The Sixth Carbon Budget and Welsh emissions targets – Call for Evidence

Background to the UK's sixth carbon budget

The UK Government and Parliament have adopted the Committee on Climate Change's (CCC) recommendation to target net-zero emissions of greenhouse gases (GHGs) in the UK by 2050 (i.e. at least a 100% reduction in emissions from 1990).

The Climate Change Act (2008, 'the Act') requires the Committee to provide advice to the Government about the appropriate level for each carbon budget (sequential five-year caps on GHGs) on the path to the long-term target. To date, in line with advice from the Committee, five carbon budgets have been legislated covering the period out to 2032.

The Committee must provide advice on the level of the sixth carbon budget (covering the period from 2033-37) before the end of 2020. The Committee intends to publish its advice early, in September 2020. This advice will set the path to net-zero GHG emissions for the UK, as the first time a carbon budget is set in law following that commitment.

Both the 2050 target and the carbon budgets guide the setting of policies to cut emissions across the economy (for example, as set out most recently in the 2017 Clean Growth Strategy).

The Act also specifies other factors the Committee must consider in our advice on carbon budgets – the advice should be based on the path to the UK's long-term target objective, consistent with international commitments and take into account considerations such as social circumstances (including fuel poverty), competitiveness, energy security and the Government's fiscal position.

The CCC will advise based on these considerations and a thorough assessment of the relevant evidence. This Call for Evidence will contribute to that advice.

Background to the Welsh third carbon budget and interim targets

Under the Environment (Wales) Act 2016, there is a duty on Welsh Ministers to set a maximum total amount for net Welsh greenhouse gas emissions (Welsh carbon budgets). The first budgetary period is 2016-20, and the remaining budgetary periods are each succeeding period of five years, ending with 2046-50.

The Committee is due to provide advice to the Welsh Government on the level of the third Welsh carbon budget (covering 2026-30) in 2020, and to provide updated advice on the levels of the second carbon budget (2021-25) and the interim targets for 2030 and 2040. Section D of this Call for Evidence (covering questions on Scotland, Wales and Northern Ireland) includes a set of questions to inform the Committee's advice to the Welsh Government.

Introduction

Deloitte welcomes the opportunity to contribute to the UK Committee on Climate Change

Overview

Deloitte has an Energy, Resources and Industrials team, providing a range of consulting, corporate finance, tax and audit services on some of the largest and most complex projects across the globe. We work with both private and public sector investors, developers and operators across the energy value chain.

Beyond this sectoral expertise, Deloitte is working with clients across all sectors to assist them in their own responses to climate change, focusing on reporting and measurement, factoring climate considerations into board decision making and understanding the effects on products, services and supply chains.

The responses reflect what we have been able to respond to in the short timeline, and where the local support and expertise were available. For future responses, we will be able to draw on the breadth of our insights and industry experience from across our c. 312,000 professionals globally.

Our responses are drawn from our experience, and may include references to publically available research that we believe may be useful evidence. We are not responsible for these papers, nor do our references provide endorsement, or complete representation of the state of the literature.

"In the context of global trends toward decarbonisation, and the accompanying trends toward decentralisation, digitisation and democratisation, we can expect to see profound changes in the way we power our communities, industries, and daily lives."

Deloitte Responses

A. Climate science and international circumstances - Q1

B. The path to the 2050 target – Q6

E. Sector-specific questions – Q23, Q24, Q29, Q30, Q31, Q32, Q35, Q36, and Q37

Section A Responses

Climate science and international circumstances

Question 1: The climate science considered in the CCC's 2019 Net Zero report, based on the IPCC Special Report on Global Warming of 1.5°C, will form the basis of this advice. What additional evidence on climate science, aside from the most recent IPCC Special Reports on Land and the Oceans and Cryosphere, should the CCC consider in setting the level of the sixth carbon budget?

In addition to the IPCC SR15 report, there is now some interesting research being published from Coupled Model Intercomparison Project (CMPI) 6 experiments, the latest generation of international climate models. One topic of particular interest may be the change in Equilibrium Climate Sensitivity (ECS) in CMIP6 compared to CMIP5.

Equilibrium Climate Sensitivity – the change in average surface temperature that an instantaneous doubling of atmospheric CO_2 concentration from pre-industrial levels would induce – has been the primary metric of summarising climate change effects since the Charney report in 1979. It is an important metric in the intercomparison of general circulation models (GCMs) and remains a standard experiment in the CMIP project.

The IPCC SR15 emissions budget and climate response was based mostly on CMIP5 data. CMIP6, which uses a new generation of climate models with higher resolution and more complete representations of many physical processes not present in CMIP5, is currently underway and will inform the next IPCC Assessment Report (AR6). While the total suite of experiments that comprise the intercomparison project are not yet complete, preliminary results suggest that the climate sensitivity of the new models in CMIP6 may be higher than CMIP5. This would mean that under CMIP6, the total carbon budget for 1.5ºC could be smaller than was calculated using CMIP5.

Source (amongst others): https://doi.org/10.1029/2019GL085782

Section B Responses

The path to the 2050 target

Question 6: What are the most important uncertainties that policy needs to take into account in thinking about achieving Net Zero? How can government develop a strategy that helps to retain robustness to those uncertainties, for example low-regrets options and approaches that maintain optionality?

For policy mechanisms to achieve Net Zero, it is worth considering the role of taxation. Facilitating finance for a public need, taxation is paid on income, wealth, inheritance, businesses, property, estates, sales, duties – and more. Climate change is a global problem, with an exhaustive list of uncertainties, that markets, regulators, government agencies and policy makers are conclusively agreeing are too difficult to predict or even model. Economically speaking, pricing in the value of any externality is not straightforward. Otherwise, it would have been done before. The call for urgency to respond to climate change has garnered significant momentum in the past five years and the last UK CCC report produced an indicative guide on how to decarbonise sectors to achieve the set net zero carbon target.

As valuable as existing economic policy (low-regrets or optionality) may be, in reality the starker uncertainties facing the UK are lack of knowledge surrounding the impact from known physical climate risks or our resilience to them, the cascade effect on our economy from transitioning to net zero carbon, and crucially the continuity of policy decision-making. Taxation, regardless of ideology, is accepted as a fundamental mechanism to pay for society. Society is currently facing unprecedented challenges. Economics may not yet be able to price in the externalities at once, but there are no regrets, low regrets and zero sum taxes that could be considered as part of the UK’s six carbon budget.

The UK’s value-added-tax (VAT) system is one example of a tax that could be used to factor in carbon intensive behaviours. Adjusting the pricing mechanism of VAT to account for activities, which have a higher carbon value, over those that do, not, is a starter to prompt consumer behaviour. For example:

Should a citizen:

- drive a diesel car for 20 hours per week with the knowledge that they directly impact the UK’s carbon budget;
- eat meat and dairy three times a day;
- purchase electricity from a provider using fossil fuels;
- purchase items that have been freighted around motorways;

over less carbon intensive behaviours as a comparable person with equal ability to refrain from those decisions, pay equal levels of taxation?

This response is provided as feedback to steer further research into the use of carbon-related taxation as an economic policy mechanism and should be qualified on that basis.

Section E Responses

Sector-specific questions

Question 23 (Industry): What would you highlight as international examples of good policy/practice on decarbonisation of manufacturing and fossil fuel supply emissions? Is there evidence to suggest that these policies or practices created economic opportunities (e.g. increased market shares, job creation) for the manufacturing and fossil fuel supply sectors?

A typical example of good policy on decarbonisation of manufacturing and fossil fuel supply emissions would be the EU emissions trading system (EU ETS). As the key tool for reducing greenhouse gas emissions cost-effectively, it is the world's first major carbon market and remains the biggest one. The EU-wide carbon trading system, even though it suffered from poor implantation decisions, has been proven to reduce carbon emissions. The study of Impact Assessment of the EU ETS (European Commission, 2015) mentioned that EU ETS may create economic opportunities. It studied economic impacts on competitiveness, administrative burden, employment and energy prices for households, etc. The ETS scheme incentivises industries to increase carbon efficiency in production. Regarding employment, there is likelihood that an ambitious climate policy will generate a demand for low carbon technologies, and renewable energy. This should increase demand for such technologies and services, leading to positive employment impacts.

Other more specific policy instruments or practices that we have seen:

- Swedish Carbon Tax1: Overall quite a successful policy.
- Tax rebate schemes in US. This includes the current proposed CCS tax credit (also known as par. 45Q2). Even though the policy effectiveness is not proven yet, overall industry expectations are that it will be sufficient to bring on more Enhanced Oil Recovery (and other) projects. The effectiveness of tax credit schemes in the US has been proven before for wind and PV technologies.
- Corporate Power Purchasing Agreements: According to relevant research (Enervis), last year in Europe about 21GW of renewable energy projects had achieved PPAs from a range of industries in 25 countries. These range from traditional utilities to manufacturing, retailer groups, conglomerates and agriculture.

[1] https://www.un.org/esa/ffd/wp-content/uploads/2016/12/13STM_Article_CO2-tax_AkerfeldtHammar.pdf
[2] Page 239 in https://www.congress.gov/115/bills/hr1892/BILLS-115hr1892eas2.pdf

Question 24 (Industry): How can the UK achieve a just transition in the fossil fuel supply sectors?

A just transition policy does not imply that it will be needed across all processes of change in the economy, instead only where climate policies lead to rapid and disruptive change that existing markets and institutions cannot deal with adequately on their own due to market failures and other barriers.

Transition to a low-carbon economy in the fossil fuel supply industry calls into question the degree to which a rapid low-carbon transition may adversely affect certain economic sectors, communities and regions. The adverse effects may include job losses, increased energy poverty, possible compromise to land, biodiversity loss and livelihoods caused by renewable expansion. As pointed in a briefing paper by Imperial College London (2018)[3], A range of measures such as near-term employment and wage protections, medium-term retraining and investment in alternative industries, and long-term education and innovation investment are central to ensuring protection and prosperity for people and communities.

Long term visions towards alternative industries and activities, with early implementation of policies to avoid abrupt changes, can support successful transitions. In addition, social dialogue between governments, businesses and labour unions is critical to ensuring all voices are heard.

Governments should work closely with businesses, local communities and labour representatives to produce long-term visions of successful, just and equitable transitions around which all stakeholders' voices are considered.

Another discussion paper from Inevitable Policy Response (IPR, 2019)[4] highlights the need for carefully targeted government and company policies to ensure a just transition for workers and communities.

An example is the Canadian Federal Policy Carbon Fee and Dividend[5] that puts a rising fee on carbon emissions and return revenue directly to Canadians, proposed by their Citizen's Climate Lobby. In this case, 100% of the total carbon fees collected are divided up and given back to all households equally. The government's aim is to ensure it is no longer "free" to pollute, help Canadians transition to a clean energy economy and critically ensure that all of society is on-board.

[3] https://www.imperial.ac.uk/media/imperial-college/grantham-institute/public/publications/briefing-papers/26.-Towards-a-just-and-equitable-low-carbon-energy-transition.pdf

[4] https://www.unpri.org/download?ac=7092

[5] https://canada.citizensclimatelobby.org/carbon-fee-and-dividend/

Question 29 (Power): Think of a possible future power system without Government backed Contracts-for-Difference. What business models and/or policy instruments could be used to continue to decarbonise UK power emissions to close to zero by 2050, whilst minimising costs?

Over the past few years, levelised cost reductions in wind and solar has contributed to their important role in global energy transition. The possibility of subsidy free renewable energy projects is at the centre of the debate amongst politicians, economists and investors. According to Aurora Energy Research, onshore wind and solar will both be viable without subsidies by 2025 in the UK[6], meaning that the business model for onshore wind and solar would be mainly operating in the wholesale market. We therefore should understand the challenges in order to respond with appropriate policy measures.

There are three main challenges:

1. With growing deployment, system-wide costs of intermittency increase substantially, along with their recognition in the eyes of policymakers;
2. With an existing grid and a relatively limited solar resource, the market-based economics of certain projects is questionable, such as distributed PV in Northern Europe; and,
3. Low commodity prices and its future evolution make renewable market competitiveness ever more elusive. A move towards greater levels of "merchant" price exposure for renewable power generators has the consequence of exposing investors to electricity price volatility. Therefore, policy measures to keep renewable deployment on net-zero emission track need to focus on coping with high system costs resulting from renewable intermittency and providing more certain investment environment for renewable merchant projects.

Other that the evolving corporate/synthetic PPA model, that is proving popular, other options for future policies/practices are:

- A certification scheme for (Blue or Green) Hydrogen. This can follow the model of the older Guarantees Of Origin, and can be the basis on which to initiate a certified hydrogen market.
- A scheme for trading "negative" emissions. Rather than provide direct support to CCS projects, a "cap-and-trade" scheme could be introduced for industries that are currently (or about to be) exposed to ETS and have very limited decarbonisation technology alternatives (such as blast furnace based industries, aviation or shipping).
- Firm Capacity Auctions: There can be several variants for participation of renewables in power markets, where capacity is available at equivalent MW terms or equivalent £ terms (subject to a predefined measure for the value of unserved energy and a reliability metric). These can be combined with a swap instrument (such as a CfD). We note a similar type of market is currently taking place in ISEM in Ireland.

[6] https://www.theguardian.com/business/2018/mar/20/uk-subsidy-free-renewable-energy-projects-set-soar-aurora-energy-research-analysts

Question 30 (Power): In Chapter 2 of the Net Zero Technical Report we presented an illustrative power scenario for 2050 (see pages 40-41 in particular):

a) Which low-carbon technologies could play a greater/lesser role in the 2050 generation mix? What about in a generation mix in 2030/35?

b) Power from weather-dependent renewables is highly variable on both daily and seasonal scales. Modelling by Imperial College which informed the illustrative 2050 scenario suggested an important role for interconnection, battery storage and flexible demand in a future low-carbon power system:

  i. What other technologies could play a role here?

  ii. What evidence do you have for how much demand side flexibility might be realised?

a) All flexible and baseload low-carbon technologies are likely to need to play an increased role in the energy mix in both 2030/35 and 2050, replacing the role fossil fuels plays today. Within this the decarbonisation of gas will have a significant part to play. The decarbonisation of the gas carrier is necessary, employing technologies to increase the share of renewable gases, such as bio-methane and Power-to-Gas, and decarbonised gases associated with Carbon Capture and Storage (CCS). In the longer term, hydrogen could become an important energy carrier towards full decarbonisation of the gas carriers in 2050. In the long-term, Power-to-Gas will play a key role in both the integration of excess electricity from variable renewables and decarbonising the gas supply. Gas fired power plants will continue to provide peak power flexibility to support an energy mix based on increasingly variable electricity generation.

b) i. The very recent ENTSO-E Ten-Year Network Development Plans (TYNDPs) 2020 Scenario Report describes possible European energy futures up to 2050. The report highlights that innovation in new and existing technologies is required to achieve net-zero emissions, including reducing the levelised cost of energy from renewable energy sources, increasing the efficiency and type of end user appliances, supporting renewable and decarbonised gas, developing technologies that will support negative emissions, etc. Wind and solar energy will play an important role in the future energy system.

ii. ENTSO-E mentions that there is potential for demand side technologies to reduce generation from carbon based peaking units, supporting decarbonisation, contributing towards system adequacy at lower costs and helping to integrate increasing variable renewables. One scenario shows more use of demand side resources as the cost of residential solar and battery systems decrease. In 2040, there is a much larger increase in use of battery technologies under this scenario. ENTSO-E considers household solar battery storage systems, vehicle to grid and industry demand side response. In Net-Zero sensitivity of FES 2019, high level of demand side response is assumed - smart appliance use reaches 85% and I&C DSR capacity reaches 13GW in 2050 (more conservative estimates based on correct deployment is 2-3GW in 2050).

Question 31 (Hydrogen): The Committee has recommended the Government support the delivery of at least one large-scale low-carbon hydrogen production facility in the 2020s. Beyond this initial facility, what mechanisms can be used to efficiently incentivise the production and use of low-carbon hydrogen? What are the most likely early applications for hydrogen?

The Future Energy Scenario (FES) 2019 published by National Grid shows 13.9 million hydrogen burning boilers installed in 2050 to reach net-zero emission target, implying that there would be a significant increase for hydrogen demand. In order to put into place mechanisms to efficiently incentivize the production and use of low-carbon hydrogen, a bulk supply of low-carbon hydrogen would need to be established, supported by a full supply chain.

Currently the BEIS hydrogen supply programme (BEIS, 2018) provides funding to support the development of low-carbon industries and looks to support programmes, which can demonstrate low-carbon hydrogen production at competitive costs. The incentive mechanism to be designed needs to set clear deployment targets of different hydrogen uses and steer clear about hydrogen production costs. As indicated by the report of The Future of Hydrogen published by International Energy Agency (IEA) in 2019, there are two leading methods of hydrogen production – electrolysis and steam methane reforming (SMR).

Both methods vary in terms of costs and potential use of application. While electrolysis is a zero-carbon production method, SMR would need to be combined with CCUS in order to achieve significant emission savings. SMR has an overall lower cost and has best efficiencies for large-scale production, while electrolysis has best efficiencies for direct fueling for hydrogen transport. The incentive mechanism can be in form of tender and should look at relevant efficiency and cost factors of a large-scale production such as plant efficiency, scale of production, gas prices, storage costs, grid/network connection, etc. Looking ahead, some UK projects with SMR are designed to provide H2 in industrial cluster areas. Several innovation programmes are underway that aim to demonstrate the future potential of electrolysis (such as H21, Hy4Heat). According to FES 2019, hydrogen fuel cell vehicles could play a vital role in the decarbonisation of transport, particularly in the commercial sector-e.g. HGVs or rail. Several projects in the UK are ongoing to demonstrate commercial viability of injecting hydrogen into the gas grid and potential of energy infrastructure of hydrogen production and storage. Project completion would be achieved in the 2020s.

Question 32 (Aviation and Shipping): In September 2019 the Committee published advice to Government on international aviation and shipping and Net Zero. The Committee recognises that the primary policy approach for reducing emissions in these sectors should be set at the international level (e.g. through the International Civil Aviation Organisation and International Maritime Organisation). However, there is still a role for supplementary domestic policies to complement the international approach, provided these do not lead to concerns about competitiveness or carbon leakage. What are the domestic measures the UK could take to reduce aviation and shipping emissions over the period to 2030/35 and longer-term to 2050, which would not create significant competitiveness or carbon leakage risks? How much could these reduce emissions?

The government has two fundamental levers available to manage emissions – a) incentivising innovation to mitigate environmental impacts and b) strengthening policies to manage demand. Both of these must recognise the need to safeguard economic competeviness.

In respect of a), the aviation sector has already reduced emissions per passenger kilometre by 50% since 1990, and improved fuel efficiency by 2% p.a. for 10 years[7]. Replacing conventional domestic flights (with a relatively high carbon footprint), with electric propulsion is being investigated worldwide. In the UK alone, the electrification of domestic flights has the potential to reduce emissions by an estimated 4,500 tonnes of CO2 per week[8]. Reviewing the Research and Development Expenditure Credit scheme available for large companies could further incentivise innovation.

Addressing the emissions generated at airports and during flight are additional areas of opportunity. On the ground, the more widespread adoption of electrified ground handling equipment and e-taxi procedures must go hand in hand with policies that enhance building efficiency and encourage the use of public transport to/from airports. In the air, innovations such as continuous gradual descent and airspace redesign are already addressing capacity issues, and can also yield an environmental benefit. For example, a report estimates that enhanced Air Traffic Management[9] can yield efficiency gains of 3-6%. The development of effective incentivisation structures within Airspace National Service Providers (ANSPs) and airports are critical to achieving enhanced environmental outcomes.

In respect of b), the UK already represents one of the most heavily taxed aviation sectors. While a step change in the tax burden would appear politically difficult, demand for air travel may be moderated by shifting public attitudes towards flying (e.g. Flygskam in Scandinavia). Nevertheless, such is the contribution of aviation to economic growth, governments have repeatedly shown themselves receptive to maintaining competitive aviation sectors. In the longer-term, investments in substitute transport modes, notably high-speed rail, have potential to break the flying 'monopoly' by shifting demand away from air for particular city pairs. The roll out of ultra-fast broadband connectivity and employer attitudes towards remote working also have a role to play in moderating the need to travel.

In respect of shipping, technical solutions are available and could be promoted in respect of UK domiciled vessels (e.g. rotor sails)[10]. Whilst not practical for all shipping, the nature of these sails may prove suitable for the UK on short-term shipping routes e.g. to Europe, and could also supplement vessels on longer voyages.

[7] Guardian Newspaper 19/9/19 "Airlines' CO2 emissions rising up to 70% faster than predicted"
[8] http://www.leasefetcher.co.uk/blog/domestic-flights-london-co2-emissions
[9] Accelerating Air Traffic Management Efficiency: A Call to the Industry – Boeing / CANSO Report Feb 2012

Question 35 (Greenhouse gas removals): What relevant evidence exists regarding constraints on the rate at which the deployment of engineered GHG removals in the UK (such as bioenergy with carbon capture and storage or direct air capture) could scale-up by 2035?

In the UK we are aware that a large renewable generator is investigating the feasibility for a commercial BECCS plant in the next few years. According to public information from their website, this would require a significant drop in the price of fuel (biomass pellets) from about £70/t to £50/t, and also a scheme to fund "negative" emissions, with a target price of about £20-30/t CO_2 (using BEIS levelised cost estimates). Other than costs, it is clear that what is missing is a policy and regulatory framework for negative emissions. Such a framework would comprise of:

- A certification scheme for negative emissions
- An industry certification, assurance and environmental compliance code
- Agreed industry standards for production, transportation and guaranteed sequestration of carbon oxides.
- Regulations for licensing facilities
- Standardised regulatory oversight of certified negative emissions and monitoring of codes compliance

[10] The Secret History of the Future – Second Wind – Economist / Slate Podcast 7/10/19

Question 36 (Greenhouse gas removals): Is there evidence regarding near-term expected learning curves for the cost of engineered GHG removal through technologies such as bioenergy with carbon capture and storage or direct air capture of CO_2?

Please see the attached a peer-reviewed paper "An Energy Transition That Relies Only on Technology Leads to a Bet on Solar Fuels" by Oscar Kraan (Senior Consultant at Monitor in The Netherlands, Deloitte) that has been published by Joule. The article is a collaboration with other professionals in the energy sector.

Document attached to response. Document Name: "UK CCC Call for Evidence_Deloitte Response_Q36 Supporting Evidence"

UK CCC Call for Evidence_Deloitte Res

Abstract:

Today the energy transition progresses through the build-out of electric renewables and increased electrification of end-use. However, significant demand for hydrocarbon fuels will persist. In a net-zero emissions world this will require that the CO2 emissions from fossil fuels be captured and stored (CCS) and that remaining emissions are offset by negative emissions from bioenergy CCS (BECCS), afforestation, etc. by deploying existing technologies. In all cases, governments need to be proactively involved to coordinate and support the transition. A radical alternative exists in the form of Solar Fuels, carbon-neutral fuels produced from renewable electricity, water and the circular use of CO2. If, and when Solar Fuels could be produced at affordable cost and scaled, their market introduction could be market-led needing no more than price-protection in the form of a carbon price. We give a specific target for the future viability of solar hydrocarbon fuels of 200 US$ per barrel (36 US$/GJ). While this is potentially achievable in the long-run if strong cost reductions can be met in all component elements, it is a high risk bet for policy to rely on it in place of other technologies that are available today, yet difficult to implement for non-technical reasons.

Question 37 (Infrastructure): What will be the key factors that will determine whether decarbonisation of heat in a particular area will require investment in the electricity distribution network, the gas distribution network or a heat network?

In a number of European countries PE replacement programmes (including in the UK the Iron Main Replacement Programme) are currently ongoing, and gas DSOs are looking to future proof their investments so that networks can carry up to 100% hydrogen. Other than the UK, we are aware that such initiatives are currently taking place in the Netherlands, Germany, Hungary, Spain and Austria. In the UK, the H21 programme is looking at the 100% case, and the Hy4Heat programme is about to compete its testing phase. Other than technical and economic feasibility of PE replacement and adapting end-user equipment, the following factors will determine investment needs:

- The localised need for H2 storage capacity, for intra season or over seasonal purposes. This could be substantial and suitable sites may not be easily available. There is little evidence on the amount of investment needed in this area.

- Sufficient CO2 storage/sequestration capacity onshore. Even though offshore reservoir capacities may be used, it is likely that some onshore capacity would also be needed. There is little evidence on the amount of investment needed in this area.

- For housing stock where conversion to H2 may not be economically or technically feasible, it is likely that heat would have to be electrified-this may require upgrades on local distribution networks.

- Electricity requirements for electrification of heat need to be considered in conjunction with the electrification of transport. In the case that massive EV penetration materialises, clearly investment in distribution network upgrades would have to be higher.

- The level of take-up of GSHPs/ASHPs with hybrid boilers. Although this technology is currently mature, it requires well insulated buildings. This in turn would assume another parallel programme to increase the energy efficiency of the housing stock (which in the UK is among the lowest in Europe).