RENEWABLE ENERGY IN KENT

Select Committee Report

2010

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Chairman's Foreword

Until the early 18th century virtually all the energy used by mankind came from renewable resources. Between them water, wind, wood and muscle provided the power for home and industry. The age of fossil fuels began as the population grew and the industrial revolution gathered force. Renewable energy could no longer keep pace with demand and the intermittent nature of many renewable energy sources became more and more of a problem. Three hundred years later these same issues are with us once again as the availability of fossil fuels declines and worries about what we now call energy security increase.

So far as electricity is concerned, a bigger and smarter grid can mitigate the problems to some extent; but it is not a cost free option and as the proportion of renewable generation increases we will inevitably see a time when overall generating capacity has to increase to meet the same level of demand. Even today 1 megawatt of wind energy cannot fully replace 1 megawatt of energy derived from fossil fuels, principally because it cannot be switched on and off as demand varies because it is dependent on how strongly the wind blows or the sun shines.

There is clear public support for renewable energy in Kent. If this is to be maintained it is vital that the case for it is not overstated. The Committee's view is that renewable energy resources are a useful addition to the energy mix available to help meet the problems of future energy security. They are not at present a panacea enabling us to meet all future energy requirements.

Most forms of renewable energy are not at present intrinsically cheaper than more conventional fuels; if anything the reverse is true, but this is likely to change as the supply of fossil fuels inevitably declines and renewable energy technology improves.

In 2009 Kent County Council spent just under £24 million on buying energy. It is clear to us that this figure could be reduced substantially over the next few years by adopting a judicious mixture of improvements in energy efficiency and the exploitation of the subsidies available for the use of renewable energy. The county would simultaneously benefit from clear environmental improvements. The same is true for industry and households in Kent.

The availability of good advice is vital to such a goal; but it is unusually hard to come by in this field. Too many of those offering advice see themselves as prophets of good practice or have a pecuniary interest in the technology they advocate. Therefore we believe that building KCC's in house knowledge-base and that of the county as a whole is vital to achieving success.

Just as certainly we now face the prospect of very real financial penalties if we fail to reduce our environmental impact.

In the Committee's view the County Council now has a rare opportunity to exploit a situation in which financial, environmental and service considerations all point in the same direction. We would be foolish not to take it.

May I thank all those who gave evidence to the Committee. Without them there could have been no report.

Keith Ferrin
Chairman, Renewable Energy Select Committee

I EXECUTIVE SUMMARY

1.1 Committee membership

1.1.1 The Select Committee comprised eight Members of the County Council; seven Conservative and one Liberal Democrat.

Kent County Council Members (County Councillors):


Keith Ferrin
(Cons)


Charles Hibberd
(Cons)


David Hirst
(Cons)


Richard King
(Cons)


Tim Prater
(Lib Dem)


Chris Smith
(Cons)


Paulina Stockell
(Cons)


Elizabeth Tweed
(Cons)

1.2 Terms of Reference

1.2.1 To determine existing and emerging national and local policies and strategies with regard to renewable energy and their effect on Kent.

1.2.2 To establish a baseline position and future projections for Kent with regard to energy requirements, generation and distribution including the contribution from renewable energy.

1.2.3 To identify key challenges as well as opportunities in relation to renewable energy in Kent.

1.2.4 To Identify and explore the views of suppliers and consumers in relation to renewable energy.

1.2.5 Having considered the above, to make recommendations which will contribute to increased energy efficiency, energy security and prosperity for Kent residents and businesses as well as supporting the national transition to a low-carbon future.

1.3 Definition of Renewable Energy

1.3.1 Renewable energy, which is replenished by natural processes as it is used, is defined by the EU as energy from: 'non-fossil energy sources (wind, solar, geothermal, wave, tidal, hydropower, biomass, landfill gas, sewage treatment plant gas and biogases).' [1]

1.4 Evidence gathering

1.4.1 The Select Committee trialled an alternative format for its evidence gathering and following initial desk research, approached a number of organisations for written evidence. Whilst awaiting responses, the Research Officer sought informal advice and information from KCC Officers. After studying the written material submitted, the Committee invited community groups and members of the public to give their views in writing, interviewed a number of individuals in person, carried out visits, attended conferences and circulated a questionnaire to Kent schools.

1.4.2 A list of the witnesses who submitted written evidence is shown as Appendix 2. A list of witnesses attending hearings is at Appendix 3. Details of visits carried out are at Appendix 4 and results of the schools questionnaire, which received 47 responses, are at Appendix 5.

1.5 Reasons for establishing the Select Committee

1.5.1 The Select Committee was established by the Environment, Highways and Waste Policy Overview Committee following suggestions put forward by Dr Linda Davies, Director of Environment and Waste and Mr David Brazier, Council Member.

1.5.2 The review has considered:-

- Data on energy generation, consumption and distribution;
- The role of energy efficiency and renewable energy in increasing security of energy supply and reducing harmful carbon emissions;
- Kent's capacity for different types of renewable technology and factors affecting its development;
- The opportunities arising from the development of a new industry.

1.6 Key findings

1.6.1 For Kent to gain maximum benefit from the transition to a low-carbon economy, it must welcome new ideas and technologies and encourage investment. It can do this by creating a favourable planning and regulatory environment; ensuring the right infrastructure is

[1] EU Directive 2001/77/EC amended and subsequently repealed by Directives 2003/30/EC and 2009/28/EC

in place; that businesses are sustainable as well as geared up and ready to play their part and that people with the right skills are 'grown' locally.

1.6.2 In April 2010, the government's introduction of a Feed-in Tariff to incentivise small-scale (up to 5MW) renewable electricity generation meant that technologies which were already desirable on environmental and energy security grounds became economically attractive. A change in legislation on the local authority sale of surplus electricity to the grid means that local authorities as well as communities and residents can make immediate savings on energy bills; earn income from long-term investment in clean energy supplies and contribute to national targets for carbon reduction and renewable energy generation.

1.6.3 Being energy efficient, and reducing the amount of energy we use is no longer a choice but a necessity. Energy efficiency alone, however, will not be enough to make the deep cuts in carbon emissions that are required and renewable, or other low-carbon energy schemes will be required in order that Kent County Council does not incur penalties.

1.6.4 There are clear advantages to Kent County Council 'leading by example' with its own activities and operations, and assisting others in Kent to contribute and to benefit. KCC Commercial Services is well placed to develop further its expertise and services in this field.

1.6.5 Very substantial cost savings are possible, using a combination of behaviour change, building adaptation and energy efficiency as shown by the example of St Peter's Church of England Primary School Aylesford..

1.6.6 Kent is rich in community groups and individuals who are passionate about the environment and keen to pursue ideas for low-carbon living and greater energy self-sufficiency. With a small amount of support to get projects 'off the ground', such groups can be enabled to grow and thrive thus creating local resilience to a changing climate; greater community cohesion; and a network for sharing energy saving ideas and best practice across the county.

1.6.7 As well as being ideally located to exploit renewable energy from the sun, wind and perhaps in future, the tides, Kent is lucky to have large areas of unmanaged, or undermanaged woodland that can be brought back into coppice-management in order to achieve sustainable local supplies of wood fuel. There are multiple benefits to be gained from coppice-management such as increased biodiversity, rural employment, improved access to the countryside and a reduced need for imported wood fuel.

1.6.8 The decarbonisation of transport will require continued advances in vehicle technology, but perhaps more importantly, a cultural shift in the way people view their cars, and the journeys they make. KCC can, by its actions, help to pave the way for future changes.

1.6.9 The successor to KCC's 'Towards 2010' strategy document: 'Bold Steps for Kent' – will focus on growth in the Kent economy, tackling disadvantage and inspiring communities. The

Select Committee believes that all three of these aims will be underpinned by the successful transition to a low-carbon economy in Kent and the recommendations of this committee will seek to support them.

1.7 Recommendations

1. That KCC works with Kent District and Borough Councils and others to agree a Low Carbon and Renewable Energy Strategy for Kent. to enable the uptake of the most appropriate low carbon technologies. (page 107)

2. That a Member Champion for Low-Carbon and Renewable Energy is appointed to promote the implementation of the Strategy and report back to Cabinet and the Cabinet Climate Change Working Group on progress. (page 107)

3. That KCC develops the existing expertise within KCC and Commercial Services (LASER) and builds capacity in order to ensure that the Council has access to sound, unbiased advice when taking energy efficiency and renewable energy schemes forward. (page 69)

4. That KCC sets up new delivery mechanisms as appropriate in order to take advantage of emerging opportunities, allied to but separate from LASER, e.g. Energy Services Company (ESCO). (page 69)

5. That KCC capitalises on opportunities in its own estate, and works with local authorities, energy network companies, landowners and prospective investors to ensure that a proactive approach is taken to the identification of sites for renewable energy schemes in the county, in order to encourage and enable investment. (page 107)

6. That KCC reconfigures the Energy and Water Investment Fund, with a longer payback period, to enable continued provision of capital funding for energy efficiency measures in the estate and to allow for the longer-term investment required for the installation of renewable energy systems.(page 66)

7. That KCC facilitates access to emerging financial mechanisms, such as the new Green Deal and the Green Investment Bank, whereby schools, businesses and householders in Kent can take advantage of loan funding to pay for the installation of renewable energy and energy efficiency systems on suitable properties, with repayments and term set to achieve a net saving in energy costs for the property and a reasonable rate of return over the period of the loan to investors (on a 'Pay as you Save' basis). (page 71)

8. That KCC substantially drives down energy consumption in its estate. Each Directorate should be required to take action to improve energy efficiency and encourage behavioural and other changes; Building User Groups should have 'energy usage and energy efficiency' as an agenda item at every meeting. (page 28)

9. That KCC implements an immediate review of its properties to assess their suitability and develop strategies for the installation of renewable technologies, particularly photovoltaic (PV) panels, and encourages District and Borough Councils, housing providers, emergency services, health institutions and other targeted businesses to do the same in their estates, taking advantage of current incentives, in order to reduce energy costs; generate income and catalyse the acceptance of renewable technologies in the wider community. (page 63)

10. That KCC uses energy display devices in prominent locations on its estate to encourage energy efficient behaviour (including where renewable energy installations are put in place, to increase awareness of the technology, the energy generation and the carbon-savings). (page 76)

11. That KCC lobbies the Department for Education to require schools to work with KCC to fulfil its CRC commitments and creates a direct incentive for schools to drive down their energy use and carbon emissions, using a range of behavioural, energy efficiency and renewable energy options. (page 34)

12. That KCC works with public agencies and approved suppliers, to provide a package of advice and support to schools, to enable them to benefit from energy efficiency work and renewable energy installations, at no net cost to the school or to KCC. (page 69)

13. That, provided currently agreed procurement criteria are met, KCC considers giving preference, for the procurement of goods and services, to businesses who obtain accreditation through the South East Carbon Hub. (page 110)

14. That KCC lobbies government, on planning issues, to:

    - promote developments with a mixed heat demand suitable for district heating systems, which should be incorporated wherever possible.

    - relax planning control for domestic renewable energy installations on listed buildings and properties affecting conservations areas where this does not detract from heritage objectives. (page 86)

15. That KCC consults with District, Borough and other councils in Kent to determine what is needed to assist local authority planners and developers in making planning decisions relating to renewable energy applications, e.g. training, or an interactive planning tool. (page 86)

16. That KCC supports low-carbon community groups in the county by facilitating access to existing support and providing small grants of up to £5000 for advice or to assist with feasibility studies. (page 71)

17. That KCC, working with District and Borough Councils ensures that Kent communities, including schools, businesses and households have access to clear and current information on energy efficiency and renewable energy opportunities, taking into account the Feed-in Tariff and any subsequent incentives. (page 77)

18. That KCC should work with organisations such as the Forestry Commission and Natural England, to invest in the sustainable production of wood fuel, through the regeneration of coppicing in Kent, by:

    - Providing marketing expertise.
    - Encouraging apprenticeships for young people wishing to enter the industry.
    - Investigating the provision of a number of collection/chipping/distribution facilities, possibly based at recycling centres
    - Ensuring that, where possible, newly designed KCC buildings include biomass boilers. (page 56)

19. That, in view of the need for the UK to have a long term, sustainable mix of power supplies and due to the intermittent nature of some renewable energy sources, KCC presses for the provision of new generation low carbon power stations so that there is adequate back up capacity to cope with demand peaks, providing security of supply. (page 91)

20. That KCC works with others, including District and Borough Councils, Network Rail and supermarkets, to assess the viability of establishing a network of public electric vehicle charging points in Kent. (page 99)

21. That KCC regularly surveys its own vehicles, and business journeys to: identify (and review) work patterns in order to minimise business mileage and to prepare for the availability and purchase of electric vehicles, where appropriate. (page 100)

22. That KCC adopts a policy of limiting its vehicles, except those attending emergencies, to a maximum speed of 56mph (90kph) in order to achieve greater fuel efficiency, in line with best commercial practice. (page 100)

2 INTRODUCTION AND POLICY BACKGROUND

'… whatever our resources of primary energy may be in the future, we must, to be rational, obtain it without consumption of any material'.

Nicola Tesla (1900)[2]

2.1 Introduction

2.1.1 There is a growing awareness that we are coming to the end of an era characterised by plentiful fossil fuels and the rapid growth that accompanied their discovery and exploitation. A recent report by the UK Energy Research Council based on 500 studies concluded that global oil production will peak before 2030 and possibly within the next ten years.[3]

2.1.2 The International Energy Agency predicts that world primary energy demand will be 40% higher in 2030 than in 2007 with more than three quarters of that increase coming from fossil fuels. However, if those trends are allowed to continue, serious impacts on our health and environment would result.[4]

2.1.3 UK energy production is in decline - coal and nuclear power stations are being decommissioned as they come to the end of their operational lives and North Sea Gas supplies are dwindling; the UK at the end of 2008 had proven reserves of 0.29 trillion cubic metres of natural gas compared with the Russian Federation's 44.38 trillion cubic metres[5]. The country is ever more reliant on imported fossil fuels – 80% of our gas is expected to be imported by 2020 - yet, for example, the UK has only 16 days worth of gas storage, so in a prolonged cold snap, we are particularly vulnerable to shortages[6].

2.1.4 The rise in domestic demand across Europe[7] coupled with higher energy costs means that in England the number of households in fuel poverty has risen threefold to 4.6 million in the period from 2001 to 2009.[8] So, there is clearly a need, based on these environmental,

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[2] Tesla, N., 'The Problem of Increasing Human Energy,' The Century Illustrated Magazine, pp. 175-211

[3] UKERC, 2009 Global Oil Depletion: An Assessment of the Evidence for a Near-term Peak in Global Oil Production. London

[4] International Energy Agency, 2009 Why is our current energy pathway unsustainable?

[5] BP plc, 2010 Statistical Review of World Energy. London

[6] Ft.com/energy source – 9th April 2010

[7] Bertoldi P., Atansiu B. (2007). Electricity consumption and efficiency trends in the enlarged European Union. European Communities:Luxembourg. 66pp.

[8] Consumer Focus, 2010 Fuel Poverty Charter. London

logistical and social imperatives, to reduce our dependence on fossil energy to ensure security of supply into the future and it is widely accepted that the way to do this, is to diversify the 'energy mix'.

2.1.5 International, European and UK energy policy is also very much driven by the need to drastically reduce carbon emissions to protect our atmosphere and this too has prompted a focus on low carbon energy generation from renewable sources. The proportion of the total energy demand which can be met in this way has been the subject of much conjecture, and whichever school of thought is subscribed to, the twin approach of increasing energy efficiency to reduce demand and increasing the proportion of energy generated from renewable sources, is the pragmatic solution.

2.1.6 Though this review has not taken evidence on or considered nuclear power, any new generation nuclear power stations would not come online until around 2020, leaving us with an energy gap. A key element in favour of distributed generation (renewable energy generated and used locally) is the added security of supply that it brings.

2.1.7 While a huge increase in renewable energy generation is needed across Europe, individual countries are free to decide upon their own energy mix[9]. The UK has a challenging target of 15% energy from renewables by 2020 which will require around 30% electricity to be generated renewably. Based on the evidence it has received, the Select Committee believe that we should take seriously concerns about the UK's security of supply and, while some would argue there is no urgency, there are indications that energy shortages could occur within two or three years and there is a real risk of 'brown outs' between 2012 and 2020.[10][11]

2.1.8 Geographical and other factors will mean that some locations will be better suited to particular renewable technologies, but in Kent we are lucky that we have the ingredients necessary to create a diverse mix of generation from renewable energy sources.[12]

2.1.9 For our future and that of our children and grandchildren, human ingenuity and our ability to harness immediately available, non-polluting, sources of energy, coupled with policy measures to move us in the right direction, are seen as key to our having sustainable energy supplies in the future.

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[9] Charles Morgan, KCC International Affairs Group – written evidence

[10] Dr Howard Lee, Lecturer and Sustainability Champion, Hadlow College – written evidence

[11] Richard Knox-Johnson, Chairman, Protect Kent: – 'Keeping the Lights On' Protect Kent Energy Conference presentation

[12] Karl Jansa, Business Development Manager, Locate in Kent – written evidence

2.2 Emissions targets

'80% cut in UK CO_2 emissions by 2050'[13]

2.2.1 A whole raft of policies is designed to reduce pollution from greenhouse gas emissions, and increase the proportion of energy obtained from renewable sources. Since the Kyoto Protocol was signed up to by the UK in 1997, and following on from the Energy White Paper in 2003, emissions reduction targets have become more stringent and The Climate Change Act 2008 commits the UK to an 80% cut in CO_2 emissions (on 1990 levels), by 2050. The legally binding Kyoto Pledge commits the UK to reducing overall greenhouse gas emissions by 12.5% by 2012.

2.3 CRC Energy Efficiency Scheme

2.3.1 This scheme, introduced in April, and known previously as the Carbon Reduction Commitment, is a mandatory carbon emissions trading scheme designed to help the UK to achieve its 80% cut in emissions. It is administered by the Environment Agency, and its aim is to ensure that large organisations in the public and private sectors address the amount of energy they use, and the carbon emissions that result from their operations. One rationale behind such a measure, implemented at a time of financial constraint, is that the costs organisations incur in implementing the scheme will be offset by savings from reduced energy usage.[14] The large organisations the scheme is aimed at, account for around 10% of UK emissions.

2.4 What does CRC mean for Kent County Council?

2.4.1 Kent County Council (KCC) is one of around 20,000 large public and private sector organisations required to participate in the scheme, which for around 5000 organisations (KCC included), will involve the purchase of carbon allowances for each tonne of CO_2 emitted (based on the level of energy consumption in 2008). **Allowances could potentially cost KCC £1.4 million.**

2.4.2 Participants will be organised into 'league tables' whereby those that have successfully cut their emissions[15] get allowances back, and those who fail to act are penalised. KCC will benefit from a degree of protection initially through the achievement of the Carbon Trust

[13] Climate Change Act 2008. London: HMSO

[14] DECC, 2010 CRC Energy Efficiency Scheme User Guide

[15] CRC emissions - which are a proportion of total emissions

Standard certification award, which provides 'early action credits'. Allowances received back from the scheme can be used to fund energy saving measures, including renewables.[16] [17]

2.4.3 As a large energy user, KCC is among those organisations legally required to both monitor and report on emissions, and in this regard it co-ordinates the emissions data from the District and Borough Councils in Kent. KCC is required to submit a 'footprint report' on 29th July 2011 for the first year of the scheme.

2.4.4 There are immediate penalties of £5000 plus £500 per working day for a maximum of 40 days for failing to submit (£25,000). Thereafter, the total rises to £45,000 and there are a number of significant financial and other penalties associated with accuracy of data recording and reporting[18][19]. There are strict criteria for accuracy, and the costs of inaccuracy could be great. A good, accurate carbon footprint report is effectively worth £5 million to KCC over 5 years.[20]

2.4.5 The select committee learned that implementation of the scheme has been costly and to ensure that the council ultimately benefits from it, sustained action and improvements will be needed in order to compete with the wide range of organisations, including for example supermarkets, who will be taking part. Aside from the costs of setting up the scheme, another detrimental effect will be its implications for cash flow, as the purchase of allowances takes place six months before any 'recycling payment' (based on position in the league table) is paid out.

2.4.6 The majority of the emissions from the KCC estate (80%) result from schools operations, since schools represent 86% of the estate's 700 buildings[21] and the Towards 2010 target of a 10% reduction in emissions has not been achieved. To benefit from the CRC, and in order to ensure direct cost savings from reduced energy use, it is therefore vital that KCC steps up its energy efficiency work, and puts in place effective mechanisms to ensure that the schools estate can quickly reduce its emissions and benefit from lower energy costs.

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[16] Jennie Donovan, Planning and Communications Manager (Kent and East Sussex), Environment Agency – written evidence

[17] It should be noted that CRC is one three emissions related schemes which together will account for over 90% of these organisations' emissions; the others being the EU Emissions Trading Scheme (EY ETS) and Climate Change Agreements (CCAs).

[18] Full details can be found in Annex 7 to the Guidance.

[19] Certain activities are excluded from CRC, namely domestic accommodation, transport and fuel, and energy purchased for supply to a third party (as undertaken by LASER, the energy buying division of KCC Commercial Services).

[20] Deborah Kapaj, Corporate Environmental Performance Co-ordinator – supplementary evidence

[21] Kent County Council, 2009 Towards a Low Carbon Kent - making a world of difference to energy saving!

2.5 Renewable Energy Strategy

2.5.1 The UK Renewable Energy Strategy[22] was published on 1st July 2009 and sets out the UK's plans to reduce fossil fuel use by 10% and reduce by 20-30% the level of gas imports which would have been needed by 2020. The aim of the Strategy is an almost six-fold increase in the amount of electricity generated from renewables. In order to achieve 30% of UK electricity generation from renewables by 2020 an increase from 22TWh[23] per annum to 117TWh per annum is required, with the majority of this expected to be from on and offshore wind.[24]

2.5.2 The Strategy acknowledges that for this to be achieved, the involvement of all sectors from government to individuals will be needed. It outlines how the rapid development of the renewables industry will be facilitated by the introduction of various financial support mechanisms, targeting both supply and take up, and those to date will be covered in Section 5 of this report.

2.6 Microgeneration Strategy

2.6.1 Underpinned by the Green Energy (Definition and Promotion) Act 2009, the government are (from July-December this year) consulting on a new Microgeneration Strategy, and it is expected to be finalised early next year. The Strategy covers small-scale electrical systems up to 50kW and heat systems up to 300kW and has four themes: quality and consumer confidence, technology improvements, skills/employment and advice for businesses, homeowners and communities.

2.6.2 The technologies covered by the Strategy are:

- Air, ground and water source heat pumps
- biomass boilers
- fuel cells
- micro Combined heat and power (micro CHP)
- micro hydro schemes
- micro wind turbines
- passive flue gas recovery devices.
- solar photovoltaics (PV)
- solar thermal water heating

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[22] DECC, 2009 The UK The UK Renewable Energy Strategy, London

[23] TW = terawatt = one trillion watts

[24] Dr Wayne Cranstone, Head of Onshore Development and Projects, RNRL - written evidence

2.7 Renewable Energy Targets

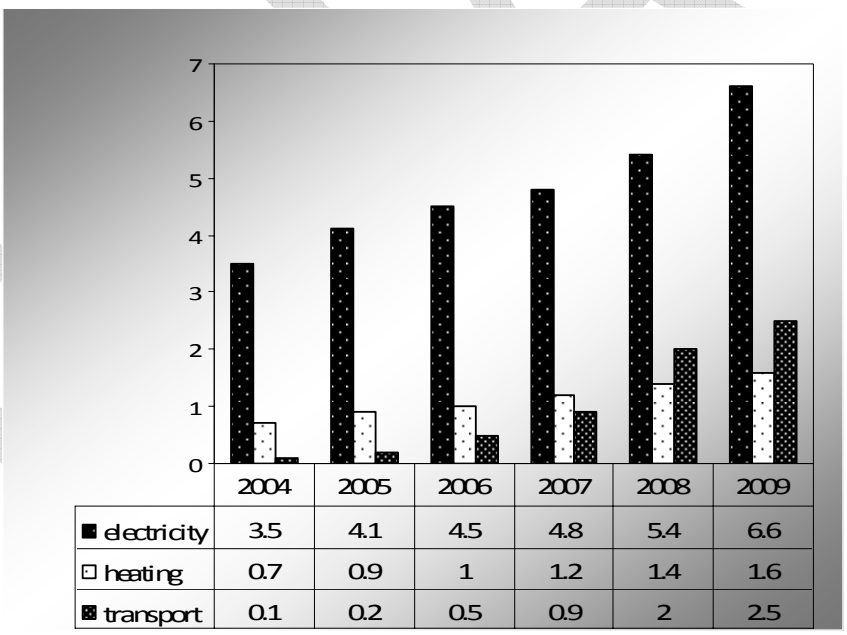
2.7.1 EU and National Targets

The EU Target of 20% of energy from renewable sources is divided up between countries and the UK 'share' is 15%. Realistically this is likely to involve renewable generation of:

- 30% electricity
- 12% heat
- 10% transport energy

It can be seen from Figure 1 below that steady progress has been made but currently we have achieved only 6.6% of our electricity, 1.6% of our heating (and cooling) and 2.5% of our transport energy from renewables. In terms of progress towards the 15% UK target, the proportion of total energy consumption from renewables is 3%.

Figure 1: % of electricity, heat and transport from renewables



	2004	2005	2006	2007	2008	2009
electricity	3.5	4.1	4.5	4.8	5.4	6.6
heating	0.7	0.9	1	1.2	1.4	1.6
transport	0.1	0.2	0.5	0.9	2	2.5

2.7.2 Regional and Local Targets

In July this year, the Secretary of State for Communities abolished regional spatial strategies and so the South East Plan, which included a regional target of 1130 MW of renewable electricity capacity by 2020; (154 MW in Kent by 2016) is no longer in effect and the national target of 15% energy from renewable sources prevails. The challenge is therefore to devise ways to help Kent play its part in achieving national targets. 'Business as usual' is expected to

deliver only 5.4% renewable energy in the South East by 2020[25] and so it is clear that its successful deployment in the county and across the region is vital in order to contribute to the UK's 2020 targets for 15% renewable energy and 80% emissions reduction..

2.8 Regeneration Framework

2.8.1 The efficient use of energy and resources is at the core of council strategies, particularly the Regeneration Framework: Unlocking Kent's Potential, which had a cross-cutting theme of 'Meeting the Climate Challenge', taken forward in Kent's Environment Strategy and subsequent Low Carbon Opportunities for Growth (which is considered further in Section 9).

2.9 Kent Environment Strategy

2.9.1 A new version of the 2007 Strategy was agreed by the Kent Partnership in June 2010. Five of the ten key priorities relate directly to energy reduction and efficiency or renewable energy generation; other priorities also relate to topics covered in this review.

2.9.2 The cross cutting themes of this strategy are environmental management and green jobs and these, as well as the key priorities, are reflected in KCC's Environment Policy and strongly embedded throughout KCC operations; monitored by the Sustainability and Climate Change Team, hosted by Environment, Highways and Waste Directorate (EHW), and providing co-ordination both within and outside of the organisation.[26] The council achieved certification to the ISO 14001 environmental management standard in May 2009 across all areas of its operation and has been selected as a case study for its community leadership role, in this regard. KCC's Policy Overview and Scrutiny Committees monitor progress within each Directorate on the sustainability work undertaken and receive annual reports on progress.

2.9.3 A number of Environment, Highways and Waste Directorate's service priorities for the coming year (and which will be referred to in later sections of this report), will impact on energy efficiency and carbon reduction, both within the Council and across Kent, including:

- emissions reduction work with the public and private sector
- development of an environmental behaviour change programme
- the start of a 25 year contract at Allington where 44% of Kent's municipal waste is converted to energy
- an area-based retrofitting programme to increase home energy and water efficiency

[25] Richards, K., 2010 SEPB Conference Presentation

[26] Kent County Council, 2010 Environment Highways and Waste: The year Ahead. Internal Report

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3 HOW MUCH ENERGY DO WE USE?

3.1 UK Energy Consumption

3.1.1 Energy consumption is influenced by mean temperatures and economic factors and with few exceptions the higher the Gross Domestic Profit (GDP) of a country, the higher the consumption. The UK is fairly typical of European countries at around 125kWh per person per day.

3.1.2 Since 1970 there has been a steady increase in primary energy consumption in the UK, which by 2001 had risen 13%, peaking at 236.3 million tonnes of Oil Equivalent (MtOE) in that year[27].

3.1.3 Over the following eight years, to 2009, this figure has fallen to 211.2 MtOE. Data for the first quarter of 2010 indicates that the downward trend continues. (The unit of oil equivalence used in the national data allows comparison of technologies and energy sources whose output is usually measured in a variety of ways.)

3.2 Kent Energy Consumption

3.2.1 As shown by the map on the next page (Figure 2), compared with the rest of the UK, energy consumption in Kent (with the exception of Medway) is towards the lower end of the spectrum, with energy use per person per year at under 30,000kWh which equates to an average of 82kWh per day.[28]

3.2.2 In 2007, Kent's total energy consumption of all fuel types was 44,167.8 GWh and this was fairly evenly split between the sectors as shown in Table 1 below. There were variations between districts, partially due to the level of industry present, though Members of the Select Committee believe that some of the disparities between districts may not be reflected in later data when they become available.

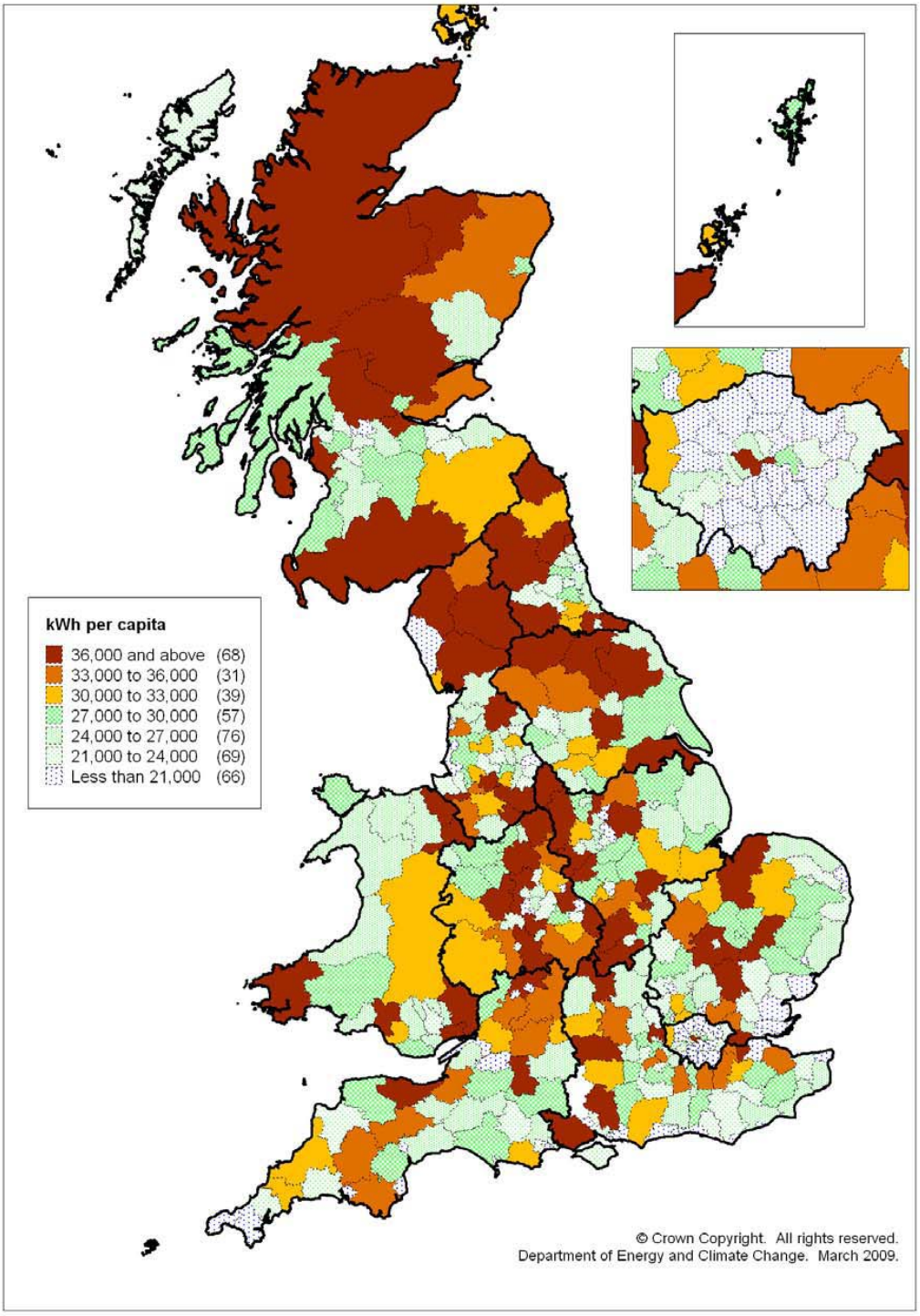
Table 1: Kent Energy Consumption in 2007 (GWh) *Source DECC: December 2009*

	Industry & Commercial	Domestic	Transport	Total
Kent (inc. Medway)	14,391.70	14,537.70	15,238.30	44,167.80

[27] DECC 2010 Energy Consumption in the UK. Table 1.1

[28] 2006 data, published in 2009.

Figure 2: Average total energy consumption per capita in 2006 (kWh) *Source: DECC*[29]

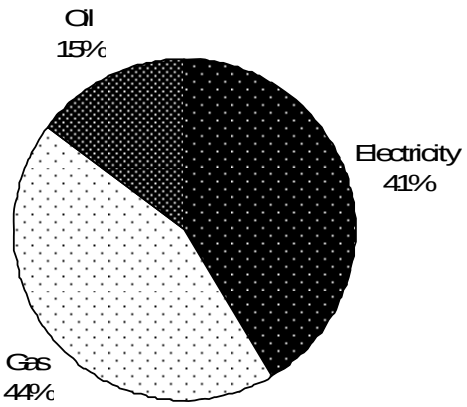


[29] http://www.decc.gov.uk/assets/decc/statistics/regional/file41497.pdf

3.3 Kent County Council Energy Consumption

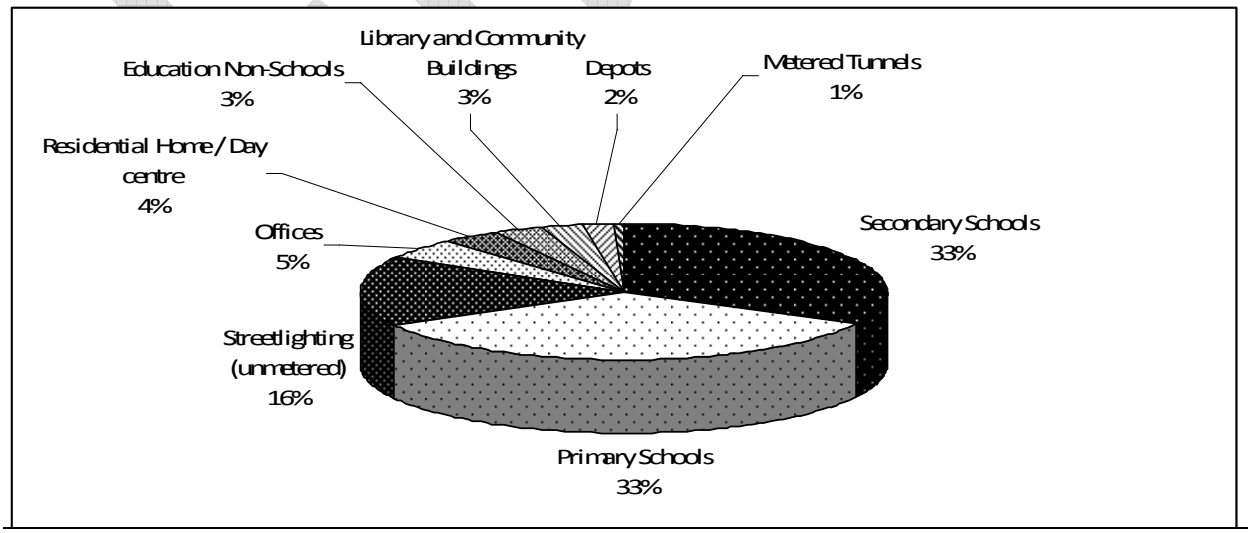
3.3.1 KCC in its operations consumed 355,811,827 kWh of electricity, gas and oil in 2008/9 (costing £23,797,107) and the breakdown of this by fuel type is shown in Figure 3 below. Of all the oil used by KCC, 92% is consumed by primary and secondary schools, (96% if non-school education buildings are included).

Figure 3: KCC energy consumption by fuel type 2008/9



3.3.2 When all fuel types are included, by far the largest proportion of energy consumption, a total of 59% is accounted for by primary and secondary schools and as stated previously 80% of the estate's emissions come from education operations as shown in Figure 4 below.

Figure 4: KCC energy consumption 2008/9[30]



[30] Data provided by Andy Morgan, Head of Energy Management

3.3.4 The next largest usage is from unmetered street lighting which is based on estimated use. However, from April this year the Select Committee has learned that estimates will be more accurate since they will take account of reductions in the wattage of bulbs or energy savings made by switching off lights at different times.

3.3.5 All the other buildings: offices, social care establishments, non-school education buildings, library and community buildings, depots and metered tunnels together only account for 16% of energy costs, though these can be significant e.g. office energy costs while representing only 5%, were still just under £1.2 million so, for example, changes in behaviour can result in significant savings.

3.4 Reducing energy consumption in Kent

National Indicator NI 186: Per capita reduction in CO_2 emissions in the local authority area

3.4.1 This Indicator is included in the Kent Agreement 2 (LA2) requiring an 11.2% reduction in per capita emissions for the county by 2011 from a 2005 baseline. Between 2005 and 2007 emissions reduced by 7.2% in Kent but a backlog in data means that more up to date figures are unavailable at present[31]. KCC contributions towards this reduction have included:[32]

- Offering Free home energy surveys to over 100,000 Kent residents with take-up from almost 9,000 households.
- Reducing congestion by using technology to improve traffic flows – a traffic management system has resulted in an 18% reduction in peak time journeys into Maidstone and this is being extended to Canterbury and Gravesend.
- Implementing the Kent Freedom Pass for children and young people (with 22,000 passes issued) which has reduced congestion particularly around school journey times.
- Promoting sustainable travel choices including Kent Car Share, saving 3 million car journeys in 2009, equal to 1,000 metric tonnes of CO_2 and Walk to School initiatives saving 114,000 school-run journeys
- Work with local businesses to help them implement travel plans

3.4.2 A future project to address the energy efficiency of Kent homes is outlined on page 74.

[31] Jennifer Hunt, Maidstone Borough Council – Hearing 1st June 2010

[32] Kent County Council, 2009 Towards 2010 Progress Report

3.5 Reducing energy use by the KCC estate

National and Kent Indicator NI 185: Percentage CO_2 reduction from local authority operations

3.5.1 NI185 measures percentage CO_2 reduction from local authority operations and relates to both buildings and transport. A number of methods successfully being used to address this are highlighted below:

Cut in business miles

A reduction in business miles of 3.5% in 2009/10 resulted in savings of £277,000 which equates to a substantial reduction in petrol and diesel consumption. Staff are also are encouraged to avoid meeting-related travel by using BT Meetme teleconference facilities and this is estimated to have avoided an additional £40,000-worth of business miles. Increased use of this facility could result in further substantial savings. It is important to maintain a focus on this aspect since business miles and commuting are responsible for 38% of all CO_2 emissions at national level. [33]

Traffic light replacement

Traffic lights were replaced with LEDs resulting in a 70% saving (reducing carbon emissions by 27 tonnes at a cost of £1000 per tonne of carbon).

Investment in environmental projects

Supplemented by a one off payment of £240,000 interest free funding available from the government through Salix Finance, KCC has invested £1 million in a range of energy efficiency projects and 25 renewable energy projects, (mainly solar powered systems and biomass boilers), the latter saving 7,000 tonnes CO_2 and reducing fuel costs. 53 energy efficiency projects together saved 1,103 tonnes of CO_2 emissions and cut costs by £187,387 per annum including a £125,000 road tunnel lighting project in Ramsgate where inefficient lighting was changed to a low energy alternative. Other measures included: boiler controls and education in how to use them; Building Energy Management Systems (BEMS); cavity wall and loft insulation; draught proofing; lighting upgrades and automatic lighting controls; valve wraps and heating pipe work insulation; voltage reduction equipment[34] and zoning controls for heating.[35]

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[33] Robin Haycock, Arup – Hearing 1st June 2010 (uncorrected evidence)

[34] KCC has implemented voltage optimisation at Sessions House in Maidstone where it has had the effect of reducing energy use by 7%. An explanation of voltage optimisation is given on page 72

[35] Kent County Council, 2009 Towards a Low Carbon Kent – Making a world of difference to energy saving!

Introduction of mixed recycling

The introduction of mixed recycling to all KCC buildings has proved to be an easier system to operate than the previous system where different types of recycling were separated. It requires fewer collections by contractors, which reduces both the cost and the associated carbon footprint.

Use of technology and innovation to influence behaviour

As an example, at new KCC premises at Thistley Hill, multi-purpose printer/fax/scanner/ photocopiers require a code to be inserted before printing can be collected; this reduces waste and avoids unnecessary energy costs.

Encouragement of energy efficient behaviour

KCC has over 300 Green Guardians who champion environmental awareness and energy efficiency. A survey of 2,800 computers in 13 offices found that 73% staff switched off their computers after work and part of Green Guardians' role is to promote good practice by conducting regular office surveys, providing either a Fair Trade sweet and a thank you note or a reminder to staff. After a period of campaigning by the Green Guardians, the proportion of computers switched off rose to 95%. It has been calculated that 100% compliance would save £46,000 energy costs from the surveyed computers alone, and so the impact is considerable. Staff who take on the role are rewarded by acknowledgement in the appraisal process.

3.5.2 Behavioural changes will be easier to effect if every individual member of staff and every county councillor is encouraged to give efficient energy use a high priority. During its evidence gathering the Select Committee learned that each KCC building has a 'Building User Group' which meets regularly; but that energy usage and energy efficiency is not on the agenda. In addition to corporate energy saving programmes, the Select Committee feel that having energy use and efficiency as a regular agenda item at every such meeting would be an effective way to ensure that local expertise e.g. detailed knowledge of buildings, heating and lighting systems, as well as staff habits with regard to energy use, is put to good use and that initiatives and successes at individual building level can be shared throughout the organisation.

RECOMMENDATION 8

That KCC substantially drives down energy consumption in its estate. Each Directorate should be required to take action to improve energy efficiency and encourage behavioural and other changes; Building User Groups should have 'energy usage and energy efficiency' as an agenda item at every meeting.

3.6 Direction of Travel

3.6.1 All new domestic buildings are required to be zero carbon from 2016; public buildings from 2018 and while Building Regulations revisions will continue to raise sustainability standards, this will only be achievable with both building integrated and community scale renewables.

3.7 KCC Sustainable Construction Policy [36]

3.7.1 Through its capital building programme KCC seeks to reduce negative environmental impacts including CO_2 and other greenhouse gas emissions. The Sustainable Construction Policy statement builds upon the Environment Policy commitments on energy, to meet high standards of sustainable construction in all new KCC buildings and refurbishments, and in all developments on KCC-owned land, with BREEAM 'very good'/Code for Sustainable Buildings Level 3 or equivalent required as a minimum; and requires all new KCC buildings and refurbishments to assess the feasibility of developing on-site renewable energy to help meet energy needs.

3.7.2 The Policy takes a lifecycle approach to costing buildings, taking into account 'future energy prices and the cost of retrofitting energy efficiency and adaptation measures to inform upfront investment' and reduce running costs. Its commitments on energy efficiency aim to reduce the embodied as well as in-use energy of a building and are summarised here:

- Maximise opportunities for natural heating and cooling
- Minimise heat loss and gain through use of thermally efficient materials
- Use natural or low-energy ventilation (including heat pumps where possible)
- Comply with or exceed building regulations for air testing and use high standards of glazing and draught proofing
- Comply with or exceed building regulations for carbon emissions
- Choose energy efficient: heating and hot water systems; lighting, cooling and ventilation; electrical equipment and appliances
- Employ, support and research new energy efficient technologies
- Investigate opportunities to retrofit energy efficiency measures into existing buildings using KCC's Energy and Water Investment Fund

3.7.3 The policy statement outlines KCC's commitments on material selection, construction, consultants and contractors. It has a specific commitment to renewable energy saying that: *'We*

[36] Supplementary to the Kent Design Guide: https://shareweb.kent.gov.uk/Documents/business/property-group/sustainable-construction-policy-2009.pdf

will thoroughly assess the feasibility of developing on-site renewable energy. This will be done by considering planning considerations, capital cost, required associated infrastructure, embodied energy of materials, ongoing management/maintenance requirements (frequency, skill required and component replacement costs), running costs, estimated payback period and predicted energy/carbon emission savings. Investigations will also be made as to whether grant funding can be obtained'.

3.8 Policies that have resulted in increased energy use

3.8.1 The Select Committee learned that despite the great strides made through the incorporation of energy efficiency schemes and a small number of renewable energy projects, the reduction in energy use achieved over two previous years has not been repeated and there has been a 10% increase in emissions from the KCC estate over the past year. The measures outlined above will have had a positive effect but other factors have militated against the otherwise downward trend.

3.8.2 Evidence provided to the Select Committee indicates that significant factors that have played a part in this are the Extended Schools programme, under which schools offer a range of extended services to pupils and the community outside of normal school hours, thus increasing energy use, and policies towards increasing the use of Information and Communication Technology (ICT) in school media suites. Aspects of flexible working and extended library hours have played a part, as has an increase in the number of Children's Centres.

3.8.3 A number of other KCC policies and strategies are likely to impact on energy use and though the net effects will not be known for some time, it is essential that any negative impacts are minimised and that opportunities are taken to minimise energy use wherever possible.

3.9 Better Workplaces

3.9.1 Over the next 6 years the Better Workplaces Programme (BWP) will see the closure of buildings and a resulting reduction in the floor plate of the office estate, as the portfolio of offices is rationalised to take account of business needs and service delivery. This will take place gradually as leases for particular buildings end and while the energy profile at retained sites is likely to increase as staff are relocated; overall there will be significant financial and energy savings. Thistley Hill, as mentioned previously in relation to the use of energy efficiency technology, is the first of the BWP to be fully functional. Here, for example, there are more staff than desks, and 60% of staff share office space at different times.[37]

[37] Edward Trimmer, Kent Facilities Business Manager – supplementary evidence

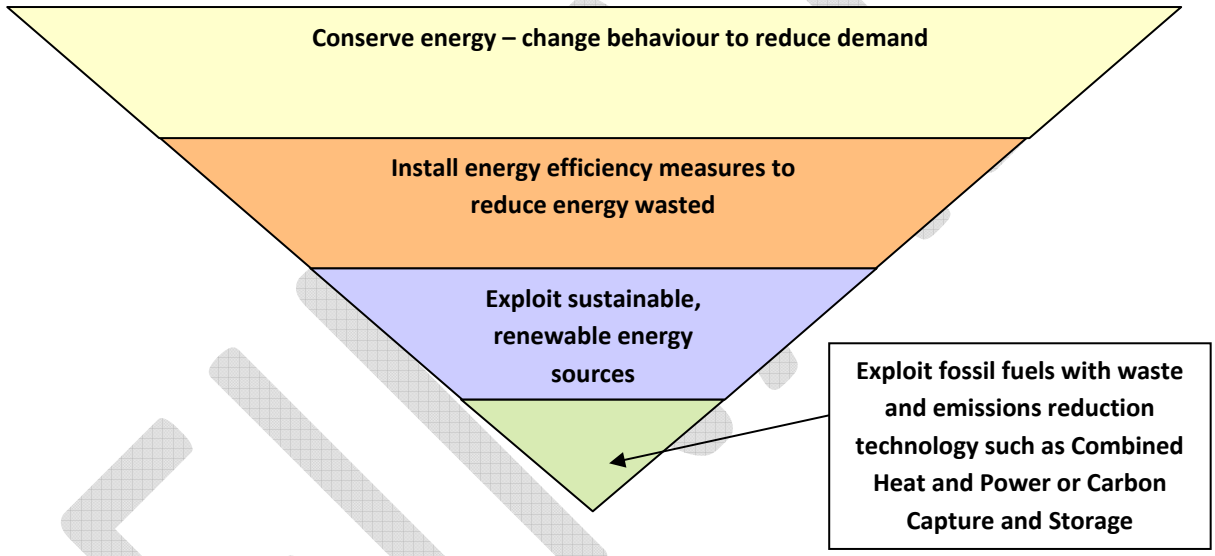
3.10 Street Lighting Policy

3.10.1 A new policy and strategy relates to the work of Kent Highway Services (KHS) who as highway authority undertake the provision and maintenance of street lights, lit signs and lit bollards. The Policy commits to a reduction in energy use and CO_2 emissions by the installation of less energy intense lighting and to de-illumination, part night lighting, light dimming or removal of certain units where they are deemed, after full consultation and consideration of public benefit and crime prevention priorities, to be unnecessary.

3.11 What needs to be done to further reduce energy use in the KCC estate?

3.11.1 A typical hierarchy for sustainable energy use is shown in Figure 5 below.

Figure 5: Energy hierarchy



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3.11.2 When finances are constrained, only a proportion of possible measures can be put in place, since, for example, implementing a renewable energy scheme will usually (but not always) be more expensive per tonne of carbon reduction than requiring behaviour change, or installing energy efficiency measures. Continuing with a hierarchical approach is therefore likely to lead to 'business as usual'. However, evidence to the Select Committee indicates that a 'step change' is required in order to make the necessary energy and cost savings and furthermore, targets for carbon reduction *will not be achievable by energy efficiency measures alone*. Therefore it is necessary to look holistically at what needs to be achieved, and the best way to achieve it.

3.11.3 This type of approach is now made possible by the introduction of the Feed-in Tariff and the forthcoming Renewable Heat Incentive (see Section 5) which make the business case for installing renewable technologies 'stack up'. However, to achieve this low-carbon transition, any investment in renewable energy, must be accompanied by a review of, and commitment

to, behaviour change to reduce energy consumption and a continuous programme of energy efficiency work, probably allied to ongoing maintenance.

3.11.4 The Select Committee learned that just such an approach had been adopted by a Kent school and a case study outlining what has been achieved, over a very brief period of time, at St Peter's Church of England Primary School, is shown on the following page.

St Peter's – Better than Zero Carbon School!

St Peter's Church of England (VC) School, Aylesford is a traditional Victorian building from 1836; not an establishment that you would expect to be setting out to become the first carbon-negative school in Europe in a venture involving all 130 school children, their parents, teachers and governors, the local community and international companies who can see the benefits from using such an unlikely organisation as a show room!

The catalyst for the venture was a House Challenge to come up with a design for Coronation Gardens (pictured above), a walled green space that had fallen into disuse and is now leased from the Parish Council. The School's desire to be self-sufficient, the arrival of PTS Renewables (a local company dedicated to the supply of energy efficiency and renewable energy technologies) to Aylesford and a lot of hard work led to some incredible results, not least a reduction in annual energy costs from £10,000 to £4,500 in a little over a year. The school's 4 R's have underpinned their energy-busting plans:

'Reduce' ☺Walls and ceilings were insulated with Actis Super 10 and wood wool (chosen by the children, who tested the insulation properties of several products)
☺Lighting sensors were installed
☺Doors and windows are being replaced
☺'Power Rangers' save energy by closing doors and turning off equipment
☺Heating systems were replaced with low energy technology, beginning with Worcester Bosch air source heat pumps (the picture above shows the nursery unit) to provide both heating and cooling as well as freeing up space in classrooms.

'Reuse' ☺There is good equipment husbandry, and everything possible is reused

'Recycle' ☺Eco-warriors make sure everything is sorted and recycled

'Renewable' ☺The children came up with some ambitious ideas for their green park with solar panels and a wind turbine as well as a slide for access! The next step is to get funding for solar photoelectric and thermal panels.

Headteacher, Simon Temple, wants other schools to benefit from the lessons learned:

reduce heat loss (insulation, windows, doors, power rangers)
reduce energy consumption (power rangers, alternative heating)
monitor energy usage to evaluate the impact of measures
generate energy with solar thermal and photovoltaic technology
reduce costs further by installing grey water recovery and rain-water capture

3.12 Sustainable Schools

3.12.1 Until the recent change of government on 11th May, the DCSF Sustainable Schools programme provided the framework for schools' activities on sustainability, including energy efficiency, and guidance for schools on carbon management was published in March 2010[38]. Government policy in this regard is likely to change under the new Department for Education.

3.12.2 KCC's document, Supporting Kent Schools to become Sustainable Schools[39] sets out the help available to schools to make them sustainable by 2020. It highlights ways in which this can be approached, including through the achievement of Healthy Schools status, the implementation of travel plans and through Eco Schools awards. In line with the government framework, the guidance provides eight voluntary 'pathways' for sustainability including 'Energy and Water', and outlines the advice and support available through KCC's Energy Management Team.

3.12.3 Energy and Water will be a compulsory theme for Eco Schools from September 2010 and progression through awards will be linked to data from Display Energy Certificates (for larger schools). The Select Committee believe this is a step in the right direction as currently DEC data shows no correlation between green flag status (the highest Eco Schools award) and energy efficiency of school buildings. However, the scheme itself is voluntary and schools can, if they wish, choose to do nothing.

3.12.4 Every Child Matters (ECM) is the central agenda under which schools are measured and as noted previously, ECM aims to increase the level of technology available to children and young people (raising the ratio of computers to 1:1) and to provide wrap around and extended services. 'The school that never sleeps' will mean increased energy usage in schools and so it will be important for government to acknowledge these potentially competing aims of energy and education policy, and seek to reconcile them.

RECOMMENDATION 11

That KCC lobbies the Department for Education to require schools to work with KCC to fulfil its CRC commitments and creates a direct incentive for schools to drive down their energy use and carbon emissions, using a range of behavioural, energy efficiency and renewable energy options..

[38] DCSF, 2010 Climate Change: A Carbon Management Strategy for the Schools Sector

[39] Kent County Council (undated) Supporting Kent Schools to become Sustainable Schools

3.13 LASER

3.13.1 LASER Energy Buying Group is part of Commercial Services; the trading arm of KCC which, enabled by legislation, provides goods and services to publicly funded bodies across the South East of England, helping those bodies to reduce their costs and generating income for KCC equivalent to a reduction in Council Tax of 1.2%.[40]

3.13.2 LASER has an active role in the energy market and carries out energy contract management, energy procurement and energy management services. A small Energy Management Team (6 officers) provides the latter for public sector clients including around 80 councils in London and the South East, Kent Police, Kent & Medway Fire and Rescue and most of the KCC estate including schools (except those built under the Private Finance Initiative). Schools that choose to buy energy through LASER benefit both from economies of scale, and from the expertise and advice the team is able to provide.

3.13.3 Members of the Energy Management Team undertook assessment training to become fully-accredited to Building Research Establishment (BRE) standards to facilitate the work required to ensure all schools over 1000m^2 were assessed and had Display Energy Certificates and Advisory Reports when these became a requirement. Equipping the team for this role saved £70,000 compared with the cost of appointing external assessors, demonstrating the cost-effectiveness of developing expertise within the organisation. In addition to DEC work, the Energy Management Team administers the Energy and Water Investment Fund, as well as managing the CRC Energy Efficiency Scheme.

3.14 LASER electricity contracts

3.14.1 The Select Committee learned from Andy Morgan, Head of Energy Management that LASER has so far chosen not to purchase renewable electricity. In 2008 for example, suppliers were required to source 9.1% of electricity from renewable sources yet only 5.5% was actually being generated – demand therefore outstripped supply. Suppliers were obliged to pay a buyout sum to be recycled back to those in the scheme based on their renewable energy portfolio. However, at that time this meant that the customer, (and as noted earlier LASER are large energy customers who seek to keep costs down for KCC and their other clients in the public sector) '*could pay a premium to their electricity supplier for renewable electricity which the supplier is already obliged by Government to source'*.

3.14.2 The CRC Energy Efficiency Scheme treats all electricity from the Grid in the same way (with CO_2/kWh based on the mix of generation across the board), again with no incentive to

[40] Kent County Council, 2010 Medium Term Plan 2010-2013

purchase renewably sourced supplies. So, LASER do not consider that paying a premium for it is a worthwhile option.[41] This situation could however change, when the current contract comes to an end. Currently, a very few energy clients specify they want to source renewable electricity and the most cost effective option has been to source electricity from (fossil fuelled) Combined Heat and Power (CHP) plants, which due to their efficient generation are exempt from Climate Change Levy for High Rate VAT clients so there is no net increase in the price per kWh purchased.

3.15 Local authority sale of renewable electricity

3.15.1 Since 1989, legislation has prevented local authorities from selling electricity they generate themselves (other than that associated with heat i.e. CHP)[42], however, the Climate Change Secretary announced his intention to remedy this situation and on 18th August 2010 the Sale of Electricity by Local Authorities (England and Wales) Regulations 2010 came into force.

3.15.2 This means that should KCC invest in microgeneration technologies such as (but not restricted to) photovoltaic (PV) panels they may sell that electricity to the Grid resulting in a long term reduction in fuel bills and carbon emissions and also deriving an income stream. This may be via the Feed-in Tariff or Renewables Obligation, though the final details are not yet available. This provides a huge financial incentive for local councils, enabling them to make sound business cases for investment in renewable energy.

[41] Andy Morgan, Head of Energy Management – written evidence

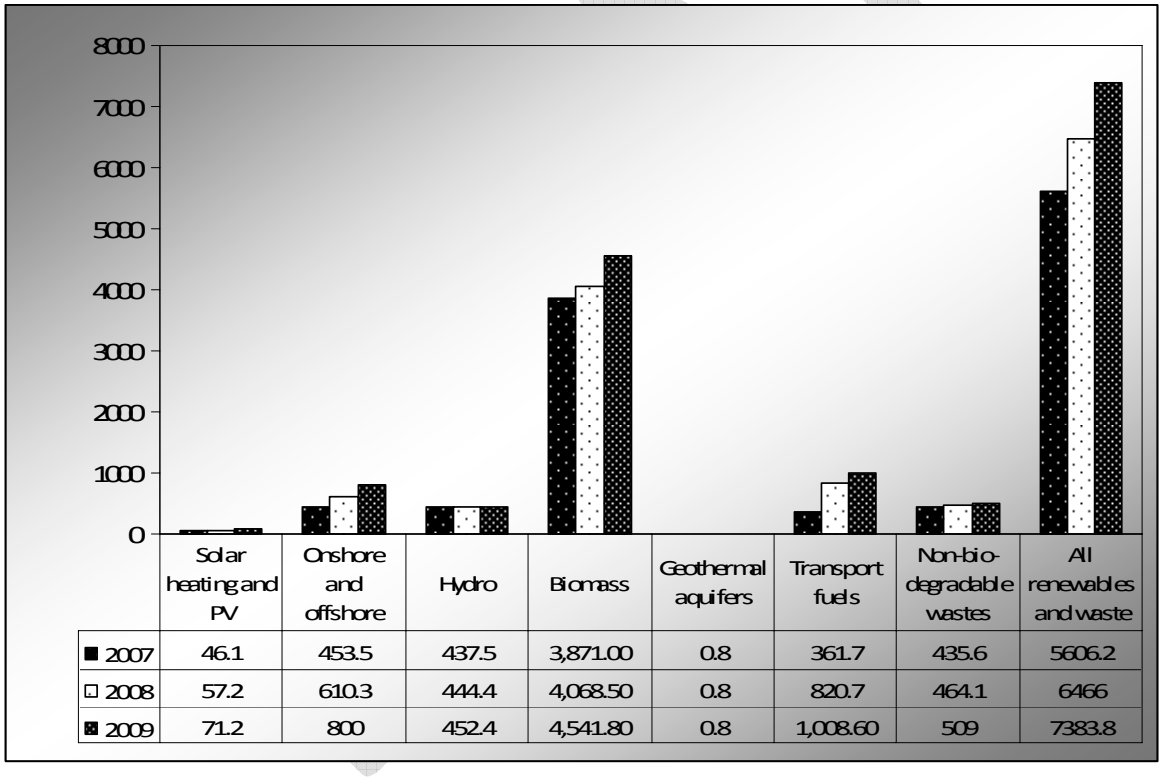
[42] The Local Government (Miscellaneous Provisions) Act 1976 as amended by the Energy Act 1989.

4 RENEWABLE ENERGY GENERATION

4.1 Renewable generation in the UK

4.1.1 There has been a steady increase in the amount of renewable energy generation from different sources and Figure 6 below shows figures for the period from 2007 to 2009. Bio-degradable waste is included in the biomass figure, and non-biodegradable waste is given separately. Data for 2010/11 will show a marked increase in offshore wind production as Phase 2 wind farms currently being built come on-stream, including two off the Kent coast at Thanet Offshore (now operational) and the London Array.

Figure 6: UK Total Generation from renewables and wastes 2007-2009[43]
(units are thousands of tonnes of oil equivalent (KtOE)



	Solar heating and PV	Onshore and offshore	Hydro	Biomass	Geothermal aquifers	Transport fuels	Non-bio-degradable wastes	All renewables and waste
2007	46.1	453.5	437.5	3,871.00	0.8	361.7	435.6	5606.2
2008	57.2	610.3	444.4	4,068.50	0.8	820.7	464.1	6466
2009	71.2	800	452.4	4,541.80	0.8	1,008.60	509	7383.8

4.2 Renewable Generation in the South East and Kent

4.2.1 Richard Hurford, Head of the Energy Saving Trust in the South East, informed the Select Committee that information from the Low Carbon Buildings Programme which provided grants for renewables between 2006 and 2010 shows that the South East is ahead of the rest of the country with 3,458 domestic installations during that period; most having under 1,000.

[43] Data source: DECC Energy Trends Special Report – Renewable Energy in 2009

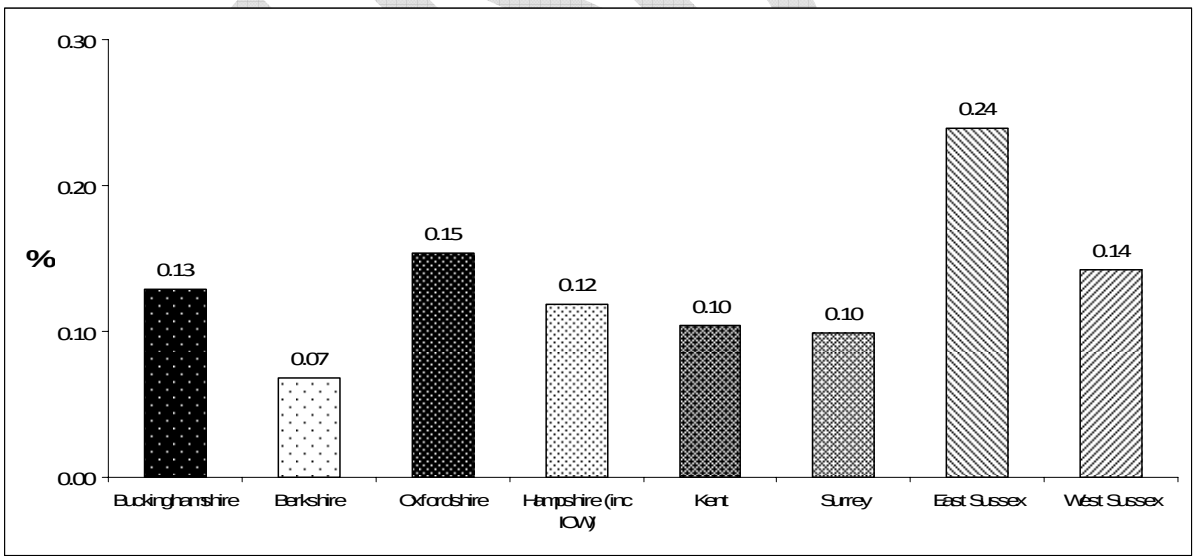
4.2.2 The Low Carbon Buildings Programme (LCBP) data shows that of the 3,458 installations in the South East, after Hampshire, Kent had the second highest number - 577 (17%) as shown in Table 2 below.

Figure 2: SE Renewable Energy Installations funded by LCBP (April 2006 – January 2010)[44]

Buckinghamshire	250
Berkshire	223
Oxfordshire	379
Hampshire (inc IOW)	610
Kent	577
Surrey	436
East Sussex	518
West Sussex	465

4.2.3 However, when the number of installations is considered as a proportion of the households in each county, it can be seen from Figure 7 below that Kent ranks fifth among the South East Counties with only Berkshire and Surrey having a lower proportion and East Sussex having over twice as many installations as Kent relative to household numbers.

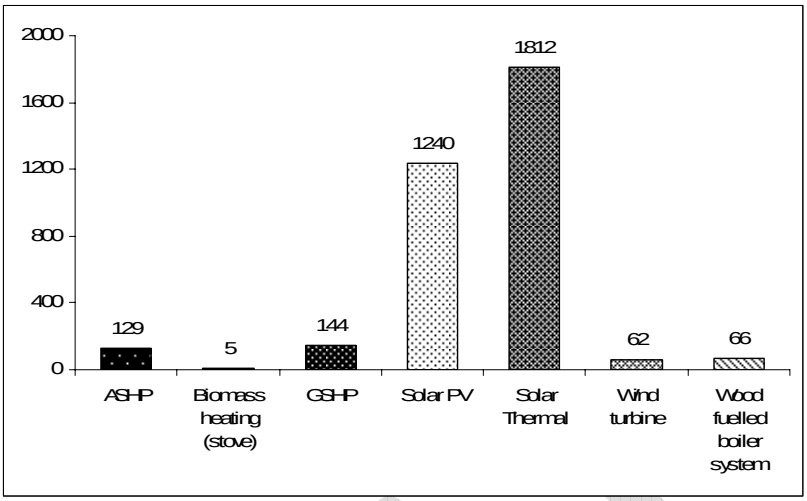
Figure 7: LCBP installations as a % of household number



4.2.4 Across the whole of the South East, the types of technology that people chose were predominantly solar-powered systems, with solar PV and solar thermal hot water systems accounting for 88% of the total as shown in Figure 8 on the next page.

[44] Data Source: Energy Saving Trust – Hearing 19th May 2010

Figure 8: SE Renewable installations by technology type (April 2006-January 2010)



4.2.5 In addition, LCBP data shows that there were a number of installations at Community, Medium and Large scale and the grant amounts allocated for these in the South East were £260,157, £832,389 and £152,189 respectively[45].

4.2.6 The Select Committee was informed that, when all types of renewable energy are taken into account, the current installed capacity in Kent is approximately 201MW of electricity and 1.18MW heat which equates to around 1.1% of the county's total energy consumption,[46]both of which will contribute to the 15% renewable energy target for the UK by 2020.

4.3 Renewable Energy Capacity in Kent

4.3.1 Land Use Consultants and TV Energy on behalf of the South East England Partnership Board[47] undertook a piece of work, to assess the potential for renewable and decentralised energy in the South East. The results of their high level assessment, which indicates a theoretical level of capacity based on a number of criteria, and before filters such as technical issues and planning constraints are applied, have now been made available. The data have been disaggregated to County level for all the included technology types and to local authority level where possible.[48] Table 3 on the next page shows the assessed capacity for the technology types in Kent (including Medway) and the estimated carbon savings from implementation at that level by 2020. There are high, medium and low scenarios assumed for

[45] http:\\www.lowcarbonbuildings.org.uk

[46] Neil Hilkene, Sustainability Manager – supplementary evidence

[47] The regional planning body which has now been abolished by the government.

[48] The full work is available online at: http://www.se-partnershipboard.org.uk/page/5/view/175/sub/77/energy

energy crop data but only the medium scenario is listed here. The high level study and associated mapping can now be used as the basis for further, more detailed work.

Table 3: Kent Resource Potential identified by the regional study[49]

Technology Resource Potential	MW installed	GWh	Kilotonnes CO_2 saved
Commercial scale wind energy (non-designated areas – 2.5 MW turbines)	3352	5285	2082
Small scale wind energy (non-designated areas – 6kW turbines)	275	385	152
Small scale wind energy (designated areas)	65.6	91.95	36.22
Biomass – managed woodland (used to generate electricity/heat)	8.6/169.7	64.8/297.3	25.5/71.9
Biomass – energy crops (medium scenario, non-designated, electricity/heat)	9.35/121.57	70.12/212.98	27.62/51.54
Biomass – energy crops (medium scenario, designated, electricity/heat)	4.30/55.87	32.22/97.88	12.69/23.69
Biomass – waste wood – electricity/heat	6.4/96.2	47.9/168.6	89.9/194.6
Biomass – agricultural arisings	129.60	3170.70	1248.90
Biomass – poultry litter	0.28	1.40	0.60
Biogas – wet organic waste	567.70	2934.00	1155.60
Biomass – co-firing	480.40	3427.40	1350.00
Municipal Solid Waste	499.00	1923.00	3688.00
Commercial and Industrial waste	1203.00	4637.00	1826.00
Biogas – landfill gas	12.00	55.20	21.80
Biogas – sewage gas	11.20	42.00	16.60
Hydropower – small scale (non-designated areas)	1.11	5.76	2.27
Hydropower - small scale (designated areas)	0.36	1.87	0.74
Solar Photovoltaic (PV)	509.41	401.62	158.20
Solar Thermal	439.71	192.59	46.61
Heat Pumps	2746.00	6254.00	755.00

[49] Land Use Consultants and TV Energy (2010) Review of Renewable and Decentralised Energy Potential in South East England

4.4 Renewable Generation on the KCC Estate

4.4.1 As noted previously, to date only 25 renewable energy projects have been put in place on the KCC estate including 4 biomass boilers and 12 solar PV and solar thermal systems[50].

4.5 School Renewables Project

4.5.1 KCC commissioned work in 2007 to find out which of Kent's schools were suited to various types of renewable energy. The technologies considered were:

Biomass (wood fuel) heating

Combined Heat and Power (CHP)

Ground source heating

Solar photovoltaic (PV) panels

Solar water heating panels

Wind turbine (building mounted)

Wind turbine (stand alone)

4.5.2 At that time 45 schools were selected for further assessment and a good potential for solar PV, solar water heating and wind power was identified. Some schools were found to be suited to a number of technologies but heat pumps were considered only where new building was planned because of difficulties with retrofitting. Just under half the schools also had good potential for wood fuel heating. It was calculated at the time that converting all those schools to wood fuel heating would save 1,800 tonnes of carbon per annum and create a demand for 1,400 tonnes of wood fuel which could be locally sourced.

4.5.3 It was recommended that two or three projects were pursued initially and work was taken forward at Valley Park Community School, Maidstone and St Augustine's Catholic Primary School, Tunbridge Wells. A report outlining progress was written in February 2010,[51] concluding that biomass heating was more expensive to implement than energy efficiency measures but provided a much deeper cut in CO_2 emissions (90%) and schools had benefited from fuel cost savings. It stated that the economic case for the technology being employed more widely on the KCC estate would be improved by the introduction of the Renewable Heat Incentive; if

[50] Carolyn McKenzie, Sustainability and Climate Change Manager – Supplementary evidence

[51] Morgan, A., 2010 Wood Fuel Heating in Kent Schools. Internal Report

installed in buildings with higher, more constant heat load or in new builds, particularly Building Schools for the Future (BSF) schools where very low carbon emissions are stipulated or if wood chip prices are stable while oil/gas prices rise significantly

4.5.4 The Select Committee were informed that a major barrier that mitigated against implementing energy saving and renewable energy measures in schools was that while KCC met the capital cost, any revenue benefits would fall to the school. Possible solutions to this barrier are discussed in Section 5.

4.6 Renewable technologies

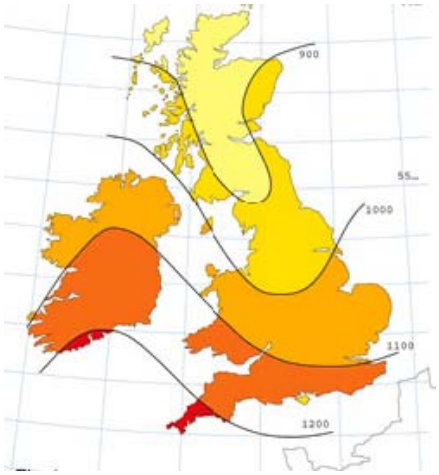
4.6.1 The following pages provide a brief overview of main technologies, with reference to evidence received in relation to Kent. For the majority of the technologies, issues in Kent are similar to those elsewhere. However, regarding onshore development, a large proportion of the county has protected status as an Area of Outstanding Natural Beauty which offers particular challenges, highlighted in Section 7 on planning. The fact that Kent has a large proportion of formerly coppiced woodland, means that there is very good potential to develop renewable wood fuel production in the county, which would also meet a number of other objectives including rural regeneration and employment as well as providing the opportunity for KCC's own Country Parks to contribute to renewable energy aims while enhancing their access and amenity value.

4.7 Renewable Electricity

4.7.1 Issues regarding the variability (usually termed intermittency) of renewable electricity are discussed in Section 8 page 86. The following technologies are covered.

- Solar PV
- Wind
- Hydro power
    - Wind
    - Wave
    - Small scale hydro electricity
- Energy from Waste
    - Biological processing
    - Thermal processing

Solar Photovoltaics



Photovoltaic (PV) cells generate electricity using solar (or reflected) energy. No fuel other than the sun's energy is needed and output is measured in terms of kilowatt peak (kWp) which is the rated capacity of the unit in ideal conditions. Cells (panels) are made of layers of a semiconductor across which electric fields are created when sunlight 'excites' the electrons in the material creating an electric current. Silicon is the most commonly used semiconductor, however research is identifying other materials and systems which may supersede this. PV roof tiles and flexible PV materials, for example, are already available. Panels can be grouped together to form an array, according to the output required.

The map above shows that Kent benefits from average insolation of between 1100 and 1200 kWh per square meter (at a 30 degree incline; 30-45 degrees is recommended); and so is in the zone best suited to take advantage of solar energy apart from the very tip of Cornwall.

Tilted surfaces such as roofs are ideal surfaces on which to mount panels, as this increases the amount of sunlight available and free-standing tilted arrays are possible with a 4kW section (the limit for a single connection to the grid that can benefit from payments from the Feed-in Tariff) taking up about $30m^2$.

Advantages: Low maintenance (simple cleaning only required), easy to retrofit, permitted development rights (since 2008); works all year round but with higher output in summer; reduced fuel bills; suitable for domestic to industrial/utility scale installations.

Disadvantages: A suitably sized south facing roof or external surface/support is required. Planning may currently be refused in protected areas though as noted in section 7, solar PV is one of the technologies that is 'given the green light' in a report compiled for the Kent Downs AONB.[52]

Stats: A 2.5kWp domestic installation would meet around 50% household needs, save 1.2 tonnes of CO_2 per year and give a £250 per year reduction in electricity bills in addition to payments from the Feed-in Tariff.[53]. The Solar Trade Association indicates that costs range from £4,000-£8,000 per kWp, therefore a typical domestic system would cost from £10,000 to £20,000 but the return on investment has been calculated to be 8-10%.

[52] Kent Downs AONB (2009)

[53] Source: Department of Energy and Climate Change (DECC)

Wind Power

Modern wind turbines harvest wind power to generate electricity and range from domestic scale micro size to massive turbines the largest of which are rated at around 6-7MW. The Select Committee would not recommend micro-scale turbines due to their low efficiency.

Large turbines are most effective and a Norwegian company is planning a 10MW turbine, 533 feet high. The technical challenges of offshore wind make it twice as expensive but the wind resource is better than onshore. A summary of the offshore wind development around the Kent coast is included in Section 9.

The UK has an excellent wind resource with average wind speeds of 8-9 m/s (in the south) and a load factor (generating capacity minus downtime) for a well-sited turbine of 30% compared to Germany's 19%. Currently there is 4.5GW of installed capacity on/offshore. Onshore, 3,490.74MW is operational, 881.75 is under construction and 4,064.13MW has planning approval but is not yet constructed. A further 7,625.19MW (47% of the total) is in planning.[54]

Rural areas have more than four times the capacity of urban areas when considering the potential for siting wind turbines.[55] However, evidence to the review indicates that small to medium scale onshore turbines could be better placed close to industrial sites. The urban environment is not generally suitable for the traditional horizontal-axis wind turbine (HAWT – shown below) which tracks to follow wind direction, because of obstructions and turbulence from buildings, but vertical axis turbines (VAWT) or wind spires which are quiet and experience less vibration, such as the Quiet Revolution, shown to the right, could provide a useful alternative.

Examples in Kent

Kent has several examples of individual turbines including the HAWT pictured, at Wealden Forest Park in Herne. An onshore wind farm at Little Cheyne Court Farm, New Romney has been operational since November 2008. It has 26 turbines each 115m tall (to blade tip) of 2.3 MW, with total capacity of 59.8MW, linked to the Grid by 13km of underground cabling.

There is likely to be continued growth of onshore wind in Kent at the single turbine/small cluster community scale[56]. Currently, a further wind farm has been approved at Sheerness, Isle of Sheppey, for 4 wind turbines each of 2.5MW, total capacity 10MW and sites at Kent Thameside, Isle of Sheppey and Isle of Grain are under consideration. The review also learned of a proposal for a turbine with shared community ownership at East Farleigh, near Maidstone and this is outlined on the next page.

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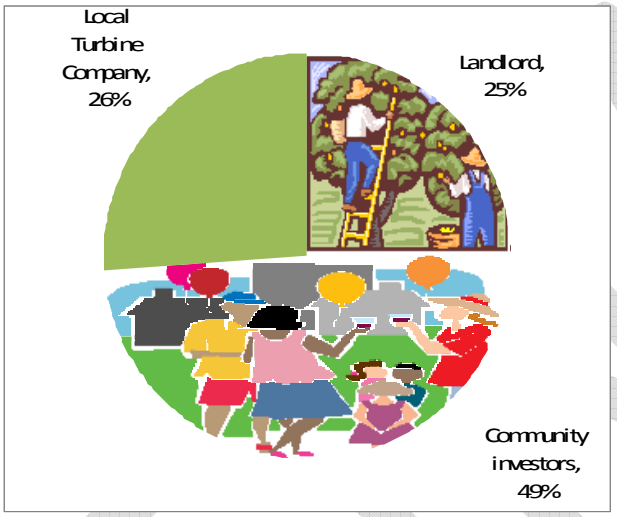
[54] Paul Reynolds, Offshore Wind Development Manager, RenewableUK – Hearing 26th May 2010

[55] William White, SE Regional Director, National Farmer's Union – Hearing 12th May 2010

[56] Neil Hilkene, Sustainability Manager – supplementary evidence

Case Study: Community Turbine Proposal

Residents in East Farleigh, near Maidstone were recently invited to their local Church Hall to find out about and give their views on a proposed community co-ownership initiative. The proposal, for a single turbine to generate electricity at a nearby fruit farm, is the first of its kind in Kent (there being only one other in the UK, in Cambridge) and would allow local people to own a share of the resource (as is common practice in Denmark) through the setting up of an investment vehicle such as a co-operative or community interest company which would earn local investors a favourable rate of return (around 12%). The community would also benefit directly from a percentage of revenue paid to the Parish Council each year (around £5000) and the scheme's landlord would benefit from a share as shown below



The scheme is for one Acsa 27 mid sized turbine located in a farm setting. Proposers, Distgen, will shortly be seeking planning permission for the turbine, having first consulted with 11 statutory consultees and members of the local community.

Residents were keen to learn about the scheme and the concerns they had were mainly about the level of noise that might be experienced from the turbine's operation. They were provided with detailed technical and environmental data as well as information about the careful positioning of the turbine, so that low levels of noise at various distances from it, would largely be absorbed by the ambient noise and virtually undetectable at 300m. The picture to the right shows how the turbine would look from the Castle Farm entrance.

Key points:

- 500,000kWh (estimated annual generation – enough to power about 100 homes)
- Ideal location with 7m/s average windspeed
- Could connect directly to the local High Voltage Grid
- A scale of development favoured by Planning Policy Statement (PPS) 22
- Could contribute to the national 15% target for renewables
- Could contribute to government aims for distributed generation, energy security and carbon emissions reduction

Project website: www.distgen.com/projects/castle-farm

Hydro Power

Wave & Tidal Power – Though output is more predictable than with wind and solar power, only 2GW is expected to be developed in the UK by 2020. Potentially wave and tidal power could supply 15-20% of UK electricity by 2050 with tidal barrages and lagoons providing another 5%. A new Marine Planning System is being developed and a draft Marine Policy Statement is at the consultation stage until 13th October 2010.

Currently, Europe's only tidal power station is in the Rance estuary in northern France (240MW) where electricity is generated by the high-volume tidal flow passing through turbines within a barrage.

In the UK, the focus is on Scotland and the West Coast and of potential sites at the Dee, Humber, Severn and Solway, the Severn Barrage has come closest to fruition.

An example of the exciting developments in the field of wave energy is the Anaconda, a giant snake-like tube made of rubber which has been developed by Checkmate Seaenergy with funding from the Carbon Trust. A 200m long device is planned for 2014, with a turbine at the 'tail end', each 'snake' capable of generating 1MW electricity.[57]

In the South East, a SEEDA study identified areas around the Isle of Wight and Dover as having potential for 1000-1900 MWh per annum but constrained by environmental factors, the location of sub-sea cables, pipelines or archaeological sites, and shipping.[58] The risk of environmental damage, as well as the cost and size of schemes have militated against large scale take up in the UK so far and the Select Committee believe that these factors are likely to restrict the potential for schemes around the Kent coast.

Small Scale Hydro-electric power - Hydro-electric schemes need a constant water source over which a weir is built. A pipeline takes water from the weir via an intake to a covered turbine and water is fed back to the watercourse via a 'tailrace'.

In England, most sites with potential for 1MW or over have been developed and currently hydropower produces 1.2% of UK electricity consumption. The Environment Agency (EA) will approve schemes provided there are no increased flood risks or impacts on migrating fish and 1200 schemes are expected across the UK by 2020. There may be potential for further 'run of river' or 'low head' micro-hydro sites and EA mapping of the South East has revealed 5832 sites which could generate 79MW electricity (enough for 55,000 homes).

The EA have so far permitted two sites in Kent and five more on the River Medway are being considered. In principle the Select Committee favour small scale hydro schemes but there is limited scope for them in the county.

(The Feed-in Tariff would incentivise a medium scale scheme (electricity for 32,000 homes) by about £25,000 per year which represents 16-25% of set up costs).

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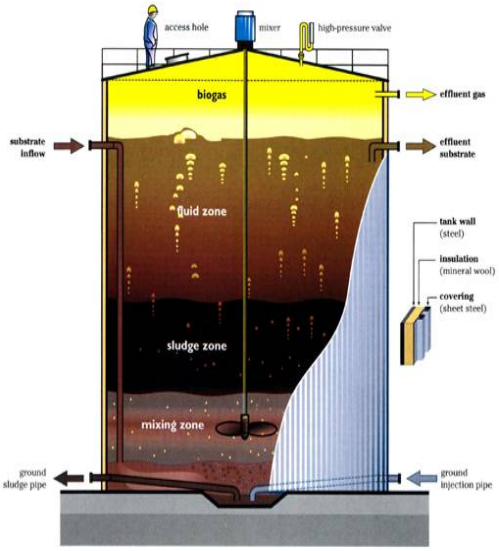
[57] The Carbon Trust, 2009 Innovations Case Study CS153

[58] Paul Reynolds, Offshore Wind Development Manager, RenewableUK – Hearing 26th May 2010

Energy from Waste – biological processing

Waste is increasingly being recognised as a resource and the Waste Strategy for England expects that 25% of municipal waste will be used to generate energy by 2020; a figure already exceeded in Kent.[59] Apart from the three thermal techniques available, anaerobic digestion (AD), a biological process involving the breakdown of organic waste by microbes in the absence of oxygen, can be used to produce biogas or methane (CH_4). AD is suited to homogenous food and agricultural waste and is the best treatment method, in energy and carbon reduction terms, provided materials are collected separately[60]. The end product of dried sewage sludge can also be used as a fertilizer.



'The NFU has a vision for 1,000 on-farm AD plants by 2020 and we firmly believe AD can add value to the agricultural sector, while demonstrating how farmers can provide part of the solution to the problem of climate change.'[61]

Biogas can be purified and injected into the gas grid; burned onsite to generate electricity; purified and bottled as a vehicle fuel or piped a short distance and used as a combustible fuel.[62] The UK potential is considerable with over 100 million tonnes (mt) per year of organic waste comprising 12-20mt food waste (50% municipal); 90mt agricultural waste and 1.73mt sewage sludge.[63]

The Environment Agency is in favour of AD provided the recovered value outweighs impacts such as bad smells and increased transport. However, incentives for farm-scale projects are felt to be too low to make them viable. Larger, more expensive schemes, taking in waste food from councils or businesses could benefit from charging gate fees.

KCC is the household waste authority for Kent, responsible for disposal of the waste (with the exception of green waste in some cases) collected by the twelve Kent boroughs and districts.

The council is contracted to supply municipal waste to the WRG Allington thermal waste-to-energy plant for the next 25 years. Nevertheless, there is potential for non-council organic waste from the restaurant/food and agricultural industries to be processed by anaerobic digestion in Kent.

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[59] Jennie Donovan, Planning and Communications Manager (Kent and East Sussex), Environment Agency – written evidence

[60] DEFRA Waste Strategy Factsheet: Energy from Waste and Anaerobic Digestion

[61] National Farmers' Union, Media Release 2 February 2010 – supplementary evidence

[62] Dr Howard Lee, Lecturer and Sustainability Champion, Hadlow College – written evidence

[63] Defra (2010) Accelerating the Uptake of Anaerobic Digestion in England: an Implementation Plan

Energy from Waste - thermal processing

'EfW can have a role both in bridging the gap left as old coal and nuclear plant are closed, and also in contributing to our renewable energy targets….'[64]

'A shift in perception is required. Waste needs to be recognised as a resource.'[65]

The three main thermal techniques available for the generation of energy from waste are combustion, pyrolysis and gasification.[66] The process of generating energy from waste is distinct from the incineration of waste to reduce its volume.

Combustion – An Energy from Waste plant operated by Kent Enviropower at Allington Quarry is one of two operated by Waste Recycling Group in the UK. The plant uses fluidised bed technology whereby hot air is blown up through a layer of sand which swirls around, like a fluid. Shredded waste is fed in from the top and the abrasiveness of the sand plus the high temperature causes the waste to vapourise. With the least noxious end products, this combustion method is preferable from the air quality point of view. An alternative method uses moving-grate technology.

The Allington plant processes 500,000 tonnes of waste per annum, and has a 34MW electricity generating capacity, offsetting 77,000 tonnes of CO_2 per annum.

KCC is contracted to supply a minimum quantity of MSW to the facility, equating to around 44% of the Kent total. Given a long term 50% recycling target, and declining waste arisings, KCC has already reached an optimum level of energy generation from MSW (the biodegradable fraction of which is considered to be a renewable energy source).[67]

Pyrolysis - Pyrolysis uses temperatures of over 500 °C to decompose biomass in the absence of oxygen. Feedstocks such as poultry litter, manure, straw, wood and green wastes can be used and the end products are syngas, pyrolysis oil and charcoal. Research is being sponsored by the Carbon Trust to see whether pyrolysis oil can be upgraded to transport fuel. The process is also being investigated by New Earth Solutions, who operate Blaise Farm In-Vessel composting facility in Kent, to see whether there are opportunities to reduce the carbon impact of waste processing by exploring ways to generate renewable fuel for use on site[68].

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[64] Paul Andrews, Managing Director, Kent Enviropower – written evidence

[65] Karl Jansa, Business Development Manager, Locate in Kent – written evidence

[66] Gasification is referred to on page 52 in relation to CHP.

[67] Sue Barton, Strategic Projects & Business Development Manager – Hearing 21st April 2010

[68] Rob Asquith - Director of Land & Planning, New Earth Solutions (Blaise Farm) – written evidence

4.8 Renewable Heat

4.8.1 Heating accounts for 46% of UK energy consumption with the majority of buildings' heat and hot water requirements provided by gas boilers; while industry uses proportionately more electricity and oil. So far, only around 1% of heat is generated from renewable sources compared to the UK target of 12% by 2020 but the take up of these technologies and others such as biogas and biomethane production and combined heat and power (CHP) will be stimulated by the Renewable Heat Incentive (introduced by The Energy Act 2008) which is due to come into effect on 1st April 2011.

4.8.2 A cost comparison of some renewable technologies with their fossil fuel alternatives is given in Table 4 below.[69]

Table 4: Cost comparisons of renewable with fossil fuel heating

Technology	**Heat Cost in pence per kWh_{th}**	**Fuel Emissions in $kgCO_2$/ kWh_{th}**
Electric heater	19-24	0.61
Oil boiler	8.1-14	0.32
Gas boiler	6.7-16	0.23
Renewable Technology		
Ground source heat pump	10-32	0.14-0.17
Air source heat pump	10-39	0.20-0.22
Biomass District Heating	11-22	0.036
Biomass boiler	11-24	0.031
Solar Thermal	50-74	n/a

4.8.3 Highlighted on the following pages are heat pumps, solar thermal and combined technology (PV-T), district heating using fossil/renewable fuels and finally biomass.

[69] Parliamentary Office of Science and Technology, 2010 Postnote: Renewable Heating

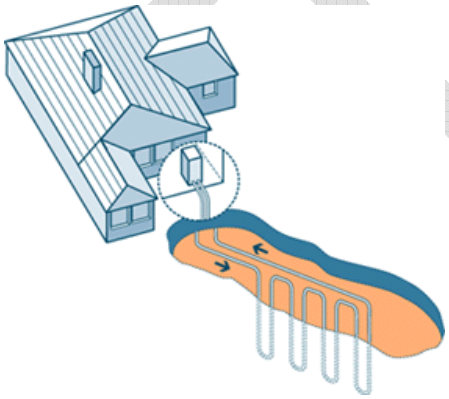
Ground Source Heat Pumps

Heat pump systems work by taking low grade heat from the environment, raising the temperature by compression and moving the heat to where it is needed (or using it to power cooling). Ground Source Heat Pumps (GSHPs) use heat stored in the ground at a stable temperature of about 9-14 degrees. Electricity is used to operate the compressor and pump but efficiency is good with a Coefficient of Performance (CoP) of 3 or 4 (for every unit of electricity 'invested', 3-4 units of heat are obtained). CoPs of 4-5 are often quoted but the Environmental Agency cautioned the Select Committee to note that the seasonal average is a better measure, and efficiency is dependant on the range between the source temperature and that of the heating system. GSHPs are usually used for low temperature heat distribution systems like underfloor heating which transfer the heat effectively over a large area.

The technology has three main parts, a ground loop (vertical, horizontal, or spiral); an electric pump, and a distribution system. Of the two types of GSHP system: 'closed loop' and 'open loop' the latter usually needs greater assessment, planning and regulation including an abstraction licence and discharge consent.[70] They are most suited to new developments where underfloor heating can be specified and bore holes or trenches incorporated into site works. The market is expected to grow significantly following the introduction of the Renewable Heat Incentive in April 2011 after which an annual installation rate of 40,000 systems is expected.

Environment agency data shows that in Kent there are 3 open loop systems currently installed in three different sectors (industrial, domestic and power generation industry) and approximately 38 closed loop systems. A typical 6-8kW system costs £7,300-£11,800.[71]

There is excellent potential for further GSHP systems in Kent. Though the technology is not easily retrofitted, at KCC's Oakwood House an alternative energy source was required for a bedroom extension, as grid limits for electricity had already been reached. The solution was to install a ground source heat pump which will supply 60% of the annual heating load (coupled with solar panels producing 15% of the energy required for hot water) for the 40 bedrooms.[72] A deep well system was chosen for the loop, shown in the diagram to the left, and its output is 30KW.



Air/Water source heat pumps

These work on the same principle as GSHPs but drawing the heat either from the ambient air, or a nearby water source of sufficient capacity. Air source heat pumps, though less energy efficient than GSHPs, can be easily retrofitted, with a small unit on the inside of a building and one on the outside, as shown in the example at St Peter's Church of England Primary School, Aylesford on page 31.

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[70] Unless hazardous materials are used in the closed loop system

[71] Dr Howard Lee, Lecturer and Sustainability Champion, Hadlow College – written evidence

[72] Peter Binnie, Head of Operations, Property Group – Hearing 14th April 2010

Solar Thermal– hot water

The UK has around 2% of the European solar market, similar to countries like Belgium and Switzerland, while Denmark has 44%.[73]

To date, solar thermal, is the most popular renewable technology in the UK, used to provide hot water. Panels are commonly roof mounted, glazed, flat plates with a closed system of pipes containing water which is heated by the sun. There are alternative designs, including evacuated tube, and systems can be either direct, where water circulates through the system to the taps, or indirect, where there is an interface between the heated tubes and the hot water system via a heat transfer fluid.

Solar thermal panels are a proven technology which is easy to retrofit or integrate at relatively low cost (cheaper still for new build). The evacuated tube design takes up less roof space and performs better in colder ambient air temperatures but costs more and is less sturdy than flat plate systems; it can also be used for central heating but with technical challenges.[74] A typical domestic installation would cost around £4,000 and provide 50-70% of domestic hot water needs.

Solar Photovoltaic Thermal (PV-T)

This hybrid technology has been introduced to the UK by a Kent company, the Carbon Free Group, who provided evidence to the Select Committee. It combines the two types of solar energy capture systems and exploits the fact that PV works best at cooler temperatures. It can therefore supply electricity, hot water and central heating, requiring less space than if the two systems were applied individually. It is felt to be an ideal choice for individual houses.[75]

The technology is relatively new to the market; early versions of combined systems proved unsuccessful and of lower efficiency than the individual systems,[76] however the latest PV-T systems offer greater efficiency and cost savings in situations where both electricity generation and hot water are required as the cost per kWp electricity plus 4.5 kWp hot water is currently £7,000.[77] At the time of writing, it was not clear to the Select Committee how this hybrid technology might benefit from the two separate government incentive schemes aimed at renewable electricity (Feed-in Tariff) and heat (Renewable Heat Incentive).

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[73] Howard Johns and Chris Rowlands, Directors, OVESCO – Hearing 26th May 2010

[74] Tom Vosper, Head of Biomass Team, Creative Environmental Networks – written evidence

[75] James Sweet, Commercial Director, C4Ci – written evidence

[76] Renewable Energy Systems – visit 16th March 2010

[77] Jae Mather, Director of Sustainability, Carbon Free Group – Supplementary evidence

District Heating and CHP

Combined Heat and Power (CHP) is an efficient method for converting fossil or renewable fuel into electricity and heat by utilising heat that would otherwise be wasted. Losses in transmission are outweighed by greatly reduced emissions, even if fossil fuels are used. CHP can provide domestic to utility scale heating and in Denmark, for example, it provides 50% of the country's electricity. Highly efficient plants in Copenhagen use a variety of fuels including waste straw. Other forms of biomass such as wood can be used and the gasification process produces emissions that comply with Clean Air requirements.

Battersea Power Station had the first decentralised CHP district heating system, supplying hot water and heating to 11,000 homes in Pimlico.[78] Few systems exist in the UK today but Southampton has a CHP system fuelled by geothermal heat from a deep well and by gas. Heat from the plant is circulated via an 11km main to customers in the City centre.

Gas powered CHP is also used in Woking and its town centre plant, situated in a multi storey car park, supplies the central business district on a private wire network. The system is over three times more efficient than centrally supplied energy.

A utility scale gas CHP plant at Kingsnorth, Isle of Grain will come online in 2011, producing 1275MW electricity, enough for 1 million homes. The heat will be used by National Grid to convert liquid natural gas, to gaseous form for the gas grid.

The Allington EfW plant is not fitted with CHP technology but WRG's smaller plant in Nottingham, in addition to generating electricity, produces 375GW high pressure steam annually which is used to provide heating for shopping centres, the National Ice Arena, Capital One HQ, Nottingham Trent University, the Guildhall and 5,000 residential customers. WRG are willing to explore the feasibility of developing of district heating infrastructure at Allington, which could raise the plant's thermal efficiency from 25% to 75%.[79]

In April, a 150kW CHP plant began operations at Port of Dover, fuelled partly by waste cooking oil collected by Kent residents. Provided there are adequate supplies of homogenous waste, anaerobic digestion can also be used to provide continuous electricity and district heating.

In order that district heating is economical and efficient, CHP plants should be located in areas with a balanced heat load, so they do not suit developments solely of housing. However, developers are happy to opt for CHP as it is cost neutral and reduces emissions. In Woking, they are guided towards it by the requirement for a particular carbon profile. [80]

The Select Committee believes that large scale developments planned in Kent offer significant opportunities for district heating and furthermore, the Select Committee was told that a medium scale biomass CHP scheme, located correctly, could showcase it as a viable technology in Kent[81].

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[78] Institute of Civil Engineers (ICE), 2009 Why Waste Heat?

[79] Paul Andrews, Managing Director, Kent Enviropower – written evidence

[80] Mr John Thorp, Director, Thamesway Energy – Hearing 14th April 2010

[81] Tom Vosper, Head of Biomass Team, Creative Environmental Networks – written evidence

Biomass

Renewable biomass is defined as 'the biodegradable fraction of products, waste and residues from agriculture (including vegetal and animal substances), forestry and related industries, as well as the biodegradable fraction of industrial and municipal waste.' Biomass is regarded as being less 'deep green' than other renewable sources but the CO_2 released when plant biomass is burnt is balanced out by the CO_2 absorbed during the life of the plant, resulting in a near neutral carbon profile for heat and power generation. As well as providing fuel for heating, biomass can provide power and be used as a transport fuel. The Select Committee primarily considered biomass wood fuel though the potential in Kent for other types of biomass is listed on page 40 and considered further in Section 10.

Wood Fuel

- Wood burning stoves produce space heating for buildings and can also provide domestic hot water/heating by means of a heat exchanger.
- Biomass Boilers burn solid biomass fuels to heat water or produce steam for space heating. They are large pieces of plant and require additional storage space for fuel, with easy access for deliveries.

The technologies have different efficiencies, for example an open fire is 10-20% efficient; a wood-burning stove 30-65% and a biomass boiler is around 80-95% efficient.

Forestry, tree surgery, sawmill and recycled timber can be used as woodfuel in the form of logs, chips or pellets.

- Logs are most often used in domestic scale stoves and this method of heating is becoming increasing popular in the UK; the Select Committee were told that last year members of the Stove Industry Alliance sold 186,000 wood burning stoves in 2009 alone.[82]
- Chips have a lower energy density than pellets and are less free-flowing, but they are cheaper to produce per unit of heat delivered (dependent on moisture content), requiring only a chipping machine. They are therefore suitable for onsite or local production and consumption.
- Pellets are as yet uncommon in the UK, however the select committee learned that Creative Environmental Networks, with the benefit of a Bioenergy Infrastructure Grant have opened a pelleting plant in Kent which will help to meet the needs of domestic customers, (since pellets are more compact, and require less storage space than chips) thus avoiding the need to import pellets.

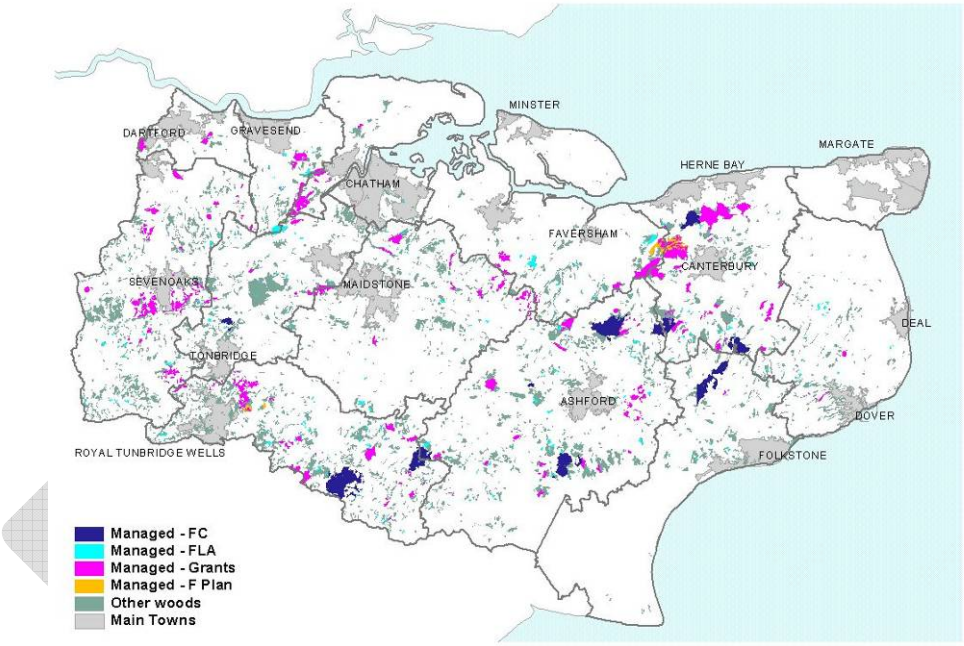
[82] Nigel Jennings, Environmental Planning Adviser, Natural England – written evidence

4.9 Kent woodfuel industry

'Biomass should be produced sustainably in order that negative environmental impacts, such as on soils, groundwater, air quality, forests and water resources, are reduced as far as possible.'[83]

4.9.1 The Forestry Commission informed the Select Committee that Kent is the second most wooded county in England, after Hampshire, with 10.6% woodland cover (40,000 hectares), a quarter of which is or has in the past been managed as coppice. Those woodlands currently under management are shown in Figure 9 below.

Figure 9: Managed woodlands in Kent *Source: Forestry Commission*



4.9.2 The shaded areas shown above could potentially be more actively managed to produce wood fuel, along with part of the Forestry Commission's own holdings of sweet chestnut coppice. The KCC estate also includes some woodland.

4.9.3 The Forestry Commission's UK Strategy target is to produce two million cubic metres of wood fuel per annum by 2020. Half of Kent's sustainable yield of broadleaved, conifer and coppice woodland would give 90,000 cubic metres of wood fuel per annum (4.5% of the national target) which equates to around 90MW of heating capacity, and maximum benefit would be from local use of the fuel.

[83] Jennie Donovan, Planning and Communications Manager (Kent and East Sussex), Environment Agency – written evidence

4.9.4 The select committee benefitted from a report by KCC Member Mr David Brazier who undertook a brief study tour to Austria, where the wood fuel industry is highly developed and is viewed as a critical element in maintaining secure fuel supplies for the country. The communities and markets served in Austria are different to those in Kent but certain factors were felt to be common to the success of both, namely: area-wide co-ordination and the development of a local supply chain.

4.9.5 The existence of an international market for biomass means that in order to establish a competitive and sustainable wood fuel industry locally, the matching of supply with demand, efficient distribution and the availability of support is necessary to keep costs down and maximise benefits.

4.9.6 Market development would be of considerable social, environmental and economic benefit to Kent, firstly since industrial demand has declined due to the closure of local paper mills, resulting in there being fewer local, forestry-related jobs.[84] Smaller scale, producers can also find logistical difficulties, regulatory requirements and other costs to be a real barrier to success. Secondly, evidence from Natural England indicates that an increase in coppicing could help to improve biodiversity since coppice woods are ideal for a large number of species who depend on the cutting cycle every 10-15 years to maintain their habitat. Thirdly, market development would ensure that Kent can benefit from the increased opportunities on both the supply and demand side, afforded by the introduction of the Renewable Heat Incentive which will greatly extend the range of organisations to whom biomass boilers, for example, become financially attractive.

4.9.7 The Select Committee would therefore like to see the positive promotion of biomass (wood fuel) heating systems in Kent, which would create a demand for a locally produced product and could stimulate a significant increase in the level of coppice management undertaken in the county. Coppice management is also complimentary to the purposes of the Kent Downs Area of Outstanding Natural Beauty and has great potential for social, environmental, economic as well as recreational benefits.

4.9.8 Aside from wishing to support the production and use of local wood fuel, the Select Committee also believe there is an opportunity for Kent, due to its coastal location, to play a part both in the international trading of wood fuels and potentially, the hosting of renewable energy production from biomass plants based on waste woods. A proposed CHP scheme at Ridham Dock would utilise waste woods to generate 25MW electricity and 35MW heat.

[84] Tom Vosper, Head of Biomass Team, Creative Environmental Networks – written evidence

4.9.9 A small number of schemes are being put in place to explore the potential benefits of bringing woodland back into management, as well as the practicalities of developing a local wood fuel market. For example, a scheme being explored by Natural England in partnership with the Forestry Commission in the South Downs area has the potential for:

- Accreditation and co-ordinated support of local firewood producers
- A 'South Downs Brand' linking product to landscape to stimulate positive, financially sustainable, woodland management
- A High quality local firewood supply for south Downs and neighbouring communities
- Targeted positive management of Biodiversity Action Plan (BAP) priority habitats
- Greater public understanding of woodland management

and in Kent, an initiative at Blean near Canterbury is considering how small scale heating solutions can help reinvigorate local coppicing. The Select Committee would like to see a number of such schemes across the county and feel that there is scope for KCC to lend support in a number of ways.

RECOMMENDATION 18

That KCC should work with organisations such as the Forestry Commission and Natural England, to invest in the sustainable production of wood fuel, through the regeneration of coppicing in Kent, by:

- Providing marketing expertise.
- Encouraging apprenticeships for young people wishing to enter the industry.
- Investigating the provision of a number of collection/ chipping/distribution facilities, possibly based at recycling centres
- Ensuring that, where possible, newly designed KCC buildings include biomass boilers.

4.9.10 As noted, mature coppice is an ideal fuel for small-scale local supply, however the fact that some areas of woodland are remote and inaccessible to heavy machinery can make large scale commercial coppicing impractical. Notwithstanding the comments made in section 9.6, if biomass heating is to be a significant part of a mixed energy market, fuel production on a quasi-industrial basis may need to be considered. Short rotation crops (SRC) such as willow and poplar varieties can be planted on a wide range of soil types from heavy clay to sand, including land reclaimed from mineral workings and colliery spoil. In general terms, these may be

harvested four years after planting and may then be coppiced every 3-5 years. The most efficient way to harvest short rotation crops of willow and poplar is to use direct-chip harvesters; the chip material then needs to be dried in store to an optimum 30% moisture content. Up to 18 tonnes per hectare may be yielded annually and the coppice stools may be productive for up to 30 years. Two further advantages are that SRC can be grown in an industrial environment on poor, marginal land and that the energy per hectare is high as shown in table 5[85] below:

Table 5: Approximate yearly outputs of biofuels

Fuel (MC=moisture content)	Net calorific value (MJ/kg)	Output per hectare p.a. MT/ha.a)	Energy per hectare p.a. GJ/ha.a	Energy per Hectare p.a. MWh/ha.a
Wood (forestry residues, SRW, thinnings etc) @ 30% MC	13	2.9	37	10.3
Wood (SRC Willow) @ 30% MC	13	12.9	167	46
Miscanthus[86] @25% MC	13	17.3	225	63
Wheat Straw @20% MC	13.5	4.6	62	17

[85] Forestry Commission Biomass Website: Potential outputs of biofuels per hectare, per annum

[86] Miscanthus is Miscanthus giganteus, "Elephant Grass" a sterile hybrid of African origin, now grown extensively on the continent as fuel biomass.

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5 FUNDING

5.1 Renewable Electricity Support Mechanisms

5.1.1 A number of financial support mechanisms for renewable electricity, in the form of obligations, grants and incentives, have been implemented by the government over a number of years, to try to create a more level playing field for this form of energy generation. However, even with demonstrable savings over time in energy costs and carbon emissions, the capital cost of renewable energy schemes has been a deterrent to their implementation for many organisations and individuals, for whom the level and availability of government support has often been the deciding factor.

5.1.2 The range of grants and loans offered differs from county to county and between areas of poverty and affluence and with limited pots of money available, the impact of some schemes has been minimal. Some of Kent's districts and boroughs have benefited from funding allocated in the Regional Housing Board round (2008-11) which focused on delivering decent homes and energy efficiency measures in private sector housing, but these grants or loans have seldom applied to microgeneration. Successful exceptions to this have been short-term schemes offered in the past by Canterbury and Shepway councils for mainly solar technologies. [87]

5.2 The Renewables Obligation (RO)

5.2.1 Introduced by the Utilities Act in 2000, this mechanism places an obligation on suppliers to source an increasing proportion of their electricity from a range of renewables to stimulate an increase in capacity. The first Renewables Obligation Order was made in April 2002 and in a scheme administered by Ofgem, generators of renewable electricity can obtain Renewable Obligation Certificates (ROCs), which can be sold to suppliers or traded. ROCs are available for:

- Agriculture and forestry wastes, and energy crops
- All biodegradable material
- Co-firing of biomass with fossil fuel
- Geothermal (hot dry rock and aquifers)
- Hydro power (under 20MW)
- Landfill gas and sewage gas
- Photovoltaics
- Tidal and tidal stream

[87] Matthew Morris, Senior Project Manager, Energy Saving Trust Advice Centre – written evidence

- Wave energy
- Wind energy (offshore and onshore)[88]

5.2.2 In addition to the electricity value, and that of sold or traded ROCs an additional benefit of ROCs is exemption from the Climate Change Levy (a small extra charge per kWh) via exemption certificates (LECs). The latest Renewables Obligation Order, from 1 April 2009, rather than a specific percentage of electricity, required suppliers in England to present 9.7 certificates per 100MWh of electricity supplied in England (in 2009/10), rising to 11.1 per 100 MWh (in 2010/11).

5.2.3 The Energy Act 2008 introduced 'banding' to the Renewables Obligation to incentivise particular technologies.

5.3 Low Carbon Buildings Programme

5.3.1 The Low Carbon Buildings Programme was a national grant scheme which operated from 2006 to 2010 offering grants of between £600 and £1200 for renewable energy installations. Different strands of the scheme focused on installations for householders, communities, medium and large scale installations with additional grants specifically for the public sector. The scheme's take up in the South East with regard to domestic installations is detailed in section 4.

5.3.2 The Select Committee learned that while the scheme was popular, the stop-start nature of support, as streams of funding became available or ended, created a very difficult environment for businesses to operate in, as demand fluctuated with the availability of grants. Furthermore, the level of interest from the public in microgeneration schemes has not, so far, been matched by schemes coming to fruition and implementation has been limited.

'…only around 20% of those considering to buy microgeneration go on to obtain a quote and only a small fraction of these (30-40%) go on to purchase.[89]

5.3.3 The Low Carbon Building Programme was withdrawn in early 2010 in favour of the Feed-in Tariff and the forthcoming Renewable Heat Incentive.

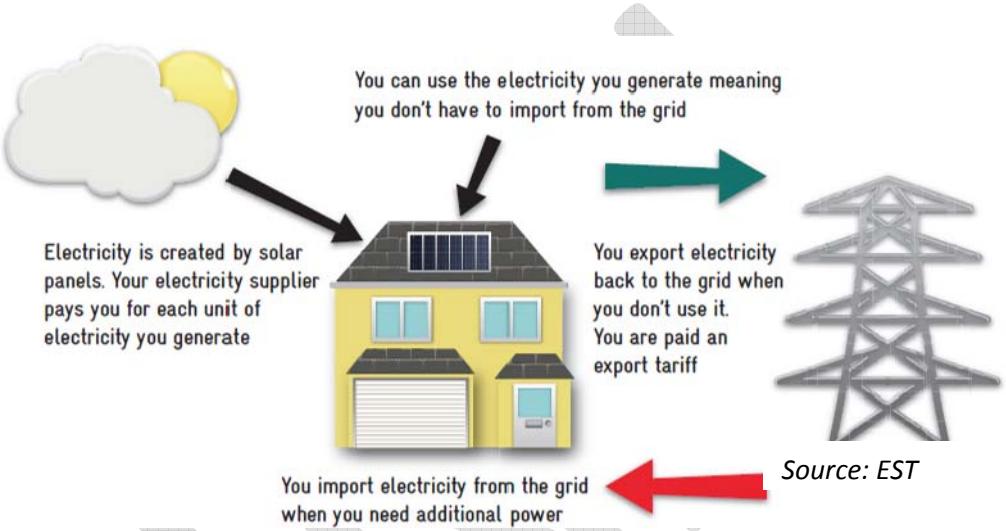
[88] DECC, 2010 Energy Trends Special Report: Renewable Energy in 2009

[89] LCBP funded installations 07/08 from Tom Vosper, Head of Biomass Team, Creative Environmental Networks – written evidence

5.4 Feed in tariff (FIT)

'The Feed-in Tariff will support growth and employment in the renewable energy industry, and bring down the cost of renewable technologies.'[90]

5.4.1 The Feed in Tariff was introduced on 1st April 2010 under Section 100 of the Energy Act 2008, and is now the main support mechanism for small scale renewable generation. It significantly changes the economics of microgeneration, making schemes for households and communities financially viable. The way it works is depicted below.



Source: EST

5.4.2 The technologies it applies to are listed on the following page in Table 6 along with the tariff rate per kWh of electricity generated, which is dependent on the type and size of technology installed. The best rate is for the installation of solar photovoltaic panels (PV) at 41.3p per kWh of electricity generated and used, plus a bonus payment (3p per kWh, index linked) for electricity exported to the grid, for systems installed between 15th July 2009 and 31st July 2012.

5.4.3 PV has the longest tariff payment period of 25 years but prompt take up of the scheme is necessary in order to gain the maximum rate, guaranteed for the entire period, as rates fall over time. For an average household, the time to payback the cost of installing a 2.5kW system is around 10 years and so provided the initial capital can be accessed, there would follow a 15 year period with much reduced electricity bills and an annual income of just under £1000.

[90] Richard Hurford, Head of Energy Saving Trust – Hearing 19th May 2010

Figure 6: The Feed in Tariff – initial rates for different technologies[91]

Energy Source	Scale	Generation Tariff (p/kWh)	Duration (years)
Anaerobic digestion	≤500kW	11.5	20
Anaerobic digestion	>500kW	9.0	20
Hydro	≤15 kW	19.9	20
Hydro	>15 - 100kW	17.8	20
Hydro	>100kW - 2MW	11.0	20
Hydro	>2kW - 5MW	4.5	20
Micro-CHP	<2 kW	10.0	10
Solar PV	≤4 kW new	36.1	25
Solar PV	≤4 kW retrofit	41.3	25
Solar PV	>4-10kW	36.1	25
Solar PV	>10 - 100kW	31.4	25
Solar PV	>100kW - 5MW	29.3	25
Solar PV	Standalone	29.3	25
Wind	≤1.5kW	34.5	20
Wind	>1.5 - 15kW	26.7	20
Wind	>15 - 100kW	24.1	20
Wind	>100 - 500kW	18.8	20
Wind	>500kW - 1.5MW	9.4	20
Wind	>1.5MW - 5MW	4.5	20
Existing generators transferred from RO		9.0	to 2027

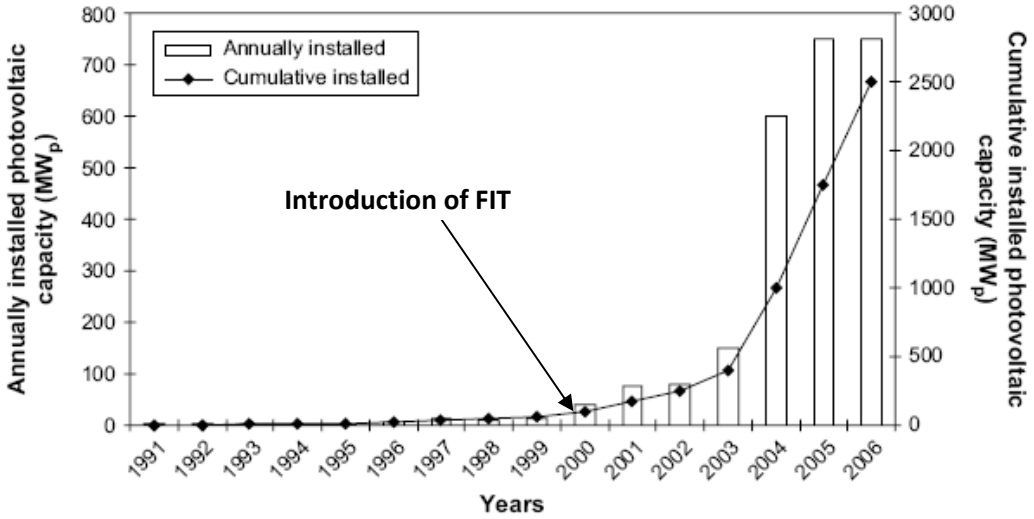
5.4.4 The success of the scheme will be key to the government's wish to involve the private sector, communities and individuals in order to achieve renewable energy targets and diversify supply. This method of fiscal stimulus for renewables is used in 19 EU countries; 47 throughout the world.[92]

[91] Source and further information: http://www.fitariffs.co.uk

[92] Ecobuild Conference – Seminar Session

5.4.5 Feed-in tariffs were introduced in Germany in 2000 and the rapid increase in photovoltatic installations that resulted, is shown in Figure 10 below. It is expected that it will have a similar positive effect on the renewable industry in the UK, helping to provide jobs, while also bringing down the price of technologies.[93]

Figure 10: The effect of the Feed-in Tariff on PV installations in Germany[94]



5.4.6 Given the introduction of the Feed-in Tariff, and the change in legislation regarding local authority sale of electricity, the Select Committee believe that KCC should take immediate steps to increase generation of renewable electricity on the KCC estate and encourage other public bodies to do the same. There is also potential for KCC, through Laser, to maximise its buying power and achieve the best price for public sector procurement of PV systems.

RECOMMENDATION 9

That KCC implements an immediate review of its properties to assess their suitability and develop strategies for the installation of renewable technologies, particularly photovoltaic (PV) panels, and encourages District and Borough Councils, housing providers, emergency services, health institutions and other targeted businesses to do the same in their estates, taking advantage of current incentives, in order to reduce energy costs; generate income and catalyse the acceptance of renewable technologies in the wider community..

[93] Richard Hurford, Head of Energy Saving Trust – Hearing 19th May 2010

[94] Ibid

5.5 Renewable Heat Incentive

5.5.1 Section 100 of the Energy Act 2008 made provision for the Renewable Heat Incentive (RHI) and, following the government's publication of its proposed operation, detailing the technologies, tariffs and eligibility criteria, consultation on the RHI ended in April 2010. Following secondary legislation the RHI is due to start on 1st April 2011. The Forestry Commission informed the Select Committee that under the proposed scheme, biomass boilers installed after July 2009 would qualify for the incentive according to the amount of heat produced by the boiler.

5.6 Energy Efficiency Funding for Kent Businesses

5.6.1 The Energy Grant 500 scheme, which is SEEDA funded through the European Regional Development Fund (highlighted in the box below), is administered through Business Support Kent and promoted through the Sustainable Business Programme. It can cover any aspect of business energy-use reduction and provides funding for energy efficiency measures. Any Small or Medium sized Enterprise (SME) can apply to the scheme, which also loans out smart meters which have been found to be an excellent tool for energy reduction. The scheme is very simple, and once approved, businesses can carry out their energy saving work, submit invoices and obtain the grant. Data from the businesses who have so far benefitted from the scheme indicate that on average, savings of £637 per year on energy costs can be made (equal to a reduction of 3.66 tonnes in CO_2 emissions). The 660 grants for the South East Region are each worth £500 and the aim is that this will 'act as a primer' and lead to businesses adopting energy saving behaviours as the norm.[95]

> *'**The European Regional Development Fund (ERDF)** has been established to reduce the gap between the levels of development of various regions and the extent to which the least-favoured regions and islands (including rural areas) are lagging behind. With nearly £22 million European funding from ERDF, the aim of the South East England Operational Programme (SEEOP) is to promote competitiveness and productivity in the South East of England through resource efficiency. This will have the win-win benefit for the region of strengthening our economic competitiveness at the same time as contributing to reducing the region's ecological footprint to achieve the vision of achieving sustainable prosperity by 2016.'*[96]

[95] Jane Ollis, Head of Sustainable Business, Business Support Kent – Hearing 26th May 2010

[96] Source: http://www.seeda.co.uk/what-we-do/european-investment/erdf

5.6.2 In another example of ERDF funding, Medway Council informed the Select Committee that they had obtained funding for two projects in order to support local businesses: Eco-Advantage, which combines the market's need for environmental skills with the opportunity to train and provide new skills e.g. in sustainable construction, to local unemployed people, those on low income or with a low level of skills. Secondly, the LO-C-US project provides local businesses with support which will help them to reduce energy costs and become more competitive[97].

5.7 Funding for energy efficiency and renewables on the KCC estate

5.7.1 With reference to the schools estate, the Select Committee learned that maintenance funding is not used for energy efficiency work, its main objective being to keep schools safe, warm and operating. However, the Select Committee believe that all maintenance work should take energy efficiency into account.

5.8 The Energy and Water Investment Fund

5.8.1 The Energy and Water Investment Fund (EWIF) is a capital pot which originally benefitted from funding by the government. It was match funded from the Low Carbon Buildings Programme (LCBP) to make (mainly) energy saving improvements to the KCC estate, though there was at one time also a £100,000 water grant. The fund, which was at its peak worth just over £2 million, fluctuates as loan payments are recycled back into the scheme.

5.8.2 In addition, a £500,000 grant for renewable energy systems was identified and this has now been spent. Funding from the LCBP is no longer available as this programme has closed and the Select Committee learned that despite the enthusiasm from schools, applications to the scheme overall were disappointing.

5.8.3 The payback period stipulated for the fund was 1-5 years and although linked to carbon reduction, this precluded the implementation of a range of renewable energy schemes whose payback time was longer.

5.8.4 There have been demonstrable savings from the investments made, and evidence to the Select Committee indicates that for energy efficiency work in particular, the Fund provided £928,995 in loans and grants which will result in eventual savings estimated at £1,923,246 over the installed equipment's lifetime (though potentially more, dependant on future energy costs). It is now a familiar scheme and the Select Committee feel it is would be worthwhile to seek an alternative funding source to refresh the recycling funds, as loans are repaid, to enable

[97] Steve Long, Senior Research and Review Officer, Medway Council – supplementary evidence

further work to take place, pending the successful implementation of an alternative funding mechanism. Along with 'an energy checklist', information about the Energy and Water Investment Fund was a top choice of respondents to Kent schools' survey carried out as part of this review, when asked about the type of support that they would most value.

RECOMMENDATION 6

That KCC reconfigures the Energy and Water Investment Fund, with a longer payback period, to enable continued provision of capital funding for energy efficiency measures on the estate and to allow for the longer-term investment required for the installation of renewable energy systems.

5.9 The Building Energy Efficiency Programme (BEEP)

5.9.1 This programme is an international funding initiative (part of the Clinton Climate Initiative) which is now being taken forward by the London Development Agency and rolled out across London with the aim of reducing carbon emissions from city buildings. Energy and facilities managers in councils and other public bodies across London have been consultees to the scheme, which proposes a commercial model to address the problem of capital funding for renewable and other energy efficiency projects. The model acknowledges and seeks to address the two main problems preventing the public sector from addressing the energy emissions from its own estate i.e. capital funding, and capacity/expertise.

5.9.2 The model of financing being developed aims to set the amount of loan funding so that it is less than or equal to the amount of savings to be made, through the implementation of energy (and therefore cost) saving measures. For London, it has been calculated that retrofitting buildings in both the public and private sector could avoid 3.6 million tonnes of carbon emissions (1 million tonnes from the public sector alone)[98].

5.10 Energy Service Companies

5.10.1 The expertise for the BEEP energy performance contracting model is provided through the employment of Energy Service Companies (ESCOs) who would provide guaranteed energy and cost savings, making the exercise cost neutral in a relatively short period of time (around 8 years) followed by a period of ongoing savings. The programme has been piloted in London by TfL (Transport for London), The London Fire Brigade and the Metropolitan Police.

[98] Simpson-Jones, R., 2009 Introduction to the Building Energy Efficiency Programme, online at: <http://www.london.gov.uk/rp/events/20090210/LCSG-buildings-retrofit-presentation-100209.pdf>

5.10.2 The Select Committee sought evidence on various types of ESCO and for example heard from Mr John Thorp of Thameswey Limited, who are a publicly owned ESCO set up by Woking Borough Council to invest in Combined Heat and Power (CHP – in this case gas powered) to provide energy to residents, with less impact on the environment than from centralised supplies. Mr Thorp advised the Committee that since 1990, the ESCO arrangements have resulted in substantial energy and cost savings for the Council, including a 31% reduction in energy consumption and a 29% reduction in CO_2 emissions. In the borough, the energy efficiency of homes has been improved by 35% and emissions reduced by 21%.[99]

5.10.3 An alternative type of ESCO was set up by Lewes District Council in the form of OVESCO, which started as a limited company, providing energy advice and assistance to the council, community groups such as Transition Towns, businesses and individuals and has now become an Industrial and Provident Society for Community Benefit, aiming to issue shares to the public to enable them to invest in local sustainable energy projects.[100]

5.10.4 Below is a summary of ESCO types and some of the alternative funding arrangements, which could, for example, facilitate the installation of biomass boilers in public sector buildings. (As noted, biomass boilers provide reduced cost heating which have been demonstrated in Kent schools to give a 90% reduction in carbon emissions and good payback times, but at high initial capital cost and with the need for ongoing maintenance.)

Energy Service Companies (ESCOs)

An ESCO can take away from the user the need to co-ordinate installation, maintenance, repair and fuel supply (possibly purchasing all or part of the plant itself), earning income from the metered heat, by way of a heat agreement. This is suitable for sites without the capital to invest in biomass technology, and with a high heat demand. A disadvantage is that the cost of metered heat could vary, moreso where there is less public sector involvement.

There are four basic models of ESCO on a spectrum ranging from publicly to privately owned and, for example, the greater degree of control at the 'public' end of the spectrum would mean that more stable heat costs could be achieved but on the right of the spectrum, the risks in terms of technology and price fluctuations are taken on by a private company.[101]

Public → Joint public/private → Stakeholder owned → Private

[99] John Thorp, Director, Thameswey Limited – Hearing 14th April 2010

[100] Howard Johns and Chris Rowlands, Directors, OVESCO – Hearing 26th May 2010

[101] King, M., 2010 SEPB Conference Presentation

Other types of funding arrangement suitable for biomass heating:

Turnkey Installation

Contractors install and set up the heating system; maintenance and management is carried out by the user.

Turnkey & Service

Contractors install the heating system and carry out regular servicing. The purchaser benefits from reduced running costs and no maintenance requirement but needs to source fuel and servicing.

Back-to-Back: turnkey, operations, maintenance and fuel supply

Contractor installs the heating system, looks after operations, maintenance and fuel supply. User does day-to-day running of the system, with support and guidance from the contractor.

5.11 Energy company funding for school renewable energy projects

5.11.1 A number of schemes are beginning to emerge in the UK whereby energy companies offer to invest in schools renewable energy projects. For example a proposed British Gas scheme aims to invest £15 million in solar technology for 750 schools which would give a proportion of free electricity. This particular scheme includes educational elements such as lesson plans and other awareness raising such as smart metering, a website shared by schools on the scheme and energy saving measures as prizes. At this stage it is not clear who would benefit from any Feed-in Tariff payments, but it is assumed the energy company would benefit, rather than the school.[102]

5.11.2 General Electric and Solarcentury also have a scheme to install solar PV technology, on a 15 year lease (on payment of a small deposit). This would cut the school's energy bills and earn income from the Feed-in Tariff, with 10 years further revenue from FIT at the end of the lease when ownership of the panels would revert to the school resulting in considerable savings in costs and carbon emissions. This type of scheme would also avoid the necessity for high capital costs which are quoted as being around £16,000 for a primary school and £35,000 for a secondary school.

[102] The website for the scheme is: http://www.generationgreen.co.uk/solarpanels/

RECOMMENDATION 12

That KCC works with public agencies and approved suppliers, to provide a package of advice and support to schools, to enable them to benefit from energy efficiency work and renewable energy installations, at no net cost to the school or to KCC.

5.12 KCC options for future projects on its estate

5.12.1 Having considered the funding models available to KCC, and with the likelihood of a variety of ESCO-type offers being made to schools, the Select Committee considered whether more work could be carried out at the same cost, if the council set up its own ESCO and/or sought to work in partnership with other organisations to provide a back-to-back service. A brokerage service for schools who may otherwise independently undertake schemes in partnership with energy companies could also help to identify the most appropriate solutions. Either of these options should help to avoid some of the pitfalls that the Select Committee has been made aware of regarding the need to co-ordinate installation/supply/maintenance as well as manage ongoing fuel needs (in the case of biomass which routinely requires considerably more every day maintenance and attention that, say, a gas powered heating system).

RECOMMENDATION 3

That KCC develops the existing expertise within KCC and Commercial Services (LASER) and builds capacity in order to ensure that the Council has access to sound, unbiased advice when taking energy efficiency and renewable energy schemes forward.

RECOMMENDATION 4

That KCC sets up new delivery mechanisms as appropriate in order to take advantage of emerging opportunities, allied to but separate from LASER, e.g. Energy Services Company (ESCO).

5.13 Funding for Low-Carbon Communities

5.13.1 Following on from a project in 2009 to find out what people across the country felt about domestic energy efficiency and how communities could get their energy supplies in the future, a Low Carbon Community Challenge was issued to 20 communities to look, for example,

at how behaviour change and community engagement could contribute to 'low energy lifestyles'.[103]

5.13.2 Kent hosts many community groups focused on or working towards more sustainable lifestyles and energy/carbon reduction, including as Eco-congregation, Fairtrade Towns, Greening Campaign and Transition Towns.[104] There are already four Transition Towns in Kent: Canterbury, Sevenoaks, Whitstable and Tunbridge Wells, (with more groups planned in Deal, Faversham and Tonbridge). The Select Committee heard from members of the Sevenoaks Group about their commitment to making communities more resilient and able to cope with the shift away from fossil fuel dependence. Transition Town groups work on long term 'Carbon Descent' plans to help them achieve a more sustainable way of living, including, energy and food supplies which must both be addressed in order to achieve local sustainability.[105][106]

5.13.2 Four Low Carbon Community pilot projects, in Eastchurch, Elham, Hadlow and St Margaret's at Cliffe each received seed funding, and have since gone on to develop their own plans. A key finding from evaluation of the projects was that:

'*… groups need assistance to get off the ground, such as hiring halls and funding publicity for awareness-raising events. The development of a 'start-up fund' would therefore allow groups to set up their project, build community support and spread awareness.*[107]'

5.13.3 The Select Committee also heard about the work of Carbon Free Group, based at Pines Calyx, St Margaret's at Cliffe who have worked with village residents and arrived at a proposal for the *whole community* to become carbon neutral, (potentially the first of its kind) meeting energy needs locally using a range of renewable energy options, including biomass combined heat and power (CHP) for the whole village. The scheme would involve the setting up of a Community Interest Company so that local people can buy shares in the scheme as well as benefitting from reduced fuel costs.[108]

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[103] Breeze, L., 2009 Supporting Low Carbon Communities in Kent: An appraisal of initiatives and opportunities. KCC Internal Report

[104] Ibid

[105] Steve Plater and Ian Smith, Core Group Members, Sevenoaks Transition Town – Hearing 19th May 2010

[106] Dr Howard Lee, Lecturer and Sustainability Champion, Hadlow College – Hearing 12th May 2010

[107] Breeze, L., 2009 Supporting Low Carbon Communities in Kent: An appraisal of initiatives and opportunities. KCC Internal Report p9

[108] Jae Mather, Director of Sustainability, Carbon Free Group – written evidence

5.13.4 Individuals are often keen to involve themselves in groups with like-minded people, rather than simply pursuing household-level schemes such as one member of the public who wrote in to the Select Committee, saying:

'If you know of any sustainability/energy group in Hythe or Folkestone, please let me know – I feel I am a lone voice in the wilderness!'

5.13.5 Sustainability and Climate Change Manager, Carolyn McKenzie, indicated to the Select Committee that in her view, a small number of groups are already at the stage where they could immediately progress with energy related projects, with some financial help.

5.13.6 The Select Committee is therefore keen that seed funding should be made available to a number of low-carbon community groups in Kent to enable them to progress and to reach out to individuals in their communities.

Recommendation 16

That KCC supports low-carbon community groups in the county by facilitating access to existing support and providing small grants of up to £5000 for advice or to assist with feasibility studies.

5.14 Funding for individual households

5.14.1 Energy efficiency schemes in homes become progressively more expensive after the first 20-35% of cuts and 'Pay as You Save' (PAYS) could enable borrowing of around £50 a month to be rewarded over 20-25 years by immediate energy cost savings of £60-70 per month. Mr Mather of the Carbon Free Group told the Select Committee that multiple benefits could result from such scheme by saving residents' money; reducing carbon emissions; securing energy supplies and helping to provide local jobs.[109]

RECOMMENDATION 7

That KCC facilitates access to emerging financial mechanisms, such as the new Green Deal and the Green Investment Bank, whereby schools, businesses and householders in Kent can take advantage of loan funding to pay for the installation of renewable energy and energy efficiency systems on suitable properties, with repayments and term set to achieve a net saving in energy costs for the property and a reasonable rate of return over the period of the loan to investors (on a 'Pay as you Save' basis).

[109] Jae Mather, Director of Sustainability, Carbon Free Group – Written evidence

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6 ENERGY EFFICIENT BUILDINGS

'In short being energy efficient is a good thing as it can save money.'[110]

6.1 European Directive

6.1.1 The European Directive on energy performance of buildings (2002/91/EC) was updated in May this year and it requires Members States to apply minimum standards for buildings energy efficiency. The reduction of energy use and emissions form buildings is key to the achievement of the 20% reductions required by 2020.

6.2 Display Energy Certificates

6.2.1 On 1st October 2008 Display Energy Certificates (DECs) were introduced under the European Energy Performance of Buildings Directive (EPBD) in an attempt to address the high proportion of energy consumption in buildings which account for 40% energy consumption across the EU. Applicable to individual public-access buildings of over 1000m^2, the aim was to increase public awareness of energy use and efficiency by displaying the energy rating of each public building based on its energy/fuel use and emissions. Buildings are graded A-G (best to worst) and also have a numerical rating (the lower the better).

6.2.2 Schools represent a large proportion of the 40,000 public buildings required to display a DEC, which must be updated every year. DEC and accompanying Advisory Reports (listing cost-effective improvement measures) require the services of an accredited energy assessor. Details of KCC's work on its own estate in this regard are given on page 33. The Energy Performance Certificates are also required for new buildings or those offered for sale or rent. The Directive also requires a change in Building Regulations and these are being gradually amended to reflect sustainable construction requirements.

6.3 Demand Reduction

6.3.1 There are widely accepted methods of energy demand reduction which most people will be familiar with such as good housekeeping (including switching off lights and equipment when not in use); replacing worn out appliances with 'A' rated equivalents; replacing conventional lightbulbs with low energy lightbulbs; installing/increasing loft and cavity wall insulation and upgrading windows and doors. The relatively simple measure of installing cavity wall insulation can reduce heat loss from most buildings by 40%.

6.3.2 In addition, technologies such as voltage optimisation have been shown to offer reductions in base demand. For example the Select Committee learned that calculations made

[110] Karl Jansa, Business Development Manager, Locate in Kent – written evidence

in relation to a 'whole community' approach to energy at St. Margaret's at Cliff, indicated that savings of £66 per household per annum could be made, following initial outlay equivalent to £266 per household, and thus a payback period of only four years[111] making them a very cost effective retrofittable technology in both domestic and commercial settings where individually, the average payback times are 5 years and 2.5 years respectively.[112]

Voltage Optimisation

The average voltage supplied to premises in the UK is around 242V. This varies in Northern Ireland and the Republic of Ireland where it is 239 and 235V respectively. Operating equipment at a higher-than-necessary voltage can lead to greater energy loss in the form of heat and voltage/current optimisation works to minimise those losses, which in turn reduces costs and CO_2 emissions. Savings of 15-20% are quoted in various sources.

For some time, the voltages supplied to premises in the UK and continental Europe have been different, with the UK's at 240V ±6% and Europe's at 220V. This situation has now been remedied through harmonisation so that Europe's supply is 230V ± 10%, (statutory limits of 207–253 Volts). Within that range, the UK supply has lower tolerances still in force (216-253 Volts). In reality, there has been little change to the voltage supplied, but it is higher than strictly necessary according to the Institution of Electrical Engineers who, in a 1996 report, recommended equipment be tested across the range 198-253 Volts (to allow for voltage drops that may occur). Voltage optimisation technology reduces the voltage supplied to a site, thus cutting energy usage and costs and with the additional benefit that equipment lasts longer and needs less maintenance.

6.4 Warm Homes Greener Homes

6.4.1 The government's strategy for Household Energy Management[113] sets out the plan for reducing CO_2 emissions from domestic buildings by 29% (24 million tonnes CO_2 – by 2020). The proposals aim to ensure that by 2015 every home will have loft and cavity wall insulation, a smart meter and display and that up to 7 million homes will, over and above that, have an eco-upgrade with measures like solid wall insulation or heat pumps. The strategy envisages that people in rented accommodation will have more efficient homes and the industry will employ

[111] Alistair Gould, The Bay Trust: 'Keeping the Lights On' Protect Kent Energy Conference presentation

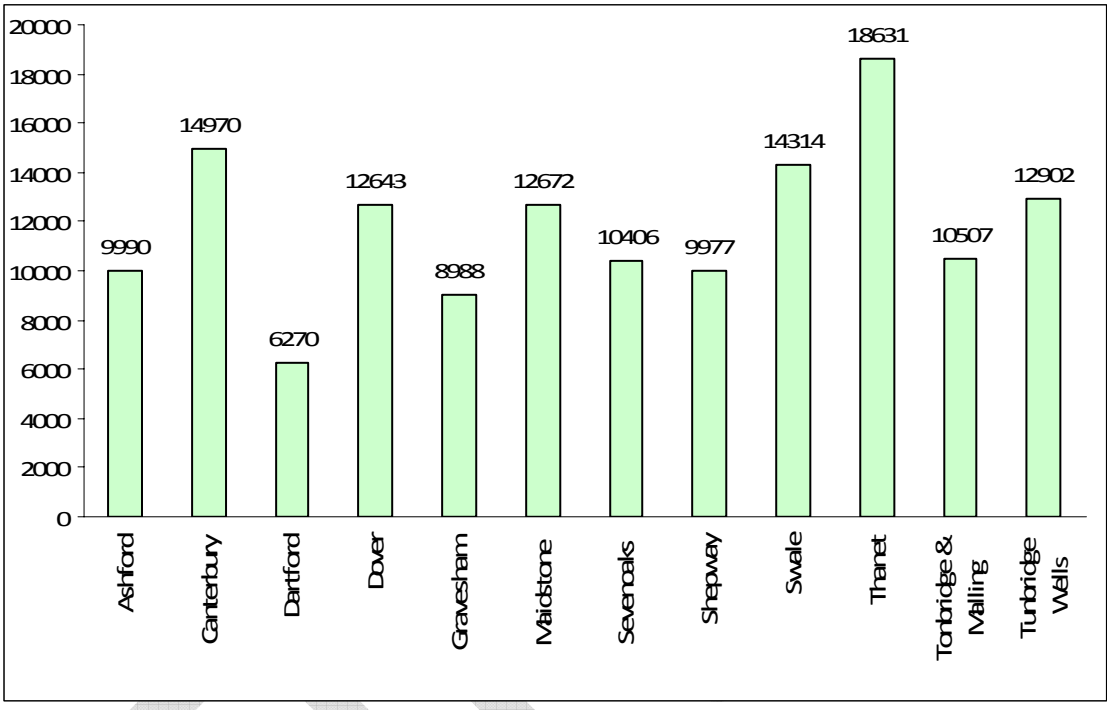
[112] James Sweet, Commercial Director, C4Ci – written evidence

[113] DECC, 2010 A Strategy for Household Energy Management: Warm Homes Greener Homes. London

around 65,000 people in core energy efficiency provision alone and that everyone should have access to Home Energy Advice.[114]

6.4.2 The take up of energy efficiency measures in Kent, as recorded on the Homes Energy Efficiency Database (HEED)[115] is shown in Figure 11 below:

Figure 11: Energy Efficiency measures (excluding lightbulbs) carried out in Kent



6.5 Public awareness and perception of energy efficiency

6.5.1 While the public generally have a good awareness of basic energy efficiency measures, resistance to making the necessary changes still exists and economic concerns usually outweigh environmental considerations. Furthermore, government's subsidy of energy efficiency measures has not yet prompted market forces to take over in spite of very short payback times. For many people, it would seem, the initial spending required to implement even those energy efficiency measures with a very quick pay back, is a deterrent and the 'hassle factor' is also significant.[116]

[114] Richard Hurford, Head of Energy Saving Trust – Hearing 19th May 2010

[115] Ibid

[116] Dr Wayne Cranstone, Head of Onshore Development and Projects, RNRL - written evidence

6.5.2 Monitoring devices with energy displays have been shown to cut down energy use and costs by between 5 and 10 %. There are two main types: smart meters to replace existing meters which display energy, emissions and cost information (Section 8 refers) and wireless display devices. The latter are a quick and easy way to encourage energy efficient behaviour and many local authorities have introduced energy monitor loan schemes, often via libraries. Units are inexpensive at around £40 each and, for example, would pay for themselves in under six months in an average household; considerably less in a large building.

RECOMMENDATION 10

That KCC uses energy display devices in prominent locations on its estate to encourage energy efficient behaviour (including where renewable energy installations are put in place, to increase awareness of the technology, the energy generation and the carbon-savings).

6.5.3 Creative Environmental Networks undertook a survey of households in Ashford to find out about attitudes to energy and water efficiency[117]. Two key findings were that:

i) Energy efficiency 'for its own sake' was not the motivator for most people but information about costs and savings could prompt them to act.

ii) Householders changed their priorities about energy efficiency measures once they had been informed about their relative cost effectiveness.

6.5.4 The Select Committee believe that it is important, firstly to ensure that householders have access to accurate and up to date information about technology options and the accompanying incentives, and secondly to ensure there are affordable ways to access the capital required to undertake energy efficiency work or implementation of renewable energy schemes (ensuring that those on lower incomes are not excluded from the longer term financial benefits to be gained by investing in measures).

6.5.5 KCC Property Group, in conjunction with the Energy Management Team recently provided clear and concise information to schools on energy saving measures and renewable energy options but as the circumstances around grants and incentives have changed considerably, the Select Committee would like to see this information updated and made available more widely than it was previously.[118]

[117] CEN (2009) Ashford Energy and Water Retrofit: Baseline Survey

[118] Kent County Council, 'Environmental Options'

RECOMMENDATION 17

That KCC, working with District and Borough Councils ensures that Kent communities, including schools, businesses and households have access to clear and current information on energy efficiency and renewable energy opportunities, taking into account the Feed-in Tariff and any subsequent incentives.

6.6 Area Based Housing Retrofit

6.6.1. The Select Committee learned of a project being planned by KCC and the Energy Saving Trust to address energy inefficient homes in Kent on an area by area basis. This follows the success of similar schemes such as at Kirklees in Yorkshire where a 3 year project to install cavity wall and loft insulation in 50,000 homes, funded 50% through CERT (Carbon Emissions Reduction Target funding) and 50% by the Council, created 118 jobs and will save an estimated 4.5m tonnes of carbon over the lifetime of the measures. In Kirklees the cost to householders was £7 on Council Tax, but savings of £200 per year per household were achieved.[119] The proposed Kent scheme is highlighted below:

KCC and Energy Saving Trust - Area Based Housing Retrofit in Kent

'80% Kent's future housing is already built and much of it is not energy efficient'.

100,000 Kent homes are eligible for Warm Front Grants (of £3500-£6000) but take up in Kent is slow with less than 5000 applications per year. Retrofitting these homes could result in £170m savings for residents and £175 million economic benefit to businesses; providing affordable warmth for residents and helping to reduce emissions from the housing sector. The aim of the Retrofit Project is to step up the rate of energy efficiency improvements using an area by area approach (including in hard-to-treat homes where renewable energy technologies could be employed to reduce fuel poverty) for the high proportion of older people living in such homes).[120] Initially the scheme would focus on an area of deprivation and an area of high energy consumption and, working with one utility partner, key features would be:

- A single point of contact for multi agency referrals provided by the Energy Saving Trust Advice Centre (ESTAC)
- A Street by street approach
- Funding simplified for residents by bringing together various sources into one pot[121]

[119] Richard Hurford, Head of Energy Saving Trust – Hearing 19th May 2010

[120] Ibid

[121] Lucy Breeze, Climate Change Project Officer - supplementary evidence

6.6.2 This scheme addresses the various barriers that residents have by simplifying the whole process and providing advice and co-ordination and it is welcomed by the Select Committee as a way to begin to address domestic energy usage, and the resulting carbon emissions in Kent. It is important, in taking such schemes forward, that energy supply companies are fully involved.[122]

6.7 Energy Efficiency and hard-to-treat homes

6.7.1 People living in homes which are hard to treat with conventional energy efficiency measures can benefit from renewables even where other measures are not possible. Work done by the Energy Saving Trust (EST) has demonstrated that this is sometimes the case where people live in homes without cavity walls; where installing energy efficiency measures would cause too much disruption such as complete redecoration; or where planning permission would be needed for changes to the outside of the building. People can benefit from lower energy costs (and thus be lifted out of fuel poverty in some cases) if easily retrofitted solar water heating or solar photovoltaic panels are installed. The Retrofit Project will seek to incorporate such measures where possible.

6.8 Other approaches to energy efficiency in communities

6.8.1 Medway Council is trying a different approach to energy efficiency through community engagement, recruiting local residents to become energy champions. The champions are provided with training so that they can identify those who may need support in order to access advice and benefit from schemes.[123] The involvement of community leaders in such schemes was also highlighted in a recent report by the Sustainable Development Commission[124].

[122] Dr Wayne Cranstone, Head of Onshore Development and Projects, RNRL - written evidence

[123] Steve Long, Senior Research and Review Officer, Medway Council – supplementary evidence

[124] SDC, 2010 Sustainable Neighbourhood Infrastructure: Evidence Base. London

7 PLANNING FOR RENEWABLES

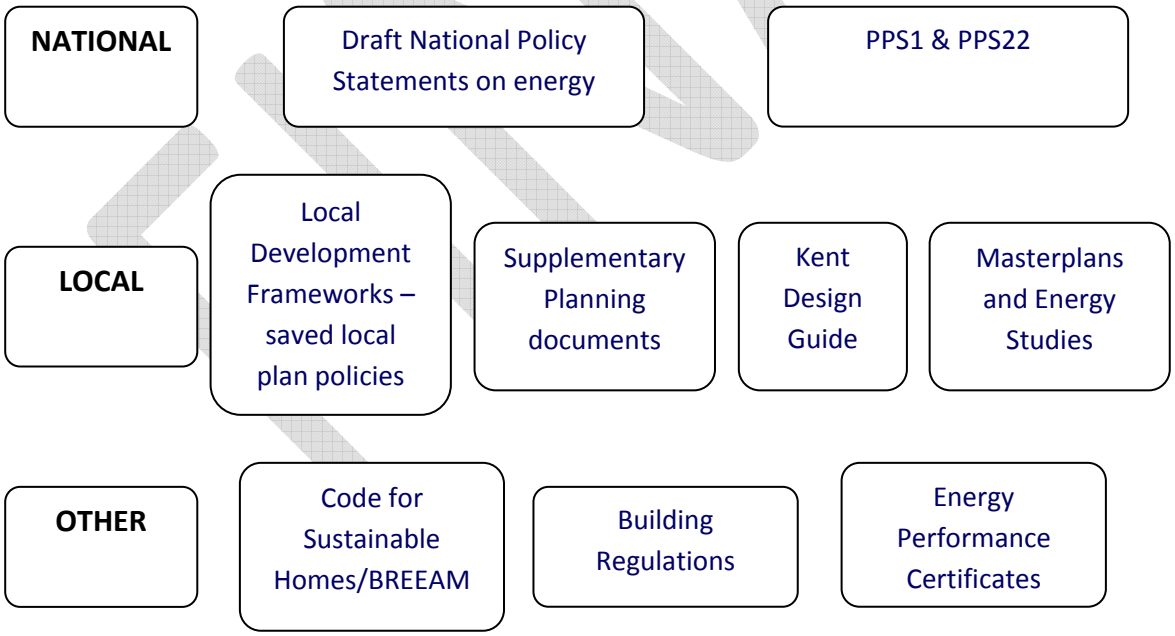
What's needed is 'a radical change of planning laws, so that renewable energy schemes across Kent are encouraged and not impeded.'[125]

7.1 A changed planning hierarchy

7.1.1 The hierarchy that has applied to the planning and development of renewable energy, from the national to the local perspective changed during the information gathering period of this Select Committee due to the abolition of the Infrastructure Planning Commission and of Regional Spatial Strategies. A Major Infrastructure Planning Unit within the Planning Inspectorate will now fast track major infrastructure proposals. The South East Plan is no longer in force and the current hierarchy is shown in Figure 12 below.

7.1.2 At the time of the Select Committee's evidence gathering the South East England Partnership Board (SEPB) were developing the Regional Strategy which required new, more ambitious regional targets to be set for renewable energy development. Members of the committee attended an SEPB consultation event held at council headquarters in June.

Figure 12: National framework for development of renewable energy[126]



[125] Dr Howard Lee, Lecturer and Sustainability Champion, Hadlow College – written evidence

[126] Based on information provided by Neil Hilkene, Sustainability Manager

7.2 Planning for a Low Carbon Future

7.2.1 Following a consultation period from March to June this year, a new National Planning Policy Statement: Planning for a Low Carbon Future in a changing climate[127]; bringing together PPS1: Delivering Sustainable Development (2005) and PPS22: Renewable Energy (2004), was due to be finalised in 2010, however a new consultation will now take place and the new PPS is likely to emerge in early 2011.

7.2.2 The Draft PPS requires that local planning authorities take a much more proactive stance on planning for sustainable energy supplies, for example by making it a condition of planning consent that major developments meet particular criteria for low carbon design. It expects planning authorities to promote low carbon and renewable technologies in Local Development Frameworks (LDFs), underpinned by the local evidence base to encourage development that will involve communities and increase their resilience to climate change.

7.2.3 In anticipation of the new PPS and based on the evidence with regard to new development in Ashford, the Select Committee believe that alongside changes to Building Regulations, it is important that the energy requirements of new developments are given a very high priority.[128]

7.3 A more local perspective

7.3.1 For councils in Kent, a starting point for the building of a local evidence base is available from a range of sources. This includes data from the high level assessment undertaken by Land Use Consultants and TV Energy, for the SEPB and, for example, information from the Environment agency on the potential for small hydro schemes in Kent as well as other types of renewable energy for which they have a regulatory role.

7.3.2 The high level assessment carried out for the SEPB used the Department of Energy and Climate Change (DECC) methodology shown in Figure 13 on the next page, which had been developed to encourage a consistent approach to assessing regional capacity for different types of renewable energy. However, when applied to protected areas the methodology was found to be less effective. The theoretical capacity identified by the study, for renewable technologies in Kent, is given on page 40.

7.3.3 The Select Committee were told that spatial approaches and strategic constraints mapping '*are not generally welcomed'* by developers due to the site specific nature of technical and other issues such as grid connections and the keenness of land owners.[129] However, the

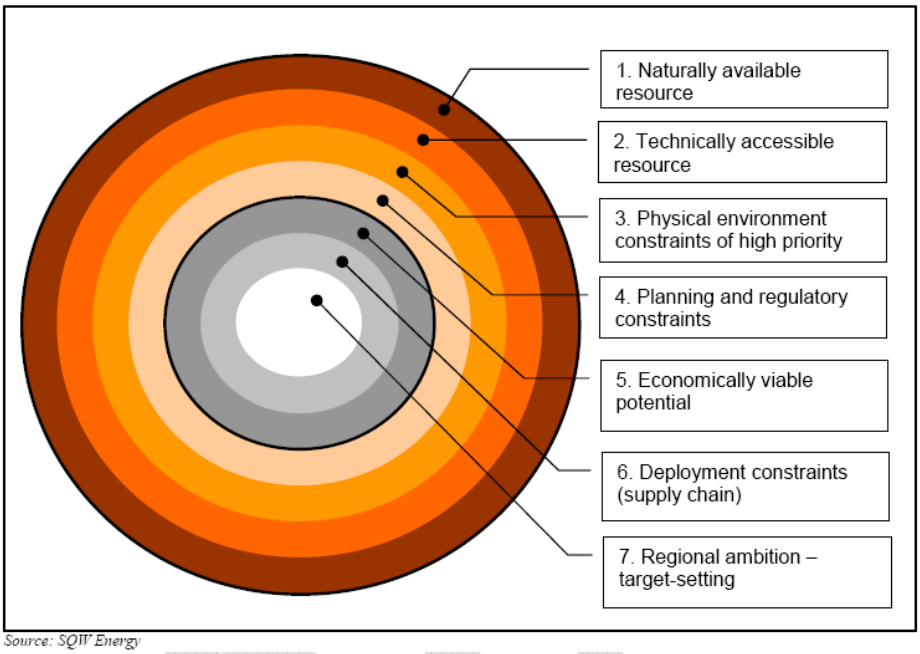
[127] http://www.communities.gov.uk/documents/planningandbuilding/pdf/1499780.pdf

[128] Dr Laurienne Tibbles, Sustainability Manager, Ashford's Future – Hearing – 1st June 2010

[129] Dr Wayne Cranstone, Head of Onshore Development and Projects, RNRL - written evidence

high level study that has already taken place could be supplemented by local detail in order to provide a comprehensive picture of the capacity for renewables development in Kent.

Figure 13: DECC Renewable and Low Carbon Energy Capacity Methodology for the English Regions - January 2010[130]



Source: SQW Energy

7.3.4 With regard to designated areas, there is an even greater need for local expertise if sufficient sites are to be identified, and organisations such as the Kent Downs AONB are well-placed to proactively identify suitable sites, based on their own detailed knowledge, in order to assess future capacity and inform target setting. It was suggested that the County Council could be best placed to take on the role of co-ordinating such an effort in Kent.

7.4 Local Development Frameworks

7.4.1 Dr Wayne Cranstone stressed to the Select Committee[131] that, from the perspective of renewable energy developers, it is important that KCC works with the local planning authorities to ensure that 'the positive national and regional planning policy framework feeds down to the local level'. In his view the aim should be to arrive at 'positively worded, criteria-based policies' in Local Development Frameworks. David Payne of the South East England Partnership Board also indicated that, along with national incentives for and public and private sector investment in renewables, the planning system has a role to enable and promote them at all scales and development management should *'fully support the transition to a low carbon future'.* (Recommendation 5 refers)

[130] Neil Hilkene, Sustainability Manager – Supplementary evidence

[131] Dr Wayne Cranstone, Head of Onshore Development and Projects, RNRL - written evidence

7.4.2 KCC is a local planning authority with forward planning responsibility for minerals and waste as well as a development control function which also covers buildings and new development in the KCC estate. There is good potential to influence the take up of renewables through these responsibilities.

7.5 Woking – C Plan

7.5.1 In Woking, a system known as C-Plan system has been developed in to assist developers to understand whether the energy efficiency measures and renewable energy/low carbon technologies in their proposed plans meet local targets and requirements for carbon reduction[132]. A system such as this would be helpful to both planning officers and developers in Kent, particularly since planning officers may not necessarily have expertise on sustainability issues[133]. This view was confirmed by Mr William White of the National Farmers' Union who indicated that '*planners and others involved in planning decisions appear largely unaware of the technology*'. Mr Thorp, Director of Thameswey Limited, an Energy Services Company set up by Woking Borough Council, indicated that using such a tool could both speed up the application process for the developer, and by stipulating certain conditions, councils could also 'direct' developers towards particular technologies that were preferred locally.

7.5.2 The Kent Design Guide's Technical Appendix on Planning and Designing for Sustainable Energy Use[134] gives guidance to developers on how to respond to planning policies requiring renewable energy, however, a more interactive format for guidance such as C-Plan may be of more benefit in both bringing renewable energy developments forward, and ensuring they meet local requirements.

7.6 Permitted Development

'We want to install a PV system on our roof, to go with the solar thermal collector installed last year. But because we are just inside a conservation area - though really part of an estate which is outside the area - we have to apply for full planning permission, which costs £150 and eight weeks, plus the risk of refusal.'

7.6.1 A Statutory Instrument on Permitted development rights - the General Permitted Development Order (GPDO) was introduced on 6th April 2008 in England[135], with the intention of simplifying the installation of renewable energy microgeneration technologies in most domestic situations. It meant that planning permission was no longer needed for a wide range

[132] John Thorp, Director, Thameswey Energy – Hearing 14th April 2010

[133] Simon Cole, Senior Planning Officer, Ashford Borough Council – Hearing 1st June 2010

[134] Kent County Council, 2009 Kent Design Guide: Sustainable Construction Technical Appendix

[135] 12th March 2009 in Scotland

of technologies, but within certain limits.[136] However, it was apparent from evidence received by the Select Committee that exceptions and omissions in the GDPO lead to confusion for people wishing to install technologies if they live in or close to a conservation area, or in a listed building. The technologies currently having Permitted Development status in England (and the exceptions) are shown below.

Solar PV and solar thermal - roof mounted: PERMITTED except where panels protrude more then 200mm when installed.

Solar PV and solar thermal - stand alone: PERMITTED up to 4m in height, minimum 5m from boundary, up to $9m^2$ but NOT on a wall within the 'curtilage of the dwelling house' which could be seen from the highway in a Conservation Area or World Heritage Site.

Wood burning boilers and stoves, and CHP: PERMITTED (if the flue is less than 1m higher than the roof height), but NOT if it can be seen from the road in a Conservation Area or World Heritage Site.

Ground source heat pumps: PERMITTED

Water source heat pumps: PERMITTED

Micro and small wind: (not covered, but expected to be allowable except in conservation areas)

Air source heat pumps: (not covered, but expected to be allowable)

7.7 Exceptions to permitted development

7.7.1 As can be seen from the information above, there are a small number of technical/safety elements to the restrictions and the others related to aesthetic factors, particularly with regard to listed buildings (to which different building regulations apply) and conservation areas. With respect to Listed Buildings and Conservation Areas, there is a need to balance preservation of the local environment with the wish to enable residents to benefit from solar powered systems, in particular. For example, Listed Building and Conservation Area Consent is only granted where panels are not considered to detract from the character or appearance of the listed building or conservation area. However, the Select Committee would like the benefit to the wider environment of renewable energy systems to be given weight in such decisions except in very exceptional circumstances.

[136] In addition, different building regulations apply to Listed Buildings.

7.8 Kent Downs Area of Outstanding Natural Beauty (AONB)

7.8.1 The Select Committee learned that the Kent Downs AONB 'usually oppose the use of wind turbines within and within sight of the AONB', however work undertaken for them would indicate that mid-sized turbines (between 10kW/25m in height to blade tip and 500kW/65m to tip) could in some cases be appropriate.[137]

7.8.2 Kent Downs AONB covers a quarter of the county and part of the High Weald AONB is also in Kent, so a significant proportion of the county is exempt from permitted development and Nick Johannsen, Director, informed the Select Committee that the Local Development Frameworks of all Kent Districts who fall within the designated area 'must have regard to the purpose of the AONB' which is primarily to conserve the natural beauty of the environment.

7.8.3 While energy security is not a driver for the AONB, renewable energy is seen as an important aspect of climate change mitigation and a detailed assessment of the suitability of all types of technology within the protected areas, was undertaken on their behalf. Each technology was assessed for its appropriateness, noting constraints and opportunities and graded in traffic light format. The outcome is summarised on the next page and it can be seen that the majority of renewable technologies are felt to be suitable; small to medium scale wind turbines and large scale biomass may be suitable in some cases and the only technologies that are felt not to be in keeping with the purpose of the AONB are wind turbines a the extremes of the size-spectrum, i.e. micro and large scale.

[137] Nick Johannsen, Director, Kent Downs Area of Outstanding Natural Beauty (AONB) – written evidence

Figure 14: Kent Downs AONB – Appropriateness of Renewable Technologies[138]

LARGE SCALE WIND TURBINES (between 500kW/65m in height to blade tip and 3MW/125m to tip)	**RED**
SMALL - MEDIUM SCALE WIND TURBINES (between 10kW/25m in height to blade tip and 500kW/65m to tip)	**AMBER**
MICRO WIND TURBINES (between 50W and 6kW and up to 20m to blade tip)	**RED**
GROUND SOURCE HEAT PUMPS	**GREEN**
SOLAR THERMAL (HOT WATER)	**GREEN**
SOLAR PV (ELECTRICITY)	**GREEN**
MICRO HYDRO (Power rating of 100kW or less, producing 100 standard units of electricity/hr)	**GREEN**
LARGE SCALE BIOMASS (typically 10-40MW electricity or 5-30MW Thermal CHP)	**AMBER**
MEDIUM SCALE BIOMASS (C. 100kw)	**GREEN**
SMALL SCALE (DOMESTIC) BIOMASS (C. 6-12 kw stove or 15kw boiler)	**GREEN**
ANAEROBIC DIGESTION	**GREEN**

[138] Kent Downs AONB, 2008 Climate Change Mitigation: Renewable Energy Technologies and Protected Landscapes, Identification of Key Constraints and Opportunities for Renewable Energy within The Kent Downs AONB. Internal Report

RECOMMENDATION 14

That KCC lobbies government, on planning issues, to:

- promote developments with a mixed heat demand suitable for district heating systems, which should be incorporated wherever possible.
- relax planning control for domestic renewable energy installations on listed buildings and properties affecting conservations areas where this does not detract from heritage objectives.

RECOMMENDATION 15

That KCC consults with District, Borough and other councils in Kent to determine what is needed to assist local authority planners and developers in making planning decisions relating to renewable energy applications, e.g. training, or an interactive planning tool.

8 ELECTRICITY TRANSMISSION, DISTRIBUTION AND STORAGE

8.1 National electricity transmission

8.1.1 It is important to state at the outset, that the national electricity transmission grid system is not itself an electricity storage system. We have, over the years, come to take for granted that we can turn on a switch, and power will be there but that 'luxury' is in part due to the expertise and skill of grid managers who constantly balance the power being taken out of the grid, with that being put in as electricity is consumed at the same time as it is generated.

8.1.2 The national grid system was established in the 1930's and links main generating sites to areas where demand is greatest, connecting to the distribution network. The electricity network was privatised under the Electricity Act 1989 and as a result a number of energy companies own and are licensed to operate the system in different areas[139]. It can be seen from Figure 15 below that at the time of gathering evidence, EDF Energy Networks were the Distribution Network Operator (DNO) for Kent and EDF informed the Select Committee that in total they cover an area of 29,165 km2, have 7.9 million end customers (2.2 million in Kent); with 125,300 km of underground network (30% of which is in Kent) and 47.647 km of overground network (27% of which is in Kent).[140] At the time of writing, however, an announcement has been made that the infrastructure part of EDF's business (cabling and substations) will be taken over by Hong Kong businessman Li Ka-Shing who has a large portfolio of business interests in the UK and elsewhere.

Figure 15: Distribution Network Operators

[139] Electricity is supplied by numerous, not necessarily energy, companies on a competitive basis.

[140] EDF Energy Networks: 'Keeping the Lights On' Protect Kent Energy Conference presentation

8.1.3 The grid system is well-established but ageing, and the need for grid maintenance has inevitably increased. The development of renewables means that the system will require expansion and modernisation, however the Select Committee learned that network operators are confident they are able to meet the necessary infrastructure requirements.[141]

8.1.4 One of the key challenges to planning infrastructure is a clear understanding of required capacity given that in future, due to the development of renewable energy and the increase in distributed generation, rather than being a passive, one-way system, the grid distribution network will become an active system capable of receiving electricity generated at numerous locations. Developments in electricity storage (including the planned increase in the number of electric vehicles, whose charged batteries will constitute storage) will mean that the process of expertly balancing supply and demand to the grid which has served us well over a number of years, will meet with new and complex challenges.

8.1.5 In order that distributed generation can take place, enabling technologies such as 'smart grids' and 'smart metering' are two major developments that will be needed. The Feed-in tariff support system requires, for example, a record of how much electricity is imported from the grid to a site, as well as how much is exported to it[142], and a smart grid would employ a range of technologies (including digital) at the interface to provide 'intelligent control' and monitoring. In 2008, the government announced its intention that all 26 million homes in the UK would be fitted with smart metering devices by 2020.

8.2 Intermittency of renewable sources

8.2.1 As noted above, the grid requires the balancing of supply and demand and so the intermittency of solar and wind power needs to be managed. Solar power is more predictable in that we know it's not there at night and we have a good idea of the range of generation that can be expected at different times of the year. Wind power is much less predictable at a given site since wind power density is proportional to the square of the wind speed. The Select Committee were told that currently wind power provides 3% of total consumption and until a level of 20% is reached there is little need for additional storage as procedures are in place to deal with variable input[143].

8.2.2 This was the finding of UK Energy Research Council research, based on 200 international studies, into the intermittency of renewable energy. Regarding the variability of wind energy,

[141] EDF Energy Networks – supplementary evidence

[142] While the necessary developments are taking place, for the Feed-in Tariff, export generation will be deemed at a rate equivalent to 50% of system capacity.

[143] Paul Reynolds, Offshore Wind Development Manager, RenewableUK – Hearing 26th May 2010

they concluded that while this cannot replace fossil fuelled generating *capacity* on a 1:1 basis, 'it is unambiguously the case that wind energy can displace fossil fuel-based *generation*, reducing both fuel use and carbon dioxide emissions'.

8.2.3 None of the 200 studies found that adding intermittent sources to the current system would compromise the reliability of supply during that period. Loss of Load Probability (LOLP) is used to measure how likely it is that demand will not be met, and for a successful electricity system, LOLP must be small. Some of the effects of intermittency require a more refined measure as they might be, for example, small losses of load over short periods, but occurring more often.

8.2.4 When the penetration of intermittent sources reaches 20% the question of back-up generation (in relation to the whole electricity system – not individual generating sites) becomes important and at the 20% level, additional conventional capacity to maintain system reliability during demand peaks is 15% - 22% of installed intermittent capacity, i.e 15-22% of 20% which is 3-4.4% of total capacity.

8.2.5 So at the level of 20% electricity generating capacity from wind power, 3-4.4% additional conventional generating capacity would be required, to maintain system reliability during peak demands. One of the main findings of the report is that the cost of renewable energy is not greatly affected by these factors.

8.3 Managing demand

'UK company receives £4m investment for global expansion of online smart meters.'[144]

8.3.1 It is intended that the grid system of the future, the 'smart grid' would be able to manage demand to an extent using a range of techniques such as switching power off (even down to individual appliances) to cope with troughs in electricity generation and while this sounds rather dramatic, it is really an extension of the concept of off-peak electricity (such as Economy 7 being cheaper at night) so that appliances (including electric vehicles) could be used/charged on timers, which would become part of the smart grid management system.[145]

8.4 Managing supply

8.4.1 Demand side management would not be enough to cope on its own and supply side solutions will also be needed.

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[144] www.carbontrust.co.uk/news 25 June 2010

[145] EDF Energy Networks: 'Keeping the Lights On' Protect Kent Energy Conference presentation

8.4.2 In Denmark, the intermittency of wind power is managed by using the hydroelectric plants in neighbouring countries as 'storage'. Since most of the wind power is exported anyway, when there is oversupply, the hydroelectric power (which is more constant) can be 'turned down' and the hydroelectric power can be bought back when there is undersupply of wind power.[146]

8.4.3 A range of other potential storage solutions are possible, including pumped storage; using electric vehicles as emergency 'batteries' – taking a small proportion of each plugged-in vehicles' charge (e.g. 10 million cars x 2kWh = 20 GWh); and even having two grids, one for the intermittent sources, supplying power to sites where constant demand is not essential.[147]

8.5 European Super Grid

8.5.1 Another of the ways in which Europe is proposing to deal with the intermittency of renewable energy is to build a 'super grid' joining large renewable energy generating sites throughout the North Sea region. In this way, it is anticipated that supply and demand can be balanced with, for example, surplus demand from offshore wind farms in Northern Europe (100 GW are currently planned) and surplus demand from solar arrays in Southern Europe balancing demand elsewhere. This is made feasible by new cabling technology which greatly reduces losses in transmission.[148] Building such a grid will be expensive to those countries concerned, but the future energy security of the region would be greatly enhanced and there would eventually be energy cost savings. The super grid would help the EU to achieve its 20/20/20 goals: to increase renewable generation to 20%, cut greenhouse gas emissions by 20% at the same time as reducing energy use to 20% by 2020.

8.5.2 The London Array, for example will feed into the Grid at Cleve Hill substation in Kent and ultimately the existence of a super grid would enable excess power to be exported. High Voltage DC (HVDC) connections already exist between the national grid systems of the UK, France and a new connection to Netherlands is under construction. To date enough power for 3 million homes has been imported via Cross-Channel, a 73km 2000MW HVDC connection between Sellindge in Kent and Bonningues-lès-Calais in France and soon the BritNed HVDC, a new 260km, 1000MW connection linking the Isle of Grain and Maasvlakte, near Rotterdam will also be part of the new European grid system used to balance supply and demand in those countries[149].

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[146] MacKay, D.J.C. (2009) Sustainability without the hot air

[147] Ibid

[148] Jane Ollis, Head of Sustainable Business, Business Support Kent – Hearing 26th May 2010

[149] Mark Willingale, Director, Metrotidal MB – written evidence

8.5.3 Mark Willingale, Director of Metrotidal MB explained in his evidence to the Select Committee that this situation parallels that of the UK in the 1920's when the national grid system we are familiar with joined together several individual power plants providing local supplies. As happened then, the most efficient (and now the most low-carbon) sources of energy can be used to meet demand across a wider area.

8.5.4 Members of the committee believe that in time, innovations will come forward and technological solutions will be put in place to cope with peak demand and balance intermittent renewable electricity sources sufficiently to avoid power cuts. However, they are concerned that, until this stage is reached, and to retain a level of national supply security, we cannot afford to lose significant capacity in conventional power generation, which is capable of being switched on and off to provide back up when necessary to meet demand.

RECOMMENDATION 19

That, in view of the need for the UK to have a long term, sustainable mix of power supplies and due to the intermittent nature of some renewable energy sources, KCC presses for the provision of new generation low carbon power stations so that there is adequate back up capacity to cope with demand peaks, providing security of supply.

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9 LOW-CARBON TRANSPORT

'for the majority of people, electric vehicles are the winning solution'[150]

9.1 Policies and targets for renewable transport energy

9.1.1 Government transport policy now focuses on the move away from liquid fossil fuels, which will become decreasingly available, and decarbonisation to reduce pollution. However transport has limited solutions, particularly due to the decreasing amount of arable land available for energy production as the population rises, and so eventually rationing or pricing solutions could be needed.

9.1.2 The UK target of 15% energy from renewables will require 10% of transport energy to come from renewable sources. It is accepted that decarbonisation of air transport is 'the hardest nut to crack' and that road transport has to bear the brunt.

9.2 Transport planning

9.2.1 Globally, transport planning focuses on cities, since this is where 50% of the world population lives, and solutions for individual cities are dependent upon their population density. Public transport solutions are appropriate for the 6% of the world's population who live in mega cities, but for the majority of people living in small towns and cities, tackling private car use is the key to carbon emissions reduction.[151]

9.3 The King Review

9.3.1 In 2008 Julia King of Aston University conducted an in depth review into low-carbon transport.[152] The review found that UK energy for transport had increased by 64% over the period from 1980 to 2004, largely due to the increase in road traffic which rose by 83%[153], but remained optimistic about the decarbonisation of UK transport by 80%, forty years from now. The King Review concluded that in the short term, the focus should be on increasing vehicle efficiency and eventually, a combination of reduced vehicle emissions; cleaner fuels, consumer choices, research and development would help us to achieve targets for transport sustainability.

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[150] Robin Haycock, Arup – Hearing 1st June 2010

[151] Ibid

[152] The King Review - http://webarchive.nationalarchives.gov.uk/+/http:/www.hm-treasury.gov.uk/d/bud08_king_1080.pdf

[153] Dr Howard Lee, Lecturer and Sustainability Champion, Hadlow College – oral evidence

9.3.2 The review identified a number of key factors to ensure success including:

- 'bringing existing low emission technologies from 'the shelf to the showroom' as quickly as possible;
- ensuring a market for these low emission vehicles;
- moving the short-term focus back from biofuels to automotive technology;
- making sure that further biofuel developments are based on our growing understanding of their indirect effects

9.3.3 The King Review also found that 'business as usual' is not an option since it would lead to a doubling of emissions from transport globally by 2050.

9.4 Renewable Transport Fuels

9.4.1 An increasing proportion of the transport fuel routinely bought at the pump is renewable due to the Renewable Transport Fuels Obligation (RTFO) which obliges the suppliers of fossil fuels for road transport to ensure an increasing percentage comes from sustainable renewable sources. The RTFO (Amendment) Order 2009 sets out that from April 2008 the percentage required rises in yearly increments from 2.6% of volume to 5.3% from April 2013 onwards. Prior to its introduction, contracts were issued in England under the Non Fossil Fuel Obligation (NFFO) which has now ended (but with some contracts still running to 2019).

9.4.2 The requirement is met by adding blends of biofuels which, the Select Committee learned had provided farmers and growers with new business opportunities. Dr Jonathan Scurlock, of the National Farmers Union explained that previously, best quality wheat or oilseed rape would go into food products, the next quality would go into animal feed and the poorest quality would be used industrially to make starch. However, with the obligation for renewable transport fuels, in Dr Scurlock's view, new investment is now needed for large facilities to convert wheat to ethanol and there are currently only three in the country, two of which are in the North East.

9.5 Biofuels and Kent

9.5.1 A project run by the University of Greenwich in 2007-9 looking at biofuels in Kent had two transport-fuel-related outcomes which were that:

- There is scope to use waste oils to manufacture biodiesel, albeit limited and small-scale and
- the use of biofuels in internal combustion vehicle engines is only 25-30% compared with up to 85% fuel use efficiency in combined heat and power (CHP) stationary engines.

9.5.2 KCC, who were involved with the project, decided not to pursue plans to investigate opportunities for Kent Fleet vehicles to convert. The Select Committee was also told that following an experiment involving biofuel buses in Maidstone, bus companies are no longer pursuing biofuels trials.[154]

9.6 Food versus Fuel

9.6.1 Members of the Select Committee were convinced by the arguments put forward against the large scale growing of biofuel crops in the UK, over the long term. The switch of emphasis away from biofuels, in the King Review, was made in the light of controversy over imported biofuels such as biodiesel from palm oil and bioethanol from maize and sugar cane which were shown to have contributed to the destruction of rainforests and threats to biodiversity. Ultimately, it is not viable to take up large swathes of arable land for growing biofuel crops, as land is needed for food production, both here and abroad, to sustain a growing world population.

9.6.2 Currently, the UK is able to meet only around one third of domestic food requirements and though, for example, we can produce 100% of the wheat we need, this is dependent on high inputs from fossil-fuel based fertilisers whose long-term availability cannot be guaranteed. Farmers wish to benefit from the opportunities that exist but, for example, solar arrays on the roofs of farm buildings could provide a significant income as an alternative to growing energy crops.

9.6.3 In the shorter term there is some potential in Kent for growing oil seed rape for biodiesel (and the Select Committee heard that this had previously been 'tried' in Kent), but the greater potential is for woody biomass (which does not compete with food crops) and this is dealt with in more detail in Section 4 on page 53 with regard to heat, rather than transport.

9.6.4 Other impacts, as well as competition with food supply, need to be taken into account such as the amount of water, fertilizer, pesticide and energy inputs into the whole process of growing, harvesting and refining. The particular pressures on resources in different areas should also dictate which options are viable in different locations. In Kent, for example, any crop which was dependant on high water inputs would be much less desirable due to the increased pressure on the county's water supply.

9.7 Methane-powered vehicles

9.7.1 In the shorter term, there could be a contribution to the decarbonisation of transport from natural gas (c. 97% methane) or biogas which could replace a proportion of the petrol and diesel used for transport. (Although it is a very reactive greenhouse gas, methane is less

[154] John Newington, Senior Pollution Officer, Maidstone Borough Council – Hearing 1st June 2010

damaging if burned.) The technology for gas-driven cars is already available and there are a number of advantages over petrol or diesel in that there are lower emissions, minimal particulates and switching to upgraded biogas is from there, an easy, renewable, zero carbon option.[155]

9.7.2 Anaerobic Digestion (see page 47) is one method of obtaining biogas, from waste organic matter (typically farm slurries or other homogenous wastes). The biogas can be burned in a gas engine to provide electricity (and heat) or scrubbed and either injected into the gas grid, or used for transport having been stored in the same way as liquid propane gas (LPG) in cylinders.[156]

9.7.3 The RE-thinking report 2050, which presents a scenario for 100% renewable energy sees both biogas and biofuels as essential if we are to 'end oil dependence in the transport sector' but from the evidence the Select Committee has seen, both biogas and liquid biofuels are far more efficient when used in stationary engines than as vehicle fuel so it would seem that in an energy constrained world, using them as transport fuels would not be the first choice.

9.8 Automotive Technology

9.8.1 UK companies are releasing a number of different vehicle types, both public and commercial, including fully electric and hybrid models. As mentioned, vehicles can run on biomethane and for example in Leeds, biomethane waste vehicles are being piloted[157]. The industry view, according to the Office for Low Emission Vehicles, is that between now and 2040 there will be a gradual development in automotive technology, beginning with continued reductions in vehicle weight and drag and innovations in internal combustion engines/transmission for vehicles using a range of fuel types: petrol, diesel, gas, renewable fuels and hydrogen.

9.8.2 A gradual progression of hybrid cars is expected until developments in storage (for hydrogen and for electricity) lead to a full plug-in hybrid vehicle anticipated in around 2020. By then, a considerable amount of investment will have to have been made in national infrastructure for both EV charging and hydrogen fuel cell vehicles.

9.8.3 For 2020, European legislation being debated is for a limit of 95g per km CO_2 vehicle emissions. While this seems a stretching target, when the 2010 aim for 130g was proposed, it did not take long for cars with less than 120g emissions to emerge.[158]

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[155] Steve Plater, Transition Town Sevenoaks – Hearing 19th May 2010

[156] Dr Howard Lee, Lecturer and Sustainability Champion, Hadlow College – Hearing 12th May 2010

[157] John Newington, Senior Pollution Officer, Maidstone Borough Council – Hearing 1st June 2010

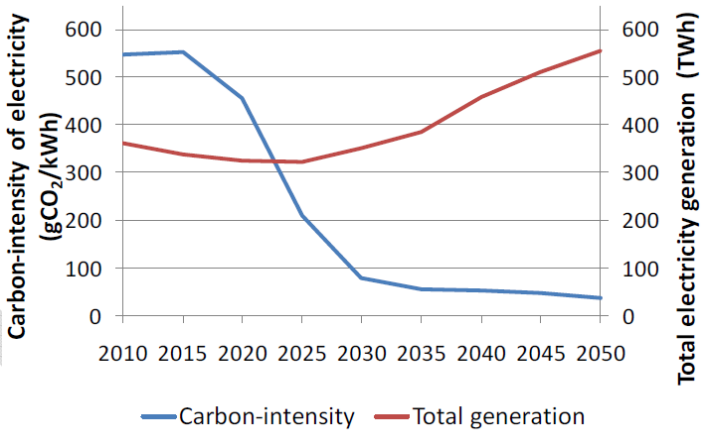
[158] Robin Haycock, Arup – Hearing 1st June 2010 (uncorrected evidence)

9.8.4 It was the view of Mr Haycock that until 2020, vehicle efficiency will be the main factor influencing the decarbonisation of road transport but at that point he felt that electric vehicles would come to the fore and the balancing between electric vehicles (EVs) and peak use of the grid, would be key.

9.9 Decarbonisation of electricity

9.9.1 Figure 16 below shows that while electricity generation must rise by around 50% over the next 40 years due to the electrification of transport and heat, the 'carbon impact' of that electricity will fall dramatically over that same period due to the proportion of it that is generated renewably.

Figure 16: Decarbonisation of electricity[159]



9.9.2 The Select Committee learned that that most of the energy requirement of a car is during its use rather than its manufacture so this means that fleets of electric vehicles would automatically be decarbonised, along with the electricity supply.[160]

9.10 Kent energy consumption from transport

9.10.1 Government figures for energy consumption from transport in Kent in 2007 were 15,238.3 GWh so reaching the 10% figure would involve 1,523.8 GWh to be from renewable sources. However, while most future scenarios for transport involve the electrification of all but the heaviest vehicles, the fine details for the interim period will be dependent on a number of factors and the relative speed of technological developments.

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[159] E.on: 'Keeping the Lights On' Protect Kent Energy Conference presentation

[160] Robin Haycock, Arup – Hearing 1st June 2010 (uncorrected evidence)

9.11 Kent Integrated Transport Strategy

9.11.1 Kent's Growth without Gridlock Integrated Transport Strategy[161], which was finalised after consultation last year, will inform the statutory Local Transport Plan 3, (LTP3) that KCC as Transport Authority is required to produce by March 2011. It will also guide transport plans within each of the Kent Districts' and Borough's Local Development Frameworks.

9.11.2 The Select Committee learned that work between KCC and Maidstone Borough Council in this regard had the challenge of evolving measures which would meet statutory requirements (including those for improvement of air quality), support the growth of the area and sustainability aims, but within the current financial constraints on the public and private sector. In this respect, Maidstone is a transport hub for Kent, and so solutions will inform the plans made by other districts and boroughs in the county.[162]

9.12 Air Quality and transport

9.12.1 Air quality is a huge issue for local authorities, who are required to meet European objectives for Nitrogen Oxides and particulates and the UK faces fines of £300 million per annum if it fails to achieve them. District authorities have air quality management areas (where limits are exceeded) and data from 2006 showed that 20 of the 22 cases in Kent were linked to transport emissions which in turn have major implications for the health of residents as well as to local authorities' own carbon emissions targets.[163]

9.13 Electric Vehicles

9.13.1 An increase in the number of electric vehicles (EVs) is one of the ways in which air quality objectives can be met but as noted earlier, it will be essential that this takes place alongside an increase in the proportion of electricity that is generated from renewable sources.

9.13.2 By 2020 it is expected that the number of electric vehicles in the UK will have risen from around 8000 to 1.7 million. The Mayor of London intends to make London the 'electric car capital of Europe' and to procure 1000 EVs for the Greater London Authority fleet by 2015, putting in 7,500 charging points by 2013. From next year a Plugged in Car Grant will be available with up to £5000 available to incentivise the purchase of ultra low carbon cars, to mitigate their current high cost, and in support of the Plugged in Places initiative which will create a network centred on London and extending initially via Milton Keynes to the North East.

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[161] http://www.kent.gov.uk/static/transport/integrated-transport-strategy.pdf

[162] Peter Rosevear, Senior Transportation Engineer, Kent Highway Services – written evidence

[163] John Newington, Senior Pollution Officer – Maidstone Borough Council – Hearing 1st June 2010

9.13.3 The Select Committee learned of plans to begin putting in place in Maidstone a small number of EV charging points, with (it is hoped) funding from the £20 million Infrastructure Grant, starting with a two-bay charging point in Mote Park (as part of the park's redevelopment scheme funded by a Heritage Lottery Grant) as well as exploring options for three more charging points, each with two bays, at Park and Ride sites. The cost for charging bays, from the evidence received, is around £5,000 - £8000 and in the case of Mote Park the total cost is £7500 plus an annual maintenance fee of £300. The existence of such 'visible' schemes will be an important way of addressing initial public fears about EVs running out of electricity.

9.13.4 Mr Robin Haycock from Arup, informed the Select Committee that in the longer term it is likely that there will be a combination of car charging at home and at work, coupled with a change in the way we use our cars, such as using range extended hybrid cars (perhaps hired) for long journeys. In the short term though, the acceptance of electric vehicles is more about social change, and so it will be necessary at first to have visible charging points, to reduce drivers' anxiety.

9.13.5 A number of organisations including supermarkets are considering how charging infrastructure might fit in with their own aims for increasing sustainability and the Select Committee also learned that, for example, Network Rail are considering how this may fit in with their programme of improvements to car parking arrangements at Kent stations.

9.13.6 The new draft Planning Policy Statement, expected early next year, is also likely to include that electric and plug-in hybrid vehicles should be encouraged through a planning requirement for charging points in new developments.

9.13.7 Given Kent's proximity to London, and the role that electric vehicles are likely to play in the decarbonisation of transport, the Select Committee are keen to explore ways to work with others, including organisations like Streetcar, who provide a pay-as-you-go service with bases in Kent, to help increase awareness about electric vehicles in Kent, and raise people's confidence to try the technology. The existence of a government website showing all the charging bays in the country will also play a role in this.

RECOMMENDATION 20

That KCC works with others, including District and Borough Councils, Network Rail and supermarkets, to assess the viability of establishing a network of public electric vehicle charging points in Kent.

9.13.8 A number of KCC vehicles carry out journeys ideally suited to electric vehicles and it is the view of the Select Committee that the council should be ready to use the technology when it becomes feasible to do so.

RECOMMENDATION 21

That KCC regularly surveys its own vehicles, and business journeys to: identify (and review) work patterns in order to minimise business mileage and to prepare for the availability and purchase of electric vehicles, where appropriate.

9.14 Changing driver behaviour

9.14.1 The South East Carbon Hub will engage with 150 businesses to help them develop sustainable mobility strategies and as part of the programme, businesses will be offered onsite travel audits to help them achieve reductions in carbon emissions by reducing travel.

9.14.2 KCC encourages its own workforce to contribute to achieving sustainable transport aims by choosing smarter working options such as teleconferencing, car sharing, flexible hours, working at home and teleworking. The new 'Journeyshare' scheme replaces Kent Car Share and provides a 'matching' service free of charge to users all over the county enabling them to cut down on car journeys, reduce pollution and save money. The Select Committee feel it is also important that Directorates closely monitor the logistics of business journeys.

9.14.3 The Kent Freedom Pass has benefited children and families across Kent by providing 'free at the point of access' bus travel to young people for their journeys to school and in the holidays, reducing the number of parental car journeys considerably.

9.14.4 The Select Committee learned that there are two other aspects of behaviour change which would have a big impact on the decarbonisation of transport. Firstly, there is a need to address 'distance travelled' and to help drivers get over fears that electric vehicles will not meet their needs, when in fact most car journeys undertaken are around 20km. Tackling 'range anxiety' is seen as being a hurdle to overcome in terms of public perception, rather than the practicalities of vehicle use and this is backed up by studies that found that once people had tried out electric vehicles, they were keen to carry on driving them.

9.14.5 Secondly, in the period to 2020 when 'efficiency' is the more important factor, lowering driving speed could have a huge impact on fuel efficiency whichever vehicle type is driven. Since legislation to reduce speed limits would be universally unpopular (though, for example, lowering the national speed limit to 50 mph could cut carbon emissions from vehicles by 30%), the Select Committee feel that it is worth exploring the savings that could be achieved in the short term, if the county takes action with regard to the speed at which its own vehicles are driven. Taking action to influence both these aspects of behaviour change would also contribute strongly to the council's community leadership role.

RECOMMENDATION 22

That KCC adopts a policy of limiting its vehicles, except those attending emergencies, to a maximum speed of 56mph (90kph) in order to achieve greater fuel efficiency, in line with best commercial practice.

10 ECONOMIC OPPORTUNITIES FROM THE TRANSITION TO LOW CARBON ENERGY

'Kent is on the map for the offshore wind sector.'[164]

10.1 National Strategy for Climate and Energy

10.1.1 The UK Low Carbon Transition Plan: national strategy for climate and energy, plots the UK's course in moving towards a low carbon economy from 2009 – 2020 and is concerned with '*cutting emissions, maintaining secure energy supplies, maximising economic opportunities, and protecting the most vulnerable'*. The White Paper supports renewable energy, the testing of new technologies and sets standards to cut emissions from cars and other products. It outlines plans for the transition covering the energy sector; homes; workplaces; transport; farming, land and jobs. Also launched in 2009, The UK Low Carbon Industrial Strategy built upon earlier work highlighting the opportunities arising for businesses and individuals.[165]

10.1.2 The growth of low carbon sustainable and renewable energy industries is an essential component of government strategy to reduce environmental impact and strengthen the security of energy supply as well as to achieving the UK commitment to 15% energy generation from renewables by 2020.

10.2 Economic Opportunities

10.2.1 Growth of the sector is also seen as a key element in the future economic prosperity of the country: the global market for low-carbon products and services is worth £3 trillion per year and rising, and in the UK will employ over a million people by 2015. In the South East, the renewable energy sector is expected to expand by £2-4 billion over the next ten years. [166]

10.2.2 Development of the required infrastructure in the county will provide economic opportunities for both business and technology and the retrofitting of existing properties, an essential component in moving towards a low-carbon economy in the county, will provide numerous opportunities to a wide range of businesses that can undertake insulation and other energy efficiency work, or supply and install micro-generation technologies. Take up has already increased due to the Feed-in tariff which incentivises renewable electricity generation up to 5MW and the Renewable Heat Incentive, due to take effect in April 2011, is likely to stimulate further activity. Businesses can also benefit by, for example, renting roofs from other

[164] Karl Jansa, Business Development Manager, Locate in Kent – written evidence

[165] Building Britain's Future: New Industry, New Jobs; The Low Carbon Industrial Strategy: A Vision; and policies and plans outlined in Investing in a Low Carbon Britain.

[166] Tom Vosper, Head of Biomass Team, Creative Environmental Networks – written evidence

people/organisations, installing their own technologies, or assisting others to create revenue streams.

10.2.3 It should be acknowledged, however, that while net gains are expected in employment during the transition to a low-carbon economy, there will be job losses but the impact of this can be lessened by taking action in advance, making use of transferrable skills and 'transforming businesses'.[167]

10.2.4 Having identified a gap in skills for the renewable energy sector, KCC's 14-24 Innovation Unit is working to develop Centres of Excellence in Kent informed by a wind-energy related learning matrix. There are Skills Centres at Thanet and Swale and the latter 'hub' site will each year offer courses for 250 engineering students aged 14-19 to include the choices of wind turbine installation and maintenance, specialist Health and Safety courses as well as waste management. The Centre will co-ordinate with colleges, the provision of courses across the County and this, and other sector strategies will develop with input from businesses to ensure that skills gaps are addressed.[168]

10.2.5 In addition, KCC has worked with energy companies and colleges to facilitate the provision of short courses so that unemployed people competent in different aspects of work, such as marine, heights, confined spaces, as well as qualified electricians could acquire the other skills in the required 'set' and gain employment. In the future, KCC will be seeking to pilot apprenticeships leading to qualifications including those appropriate to working in the offshore wind industry.[169]

10.3 'Low Carbon Opportunities for Growth'

10.3.1 KCC's Report, Low Carbon Opportunities for growth builds on the UK Low Carbon Industrial Strategy[170] to identify how to maximise the benefits to Kent from growth of the sectors. It is vital that Small and Medium sized Enterprises (SMEs) and new businesses have the ability to fully understand and take advantage of the opportunities offered by the transition to low carbon and renewable energy, so that their business plans, forecasts and borrowing can be fully informed. It is equally important for investors to be confident that right infrastructure and planning policies are in place to allow development of renewables across the county, whether in new builds or through the retrofitting of existing properties.[171]

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[167] Ibid

[168] Dunn, S. and Styles, M. (2010) Developing Sector Based Skills Strategies. Internal Report

[169] Roger Gabriel, Employment and Skills Board Manager, Kent and Medway – Supplementary Evidence

[170] HM Government, 2009 *The UK Low Carbon Industrial Strategy,* London: BERR/DECC

[171] James Sweet, Commercial Director, C4Ci – written evidence

10.4 Offshore wind development

10.4.1 The Select Committee learned about the opportunities arising from large scale offshore wind farm development. Kent has benefited from £4.5 billion in capital investment to the offshore wind industry and there is a potential for a further £110 million per annum in operations and maintenance. The Carbon Trust estimate that there could be between 40,000 and 70,000 jobs along the UK supply chain by 2020[172] by which time UK employees could account for half of wind farm service jobs globally.[173] These estimates are dependent on the success of the Phase 3 wind farms which have yet to gain the necessary agreement.

10.4.2 In order for Kent and Medway to benefit from Phase 3, in addition to Ramsgate which is *en route* to becoming a base for Operations and Maintenance for the London Array and Thanet Offshore wind farms, and Whitstable, which is the established operations and maintenance base for the Kentish Flats wind farm, considerably bigger sites will need to be identified, particularly for Tier 1 suppliers to the industry.[174]

10.4.3 RWE Npower Renewables Ltd (RNRL), the UK subsidiary of RWE Innogy who develop and operate wind farms and other renewable electricity projects, informed the Select Committee that it would like to direct a large proportion of its €1.1 billion annual investment in renewables to the U.K. provided the regulatory framework is favourable. The risk of not creating the right planning and regulatory conditions, and of failing to identify appropriate sites in the county and in Medway will be '*that Kent will miss out on a massive new industry sector which will create jobs*.'[175]

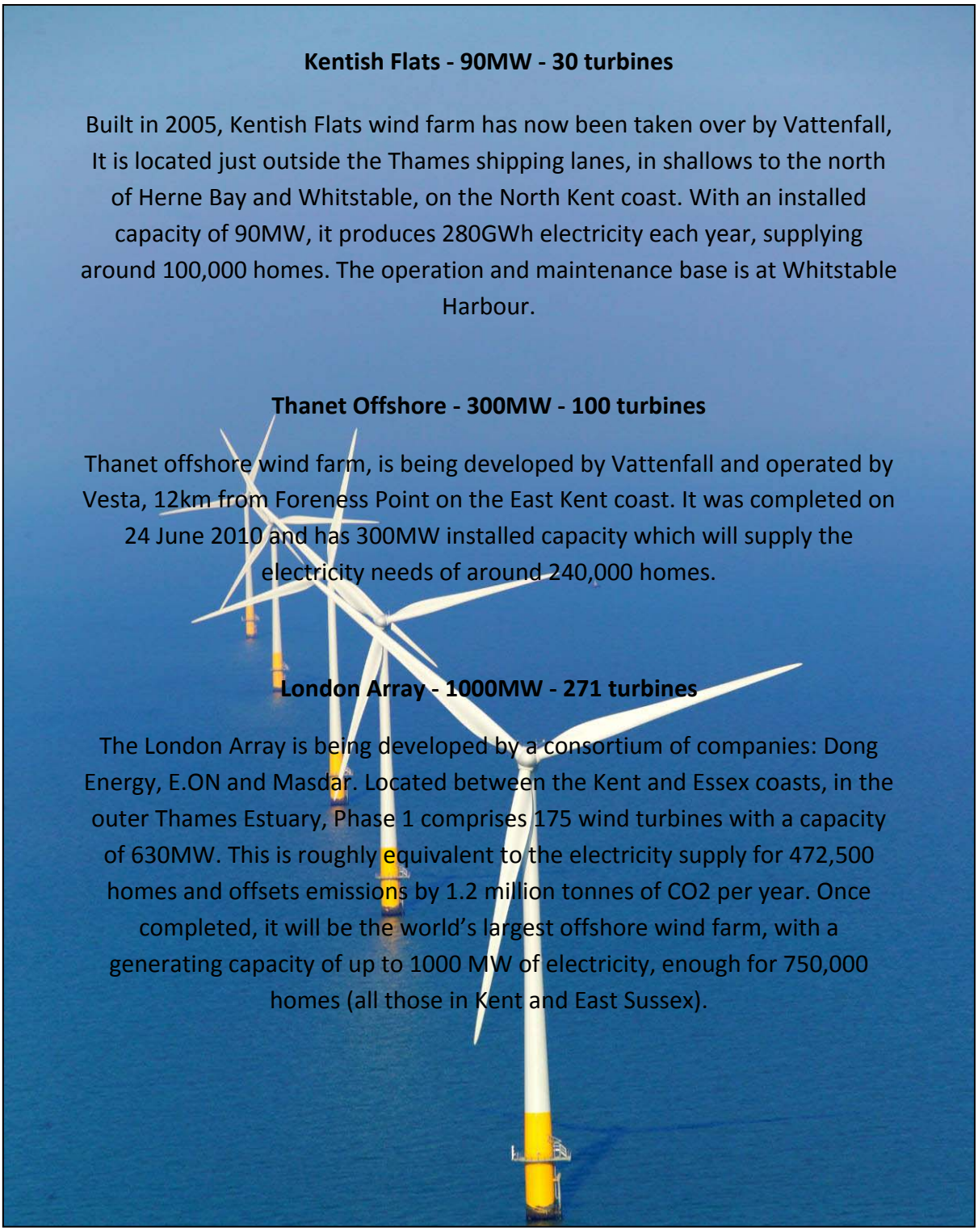
10.4.4 Wind farm development off the Kent coast is highlighted on the next page.

[172] (based on 29 GW of installed capacity)

[173] Global Climate Network (2009): *Low-Carbon Jobs in an Inter-Connected World*, London: GCN

[174] Karl Jansa, Business Development Manager, Locate in Kent – written evidence

[175] Ibid



Kentish Flats - 90MW - 30 turbines

Built in 2005, Kentish Flats wind farm has now been taken over by Vattenfall, It is located just outside the Thames shipping lanes, in shallows to the north of Herne Bay and Whitstable, on the North Kent coast. With an installed capacity of 90MW, it produces 280GWh electricity each year, supplying around 100,000 homes. The operation and maintenance base is at Whitstable Harbour.

Thanet Offshore - 300MW - 100 turbines

Thanet offshore wind farm, is being developed by Vattenfall and operated by Vesta, 12km from Foreness Point on the East Kent coast. It was completed on 24 June 2010 and has 300MW installed capacity which will supply the electricity needs of around 240,000 homes.

London Array - 1000MW - 271 turbines

The London Array is being developed by a consortium of companies: Dong Energy, E.ON and Masdar. Located between the Kent and Essex coasts, in the outer Thames Estuary, Phase 1 comprises 175 wind turbines with a capacity of 630MW. This is roughly equivalent to the electricity supply for 472,500 homes and offsets emissions by 1.2 million tonnes of CO2 per year. Once completed, it will be the world's largest offshore wind farm, with a generating capacity of up to 1000 MW of electricity, enough for 750,000 homes (all those in Kent and East Sussex).

10.5 Kent Wind Energy Directory

10.5.1 The Select Committee learned that KCC has invested in an online directory to support local businesses in meeting the needs of offshore wind developers. [176]

The Kent Wind Energy Directory

On 1st July 2010 Backing Kent Business[1], in collaboration with London Array and Marine South East, launched Kentwindenergy.co.uk; an interactive online business directory (the first of its kind) dedicated to supporting the growth of the offshore wind industry around the Kent coast.

The directory provides information about development of the offshore wind industry in the UK and will enable businesses involved in the supply chain to plan for forthcoming opportunities, register their capability, and bid for contracts. Wind farm developers will have the benefit of a simple-to-use search facility, enabling them to identify companies who have the right skills and expertise to meet their requirements at every stage, from project development through to construction and operation.

The online portal is designed to support Kent businesses, ensuring they can benefit from the wide range of opportunities as the industry develops.

10.5.2 Jane Ollis, Business Support Kent, explained to the Select Committee that in order to support business in its response to a new challenge such as the opportunity provided by a switch to a low-carbon economy, it is important to focus on the relatively small number of 'early adopters' who are prepared to invest in new technology following the initial innovation, so that market creation can occur and suppliers are geared up to step into the market once the consumer demand is there.

10.5.3 In addition to early adopters, there are also likely to be significant opportunities arising from low-carbon industry development for tradesmen such as heating engineers, plumbers, builders, decorators, windows fitters and given that the pace of change is such that 'every Londoner is going to be in 1 mile's reach of an electric charging point within 5 years', presumably electricians too.

10.5.4 With regard to the supply chain for microgeneration the Select Committee learned that in Kent we are fortunate to have quite good capacity and this is due in part to the work of Creative Environmental Networks (CEN) who have been promoting renewables in Kent for some time through their own microgeneration supply chain network.[177] The introduction of the

[176] Neil Hilkene, Sustainability Manager – supplementary evidence

[177] Tom Vosper, Head of Biomass Team, Creative Environmental Networks – written evidence

Feed-in Tariff means that further development of the supply chain in this sector of the market will be necessary and will create opportunities for further jobs in the county.

10.6 Microgeneration Certification Scheme Accreditation

10.6.1 Both the Feed-in Tariff and Renewable Heat Incentives will require small scale schemes to be installed by companies accredited to Microgeneration Certification Scheme (MCS) standards. For the Feed-in Tariff, this applies to installations up to 50kW capacity (except in the case of anaerobic digestion where MCS accreditation is not required). For larger schemes of between 50kW and 5MW (and anaerobic digestion up to 5MW), generators can obtain accreditation through the ROO-FIT process operated by Ofgem; an online registration scheme for renewable and Combined Heat and Power (CHP) generators which also facilitates the exchange of traded certificates and Renewable Electricity Guarantees of Origin.

10.6.2 According to the Energy Saving Trust, at June 2010 there were 100 accredited MCS installers in the South East listed below according to the technology they specialise in:

- Biomass - 6
- Heat pumps - 30
- Hydro - 1
- Solar PV - 49
- Solar thermal - 66
- Wind turbines – 9

10.6.3 Following the introduction of the RHI next year, there may prove to be insufficient capacity of 'installers, designers and architects' for biomass, heat pumps and solar, and accreditation schemes for both equipment and installers may themselves need to be strengthened.[178]

10.7 Industry confidence

10.7.1 Apart from the significant investment attracted to Kent by the development of offshore wind, the Select Committee learned that across the UK at least 13,000 jobs in the farming industry are expected to be dependent on the development of renewable energy; supported by income from on-farm anaerobic digesters, small scale on farm generation, ground rents and electricity sales from wind farms plus the supply of biomass feedstocks.[179]

[178] William White, SE Regional Director, National Farmer's Union – written evidence

[179] Ibid

10.7.2 To attract investors to Kent, it is vital that industry confidence is gained and that sites are identified for the types of scheme that are needed. The Select Committee were told that, for example, '*every farmer should have the opportunity to become a net exporter of low-carbon energy services*' but it is currently the case that few if any farmers in Kent have managed to participate in the way they would like and most are still reliant on fossil fuels for their own operation, hampered by such things as planning difficulties, grid connection charges and environmental regulation.

10.7.3 Apart from being ideally placed to produce transport biofuels; wood, straw and energy crops for electricity and heat, and anaerobic digestion for biogas; it is the view of the National Farmers Union that there is great potential to attract investment to Kent since agricultural buildings and land are well-suited for the siting of solar PV technology, wind power and ground source heat. The different grades of land that are available mean that: '*renewable energy can be embedded in the agricultural sector without any possibility of perceived conflict with the industry's traditional role in food production'.*[180] Furthermore, there is similarly an opportunity for the siting of solar PV technology on other commercial buildings, particularly those with large roofscapes across the county.

RECOMMENDATION 1

That KCC works with Kent District and Borough Councils and others to agree a Low Carbon and Renewable Energy Strategy for Kent to enable the uptake of the most appropriate low carbon technologies.

RECOMMENDATION 2

That a Member Champion for Low-Carbon and Renewable Energy is appointed to promote the implementation of the Strategy and report back to Cabinet and the Cabinet Climate Change Working Group on progress.

RECOMMENDATION 5

That KCC capitalises on opportunities in its own estate, and works with local authorities, energy network companies, landowners and prospective investors to ensure that a proactive approach is taken to the identification of sites for renewable energy schemes in the county, in order to encourage and enable investment.

[180] William White, SE Regional Director, National Farmer's Union – written evidence

10.8 Sustainable Business Programme

10.8.1 As well as providing support for businesses directly involved in the low-carbon sector, a number of KCC workstreams provide support to SMEs to increase their sustainability since the environmental credentials of companies are important to customers. Having developed over a number of years, the KCC/Environment Agency (EA) Sustainable Business Programme works to influence businesses in Kent, decrease their impact on the environment and save them money. The main aspect of the programme is a free-to-business review service whereby an EA adviser audits businesses and provides advice on energy, water and waste.

10.8.2 Reductions in carbon emissions and costs savings are achieved through take up of advice on efficiencies, as well as on transport issues. With around 30% of advice being followed up, there are demonstrable savings equating to an average of £1800 per annum for each business (6 tonnes of carbon per year)[181].

10.9 Low Carbon Futures Project

10.9.1 Through its Low Carbon Futures Project, which is funded by the South East Regional Development Fund Competitiveness Programme and runs from 2007 – 2013, KCC is supporting small and medium sized enterprises in all sectors to address their carbon footprint and to improve their environmental credentials by working towards accreditation.[182] With further funding from the private or public sector, the project hopes to influence businesses beyond the lifetime of the project ensuring that reductions in carbon emissions are achieved throughout the South East.

10.9.2 The project relates to National Indicators on carbon emissions reduction NI185 (KCC's own estate) and NI186 (Kent-wide) and to the strategic aims of adopting resource-efficient business practices as well as sustainable consumption practices. The project is being delivered by KCC with support from Business Support Kent, the Environment Agency, Kent fire and Rescue, Kent Police and The Carbon Hub. The four elements of the project are sustainable transport (covered in the next section), accreditation, providing a service which could be replicated elsewhere, and the South East Business Carbon Hub, a website created by The Carbon Hub Limited; developed and tailored in conjunction with KCC. Key elements of the project are highlighted on the next page.

[181] Alex Green, Sustainable Business Manager – supplementary evidence

[182] Information provided by Viviane Walker, Carbon Hub Adviser and Jennie Colville – Low Carbon Futures Project Manager

The South East Business Carbon Hub

What – An online resource for businesses that allows them to measure their carbon footprint (including energy, water, waste, and transport); create action plans to reduce carbon emissions and costs; work towards implementing an environmental management system (EMS); communicate with other businesses and access resources in relation to sustainable business. Website https://southeastbusiness.carbon-hub.com

How - Businesses can apply or be invited to the hub. Following checks for eligibility (SME based in the South East) the organisation can feature on the site. Service support will be provided via online seminars and by the Carbon Hub Adviser.

When – The site is live with more than 70 businesses registered on a trial basis. After further development, more businesses are now being encouraged to sign up and the Hub aims to help 1000 businesses by 2013.

Why - Businesses seeking to implement an Environmental Management System (EMS) will find useful tools on the website. A sophisticated but simple reporting mechanism became available in June to enable businesses to monitor their own progress. Through the Hub, businesses will be enabled to respond to increased pressure from clients, stakeholders and legislation to take effective, practical action to measure and reduce their carbon emission. They will also benefit from lower operational costs from improved efficiencies.

Accreditation

By promoting an accreditation scheme (BS 8555 EMS), the Hub will enable businesses to be recognised for the environmental work they have undertaken and having better environmental credentials could give them a competitive edge and lead to new business. Companies can obtain environmental accreditation much more cheaply and easily by using the Carbon Hub.[183]

10.9.3 A key way for KCC to promote sustainable business would be through its own procurement of goods and services which is in the region of £860 million annually. This would also support Kent Environment Strategy Priority 4 which is to reduce the ecological footprint of what we consume.

10.9.4 While acknowledging that suppliers have 'many hoops to jump through', the Select Committee believe that KCC should seek to support those companies who are being proactive about their own environmental impact and the importance of companies' carbon footprints could be flagged up through the tendering process.

[183] Jane Ollis, Business Support Kent – oral evidence 26th May 2010

10.9.5 The National Farmers Union are also of the opinion that KCC could send a strong message of support by 'leading by example' with regard to sustainable procurement policies.

RECOMMENDATION 13

That, provided currently agreed procurement criteria are met, KCC considers giving preference, for the procurement of goods and services, to businesses who obtain accreditation through the South East Carbon Hub.

10.10 Kent Excellence in Business Awards

10.10.1 The Awards run across a range of categories as shown below:

Best Business from the Creative Industries
Best Business in Adult Social Care
Best Leisure and Tourism Business
Business Commitment to the Community Award
Customer Service and Commitment Award
Employer of the Year
Entrepreneur of the Year
Large Business of the Year
Outstanding Contribution to the Business Community of Kent
SME Business of the Year
Start Up Business of the Year
Young Entrepreneur of the Year

10.10.2 The Select Committee were interested to learn how the Awards could prompt businesses to take action on carbon reduction. It was the view of Jane Ollis, Business Support Kent, that the importance of carbon reduction across the board could be emphasised by having an additional question such as 'what are you doing to reduce the carbon impact of your business?' in every category. Organisations that enter for the Kent Excellence in Business Awards are automatically shortlisted into the Kent Environment Awards, so there is a strong link across, on the importance of taking action on energy efficiency.

10.11 Kent Environment Awards

10.11.1 The Environment Awards which have been taking place for 22 years, reward Kent businesses who show corporate responsibility and excellent environmental performance. It is the view of Karl Jansa, Locate in Kent, that the awards have also highlighted how companies can save money by being energy efficient.

11 CONCLUSIONS

Satisfying Kent's future energy demands will present both challenges and opportunities and it is important that we minimise any threats and take advantage of the real opportunities that exist. The Select Committee has little doubt that the people of Kent would like to see the environmental impact of energy production and use minimised and it is also clear that there are significant financial savings to be made. Failure to change will result in substantial additional costs to the council, and to the county as a whole. The case for change is therefore very strong and it is good sense to secure a successful transition to a low carbon future for Kent.

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Appendix 1: Glossary

AD	Anaerobic Digestion
ASHP	Air Source Heat Pump
Biomass	Plant material and animal waste that can be used as fuel
Biofuels	Synthetic fuels made from biomass commonly bio-ethanol and bio-diesel
CERT	Carbon Emissions Reduction Target Funding
CHP	Combined Heat and Power
CO_2	Carbon Dioxide
CoP	Coefficient of Performance – measure of energy efficiency usually applied to heating and cooling devices
Coppicing	Cutting trees close to the ground so that they produce several small shoots which can be harvested every few years and used for a variety of purposes including fuel.
CRC	Carbon Reduction Commitment
DCLG	Department of Communities and Local Government
DEC	Display Energy Certificate
DECC	Department of Energy and Climate Change
DH	District Heating
Distribution (electricity)	Local wiring from substations to customers.
Distributed Energy	Heat and power generated and used locally
DNO	Distribution Network Operator
Embedded (or embodied) energy	Energy used in manufacturing, packaging and supplying a product.
EPC	Energy Performance Certificate
ESCO	Energy Services Company
EST	Energy Saving Trust
FC	Forestry Commission - government department responsible for all forestry matters in England plus executive forestry functions throughout Great Britain.
FIT	Feed-in Tariff
Fossil Fuel	Ancient biomass (e.g. petroleum, coal, natural gas)
Gigawatt (GW)	Unit of power equivalent to 1 billion watts or 1000 megawatts
Gigawatt hour (GWh)	Unit of energy equivalent to 1 hour of electricity consumed at a rate of 1 GW
GPDO	General Permitted Development Order
GSHP	Ground Source Heat Pump - transfers heat from the ground to a building via a heat exchanger, for space heating and hot water. Can

	be used in reverse for cooling.
ha	hectare – unit of land measurement equal to 2.471 acres
Joule	Unit of energy
kilowatt (kW)	Unit of power equivalent to 1000 watts
kWh	Unit of energy equivalent to 1kW of power expended for one hour of time.
LASER	Group within KCC Commercial Services responsible for energy matters.
Load factor	Ratio of average energy demand (load) to the maximum demand (peak load) during a period.
LCBP	Low Carbon Buildings Programme (renewable energy grant scheme which closed to new applications on 24th May 2010)
Megawatt (MW)	Unit of power equal to 1000 kilowatts
Miscanthus	Woody, perennial grass – biomass/biofuel source
Ofgem	The Office for Gas and Electricity Markets
Peak Oil	Global peak in oil production
Retrofitting	Installing or adding features/measures to a building which has already been constructed.
RHI	Renewable Heat Incentive
RO	Renewables Obligation - the main support scheme for UK renewable electricity projects, whereby UK electricity suppliers must source an increasing proportion of electricity from renewable sources.
ROCs	Renewable Obligation Certificates - issued to an accredited generator for eligible renewable electricity generated, and supplied to customers, within UK by a licensed electricity supplier.
SAP	Standard Assessment Procedure - government system for calculating the energy rating of residential buildings. (Includes lighting, space heating, water heating and CO_2 emissions.)
SME	Small and Medium Sized Enterprises are businesses which employ fewer than 250 people; with an annual turnover of up to 50 million euro, and/or an annual balance sheet of up to 43 million euro.
TOE	Tonnes of Oil Equivalent = unit of energy equal to that derived from burning 1 tonne of oil = to 11.63 GWh
Transmission (electricity)	Transfer of very high voltage electrical energy from generating plants to local substations. In the UK this is mostly via overhead cables supported by towers (usually referred to as pylons) or insulated cables buried underground. National Grid is the main transmission company in the UK.

Appendix 2: Written Evidence

Organisation	Name	Position	Format
British Gas	Niall Thorburn	Community Energy	Email/comment
C4Ci	James Sweet	Commercial Director (Chairman of KEB Task & Finish Group on Maximising Green Opportunities)	Document
Canterbury City Council	Charlotte Hammersley	Senior Scrutiny and Improvement Officer	Documents
Carbon Free Group	Jay Mather	Director of Sustainability	Documents
Carbon Trust	Matthew Spencer	Head of Government Affairs	Email/ comment
Creative Environmental Networks (CEN)	Jeff Slade	Director, Technical Services Team	Document
Creative Environmental Networks (CEN)	Tom Vosper	Head of Biomass Team	Document
CPRE	Sean Furey	Deputy Director	Document
Energy Saving Trust Advice Centre (ESTAC)	Matthew Morris	Senior Project Manager	Document
E.ON Climate and Renewables	Brian Tilley	Strategy and Stakeholder Coordination Manager	Document
Environment Agency	Jennie Donovan	Planning and Communications Manager – Kent and East Sussex	Document
Fintry Development Trust	Bill Acton	Founder	Email/ comment
Fintry Development Trust	Martin Turner	Founder	Email/ comment
Forestry Commission	Ian Tubby	Head of Biomass Energy Centre	Document

Forestry Commission	Matthew Woodcock	Programmes Manager, South East Region	Document
Greenwich University	Dr Jeff Pedley	Business Development Manager, School of Science - Low Carbon Projects	Document
Kent Community Foundation	John Jackson	Funds Manager	Document*
Kent Downs AONB	Nick Johannsen	Director	Documents
Kent Enviropower (WRG)	Paul Andrews	Managing Director	Document
Kent Highway Services	Peter Rosevear	Senior Transportation Engineer	Document
Locate in Kent	Karl Jansa	Business Development Manager	Document
Medway Council	Steve Long	Senior Research and Review Officer	Email/Comment
National Farmers Union	William White	SE Regional Director	Document
Natural England	Nigel Jennings	Environmental Planning Adviser	Document
RWE npower renewables (RNRL)	Katy Woodington	Community Investment Officer	Document*
RWE npower renewables (RNRL)	Dr Wayne Cranstone	Head of Onshore Development and Projects	Document
South East England Partnership Board	David Payne	Planning Manager	Document
University of Greenwich (Bioenergy Research Group)	Jeff Pedley	Business Development Manager	Document
Community Groups and Members of the public			Email/comment

Appendix 3: Hearings

14th April 2010

- Peter Binnie, Head of Operations (Property Group)
- Andy Morgan, Head of Energy Management
- Rebecca Spore, Head of Public, Private Partnerships and PFI (CFE)
- John Thorp, Director, Thameswey Energy

21st April 2010

- Rob Asquith, Director of Land and Planning, New Earth Solutions
- Sue Barton, Strategic Projects and Business Development Manager (Waste Management)
- Dan Gillert, Commercial Manager, Living Fuels

12th May 2010

- Ian Tubby, Head of Biomass Energy Centre, Forestry Commission
- Matthew Woodcock, Programme Manager – SE Region, Forestry Commission
- Dr Howard Lee, Lecturer and Sustainability Champion, Hadlow College
- Jonathan Scurlock, Chief Adviser, Renewable Energy and Climate Change, National Farmers' Union
- William White, SE Regional Director, National Farmers' Union

19th May 2010

- Janey Bray, Research and Project Manager, Amicus Horizon
- Richard Hurford, Head of SE Region, Energy Saving Trust
- Steve Plater, Core Group Member, Sevenoaks Transition Town
- Ian Smith, Core Group Member, Sevenoaks Transition Town

26th May 2010

- Jane Ollis, Head of Sustainable Business, Business Support Kent
- Howard Johns, Director, OVESCO
- Chris Rowlands, Director, OVESCO
- Paul Reynolds, Offshore Wind Development Manager, RenewableUK

27th May 2010

- Mike Dixon, Engineering Projects Manager, EDF Energy Networks
- John Park, Infrastructure Planning Engineer, EDF Energy Networks
- Dick Polley, Planning Manager (South), EDF Energy Networks
- David Cook, Metrotidal NB
- Matthias Hamm, Metrotidal NB
- Mark Willingale, Metrotidal NB

1st June 2010

- Simon Cole, Senior Planning Officer, Ashford Borough Council
- Robin Haycock, Associate, Arup
- Jennifer Hunt, EMS Project Manager, Maidstone Borough Council
- John Newington, Senior Pollution Officer, Maidstone Borough Council
- Peter Rosevear, Senior Transportation Engineer, Kent Highway Services
- Laurienne Tibbles, Sustainability Manager, Ashford's Future

Appendix 4: Visits undertaken as part of select committee review

3rd March 2010

Ecobuild Conference, Earl's Court

16th March 2010

Beaufort House, Headquarters of Renewable Energy Systems Limited, Kings Langley, Hertfordshire

20th April 2010

'Keeping the Lights on', Protect Kent Energy Conference at Pines Calyx, St Margaret's at Cliffe

17th May 2010

South East England Partnership Board – Consultation Event (Sessions House)

6th July 2010

St Peter's Church of England Primary School, Aylesford

Appendix 5: Summary of questionnaire survey results

1. Number of responses = 47

2. Breakdown of responses by District and school type:

District	**Primary**	**Secondary**	**Special**	**Total**
Ashford	5	0	0	5
Canterbury	2	0	0	2
Dartford	4	1	0	5
Dover	0	3	0	3
Gravesham	0	2	1	3
Maidstone	3	1	0	4
Sevenoaks	3	0	1	4
Shepway	1	0	0	1
Swale	5	1	0	6
Thanet	4	1	0	5
Tonbridge & Malling	7	2	0	9
Tunbridge Wells	0	0	0	0
TOTAL	**34**	**11**	**2**	**47**

3. Schools' current energy rating (where stated):

Not stated/ Not applicable	A 0-25	B 26-50	C 51-75	D 76-100	E 101-125	F 126-150	G 150+
13	0	0	6	15	10	3	0

4. Main heating fuel:

Gas	Oil	Calor Gas	Gas/Oil	Oil/Elec	Woodchip/ Gas
26	15	1	3	1	1

5. Eco Schools status:

Yes	No	Not Stated
28	18	1

6. Energy saving measures in place:

Notes:

i) There was a problem filling in the questionnaire in some cases.

ii) No definition of energy saving measures was given and the perception of an energy saving measure varied e.g. some responses related to water efficiency measures (these are not noted below).

iii) 20 schools did not respond to this question or said none were in place.

Energy saving measures noted:

- Lighting sensors, new light fittings
- Double glazing
- Boiler controls
- Improved programmer on boiler and lower energy electric tube fittings and some roof insulation
- Energy saving light bulbs, energy saving reminders about the school
- Movement sensors, sun tubes, timed switches
- Switching off lights, standby on computer, closing doors to keep heat in, low energy bulbs
- One boiler renewed since DEC survey, educating children, eco warriors
- Lighting controls, boiler controls
- Eco monitors, monitoring of electric and gas, renewal of heating parts
- Heating controls, lagging to pipes, light sensors in classrooms

- Currently we are educating pupils, having the green gang we have attained our second Green Flag, two walking buses, meter readings, fabric collections. Power Busters are nominated pupils who turn off lights close doors etc
- ICT suite closedown checks each night, lights, power etc
- Power sources turned off when rooms not used
- Insulated all roofs and walls (where possible), eco plan in place to reduce, reuse, recycle
- Energy efficiency notices

7. Energy saving measures planned:

16 schools did not respond to this question or said none were planned.

Comments included:

No energy efficiency work due to budget implications for school. Haven't been able to obtain 100% funding.

Undecided

Planned energy saving measures noted:

- Double glazed windows and door
- Planning to become an Eco school
- Planned Eco status
- Next level of Eco Schools status
- LED lighting
- Replacement of old radiators, adding thermostatic valves.
- Power Rangers
- Monitoring – we are open to ideas to cut our energy bills!
- Expecting BSF to significantly improve energy efficiency and make substantial savings through a variety of energy efficiency measures
- Voltage optimisation being installed summer 2010
- Changing light fittings for more efficient ones, cutting down on food waste
- Energy Meter
- To complete double glazing
- Radiator thermostats being fitted August 10
- Recycling

7. Renewable technologies in place:

Yes	No	Not Stated
10	36	1

Technologies at the 10 schools:

i) photovoltaic panels
ii) photovoltaic panels
iii) not stated
iv) ground source heat pump (greenhouse only)
v) photovoltaic panels
vi) photovoltaic panels
vii) photovoltaic panels and wind turbine
viii) photovoltaic panels, solar thermal panels and wind turbine
ix) air source heat pumps
x) biomass heating

8. Schools with south-facing roof space

Yes	No
40	7

9. Amount of south-facing roof space (n=40)

Not stated	>30m^2	30-99m^2	100-499m^2	500 m^2+
18	1	3	12	6

10. Currently considering renewable energy systems:

Yes	No	Not Stated
20	25	2

The technologies being considered included photovoltaic panels (which in one case were currently being fitted), solar thermal panels and wind turbine.

11. Reasons for not considering renewable energy systems (in some cases these are reasons for not yet taking plans further, even though systems have been considered:

- Lack of funding/costs
- Flat roofs, very old building, densely populated residential area
- Strict planning permission
- Time (to consider options)
- (Not considering but would like to)

Other comments included:

- PV installed in 2009 with grants, further initiatives too expensive.
- Our boiler is very old and KCC hope to replace this in the next financial year.
- Would like to investigate possibility of funding /support for panels on south facing school roof pv/st and also need to investigate KCC planning dept attitude to school installation in AONB/sensitive area
- We would be an ideal site for the location of wind turbines and solar panels, which we have previously considered but as part of BSF Wave 5 with a prospective new build on a relocated site, were not able to pursue further. However, now BSF is cancelled, it would be timely to look at this again but funding is an issue however as the school has no available funds to contribute to the cost of renewable energy schemes.
- Unsure what is available
- Registered with British Gas for free solar panels
- Wind turbine to be installed at off-site engineering centre summer 2010
- Would like to purchase mini wind turbine
- Grants in place. Planning permission for PV, still trying to get planning permission for wind turbine but at risk of losing grants.

12. Information or support that would assist schools in making decisions about energy efficiency work or the installation of renewable technologies:

The original questionnaires distributed via the schools' e-bulletin allowed one choice from a list of options. Following comments, the version sent out with a 'reminder' enabled selection of more than one option. The options given were:

Access to online resources
Access to case studies
An energy checklist

Information about KCC Energy and Water Loan Fund
Site visit by energy assessor
Training Course
Visits to/meet with other schools

Of those questionnaires sent back with only the top selection possible, the most popular choices (evenly split) were an energy checklist and information about the Energy and Water Loan Fund. Respondents who could choose more than one option frequently chose all, or most of the options given.

13. Respondents were asked whether they would, in principle, be interested in a scheme (which could be brokered by KCC) whereby their school could benefit from energy efficiency work and the installation of appropriate renewable energy systems, enabling immediate financial savings and reducing carbon emissions by accessing funding at a cost less than the value of savings to be made (and whether they would like more information about such a scheme should it become available).

98% (46/47) respondents indicated their interest in such a scheme

(The remaining respondent had already obtained grant funding for renewable technologies but had not yet been given planning permission to proceed.)

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http://www.fitariffs.co.uk

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ACKNOWLEDGEMENTS

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All the information received, whether or not it has been included in the final report, has contributed to the Select Committee's knowledge and appreciation of the issues.

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