CARBON TRUST
Making business sense of climate change

The Case for Renewables in UK Business

New incentives, energy market trends and building regulations have transformed the returns available to UK businesses from generating their own renewable energy

Between now and 2020 energy prices may grow by ~37%[1]. Renewables are now a key way for businesses to combat rising energy bills. New incentives and building regulations have radically improved the viability and necessity of renewables. This note examines the business case for renewable energy, highlighting the technologies and sectors that stand to gain. It also examines issues and benefits for UK businesses.

Executive summary

In January 2011, the Government re-iterated its aim to increase renewable energy from around 3% of energy currently supplied to 15% by 2020. And in March 2011 the Government announced a new £860 million support mechanism, the Renewable Heat Incentive (RHI) to work alongside the existing Feed in Tariff (FiT) regime.

Analysis carried out by Carbon Trust Advisory indicates that new incentives, growth in energy costs, and building regulations create a strong case and increasing requirement for businesses to produce their own renewable energy. Our analysis of returns from renewable energy, summarised in Figure 1, finds that the viability of many renewable energy measures has dramatically improved since the introduction of new incentives.

Historically, the business case for this class of technology was weak. However, given government support mechanisms this is changing and businesses should be looking at investing in these technologies to generate a financial return. Our work in this area indicates average returns of 11-12%, with the potential for returns in excess of 20%. Returns like these give businesses that make the necessary investment an excellent hedge against the rises in energy costs that are expected in coming years. Acting early to secure income from the RHI and FiT incentives is a key element of these attractive returns.

Those standing to benefit most are businesses in the utilities, manufacturing, retail, hospitality and agricultural sectors. Retailers and suppliers of consumer brands are already leading the way, with many aiming to source all of their energy from renewables in the longer term.

We recommend that businesses adopt a staged approach to capturing the benefits from renewable energy, involving:

- systematically investing in cost effective energy efficiency measures to minimise energy requirements;
- establishing a clear and long-run business case for using renewable energy;
- implementing a strategy that enables measures to be developed quickly and in-house expertise to grow;
- installing measures on a trial basis, initially, to test their viability and acquire experience prior to likely energy price increases and growing regulatory pressure;
- following a learning phase by acting quickly to benefit from the capped level of funding available under the RHI and FiT schemes; and
- keeping a close eye on energy policy and market developments.

Key drivers for renewable investment

The main motivations for businesses to develop their own renewable energy are to:

- avoid expected energy price rises and increases in price volatility;
- benefit from long term financial incentive schemes;
- reduce energy and waste handling costs;

[1] Source: Estimated impacts of energy and climate change policies on energy prices and bills; DECC, July 2010

- acquire planning approvals and meet the requirements of building regulations; and
- derive brand and reputational benefits.

These drivers are examined in the following paragraphs.

Businesses are acting to manage rising energy prices

According to Government forecasts, electricity and natural gas prices will increase by ~37% by 2020. In addition, energy prices are expected to become more volatile[2]. Concerns about energy security have also been highlighted as one of the key factors driving some businesses to develop renewable energy projects.

> "*We are looking at energy security… we know that as we get hotter summers, we will get more energy supply fluctuations in the UK*" Neil Sachdev, Property Director at Sainsbury's, speaking to Business Green in November 2010

New incentives provide support with certainty

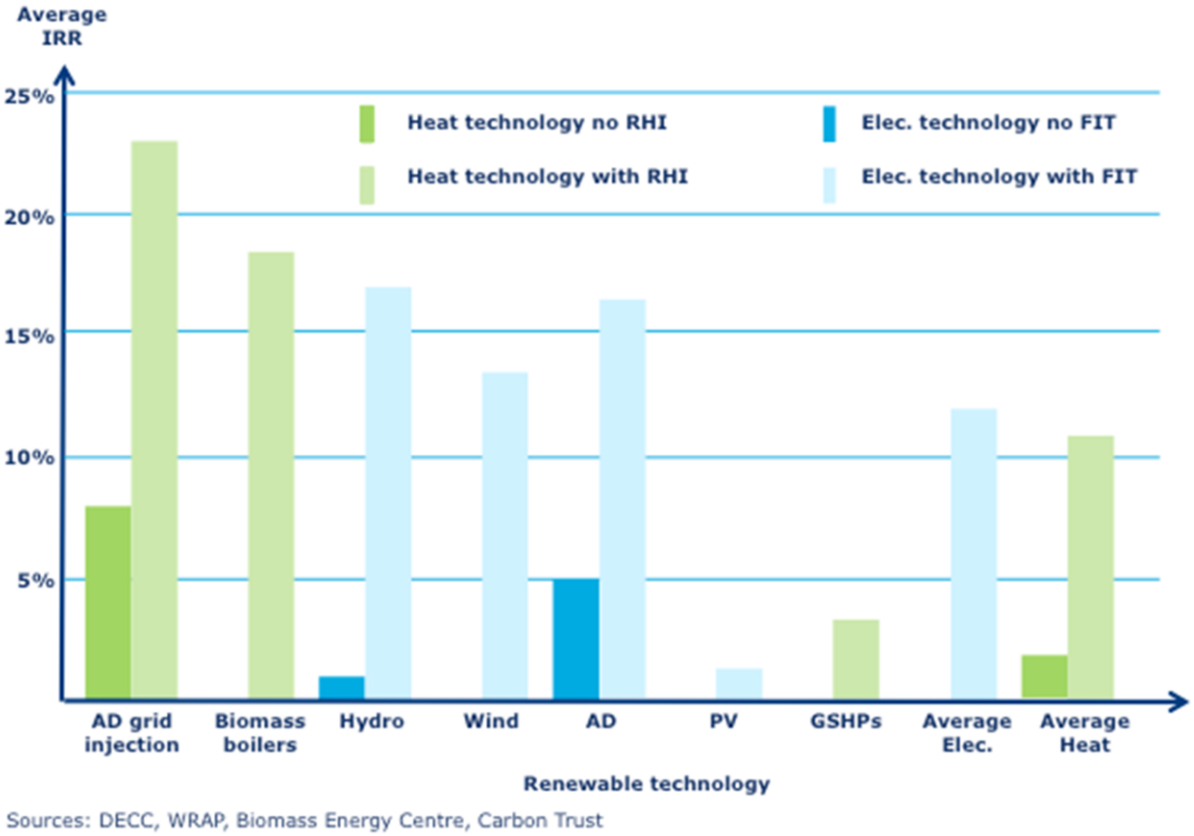
FiTs were introduced in April 2010 for the generation of electricity from small scale renewables (less than 5MW). A similar scheme for renewable heat (all sizes), the RHI, is being introduced later this year. FiTs and the RHI provide a 10-25 year guaranteed fixed payment for renewable energy consumed onsite or exported. Businesses currently stand to receive 13.12 – 49.92 pence/kWh of electricity and 3.9 – 10.1 pence/kWh of heat generated for their own use comprising incentive income and avoided energy expenditure.

Generating and purchasing renewable energy also enables businesses to reduce Climate Change Levy (CCL) payments.

Potential to reduce waste disposal costs

Waste disposal costs are increasing, with the Landfill Tax Accelerator playing a key part. Where businesses have sufficient waste for waste-to-energy projects - in particular anaerobic digestion (AD) projects - they will be able to benefit from avoided waste disposal costs. Businesses that have been unable to develop their own waste-to-energy projects have found opportunities to reduce waste

Figure 1 *Indicative IRRs for renewable technologies with and without new incentives (negative IRRs not shown)*



Sources: DECC, WRAP, Biomass Energy Centre, Carbon Trust

[2] One of the aims of the Government's proposed reform of the UK energy market is to improve security of supply, which should help to combat price volatility

costs by supplying waste to third-party projects, benefitting from lower handling fees than alternative waste disposal options.

The planning process is a growing driver

In recent years with a widespread application of the "Merton Rule" by planning authorities, businesses have faced a growing requirement to incorporate renewable energy into new developments. Originally, The Merton Rule required 10% of energy needs to be sourced from onsite renewables. This requirement has now been increased to 20%. The Merton Rule was incorporated into central planning guidance to Local Authorities in 2008 and the Planning and Energy Act 2008 enabled all councils to adopt the rule. It is now applied by around half of the UK's Local Authorities.

With the policy aspiration of "zero carbon," new commercial buildings by 2019, and step changes in building regulations in 2013 and 2016 moving towards the zero carbon goal, many businesses believe that, from as early as 2013, mandatory building regulations will necessitate more onsite renewable energy.

> "*Changes to building regulations (part L) from 2013 onwards will necessitate a growing level of onsite renewables use*" Stewart Bunney, Renewable Energy Manager, ASDA

Brand and CSR benefits

A growing number of businesses are keen to be viewed as taking a strong stance on climate change. From October this year, under the CRC policy package, there is potential for league tables for onsite renewables to be published alongside central Government carbon performance league tables. For the first time, this will provide transparency on UK businesses' renewable energy use.

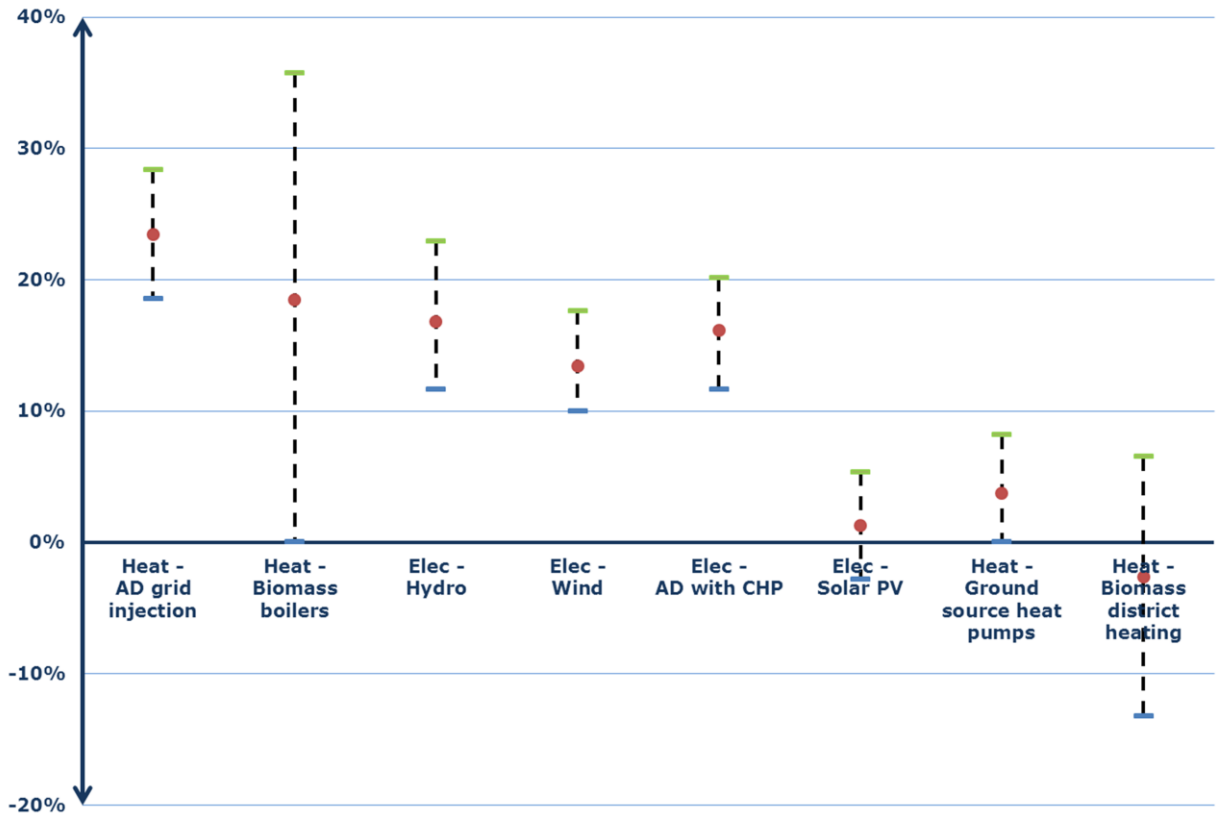
For many businesses, renewable energy presents a simple way of communicating good environmental performance. Renewable energy is often easier for investors and customers to understand than other sustainability indicators that tend to vary between businesses.

New drivers create attractive returns

As shown in Figure 1, the drivers described above radically improve returns that can be derived from small scale renewables. On average, returns for renewable energy projects are in the order of 11-12%, however, as Figure 2 shows, returns exceeding 20% are now possible. Many renewable energy options, such as wind, hydro, biomass heat and anaerobic digestion for grid reinjection, heat or power generation appear to have potential to yield returns acceptable for a wide range of businesses.

As Figure 2 also shows, there is a wide variance in returns

Figure 2 *Variance in IRRs of different technologies*



from renewable energy, with higher returns available for larger scale developments, projects utilising self-generated waste or biomass and measures utilising relatively high calorific value inputs (e.g. food waste or energy crops as opposed to sewage sludge or agricultural waste). The wide variance in returns highlights a need for opportunities to be carefully appraised on a business and site-specific basis.

The market response has been quick and emphatic

In the first year of their introduction, FiTs have had a big impact on the use of renewable energy. In the financial year 2010/11 the UK business sector had invested in 290[3] FiT-registered projects amounting to 9MW of installed capacity. While solar PV accounted for the most significant number of new projects (60%), wind and hydro projects accounted for most new capacity (75%).

As shown in Table 1, many leading retailers and producers of customer brands have announced ambitious plans to radically increase their use of renewables. In many cases these businesses have announced long-term commitments to meet all of their energy needs from renewables.

In general these businesses appear to be taking a mixed approach to sourcing renewable energy from either their own projects or purchases from energy providers. However, a growing number appear to be focusing on their own developments, including ASDA, IKEA and Tesco. In addition, the commitments of many companies (e.g. Tesco, PepsiCo, IKEA and Proctor & Gamble) apply to their operations around the world.

Strategic and tactical issues

Businesses face a number of issues relating to renewable energy use including:

- identifying appropriate renewable energy schemes and locations;
- managing key implementation considerations including: choice of incentive (e.g. ROC vs FiT where either may be applied but not both); regulatory uncertainty and timelines; developing in-house capabilities; and supply chain and environmental issues; and
- developing a business culture that fosters renewable energy use.

Table 1 Actions and commitments on renewable energy

Company	Renewables Target	Current use of Renewables	Approach	Key Technologies (in use or under trial)
ASDA	100% of energy	Not disclosed	Purchases / development	Wind, solar PV, Ground source heat pumps, CHP
IKEA	100% all energy	80% of total energy use; 100% of electricity use	Purchases / development	Ground source heat pumps , air heat pumps, biomass, solar panels & wind
Cooperative Group	15% of energy needs by 2012	4,000 outlets using renewables	Purchases / development	Wind & PV, micro hydro, AD, biomass
John Lewis	100% of electricity	100% of electricity	Purchases / development	Wind, solar PV, biofuels & waste to energy
M&S	100% of electricity	40% of electricity	Purchases / development	Various, including wind and solar
Tesco	"Generating our own renewable energy is a key part of our climate change strategy"	CHP in 100 stores; 13 using biofuels (worldwide)	Own developments	Biofuels, trialling other technologies (solar PV, ground source heat pumps)
PepsiCo	100% renewables by 2023	17% electricity 4% energy	Purchases / development	CHP, wind, solar PV, anaerobic digestion
Proctor and Gamble	100% of energy	Not disclosed	Not disclosed	Not disclosed

[3] Although businesses registered 504 projects for FiTs in the period, this analysis focuses on the additional investment after the introduction of FiTs (projects commissioned after 1 April 2010)

Determining appropriate renewable energy measures

Determining the appropriate renewable measures for your business necessitates:

- the identification of financially viable & practical measures;
- deciding whether to develop your own projects or to purchase renewable energy; and
- deciding where to implement renewable energy measures.

The measures that work well for a specific business will require careful evaluation considering the exact nature and location of activities and the financial viability of measures. Based on our analysis and interviews with businesses, it appears as though AD, wind, biomass heating systems and ground source heat pumps are some of the most attractive and practical renewable energy technologies for UK businesses. Any evaluation should also consider the measures that fit with a business' brand (e.g. a number of food retailers such as Sainsbury's and Marks and Spencer are involved with projects that utilise food waste).

The second key decision is whether to purchase or generate renewable energy. In practice, many leading businesses do both. Purchases have benefits including the ability to reduce CCL payments, upfront investment costs and the many implementation issues associated with self-generation. Self-generation, on the other hand, has longer run and, potentially, greater financial benefits. When combined with financial incentives, cost savings enable businesses that choose to generate their own renewable energy to earn a return on investment as opposed to incurring a net cost.

The third factor is deciding where to develop projects. Some businesses demonstrating leadership have chosen to develop a variety of onsite and offsite[4] measures. For example, IKEA uses many onsite renewable energy measures at its stores around the world and has also bought a number of offsite wind farms. Onsite & near-site[5] projects have a number of benefits:

- they directly mitigate risks associated with energy price increases & price volatility for the site in question;
- they are more likely to enable building regulation compliance and to be considered within CRC league tables; and
- they are more likely to be recognised within various carbon reporting standards.

Offsite projects on the other hand have their own benefits. They may offer more scope:

- to overcome site specific constraints such as space, access to resource (e.g. wind) and can improve the likelihood of acquiring planning consents;
- for pooling a fuel input (e.g. an AD project taking waste from a number of sites);
- to partner with third parties;
- for developing larger scale more viable projects; and
- to ensure generation certainty and overcome implementation risks (in the case of acquiring existing renewable generators).

The issue of whether to develop projects onsite, near-site or offsite requires careful evaluation and, in practice, a large business may find it beneficial to use a combination of options.

Managing implementation considerations

Key factors relating to the implementation of renewable energy measures include:

- choosing appropriate financial incentives;
- managing regulatory timelines and uncertainty;
- building internal experience and skills; and
- giving due consideration to supply chain and other issues.

Few renewable energy projects are financially viable without incentives. There are three incentives available in the UK for self-generation[6]:

- the RHI is the key financial incentive for heat projects;
- the FiT scheme is the only incentive for renewable electricity projects of less than 50kW in capacity; and
- for small scale renewable electricity projects, of between 50kW and 5MW, there is a choice to be made between ROCs and FiTs.

In many (but not all) cases project developers may experience higher returns from the ROC than the FiT scheme. The ROC scheme, which centres on tradable certificates, has one key disadvantage in comparison with

[4] Offsite projects are situated outside of a business' physical boundaries and do not supply energy to the business
[5] Near-site projects are situated outside of a business' operating boundaries but supply energy directly to the business

[6] Under the Energy Market Reform proposals, a FiT scheme with Contracts for Difference (FiT CFD) will be available to renewable generators. This is not considered further in this paper as it is aimed at generators selling capacity into the market.

the FiT scheme in that it does not provide long-run certainty over the incentive income that will be received.

With incentives forming a central element of the financial viability of renewable measures, regulatory certainty is important. The Government's early review of the FiT scheme appears to have knocked investor confidence. Unexpected changes to regulatory incentives are not unique to the UK and seasoned developers of their own renewable energy projects, such as IKEA, emphasise the need to scope and implement projects quickly to manage this risk.

> "*It is no good to have a five year plan, businesses need to move fast*" John Harris, Technical Manager, IKEA

Many businesses do not have experience of developing their own renewable energy projects. Given the growing drivers for using renewable energy, it is important that businesses take steps to develop their own capabilities.

> "*Using renewable energy can be a hard transition, for example, biomass boilers require more maintenance than conventional gas boilers. Businesses are going to have to learn new skills – they really shouldn't outsource all development and implementation aspects*" John Harris, Technical Manager, IKEA

Businesses demonstrating leadership in renewable energy use have chosen to develop their internal capabilities by:

- taking a phased approach to renewables development involving trial use of technologies at the outset; and
- developing projects, at least initially, with the assistance of the many businesses in the energy, waste management and advisory sectors that have the relevant technology installation, management and operating experience.

Other important implementation considerations include planning and environmental issues:

- Timelines for acquiring planning approvals vary considerably by technology, ranging from months to years.

  "*Planning has been costly and delays can lead to project development cycles in excess of 2 years for wind projects. Planning for other projects such as ground source heat pumps has been less problematic, but still costly*" Stewart Bunney, Renewable Energy Manager, ASDA

- There are safety and environmental factors that require consideration. For example, AD grid injection projects require purification.
- There are a number of supply chain issues that need to be managed. For example, certain projects require a reliable and long-term source of fuel, e.g. waste or biomass.

These issues can be managed through careful technology selection and due diligence. Further, taking a portfolio approach, implementing technologies in a number of stores or operations, enables a business to benefit from economies of scale and hence exercise more power when negotiating with renewable fuel or waste suppliers.

Developing a culture for success

The strategies of businesses demonstrating leadership in renewable energy shows that success requires:

- a long term strategic view of the benefits of renewable energy;
- implementing an organisational culture that fosters renewable energy use; and
- the ability to develop renewable energy measures rapidly.

Taking a long-term strategic view requires a full assessment of the drivers detailed in this article, considering, at least a ten year time horizon.

Organisational culture is one of the key factors that enable the successful development of renewable energy measures. Businesses demonstrating leadership mirror best practice more generally in terms of driving change. They:

- have a clear understanding of the business case for renewable energy and carbon reduction;
- view the implementation of renewable energy and carbon reduction measures as a task for the entire business;
- demonstrate leadership from the top;
- set and track aspirational goals;
- create accountability for fulfilling goals and targets and cascade these to staff throughout the business;
- introduce incentives for key staff members; and
- provide performance feedback is to key individuals.

  "*Our success has been driven by clear goals and good communication. All key internal stakeholders have a good understanding of goals and expectations. All partners are aligned with our goals and are good at working together*" Paul Crewe, Head of Engineering, Sustainability, Energy & Environment Sainsbury's

The ability to act quickly has been cited as another key factor driving a successful renewable energy strategy. This is of particular importance in the UK context for two key reasons:

- with RHI and FiT funding capped, there is a case to act quickly to benefit from the committed funding available; and
- FiTs, the RHI and other support schemes are subject to periodic review and incentives are likely to be reduced over time. This presents a necessity to develop specific renewable energy measures within a time period during which incentive rates are known with certainty. The project cycle for implementing small scale renewable projects is in the order of 6 – 18 months[7], so companies taking action now may still be able to benefit from known FiT rates.

To address these timing issues it is vital to implement an over-riding organisational culture that enables effective but rapid action.

Conclusions

A number of new drivers are combining to make renewable energy measures viable for UK businesses, in many cases, for the first time. Carbon Trust Advisory Services concludes that:

- With a recent and significant improvement in the financial viability of many renewable measures, upcoming energy price hikes and growing requirements of building regulations, the opportunity (and need for) renewable energy exists and is significant.
- There are many drivers for businesses to act now to evaluate the renewable energy opportunity for their organisations. Businesses acting now will have a greater chance of benefitting from the capped level of incentive funding available.
- Businesses taking early action to understand and trial renewable energy measures will be the best placed to mitigate risks associated with energy price hikes and the growing requirements of building regulations throughout the decade.

[7] The project cycle can be considerably longer for projects that require careful consideration at the planning stage, in particular wind

About the research

The Carbon Trust has a decade of experience of helping UK business to appraise and implement energy efficiency and renewable energy projects.

For this study we revisited renewable energy measures that have been evaluated and supported by the Carbon Trust via our advisory offerings and technology accelerator programmes in recent years. We also carried out interviews with leading businesses and sector associations to obtain an up to date views on the opportunities, challenges and best practice associated with implementing renewable energy measures.

In addition to using our own information, our assessment of the benefits of renewable energy measures took account of technology cost, renewable energy deployment forecasts, energy consumption and energy cost projections produced by DECC and DEFRA. Cost assumptions for waste and biofuels were obtained from WRAP and the Biomass Energy Centre.

Carbon Trust Renewable Energy Guides

The Carbon Trust has published guides to many aspects of the low carbon economy, including more detailed and operational guides to implementing renewable energy measures and understanding the UK policy landscape. Some of our key documents are listed below.

- Down to earth - Lessons learned from putting ground source heat pumps into action in low carbon buildings (CTG036)
- A place in the sun - Lessons learned from designing low carbon buildings with photovoltaic electricity generation (CTG038)
- Feed-in tariffs - Policy checklist (CTL111)
- Feed-in tariffs - Policy and Markets guide (CTL110)
- Feed-in tariffs - FAQs (CTL112)
- Technology update - Biogas from anaerobic digestion (CTC773)
- Biomass heating - technology fact sheet (CTL090)
- Biomass heating - An introductory guide for potential users (CTG016)
- Biomass heating - a practical guide for potential users - Part 1: Introduction (CTG013)
- Biomass heating: a practical guide for potential users (CTG012)
- Biomass heating - a practical guide for potential users - Part 3: Implementation plan (CTG015)
- Biomass heating - a practical guide for potential users - Part 2: Technical manual (CTG014)
- Small scale wind energy - Policy insights and practical guidance (CTC738)
- Renewable energy technologies in Northern Ireland - In-depth technology guide (CTG011)
- Renewable energy technology overview (CTV010)

Please visit **www.carbontrust.com/resources** to access all Carbon Trust publications.

About Carbon Trust Advisory

Carbon Trust Advisory is a team of experts on business and sustainability dedicated to delivering large business growth through understanding and addressing the strategic issues raised by climate change. We focus on the impacts of climate change on our customers' businesses and brands; strategic and operational planning that delivers clear business benefits from early action; and maximising the cost reduction potential of our customers' resource use.

Further information

For more information or a confidential discussion please email **businessadvice@carbontrust.com** or call us on +44 (0)20 7170 7000. We also welcome your comments on this paper.

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