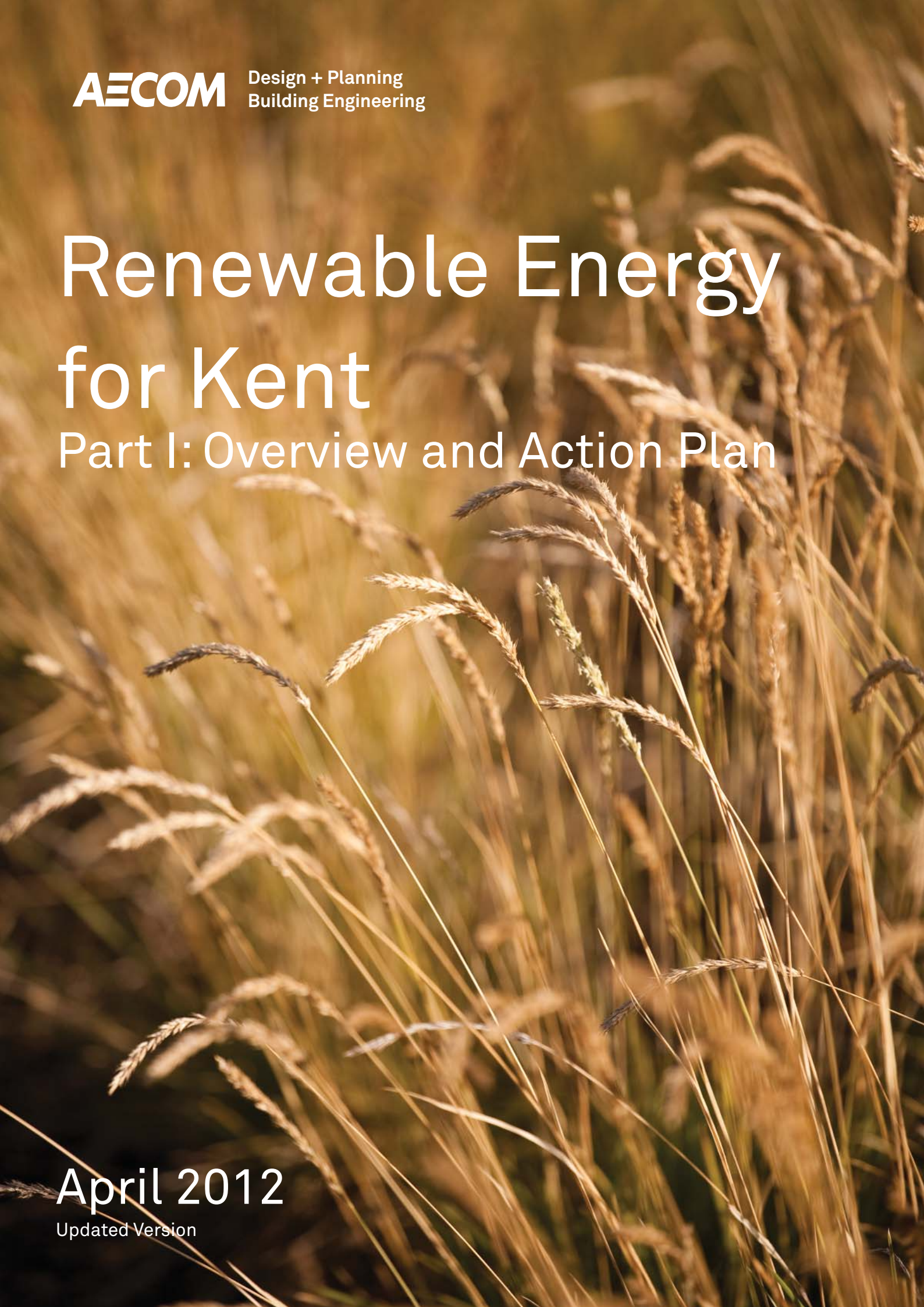
AECOM Design + Planning
Building Engineering

Renewable Energy for Kent

Part I: Overview and Action Plan



April 2012

Updated Version

Committing a Path

The development of low carbon and renewable energy sources is a crucial part of the UK's strategy to minimise the future consequences of climate change. For this reason, it is important that Kent and its local authorities consider how they can foster the development and deployment of renewable energy technologies to meaningfully contribute to meeting the UK's ambitious targets for CO2 reduction.

Kent is committed to reducing greenhouse gas emissions by 34% by 2020 and 60% by 2030. Delivery of renewable energy is not only central to this vision but essential to the solution. This study proposes that a 10% reduction in carbon emissions through the use of renewable energy is deliverable in Kent by 2020 if proactive steps are taken by all delivery partners. The remaining carbon reductions will need to come through a range of other measures delivered on a local and national scale, including the improvement of existing buildings, the de-carbonisation of the national electricity grid, and an emphasis on lower carbon transportation.

While this study focuses on the delivery of carbon reduction, its reach is much broader, as the delivery of renewable energy could also have a range of economic and social benefits for Kent. To understand Kent's potential we have interrogated how and why renewable energy will be delivered by various stakeholders - local governments, communities and individuals. An understanding of the delivery paths provides us with a full understanding of the possible benefits to that we can direct Kent along the most fruitful journey. However, delivery will not come without effort, and actions will only be effective where this effort is wide-spread and coordinated. The Action Plan for Kent sets out possible actions for a number of partners, and highlights the support they will need in turn from others. There is no silver bullet here. Real change will only come through communication, cooperation and leadership.

An Opportunity Too Good to Miss

The delivery of renewable energy makes good business sense. Kent hopes to develop a thriving low carbon economy as part of its wider economic strategy, and hence the need is not only environmental but economic. Local businesses and Kent's wider economy stand to benefit from a low carbon strategy through job creation, enhancement of market reputation and smarter use of capital funding. It has been estimated that 19,600 people in Kent are currently employed in renewable and low carbon technology related industries, with this sector growing nationally at around 5% per year, and the broader economic benefits associated with a green economy will add to economic growth.

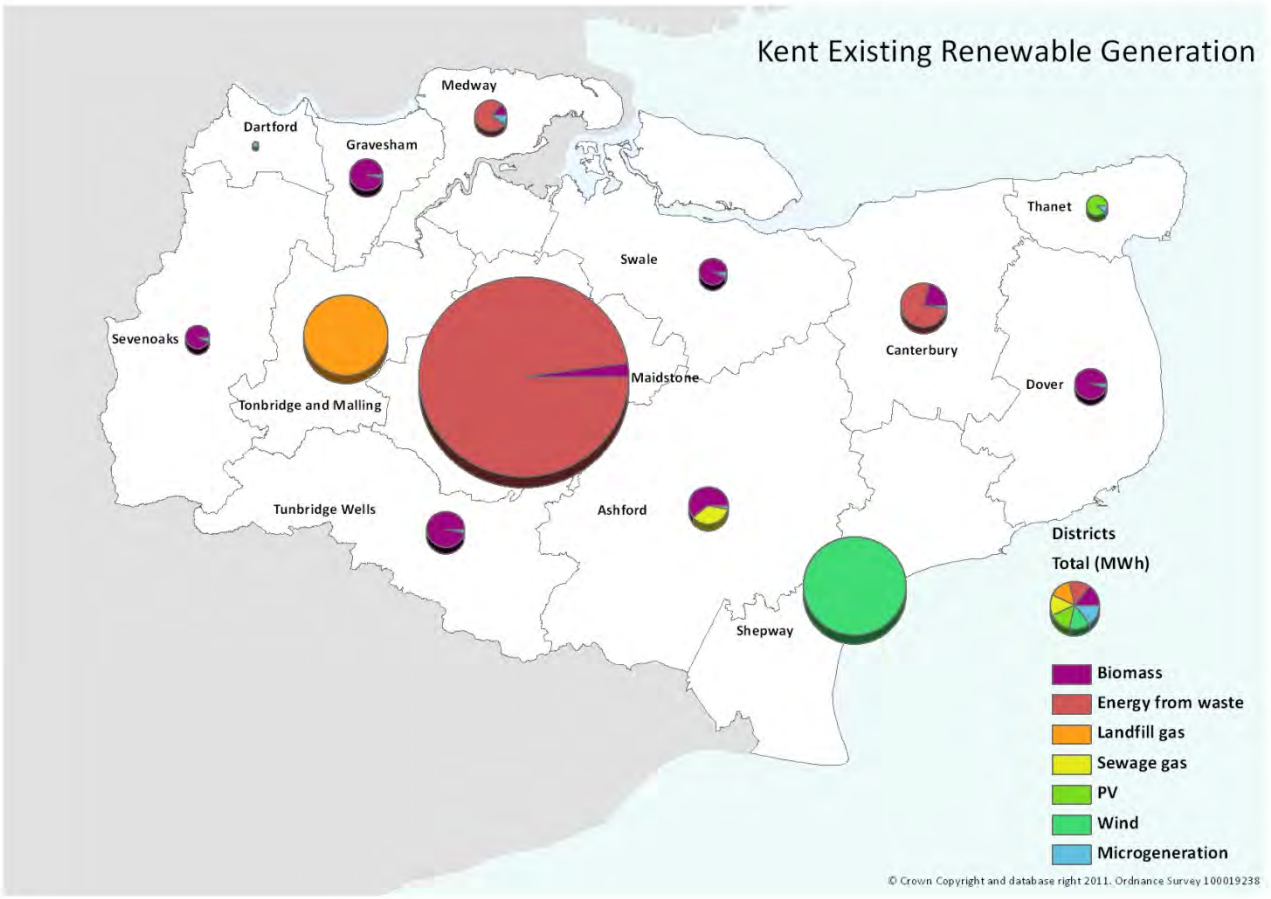
With a strong construction sector, Kent is well positioned to deliver a range of renewable energy technologies. Focussed skills and training of local workers can lead to transferrable benefits for existing sectors where skills traditionally associated with building services can be re-trained into a specialist renewable energy sector.

Kent's geographical and physical assets make it a prime contender to lead development of the renewables sector in the UK. With strategic transport links to Europe, Kent is geographically positioned as a gateway for import/export. With a rich array of renewable resources and a high proportion of sunshine hours, Kent has a range of renewable energy options to exploit. With key port locations, Kent is well positioned to develop a wider support economy for offshore wind development.

Celebrating then Accelerating

Renewable energy delivery has begun in Kent, but has much more potential to explore. Kent currently produces over 640GWh of renewable energy annually. More than half (60%) of that energy is from energy from waste schemes, the largest of which is located in Maidstone and alone is responsible for 57% of renewable energy for the county. The corollary is that a few installations are contributing significantly to Kent's share of renewable energy. Shepway's Little Cheyne Court Wind Farm is Kent's only onshore wind farm in operation. With 26 wind turbines, it produces nearly 94GWh of electricity – enough to power approximately 19,000 homes. The other major renewable resource currently being exploited is biomass energy. Of the 13 local authorities in Kent (including Medway), nine operate biomass schemes, though most of these are small scale.

All sectors have been involved in the delivery of renewable energy across the County, with numerous examples of delivery of small-scale schemes by community groups, private land owners and local authorities. Local delivery examples are in place to learn from and be inspired by, but the level of delivery needs to increase dramatically. Renewable energy needs to become common place if Kent is to meet its carbon reduction ambitions and benefit from a low carbon economy.


Kent Existing Renewable Generation
Medway
Dartford
Gravesham
Thanet
Swale
Sevenoaks
Canterbury
Maidstone
Dover
Tonbridge and Malling
Tunbridge Wells
Ashford
Shepway
Districts
Total (MWh)
Biomass
Energy from waste
Landfill gas
Sewage gas
PV
Wind
Microgeneration
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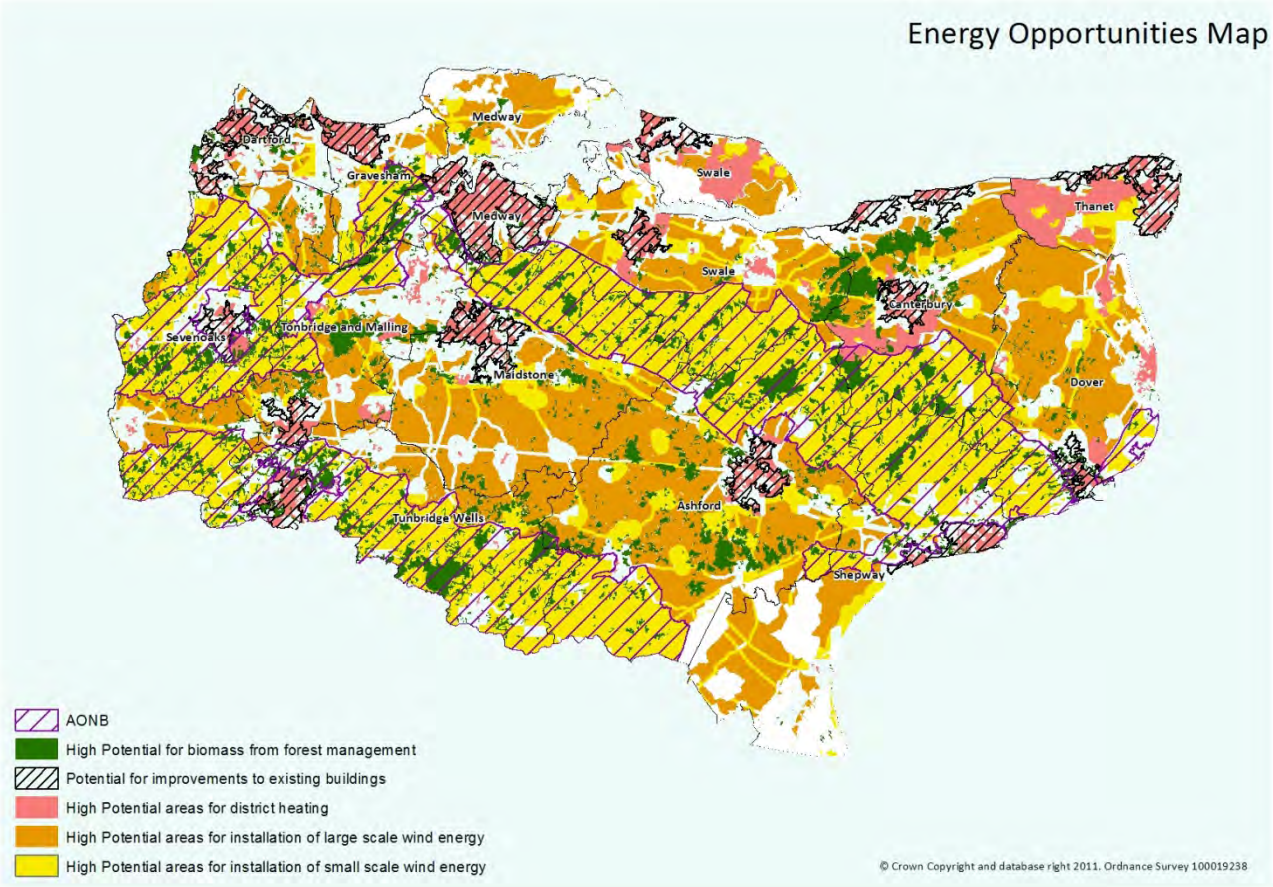
A Naturally Rich County

Fortunately, the opportunities for renewable energy in Kent are numerous, rich and diverse. The greatest opportunities for carbon reduction through renewable energy are centred around five natural and physical resources shown in the table above. Detail of the assessment of resources is given in Part II of this study.

Renewable Energy Resource Potential Across Kent - The Priorities	
Wind	Wind speeds across the county will support the installation of large and small scale wind energy. Wind has very high physical potential across Kent. Delivery of large scale wind needs to take account of protected landscapes including the Kent Downs AONB, but still provides numerous opportunities. The local authorities in Kent with significant apparent potential for commercial scale wind are Ashford, Canterbury, Maidstone, Dover, Shepway and Swale. These authorities – based on the regional resource assessment – could each physically accommodate between 100 and 300 2.5MW turbines. Ashford has 40,000 homes so would require 51 2.5MW turbines to meet its total domestic electricity demand. Small and medium-scale wind is a very deliverable option for rural land owners and communities.
Biomass Energy	Kent, and in particular the Kent Downs and High Wield, is a relatively well wooded landscape. With around 46% of privately owned woodland in Kent not being actively managed the evolving market for wood as a renewable local fuel source provides a major market focused opportunity to help woodland owners draw a direct return from their woods. The annual available sustainable woodfuel supply from managed woodland is around 60,000 tonnes per annum - sufficient to heat between 15,000 and 30,000 average sized homes. Waste wood diverted from landfill is another important biomass feedstock that energy developers are already actively investing in. Waste wood from arboricultural arisings can also play its part in the generation of renewable energy. There is dual opportunity for large-scale biomass-fired power generation as well as more local supply for heating homes and businesses at a range of scales. The Kent Downs Woodfuel Pathfinder, part of the EU ERDF funded MULTIFOR Interreg programme, is an active partner promoting woodfuel in Kent.
Energy from Waste	Waste is a constantly produced resource, which can very effectively be used to produce both electricity and heat for local neighbourhoods. Kent has already proved delivery of this technology and has potential for two more installations.
Micro-Generation	Some of Kent's greatest assets are its physical structures and resourceful communities. Micro-generation installations such as solar power, solar heating and heat pumps individually contribute very small carbon savings, but collectively show a large potential.
District Heating	The urban cores and industrial areas in Kent provide excellent opportunities for the reduction of carbon through the delivery of renewable heat via district heating installations. However, these schemes can also be accommodated in more rural areas, and should be pursued where local ambition exists.

The potential for various renewable energy opportunities varies spatially across the County. An Energy Opportunities Map has been developed for Kent to provide guidance on promising locations for renewable energy developments. They provide useful information to those seeking to guide or deliver renewable energy projects on where suitable locations are likely to be. Maps for individual authority areas are included in Part II of this study. Energy opportunities maps can be utilised as a tool both within spatial planning and policy development at a local level and for the development of wider strategies for Kent, agreeing geographical actions and priorities.



Matching Ambition to Opportunity

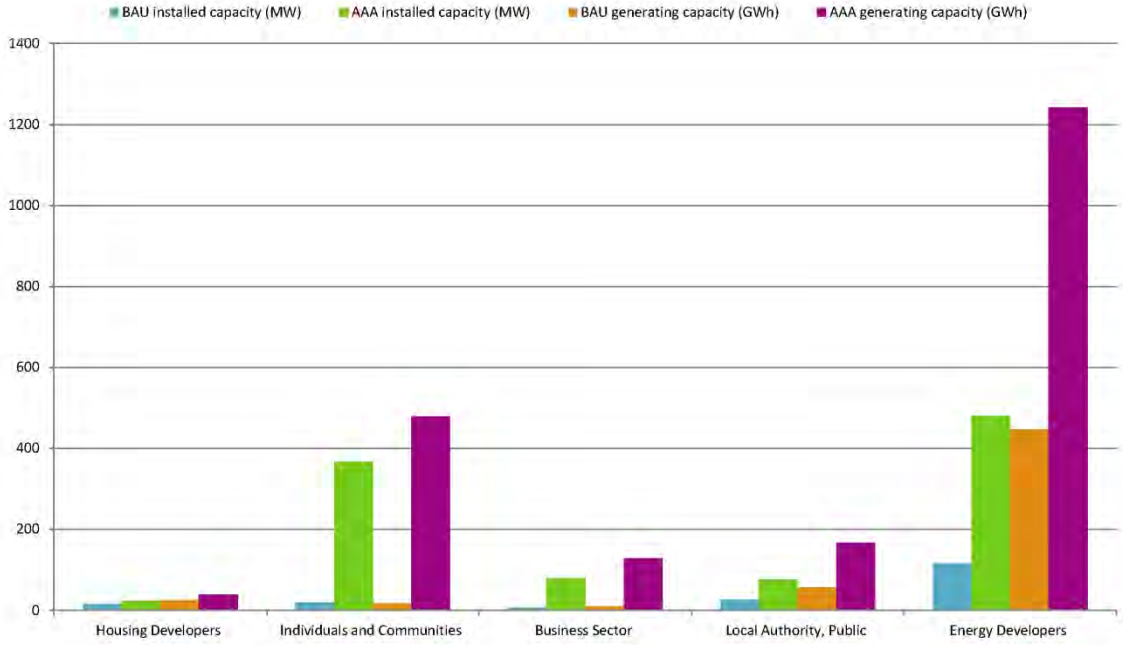
Traditionally, assessments of renewable energy potential only consider the physical resource available in an area. A national methodology developed by DECC has been used to estimate the physical capacity in all regions across the UK. This estimate has been reviewed and further refined in this study by considering physical barriers and possible constraints on deployment and supply in Kent. However, a real understanding of the potential for delivery of renewable energy can only come through consideration of potential delivery partners, their motivations and the barriers they face. This study has considered five broad delivery partner types in Kent; energy developers, housing developers, the public sector, the private sector and communities. Part II of this study includes a set of case studies projects delivered by each of these partners, demonstrating how renewable energy of all types have been delivered successfully in Kent, highlighting barriers that were overcome and the opportunities that were realised.

Kent benefits from an active and enthusiastic network of practitioners and communities, with a wide variety of local and County-wide groups that have a strong interest in renewable energy. Work with local stakeholders suggests that the level of ambition is high, but a lack of coordination and leadership is holding delivery back.

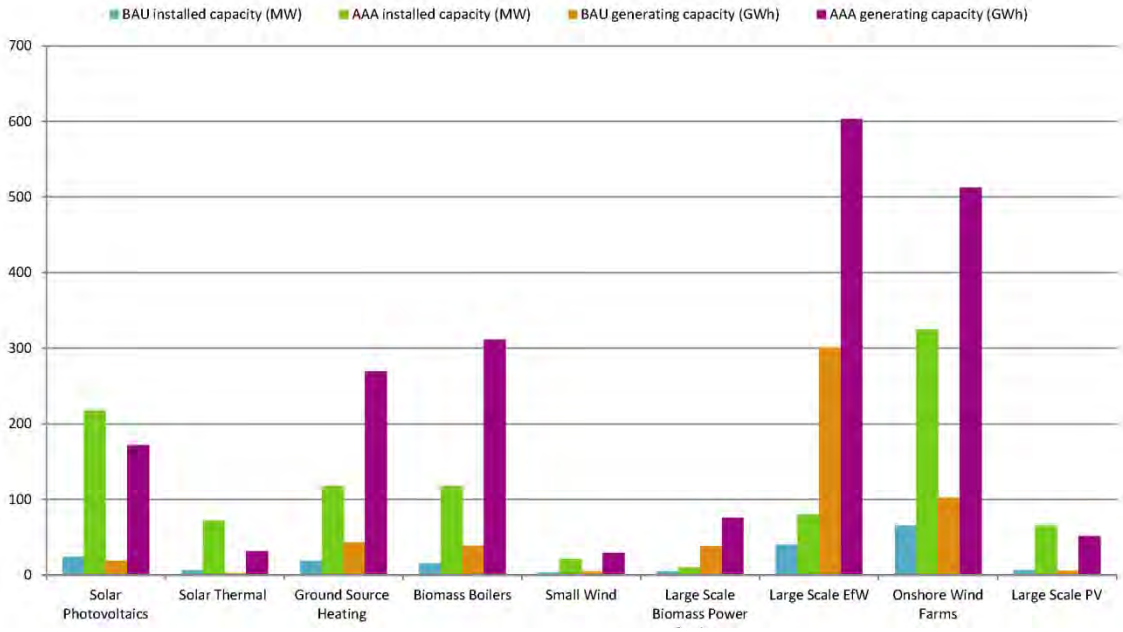
Taking a partner-based perspective, this study has estimated possible delivery scenarios for renewable energy in Kent up to 2020. Two scenarios were considered; ‘business as usual’ (BAU) and ‘all actions adopted’ (AAA).

The BAU reflects what would be delivered if no actions were taken. It assumes that the current level of uptake is maintained, taking into account likely legislation changes and incentives emerging through national policy. The AAA scenario assumes that all the recommended actions from this study set out in the action plan are taken forward in Kent. The action plan can be found on page 16 of this document. The AAA scenario creates an atmosphere that supports the various delivery partners in accelerating their uptake of renewable energy. It is intended to reflect a realistic maximum.

Installed and generating capacity by developer partner - under business as usual and 'all actions adopted'



Installed and generating capacity by technology type - under business as usual and 'all actions adopted'



The results of the scenario testing can be seen in the accompanying graphs. The graphs show both the ‘installed capacity’ – the maximum amount of power the technology can produce at any one time, and the ‘generating capacity’ – the amount of energy which will be generated each year on average. This provides an idea of the relative impact of actions and interventions within different sectors and technology types, showing where further support is needed and where incentives may be most effective. It also shows how much low and zero carbon energy can contribute to the reduction of carbon emissions in Kent by 2020. A carbon reduction of 10% can be achieved in the ‘All Actions Adopted’ scenario.

Being structured to deliver large scale renewable energy installations, energy developers have the greatest potential to deliver carbon reductions in Kent. However, they cannot succeed alone and will require the support of other partners. Equally other delivery partners, such as communities and local authorities can partner with energy developers to reduce risk and gain benefit from energy developments. Communities show a great potential to increase their delivery of renewable energy if greater focus and support is given to individuals and community groups. Public Sector and the Private Sector also play a key role which can be significantly enhanced through focussed action. Housing developers are likely to play a relatively small role in delivering renewable energy; however, some developers in Kent have signalled their interest in partnering with energy companies to drive the delivery of low carbon and renewable energy schemes including district heating, so they may become important catalyst for delivery.

Considering carbon benefits only tells part of the story. Also to be considered are the capital and operational cost incurred in the deployment of the various technologies each partner can deliver. Some technologies make better economic sense than others, and generally larger scale installations are more commercially favourable. There are also other benefits that can be gained. A total benefit analysis, which considers the potential for job creation, community gain and partner benefits is conducted in Part II of this report. The table below summarises the total benefit assessment for delivery by each partner. Here we can see substantial wider benefits can be gained through delivery of renewable energy by the public sector, private sector and communities in particular.

Delivery Partner	Cost Efficiency	Job Creation	Local Community Benefits	Partner Benefits
Energy Developers	High	High	Medium	High
	• Large scale renewable energy, particularly onshore wind has a low levelised cost	• Job creation could be achieved through local development of manufacturing supply chains, and establishment of Kent as a low carbon economic hub. Support for offshore wind farms using Kent's ports as well as onshore technology delivery could develop a renewable energy specialist economy.	• Through partnership business models, local communities can directly profit from renewable energy development. Some energy developers are actively looking at PV share schemes where dividends are offered to community member who buy a stake in the installation – typically on school or community buildings.	• Financial benefit and business development.
Housing Developers	Low	Low	Low	Medium
	• Micro-generation technologies have a high levelised cost. • The sector is small. Regulation may mean that technologies are selected primarily to meet carbon reduction targets.	• Individual installations across Kent will lead to high demand for skilled workers. However this sector is small by comparison to other sectors identified for Kent.	• Delivery of local micro-generation will reduce energy bills for consumers (new residents)	• Reputational benefit – developing sustainable homes • Perhaps a premium on 'Green Homes' – or just a competitive advantage in the market place.
Public Sector	Medium	Medium	High	High
	• Micro-generation technologies have a high levelised cost. However there is a greater opportunity to achieve scale in this sector due to land ownership or ownership of portfolios of buildings. This scale can reduce costs.	• As for other delivery partners. Individual installations across Kent will lead to high demand for skilled workers.	• Delivery of local micro-generation will reduce energy bills for consumers.	• In delivering renewable energy, communities will see wider educational and community cohesion benefits that arise from communal projects. • Local Authorities have a key role as a facilitator/co-coordinator of action in this sector – they need to be seen to be leading by example.
Private Sector	Medium	High	Low	Medium
	• Micro-generation technologies have a high levelised cost. However there is a greater opportunity to achieve scale in this sector due to land ownership or ownership of portfolios of buildings. This scale can reduce costs.	• Individual installations of micro-generation across Kent will increase demand for skilled workers. • Business involvement in renewable energy delivery will foster a low carbon economy	• Unless accompanied by wider community initiatives and education, wider community benefits are likely to be limited	• Reduced running costs – but likely to be a lower order driver for business • Possible Corporate Social Responsibility/Brand benefits • Economic benefits derived through establishment of Kent as a low carbon
Communities and Individuals	Low	High	High	High
	• Micro-generation technologies have a high levelised cost.	• Individual installations across Kent will lead to high demand for skilled workers. (Electricians/Installers). This sector offers a big market – even relatively low uptake can generate significant numbers of installations. Feed in Tariff and Renewable Heat Incentive will help.	• In delivering renewable energy, communities will see wider educational and community cohesion benefits that arise from communal projects.	• Delivery of local micro-generation will reduce energy bills for consumers. • Individuals and communities will also be able to generate financial revenue stream through Feed in Tariff and Renewable Heat Incentive.

The Action Plan for Kent

Targets are just theory without action. Delivery of renewable energy will continue to happen in Kent, but if this continues at ‘business as usual’ rates, the County will fall well short of its ambitions and carbon reduction commitments. This study has shown significant gain in renewable energy deployment and wider benefits could be achieved by improving the delivery capacity of energy developers, communities and the public and private sector. Through coordinated delivery across partners, Kent can also reap the benefits associated with being amongst the first to establish a low carbon economy.

All partners have a part to play in delivering renewable energy in Kent. Kent County Council and local government have a crucial role to play in leading and supporting delivery. Communities have perhaps the most exciting opportunity to deliver renewable energy projects and simultaneously achieve wider community benefits. Local businesses, industry and farmers can take advantage of a range of renewable energy opportunities for financial and marketing benefit while stimulating impetus for the green economy in Kent. All partners will also play in crucial role in working with energy developers to deliver some of the biggest strategic opportunities in Kent from onshore wind, biomass and energy from waste. Without delivery of these substantial solutions, the pathway to substantial carbon reduction will be arduous.

The Action Plan sets out a range of possible actions that could be taken forward in Kent and suggests possible leading and supporting partners. Actions are prioritised based on the likely delivery impact, the partner they will influence and the wider benefits they are likely to drive. These actions were developed in consultation with stakeholders at a workshop held by Kent County Council in September 2011. It is recommended that the Action Plan is evolved and adopted by the County Council in creating a vision for Kent’s future.

Action Description	Main actor(s)	Timeframe	Support required from	Priority
 ***Planning and Strategy***				
Develop Vision and Direction	Kent Districts/ Medway Council	Short-term		High
Develop a strategy to establish a low carbon economy	KCC	Long-term	LEP Industry and business	Medium
Identify deliverable local Allowable Solutions	Kent Districts/ Medway Council	Long-term	KCC	High
Establish a renewable energy economic hub in Kent, initiated by development and servicing of offshore wind farms	KCC Kent Districts/ Medway Council	Long-term	Renewable energy technology companies	High
Set planning standards for sites which have a significant ability to deliver renewable energy	Kent Districts/ Medway Council	Long-term	KCC	Medium
Identify promising areas for community energy schemes	Kent Districts/ Medway Council	Medium-term	Community groups	Medium
Establish cross boundary planning strategy with surrounding local authorities	Kent Districts/ Medway Council KCC	Long-term	KCC	Low

Partnership Working				
Create county-wide expertise network	Kent Districts/ Medway Council	Short-term		High
Establish public sector or community based energy services company (ESCo) for Kent	Kent Districts/ Medway Council KCC Community groups	Long-term	Energy developers Community groups	High
Establish community investment partnerships for large-scale schemes	Energy Developers	Medium-term	Leadership within community	High
Public-private partnerships to deliver difficult renewable energy projects, such as district heating	Energy Developers Kent Districts/ Medway Council	Long-term	Renewables champion on local authority council	Medium
Provide support for community champions	Kent Districts/ Medway Council Private sector Energy developers	Short-term		Medium
Develop private sector champions	Private sector	Medium-term	Industry and business	Medium

Education and Empowerment				
Provide guidance on appropriate technologies and funding sources to community groups	Energy developers Kent Districts/ Medway Council	Medium-term	KCC – low carbon communities	High
Educate and promote the importance of renewable energy to community members	Community groups	Short-term	Kent Districts/ Medway Council	High
Develop renewable energy installation skills locally	Local colleges Energy developers Housing developers	Long-term		Medium
Disseminate renewable energy delivery models and case studies for local communities	Community groups	Medium-term		Medium
Establish a database of case studies detailing experience with renewables	Community groups Kent Districts/ Medway Council	Medium-term	Industry and business Renewable technology companies	Medium

Investment and Resources				
Install renewable energy on all public council and school properties	Kent Districts/ Medway Council/Schools	Long-term	Energy developers	High
Coordinate funding pot for public sector	KCC Kent Districts/Medway Council/Universities	Medium-term		High
Develop Kent development capital fund for private sector investment in renewables	KCC	Medium-term	Private sector funding	High
Pilot projects with self-selecting communities interested in renewable energy	Community groups KCC	Long-term	Community groups and	High
Fund feasibility studies for local energy schemes	Kent Districts/ Medway Council	Medium-term	CIL Finance South East EU funding	High
Conduct feasibility studies to decide which strategic projects are worthwhile investing in	Kent Districts/ Medway Council	Medium-term	Carbon Trust	High
Set vision and lobby for funding	LEP KCC	Long-term	Kent Forum	Medium
Improve energy infrastructure to provide additional grid capacity	Energy Companies	Long-term	Kent Districts/ Medway Council	Medium
Establish support network for evolving renewable energy start-ups	Locate in Kent Business Forums	Medium-term	Local renewable technology companies	Medium
Establish local biomass supply chains	Forestry Commission Biomass producers	Medium-term	Farmers AONB Kent Districts/ Medway Council	Medium

 ***Innovation***				
Provide independent advice to private sector to provide business case for energy projects	Large energy users	Medium-term	Industry and business	Medium
Create local innovation hubs, focusing on researching renewable energy	Energy focused companies Kent Districts/ Medway Council	Long-term	Locate in Kent	Medium
Perform energy life cost analysis	Large energy users	Medium-term	Industry and business	Medium
Market Kent as a place for low carbon living and working	Locate in Kent	Long-term	KCC	Low