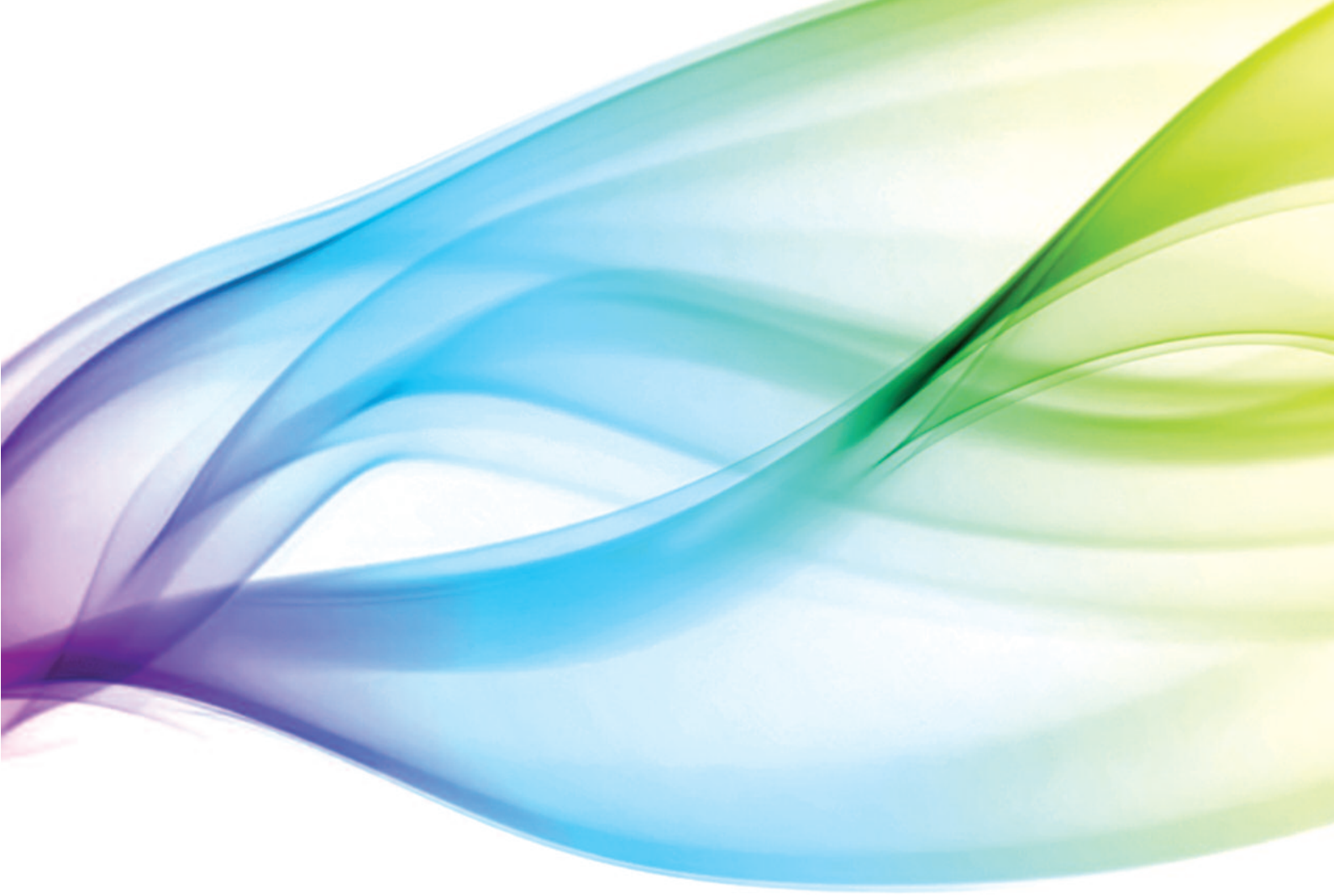

The road to 2020

An analysis of renewable energy options in the South West of England

A report by Regen SW, in association with the South West RDA.

September 2008

South West of England
Regional Development Agency

regensw
sustainable energy agency

CONTENTS

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SUMMARY

The report lays out an early analysis of what the new UK renewables target for 2020 could mean for the South West of England and where there are opportunities for the region to speed up renewable energy deployment.

- Our analysis indicates that generating 15% and 20% of all energy consumed in the South West from renewables is possible by 2020, but requires rapid changes in national policy and stronger support from decision makers at a local level. Without such changes less than 5% of the region's energy will come from renewable sources.
- The challenging nature of a 2020 target and the significant deployment risks mean that it will be essential to achieve high and rapid deployment in all technologies.
- Achieving 15% is critically dependent on the development of offshore wind in the region. Achieving 20% additionally requires very extensive installation of renewable heat systems in existing buildings.
- Achieving a 15% target could result in the equivalent of two-thirds of the region's total electricity consumption being generated by renewable projects, and will require any constraints in the national and regional electricity networks to be speedily addressed.
- Meeting the 15% target would result in carbon emission savings from energy use of about 30%, and would reduce the carbon footprint of the region significantly.
- Reducing energy demand and increasing energy efficiency will play a central role in making these targets achievable. We estimate that the absence of a successful energy demand reduction programme will require an additional 4 TWh of renewable energy production in the region.
- After taking into account landscape constraints, there remains scope for a large increase in the deployment of onshore wind turbines. We highlight the case for developing a renewables deployment plan for the region covering all technologies and drawn up in collaboration with local authorities and statutory consultees.
- The potential for the retrofit of renewable heat systems in existing buildings is large, and could deliver twice the renewable energy output from new buildings constructed to zero carbon standards. We consider that there is a strong case for a planned boiler replacement programme in off gas grid areas of the South West.
- Offshore wind deployment is critically dependent on being able to construct foundations in water depths of 30–50 metres at reasonable cost. We highlight the need for a UK technology accelerator programme to support engineering innovation in deeper water turbine installation.
- The report identifies the delivery risks and economic opportunities for each technology area. It concludes by highlighting fifteen key opportunities for the region, and the national enabling actions essential for these opportunities to be realised.

PURPOSE

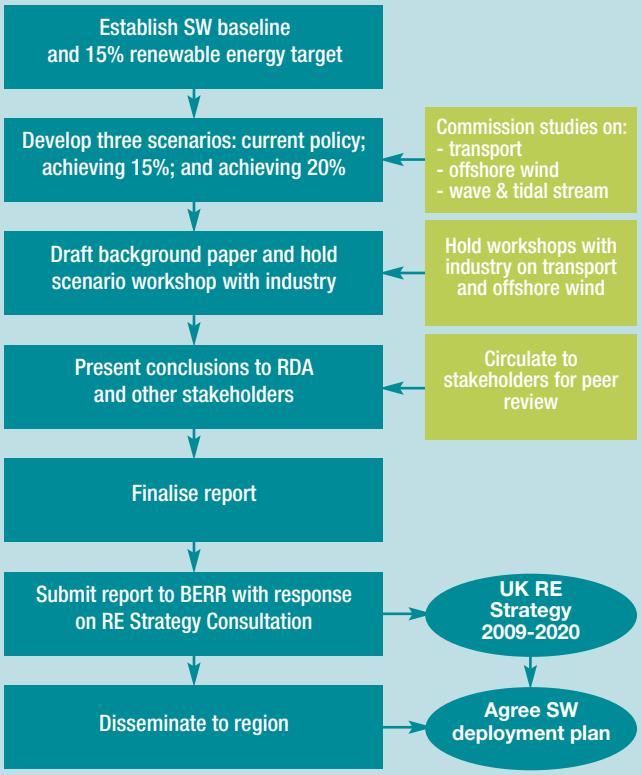
For the first time the UK has a legally binding renewable energy target. It commits the country to producing 15% of all energy consumed in transport, heat and power generation from renewable sources by 2020. This is an extremely challenging target as the UK presently generates less than 2% of its energy from renewable sources and total energy consumption has been rising in recent years.

This report lays out an early analysis of what this new target could mean for the South West of England, where the challenges lie, and where there are opportunities for the region to speed up deployment and increase economic development.

We have explored the implications of both a 15% and a 20% target for the region because our strong renewable resource offers the opportunity for us to go beyond the national average.

This report is intended as both a contribution to the government's Renewable Energy Strategy consultation, and to provide guidance to businesses and public sector partners in the region who want to understand the opportunities created by the new UK renewables target.

APPROACH



We examined the three energy sectors of electricity, heat and transport, focusing mainly on heat and electricity as transport fuel is principally affected by national policy and international markets.

ANALYSIS

This section summarises the analysis undertaken by Regen SW's technical experts. It included three specially commissioned studies on transport, offshore wind, and wave and tidal stream. The scenario analysis was reviewed at workshops held with industry and other stakeholders. The scenarios are not a forecast of how the target will be met, but an attempt to assess the key issues in meeting a regional target. More detail on the background data and the analysis is contained in a separate technical appendix.[1]

Energy efficiency and demand reduction

Determining how much renewable energy is required to meet the 15% and 20% targets requires a prediction of total energy consumption in the region in 2020. This figure has been estimated taking into account current demand, the energy reduction and efficiency measures that can be put in place, and consumption growth caused by increasing population and economic activity in the region.

The cheapest and quickest method of reducing carbon emissions is by reducing energy consumption through:

- demand reduction measures
  - such as turning off lights when not required; and
- energy efficiency measures
  - for example using compact fluorescent light bulbs.

Estimates of post growth energy efficiency savings from national, regional and local sources are quite similar. We therefore made a consistent set of assumptions about energy efficiency savings in the existing built and industrial environment to give a net (post-growth) 10% reduction in heat demand and a 12% reduction in electricity demand. Growth in transport energy remains stubbornly high at 11%.

Actual and predicted energy consumption in 2005 and 2020

	2005 actual TWh	2020 predicted TWh	% change
Electricity	27.9	24.5	-12%
Heat	65.2	58.6	-10%
Transport	41.3	45.8	11
Totals	134.4	129.0	-4%

The electricity and heat predictions were derived from extensive review of relevant national policy and research and local studies. The transport demand was estimated from specially commissioned modelling, and based on the assumptions outlined in the technical appendix.

On the basis of this analysis we predict that renewables will have to produce 19 TWh by 2020 to be producing 15% of the South West's final energy consumption, or 26 TWh to meet a 20% target.

[1]The Road to 2020: Technical Appendix, Regen SW 2008

Three scenarios for 2020

Three scenarios were created based on common background assumptions that there would be no abrupt changes in external factors such as economic climate and technology. We assumed the price of oil would be about US $100/barrel in real terms; if the oil price stays higher than $100 a barrel the recommendations we propose will work more effectively. The three scenarios are set out below.

Scenario 1: Current Policy

In the current policy or baseline scenario, little changes from today's situation and government makes no significant policy changes to achieve the 2020 renewable energy target. Only the policies already announced are implemented and commitment to renewable energy remains low to medium, both locally and nationally. The Consultation Document from the Department for Business Enterprise and Regulatory Reform (BERR) states that current policy (as the 2007 Energy White Paper) will achieve only about 5% renewable energy by 2020; deployment of renewable energy generation has been very slow in the South West, so on present trends we predict that the region will only be producing 4.6% of its energy from renewables by 2020. This emphasises the need for big changes in national policy and dramatic improvements in local planning practice if renewables are to achieve even a modest contribution to the region's energy use.

Scenario 2: Achieving 15% in the South West

We would need to see a significant change at both national and local levels that markedly improves the prospects of sufficient renewable energy being generated to meet the target. The step up to this level of intervention is significant, and changes will have to occur within the next two to three years to have time to make sufficient impact by 2020. New policies will have to be devised, agreed by the political establishment and the civil service, and explained to the public. This will require the expenditure of political capital by the government of the day and large sums of tax-payer's and consumers' money may be required to kick-start new technologies and implement energy efficiency and renewables quickly.

It is clear from our preliminary analysis, that to achieve renewables at anything close to 15% will require a large component of offshore wind and that this will have to be located in water depths of between 30 to 50 metres.

We have assumed that one of the possible Severn tidal schemes is constructed and contributes 4 TWh by 2020. This corresponds to the potential 2020 contribution to target of the Cardiff–Weston Barrage at 17 TWh: half this figure is credited while it is under construction and we have assumed that the output would be split 50:50 between the South West and Wales. Finally we assume that sustainability issues limit the Renewable Transport Fuel Obligation to 5% until 2020 rather than the 10% planned.

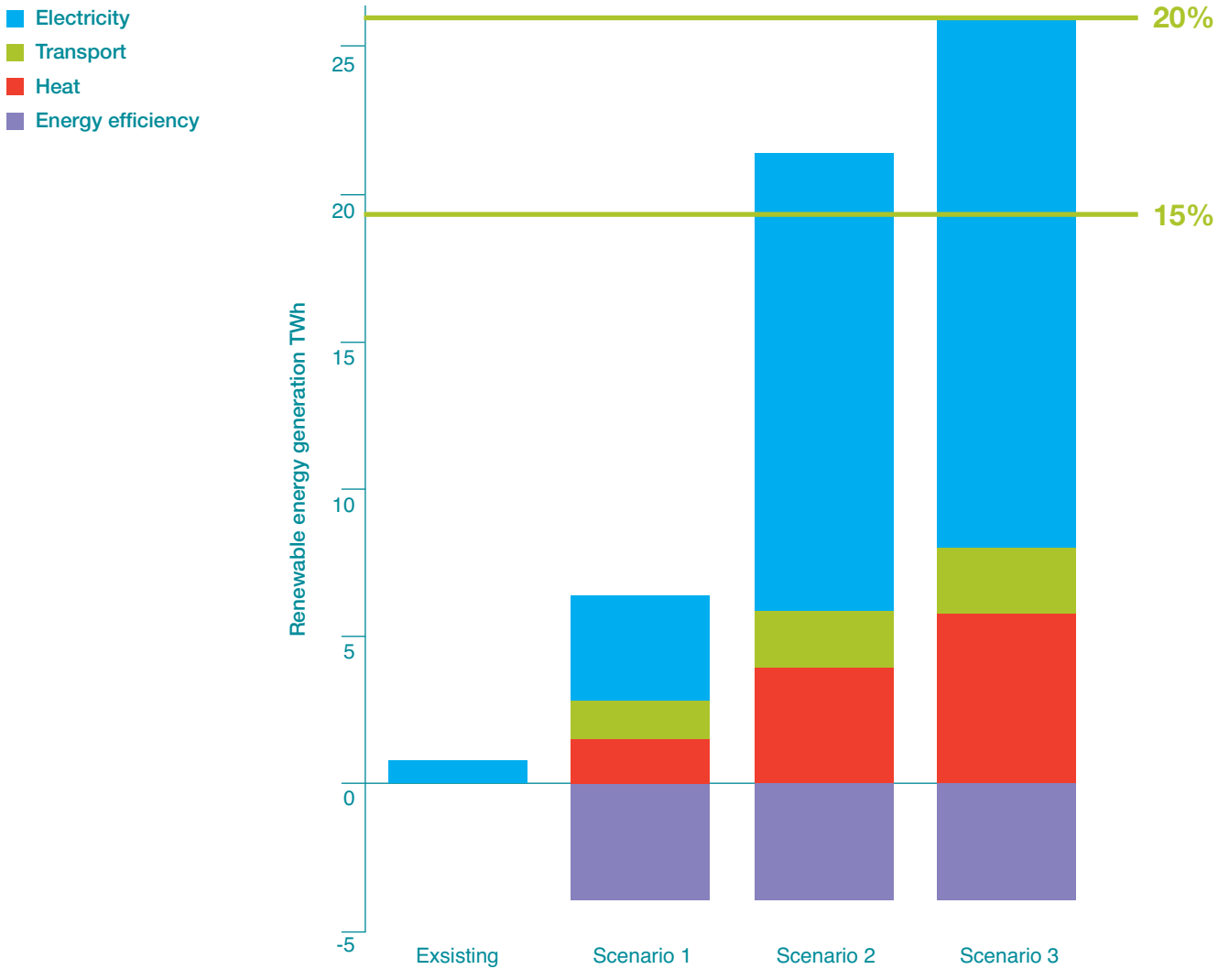
Scenario 3: Achieving 20% in the south west

We explored a scenario which follows the same approach as above but aims for a more ambitious level of renewables in the South West. This scenario moves towards the resource limitations for biomass and includes 50 MW of energy from waste, an additional 250 MW of onshore wind, and an extra 300 MW from wave energy. It assumes that political support, at national and local levels, will be the same or higher than in Scenario 2.

Results

The bar graph below shows the magnitude of the step up to 15% and 20% renewable energy from the existing situation and the predicted relative contributions from renewable electricity, heat and transport fuel. The blocks under the horizontal axis reflect the importance of the energy efficiency measures that have to be achieved by 2020, representing a saving of about 4 TWh of renewable energy generation.

Scenarios by type of energy generation



Scenarios: 1 - Current policy maintained to 2020 2 - Achieving 15% 3 - Achieving 20%

The increasing proportion of renewable electricity across the three scenarios means that it meets an increasingly larger amount of the region's total demand for electricity as shown in the table below.

Scenarios by proportion of energy generation and carbon emissions

	Existing	Scenario 1	Scenario 2	Scenario 3
RE % of total sector demand				
Electricity	3%	12%	66%	73%
Heat	0%	2%	7%	11%
Transport	0%	3%	3%	3%
Totals	1%	5%	17%	20%
Emissions Mt CO_2				
from energy sector	39	33	27	26
reduction		15%	31%	34%

So in Scenario 3, renewable energy meets 20% of the region's total energy demand, but 73% of its electricity demand. Note also that carbon emissions reduce dramatically as increasing amounts of fossil-fuelled electricity are displaced by renewable electricity.

The role of the region

National governments are in the best position to set regulatory policy on climate change and determine overall levels of taxation and public expenditure on energy. However, they tend to find it difficult to understand the local impact of government decisions because ministers and civil servants are one or two steps removed from delivery. Equally, many of the things that are needed to create a low carbon economy are 'below the national radar', and would not be identified without local and regional champions.

Local authorities are in a good position to ensure accountability for planning decisions, and shaping local responses to climate change. However, in newly emerging markets such as renewable energy, it is often hard to create critical mass for business support at a local level because of the low number of players and the high degree of expertise needed.

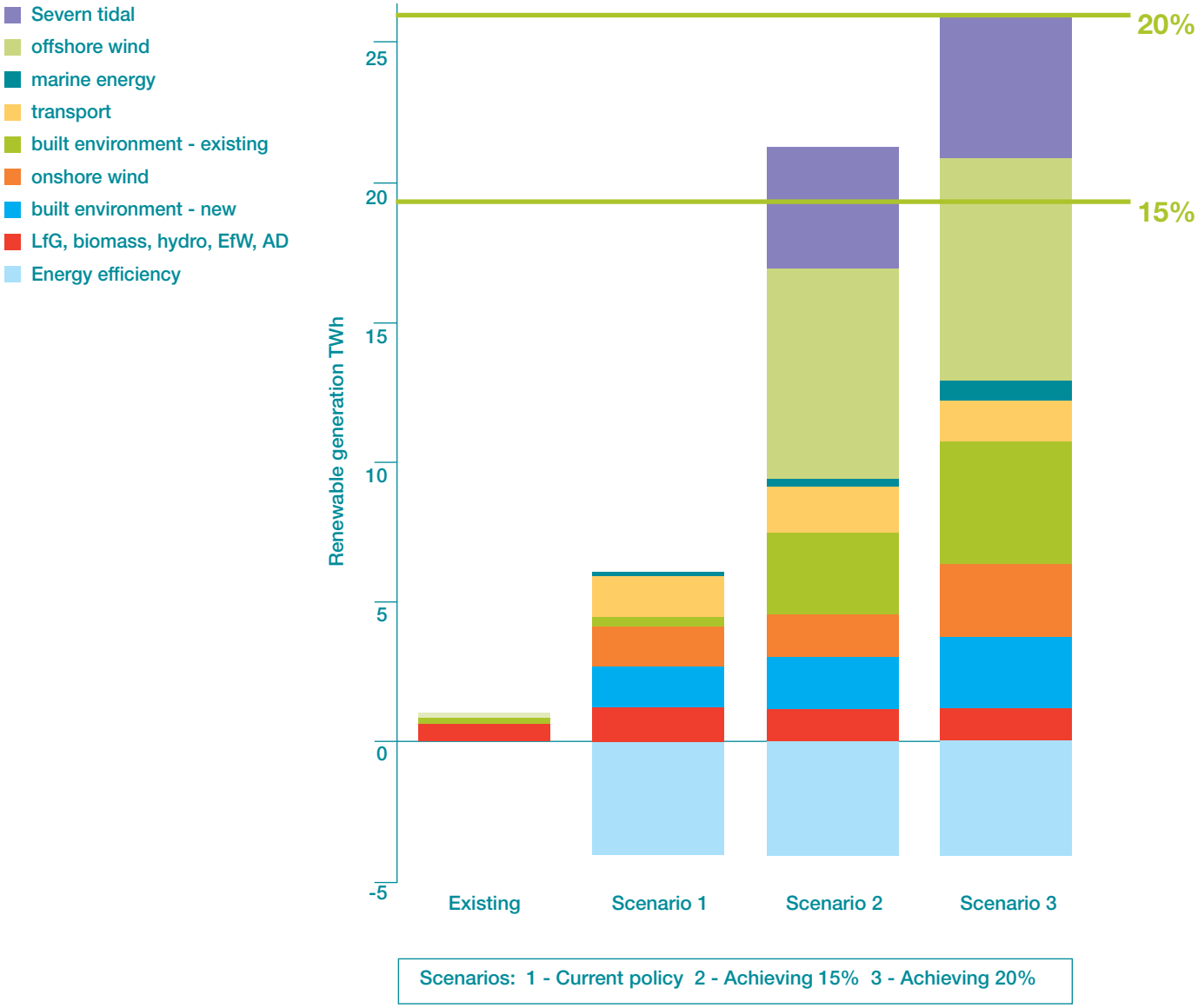
For example Round 3 offshore wind projects will be billion pound projects of regional significance, but will be too big and complex for local authorities to easily interact with.

Regional support for renewable energy deployment and business growth can thus help fill a gap, by building relationships with the business sector, offering advice to local and national decision makers, and identifying strategically important opportunities.

INSIGHTS

The scenario analysis we carried out together with the discussions at the three workshops we held, enabled us to put together 'building blocks' of the contributions from various technologies or groups of technologies. Stacking these building blocks up in approximate merit order (lowest £/MWh at bottom) illustrates how both a 15% and a 20% target might be met in the South West region. The importance of energy efficiency and demand reduction measures is represented by the negative 4 TWh block in the diagram.

Scenarios by generation technology



Scenarios: 1 - Current policy 2 - Achieving 15% 3 - Achieving 20%

Headline findings

Our analysis indicates that:

1. Current policy maintained to 2020 is likely to achieve less than 5% of the region's energy from renewable sources.
2. 15% and 20% renewables targets can be met by the region, provided that there is a major and successful effort to implement energy efficiency and demand reduction measures.
3. The challenging nature of either of the 2020 targets and the high deployment risks mean that it will be essential to achieve high levels of deployment in all technology areas.
4. A 15% target can only be met with a significant contribution from offshore wind, and will require developments in the moderately deep water of the Bristol Channel and Lyme Bay.
5. The higher costs and risks associated with offshore wind, wave and tidal stream, and barrage technology mean that onshore renewables will be quicker and cheaper to deploy in the region, and will play a central role in meeting any target.
6. A 20% target could be met by the region, but only with very high levels of deployment in all renewable technologies, including very rapid growth of the market for renewable heat in existing buildings.
7. The 15% and 20% scenarios result in very high levels of renewable electricity generation, equivalent to between two-thirds and nearly three-quarters of total electricity consumed in the region. Most of this electricity will enter the national grid, and be managed at a UK level, but it means that any electricity network constraints will have to be overcome for either scenario to be possible.
8. The high electricity displacement in the scenarios raises the carbon emission savings. In the 15% scenario it results in about 30% carbon savings from energy consumption.

A number of important technological insights follow, which were derived from this work.

Energy efficiency and demand reduction

Energy demand reduction and energy efficiency measures are usually the cheapest and quickest routes to reducing carbon emissions.

The greatest gains by 2020 come from tackling existing premises rather than new build.

In retro-fitting existing premises, energy efficiency measures must be deployed at the same time as renewables are installed, particularly in hard-to-treat properties. If energy reduction measures are omitted, then about 4 TWh of extra renewable energy is needed.

Onshore bulk electricity

This includes onshore wind, landfill gas, biomass power, hydro, energy from waste and anaerobic digestion.

With the potential of over 1,000 MW of developable onshore wind capacity in the South West and only about 52 MW built to date, there is scope for a large increase in the rate of installation of onshore wind turbines.

Although the region has a very good biomass resource, its availability is constrained in some scenarios and it would be more productive to use it for the production of renewable heat in existing premises and combined heat and power (CHP) in large new developments, rather than in power-only plant, where much of the energy is lost as waste heat.

Although there are numerous issues in its exploitation, including the extra costs of separation and the higher costs of waste regulation, the biomass resource in the waste stream is very large.

Bulk electricity could deliver some 3 TWh by 2020, but this will be largely through numerous projects of relatively small size – the distribution of settlements in the South West means that only one wind farm over 50 MW has ever been proposed in the region. This differs from offshore wind, where there could be one or two very large projects of over 1,000 MW.

Transport

Growth in transport energy demand appears to be very difficult to curtail in a predominantly rural region like the South West where public transport cannot displace many journeys. Nevertheless there are a number of measures that can have an impact, including supporting home working and car sharing, and the role of walking, cycling and public transport could clearly grow in the region's urban and suburban areas.

In this context, renewable fuels have a role to play in reducing carbon emissions and improving air quality. Unfortunately there is evidence that some tropical forests have been cleared for crops that form the basis of some biofuels, and that some biofuels compete for land with food-crops. This is likely to lead to a lowering of the European target for biofuels and has led us to assume that for the foreseeable future biofuels will not provide more than 5% of transport fuel consumption.

We consider that local biofuel production should be encouraged in the region where sustainability issues can be addressed and that research and development should be encouraged in waste based biofuels. Using a fraction of the waste stream to produce biogas for fleet vehicles would be an efficient use of waste biomass and could contribute to improvements in air quality in urban areas.

Built environment and heat

Significant new policy drivers, particularly for the retrofit of renewable heat systems in existing buildings, are essential to deliver significant amounts of renewable energy in the built environment.

The BERR Renewable Energy Strategy consultation document (June 2008) suggests that 14% of the UK's heat in 2020 (90 TWh) could be derived cost effectively from renewable sources. We think that this is overly optimistic, because despite the fact that renewable heat technologies are mature, the market is immature and it will take longer than 12 years to get to this level of uptake. Based on our analysis of an ambitious uptake scenario for renewable heat we consider that a renewable contribution of between 7–11% of total heat consumed would be suitably stretching for the South West for 2020.

District heating appears to be the most cost-effective means of delivering renewable heat to high density new developments, even where heat demand from homes is reduced dramatically by super insulation and improved thermal design. However the large initial capital investment required by district heating schemes is a barrier.

Sustainable biomass resource availability will eventually be a resource constraint on the deployment of renewable heat.

Renewable heat – the opportunity in off gas grid areas

Studies in the South West[3] suggest that 16% of the region's 2.1 million homes have no access to mains gas, as they are too far from the gas grid network. These homes currently use expensive fuels such as oil, electricity and liquefied petroleum gas for their heating. Normal boiler replacement cycles mean that at least 60% of these homes are likely to replace their boiler between now and 2020.

If all of the heating systems replaced over this period switched to renewable fuels they would generate up to 4.4TWh of renewable heat a year, which is equivalent to 7% of the South West's heating demand.

[3] South West Regional Targets for Low Carbon Housing and Fuel Poverty, GOSW, 5 November 2006

Looking forward to 2050

The analysis in this report shows that the task of meeting the 2020 renewable targets in the South West is challenging, but it looks simple when compared to the challenge of reducing carbon emissions by 60–80% by 2050.

This level of emissions reduction will mean that the UK energy system will have to be almost entirely carbon free, because some emissions from land use, agriculture and waste disposal will be even harder to eradicate than those from energy use.

It is likely that the use of electricity in transport will have grown dramatically, as trains are electrified and as government incentivises the market for plug-in hybrids and electric vehicles to displace demand for liquid transport fuels. The majority of liquid and gaseous transport fuels are likely to be created from agricultural and commercial waste.

New buildings will have been constructed with no requirement for space heating or cooling for the three decades following the introduction of zero carbon building regulations by 2020, and the majority of old buildings will be required to either generate a proportion of their own heat and power from a microgeneration or to be connected to district heating networks.

It is quite plausible that by 2050 the UK will be a net exporter of renewable electricity to mainland Europe, using a new offshore electricity supergrid to connect wind and wave farms in the seas around the UK to the continent.

Offshore wind, wave and tidal power

Offshore wind's renewable energy contribution is potentially enormous and is very important for meeting the region's 2020 target. However, if we are to deploy offshore wind on a large scale in the region, we will have to see technologies deployed outside of the current cost limit of today's offshore wind sector – approximately 35 metres depth. Offshore wind in the South West is critically dependent on being able to construct foundations for water depths of 30 - 50 metres at reasonable cost.

Neither wave nor tidal stream technology has yet been commercialised and progress has been very slow. These technologies are not therefore expected to make a significant contribution by 2020, but are likely to have an important role to play by 2030 and it is important that work continues to bring forward commercialisation. Achieving even the modest contribution assumed in our scenarios will require a speeding up of the development process. This will require successful innovation by device developers, improved financial support for wave and tidal device development and continued research and demonstration support, both regionally and nationally.

The large potential tidal stream resources of the Bristol Channel also require development of generators that can operate in relatively shallow waters with a large tidal variation.

The government is currently investigating the feasibility for a large tidal energy development in the Severn Estuary. Whilst we have used the proposed Cardiff-Weston barrage as our reference option, we consider that it is important that the government continues to examine a broad range of technologies including tidal reefs, fences, lagoons and barrages.

ECONOMIC DEVELOPMENT

Renewable energy markets are largely driven by government policy responses to climate change. Renewable energy markets are generally ring-fenced from the main energy and carbon markets with their own targets and subsidies. This means that there is a very strong advantage created for businesses which can produce cost-effective renewable technologies and services for a wide range of applications. At the moment, the bulk renewable electricity market is dominated by wind energy, because innovation in the 1980s by Denmark and Germany led to the development of a mature low cost design for a horizontal axis wind turbine. In the future, other technologies such as wave and tidal energy will reach an optimal design and be able to enter the commercial market for renewable energy. The EU renewable energy target will also provide new drivers for renewable heat markets, and the regulation of new buildings is important to drive strong growth in onsite renewable energy technology.

Energy efficiency and demand reduction

Recent industry assessments have shown the UK energy efficiency business sector to be substantial, with scope for considerable growth over the next decade. The UK market for energy efficiency products and services was found to be:

- Currently 10 times the size of the renewable energy sector;
- Potentially of the order of £4.27 billion by 2010 and £6.87 billion by 2015;
- Experiencing a growth rate of 10% per year.

In the South West, a recent survey for Regen SW has demonstrated that the energy efficiency businesses directly employ 4,300 staff (Full Time Equivalent) in the region, and that they contribute £379 million to the economy (net Gross Value Added). These businesses should benefit substantially from new policies to meet both the EU renewable energy target and the EU target of reducing carbon emissions by 20% by 2020.

Onshore bulk electricity

The biggest element of onshore electricity is expected to come from wind. Although breaking into the manufacture of larger value components in wind turbines is likely to be difficult, there will be opportunities in the region and in Europe to supply components and balance of plant goods and services. The region has particular strengths in wind project development and high end engineering and financial advisory services for wind energy projects.

Entrepreneurs in the South West are developing several energy-from-waste technologies, such as pyrolysis and anaerobic digestion, and there are opportunities to profit from the increasing cost of landfill that makes alternative treatment process increasingly viable.

Transport

Transport accounts for 30% of South West energy consumption and there will be some opportunity to supply bio-fuels from recycled oils.

The market for imported fuels is unlikely to produce major economic benefit for the region because we currently have no refinery capacity. Whilst dedicated biofuel refineries are planned for the region, the current crisis in confidence in the biofuels market is making their financing difficult.

Use of bio-gas from domestic and commercial waste streams may become an attractive proposition and there may be opportunities to increase the number of anaerobic digestion plants producing bio-gas for road vehicles.

Built environment and heat

We estimate that if renewable heat provides 7% of the UK's heat market, it could require capital expenditure of £25 billion to 2020. If it achieved 11% of heat consumption this would rise to £39 billion.

A report by the Renewables Advisory Board[2] suggested that the market for onsite renewables generated by zero carbon homes regulation could be between £1.4 billion and £3.1 billion a year by 2016, depending on how much onsite generation is required by the government's final definition of zero carbon. The government's intention to make all new non domestic buildings zero carbon by 2019 will create additional demand for onsite renewables and energy efficient goods and services.

Offshore wind, wave and tidal

The South West is unlikely to get major offshore wind turbine fabrication investment because it is far from the shallow waters of the North Sea and is less conveniently situated for the northern European market than the east of the UK.

However offshore wind deployment in deeper water poses a new opportunity to engineer financially viable ways of deploying in water depths greater than 30m. With few global offshore turbine manufacturers, a supply chain already stretched by onshore wind, and over half the total cost in balance of plant, there are significant opportunities for the region, particularly if it can become a centre for research and innovation in deeper water technology.

If offshore wind farms are built in the region there are certain activities that have to take place locally and a higher probability that business can be won by South West businesses. Maximising the opportunities for economic development from new offshore wind farms will also require the identification of ports available for construction and maintenance and the protection of large areas in those ports for laying down key components.

Wave and tidal stream technologies are commercialising slowly but the South West has an edge in wave research and demonstration with Wave Hub and PRIMaRE, the marine energy institute set up by Exeter and Plymouth Universities. The South West also has leading tidal stream companies, Marine Current Turbines and Tidal Generation, headquartered in the region. The Carbon Trust estimates that UK annual revenues from marine renewables could range from £300–900 million by 2020.

[2] The role of onsite energy generation in delivering zero carbon homes, 2007, Renewables Advisory Board

The impact of renewables on the South West economy

A 2008 study for Regen SW by DTZ Pieda demonstrated very strong growth in the Renewable Energy sector in the South West when compared with a 2005 report on the sector:

Renewable Energy in SW	2005 data	2008 data
Gross direct employment (FTEs)	1,140	2,900
Direct GVA creation	£34m	£215m
Net employment effect (FTEs)	-	4,000
Net GVA effect	-	£288m

FTE = Full time equivalent employment
GVA = Gross Value Added

- Renewable energy directly employs 2,900 FTE jobs in the region today compared with 1,140 FTE jobs in 2005, equivalent to an average annual growth rate of approximately 37%.
- The sector directly contributes £215m of GVA to the regional economy, compared with £34m in 2005.
- Productivity (GVA per employee) in the renewable energy sector is on average £51,000, up from £30,000 in the previous study, indicating that the renewable energy sector has become much more productive since 2005.

The growth in employment has occurred through a combination of larger firm size and an increase in the number of firms. However, the sector is still dominated by small businesses as these results show:

- 61% of businesses employed less than 10 employees.
- 22% of the firms surveyed were start-ups, established since 2005.
- Renewable energy businesses make just under a third (32%) of their purchases and a similar amount of their sales in the region.

The main findings by sub-sector were:

- Wind was the largest sub-sector, employing 32% of all employees in renewable energy, with 23% of firms involved in the sub-sector.
- Micro-renewables was also a large sector employing 12% of employees and involving 16% of firms in the renewable energy sector.
- Businesses in the renewable energy sector tend to be focused on consultancy (32% up from 22% in 2005) and project development (23%, no change from 2005).

In summary, the renewable energy sector has seen considerable growth in employment, productivity and overall GVA contribution to the regional economy since 2005

DELIVERY RISKS

There is considerable uncertainty in assessing the potential of different renewable technologies in the region because of the risks associated with their delivery. The magnitude of risk can be evaluated by multiplying the probability of the risk occurring, by the impact of the risk if it occurs. The impact varies significantly by technology type, and can be assessed by looking at their relative TWh contributions in the scenarios. For example, no deployment of offshore wind has a greater impact on achieving a regional 2020 target than no marine energy.

We focus here on assessing the probability of various risks occurring. The risk probability profile of different technologies tends to be dominated by their financial risk, but there are also significant political and supply chain/technical risks.

Inevitably these risks interact, and a technology with high risk in one category will tend to have a higher risk factor in another. For example, wave energy currently has a high financial risk, because of the high probability of low or no returns on investment. This is directly related to its high technical risk due to relatively low technical maturity. Conversely if technical risk declines in wave energy so too should its financial risk.

We have categorised these broadly into high probability (red) moderate probability (amber) and low probability (green). Technologies with low risks should require less direct support from the public sector than those with high risks, where there is often a market failure.

Summary probability assessment

	Financial	Political	Technical/ supply chain
Energy efficiency			
Onshore wind			
New build			
Heat retrofit			
Offshore wind			
Marine			
Severn tidal			

Financial risk

Financial risk is defined here as the volatility of returns on investment, and therefore reflects the difficulty of financing delivery.

Distinguishing between the financial risk of offshore wind, marine energy and a Severn tidal project is difficult because of the relatively poor understanding of costs for these technologies. We consider that the financial risk of offshore wind in deeper water is likely to be lower than that for marine energy because it requires a lower magnitude of engineering innovation. A Severn tidal project is likely to have higher financial risk than offshore wind because of the difficulty of financing the very large capital investment that has to be made a number of years in advance of revenues being returned.

Political risk

We define political risk as the risk of key decision makers deciding against deployment. Political risk is the most significant factor in a number of technology areas since renewable energy markets are created and constrained by policy decisions. Renewable energy deployment is therefore dependent on, and vulnerable to, a broad range of decisions by politicians at a national and a local level.

Onshore wind delivery is a moderate risk. This is both a reflection of the significant planning risk, and the real possibility that the region will not attract sufficient proposals from the energy sector in the face of better opportunities in other parts of the UK and elsewhere.

New build renewable delivery is a moderate risk, because government have not yet set the definition of zero carbon, and are under strong pressure to ease the burden on the construction sector at a time when the market is slowing. This could result in very low levels of onsite renewables being required as part of zero carbon standards.

We consider that the political risk of ministers deciding not to underwrite a Severn tidal project is high. There is a moderate risk of ministers deciding to set a low end target for offshore wind for the UK which would tend to slow development in the South West.

Technical and supply chain risks

Technical risk is defined here as the probability of technical failure and its impact. Supply chain risk includes both the availability of equipment and the risk of the necessary human skills being available for deployment.

The biggest technical risk relates to the deployment of marine renewables, where there are still major engineering challenges to be overcome, particularly for wave energy.

The biggest supply chain risk relates to heat retrofit deployment where the small size of the current market means that supply could be a major short-term constraint to the rapid growth of the sector. This is exacerbated by the absence of a financial incentive framework for renewable heat, which will require primary legislation, and could take four years to become law.

There are also significant supply barriers for offshore wind. These are principally the short-term supply shortage of turbines, the current high cost of offshore construction, and limited industry experience of installation in waters deeper than 30 metres.

REGIONAL OPPORTUNITIES

We focused the second half of our stakeholder workshops on identifying the big opportunities to change deployment levels in the region, and what follows are the fifteen that we think would make the biggest difference, as well as the national enabling actions that we think will be essential to bring them to fruition. Needless to say there are many areas where the region cannot make progress without rapid decisions by national government. However, given that there is strong support in the South West for leadership on renewable energy, we believe that many of these opportunities should be taken forward jointly by national, regional and local organisations.

There is a risk that the combined effect of acting on all of the opportunities we identify is not sufficient to close the large gap between where we are now, and where we need to be by 2020. We would therefore recommend a further analysis of actions for the region is carried once the government has finalised its renewable energy strategy.

Energy efficiency and demand reduction

Regional opportunities

- The region can use an expanded Energy Saving Trust programme and increased funding to ensure that all lofts and wall cavities in the South West are insulated in advance of 2020.
- We could pilot the use of renewables and solid wall insulation to treat 'leaky' homes which have no access to gas.
- The South West could create a low carbon culture by promoting energy efficiency and renewable energy solutions to citizens and businesses.

National enablers

- Defra will have to continue to support the public provision of energy advice to businesses.
- Defra will need to continue to support the Energy Saving Trust advice centres in the region.
- Defra, BERR and energy utilities should help to fund pilot programmes to support energy retrofit activities in hard to treat homes in off gas areas.

Onshore bulk electricity

Regional opportunities

- District and unitary councils could set targets for renewables as part of a new regional renewables deployment plan.
- The region is in a strong position to set up a renewables advisory service to provide advice to local authorities and to monitor implementation of a regional renewables deployment plan.
- A community wind support scheme could be developed regionally and delivered through local partners.

National enablers

- BERR and CLG will need to provide resources to create a regional renewables deployment plan and set local targets.
- BERR and CLG should provide funding for the development of renewable energy growth points if the concept is considered helpful by local authorities.
- All government departments need to ensure national and regional statutory consultees respond consistently and quickly to planning applications.

Transport

Regional opportunities

- Local authorities should be able to allocate more resources to activities most likely to reduce demand for transport energy – car sharing, restricting car access, and home working, using new mechanisms such as the Community Infrastructure Levy.
- Local waste authorities should be encouraged to find opportunities to divert waste to anaerobic digestion or advanced thermal treatment to produce biogas for use in local fleets.

National enablers

- DfT will have to delegate more responsibility and resources for transport initiatives to a local level.
- DfT should consider banding the RTFO to incentivise production of high capital cost second generation biofuel.
- DfT should change fiscal incentives to encourage use of biogas in bus fleets to improve air quality and the carbon credentials of public transport.

What could a regional renewables deployment strategy look like?

The UK Renewable Energy Strategy Consultation suggests that there may be a case for a 'regional deployment strategy' to ensure that the planning system creates an attractive environment for innovation and investment in renewable energy.

The South West has already had very positive experience of creating ownership of renewable electricity targets through the REvision 2010 project. The process resulted in each of seven counties agreeing to a renewable electricity target, derived from a thorough resource assessment, and improved planning policy across the region through engagement and training of planning officers. Most counties went on to develop their own renewable energy action plans, and a number have employed renewable energy officers directly or through delivery partners. The project was steered over its 18-month life by a partnership of regional bodies including Regen SW, the regional assembly and the RDA. It was funded by the DTI via the Government Office for the South West, at a cost of £100k.

The main weakness of the REvision 2010 project was that it did not create political ownership at district council level, where the majority of planning decisions on renewable energy are made.

The government points to the housing planning process as an example of where a locally owned delivery strategy is created, and suggests that a renewable deployment strategy could adopt this model. One of the key features of the model is the identification of growth points, where local authority consortia are awarded additional funding to pay for detailed studies, increased local participation in the master planning process and part funding of new infrastructure, in return for agreeing to speed up delivery and exceed average housing growth targets.

The concept of renewable energy growth points might be attractive for local authorities that identify good resources for utility scale renewables. In return for agreeing to higher targets they could receive financial support to develop local delivery partnerships, help in attracting private sector investment into the area, and provide expert advice to help inform their plan making and development planning decisions.

The process would need regional leadership, both to identify and support growth points and also to monitor progress in non growth point areas.

Built environment and heat

Regional opportunities

- The South West could develop a renewable heat retrofit pilot programme, targeting off-gas grid oil boiler replacement and the retro-fitting of large commercial or office buildings.
- The installation of heat pipes in new developments could be supported using mechanisms such as the Regional Infrastructure Fund.
- Regional and local planning policy could be used to raise energy standards in larger developments.

National enablers

- DEFRA and BERR need to implement a scheme to reward renewable heat by 2009.
- CLG should allow well designed regionally distinct planning policy on energy standards.

Offshore wind, wave and tidal

Regional opportunities

- There needs to be a major UK technology accelerator programme to overcome the engineering challenges to deploying wind turbines in 30–50 metres of water, and the South West should aim to contribute by becoming a centre for applied research in deep water foundations and innovation in turbine design.
- Wave Hub can be used to stimulate applied research and supply chain development to make the region an international centre for wave energy.
- Space at South West port facilities could be protected to facilitate large-scale offshore wind and wave deployment.
- The region will maximise the chances of exploitation of the Severn tidal resource by supporting a broad and rigorous assessment of all technology options in the Bristol Channel.

National enablers

- Crown Estate will need to grant leases for offshore wind development in the South West, notably in the Bristol Channel and Lyme Bay.
- BERR should increase the next round of grant support for innovation in the offshore wind supply chain to reflect the challenge of deeper water deployment.
- Defra and BERR need to broker early agreement between relevant government departments and agencies for the deployment of marine renewables.
- BERR and Ofgem must ensure national and regional grid infrastructure constraints are addressed rapidly, so that the significant offshore renewables potential in the South West can be realised.
- BERR should collaborate with the region to ensure that Wave Hub is successfully delivered.
- BERR needs to make an early decision on tidal energy in the Severn to avoid sterilising the resource.

WORKSHOP PARTICIPANTS

We would like to thank the workshop participants for their contributions, which were invaluable in ensuring that our insights are grounded in reality. Naturally, we have had to select and edit ideas, and the conclusions in this report should not be taken as the views of the participants.

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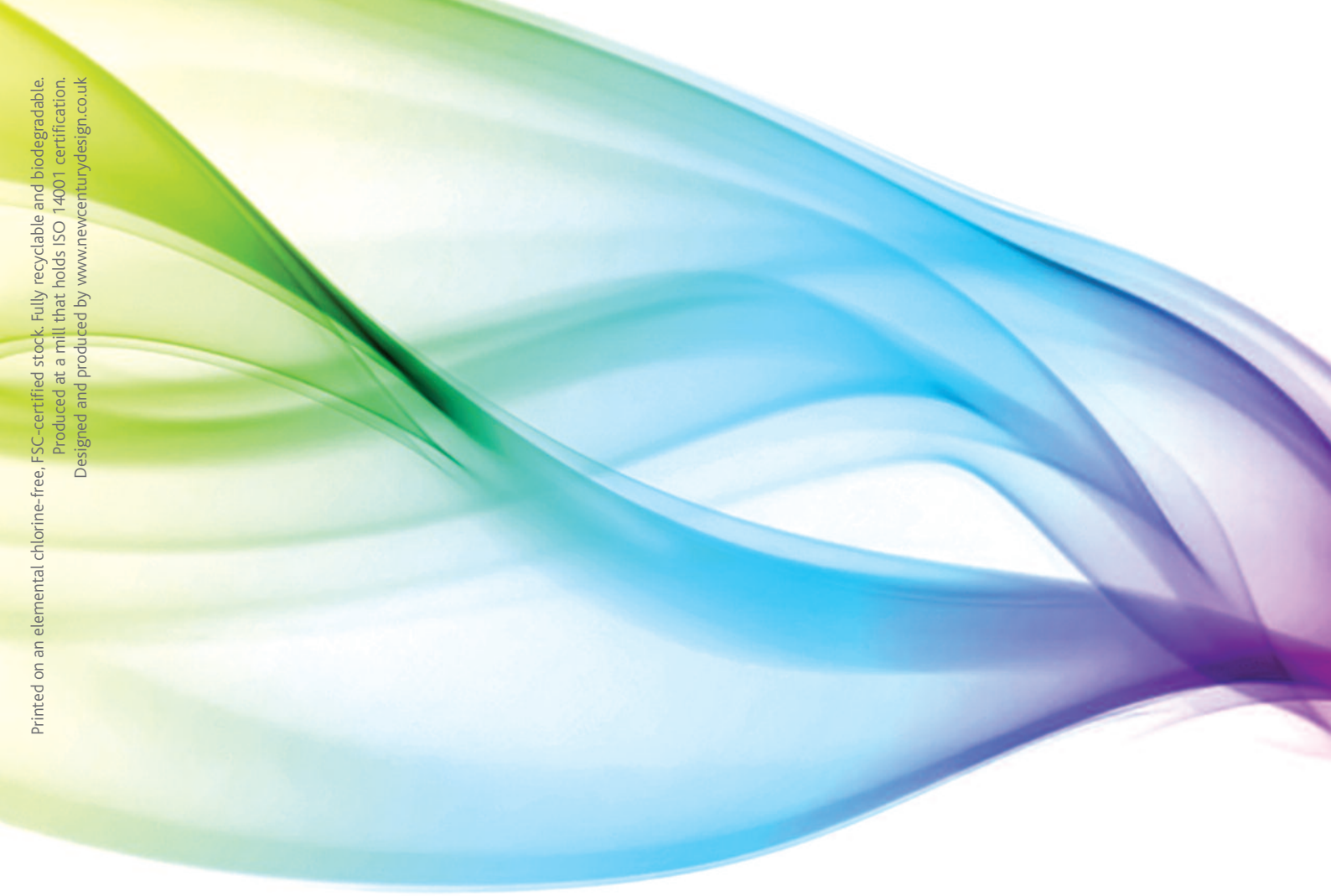

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