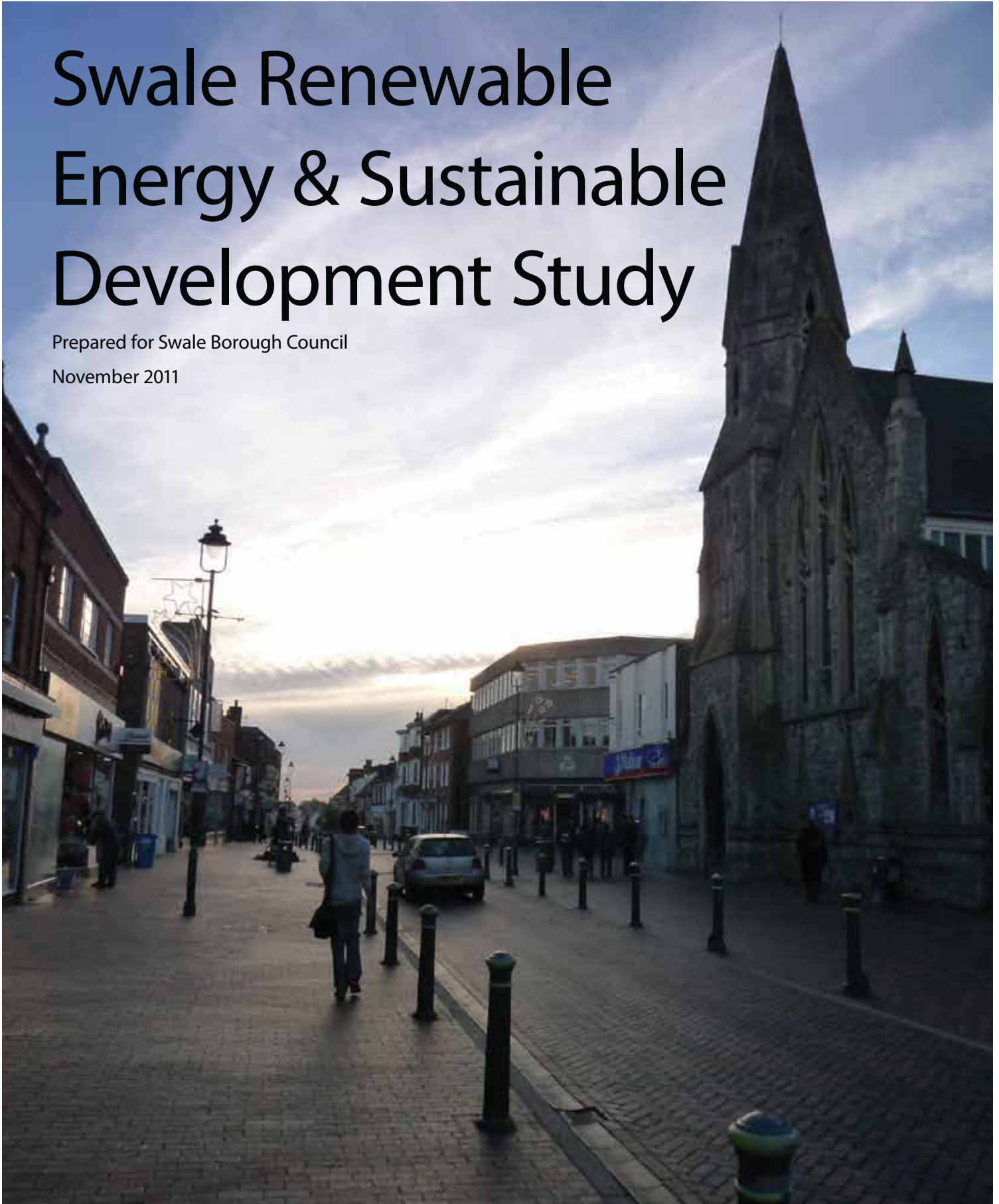


Swale Renewable Energy & Sustainable Development Study

Prepared for Swale Borough Council

November 2011



Executive Summary

STUDY OBJECTIVES AND SCOPE

Swale Borough Council appointed AECOM to develop a climate change, sustainable construction and renewable energy evidence base to inform the development of relevant Core Strategy policies and supporting documents for the Authority. The objectives of this study were to:

- Understand current and future carbon profile for the Borough
- Identify carbon reduction and renewable energy opportunities
- Help set appropriate policy and targets where appropriate
- Consider full sustainable design and construction standards
- Enable mechanisms for delivery

The focus of the study will be set out how the Core Strategy can be delivered in a more sustainable, carbon efficient way, which meets the requirements of PPS1, specifically:

“Planning authorities should have an evidence-based understanding of the local feasibility and potential for renewable and low carbon technologies, including micro-generation, to supply new development in their area.”

Analysing Swale’s policy direction, and physical and delivery context provided us with the necessary understanding of the Borough’s current circumstances and expected growth scenarios. Armed with this knowledge, we have identified the locally specific needs for policies and actions as outlined in the diagram below.



Figure E1: Policy development Process

ENERGY DEMAND FROM THE BUILT ENVIRONMENT

The spatial analysis in the figures below shows areas where energy use per home is greater than the South East average. Focus on these areas should be given to these areas when applying improvements.

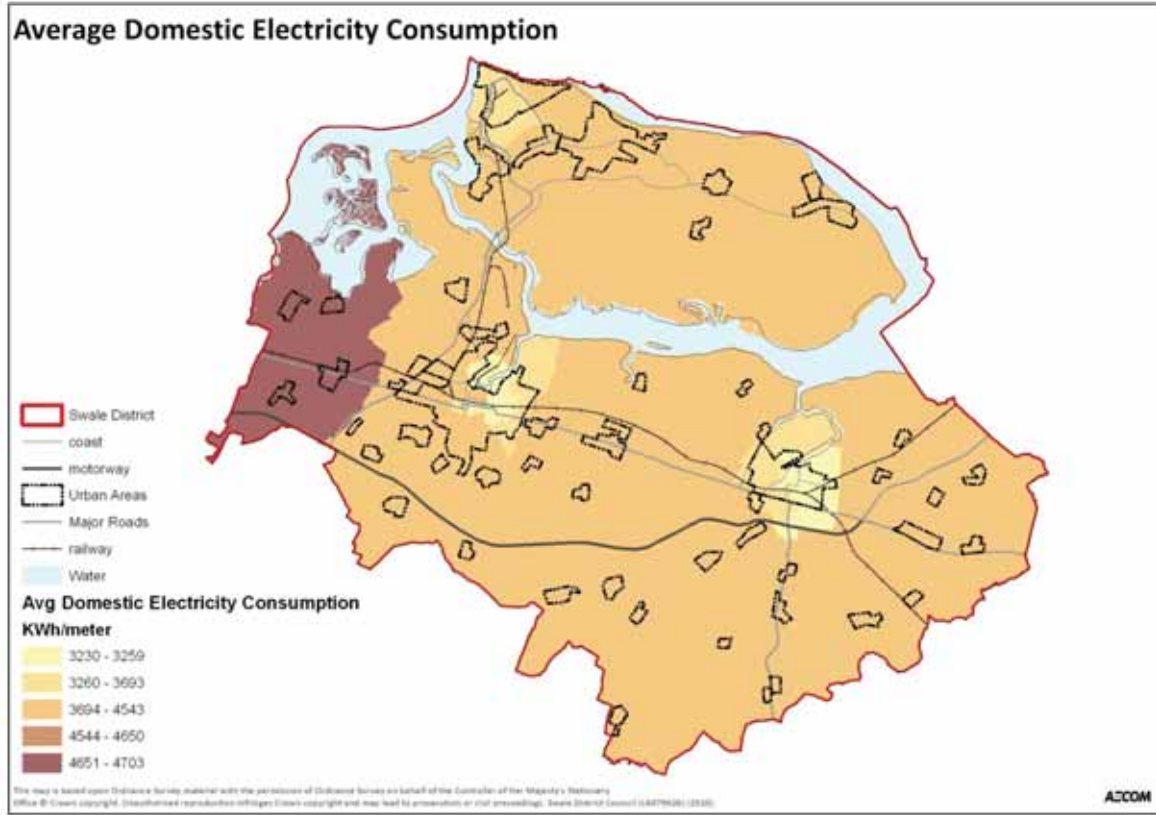


Figure E2: Average Domestic Electricity Consumption

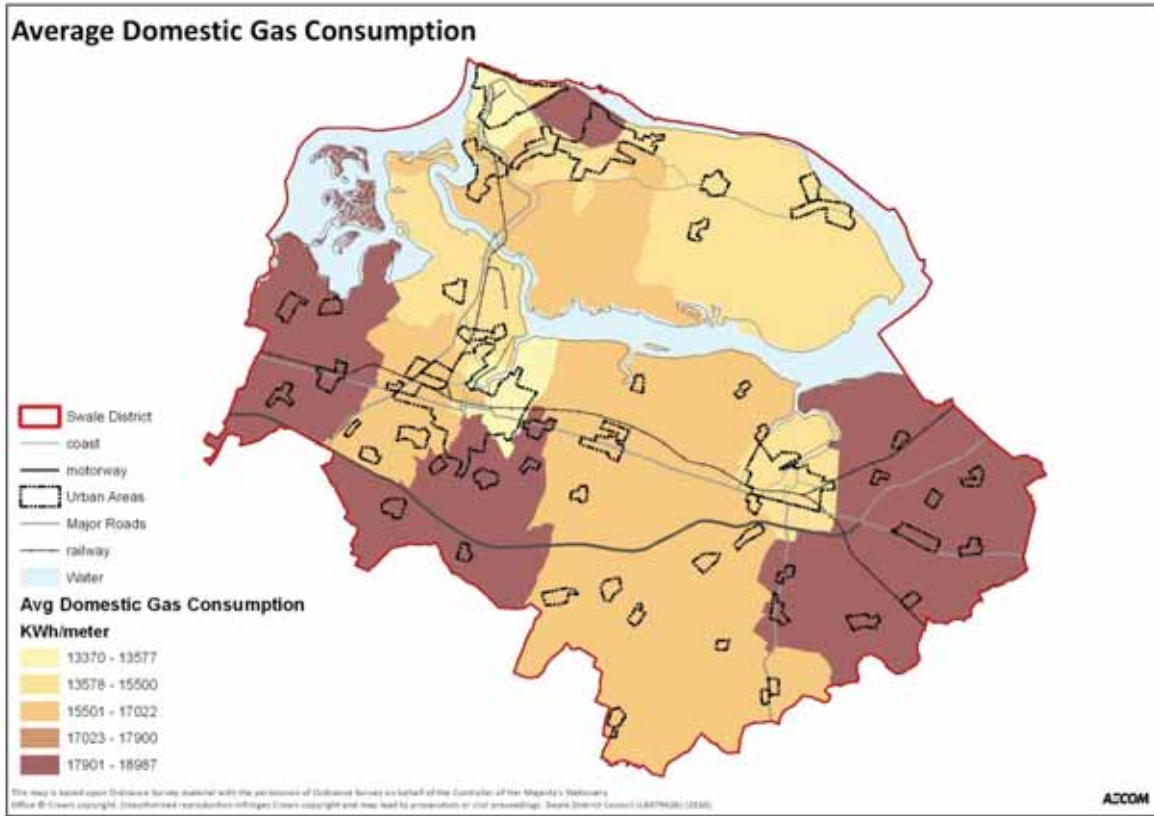


Figure E3: Average Domestic Gas Consumption

The Council plays a key role in increasing energy efficiency of existing buildings, which make up the majority of future energy demand. The figure below shows the extent to which existing buildings contribute energy demand, and the potential that retrofits can help the Borough realise if they are implemented.

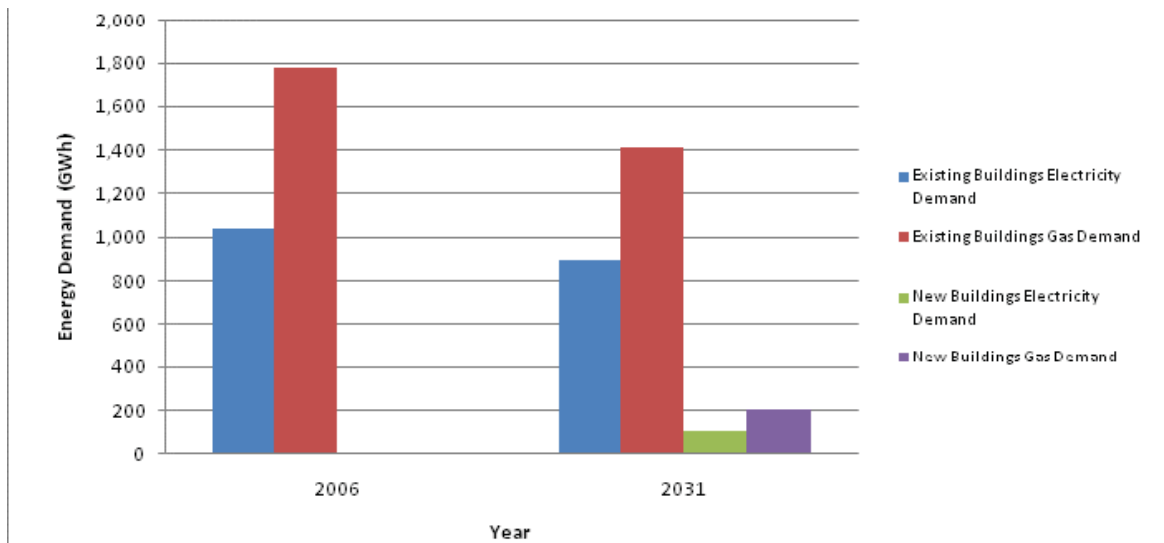


Figure E4: Energy Demand Profile for Buildings in 2006 and Expected in 2031

As is shown in the table below, Swale’s energy profile is unique in that existing non-residential buildings are responsible for the majority of the Borough’s energy demands. With this in mind, it is particularly important for the Council to support initiatives to increase energy efficiency in non-residential buildings in their area, particularly large energy users.

Table E1: Baseline CO₂ emissions in the UK and Swale Borough for 2007 (Source: Emissions of CO₂ for local authority areas, DECC)

Tonnes CO ₂ per annum (2007)	Swale	Percentage of Total	UK	Percentage of Total
Industry & Commercial	1,076,000	63%	228,137,000	45%
Domestic	288,000	17%	149,317,000	29%
Road Transport	337,000	20%	131,045,000	26%
Total Emissions	1,703,000		506,526,000	
Emissions Per Capita	13.0		8.2	

By encouraging higher densities and mixture of housing types, planning can influence a reduction in CO₂ emissions. While Swale’s current high density of the housing stock is a strength of the residential energy market, even higher densities should be encouraged where suitable.

RENEWABLE AND LOW CARBON POTENTIAL

There are considerable renewable and low carbon resource opportunities across the Borough, with high carbon reduction opportunities linked to biomass, wind, CHP and micro-generation. Some excellent examples of renewable installations already exist in the Borough and several more are planned. As the industrial and commercial industries are large energy users, they represent an important partner in the delivery of micro-renewables, and efforts should be made to cultivate these relationships.

The most relevant large renewable and low carbon energies include:

- **District heat network** – As shown in the figure below, Faversham, Sittingbourne, Sheerness, and Minster present good opportunities to generate and supply district heating networks, which can be supported and encouraged through planning

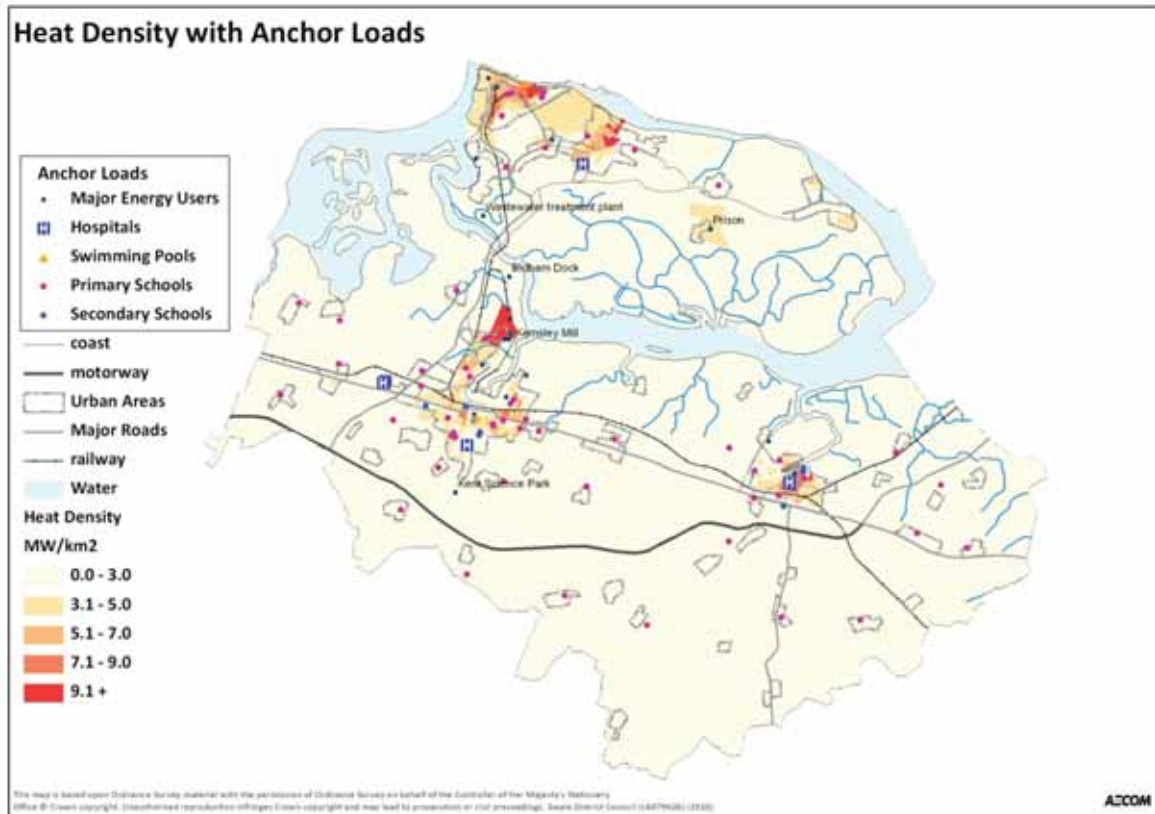


Figure E5: Heat Density in Swale with potential anchor loads

- **Biomass** – This represents strong resource for the area, but a local biomass supply chain needs to be established. Building on the history of timber processing in the Borough, this can build on the paper industry’s existing wood supply to the area.
- **Wind** – The figure below indicates that areas on the Isle of Sheppey present the best opportunities for wind development, with some relatively unconstrained areas available for large scale wind development to the southeast of the Borough. The Kent Downs AONB is technically the most favourable for the development of large-scale wind, but the impact of turbines on the landscape character would need to be strongly considered.

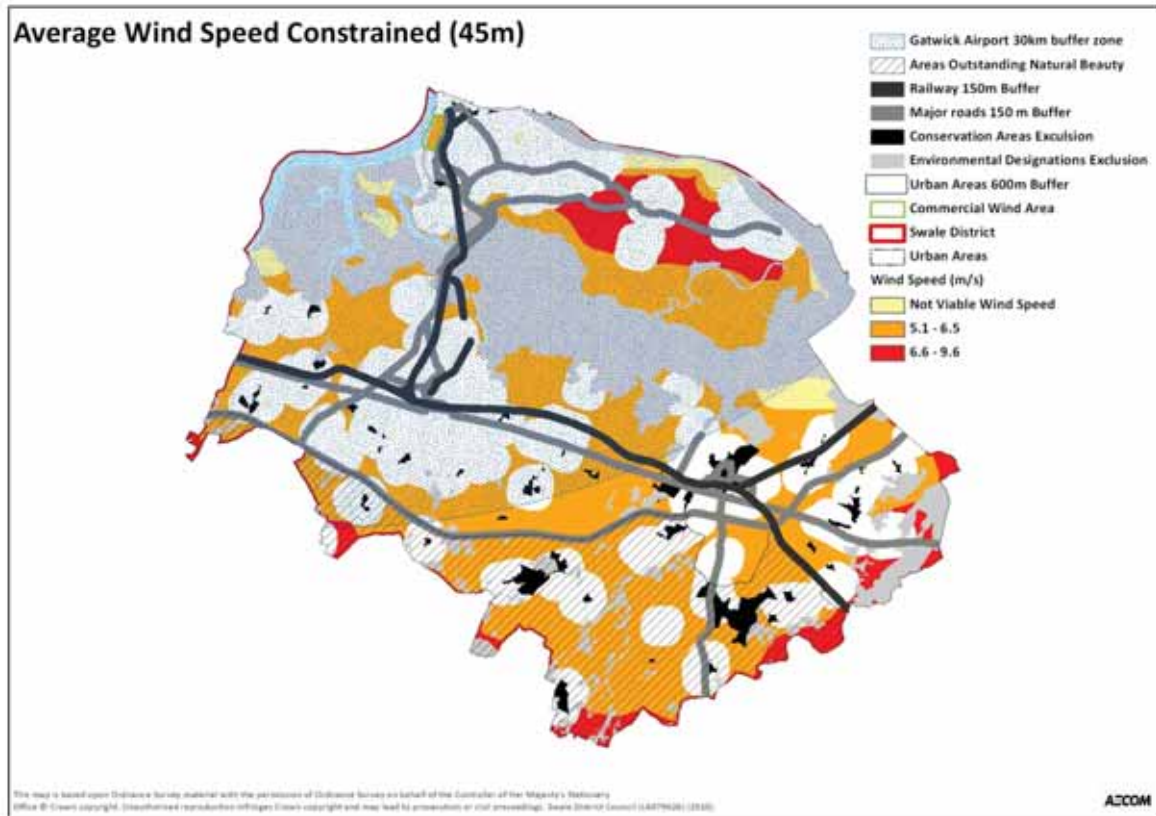


Figure E6: Average Wind Speed at 45m with Constraints

The potential for renewable energy in Swale is extensive and provides an evidence base to support the application of targets of 30% electricity and 12% heat from renewables by 2020. To assist in meeting these targets, the Energy Opportunity Map (EOM) in the figure below has been produced. The EOM is a planning resource, which will allow assessment and prioritisation of delivery opportunities for Swale.

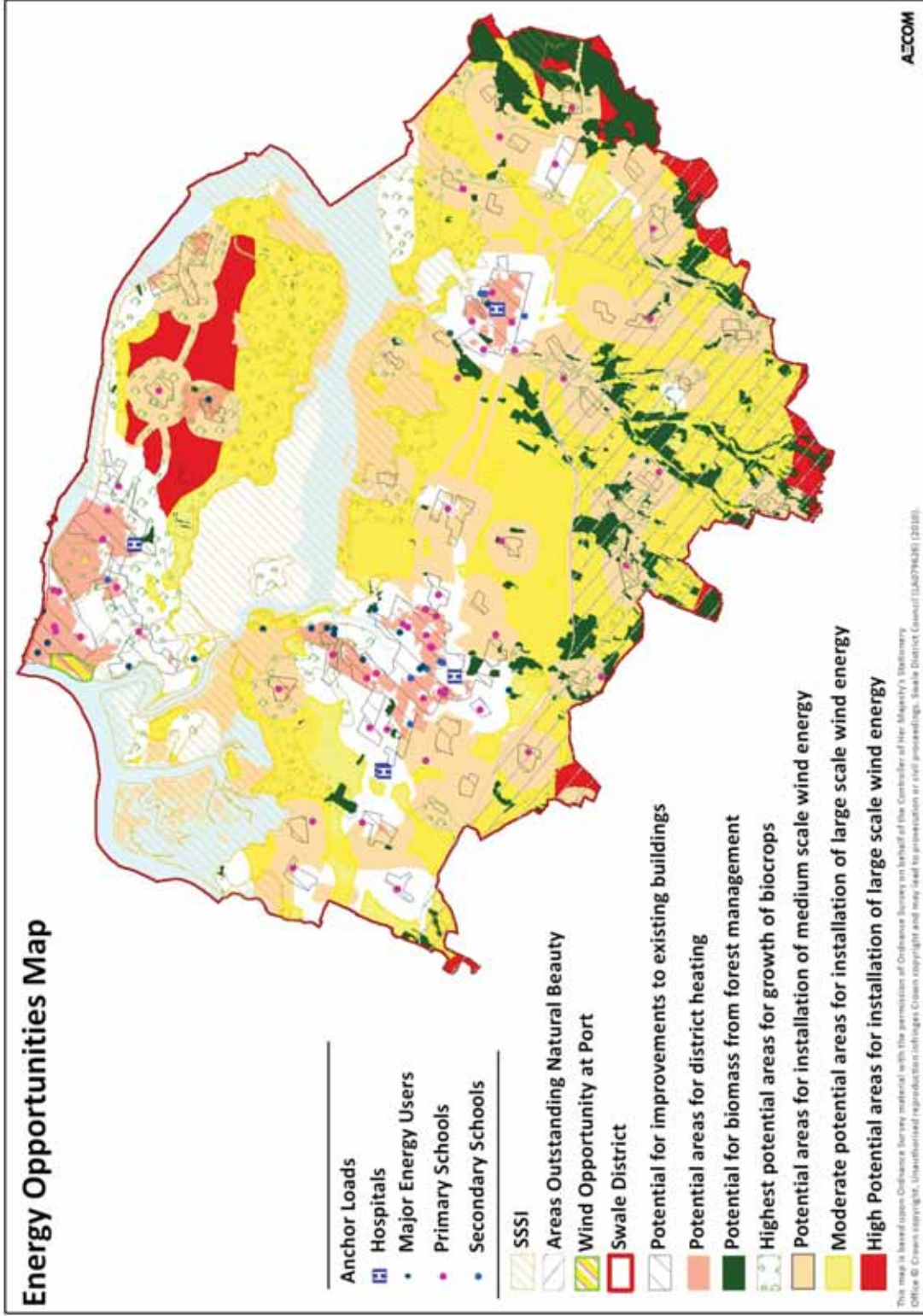


Figure E7: Energy Opportunity Map

CONSIDERING WIDER SUSTAINABILITY DRIVERS

When looking to improve Swale’s sustainability, Code for Sustainable Homes and BREEAM are key sustainability standards that can be used through policy either on a borough-wide basis or for strategic sites. While Code levels 5 and 6 are impressive in their aspirations, as shown in the figure below, they have significant cost implications and many developments may not be financially capable of achieving them. This is the most recent cost data available, and reflects changes made to the Code from March 2010.

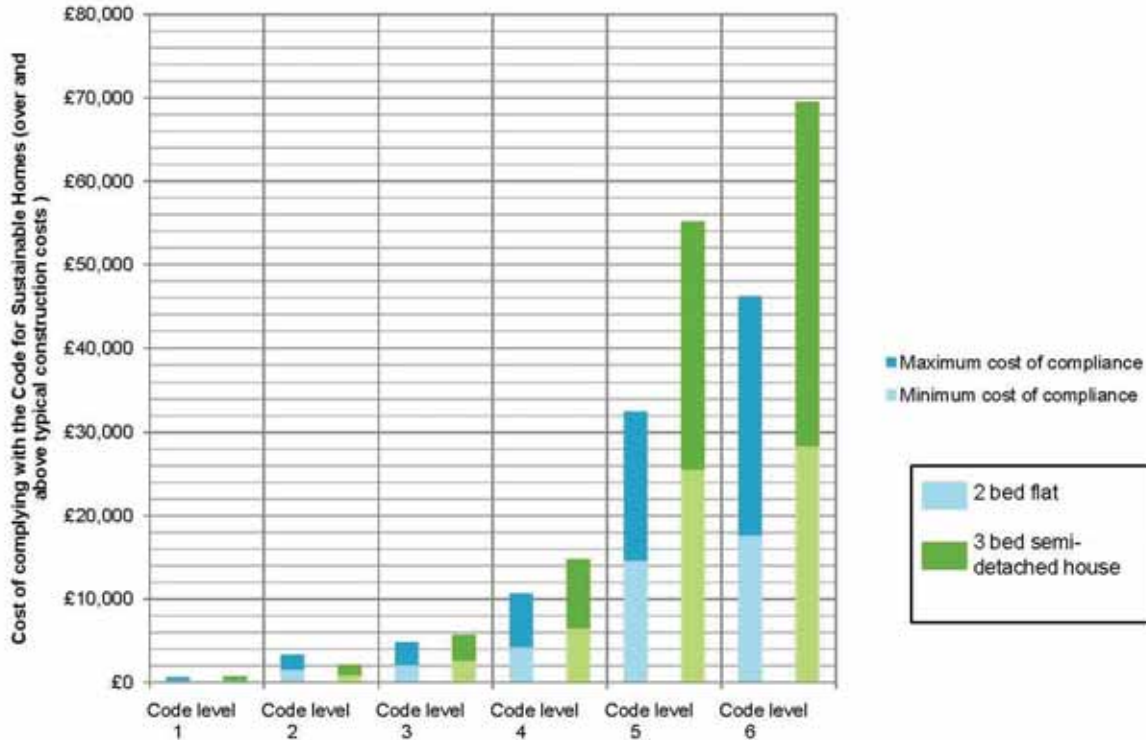


Figure E8: Costs associated with complying with the Code for Sustainable Homes

In terms of water resources, Swale will likely become one of the most water stressed areas of the country as population increases are likely to grow between 21 and 40% by 2031. Therefore, new development water efficiency is a key issue. Due to the financial commitments required, a recently published Thames Gateway study recommends that Code 4 is the most feasible Code level as a standard for new development in the area.

Water quality is also an issue for Swale. Urbanisation has altered many of the water channels and contributed to the degraded groundwater quality. With much of the Borough located in a flood risk zone, as shown in the figure below, new development should incorporate sustainable drainage systems to treat runoff and reduce downstream flooding. All new development should also be sited outside of flood zones 2 and 3.

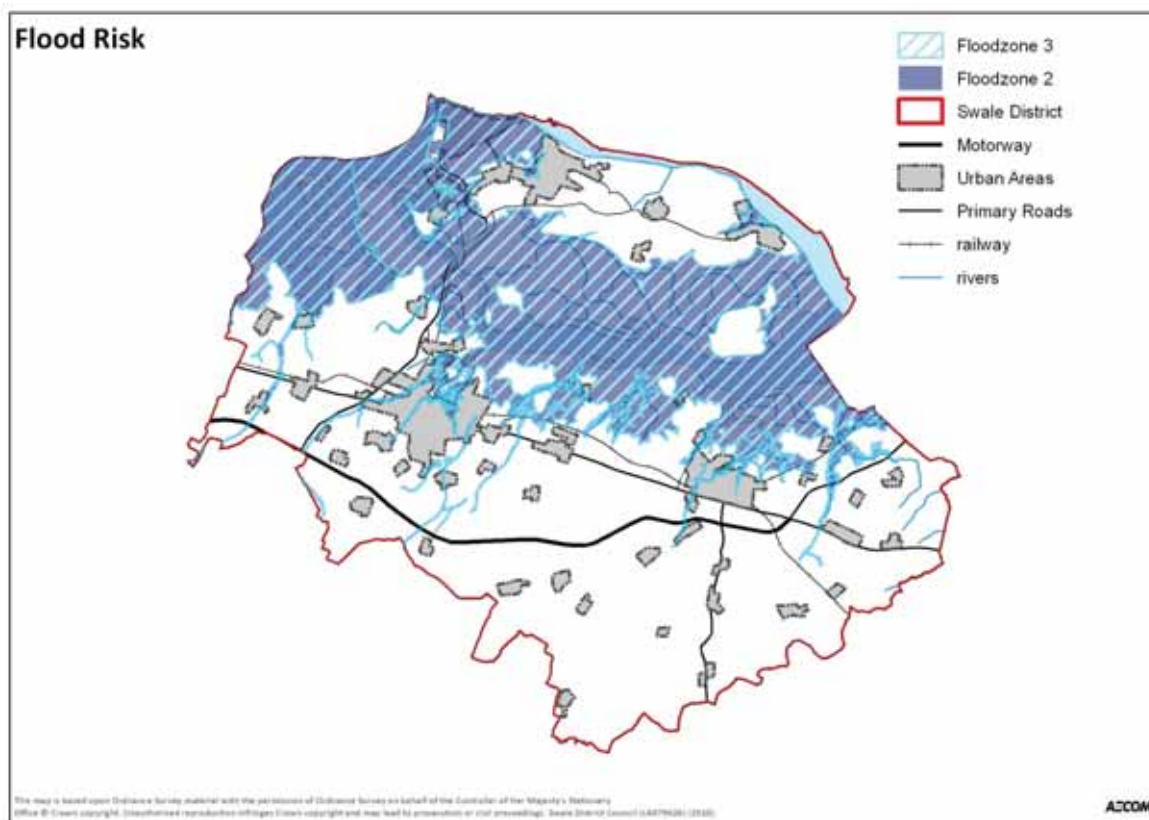


Figure E9: Flood risk zones

Implementing ecological infrastructure in new developments can help improve water while at the same time protect the Borough’s high quality agricultural value. This fertile agricultural land is rich in biodiversity and makes up a large portion of Swale’s landscape. Increasing the ecological infrastructure provision will also benefit the health of this ecosystem while increasing biodiversity.

With respect to the health and wellbeing of the Borough’s citizens, Swale is seen as one of the most deprived local authorities in the country – based on multiple deprivation indices (including health, education, benefit claims, etc.), it ranks among the lowest 35%. Social and economic sustainability initiatives will be key to the success of new development.

CLIMATE CHANGE IN SWALE AND POTENTIAL ADAPTATION MEASURES

Mitigation strategies for climate change will not be enough to offset the changes that have already been set in motion. For this reason, adapting to climate change will be crucial, and planning has a key role to play in helping new and existing communities and environments in this respect. Like many Local Planning Authority Areas, Swale is at risk to a number of climate impacts, including flood risk, changes in microclimate, water supply impacts and effects on biodiversity and agriculture. With help from Swale Borough Council, Kent County has produced a Local Climate Impact Profile to gain a better understanding of the likely social, economic, and environmental impacts of climate change in Swale, based on weather events in the past. Implementing local responses to the county-wide recommendations flowing from the document will be important to an effective climate change adaptation.

ROLES AND MECHANISMS

There are a wide range of delivery mechanisms that can be employed to support planning for energy. These mechanisms can be divided into three broad categories: leadership and skills, priority actions and projects, and delivery vehicles and funding.

Leadership and skills

The Council must take a strategic leadership role to ensure the necessary political and stakeholder buy-in. This could include developing relevant skills across the Council and its partners, and proactively engaging industry – the Borough’s largest energy user – in the delivery and development of renewable energy.

Priority actions and projects

The Council needs to set out a clear framework for action which gives relative certainty. Action should be prioritised on strategic sites, and council and public sector property and assets. Oversized energy generation should be considered on new development sites and in public sector and council owned schemes to supply excess heat and energy to surrounding developments.

For existing buildings, initiatives in energy efficiency priority areas should focus on home improvement measures such as loft, cavity and solid wall insulation, double glazing and boiler replacement. Working with eligible partners to develop a micro-generation retrofit strategy and setting clear guidance should also be given to homeowners on which micro-renewables are permitted.

To facilitate the adoption of district heating networks, the Council and its partners should create a set of priority district heating schemes designated as Strategic District Heating Areas (SDHAs) and further feasibility work carried out. This should be based on factors such as financing options, planning, phasing and type of development. Part of this work could be to investigate the ability for new and existing developments to link into existing heat networks at Kent Science Park, and Kemsley Paper Mill.

In the event that the Council agree to lead installation of a district heating network, it is recommended that they explore the option of establishing a Local Development Order (LDO), which would add certainty to the development process and facilitate its delivery.

Similarly for other renewable energies, the council needs to identify delivery opportunities. For all potential wind sites, the Council and its partners should consider available financial mechanisms, publically owned land and buildings, as well as community involvement and ownership. Opportunities for biomass, biofuels and biogas should be explored with partners in neighbouring authorities as well as with current local suppliers of biomass.

The Council should also reach outside its borders to work with the other local authorities in the East Kent sub-region to progress shared renewable energy opportunities. Many of the surrounding local authorities are in the process of developing their own renewable energy strategy, and it may be possible to co-ordinate priorities.

Delivery vehicles and funding

The Council and its partners need to establish an appropriate form of delivery vehicle or vehicles to pursue the key energy efficiency and supply opportunities. Further work will be needed to understand what is suitable for Swale but will need to consider the potential for ESCo, partnerships and joint ventures with local community organisations.

Equally important is identifying funding mechanisms and applying them first to priority schemes, co-ordinated through the appropriate delivery vehicle. These could include:

- Delivery of whole house and street-by-street energy efficiency improvements and retrofit of micro-generation technologies.
- Delivery of district heating networks in feasible areas identified in the Energy Opportunities Map.
- Organising funding, possibility with community input, to pay for large or small wind turbines off-site in the wind opportunity areas. Further work will need to be undertaken to establish the extent of the opportunity, considering issues such as land ownership.
- Developing a plan to deliver allowable solutions to ensure funding from new development is directed towards the best solutions in a coordinated way.
- Communities are likely to play a crucial role in the delivery of energy infrastructure. However, to be successful, further work will be needed to explore how community groups can be established and empowered.

POLICY AND PLANNING RECOMMENDATIONS

Existing Development

Consequential Improvements to Existing Homes

We recommend that the Council develop supporting guidance in an SPD, or targeted brochure, that encourage improvement of existing buildings (for both energy and water efficiency), and apply these where the planning process is triggered in extension or conversion applications. Currently, requiring improvements to existing homes through policy is seen to be in conflict with national planning policy and is yet to be tested. However, the Council, especially Development Management, can play an active role by working with building owners and developers to prompt the opportunity to retrofit carbon reduction and adaptation measures.

Specifically, the Council should investigate guidance which support the appropriate installation of solar photovoltaics on roofs within the Borough. This is particularly important for industrial buildings, which usually have large flat roofs making them ideal places to install solar panels.

The installation of micro-generation technologies in conservation areas should also be supported by guidance that shows how selection and placement of micro-generation technologies should be undertaken to ensure conservation priorities are not harmed.

New Development

Achieving a reduction in CO2 Emissions through new development

Through a spatial planning process, opportunities for growth and development should be prioritised where they are likely to drive low carbon solutions; by being in an opportunity area near a viable district

heating network, where development sites are of a size to drive their own decentralised systems, or where clear opportunities exist to implement wind energy or support hydro developments.

Policy Option: Efficient Design and Integration of New Development

All new development should, where possible, be located and designed in a way in which advantage can be taken of opportunities for decentralised, low and zero carbon energy.

All new development should catalyse improvements for energy efficiency and increase supplies of decentralised, low-carbon energy in existing buildings.

All new development should, where appropriate, be required to connect to existing or planned decentralised heat and/or power schemes.

Policy Option: Design, Layout and Location

Development proposals should respond to opportunities identified in the Energy Opportunities Map.

All new developments should ensure buildings are designed to be warmed by the sun, orientating buildings to maximise sunlight and daylight and using natural lighting and ventilation to reduce carbon emissions. This is similar to CEN's recommendations.

The Council should support the design or location of buildings to enable people to get access to amenities with fewer or shorter car journeys. In addition the council should support development which makes efficient use of land with good access to public transport to reduce travel and therefore carbon emissions.

Wider Sustainable Construction Targets for New Development

Policy Option: Sustainable Design and Construction

New residential developments (10 units or greater) in Swale are required to meet full 'Code for Sustainable Homes' standards or equivalent. These requirements will not come into effect until successive updates to Part L of the Building Regulations become mandatory:

Code level 3 or above, will be the current required for all new homes as part of Part L Building Regulations.

Code level 4 or above, will be required for all new homes once updates to Part L come into effect (currently scheduled for 2013).

All new non-residential developments in Swale over 1000m² gross floor area should aim to achieve the BREEAM "Very Good" standard or equivalent, with immediate effect (relevant versions of BREEAM are available covering offices, retail, industrial, education and healthcare).

If this policy option is to be applied it should require submission of final Code certificates and post-construction BREEAM certificates, as appropriate.

Policy Option: Climate Change Adaptation

All new development will be expected to be adaptable to climate change in terms of the design and layout of both buildings and associated external spaces. In achieving developments which are adaptable to climate change, developers should have regard to the following:

How their design, orientation, materials and construction will minimise overheating and cooling needs.

How development will incorporate green infrastructure, including tree planting, green roofs and walls, and soft landscaping, where possible.

How Sustainable Drainage System (SuDS) can be implemented, and where possible aiming to achieve greenfield run-off rates. Runoff should be managed as close to its source as possible, in line with the following hierarchy:

- Store rainwater
- Use infiltration techniques (porous surfaces) when possible
- Attenuate rainwater in ponds for gradual release
- Attenuate rainwater by storing it in tanks for gradual release
- Discharge rainwater into existing waterway.

Strategic Sites

Where suitable strategic sites come forward, we recommend the Council require the following:

An energy strategy, including phasing requirements, should be developed for the entire site and surrounding area. This will guide the installation of low carbon infrastructure in a coordinated way, and ensure that individual developments on the site can be taken forward in a carbon and cost-efficient manner. All energy strategies for sites in or near feasible district heating areas, as identified in the Energy Opportunities Map, should include feasibility assessment for district heating and CHP.

Based on feasibility study results, carbon reduction targets relative to Building Regulation standards or the Code for Sustainable Homes/BREEAM targets should be set for strategic sites to drive additional carbon reductions. Calculations showing the achievement of the required carbon reduction should be provided to the Council using the standard methods outlined in Building Regulations.

Strategic Community-Wide Interventions

Renewable Energy

The Council should engage with the Kent Downs Area of Outstanding Natural Beauty Authority to develop a clear policy on wind turbine installations and bio-crop growth. While the current policy is not in favour of large scale wind, we recommend that policy for medium and smaller wind energy be tied to a flexible visual impact assessment process, rather than a blanket restriction. Kent Downs' wind policies should be updated if wind technology improvements are made that reduce visual impacts.

Policy Option

Swale Borough demonstrates significant potential for inclusion of district heating, biomass heating and micro-generation and should aim to meet at least the national heat target of 12% or above.

Swale should assist in the delivery of its portion of the 30% electricity from renewables by 2020 using its potential for combined heat and power, wind energy, solar farms and micro-generation.

Applications for low carbon and renewable energy installations should generally be supported in the area, except where adverse effects would be seen. The area is seeking new renewable energy generation capacity to deliver an appropriate contribution towards the UK Government's binding renewable energy target.

Delivering the Energy Opportunities Map

Policy Option

Decentralised, low carbon and renewable energy is a priority for the Council. Planning applications for new development in Swale will need to demonstrate how they contribute to delivery of the ‘Energy Opportunities Map’.

Priority Areas

The Council will favourably consider applications for development which will support the following energy priority areas:

Policy Option: District heating priority areas

The Energy Opportunities Map (EOM) highlights the areas in the Borough with high heat density. The Council should consider these as priority areas for installing district heating systems.

The Council will support the delivery of district heating in these areas and will work with all relevant stakeholders, which may include residents, private sector partners, utilities companies, neighbouring authorities and other public sector bodies, as appropriate, to bring forward more detailed proposals for district heating in these areas.

Development within the priority area should install the secondary elements of a district heating network (i.e. from the wider network to properties), unless it can be shown not to be viable or feasible. Should development come forward prior to a district heating network being in place, developers should provide a containerised energy centre to provide temporary supply. Where appropriate, applicants may be required to provide land, buildings and/or equipment for an energy centre to serve proposed or multiple developments.

New residential and commercial development should be designed to maximise the opportunities to accommodate a district heating solution where feasible, considering: density; mix of use; layout; and phasing.

Policy Option: Wind Power Priority Areas

The Energy Opportunities Map (EOM) highlights potential favourable locations for wind turbines.

The Council will look favourably on the addition of new wind turbines at the medium or large scale as part of any redevelopment of industrial parks, commercial areas or public realm located a suitable distance from residential areas. The location of wind turbines in these areas should not be to the detriment of local wildlife. Applications would be encouraged from community groups and individuals in priority areas.

Sites within Kent Downs AONB are subject to (evolving) policy from Natural England.

Adaptation Strategy

The Council should use Kent’s Local Climate Impact Profile to inform solutions for local vulnerabilities. This should be taken forward as a collaborative approach between planning and wider council services. In this way, the Council should develop a clear Climate Change Adaptation Strategy to structure the response to climate change risk.

Policy Option

The core strategy should support adaptation measures that need to occur separate from new residential or commercial developments (e.g. improvements in existing areas, strategic adaptation measures):

The Council will support and encourage the integration of strategic climate change adaptation measures in the borough, including the provision of green infrastructure, SuDS and flood risk management features.

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Appendix A: Funding Mechanisms

Addendum 1: Opportunities on Strategic Sites

Addendum 2: Transport Carbon Assessment

1. Introduction

1.1 INTRODUCING THE STUDY

AECOM were appointed by Swale Borough Council to develop an evidence base to inform the development of climate change, sustainable construction and renewable energy policies to be included in the Core Strategy and supporting documents for the Authority.

Figure 1 shows the area covered by Swale Borough and the broad landscape characteristics of the area. Swale is a diverse Borough, comprising the historic town of Sittingbourne, which has roots in ancient Roman times, as well as the Isle of Sheppey and the market town of Faversham. Most of the population live in the four urban centres of Sittingbourne, Faversham, Sheerness and Minster. The Borough is rich in biodiversity with assets including: the Greater Thames Estuary and its adjacent land, which is mainly arable, productive land; the North Kent Plain, which contains some of the most fertile land in southeast England as well as large areas of woodlands, and extensive wetlands in the east; and the Kent Downs Area of Outstanding Natural Beauty (ANOB).

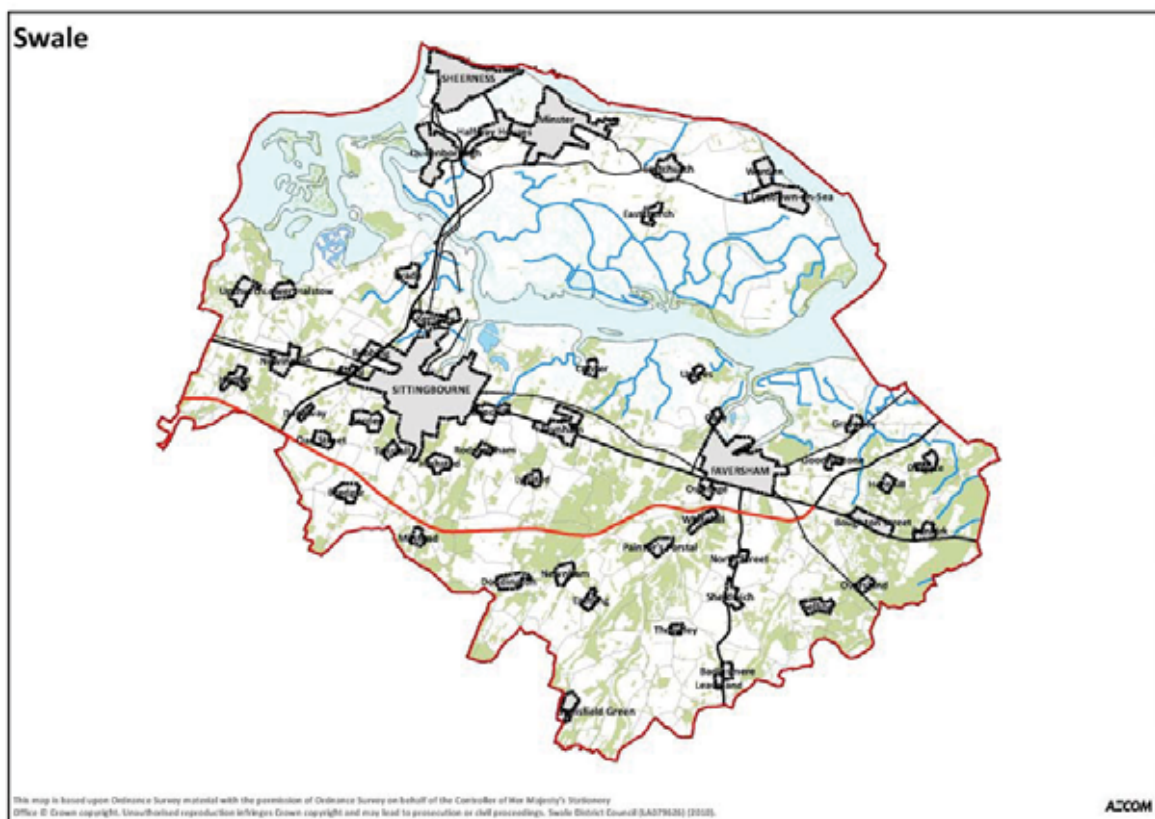


Figure 1: The study area

1.2 SCOPE OF THE STUDY

This study seeks to ensure that the objectives set out in the Core Strategy can be delivered in a more sustainable, carbon efficient way. The primary focus of the study is the delivery of carbon reduction through energy efficiency and low carbon energy generation, but the Study also includes supporting analysis of wider sustainability impacts of new development and the corresponding policy drivers.

The development of this evidence base responds directly to requirements set out in Planning Policy Statement 1: Planning and Climate Change (Supplement to Planning Policy Statement 1). The PPS1 Supplement requires local authorities to understand the potential for incorporating renewable and low carbon technologies in their authority area:

“Planning authorities should have an evidence-based understanding of the local feasibility and potential for renewable and low-carbon technologies, including micro-generation, to supply new development in their area.” – PPS1 Supplement on Climate Change.

Under the current PPS1 Supplement Local Authorities should:

1. Along with criteria based policies, identify suitable sites for decentralised and renewable or low carbon energy;
2. Expect a proportion of energy supply for new development to be secured from decentralised and renewable or low carbon energy:
 - Set targets where necessary;
 - Where opportunities allow, bring forward development area or site-specific targets;
 - Set thresholds and development types to which the target will be applied; and
 - Ensure a clear rationale for the target and it is properly tested.

Since the release of the PPS1 Supplement on Climate Change, a new PPS has been released for Consultation entitled ‘Planning for a Low Carbon Future in a Changing Climate’. The draft PPS combines and updates the PPS1 supplement and PPS22 on Renewable Energy. The draft PPS states:

Local Authorities should assess their area for opportunities for decentralized energy. The assessment should focus on opportunities at a scale which could supply more than an individual building and include up-to-date mapping of heat demand and possible sources of supply. Local planning authorities should in particular look for opportunities to secure:

- i. Decentralized energy to meet the needs of new development;*
- ii. Greater integration of waste management with the provision of decentralized energy;*
- iii. Co-location of potential heat suppliers and users; and*
- iv. District heating networks based on renewable energy from waste, surplus heat and biomass, or which could be economically converted to such sources in the future.*

The draft PPS also encourages local authorities to work with regional authorities and neighbouring authorities to identify and understand the potential for all types of renewable and low carbon energy infrastructure in the area, then put in place policies to support the delivery of such infrastructure. The draft PPS also requires LDFs to set out how the area will be planned to adapt to the opportunities and impacts arising from changes in climate.

This study aims to provide a robust evidence base following both the current PPS1 Supplement on Climate Change and the emerging direction of the Draft PPS ‘Planning for a Low Carbon Future in a Changing Climate’. Through an understanding of the current situation in Swale, review of policy direction and analysis of the Borough’s potential, this report sets out the premise and justification for policies to be

included in the emerging Core Strategy. The study considers proposed new development and changes to the Local Planning Authority (LPA) area over the Core Strategy period (until 2026).

Currently, the Core Strategy is in the early stages of development, and no strategic sites with proposed uses have yet been defined that can be examined for their potential, to meet advanced carbon reduction targets as required by the PPS1 supplement. However, some sites may come forward that are capable of exceeding LPA-wide policy requirements, so the process for identification of these sites and identification of key delivery opportunities is also discussed in this report, and should be utilised by the LPA to set site specific planning policies as sites come forward.

While energy is a key consideration for both resource efficiency and climate change mitigation, this study also considers wider sustainability needs. The study incorporates an evidence base for other aspects of sustainable design and construction that can be influenced by the Core Strategy. PPS1 requires planning to support sustainable development as a whole, considering all aspects of environmental, social and economic need through plans for growth and change. The Government supports the use of sustainable construction standards such as the Code for Sustainable Homes and BREEAM to ensure new development meets a wide range of sustainability aims. Accordingly, this evidence base considers the local context for key sustainability aspects, including water, flooding, ecology and transport at a high level. Transport modelling for the Borough is being undertaken separately, but a carbon appraisal of the modelled scenarios is included within this study.

1.2.1 PREVIOUS STUDIES

This study builds on and reviews a climate change and sustainability study undertaken by CEN for the Borough in 2009. The study made Code for Sustainable Homes and BREEAM recommendations along with a series of strategic and policy recommendations around sustainable design.

The study recommended all major residential sites be required to achieve Code level 4 immediately, with an eye to achieve Code level 5 in 2013 and Code level 6 by 2015. With respect to BREEAM, CEN recommends “BREEAM Outstanding” is to be achieved by 2016 for non-residential buildings. The Borough’s ability to achieve these goals is the focus of this report and is discussed in detail in chapter 7. Code level 6 and BREEAM Outstanding, specifically, are ambitious targets which could deliver exemplar development across the area, but also hold the potential to make many developments prohibitively expensive to design, construct, and sell. This study considers the drivers and viability of such standards in further detail.

While the Code and BREEAM recommendations are the most pertinent to this report, the study also made other policy recommendations, which are discussed in more detail in Chapter 8.

1.3 POLICY DEVELOPMENT PROCESS

The challenge of reducing CO₂ emissions and mitigating the effects of climate change is global in nature. At a national level, government policy and targets outline the overall approach to CO₂ reduction, but in response to the PPS1 Supplement it is the responsibility of local authorities and local planning to seek to understand and capitalise on local opportunities to deliver CO₂ reduction, associated with the built environment. To develop policy and targets on a local level, it is important to understand three areas of context; policy context, physical context and delivery context. While the policy context is consistent on a national level, the local response needs to be tailored according to regional and local policy context, the physical constraints and opportunities of a local area and the market and delivery opportunities available. A tailored local evidence base enables a direct and meaningful application of national aspirations for CO₂ reduction.

Figure 2 below demonstrates the policy development process. This process has been used to structure this evidence base report.

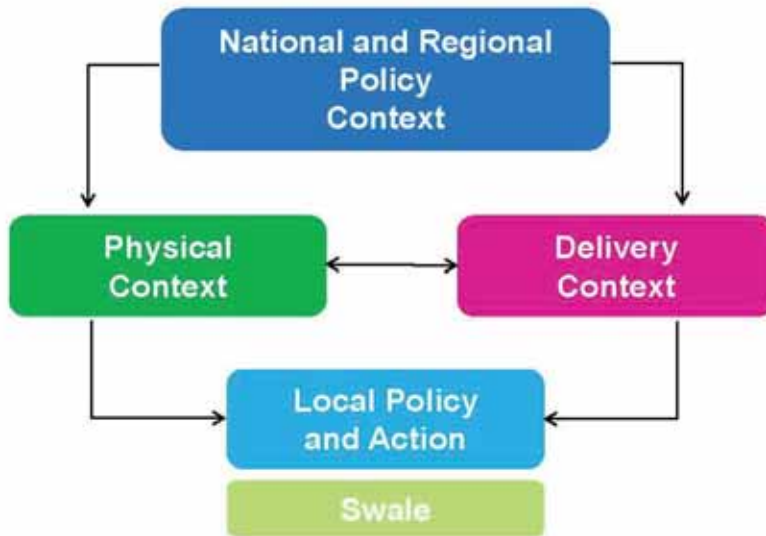


Figure 2: Policy Development Process

It should be noted that where possible information and statistics have been collected at a Borough level and cited in the report. However, this has not always been possible and, therefore, the next most localised geographical area with available information and statistics has been used. This has generally been at a county or regional level.

1.4 THREE SCALES OF ENERGY OPPORTUNITIES

To deliver energy-related carbon reductions it is important to relate initiatives to the various mechanisms and scales of intervention. The scope and influence of change can be understood as three scales of energy opportunity:

1. Existing Development: The potential to improve performance of existing buildings, through both energy efficiency and inclusion of on-site low carbon and renewable technologies.
2. New Development: The potential to deliver CO₂ efficient buildings on new development sites along with on-site low carbon and renewable technologies.
3. Strategic Community Wide Interventions: Considering the existing and new built environment together in the wider environmental context and the opportunities this brings for development of low carbon energy systems and interventions on a strategic scale.

Figure 3 demonstrates the three energy opportunities that are referred to and utilised in the structure of this report. The influence of planning and of Local Planning Authorities on these three opportunities differs in scope and scale, but policy options can be applied to affect all of these opportunities. Through spatial planning, LPAs play an important role in realising the strategic opportunities at a larger scale, and utilising this wider vision to inform opportunities at a site scale. For example, on a site by site basis, certain low carbon technologies such as district heating may not be viable, but in the wider context, these can become viable when linking to existing areas and neighbouring development sites. LPAs play a key role in identifying and coordinating these opportunities. The wider LPA context also provides a scale of opportunity for utilisation of low carbon and renewable energy resources and infrastructure in landscapes and open spaces as well as the built environment. This wider context informs the level of natural resource available for utilisation either through independent or development-driven delivery of infrastructure, including levels of fuel resource available, such as biomass and waste for energy production, and viability of renewable resource utilisation, such as wind speeds and solar intensity.



Figure 3: Three energy opportunities

1.5 REPORT STRUCTURE

The rest of this report is set out as follows:

- **Chapter 2: Policy Context** – reviews the relevant national, regional and local policy drivers and opportunities.
- **Chapter 3: Physical Context: Energy Demand from the Built Environment** – examines the current and future physical context of the LPA area, considering the state of existing buildings, expected growth and new development and the overall LPA-wide energy demand profile.
- **Chapter 4: Physical Context: Low Carbon and Renewable Energy Potential** – considers the renewable and low carbon resource potential at a site and Borough scale.
- **Chapter 5: Physical Context: Considering Wider Sustainability Aspects Design** – considers other aspects of sustainability that could be affected by sustainable design and construction policies.
- **Chapter 6: Physical Context: Climate Change in Swale** – Considers the effect of climate change on Swale Borough and possible adaptation measures.
- **Chapter 7: Delivery Context: Delivery Mechanisms and Partners** – considers delivery partners and mechanisms for CO₂ reduction across the LPA area for every type of energy opportunity.
- **Chapter 8: Policy Recommendations and Conclusions** – gathers together evidence from the previous chapters to forward policy recommendations for the Core Strategy and supporting documents.