, biogas and the use of biomethane injected directly into the gas grid, and what are the options to address them?

Q33: What action could we take to make biomass communications more effective to both improve public awareness and help to address acceptability issues, and how should this be delivered?

Q34: Are there issues constraining biomass supply and use other than sustainability, supply chain and information issues? How should these be tackled?

Chapter 8

Q35: How can we adapt the Renewables Obligation to ensure that it effectively supports emerging as well as existing renewable technologies? Are there more effective ways of achieving this?

Q36: Is there evidence that specific emerging renewable and associated technologies are not receiving an appropriate form of support?

Q37: Are there barriers to the development of renewable and associated technologies that are not addressed by current or proposed support mechanisms?

Chapter 9

Q38: What more could the Government or other parties do to ensure that the UK secures the maximum business and employment benefits from the EU renewable energy target?

Chapter 10

Q39: Do you agree with our analysis of the likely impacts of the proposed increase in renewable deployment on:

a. carbon dioxide emissions;

b. the local environment;

c. security of supply;

d. energy prices;

e. fuel poverty;

f. the energy market;

g. the economy;

h. any other wider issues that we should be considering?

Chapter 11

Q40: What more could the Government or other parties do to ensure the UK meets the EU renewable energy target?

Q41: Do you agree with our overall approach to developing a UK Renewable Energy Strategy?

Annex 2: Feed-in tariffs for small-scale electricity generation

QA1: Do you agree with our assessment of the basic starting principles that feed-in tariffs for small-scale electricity generation should adhere to? Are there other principles you think we should consider?

QA2: What are your views on the option we have described? Factors we would like you to consider in your response include:

- if there are problems with the option described or improvements you could suggest;
- if you can envisage a more effective way of implementing feed-in tariffs for small-scale electricity generation.

QA3: Are there any other bodies or organisations that would be impacted by feed-in tariffs for small-scale electricity generation that we have not considered?

QA4: Who do you think should have access to feed-in tariffs for small-scale electricity generation? Factors that we would like you to consider in your response include:

- different generation technologies;
- size of generation station (i.e. to distinguish from eligibility of large-scale generation for support under the Renewables Obligation);
- whether generation is primarily for own use, supply locally or for export;
- whether generation is on or off-grid;
- whether or not energy efficiency measures should be required

QA5: Do you think it is reasonable to put in safeguards to limit the potential cost of feed-in tariffs for small-scale electricity generation, and if so how could those safeguards be set, and what would the access criteria be? Possible factors and criteria we would like you to consider include:

- a limit on overall number of new installations in a given period;
- a limit on new installed capacity in a given period;
- whether priority should be given to particular groups; for example, people in fuel poverty.

QA6: How would we set the feed-in tariffs for small-scale electricity generation? Factors that we would like you to consider in your response include:

- the basis for setting the number of tariffs and their level;
- initial costs, electricity production rates and differing carbon saving potential of generation equipment;

- how long installations should receive the relevant tariff;
- how, when and on what basis we would vary the tariffs for new installations;
- how different tariffs would impact on multiple installations at one location, e.g. a building with wind turbines and solar panels.

QA7: What arrangements should apply to:

- currently existing small-scale renewable electricity installations;
- installations which enter into operation before feed-in tariffs come into effect?

QA8: Do you think that financial markets will move to assist potential small-scale electricity generators with financing of the initial capital cost of renewable installations, or should we seek to introduce policies that will guarantee frontloaded support?