Mid Sussex District Council

Sustainable Energy Study

Final Report

AMEC Environment & Infrastructure UK Limited

October 2014

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Executive Summary

Purpose of this Report

The purpose of this report is to help Mid Sussex District Council develop planning policies for renewable energy and climate change in the emerging Mid Sussex District Plan 2014-2031 (the District Plan). These policies need to reflect national and local priorities for reducing carbon emissions and responding to climate change based on the specific characteristics of Mid Sussex.

Key considerations for planning policy development in the District include:

- Understanding the latest national policy and legislative context regarding how local authorities should plan for climate change, both in terms of reducing carbon emissions and ensuring resilience to the impacts that are already faced. The on-going housing standards review being progressed by government, which aims to reduce regulation on house building, will also have key implications for the preparation of new planning policies.

- The District's potential for new renewable and low carbon energy projects (e.g. wind turbines, solar, hydro and biomass schemes), considering energy generation potential alongside environmental and technical constraints, including designated landscapes. In this regard, we can draw on the conclusions of the previous energy capacity study for West Sussex published in 2009[1] and accompanying landscape evidence.

- The level of new development, including new homes and associated employment planned by the Council through allocations in the District Plan (or Neighbourhood Plans), considering what requirements can be placed on developers to maximise energy efficiency, encourage the take-up of renewable technologies and reduce carbon emissions associated with the built environment.

Key findings

Potential for new renewable and low carbon energy projects

The potential for new large-scale renewable/low carbon energy projects in Mid Sussex is limited due to a range of technical constraints (e.g. communication links and airport/radar, particularly for wind) as well as nationally important landscapes (area of outstanding natural beauty and nearby national park). Whilst such constraints do not necessarily preclude renewable energy development, the range of issues simply increases the risks for potential developers. This is one of the reasons why there has been no significant interest from developers in bringing forward major renewable energy projects in Mid Sussex to date.

[1] West Sussex Sustainable Energy Study, Centre for Sustainable Energy, 2009

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Potential for community-led energy projects

Given the limited potential for larger commercial scale renewable energy projects, one opportunity may be for community-led renewable/low carbon led schemes at a smaller scale, for example a community owned wind turbine(s), solar farm or biomass scheme. These types of project are encouraged in national planning policy and could be delivered as part of neighbourhood plans or other local initiatives to help support energy security, respond to fuel poverty and reduce carbon emissions. Similar schemes in the UK typically involve the local community having shared investment in project, which could offset their energy bills or provide a longer term financial return on their investment.

Landscape capacity

With Mid Sussex covered by an area of outstanding natural beauty (High Weald) and adjacent to a national park (South Downs), the potential for landscape impacts was a key issue raised in previous work commissioned by the Council. Whilst landscape designations need not necessarily preclude renewable energy schemes, it is likely that if projects do come forward then the focus will be on well designed smaller scale schemes which are sensitive to landscape character and site-specific characteristics.

Delivering on-site renewables and zero carbon development

A traditional approach to ensuring that new residential/commercial developments are energy efficient and reduce carbon emissions is to ask a developer to provide a specific percentage of renewable energy on-site as part of their scheme (typically 10%). A similar model could be adopted in Mid Sussex however consideration needs to be given to wider national initiatives, including changes to building regulations, which will already necessitate use of on-site renewables. For example, from 2016 all new homes are expected to be 'zero carbon', to be enforced through building regulations through a combination of energy efficiency (better building performance), on-site renewables and off-site measures known as 'allowable solutions' (likely to be a financial contribution paid by the developer).

A wider approach to housing and development standards

Established standards already exist to help ensure sustainable design and construction for new homes and commercial developments, namely the Code for Sustainable Homes and BREEAM respectively. Typically, local planning authorities have required that developers achieve a particular rating against these standards, for example that all new homes are to be built to Code for Sustainable Homes Level 4 and non-residential development to achieve BREEAM 'Excellent'. The caution with pursuing this approach is that the government is now proposing to scale back use of the Code for Sustainable Homes. Many elements of the Code are to be incorporated within future revisions to building regulations to help achieve the zero carbon building standard (building regulations are expected to be set at a level commensurate with Code Level 4). It is for these reasons that the government's latest consultation on housing standards suggests that planning authorities should no longer include Code requirements in their plan.

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Summary

There are two main areas where planning policy can assist with the take-up of renewable energy and energy efficiency in Mid Sussex, reflecting the policy context and key findings in this report:

- Providing a policy which both supports and encourages renewable energy schemes, including community-led schemes, subject to considering the local environmental impacts (from impacts on landscape to heritage and amenity).

- Providing a policy which requires developers to actively plan for energy efficiency and renewable energy as part of new development projects (including sites allocated in the District Plan or future neighbourhood plans), linking with national policy. The focus here will be on ensuring that developer's actively respond to national targets, such as zero carbon homes from 2016, given the land-use implications that this could have for their masterplans (e.g. the need to consider on-site generation to achieve the zero carbon standard).

In developing the policy recommendations in this report it is important to note that the national policy context is still evolving, with further government announcements pending in relation to its housing standards review and timetable for delivering zero carbon homes. It is for these reasons that the policy wording may need to be revisited as the plan-making process continues.

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1. Introduction

1.1 Context

Mid Sussex District Council (the Council), alongside Arun, Chichester, Horsham and Worthing Councils, commissioned a Sustainable Energy Study in 2009[2] to investigate the opportunities for renewable and low carbon energy across West Sussex County. This work informed policies within the Mid Sussex District Plan submitted in July 2013 (since withdrawn). With work now underway on a revised District Plan, the Council is seeking to update its renewable energy evidence base and draft new policies based on the latest national policy context. This links with wider evidence commissioned by the Council, including an updated Mid Sussex Capacity Study[3].

1.2 Purpose of this Report

The objectives addressed in this report can be summarised as follows:

- **Policy & legislation** – To establish the latest position in what is a an ever changing national policy context, reflecting targets for climate change as well as the government's zero carbon buildings programme and on-going housing standards review. This will be central to the development of planning policies for the emerging District Plan.
- **Resource Assessment** – To assess the current contribution from decentralised renewable / low carbon energy technologies operating in Mid Sussex and the opportunity for new projects, considering wind, solar, biomass and decentralised energy supply such as combined heat and power (CHP) networks. As part of this assessment, cumulative effects and cross-boundary issues will also be addressed.
- **Feasibility Assessment** – To consider the feasibility for delivering new renewable energy projects, accounting for both technical constraints (resource availability and environmental considerations) and financial constraints (to inform a revised viability assessment).
- **Local Policy Development** – To provide draft policy options to test as part of the emerging District Plan reflecting feasibility, viability, cumulative impacts and how constraints can be overcome.

[2] 'West Sussex Sustainable Energy Study', Centre for Sustainable Energy, 2009
[3] 'Mid Sussex Capacity Study', LUC, 2014

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2. Policy Context

2.1 National Policy and Legislation

2.1.1 National Legislation

The 2008 Climate Change Act commits the UK Government to delivering an 80% reduction in carbon emissions by 2050 (against a 1990 baseline) in order to help mitigate future climate change. With energy use from the built environment accounting for a significant proportion of the UK's total carbon emissions[4] the Government has identified both the spatial planning system and building regulations as having key roles to play. This is complemented by the Planning and Energy Act 2008, which first allowed local planning authorities to request on-site renewable or low carbon energy generation as part of new developments, typically referred to as the 'Merton rule' (e.g. that 10% of a development's energy demands shall be met via the use of on-site renewables). As part of the government's 2014 Deregulation Bill, it was proposed that the Planning and Energy Act would be modified to remove these provisions. However, the government has since stated that this requirement will remain following concerns from renewable energy groups.

2.1.2 National Planning Policy and Guidance

The role of the planning system in reducing emissions is affirmed in the National Planning Policy Framework (NPPF)[5] by encouraging local planning authorities to plan for new development in ways which reduce emissions (linked to wider policies on reducing the need to travel by car), actively supporting energy efficiency improvements to buildings and linking with the government's policy for zero carbon buildings (zero carbon homes from 2016). The NPPF also requires local planning authorities to have a positive strategy to promote energy from renewable and low carbon sources, design policies to maximise renewable and low carbon energy development, consider identifying suitable locations for such developments, support community-led initiatives and identify opportunities where development can draw its energy supply from decentralised, renewable or low carbon sources[6].

The NPPF is accompanied by Planning Practice Guidance (PPG), which provides further details on how local planning authorities can promote the development of renewable energy strategies in their areas, balanced against the views of communities and local environmental impacts (Refer Box 2.1).

[4] In 2009 buildings accounted for about 43% of all the UK's carbon emissions - source: Department for Communities and Local Government, https://www.gov.uk/government/policies/improving-the-energy-efficiency-of-buildings-and-using-planning-to-protect-the-environment (accessed February 2014)

[5] Department for Communities and Local Government, March 2012

[6] Refer Paragraphs 95-97, NPPF

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Box 2.1 Extract from Planning Practice Guidance

Paragraph: 003 Reference ID: 5-003-20140306

How can local planning authorities develop a positive strategy to promote the delivery of renewable and low carbon energy?

The National Planning Policy Framework explains that all communities have a responsibility to help increase the use and supply of green energy, but this does not mean that the need for renewable energy automatically overrides environmental protections and the planning concerns of local communities. As with other types of development, it is important that the planning concerns of local communities are properly heard in matters that directly affect them.

Local and neighbourhood plans are the key to delivering development that has the backing of local communities. When drawing up a Local Plan local planning authorities should first consider what the local potential is for renewable and low carbon energy generation. In considering that potential, the matters local planning authorities should think about include:

- the range of technologies that could be accommodated and the policies needed to encourage their development in the right places;
- the costs of many renewable energy technologies are falling, potentially increasing their attractiveness and the number of proposals;
- different technologies have different impacts and the impacts can vary by place;
- the UK has legal commitments to cut greenhouse gases and meet increased energy demand from renewable sources. Whilst local authorities should design their policies to maximise renewable and low carbon energy development, there is no quota which the Local Plan has to deliver.

In particular, the PPG lends support to 'community-led' renewable energy initiatives, directing to further guidance provided by DECC[7], which identifies opportunities including:

- Community-owned renewable electricity installations such as solar photovoltaic (PV) panels, wind turbines or hydroelectric generation.
- Members of the community jointly switching to a renewable heat source such as a heat pump or biomass boiler.
- A community group supporting energy saving measures such as the installation of cavity wall or solid wall insulation, which can be funded wholly or partly by the Green Deal.
- Working in partnership with the local Distribution Network Operator (DNO) to pilot smart technologies.
- Collective purchasing of heating oil for off gas-grid communities
- Collective switching of electricity or gas suppliers.

For larger 'nationally significant' renewable energy projects, the government's National Policy Statement for Renewable Energy Infrastructure (EN-3)[8] applies. These larger scale projects would be determined via the Planning Inspectorate rather than the local planning authority, with a threshold of 50 MW for onshore projects (e.g. 14 or more large wind turbines) and 100 MW for offshore.

[7] https://www.gov.uk/community-energy (Accessed October 2014)
[8] DECC, July 2011

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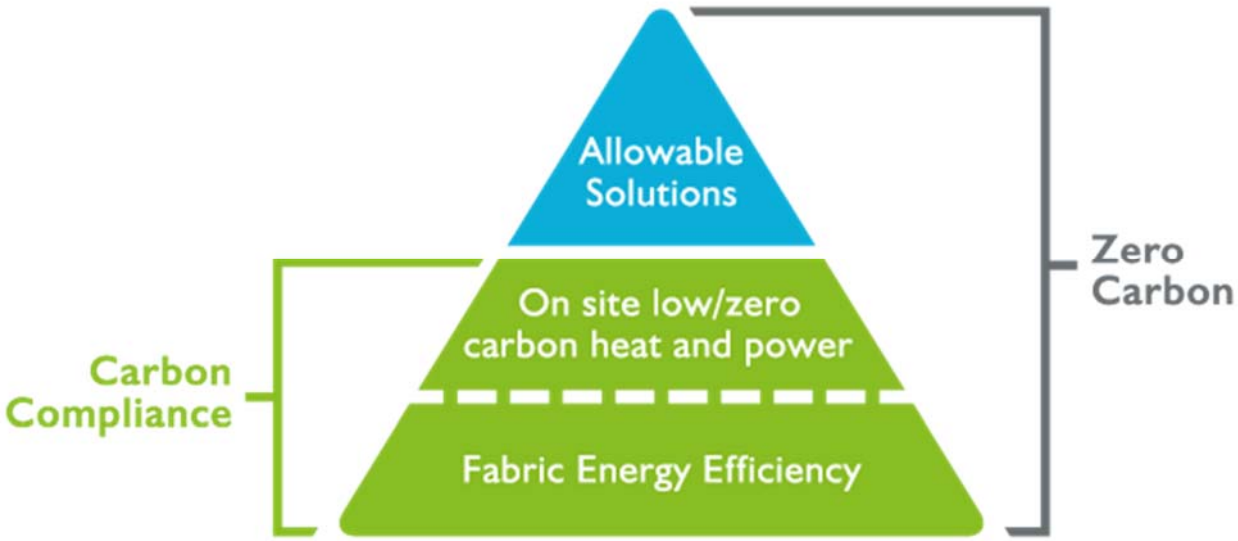
2.1.3 Building Regulations and Standards

Changes to national building regulations are on-going, alongside a government review of housing standards to reduce the number of requirements on developers. This is linked to achieving a target for zero carbon homes from 2016, which has involved incremental changes to Part L (Conservation of Fuel and Power) of the original 2006 Building Regulations: 2010 regulations represented a 25% improvement in carbon performance against 2006, with 2013 regulations representing a further 6% improvement.

The zero carbon hierarchy proposed by government is outlined in Figure 2.1. The key issue is the mechanism and final approach to delivering 'allowable solutions' (which could be off-site measures) where further guidance is awaited from government. From a planning perspective, the main consideration is what impact the 'on site low/zero carbon heat and power' could have for the masterplanning of strategic sites. It is considered important for developers to take this into account in preparing their proposals.

Figure 2.1 Zero Carbon Hierarchy



Source: Zero Carbon Hub

The government's latest consultation reports on housing standards suggests that nationally recognised standards, such as the Code for Sustainable Homes (CSH), should no longer be requested as part of local plans, with many elements of the CSH to be incorporated within national building regulations, broadly equivalent to CSH Level 4.

> *"From the date of the statement* [the Policy Statement to be published setting out the government's final list of standards], *local planning authorities will continue to be able to set and apply policies in their local plan requiring development in their area to comply with energy efficiency standards that exceed the energy requirements of building regulations until the zero carbon home policy has been put in place. This will happen alongside the commencement of the amendment to the Planning and Energy Act 2008, which,*

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subject to Parliamentary approval, we anticipate would be in late 2016. The Government has stated that from that point forwards the energy efficiency requirements in Building Regulations will be set at a level equivalent to Code Level 4. Until the amendment is commenced, we would expect local planning authorities to take the statement of the Government's intention into account in applying existing policies and not set conditions requiring energy efficiency requirements above a Code level 4 equivalent."

For reference, and to inform wider viability testing, Table 2.1 summarises the likely cost implications of achieving particular CSH levels, Building Research Establishment Environmental Assessment (BREEAM) rating and zero carbon standard. The key point here is that from 2016 the zero carbon standard is likely to present the 'baseline' to which all homes need to be built, as such it would not necessarily be seen as an extra over cost. In addition, the government has signalled that the main elements of CSH Level 4 are likely to form the basis for future building regulations. The combination of CSH Level 4 and the zero carbon standard are therefore ultimately likely to form the future baseline for building regulations, most likely from 2016. The ability to go further than this is then subject to cost and viability implications, with CSH Levels 5 and 6 having significant extra over costs (at least £6k per dwelling). Fundamentally, this is why there has been limited widespread national take-up of these standards. If the Council did want to pursue these higher standards then it would need to be considered as part of a plan-wide viability appraisal.

With regard to BREEAM, national information on extra over costs is limited when compared to the CSH. However, figures suggest that achieving a BREEAM Very Good-Excellent rating should not have a major cost impact for a scheme. BREEAM Outstanding is of course more challenging and costly to implement, as would be expected since it is deliberately intended to be the highest level of environmental performance for a building.

Table 2.1 Costs associated with sustainable building standards

Standard	Cost implications
Residential development	
Compliance with current Building Regulations (Part L) 2013	No E/O cost (baseline)
2016 Building Regulations (Zero Carbon standard)	£6,700-7,500 per dwelling (pd) for detached houses £4,100-5,100 pd for semi-detached/mid-terraced £2,300-2,500 pd for apartments *Source: Cost Analysis: Meeting the Zero Carbon Standard, Zero Carbon Hub, February 2014*
CSH Level 4 CSH Level 5 CSH Level 6	Up to £2,500 pd £6,000-9,000 pd £15,000-20,000 pd *Source: Cost of Building to the Code for Sustainable Homes, Element Energy & Davis Langdon, 2013*

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Non-residential	
BREEAM 'Very Good'	Up to 0.2% increase in capital cost for a building (0.2% uplift for school, 0.04% for warehouse, 0.24% for supermarket, 0.17% for office and 0.14% for mixed use)
BREEAM 'Excellent'	Up to 1.8% increase in capital cost for a building (0.7% uplift for school, 0.4% for warehouse, 1.76% for supermarket, 0.77% for office and 1.58% for mixed use)
BREEAM 'Outstanding'	Up to 10% increase in capital cost for a building (5.8% uplift for school, 4.8% for warehouse, 10.1% for supermarket, 9.8% for office and 4,96% for mixed use) *Source: Table 3: Capital cost uplift for a range of building (their source Target Zero), The Value of BREEAM, A BSRIA Report by James Parker, 2012*

2.1.4 UK Implementation of EU Directives

UK policy is influenced by a number of European Directives relevant to climate change and the built environment:

EU Energy Performance of Buildings Directive – The recast version of this Directive outlines requirements for all new non-domestic buildings occupied and owned by public authorities to be 'nearly zero energy' from December 2018 onwards. This will then be extended to all new buildings constructed from December 2020 onwards. A further requirement is that prior to construction the technical, environmental and economic feasibility of alternative energy systems must be reviewed and documented. This specifically includes decentralised energy systems based on energy from renewable sources.

Energy Efficiency Directive – This includes a requirement that Central Governments purchase only products, services and buildings with high energy-efficiency performance.

2.1.5 Other Drivers

The Energy Act 2008 enabled market incentives for some forms of low/zero carbon energy generation through provision of feed in tariffs (FiTs) and the renewable heat incentive (RHI).

FiTs: the scheme was introduced in 2010, aiming to encourage the deployment of small-scale renewable energy technologies (less than 5 megawatts (MW). It is open to organisations, businesses, communities and individuals. Similar to other renewables support schemes, payment is made for each kilowatt hour (kWh) of electricity generated. As in the case of the Renewables Obligation (RO), the rate paid is dependent on the technology used to produce the electricity. The rate is fixed for a 20 year period from date of registration on the scheme. Eligibility is determined and administered by the Office of Gas and Electricity Markets (Ofgem) and payments are made from the energy suppliers[9].

[9] A full list of Registered FIT Licensed Suppliers is available at https://www.ofgem.gov.uk/environmental-programmes/feed-tariff-fit-scheme/applying-feed-tariff/registered-fit-licensed-suppliers (Accessed October 2014

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RHI - The RHI is a financial support scheme that aims to increase significantly the proportion of heat that is generated from renewable sources. It was introduced in 2011 initially for non-domestic sectors[10]: industrial and the commercial sector; the public sector; not-for-profit organisations; and communities. The scheme is a DECC policy mechanism and is administered by Ofgem.

It has certain similarities to FITs with various payment rates determined by technology type; the scheme provides payment for every eligible unit of heat produced (i.e. per $kWh_{thermal}$) and the payment rate is fixed for a 20 year period.

Green Deal[11] - Alongside these market incentives the Government has also introduced the Green Deal. This initiative promotes the installation of energy efficiency measures to householders and businesses to help reduce energy use and bills. There is no upfront cost to the consumer; instead a finance package will be repaid via a charge on their existing electricity bill over a specified period. The Green Deal 'Golden Rule', set out in legislation, specifies that any additional charge on the electricity bill must be less than the expected savings from the retrofit over the specified period.

2.2 Mid Sussex Sustainable Communities Strategy 2008-18

The Sustainable Communities Strategy, prepared by the Mid Sussex Partnership, is clear that more energy and resource efficient developments are to be promoted alongside ensuring adaptation to future climate change. In addition, the need to encourage developments and projects which reduce CO_2 emissions is also identified.

2.3 Implications for the emerging District Plan

This national and local policy context has the following implications for the District Plan:

- The Council needs to plan for renewable and low carbon energy, looking out how take-up can be encouraged, whilst also reflecting the needs of local communities and local environmental impacts. In particular, national guidance is clear that community-led schemes should be considered. For Mid Sussex, neighbourhood planning may be one opportunity for exploring the potential for community-led schemes.

- The Council can still request a proportion of on-site renewables from new developments (i.e. Merton Rule), which is still retained in the Planning and Energy Act 2008, based on the feasibility and viability of doing so.

- Planning policies need to take account of the government's timetable for zero carbon homes, with developers needing to consider the potential land-use implications of incorporating on-site renewable/low carbon technologies as part of achieving this standard. This will be important to 'future proofing' development projects to ensure they factor in the higher standards to be implemented by government in the future.

[10] The scheme was expanded to the domestic sector in April 2014
[11] https://www.gov.uk/green-deal-energy-saving-measures (Accessed September 2014)

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- Whilst targets to achieve particular levels of the Code for Sustainable Homes could still be set (dependent upon financial viability), it is likely that setting specific requirements in local plans will soon no longer be supported by government.

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3. Mid Sussex's Carbon Profile

3.1 Existing Energy Consumption

National figures from the Department for Energy and Climate Change (DECC) provide a breakdown of energy consumption for Mid Sussex District. The latest figures for electricity and natural gas are from 2012[12].

3.1.1 Electricity Consumption

The trend in electricity consumption for domestic and commercial customers 2005-2012 is shown in Figure 3.1; a steady decline in domestic energy demand is evident. For domestic consumers, the average electricity consumption per meter in Mid Sussex in 2012 amounted to 4,502 kWh, which is higher than the average for Great Britain as a whole of 4,014 kWh. For non-domestic consumers, the average electricity consumption per meter in Mid Sussex in 2012 amounted to 48,898 kWh, which is lower than the average for Great Britain as a whole of 75,372 kWh. In Mid Sussex there is therefore a higher than average domestic energy consumption and significantly lower than average non-domestic consumption.

3.1.2 Natural Gas Consumption

In the case of gas consumption the consumption trend is as per Figure 3.2. A decline in consumption can be seen in the case of both domestic and non-domestic consumers. For domestic consumers, the average gas consumption per meter in Mid Sussex in 2012 amounted to 15,060 kWh, which is higher than the average for Great Britain as a whole of 14,080 kWh. For non-domestic consumers, the average gas consumption per meter in Mid Sussex in 2012 amounted to 386,948 kWh, which is lower than the average for Great Britain as a whole of 688,941 kWh.

In Mid Sussex there is therefore a higher than average domestic gas consumption and lower than average consumption from non-domestic users.

[12] https://www.gov.uk/government/statistics/mlsoa-electricity-and-gas-2012 (Accessed August 2014)

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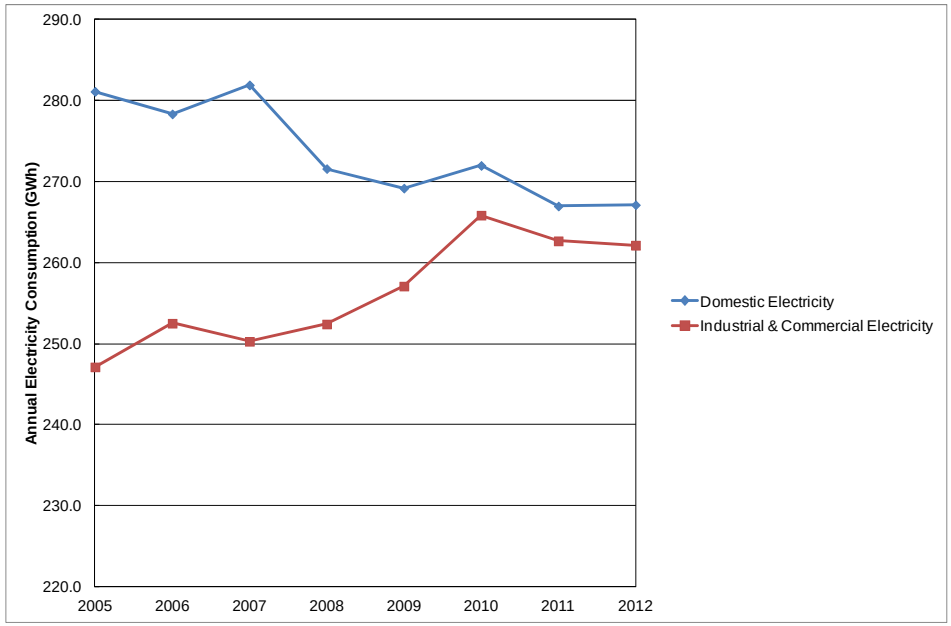
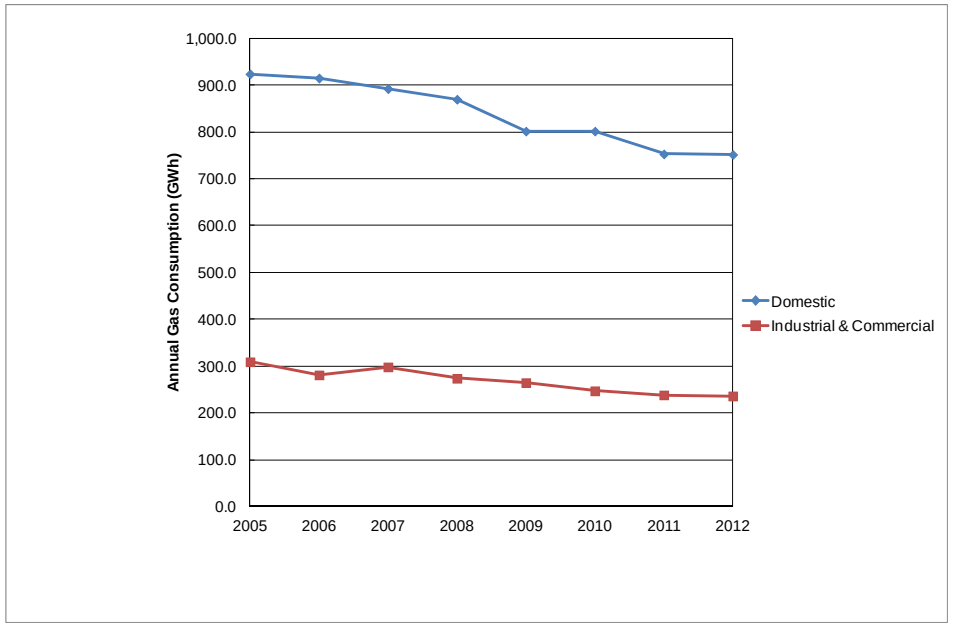
Figure 3.1 Existing Electricity Consumption



Source: DECC Statistics

Figure 3.2 Existing Natural Gas Consumption



Source: DECC Statistics

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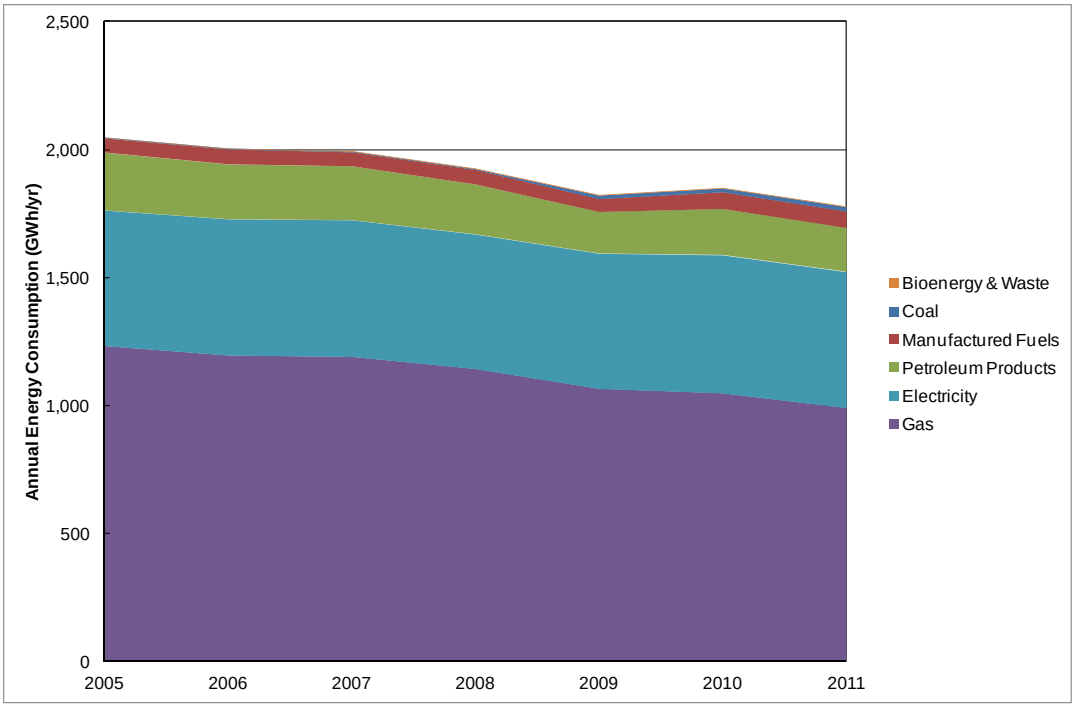
3.1.3 Total Energy Consumption

Electricity and natural gas are the predominant energy sources used in Mid Sussex, amounting to around two thirds (68%) of non-domestic energy consumption and the vast majority of domestic energy consumption (98%). A summary of the total energy consumption within the District broken down by energy source is provided in Figure 3.3.

Figure 3.3 Regional Energy Consumption by Energy Source



Note: DECC Statistics. Petroleum products are those not used in transportation. Manufactured fuels are secondary fuels such as coke and breeze not used in electricity generation

Existing energy consumption within Mid Sussex is dominated by electricity and mains supplied gas. A summary of key details is provided in Table 3.1.

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Table 3.1 Existing Energy Consumption in Mid Sussex (2011)

Energy Source	GWh/yr	tCO_{2e}/yr
Total Energy Consumption, of which:	**1,780**	**508,790**
Natural Gas	991	182,379
Electricity	530	259,890
Petroleum Products	173	43,384
Manufactured Fuels	65	17,502
Coal	18	5,636
Bioenergy & Waste	3	
Average Consumption Per Meter	**kWh/yr**	**tCO_{2e}/yr**
Domestic Natural Gas - Mid Sussex (Great Britain)	15,060 (14,080)	2.8
Non-Domestic Natural Gas - Mid Sussex (Great Britain)	386,948 (688,941)	71.2
Domestic Electricity - Mid Sussex (Great Britain)	4,502 (4,014)	2.2
Non-Domestic Electricity - Mid Sussex (Great Britain)	48,898 (75,372)	24.3

Note: Transport fuel consumption is excluded from these figures. Rounding of figures means sub-totals may not sum accurately. All carbon emissions calculated using latest published emission conversion factors from DECC

3.2 Future Energy Consumption

The previous draft of the District Plan provided an indicative housing requirement of approximately 530 dwelling per annum. Whilst this may be subject to change, it is a helpful starting point to consider what the District's future energy demands could be.

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Table 3.2 Submission District Plan Proposed Housing Development Summary

Item	Number of Units
District Plan Requirement	10,600
Completions	-522
Net Total Housing Requirement	10,078
Total Housing Commitments	4,213
Total to be identified	5,865
Burgess Hill Strategic Development	3,865
Elsewhere in the District, as allocated through Neighbourhood Plans or other appropriate planning documents	2,000
Average rate of completions	530 pa

Table 3.3 provides an estimate of the energy demand associated with this future housing growth. Against a 2011 baseline, these new homes could increase the District's energy demands by up to 12%.

Table 3.3 Summary of Estimated Future Energy Demand (New Developments)

Housing	No. of Units	Heat Demand (GWh/yr)	Electricity Demand (GWh/yr)	Total Energy Demand (GWh/yr)
Total Housing Commitments	4,213	30.0	9.8	39.8
Future Commitments	5,865	37.3	49.9	87.2
Total	10,078	67.3	59.7	127.0
% of 2011 Demand		9%	22%	12%

Note: At this stage no details regarding the mix of dwelling types to be built is available. In developing an estimate of the forecast energy requirements of these proposed developments a number of assumptions need to be made to inform our energy demand assessment (Refer Appendix A for details).

It is likely that the majority of units constructed over the lifetime of the plan will need to meet zero carbon home standards once introduced in 2016. This will involve minimum performance standards as set via Building Regulations in terms of both fabric energy efficiency and on-site energy generation requirements. All remaining regulated carbon emissions will then need to be offset via 'allowable solutions'. Such allowable solutions could include district heating or retrofit efficiency measures implemented in neighbouring existing properties.

The combination of these requirements means that the energy demand estimates provided here are likely to be an upper limit to future energy demand. The use of allowable solutions may well have a small impact in reducing energy consumption (and associated carbon emissions) within existing buildings, for example if the allowable solution includes investment aimed at improving energy efficiency within existing communities.

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All new non-domestic buildings from 2019 onwards will need to meet zero carbon building standards although there is less detail from government as to how this will be delivered.

3.3 Low and Zero Carbon Generation

In Mid Sussex, as across the rest of the UK, there is a continuing growth in the extent of energy generation available from renewable or low carbon sources. Renewable energy and low carbon generation can come in the form of either stand alone devices used at individual building level (e.g. roof mounted solar PV or a small scale wind turbine) or in decentralised systems supplying a number of buildings (e.g. district heating). Before considering what new potential exists for renewable and low carbon energy, it is first helpful to look at what *existing* schemes are operational in Mid Sussex. A summary of known existing renewable energy capacity is provided in Table 3.4.

Table 3.4 Existing Renewable / Low Carbon Energy Generation Capacity in Mid Sussex

Technology	Number of Installations (No.)	Installed Capacity (kW_e)	Installed Capacity (kW_{th})	Commentary
Biomass Heating	1		300	Hoathly Hill
Sewage Gas Electricity	1	465		Goddards Green (Southern Water Services)
Non-Domestic Renewable Heat Incentive (Biomass, Heat Pumps, Solar Collectors, Biogas)	8		1,400	RHI DECC Statistics at April 2014
Non-Domestic Solar PV	42	1,346		Feed in Tariff - DECC Statistics at June 2014
Domestic Solar PV	1,355	4,544		Feed in Tariff - DECC Statistics at June 2014
Non-Domestic Wind	2	4		Feed in Tariff - DECC Statistics at June 2014
Domestic Wind	2	11		Feed in Tariff - DECC Statistics at June 2014
Domestic Micro-CHP	3	3		Feed in Tariff - DECC Statistics at June 2014
Total		6,373	1,700	

Source: RESTATS database, DECC statistics, ECO/Green Deal statistics

Note: this is not intended as a definitive list of *all* renewable and low carbon energy schemes in Mid Sussex but it provides an overview based on publicly available information.

Whilst the majority of these installations serve individual buildings there is a biomass fed community heating scheme feeding the Hoathly Hill Community. This provides space heating and hot water to a total of 27 buildings.

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3.4 Summary

This section of the report establishes the baseline in terms of Mid Sussex's current energy demand, emissions and existing contribution from renewable and low carbon sources of energy. In summary our assessment shows that:

- Proposed growth via the District Plan is unlikely to have a significant impact on energy demand (less than 12%) or associated emissions, given minimum energy efficiency requirements and use of renewable energy under building regulations. The key issue will of course be to ensure that developer's future proof their schemes in response to the national target for zero carbon homes from 2016 given associated design implications.

- The biggest challenge will be to see how energy efficiency and renewable energy can be maximised within the *existing* built environment, particularly reflecting on the limited prospects for strategic scale renewables in the district (both at present and in terms of future potential – see also section 4). Allowable solutions may be one approach to responding here, for example if it involves a 'retrofit' project but the main mechanism is likely to be through national energy legislation to decarbonise the national grid. The ability for planning policy to affect change on the existing built environment in terms of energy efficiency and renewable energy is therefore somewhat limited.

- Where new renewable and low carbon energy schemes have come forward in Mid Sussex, this has been predominantly via domestic scale installations, such as solar PV, driven by financial incentives such as the FiT. The take-up of strategic/commercial scale energy projects has been limited.

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4. Resource Assessment

4.1 Summary of Potential Capacity

A review of the original West Sussex wide study has been carried out in order to provide an understanding of the scale of renewable energy that could be realised in Mid Sussex. Table 4.1 highlights the technologies investigated and their potential energy generation capacity.

If the full potential from all of these technologies could be exploited, then some 100,000 tonnes of CO_{2e} per year could be offset, equivalent to around 20% of Mid Sussex's annual emissions from a 2011 baseline. The figures in Table 4.1 are indicative, and based on a number of assumptions, but they demonstrate a helpful order of magnitude as to what could potentially be achieved.

It is important to note that where sites or areas are shown as subject to technical and/or environmental constraints (or that they lie beyond such constraints) this is not to reflect a judgement on whether a site would be suitable in planning terms. Our assessment is simply to identify what technical potential exists. Any specific proposal for a site or area would need to be based on site-specific work, environmental surveys, discussions with Mid Sussex District Council (as local planning authority) and consultation with local communities.

Table 4.1 Estimated Potential Deployment by Technology

Technology	Potential Capacity (MW)	Electricity Generation (MWh/yr)	Heat Generation (MWh/yr)	Abatement Potential (tCO_{2e})
Wind	7.5	14,250	NA	6,890
Solar PV (Ground Arrays)	13	14,520	NA	7,020
Solar PV (Building Mounted)	20	17,420	NA	8,420
Solar Thermal	10	NA	6,740	1,240
Hydro	0.1	958	NA	460
Biomass (Wood / Energy Crops)	23 / 0.3	2,985	71,395	14,580
Biomass (Waste Streams)	9	71,567	178,916	67,540
District Heating	10 – 20	NA	*	*
Heat Pumps	< 0.1	NA	160	40
Micro-CHP	< 0.01	-	-	-
Geothermal	NA	NA	NA	NA
TOTAL				106,180

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Note: Abatement potential means what level of CO_{2e} could be offset through the use of the different technologies, (rounded to 2 significant figures)

* District heating generation dependent upon number of schemes taken forward and end consumer mix.

The remainder of this section provides a more detailed review of the potential from these different renewable and low carbon energy sources.

4.2 Wind

At a height of 45 m above ground level (agl) the average annual wind speed in Mid Sussex is shown in Figure A.1. It can be seen that the majority of average wind speeds are in the range 6.3 – 6.6 ms^{-1}. Developers will typically consider wind turbines in areas where the average wind speed is 6 ms^{-1} or higher. However, wind speed is only one factor influencing the commercial viability of wind turbines. The recently updated capacity study[13] lists several key issues:

Environmental Designations - Mid Sussex has a number of important biodiversity, landscape and heritage designations which can limit capacity of the District to accommodate development. These include Sites of Special Scientific Interest (SSSI), ancient woodland, Sites of Nature Conservation Importance (SNCIs), local nature reserves and biodiversity opportunity areas (BOAs).

Landscape Capacity – Preservation of landscape character areas and national landscape designations in the form of the High Weald AONB and South Downs National Park.

Historic Environment – Taking due account of listed buildings, registered parks and gardens, scheduled monuments, conservation areas, registered battlefields and heritage at risk.

In addition, impacts on amenity (e.g. noise), transport and wider environmental factors also need to be taken into account. These, and other relevant factors in development potential, are summarised in Table 4.2.

Table 4.2 Constraints Considered for Wind Assessment

Constraint	Description	Impact on siting of wind turbine
Wind Resource	Reviewing published average wind speed data for areas within the Mid Sussex boundary	Wind turbines best sited where mean average wind speeds are highest
Environmental	Designated landscapes, heritage sites, wildlife sites and protected species	Development needs to be sensitive to these designations and key features of interest
Infrastructure	Roads, railways, power lines, airfields, airports	Turbines need to be sited away from major infrastructure
Noise	Separation distances to buildings and development areas	Wind turbines must be sited at sufficient distance from existing buildings to ensure noise levels meet national requirements.

[13] Capacity of Mid Sussex District to accommodate development, LUC (2014)

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Constraint	Description	Impact on siting of wind turbine
Flood Risk	Proximity to water courses	Siting turbines in areas of flood risk would require expensive foundations and make access for maintenance more costly
Ministry of Defence	MOD owned sites and related radar operation issues	Turbines need to be at a distance from MOD sites that avoids any compromising of MOD activities.
Grid Connection	Proximity to a feasible grid connection point	This will indicate whether substantial cabling and support infrastructure may be required
Grid Capacity	Availability of the distribution network to incorporate the additional power output.	Lower network capacity may require upgrades to grid infrastructure such as substations and safety systems (at a cost to the wind developer)
Safeguarded CAA sites, NERL and other radar systems (aviation issues):	Potential issues of interference with radar systems.	Careful siting will minimise impacts on radar systems and reduce any potential mitigation costs
Radio / Communications Links / fixed microwave links:	Existing location of communication links	Careful siting will minimise impacts on the links and reduce any potential mitigation costs
Construction	Outline construction requirements	Avoiding complex development areas (e.g. wetland areas), minimising the need for more complex wind turbine infrastructure.
Access	Ease of access to site for construction / maintenance.	Due to the size of medium to large scale wind turbine components access can determine if a site will be physically and economically feasible.

Application of these constraints suggests that the technical potential available for medium to large scale wind within Mid Sussex amounts to 7.5 MW of capacity. Fundamentally, there is limited scope for significant wind farm development given the combination of environmental designations, communication and radar issues and proximity to existing communities. Any proposal for a wind farm would need to consider all of these factors, but in our view it is likely that where such development does come forward then it is more likely to be smaller scale, e.g. one or two turbines in a given location (Further details are provided in Appendix A).

4.3 Solar

4.3.1 Solar Photovoltaics (Solar PV)

Building Mounted Solar PV

The technical potential available in Mid Sussex for building mounted solar PV is estimated at 20 MW_p. Building mounted solar PV can be installed on both domestic and non-domestic properties where roof orientation and over-shading allow. It is noted that the data presented in Section 3.3 shows that there is already around 6 MW_p of solar PV capacity installed within Mid Sussex (approximately 4.5 MW_p of domestic installations and 1.5 MW_p of non-domestic installations).

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Solar PV is an integral part of building design in achieving compliance with Zero Carbon Homes (ZCH) requirements. It is therefore anticipated that there will be additional Solar PV capacity associated with major future developments in the area (e.g. at the allocated sites around Burgess Hill). Further details are provided in Appendix A.

Ground-Based Solar PV

Ground-mounted solar PV arrays offer further potential for an estimated 13 MW_p of capacity. Land availability for such arrays will be restricted by constraints similar to those applied in the case of wind. Given the capacity constraints it is unlikely that single site multi-Megawatt schemes will be brought forward in the Mid Sussex area. There is growing interest in community owned assets such as solar farms, financed via public share offerings, crowd funding or a combination of both. One such example is the Cuckmere Community Solar Company[14]. Similar types of schemes could be brought forward in Mid Sussex.

4.4 Hydro

The West Sussex wide study carried out in 2009 did not consider hydropower opportunities in any detail. An Environment Agency (EA) study of potential hydropower opportunities across England and Wales[15] shows no large scale (i.e. Megawatt scale) hydro opportunities identified within Mid Sussex.

There are a number of small scale hydropower (0 – 10 kW) sites identified as having potential within the EA study. A total of 40 locations with greatest development potential and associated details are summarised in Appendix A. While the precise details of each given scheme would be subject to more detailed feasibility work, an initial estimate is that this would amount to a maximum technical capacity of 100 kW capable of generating in the region of 960 MWh of electricity per annum. Hydro power will therefore only make a small contribution to low/zero carbon energy generation in the District.

4.5 Biomass

4.5.1 Woodland Residues and Energy Crops

The 2009 Sustainable Energy Study provides analysis of the total resource available for use in supplying to either heat only systems or large scale CHP. The summary figures are provided in Table 4.3.

[14] http://cuckmerecommunitysolar.com/who-we-are/ (Accessed September 2014)
[15] 'Mapping Hydropower Opportunities and Sensitivities in England and Wales', Environment Agency (2010)

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Table 4.3 Woodland Residues and Energy Crops

Energy Source	Annual Yield (odt/yr)	Potential Heat Capacity (kW_{th})	Potential Electrical Capacity (kW_e)
Woodland Residues	**16,153**	**23**	**-**
Broadleaved	9,925	14	-
Other	6,228	9	-
Energy Crops	**2,511**	**-**	**0.3**
Miscanthus	2,511	-	0.3
Short Rotation Coppice	0	-	-

Note: Energy Crops yields based on utilising 5% of available arable land once environmental designations have been accounted for

This provides an indication of the extent to which local resources could provide fuel supply. It does not necessarily mean that there is demand for all of this energy resource. The appetite for local landowners to exploit this resource within the biomass supply market will be determined by the number of existing suppliers already operating in the area (see list in Appendix A).

There are a limited number of large facilities operating within a 50 mile radius of Mid Sussex with significant demand for biomass fuel. All of these will have existing contracts in place. For these reasons it is unlikely that the entire energy potential identified here will be taken up.

4.5.2 Waste

The waste management hierarchy seeks to reduce, re-use or recycle waste prior to any energy recovery. Given recycling and recovery targets it is therefore likely that the waste stream available for energy generation will reduce over time. This is shown through comparison of the 2004/05 based figures used in the original 2009 study and most recent figures for 2012/13[16].

[16] West Sussex Minerals Local Plan and Waste Local Plan, Annual Monitoring Report 2012/13, West Sussex County Council (Accessed September 2014)

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Table 4.4 Waste Arisings Figures for West Sussex

Year	Municipal Solid Waste (tonnes)	Commercial and Industrial Waste (tonnes)	Construction and Demolition Waste (tonnes)
2004/05	464,341	819,425	1,447,652
2012/13	414,000	604,000	949,000
Difference	-11%	-26%	-34%

Figures from the 2009 study, produced on a demographic pro rata basis, can therefore be seen as an upper boundary for potential energy generation (Table 4.5).

Table 4.5 Estimated Energy Generation Potential from Waste Streams

Waste Stream	Applicable Technology	Quantity of Waste (tonnes/yr)	Energy Generation Capacity (MW_e)
Commercial and Industrial Waste	EfW CHP	64,025	6.4
Municipal Solid Waste	EfW CHP	15,721	1.6
Agricultural Waste	Anaerobic Digestion	107,922	0.4
Waste Wood – Construction & Demolition	EfW CHP	3,510	0.5
Food waste- commercial and industrial	Anaerobic Digestion	25,610	0.1
Food waste – municipal solid waste	Anaerobic Digestion	13,804	0.1
Total		230,592	9.0

Source: West Sussex Sustainable Energy Study (2009)

Since waste management is strategically addressed at County level in West Sussex any large scale energy from waste facilities will be developed in partnership with the Borough and District Councils. A large scale facility is presently proposed for Horsham.

A downward trend in waste arisings means that any solution proposed at County Level will incorporate a large proportion of existing waste arisings (certainly in terms of MSW and potentially also in relation to food waste). For this reason it is unlikely that any large scale EfW facilities will be proposed within Mid Sussex.

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Anaerobic digestion can be carried out at much smaller scales than EfW and therefore offers more potential for small scale facilities to be developed within Mid Sussex. As with EfW, any large scale facility proposed at County Level would be unlikely to be situated within Mid Sussex.

4.6 Heat

4.6.1 Solar Thermal

As the existing statistics for Mid Sussex show in Section 3 the number of solar thermal systems installed is not known at this point but does not make up a significant proportion of existing capacity. The technical potential for further installation is limited by a number of factors:

- Not all buildings have suitable roof areas available;
- For any given building only one of heat producing technologies is likely to be installed (e.g. biomass boiler rather than solar thermal, or heat pump);
- For any given building only one of solar thermal or solar PV is likely to be installed;
- Since solar thermal systems can only meet a proportion of overall building hot water demand they offer a limited contribution to the achievement of zero carbon homes standards. It is not therefore likely to feature extensively within proposed zero carbon home designs;
- Properties that are off the national gas grid will benefit most from the introduction of solar thermal systems; and
- In some instances built heritage designations may preclude installation of solar thermal systems.

It is unlikely that solar thermal will feature significantly in future development within Mid Sussex (either domestic or non-domestic). It is most likely to be installed as a retrofit measure on a proportion of existing properties (predominantly domestic). Domestic capacity is estimated at 7 MW_{th} and non-domestic capacity at 3.3 MW_{th} based on working assumptions regarding available roof areas (see Appendix A for details).

4.6.2 Heat Pumps

While the majority of properties in Mid Sussex have access to natural gas, there are a number of dwellings that do not (estimated at around 7,500[17]). These dwellings are therefore likely to offer the most economic opportunities for heat pump installation.

The heat output from heat pumps (whether ground, air or water) is lower than a typical wet radiator system fuelled via natural gas or oil. For this reason heat pumps are generally best used with underfloor heating, providing a larger surface area for supply. If used to supply a wet radiator system then these radiators need to be much bigger than conventional systems.

[17] DECC Statistics 2014

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Consequently it is more difficult to retrofit heat pump systems in existing buildings than it is to install them in new build properties.

Large scale heat pumps, serving multiple properties, form part of the mix of technologies the UK Government anticipates will contribute to low carbon energy supply from 2030 onwards. A resource map providing an indication of areas where potential for water source heat pump use at this scale does not identify immediate opportunities within Mid Sussex[18].

In summary, heat pump opportunities are likely to be confined to new building properties and buildings not served by the national gas network. This provides only a small contribution to overall energy supply.

4.6.3 Micro-CHP

Micro-CHP are small scale combined heat and power (CHP) units designed for use in domestic premises. These units therefore feed space heating and hot water circuits in the dwelling just as a conventional boiler, but also provide additional energy output in the form of electricity. The electricity produced requires a single cable connection and can be readily integrated with existing electrical circuits.

Previous field trials conducted by the Carbon Trust suggest that micro CHP is best suited to larger houses[19]. There are a small number of commercially available units currently within the UK market, though this is anticipated to increase given the feed-in tariff support available to micro-CHP users.[20]

As can be seen in Section 3 the present installed capacity of micro-CHP in Mid Sussex is 3 kWe. It is not anticipated that this figure will rise significantly in future.

4.6.4 Geothermal

The potential for geothermal energy generation in the UK has been analysed as part of the Deep Geothermal Review study undertaken by DECC and summarised in a report released in October 2013[21]. The report used evidence from a number of previous studies examining the potential for geothermal energy generation in different areas of the UK.

The report identifies the key areas for UK geothermal resource which include granite outcrops in South West and northern England, and hot sedimentary aquifers in the Wessex and Cheshire basins (Figure 4.1). The Southampton Geothermal Heating Company (SGHC) was set up to exploit this resource in terms of the district heating scheme operational within Southampton.

[18] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/353979/decc_water_source_heat_map.pdf (Accessed September 2014)
[19] http://www.carbontrust.com/media/77260/ctc788_micro-chp_accelerator.pdf (Accessed September 2014)
[20] http://www.ecuity.com/wp-content/uploads/2013/03/The-role-of-micro-CHP-in-a-smart-energy-world.pdf (Accessed September 2014)
[21] Deep Geothermal Review Study Final Report Department of Energy & Climate Change (DECC) October 2013

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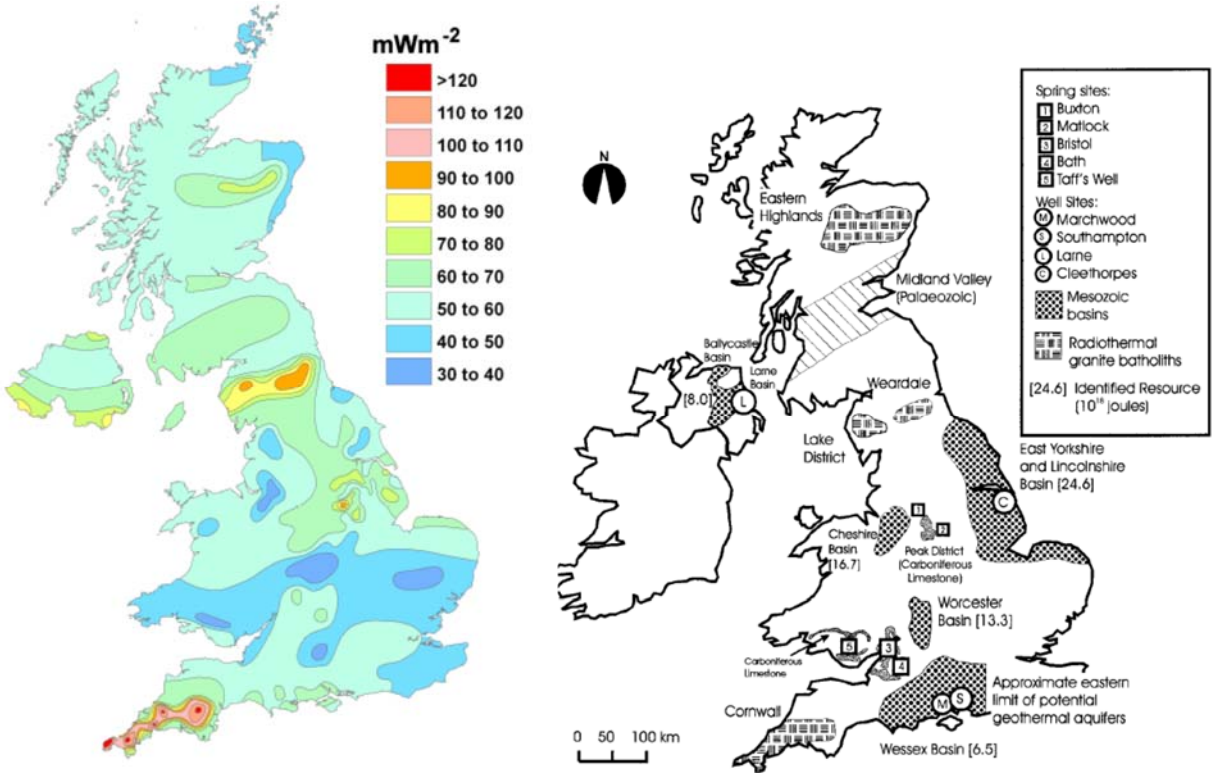
Figure 4.1 Heat Flow Map of the UK (Left); Location of Sedimentary Basins and Major Radiothermal Granites (Right)



Source: DECC

The report identifies key criteria for the viability of any geothermal power generation systems in terms of being able to access a thermal store of greater than 100 deg C at a depth of no greater than 5 km. On this basis, the report does not identify any significant potential for geothermal power production within the Mid Sussex region.

4.6.5 District Heating

Ongoing tightening of carbon performance requirements of both domestic and non-domestic buildings means that the potential development of district heating networks is being given greater scrutiny. Large scale networks, serving hundreds of properties, operate across the UK and are typically supplied by large scale combined heat and power plants. These large networks are operated by Energy Service Companies (ESCOs) that also have responsibility for the billing of consumers on the network.

Identifying a large enough consumer base for heat is critical to maximising the commercial viability of such large scale networks. Smaller scale decentralised networks are less risky to set up initially and can be as simple as a single boiler serving a block of flats. If designed for future change, such small scale networks could eventually be interlinked to form a larger neighbourhood scale network.

It is difficult to truly assess the potential for such district heating schemes based on the commercial sensitivity associated with the extent of future heat demand.

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The 2009 Study carried out an assessment of the potential for large scale network deployment based on three 'rules of thumb':

1. Minimum development of 100 dwellings;
2. Minimum heat density of 3,000 kW/km^2 equating to 50 dwellings per hectare; and
3. Non-domestic heat consumers within 1 km of the new development available as an anchor load.

The sites identified in Mid Sussex on this basis, and yet to be developed, are listed here.

Table 4.6 Potential District Heating Sites

Site Ref	Town/Parish	Timescale for Development	Potential Anchor Loads
345	Burgess Hill	6 years -2031	2 schools, 2 colleges, primary school, trading estate, Leisure centre,
083	Burgess Hill	6 years -2031	2 schools, college, primary school, care home, Leisure centre
081	East Grinstead	6 Years - 2031	supermarket, college, 2 schools, primary school, hospital,
525	East Grinstead	Not currently deployable	supermarket, college, 4 schools, primary school, hospital,
528	Burgess Hill	Not currently deployable	2 schools, college, primary school, care home, Leisure centre
485	Haywards Heath	1-5 years	Princess Royal Hospital, swimming pool, primary school, 2 schools, village hall,
091	Burgess Hill	1-5 years	2 schools, college, primary school,
080	Burgess Hill	6 years - 2031	2 schools, 2 colleges, primary school, Leisure centre
246	Haywards Heath	6 years - 2031	Princess Royal Hospital, Hurstwood Grange school
493	Burgess Hill	6 years -2031	Leisure centre, college, school
494	Lindfield	1 -5 years	2 primary schools, 3 schools, college, Heath centre, Princess Royal hospital
233	Burgess Hill	1 -5 years	2 schools, college, primary school,
557	Burgess Hill	Not currently deployable	2 schools, college, primary school, care home,

Source: West Sussex Sustainable Energy Study (2009), MSDC updates and AMEC review of anchor loads

4.7 Summary

This section of the report has looked at the renewable resource availability within Mid Sussex and the potential capacity to develop low/zero carbon technologies in the region. The assessment shows:

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- Significant constraints on large scale wind or solar farm (ground mounted solar PV) development within the district;
- Substantial potential biomass resources (woodland residues, energy crops) but limited potential for landowners to enter the supply chain given the combination of a large number of existing suppliers in the local area and limited numbers of large consumers to supply;
- Availability of both food and animal waste for anaerobic digestion, which is more likely to be supplied to a West Sussex wide energy recovery plant;
- Some small scale hydro scheme development potential;
- Some potential for development of district heating networks within the three main urban areas; and
- Small scale contributions from other technologies such as heat pumps, solar thermal and micro CHP.

The overall assessment suggests that large scale low/zero carbon energy generation schemes are unlikely to come forward in major numbers. Instead there may be a few medium scale wind and solar projects potentially brought forward as community operated assets. Beyond this, contributions are individual dwelling led with the exception of a few potential district heating schemes.

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5. Policy Recommendations for the District Plan

5.1 Overview

Based on the evidence presented in this report we propose two main policies for testing via the plan-making process, which is to include consultation with residents and subsequent examination by the planning inspectorate. The development of these draft policies included discussion with a group of officers at a workshop on 19th September 2014.

The key considerations for developing these policies are the tests of 'soundness' enshrined in national planning policy. To be considered sound, policies need to be positively prepared, justified, effective and consistent with national policy (NPPF, para. 182). The implications of these four tests for our policy recommendations are therefore as follows:

- Positively prepared: the policies are consistent with the national priority for delivering sustainable development and ensure that the Council is taking a positive approach to both considering the potential for and planning for renewable energy and more efficient developments.
- Justified: this report provides the evidence base necessary to support the policies, from an understanding of the district's renewable energy potential to the wider policy and legislative context that the policies need to respond to.
- Effective: the policies can be tested via the plan-making process, with the evidence base used to inform discussions with neighbouring authorities. Fundamentally, the study is not directly identifying significant projects which would have cross boundary implications.
- Consistent with national policy: the policies reflect the NPPF, PPG and other key legislation presented in Section 2. However, it is important to note that national policy for both renewable energy and climate change is ever changing (not least housing standards review and timetable for zero carbon homes) so there will need to be some flexibility and recognition that policies may need to be updated as the plan progresses through examination.

5.2 Draft Policy 1: Sustainable Design and Construction

Draft policy wording for testing

The following policy would replace adopted Local Plan Policy B4, to provide a much clearer set of requirements for developers in response to the latest national policy position:

All new major development proposals (defined as the creation of 10 dwellings/1000m^2 floorspace or more, or application sites over 1ha) must be accompanied by a Sustainability Statement which addresses the following aspects of sustainable design and construction:

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Energy efficiency

Demonstrating how the proposals take account of the following energy hierarchy:

- **Minimising energy use through the design and layout of the scheme and its individual buildings.**
- **Supplying energy efficiently, through assessing feasibility and viability of establishing or connecting to communal heating networks (supplied by biomass boilers, biomass/gas CHP or heat pumps).**
- **Using renewable sources of energy.**

For new residential developments, applicants must demonstrate how their proposals also address the national timetable for zero carbon homes, including fabric energy efficiency standards, on-site renewable/low carbon technologies and allowable solutions once adopted by government.

Waste and resources

Demonstrating how the development will maximise an efficient use of resources, including minimising waste and maximising recycling/re-use of materials through both construction and occupation.

Water use

Demonstrating how the development will maximise water efficiency, in accordance with policy DP41 Water Infrastructure and the Water Environment.

Resilience to climate change

Demonstrating how the risks associated with future climate change have been planned for as part of the layout of the scheme and design of its buildings to ensure its longer term resilience.

Other approaches considered

- A Merton Rule style policy was considered, but with national building regulations already likely to necessitate consideration of on-site renewables (e.g. via the zero carbon homes hierarchy) it is considered more important to ask developers to take this into account in preparing their schemes given the implications it could have for design and layout.
- Specific Code/BREEAM levels could be set in the interim period until the recommendations from the government's housing standards review are implemented however there are risks that the policy could become rapidly out-of-date. The direction of travel with government policy clearly seems to involve no longer using the Code for Sustainable Homes.

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5.3 Draft Policy 2: Renewable Energy Schemes

Draft policy

Proposals for new renewable and low carbon energy projects, including community-led schemes, will be permitted provided that any adverse local impacts can be made acceptable, with particular regard to:

- **Landscape and visual impacts, including cumulative impacts, such as on the setting of the South Downs National Park and High Weald Area of Outstanding Natural Beauty, and the appearance of existing buildings.**
- **Ecology and biodiversity including protected species, and designated and non-designated wildlife sites.**
- **Residential amenity including visual intrusion, air, dust, noise, odour, traffic generation, recreation and access.**

Assessment of impacts will need to be based on the best available evidence, including landscape capacity studies.

Other approaches considered

- The Council could set a specific target – e.g. xMW installed capacity by 2020 - but with a range of constraints and potential limited in the district it is suggested that this would be hard to justify based on the evidence presented in this report.
- Some authorities have sought to allocate specific sites for renewable energy development but there would need to be clear interest from a developer or landowner to do this, and a wider range of evidence prepared to justify the allocation of a site in the plan. This may be an opportunity to consider via neighbourhood plans however, linked to the promotion of 'community-led' projects where there is an appetite to do so.

5.4 Monitoring and implementation

The key to effective monitoring is the use of a limited number of indicators that are based on readily accessible information. While a wide raft of indicators can be used, the broader the range then the more difficult and time-consuming the process of monitoring becomes. The process of monitoring is assisted by a number of datasets already recorded by other bodies. One such example would be the technology type, capacity and number of installations within Mid Sussex recorded by Ofgem in the context of registration for payment of FiTs and RHI.

It is suggested that monitoring could focus on two indicators which should be relatively straightforward to monitor:

- The number of Sustainability Statements submitted for major applications in accordance with the policy requirement.

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- Number of MW installed capacity from new energy projects granted planning consent. This could exclude householder applications (to save time/resources) and focus on stand-alone schemes or community-led projects incorporated as part of major developments.

5.5 Policy Cost Impacts

5.5.1 Sustainable Design and Construction

Draft Policy 1 relating to Sustainable Design and Construction does not set out minimum requirements of developers in terms of particular sustainable construction standards (e.g. Code for Sustainable Homes Level 5, BREAAM Excellent for non-domestic buildings etc.). What it does do is to encourage developers to utilise the energy hierarchy to best effect in terms of energy efficiency of the built form and use of on-site renewables.

As previously discussed in Section 2.1.3, in the case of domestic properties the combination of requirements similar to CSH Level 4 and the zero carbon standard are likely to form the future baseline for building regulations (most likely from 2016). Given this baseline, the present policy does not impose any extra over costs since no explicit requirement to exceed Building Regulation requirements is proposed.

In the case of non-domestic developments, Table 2.1 provides a summary of what national information there is regarding extra over costs of development. These figures suggest that achieving a BREEAM Very Good-Excellent rating should not have a major cost impact for a given scheme. BREEAM Outstanding is more challenging and costly to implement, as would be expected since it is deliberately intended to be the highest level of environmental performance for a building.

5.5.2 Renewable Energy Schemes

The present draft policy has no direct impact on development costs of any given renewable energy scheme. It may however have indirect impacts in the case of a specific proposed development in ensuring no adverse landscape/visual, ecology/biodiversity or residential amenity impacts. Any proposed scheme will account for these factors as a matter of course in the preparation of a planning application. The business case for any such scheme will therefore inherently account for any cost implications of the policy.

Technologies costs are linked to market developments and, to an extent, the direction of UK Government policy in the level of market support that it provides to different forms of energy generation. While recognising the fluid nature of such costs it is useful to provide some guidance figures here in terms of the relative scale of costs associated with each technology type considered in this report. These details are provided in Table 5.1.

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Table 5.1 Illustrative Costs of Technologies

Technology Type and Scale		Installation Cost Range (£/kW)		
Technology	**Scale of Capacity (MW)**	**Low**	**Medium**	**High**
Wind	< 0.015	5,000	5,500	6,100
Wind	1 – 5	1,600	2,000	2,300
Wind	> 5	1,130	1,600	2,040
Solar PV (Domestic)	< 0.004	1,500	1,900	2,500
Solar PV (Commercial)	1 - 10	900	1,000	1,100
Dedicated Biomass	5 - 50	2,540	3,695	5,210
Biomass CHP	5 - 50	2,700	3,900	5,000
Anaerobic Digestion	< 0.25	4,000	6,000	8,000
Anaerobic Digestion	> 0.5	3,000	4,500	6,000
Hydro	< 0.015	4,200	9,500	21,400
Hydro	0.1 – 1	2,000	4,500	10,000
Hydro	5 - 16	NA	3,150	NA
Solar Thermal*	0.001 – 0.005	3,000	4,000	5,000
Heat Pumps**	0.001 – 0.02	700	1,100	1,600
Micro-CHP***	0.001 – 0.005	1,800	NA	3,000
Geothermal	> 0.1	2,350	4,740	7,000
Geothermal CHP	> 1	2,650	5,240	7,540

Source: 'Electricity Generating Costs 2013' (DECC, July 2013). Note that this includes an estimate of pre-development as well as construction costs.
* Energy Saving Trust figures
** Average of small market survey at April 2014. Water and air source pumps are at lower end of this range; ground source heat pumps at upper end.
*** https://spiral.imperial.ac.uk/bitstream/10044/1/9844/6/Green%202012-08.pdf

Having reviewed the capital costs associated with development of given renewable energy schemes, it is also useful to consider the order of magnitude costs associated with their operation and maintenance. These costs assist in any subsequent viability appraisal work and are provided in Table 5.2.

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Table 5.2 Illustrative Operating and Maintenance Costs of Technologies

Technology Type and Scale		O&M Cost Range (£/kW/yr)		
Technology	**Scale of Capacity (MW)**	**Low**	**Medium**	**High**
Wind	< 0.015	66	73	81
Wind	1 – 5	24	30	35
Wind	> 5	26	37	47
Solar (Domestic)	< 0.004	19	24	32
Solar (Commercial)	1 - 10	21	23	25
Dedicated Biomass	5 - 50	77	112	158
Biomass CHP	5 - 50	104	150	192
Anaerobic Digestion	< 0.25	616	924	1,232
Anaerobic Digestion	> 0.5	477	715	953
Hydro	< 0.015	49	110	248
Hydro	0.1 – 1	46	104	231
Hydro	5 - 16	NA	44	NA
Solar Thermal*	0.001 – 0.005	45	60	75
Heat Pumps*	0.001 – 0.02	21	33	48
Micro-CHP*	0.001 – 0.005	18	NA	30
Geothermal	> 0.1	18	36	53
Geothermal CHP	> 1	17	34	49

Source: 'Electricity Generating Costs 2013' (DECC, July 2013).
* Energy Saving Trust figures

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