A report by Carbon Connect

Driving demand: Creating opportunities for the commercialisation of low carbon technologies

carbon Connect

‘Stabilisation of greenhouse gases in the atmosphere will require the deployment of low-carbon and high-efficiency technologies on a large scale.’

Stern Review on the Economics of Climate Change, HM Treasury (2006) p. 347

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FOREWORD

The UK has among the most ambitious climate change legislation of any country in the world. The government has shown real leadership by setting stringent, independent and legally binding targets for reducing our carbon emissions. The challenge for government is now to turn these ambitious targets into concrete and practical policy solutions that will put the UK on a clear trajectory towards a low carbon future.

The Stern Review on the Economics of Climate Change argues that technology policy is one of the 'essential elements' for mitigating the effects of climate change. New technologies also offer one of the clearest commercial wealth-creating opportunities of climate change.

There is a real opportunity for the UK to become a world leader in the development and commercialisation of low carbon technologies. We have some of the best universities in the world, an exceptional culture of invention and innovation, and a long-running engineering tradition. That these technologies will be developed here in the UK must, however, not be taken for granted.

To capitalise on this great potential, government must match its supply-side interventions with an ambitious and demand-focused policy framework that creates clear 'pull' signals and long-term market certainty. These demand-side policies must combine ambitious and farsighted targets with clear milestones, making the direction of travel very clear, whilst allowing industry time to invest to deliver against these targets cost effectively. These policies must be designed without prescribing specific technology input, but instead be assessed by the lower carbon output delivered.

More focus from government is needed on ascribing a value to carbon, whether saved though energy efficiency, low carbon energy production or the production of renewable energy. This value needs to be sufficiently high to justify large scale investment in low carbon technologies. This logic must be applied throughout both regulation and government procurement to make the low carbon option the obvious choice in both the private and public sector.

Government must seek to support purchasers in overcoming the difficulties associated with measuring embedded carbon in products and services to ensure low embedded carbon products and services are supported by regulation and public procurement mechanisms so that the largely untapped potential for wealth creation and carbon reduction in product design and manufacture is released.

Together, these measures would create long term market certainty, allowing companies to develop strong business cases for their low carbon products and giving investors the confidence to support them with capital.

Throughout this inquiry we consulted with a wide range of industry representatives, low carbon technology experts, policy makers and other stakeholders. The findings and policy recommendations in this report are based on the witness statements heard in the inquiry sessions, in depth interviews and written submissions, but do not reflect the opinions of individual participants or steering group members.

The inquiry focused on three major case study areas – energy efficiency in homes, personal transport, and products and services. We selected these case study areas because, together, they cover a large proportion of the UK's carbon emissions and because they represent technology areas where there is great potential for commercialisation of low carbon technologies.

For the purpose of this inquiry, we defined 'technology' in its broadest and classical sense as a product, process or methodology. By 'carbon' we mean carbon dioxide and other greenhouse gases.

We would like to thank everyone who participated in this inquiry who generously gave their time and expertise during its course. We would also like to thank the members of the steering group for this inquiry for their time and hard work. We are grateful to Consensus Business Group and Addleshaw Goddard LLP for sponsoring this inquiry. Finally, we would like to extend a special thanks to Duncan Hill for compiling this report.

Dr. Jonathan Frost
Inquiry Co-Chair

Lord Oxburgh
Inquiry Co-Chair

EXECUTIVE SUMMARY

Under the Climate Change Act of 2008 the UK is committed to reducing its greenhouse gas emissions by 80% from 1990 levels by 2050. Low carbon technologies will play a key role in helping to reach this target. This presents the UK with a real chance to turn the climate change challenge into a commercial opportunity.

The UK is well placed to make the most of this opportunity and to not only satisfy its own requirement for low carbon technologies, but to become a world leader and exporter in this field.

This report examines what should be done to ensure that the UK grasps this opportunity, and makes recommendations for what policy measures are needed to accelerate the commercialisation of low carbon technologies in the UK. The report is based on the findings of an inquiry which brought together a wide range of industry representatives, low carbon technology experts, policymakers and other stakeholders during six evidence sessions and a series of follow-up interviews.

Driving demand for low carbon technologies

The inquiry heard that there is no shortage of low carbon technologies being developed by the UK's inventors, entrepreneurs, universities and industry. A range of government support mechanisms exists for guiding these technologies from invention to commercially viable products, including R&D support, financing, and technology road-mapping, through bodies like the Carbon Trust and the Technology Strategy Board. The inquiry welcomed these supply-side efforts and recognised their importance.

However, the inquiry found that for these supply-side measures to be effective, government must create a coherent policy framework to drive demand for low carbon technologies. The inquiry heard that, in general, it is not a shortage of funds, but risk aversion that is keeping private investors from funding low carbon technologies. Government should therefore develop a long term policy framework of public procurement and regulation that would drive demand and create long-term market certainty, allowing investors to fund low carbon technologies.

Recommendation 1

Government must use regulatory and procurement mechanisms to create demand for low carbon technologies, helping steer private investment towards this sector.

Valuing carbon savings

The inquiry heard that one of the clearest ways to support the commercialisation of low carbon technologies would to be to ascribe a monetary value to carbon emissions saved through energy demand reduction. This would drive the demand for energy efficiency technologies and make these an attractive investment opportunity.

Government policy to ascribe value to carbon savings is currently inconsistent. Through policies such as the Renewables Obligation, and the incoming Feed-in Tariffs (which commence in April 2010), government is ascribing a monetary value to carbon saved by renewable energy generation.

However, the inquiry found that there are currently no policies in place that ascribe a monetary value to the carbon saved by technologies that reduce demand for energy. The inquiry heard that this distorts the market. Private investment is being directed towards technologies that generate energy in a renewable way, to a greater extent than it is being directed towards technologies that can reduce energy demand.

While both types of technologies can enhance the UK's energy security, the inquiry heard that technologies that reduce demand for energy can enable carbon savings more quickly and more cheaply than renewable energy generation. In order to ensure that private investment flows more evenly to both types of technologies, government must ensure that carbon savings are ascribed a consistent value regardless of the manner in which they are made. Policy levers should be enhanced or developed to value emission savings from energy demand reduction equally to savings from renewable energy generation.

Recommendation 2

Government must develop a policy framework that ensures that carbon saved by reducing demand for energy is valued consistently with carbon saved through renewable energy generation.

Embedded carbon in goods and services

Embedded carbon is the carbon emitted at each stage of a product's life, from material sourcing, production and transportation to use, disposal and recovery. The inquiry found that to introduce policies to assist the commercialisation of products with a lower embedded carbon content, government must first make embedded carbon more 'visible' by encouraging companies to measure it through life cycle assessment.

To that end, government has sponsored the development of the PAS2050 Specification, a standard for measuring carbon emissions across a product's lifecycle. PAS2050 is widely regarded as both fair and accurate, and witnesses praised the fact that it has been developed with a high degree of industry input. However, the inquiry found that it

can often be costly or unfeasible for companies to gather all the necessary data to achieve an accurate measurement using PAS2050.

In order to make it easier to gather data, the inquiry heard that government has been closely involved with the development of the European Union's 'LCA Platform', which seeks to create a database so that information from previous life cycle assessments can be more easily shared between companies. While such a database is being developed, the inquiry heard that government policy should encourage industry to focus measurement on the most carbon intensive stage of the life cycle of a product. This would concentrate a company's data gathering activities, making it cheaper and easier to achieve an accurate measurement.

Recommendation 3

Government should support the commercialisation of products with a low embedded carbon content by adopting policies which take a sector-specific approach to targeting the most carbon intensive stages of a product's life cycle.

The inquiry heard that there are economic reasons for companies to want to reduce embedded carbon in their supply chain. For example, carbon savings usually equate with cost savings, because improved energy efficiency means lower energy bills. The inquiry heard that, therefore, government must encourage businesses to look for embedded carbon through regulatory and procurement mechanisms.

The economic drivers for reducing embedded carbon are only usually applicable for the production stages of a product's life cycle (production and distribution) and not to the consumption phases (use and disposal). This is because in most business cases the manufacturer relinquishes responsibility for a product at the point of sale. This means that there are no obvious economic incentives for manufacturers to reduce carbon emissions in the consumer stages of a product's life cycle.

The inquiry heard that businesses would be more inclined to consider emissions in the consumer phase if they were to lease products rather than sell them. Such a 'sale of service' business model aligns the consumption phase of a product's life cycle with the production phase and provides an economic incentive for companies to reduce carbon emissions in the use and disposal of products. The inquiry heard that government should support the commercial development of 'sale of service' business models through the procurement process.

Recommendation 4

Government should use the procurement process to support the commercialisation of 'sale of service' business models where low carbon is a key component of the specification.

Driving demand through regulation

The inquiry heard that one of the clearest opportunities for government to support the commercialisation of low carbon technologies is to use regulation to drive demand, create long-term market certainty and encourage investment. There were however widespread concerns from witnesses that the government's current regulatory framework will not be sufficient to set the UK on a trajectory to deliver the 2050 target.

The inquiry found that to support the commercialisation of low carbon technologies, regulation needs to be as farsighted and as definite as possible. Technology companies and private investors want to be confident that the regulatory framework which creates the demand for the technology in which they are investing will remain in place well into the future. The inquiry found that regulation should also be as ambitious as possible in order to encourage the development of low carbon technologies that have the potential to make considerable carbon savings. The ambitious and farsighted targets must be supported by medium-term targets, which increase incrementally over time.

The inquiry found that government should actively engage with technology companies on the cutting edge of an industry. These 'niche players' are often well placed to envisage what is technically possible at present and what will be technically possible in the future. By doing this, government can be more confident in setting ambitious targets that go beyond what can be met using the best currently available technology.

The inquiry heard that government should be 'technology neutral' when setting regulatory targets by expressing those targets as low carbon outcomes. By doing this government avoids 'picking technologies' and would allow the private sector to select the appropriate technologies for meeting the target on the basis of market considerations.

Recommendation 5

Government should ensure that low carbon regulation is ambitious, farsighted, life cycle informed and technology neutral in order to encourage private sector investment in low carbon technologies

Driving demand through public procurement

The Office of Government Commerce informed the inquiry that total annual public sector spend is somewhere in the region of £220 billion. Consequently public procurement represents an enormous opportunity to drive the commercialisation of low carbon technologies. However, the inquiry found that government has not yet fully grasped this opportunity. Much of the government's current sustainable procurement activities involve unenforced targets and standards that do little to drive innovation or to signal to industry that government will be favouring low carbon technologies in the procurement process.

Suppliers are constantly searching for ways to differentiate their products in ways that the customer values. There is an opportunity for public procurement to drive the supply chain to design and develop lower carbon goods and services if this is specified in procurement contracts. Ideally this would be on the basis of a full life cycle assessment; however, individual procurements can adopt a more flexible approach to reduce measurement complexity and cost which will still have the effect of focussing supplier attention on this issue. The government should assist public procurers with the development of simple methods of specifying carbon outcomes in contracts.

Recommendation 6

Government must structure public sector procurement to allow suppliers to differentiate their bids on the low carbon characteristics of the products which they are tendering.

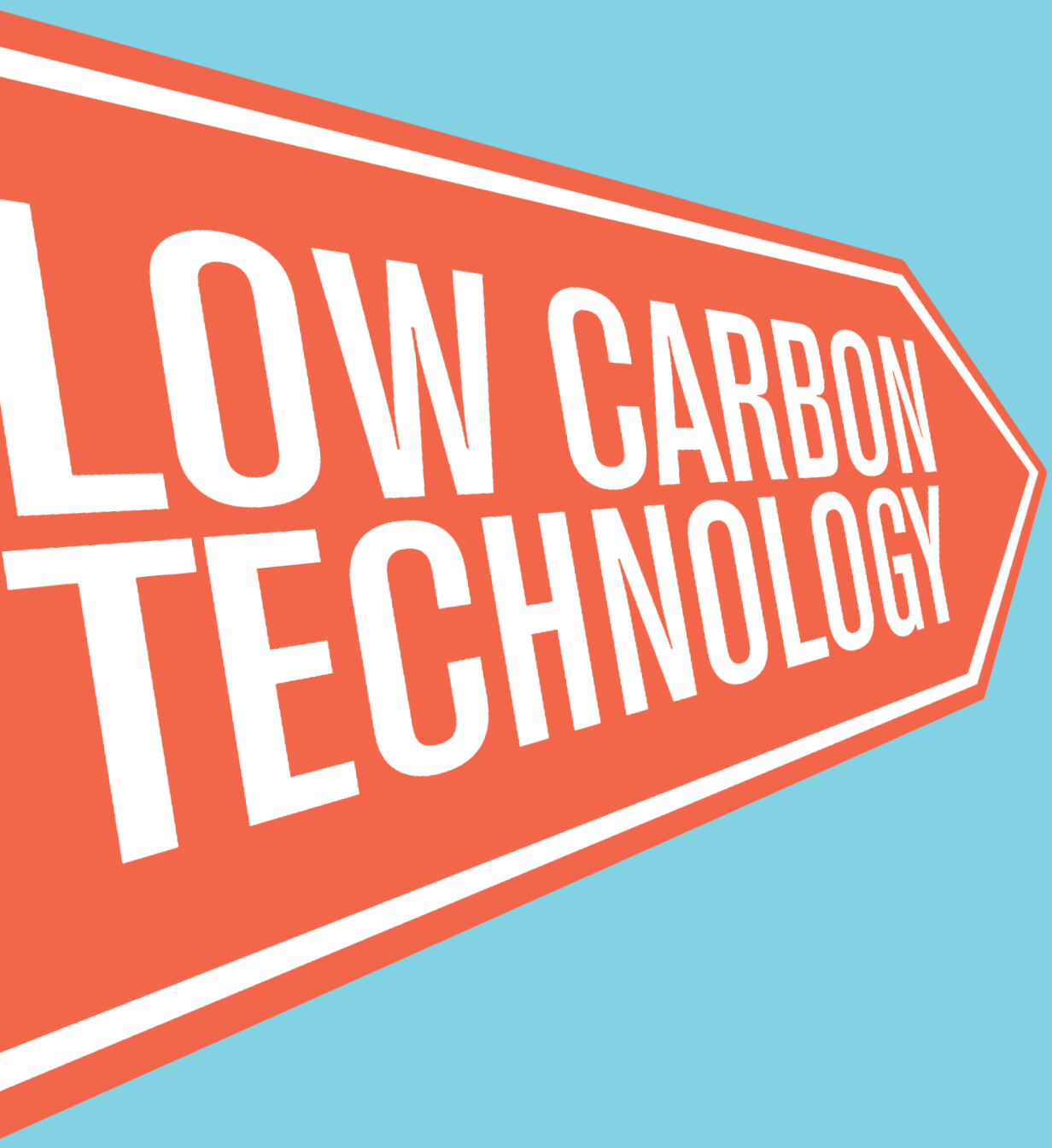
Procurers should commission low carbon outcomes rather than set detailed technical specifications. This will enable them to maintain technology neutrality and encourage low carbon innovation from suppliers. In many cases this will lead to the provision of a service rather than capital goods purchase as this business model is often better suited to managing the whole life cycle carbon costs.

In many cases lower carbon goods and services require product innovation. The inquiry heard that the Forward Commitment Procurement model being trialled in the Department of Business, Innovation and Skills (BIS) addresses and manages the risks for procurers and suppliers in the commercialisation of new low carbon technologies. Its use should be encouraged and supported.

The Small Business Research Initiative being promoted by the Technology Strategy Board (TSB) allows potential procurers to fund research and development work with potential suppliers. This is clearly an important new tool to support the introduction of low carbon technologies. The inquiry heard that the approach would be even more effective if combined with the Forward Commitment Procurement approach as this would improve the supplier's investment case for new technology development.

Recommendation 7

To encourage innovation and maintain technology neutrality, government must move away from procuring standard market solutions to a process of commissioning outcomes.


LOW CARBON
TECHNOLOGY

METHODOLOGY

Carbon Connect carried out this inquiry between July 2009 and January 2010. The inquiry was organised as a series of witness sessions which brought together a wide range of industry representatives, low carbon technology experts, policy makers and other stakeholders. These meetings were chaired by Lord Oxburgh and Dr Jack Frost. A steering group of senior industry representatives supported the inquiry and informed its direction. The inquiry was also informed by interviews with key stakeholders, written evidence, and desk-based research.

The findings and policy recommendations in this report are based on the witness statements heard in the inquiry sessions, in depth interviews and written submissions, but do not reflect the opinions of individual witnesses, participants or steering group members.

Please see below for lists of inquiry sessions held, the members of the steering group and the inquiry witnesses and contributors.

Inquiry Sessions

Session I	Home energy efficiency
Session II	Low carbon personal transport
Session III	Embedded carbon in products and services
Session IV	Finance and risk
Session V	Regulation and fiscal measures
Session VI	Public procurement

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The report does not represent the individual views of the steering group or their organisations.

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1 INTRODUCTION: DRIVING DEMAND

The Climate Change Act commits the UK to reduce greenhouse gas emissions by 80% from 1990 levels by 2050 and leaves the way open for further cuts if necessary. When it was passed, the act was the most ambitious legislation of its kind anywhere in the world. However, the gap between the Act's ambitions and the UK's situation in 2010 is large. There is no simple, single way to bridge this gap and, if the government is to succeed, all available mechanisms must be deployed effectively.

The Stern Review on the Economics of Climate Change argues that technology policy is one of the 'three essential elements' available to government for mitigating the effects of climate change (along with carbon pricing and removing the barriers to behavioural change).[1]

Low carbon technologies also offer one of the clearest wealth-creating opportunities of climate change. They offer the UK an opportunity to draw on its culture of invention and innovation, manufacturing base and strong financial sector to turn the climate change challenge into a commercial opportunity.

However, global competition is intense and a wide range of policy mechanisms should be developed to ensure the UK is competitive in the international marketplace. By defining technology in its broadest sense to include ways of doing things as well as devices, the Carbon Connect inquiry examined what would be required to mobilise innovation and private investment to commercialise low carbon technologies.

1.1 Towards a demand-led approach to commercialising low carbon technologies

The inquiry found that there is no shortage of new low carbon technology ideas coming from UK inventors, entrepreneurs, universities and industry. The inquiry heard that government is supporting these ideas with a range of supply-side interventions that aid their journey from invention to commercially viable product. These measures include R&D support, venture capital, interest-free loans, skills development, knowledge sharing and technology road-mapping from organisations such as the Carbon Trust and the Technology Strategy Board. The inquiry heard that these supply-side measures play a key role in supporting the development of low carbon technologies.

1 Stern Review on the Economics of Climate Change, HM Treasury (2006), pXVIII

However, the inquiry did find that for these supply-side measures to be effective they must be matched by a coherent policy framework that will drive demand for low carbon technologies. Without long term market demand and a strong consumer base, companies struggle to build business cases and secure funding for development of low carbon technologies. The inquiry found that strong and sustained market demand would be a key motivation for investors to direct funds towards the low carbon sector. It heard that it is not the lack of funds that is prohibiting investors from investing in the low carbon technologies, but the lack of long term market certainty for the companies in this sector.

A range of key policy mechanisms that would create demand for low carbon technologies were explored by the inquiry, including: valuing carbon savings (chapter 2); measuring embedded carbon (chapter 3); regulation (chapter 4); and public procurement (chapter 5). The inquiry found that these polices would together provide coherent and long-term 'pull' signals for low carbon technologies, which would encourage innovation and investment in this sector.

Recommendation 1

Government must use regulatory and procurement mechanisms to create demand for low carbon technologies, helping steer private investment towards them.

2 VALUING CARBON SAVINGS

To support the commercialisation of low carbon technologies, the inquiry found that government should seek ways to ascribe a monetary value to carbon emissions saved through energy demand reduction. This would increase the competitiveness of energy efficiency technologies and improve their attractiveness as an investment opportunity.

The government currently ascribes a monetary value to carbon saved by renewable energy generation through the Renewables Obligation (see box 2.1). The inquiry heard that this policy has encouraged private investor interest in this area and has led to a threefold increase in renewable energy generation since it was initiated in 2002. Feed-in Tariffs, which are scheduled to commence in April 2010, will also ascribe value to the carbon savings made by renewables, specifically for microgeneration (see box 2.2). The inquiry heard that the Feed-in Tariff policy is already attracting private investors towards renewable microgeneration technologies.

2.1 Valuing carbon savings made by demand reduction technologies

The inquiry found that there has been an absence of equivalent policies that ascribe value to carbon savings made by technologies that reduce demand for energy in the first place. A range of policies are designed to reduce demand for energy, such as the Carbon Emission Reduction Target (CERT) (see box 4.3), but these policies only indirectly ascribe a value to carbon saved. As a result, investment has been directed towards renewables more than demand reduction technologies.

Participants in the inquiry pointed out that technologies which reduce demand for energy are often a cheaper and faster way of making carbon savings than renewables. In addition, like renewable energy generation, these technologies can enhance the UK's energy security by reducing demand for imported supplies of fossil fuels. As such, the inquiry found that it is important that carbon saved by reducing demand for energy is given a commensurate monetary value to the carbon saved by renewable energy generation.

The inquiry found that the government must create a more level playing field to ensure that private investment flows to both renewable energy generation technologies and energy efficiency

Box 2.1 - The Renewables Obligation

The Renewables Obligation requires electricity suppliers to source a percentage of their electricity from renewable sources. The target percentage increases incrementally from 3% in 2002 to 15.4% in 2015. Renewable energy generators are issued with Renewables Obligation Certificates (ROCs) for every megawatt hour of renewable energy they produce. When an electricity supplier buys renewable energy from a renewable energy generator, they are also required to pay an additional amount to purchase the ROC to prove that they have met their Renewables Obligation. Suppliers that fall short of meeting their Renewables Obligation are obliged to pay the difference into a 'buy-out fund'. The revenue generated by this fund is redistributed among suppliers that met their Renewables Obligation in full.

Box 2.2 - Feed-in Tariffs

Feed-in Tariffs support small scale renewable energy generation by obligating energy companies to buy all surplus energy generated in this way, and guaranteeing they will pay a fixed, above-market rate for it. The cost will be shared among electricity suppliers proportional to their share in the electricity market in the UK. The tariff will apply to renewable electricity installations up to a maximum capacity of 5 MW from sources including solar photovoltaic, wind, hydro, anaerobic digestion and domestic-scale micro-CHP. Feed-in Tariffs are due to begin in April 2010.

technologies. The inquiry heard that the most obvious way to do this would be to make technologies that can reduce demand for energy eligible for a scheme which, like the Renewables Obligation, monetises carbon savings.

However, the inquiry acknowledged that doing so presents difficulties because it is harder to measure energy saved than energy generated. Any policy targeting energy demand reduction would need to cover a multitude of sectors and users (see section 2.2 on the CRC below), unlike the Renewables Obligation, which is limited to one sector.

Recommendation 2

Government must develop a policy framework that ensures that carbon saved by reducing demand for energy is valued consistently with carbon saved through renewable energy generation.

2.2 CRC Energy Efficiency Scheme

The CRC Energy Efficiency Scheme (see Box 2.3), which will commence in April 2010, is a policy tool focused on saving carbon through demand reduction. In the introductory phase, the scheme will include around 5,000 of the UK's largest non-energy intensive private and public sector organisations who will be obliged to buy carbon allowances to cover their onsite energy use. In addition, under the scheme the government will publish annual league tables showing the relative performance of participating organisations. The revenue generated by the government sale of carbon allowances is to be redistributed among participating organisations depending upon their performance in reducing emissions.

The inquiry heard that this scheme is already 'placing carbon in the boardroom' and is encouraging some organisations to consider energy efficiency measures more actively. Whilst the scheme will ascribe a value to carbon saved, the inquiry heard that the initial cost of the carbon allowances may not be enough to drive substantial and wide-ranging investment in low carbon technologies. However, the inquiry noted that the scheme does not just depend on financial drivers as the publication of annual league tables will seek to reduce energy demand through reputational levers.

Box 2.3 - CRC Energy Efficiency Scheme

Under the CRC Energy Efficiency Scheme, participating organisations will be obligated to buy carbon allowances to cover their on-site energy usage, but not transport. The revenue generated by the sale by government of carbon allowances is to be redistributed among participating organisations depending upon their performance in reducing emissions.

The carbon allowances in the CRC Energy Efficiency Scheme are to be sold by the government at £12 per allowance in the introductory phase. Allowances may also be traded on a secondary market.

In the introductory phase, unlimited allowances are available in the sale period. In subsequent phases, there will be a cap on the total number of available allowances, with the aim of ensuring that total CO_2 emissions are reduced over time. In these phases, allowances will be auctioned and the supply of allowances will be capped.

3 EMBEDDED CARBON IN GOODS AND SERVICES

Embedded carbon is the carbon emitted at each stage of a product's life cycle, including material sourcing, production, transportation, use, disposal and recovery. The inquiry found that there are currently no policies in place to drive demand for products (goods and services) with a lower embedded carbon content. The inquiry heard that this is because embedded carbon needs to be made 'visible' before policy can be introduced in this area. Embedded carbon can be made visible by measuring it in a 'life cycle assessment', also known as a 'carbon footprint'.

3.1. Measuring embedded carbon

To that end, government, together with the Carbon Trust, has sponsored the development of PAS2050, a standard for measuring embedded carbon.[2] PAS2050 was developed by BSI British Standards with a high degree of industry input. It has subsequently become one of the most widely employed life cycle assessment methodologies in the UK and is being used to inform international work in this area. Participants widely regarded PAS2050 as both fair and accurate and praised it for offering one of the most reliable methods of comparing embedded carbon between products.

However, the inquiry found that the feasibility and cost of gathering essential data can be a barrier to the use of PAS2050, especially if the supply chain of the product or service is particularly complex. Supply chains have become increasingly internationalised and fragmented, so it is often difficult for companies to acquire all the necessary data to achieve an accurate measurement. It is a challenge for large companies and even more so for smaller companies with limited resources.

Witnesses also questioned the reliability of data. The inquiry noted that if carbon footprinting were built into regulation and procurement, it would require a costly process of independent verification and regular audits of data.

> 'What PAS2050 aims to achieve is a carbon footprint measurement that gives companies an accurate picture of the greenhouse gas emissions across their product supply chains so they can then reliably use this for effective greenhouse gas emissions reductions and management'.
>
> Dorothy Maxwell, Global View Sustainability Services

2 The PAS2050 Specification measures the life cycle emissions for all greenhouse gases not just carbon dioxide. Other gases are measured in carbon dioxide equivalents.

3.2 Overcoming barriers to measurement

Although the barriers to measuring embedded carbon make it difficult to introduce policy to support the commercialisation of products with a lower embedded carbon content, the inquiry identified a possible way forward.

The PAS2050 measurement can be divided up into separate stages of the product's life cycle. The stages include the obtaining, creating, modifying, transporting, storing, operating, using and disposing of a product. By concentrating their efforts on just one or two stages rather than the life cycle as a whole, companies can find it easier to gather and verify all the necessary data in order to develop a more accurate and reliable measurement. Government policy could be developed to encourage reductions in embedded carbon in just one or two of the stages rather than a product's entire life cycle. The inquiry heard that a product or sector specific approach should be adopted, responding to whichever life cycle stages are the most carbon intensive for a given product or sector.

The inquiry heard that dividing up the measurement should only be a stop-gap and ultimately it will be desirable to introduce policy to encourage emissions reductions across the entire life cycle of a product. In order to do that, the development of an international database containing information from previous footprinting assessments would be helpful. This would save companies from 'reinventing the wheel' by allowing them to replicate elements of past studies. The UK government has been closely involved with the development of the European Union's 'LCA Platform' designed to serve this purpose. Witnesses estimated that there is at least another five years worth of work before the LCA Platform will be at a standard sufficient to allow government to consider basing policy on PAS2050, or a similarly robust measurement methodology. The inquiry heard that the government should continue to support the development of the LCA Platform and encourage contributions from UK companies.

Recommendation 3

Government should support the commercialisation of products with a low embedded carbon content by adopting policies which take a sector-specific approach to targeting the most carbon intensive stages of a product's life cycle.

> 'Carbon and cost savings can be made quite quickly just by looking at a supply chain'
>
> Euan Murray, Head of Climate Change, Carbon Trust

3.3 Supply chain management

The inquiry found that reducing embedded carbon in a product usually equates with cost savings for a company, because improved energy efficiency means lower energy bills. Thus, reducing embedded carbon in products and services is simply 'good supply chain management', and something that most companies ought to be investing in as a matter of course (see box 3.1). However, the inquiry heard that many businesses are not carrying out life cycle assessments in practice, despite the economic and environmental benefits that this can offer.

The inquiry heard that government should encourage the use of life cycle assessments through regulatory and procurement mechanisms. The government has started to do this through the procurement process by encouraging suppliers to voluntarily examine and disclose carbon emissions in their supply chain, which it did with 164 companies in 2009. Government should accelerate this process and encourage many more of its suppliers to start looking for and reducing embedded carbon in their supply chains.

The inquiry heard that companies do not need to comply with the PAS2050 methodology in its entirety to make reductions to embedded carbon. A crude carbon footprinting exercise will allow companies to identify the 'carbon hotspots' in their supply chains and make reductions. A number of private consultancy firms provide services to help firms identify carbon in their supply chains using their own footprinting methodologies.

Box 3.1 - Carbon footprinting as key to supply chain management

While direct emissions from on-site electricity and fuel use can be major sources of greenhouse gas emissions from production processes, examination of supply chains, and consumer use phases of the product life cycle, can reveal that these also make a significant contribution to climate change.

Best Foot Forward (BFF) has conducted a number of footprint assessments and these have shown that emissions from the supply chain often contribute more than 90% of the total impact of a product, or that, in some cases, emissions associated with the use phase of a product can dwarf production emissions. A small effort in the supply chain can therefore contribute a greater reduction in emissions than an on-site effort, as well as reducing the risks and costs to the supplier.

'Diagnostic' footprinting, using readily available physical or financial data, is a cost effective way to identify potential opportunities to improve resource efficiency and reduce emissions. These may include initiatives such as light-weighting, materials substitution, waste minimisation and recycling, durability improvement and innovative business models, such as refurbishment and leasing, rather than ownership followed by disposal. It can also be used to identify priority actions based on return on investment and scale of improvement. Carbon labelling, which requires more product specific data to derive a footprint, costs more but can be a useful tool for communicating with consumers.

CASE STUDY

Best Foot Forward and Orangebox

Orangebox designs and manufactures a range of office chairs. In 2006 they commissioned Best Foot Forward to carry out an ecological and carbon footprint assessment of several of their chair models. Initially they were concerned about the 'component miles' of the parts sourced from around the world. Best Foot Forward used 'consumption' information from design specifications, logistics providers and on site meters, and applied carbon footprint conversion factors, to illustrate that the vast majority of the products' footprint was in component materials. Transport of components was not significant and the footprint of energy used for assembling components on site was around 2% of the total impact.

In addition to offsetting the carbon footprint of the chairs, Orangebox designers were able to understand the impacts of the different component materials, and work closely with their suppliers to identify means of light weighting and materials substitution. They also developed a new business model refurbishing the more easily worn parts of the chair to extend its life, rather than see chairs go to landfill because of a frayed seat cover. The business continues to use footprinting to inform designs, and to embed the concepts of sustainability across the business under a 'No Green Bull' marketing message.

3.4 Selling goods as services

Although the inquiry heard that reducing embedded carbon in a product is part of 'good supply chain management', this usually only relates to the production phase of a product's life cycle (the obtaining, creating, modifying and transporting stages). The manufacturer often abdicates almost all responsibility for a product at the point of sale, meaning it does not have any responsibility for the carbon emitted during the consumption phase of the product's life cycle (the operation, use and disposal stages).

As such, there are few obvious economic drivers for a manufacturer to reduce the embedded carbon emissions linked to the consumption phase of a product's life cycle. However, the inquiry heard that if a manufacturer was to lease its product to consumers whilst retaining ownership and, critically, paying for any in-use energy costs, it would have a vested interest in 'designing carbon out' of that product. Essentially, such a 'sale-of-service' business model aligns the consumption phase of a product's life cycle with the production phase and encourages businesses to take account of embedded carbon emissions over the entire life cycle of the product.

The inquiry heard that carbon savings could be made most rapidly if the manufacturer was also the service provider because the incentive to design carbon out of the product would be more immediate. However, the inquiry also heard that this should not preclude the establishment of new service companies, external to the manufacturing organisation. These businesses would make revenue by reducing embedded carbon in the consumption phase of the life cycle of a product and so could be expected to buy the most energy efficient technologies in order to maximise their profits.

However, the inquiry noted that service companies could be considerably challenging to start up. They can often involve expensive capital start up costs because of the need to buy or manufacture the goods for lease to consumers in the first place, and this means investors view them as a potentially risky investment. It was suggested to the inquiry that government should encourage the establishment of service companies by providing risk guarantees to help them get preferential access to private finance. Government can also support the

CASE STUDY

Car clubs – a 'sale of service' business model

The inquiry heard that car clubs have the potential to both dramatically reduce the number of cars on the road and support the commercialisation of low carbon technologies. Westminster City Council operates a car club and aims that for every one of its cars on the road, 15-20 privately-owned vehicles will be taken off the road. Car clubs assist the commercialisation of low carbon vehicles because the fuel bills are paid for by the car club, which therefore has a vested interest in purchasing the most energy efficient vehicles.

Car clubs also help to mitigate the risk factor associated with being an early adopter of low carbon vehicles. The inquiry heard that some consumers are worried about being the first to own a low carbon vehicle because most mechanics and breakdown services do not yet have the right equipment or expertise to assist. For example, the electric car industry has been trying to mitigate this by leasing batteries to give the early adopters greater confidence in the technology. Car clubs can work in much the same way; encouraging people to drive low carbon vehicles with the reassurance that the car club will fix any problems associated with the newness of the technology.

Local Authorities like Westminster City Council are in a position to offer premium parking spots for car club users. This acts as a major incentive for people to join the club. Moreover, local authority run car clubs can also spearhead the development of low carbon vehicle infrastructure within the local authority area. The inquiry heard that by supporting car clubs and low carbon vehicles, local authorities are also able to improve air quality in their areas.

commercialisation of 'sale of service' business models through the procurement process (see section 5.2). Procuring services in favour of goods would reduce capital cost in a time of fiscal challenge, whilst simultaneously lowering carbon emissions and resource use.

The inquiry examined two practical examples of a sale of service model: leasing cars and leasing heat. Under a sale of service business model for the car industry, car manufacturers or car service companies would retain ownership of the car and pay the fuel costs. This would encourage investment in much more energy efficient technologies. Although such a model would be a considerable departure from the way cars are bought and sold at present, the inquiry heard it could prove attractive to the car industry because consumers could have long term contracts with the same manufacturer. With regards to home heating, the inquiry heard that considerable carbon savings could be made if boiler companies 'leased heat' to homes rather than selling boilers and leaving it up to the householder to heat their homes as is the current norm. As with the car industry, if a boiler company was responsible for the 'in use' energy costs, it would have a vested interest in installing the most energy efficient boilers in order to maximise its profits.

Recommendation 5

Government should use the procurement process to support the commercialisation of sale of service business models where low carbon is a key component of the specification.


ENERGY EFFICIENCY

4 DRIVING DEMAND THROUGH REGULATION

The inquiry found that one of the clearest opportunities for government to support the commercialisation of low carbon technologies is by driving demand through farsighted, ambitious regulation. Regulation can be a powerful tool for government to influence private sector purchasing decisions in favour of low carbon technologies and can also stimulate private investment in these technologies.

4.1 Targeting regulation

The inquiry heard that targeting regulation at a company's ability to sell a product rather than its ability to produce a product is an effective tool for driving change without driving businesses out of the UK. When production is regulated there is a risk that the company relocates its production abroad, taking jobs and 'know-how' with it. The inquiry heard concerns that if the UK targets regulation at a company's ability to sell in the UK, it might opt not to sell to the UK rather than meet the target. However, in the case of the California Zero Emissions Mandate, the inquiry heard that this did not happen (see Case Study). No car company opted to leave the California market as a result of this particularly ambitious legislation. Given that California has a similar size economy to the UK with a similar size car market, the inquiry heard that it could not be assumed that a company would abandon the UK market under similar circumstances.

4.2. Regulating outcomes

The inquiry heard that government should express policy targets in terms of low carbon outcomes. Setting targets in this way leaves it to industry to select the best technologies to meet them on the basis of market considerations. This outcomes based approach is technology neutral and avoids 'picking winners', which gives industry the freedom to innovate.

An example of such an 'outcome' based target is the Code for Sustainable Homes regulation. The regulation stipulates that there must be zero net carbon emissions from all newly-built homes from 2016. This target makes no specific mention of technologies and has therefore left it up to the construction industry and other associated industries to select which technologies should be used to meet it. This contrasts with the Carbon Emissions Reduction Target (CERT), a policy whereby energy suppliers are given a target for reducing energy emissions from the existing housing stock depending upon the size of

> 'It's a market founded on regulation and the regulation needs to be consistent to give investors confidence to invest in what are mainly long life assets.'
>
> – Baba Abu, RBS Global Banking and Markets

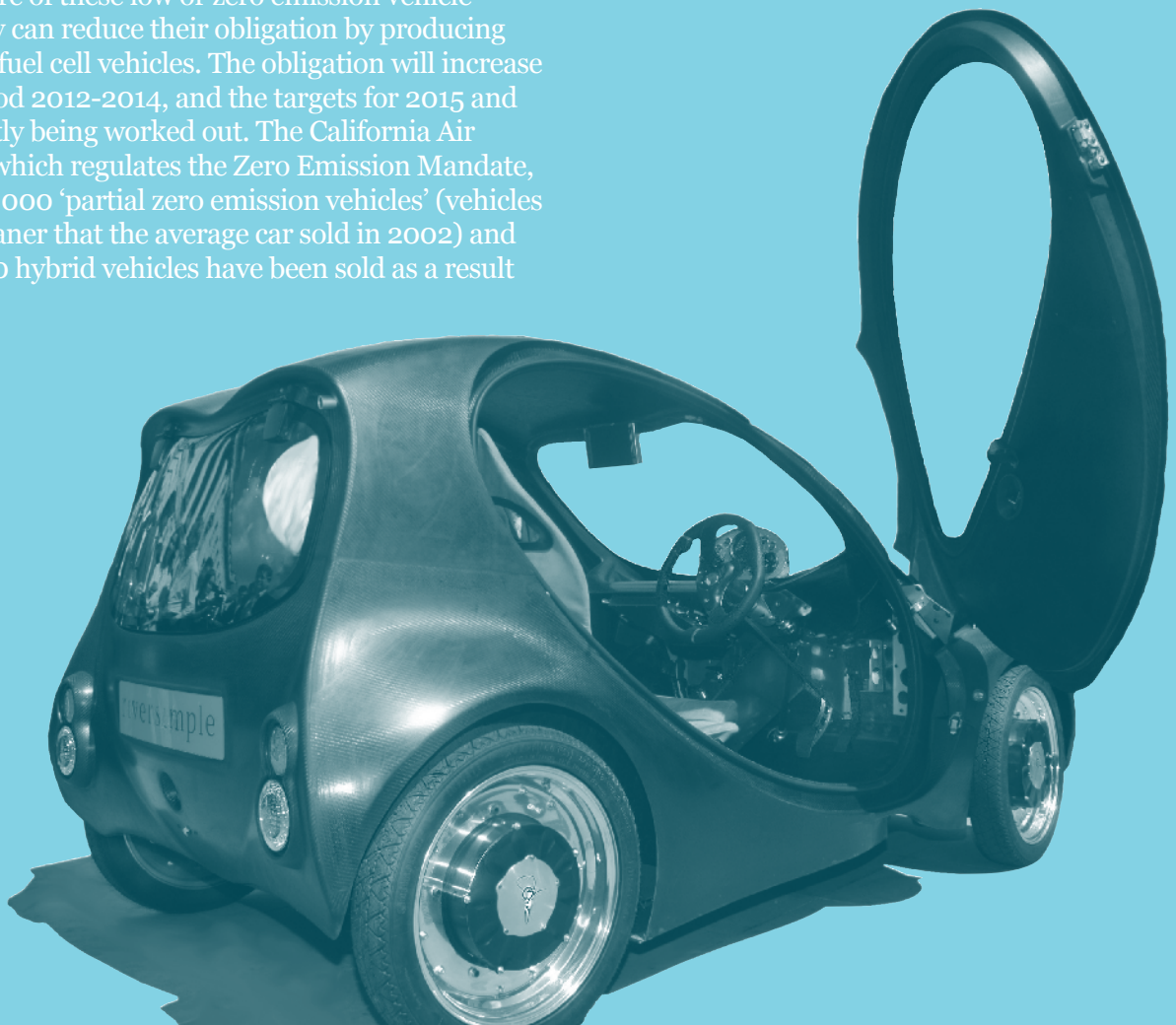
CASE STUDY

California's Zero Emission Vehicle (ZEV) Mandate

California introduced the Zero Emission Vehicle (ZEV) Mandate in 1990 in a bid to improve air quality in the State, especially in Los Angeles and the San Joaquin Valley. In 2002, California became the first state to pass legislation requiring reductions of greenhouse gas emissions from motor vehicles, which provided further impetus for the ZEV Mandate.

The California government initially framed the target as a low carbon outcome. It required 2% of cars sold from 1998 to be zero emission vehicles. This was to increase incrementally to 5% in 2001 and 10% in 2003.[3] The target has evolved considerably over time and now various gradations of vehicle standard are included in the Mandate. These range from 'super ultra low emission vehicle', 'partial zero emission vehicle' and 'zero emission vehicle'. Each standard is defined as a low carbon outcome and entails a certain percentage reduction in emissions using the 2002 or 2003 fleet average as a baseline.

Currently manufacturers are obligated to sell 11% of vehicles at an agreed mixture of these low or zero emission vehicle standards, but they can reduce their obligation by producing a small number of fuel cell vehicles. The obligation will increase to 12% for the period 2012-2014, and the targets for 2015 and beyond are currently being worked out. The California Air Resources Board, which regulates the Zero Emission Mandate, estimates that 750,000 'partial zero emission vehicles' (vehicles which are 80% cleaner that the average car sold in 2002) and more than 100,000 hybrid vehicles have been sold as a result of the regulation.[4]



3 Brent D. Yacobucci, Advanced Fuel Technologies: Energy, Environment and Development Issues, CRS Report for Congress, (2007) p.5

4 California Environmental Protection Agency Air Resources Board http://www.arb.ca.gov/msprog/zevprog/background/background.htm

their market share. Rather than allowing the energy suppliers to select the technologies they wish to use to meet a target, the government provides a list of approved technologies for suppliers to select from. This restricts the commercialisation of new low carbon technologies to when and whether they can make the list and does not allow energy suppliers to pick technologies on the basis of market considerations.

4.3. Ambition

To ensure that low carbon targets are as ambitious as possible, they should be set, where feasible, beyond what can be achieved using the best currently available technology. The inquiry found that the EU car target of 130g CO_2/km by 2015 does not do this because a range of technologies are already available to achieve the target now. The internal combustion engine can already achieve significantly lower emissions, for example the Audi A2 1.2 TDI, which came on the market in 1999, can achieve 80g CO_2/km[5]. Consequently, the car industry will be able to meet the target without necessarily having to develop low carbon vehicle technology to meet the European Union target.

The inquiry heard that target setting is often dominated by the established players of an industry, who are not always in the best position to suggest targets beyond the best currently available technology because their business models are closely linked to the status quo. In order to set sufficiently ambitious targets, government should engage with cutting edge technology companies that are better placed to provide information of what is technically possible at present and what will be technically possible in the future. However, these companies are often small and lack the resources to actively participate in target setting. As such, government should actively seek to engage with these companies in order to get their help with setting ambitious low carbon regulatory targets.

While the cutting edge companies can provide 'outlier information' and push for more ambitious targets, the inquiry heard that it is important that the government continues to engage with the existing players, especially because they are likely to be the ones faced with delivering on the targets. By actively engaging with niche players and continuing to work with the established players as before, policymakers should be able to strike a balance between what is ambitious and what is attainable.

Box 4.1 - EU Carbon regulation targets

The EU framework for reducing car emissions agreed in April 2009 set a legally binding target to reduce average new car emissions across the European Union from the then average level of 153.5g CO_2/km to 130g CO_2/km by 2015. Each manufacturer will be given an individual target along with penalties for not achieving these targets.[6]

5 Disruptive Technologies for Light Metals Symposium, Aluminium from Cars to Cans, Geoff Scamans Innoval Technology, London (April 2006)
http:www.innovaltec.com/downloads/scamans_cans_to_lowco2_cars.pdf
6 Meeting Carbon Budgets – The Need for a Step Change, Climate Change Committee (2009), p196

4.4 Medium term benchmarks

The inquiry heard support for breaking up long term regulatory targets into medium term targets which increase incrementally over time. Such medium term targets can help to provide industry with a route towards achieving the longer term target. They also ensure that carbon reductions are still being made while industry is finding technology solutions to meet the more ambitious, longer term target.

The inquiry heard that the Code for Sustainable Homes, the government's main policy aimed at reducing energy emissions from newly built houses, does this with relative success (see box 4.2). The long term target requires that all new homes have zero net carbon emissions after 2016, while medium term targets are code levels, expressed as a percentage increase on the 2006 building regulation standards. After 2010 all new homes must be built to code level three, which requires a home to be 25% more energy efficient than the 2006 regulations, and by 2013 all homes need to be level four, 44% more energy efficient than the 2006 regulations.

Medium term incremental targets are also expected in the car industry. The EU target for 2015 is expected to be followed by a 2020 target of 95g CO2/km, with quinquennial targets expected to become the norm. The inquiry heard that the EU must formalise the 2020 target as soon as possible, as well as the 2025 targets and beyond. This will provide maximum certainty not only to the car industry, but also to the industry's potential low carbon technology suppliers and their investors.

The inquiry heard that one of the reasons that the EU has not set the 2025 targets is because current standards for measurement might not be appropriate by that date. Measuring tailpipe emissions, as the current target does, is appropriate for internal combustion engine technology, but not for more advanced fuel vehicles such as electric, plug-in hybrid, and fuel cell vehicles. These vehicles register either no or low emissions under the current measurement methodology. Consequently the inquiry heard that new ways of measuring, based upon a life cycle assessment, are likely to be required for the 2025 target and beyond.

Box 4.2 The Code for Sustainable Homes

The Code for Sustainable Homes aims to reduce energy usage in newly built homes. The Code requires that new homes conform to a certain energy efficiency standard depending upon the date upon which they are built. The energy efficiency standard is expressed as a percentage increase on the energy efficiency standards in the 2006 building regulations. After 2010 all new homes must be built to code level three, which requires a home to be 25% more energy efficient than the 2006 regulations, by 2013 all homes need to be level four, 44% more energy efficient than the 2006 regulations. Finally, all homes built after 2016 are required to be 'zero carbon', i.e. the net carbon emissions from a house over the course of the year should zero.

4.5 Maximising market certainty

The inquiry heard that long term regulatory targets boost market certainty and increase investor confidence in low carbon technologies. Private investors want to be as certain as possible that demand for a technology will be sustained before they invest. If the regulation is too short term in outlook (or at risk of being dropped or not extended) it increases the market risk associated with the technology and will discourage investment. The inquiry heard from private investors about the importance of developing cross-party support for regulatory targets to safeguard against substantial changes to the regulatory framework following a change of government. 'It's a market founded on regulation and the regulation needs to be consistent to give investors confidence to invest in what are mainly long life assets. It is really important to have political consensus on any regulation as that would provide long term predictability'. (Baba Abu, RBS Global Banking and Markets).

The inquiry found that the Carbon Emissions Reductions Target (CERT), the government's main policy for reducing energy emissions from the existing housing stock is an example of regulation that is not sufficiently long term (see box 4.3). CERT is set to expire in April 2011, but the government is currently consulting on extending the policy until the end of 2012. Even if CERT is extended as expected, there is still no clear signal from government as to what regulation will be in place to encourage energy efficiency in the existing housing stock from 2013 onwards. This means there is no evidence for sustained demand and as a result, companies trying to commercialise relevant technologies are finding it difficult to build an investment case.

The inquiry heard a range of suggestions regarding the replacement of CERT after it comes to the end of its life. It found that a 'son of CERT' must drive demand for ambitious new technologies that are capable of delivering considerable carbon savings from the existing housing stock quickly. The inquiry heard that the current scheme lacks ambition because the total impact of CERT by the end of the scheme will only be an estimated 3-4 per cent reduction in emissions from the UK housing stock.

In addition, the inquiry heard that CERT has mainly targeted the 'low hanging fruit'; the easiest low carbon technologies that only

Box 4.3 - The Carbon Emissions Reduction Target (CERT)

The Carbon Emissions Reduction Target (CERT) is the government's main policy to reduce energy demand within the existing housing stock. It drives demand for energy efficiency technologies by obligating energy suppliers with more than 50,000 customers to reduce the carbon emissions of those customers. CERT is expected to save 5.6MtCO_2/yr at the end of the policy, which is approximately 3-4% of emissions from the UK's housing stock. The programme began in 2008 and was expected to run until April 2011. However in December 2009 the government began consulting on whether to extend the programme until the end of 2012. CERT follows on from two similar schemes, the Energy Efficiency Commitment 1 (EEC1), which ran from 2002-2005, and the Energy Efficiency Commitment 2 (EEC2), which ran from 2002-2008.

Energy suppliers deliver carbon saving measures to homes and are given a score for each measure they use. The score represents the expected emissions reduction delivered by that measure over its lifetime and is determined by the Buildings Research Establishment domestic energy model, which is based on an average UK house. The scores allocated to loft and cavity wall insulation have been reduced by around 50% because it was discovered that poor installation skills and the 'rebound effect' were impacting upon the effectiveness of these technologies. The 'rebound effect' is where householders use energy less efficiently in response to their cheaper energy bills, counteracting potential carbon savings.

offer incremental carbon savings, and has not encouraged the commercialisation of more ambitious technologies that offer a 'higher carbon return'. Witnesses suggested replacing CERT with a much longer term and more ambitious target in order to drive demand for more radical technology solutions.

Recommendation 6

Government should ensure that low carbon regulation is ambitious, farsighted, life cycle informed and technology neutral in order to encourage private sector investment in low carbon technologies.

5 DRIVING DEMAND THROUGH PROCUREMENT

The Office of Government Commerce informed the inquiry that the UK's current public sector spend is in the region of £220 billion per year. As such public procurement represents an enormous opportunity for government to create demand and foster innovation. Procurement and procurers are situated at the intersection of the public and private sector and therefore have the potential to play a crucial role identifying and communicating needs and developments between the two.

The inquiry was concerned that the government has so far done little to realise public procurement's potential for driving the commercialisation of low carbon technologies. The inquiry identified the ability of the supplier to differentiate their product on the basis of its low carbon characteristics, as a key means to address this issue. To do so the inquiry also noted the importance of procurement specifications shifting to a more outcome focused form in which suppliers are given freedom to innovate as to how to meet specified performance criteria.

5.1 Low carbon differentiation

The inquiry established that the key to promoting the commercialisation of low carbon technologies through public procurement is allowing suppliers to differentiate their products on low carbon criteria. Currently, procurement largely differentiates on the basis of value for money and lowest cost, which drives suppliers to innovate to find cheaper methods of providing a product. In the same manner, if suppliers were encouraged to differentiate products or services on lowest carbon, this innovative potential would be harnessed to seek out new, more carbon efficient methods of delivering a particular product.

While the government has recognised the potential of procurement to promote sustainable development goals more broadly, work has been relatively limited in this area. One of the government's key moves has been the creation of 'Buy Sustainable Quick Wins' minimum product standards. These are a list of minimum product specifications for around sixty of the items most commonly procured by the public sector. Though mandatory since 2003, the application of these standards in the public sector is still far from universal. However, the inquiry identified a more fundamental problem in the use of minimum standards in relation to the commercialisation of low carbon

technologies. In applying minimum standards procurers are effectively creating a quality 'ceiling', the surpassing of which renders no benefit to the supplier. This means that standards can act as an obstacle to the development of innovative new technologies by suppliers. This is because developing new technologies involves greater risk than using traditional solutions but minimum standards create a market where this greater risk is not matched by potentially greater reward.

5.1.1 Comparing low carbon tenders

While the inquiry identified the benefits of encouraging procurers, and concomitantly suppliers, to differentiate on grounds of low carbon, it also acknowledged the complexity of doing so, due to the difficulty of comparing low carbon claims. For instance, while a product may be more energy efficient in terms of operation, this may be outweighed if its production or disposal is particularly carbon intensive.

One potential means for overcoming this problem of comparability is through life cycle carbon assessment. PAS2050 is a life cycle assessment standard developed by BSI British Standards in conjunction with DEFRA and the Carbon Trust. PAS2050 provides a standardised method of measuring the carbon footprint of the production, transportation, packaging, operation and disposal of goods or services. While there is a complex range of issues associated with attempting to apply lifecycle analysis tools (see section 3.1) they do provide a method for procurers to reliably evaluate and compare low carbon aspects of tenders for public contracts.

5.1.2 EU law and low carbon differentiation

The inquiry identified some concerns that EU procurement law can create an obstacle to differentiating on low carbon grounds. The inquiry noted that it would be illegal in the procurement of a particular product or service to differentiate on the basis of a supplier's carbon footprint as a whole. However, the inquiry established that so long as the carbon differentiation is proportionate and specific to the product or service being procured, it is compatible with EU procurement law.

The central point is that the public sector is free to decide what it wishes to procure and as such is free to procure low carbon technologies. Where it is constrained in relation to compliance

> 'If procurers thought in terms of two or more procurement cycles this would allow them to set more ambitious outcomes and signal their direction of travel to the market, giving the supply chain time to respond.' – Gaynor Whyles, JERA consulting

with EU law is in differentiating between competing bids where procurers may only use two criteria; lowest cost and the degree to which the bid delivers what was originally requested. Therefore, if the procurer does not specify low carbon in the specification, then, it is illegal to use carbon as a differentiating factor when selecting between bids.

Recommendation 7

Government must structure public sector procurement to allow suppliers to differentiate their bids on the low carbon characteristics of the products which they are tendering.

5.2 Outcome based procurement

The current prevailing norm in procurement is for procurers to specify the technologies or 'kit' they require. However, if a technology is particularly new or innovative, a procurer will not necessarily be aware of it and therefore will not be able to request it. Moving towards an outcome based model of procurement would overcome this problem and assist the commercialisation of low carbon technologies. Under such a procurement model, procurers are encouraged to only specify their need and leave it to the market to decide which technologies can best meet that need. An outcome based model therefore also works to promote technology neutrality in procurement. An example of this would be that in the procurement of a building, procurers would specify the requirements that the building must serve and allow suppliers to decide how best to fulfil these criteria. This passes the technical risk onto suppliers, who become responsible for working out which technology to use to meet the requirement.

The inquiry heard that by procuring low carbon outcomes the public sector will encourage the commercialisation of 'sale of service' business models. Business models are included in the broadest definition of technology, and the inquiry found that 'sale of service' models have the potential to save the government money and make considerable carbon savings (see section 3.4).

Recommendation 8

To encourage innovation and maintain technology neutrality, government must move away from procuring standard market solutions to a process of commissioning outcomes.

5.2.2 Forward Commitment Procurement

In order to maximise supply chain innovation, procurers should be encouraged to set the low carbon outcomes being commissioned beyond what can be met using the best currently available technology. This will encourage suppliers to government to support the commercial development of new low carbon technologies in order to win the bid. The Department of Business Innovation and Skills is already trialling the use of such stretching outcomes through a model known as Forward Commitment Procurement.

The Forward Commitment Procurement scheme helps support procurers in specifying outcomes that cannot be met using existing technologies. If a supplier can meet the Forward Commitment Procurement to the agreed performance level within a set time period and budgetary framework, the contracting authority is obligated to buy it in a pre-agreed volume. The inquiry found that private investors in low carbon technology companies want proof of sustained demand for a low carbon technology. Forward Commitment Procurement helps to provide that proof and mitigates the market risk associated with investment in new low carbon technologies. Forward Commitment Procurement encourages public procurers to engage with the supply chain at the earliest opportunity and to consider their longer term needs. The inquiry heard that public procurers are often very short termist in their outlook, 'If you are lucky, public procurers start thinking about procurement six months before they are due to let the contract again, and they only think in terms of their next procurement cycle. If procurers thought in terms of two or more procurement cycles this would allow them to set more ambitious outcomes and signal their direction of travel to the market, giving the supply chain time to respond.' (Gaynor Whyles, Jera Consulting). Forward Commitment Procurement encourages procurers to work out what their future needs will be and to send advanced information to the market in the shape of an outcome-based specification.

The inquiry heard that the Small Business Research Initiative (SBRI), which is being run by the Technology Strategy Board, could be developed as a delivery mechanism for Forward Commitment Procurement. The SBRI encourages public sector organisations to fund research and development to find

Box 5.1 - The Small Business Research Initiative

The Small Business Research Initiative (SBRI) is being run by the Technology Strategy Board to try to encourage innovation and small business participation in the procurement process. Under the SBRI, public sector organisations are encouraged to set out a challenge or to define an outcome that cannot be met using existing technology. Industry is then invited to suggest technology solutions and the public sector organisation funds the research and development of the technology.

The SBRI operates under procurement regulations, so it cannot be restricted to small businesses, but the inquiry heard that around three quarters of all contracts have been awarded to small companies, and around 60% have been awarded to companies with fewer than fifteen employees.

a technology solution to meet an expressed need that cannot be met using existing technologies. If an organisation can develop a technology, the scheme does not mandate that the commissioning organisation procure the technology at the end of the process. Conversely, the Forward Commitment Procurement model guarantees a buyer but does not offer suppliers any funding for research and development and demonstration. The inquiry heard that by pairing these two schemes, wherever possible, government should be able to maximise their ability to drive low carbon innovation.

5.3 Whole-life costing

While the methods identified above for securing the commercialisation of low carbon technology through public procurement could often just be described as good practice, the inquiry acknowledged that low carbon technologies are often accompanied by higher capital costs. However, these costs will often be recouped through lower operating costs due to reduced energy consumption, but public procurement does not necessarily account for these reduced costs.

One method identified by the inquiry for overcoming this obstacle is through the adoption of whole-life costing in public sector procurement. This entails factoring in all costs of a product or service during procurement, from purchase, through to operation end eventual decommissioning. The Treasury's procurement Green Book advocates the use of whole-life costing in procurement but the inquiry was concerned that this does not appear to happen in practice.

CASE STUDY

Forward Commitment Procurement of Zero Waste Prison Mattresses

In 2005 Her Majesty's Prison Service (HMPS) was approached by the Department of Trade and Industry to work with them to demonstrate the Forward Commitment Procurement (FCP) model.

This began by identifying that HMPS had an 'unmet need' for a 'Zero Waste Mattress Solution'. In a typical year, HMPS purchase around 53,000 foam mattresses and 48,000 pillows, and dispose in the order of 40,000 items due to soiling, misuse, and wear and tear. The majority of 'end of life' mattresses were being sent to landfill, with the remainder classed as clinical or hazardous waste. The combined cost of supply and disposal was estimated to be in the region of £3 million per year. The mattresses and pillows had a short life span and disposal was unsustainable and costly.

Individual prisons were finding it increasingly difficult to have the products taken away by contractors due to increasing demands and restrictions on the use of landfill sites. To compound matters, disposal costs were also set to rise as a result of regulatory drivers, such as the EU Landfill Directive, and the EU Waste Framework Directive.

In normal circumstances the next procurement cycle for the supply of mattresses would have begun six months before the existing contract was due to expire. The Forward Commitment Procurement project provided the impetus and assistance for HMPS to review its arrangements not only for the supply, but also the use and disposal of mattresses and pillows. A 'call for innovative solutions and information' was widely publicised and responses were invited from all sectors and from any part of the supply and disposal chain, extending to Small and Medium Enterprises (SMEs) and third-sector organisations.

The aim of the FCP market sounding exercise was to communicate the requirement to the market and provide a process whereby potential suppliers were able to put forward innovative solutions. Over 30 good quality submissions from a wide range of respondents, including multinationals, SMEs and social enterprises, were received This exercise provided HMPS with information on a number of products and technologies that could contribute to achieving a zero waste system.

A representative sample of these companies was then invited to attend an information exchange in a supply chain workshop event in April 2007 'to explore means of delivering a zero waste prison mattress system'. The HMPS used the information gathered through the market sounding and supply chain workshop to inform their procurement strategy and decisions on the contracting approach. The result was a transformation in the procurement approach to a whole life managed service contract.

In March 2009, HMPS signed a supplier contract for a 'Zero Waste Mattress and Pillow Solution' which featured innovative new covers, reducing turnover, and eliminating the need for clinical waste disposal. End-of-life mattresses are to be recycled into useful products, rather than sent to landfill. This contracting approach not only delivered a more sustainable solution, it will also save an estimated £5 million over the life of the contract.

CARBON CONNECT

Carbon Connect is a cross-party coalition committed to advancing the low-carbon agenda in the UK. The group brings together a wide range of stakeholders working towards the development of a policy framework that effectively supports the integration of the low carbon agenda into industry decision making. Carbon Connect manages an independent research programme and hosts regular networking events for Parliamentarians, civil servants and our members.

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