Review of the Fourth Carbon Budget - Call for Evidence

www.theccc.org.uk/call-for-evidence

Question and Response form

When responding please provide answers that are as specific and evidence-based as possible, providing data and references to the extent possible. Please limit your response to a maximum of 400 words per question.

Questions for consideration:

A. Climate Science and International Circumstances

The Committee's advice assumes a climate objective to limit central estimates of temperature rise to as close to 2°C as possible, with a very low chance of exceeding 4°C by 2100 (henceforth referred to as "the climate objective"). This is broadly similar to the UNFCCC climate objective, and that of the EU.

In order to achieve this objective, global emissions would have to peak in the next few years, before decreasing to roughly half of recent levels by 2050 and falling further thereafter.

The UNFCCC is working toward a global deal consistent with such reductions, to be agreed by 2015. Earlier attempts (e.g. at Copenhagen in 2009, before the fourth budget was recommended or legislated) have failed to achieve a comprehensive global deal to limit emissions.

It is difficult to imagine a global deal which allows developed countries to have emissions per capita in 2050 which are significantly above a sustainable global average, implying the need for emissions reductions in the UK of at least 80% from 1990 levels by 2050.

The EU has not yet agreed a package beyond 2020, but the European Commission is consulting on a range of issues relating to development of climate and energy targets for 2030. In its 2011 Roadmap for moving to a competitive low-carbon economy, the Commission suggested a reduction in emissions of 40% on 1990 levels by 2030, as being on the cost-effective path to an 80-95% reduction by 2050. The UK Government has signalled its support for a 40% reduction by 2030, and for an increase to 50% in the context of a global deal.

China has made ambitious commitments to 2020 which would, if delivered, cut carbon-intensity relative to GDP by around 45%.

The United States could achieve its Copenhagen Accord commitment to reduce emissions by 17% on 2005 levels without the need for further federal legislation.

Question 1: Does the scientific evidence justifying the climate objective remain the same as in 2010? In particular, is there new evidence on climate change impacts?

ANSWER: This question, and others, have been considered in the current BIEE seminar series on climate and energy policy issues. Full reports of these seminars, including presentations, have been open for comment and can be found on the BIEE website. The Chairman's assessment of issues related to Question 1 and Question 2, as discussed at the 19 February 2013 seminar, was as follows.

The science continues to be incremental in terms of adding evidence and understanding, and it is not clear why we should necessarily expect this process to change in any fundamental way. Arguably the tendency has been to observe unusual episodes and trends (consistent with changes in climate but not per se providing proof of it) rather earlier than might have been expected. There are known imperfections and anomalies in our understanding of the processes involved, in our understanding of the history (ability to reconstruct the past), and there are limitations to what will ever be predictable from climate modelling, but none of these factors challenge the underlying science.

The main inferences about the nature and scale of potential risks remain essentially unchanged. The science is quite unequivocal in setting out the position, best summarised as the presumption that continued increase in atmospheric concentrations of CO_2 is a dangerous and possibly catastrophic experiment with the planet.

No contradictions to this view, at least within the context of serious informed discussion, seem to be available. The absence of any genuinely contrarian view, with serious support within any of the scientific communities, and despite the obvious incentives to develop such research were it credible, seems particularly telling. The FT made a very similar observation in its 2009 survey of the state of climate science.

The meeting report also noted that

A comment sent in after the meeting suggested that, given the extent to which

the global carbon budget had already been expended, some of the CCC conclusions[1] were too optimistic, notably in terms of the early peaking of India/ China emissions, and the scale of reductions required in UK emissions.

It is also apparent that it is possible to argue that even the current "science consensus" is too optimistic. Some experts take a more pessimistic view, which tend to support even more challenging objectives for emissions reduction, at least at a global level. The work of the Tyndall Centre appears to fall into this category.

Question 2 ***Have the emissions pathways consistent with achieving this objective changed? In particular, is there new evidence on climate sensitivity to emissions?***

ANSWER: The answer to the particular question of climate sensitivity to emissions must be closely linked to the observations made above in relation to Question 1. Once again we should expect in the future to observe a steady flow of incremental evidence, of which one particular example has been the measurement of impacts on Arctic ice.

As regards pathways, I believe there is one important element of the science which is understated, and that is the essentially cumulative nature of CO_2 emissions.

The arguments are set out more fully in OIES Working Paper. ***Cumulative Carbon Emissions And Climate Change*** - *Has The Economics Of Climate Policies Lost Contact With The Physics?* The link is:

http://www.oxfordenergy.org/2011/07/cumulative-carbon-emissions-and-climate-change-has-the-economics-of-climate-policies-lost-contact-with-the-physics/

The cumulative nature of anthropogenic CO_2 carries the important corollary that a heavier weight should attach to current and near term emissions than to emissions in 10, 20 or 30 years time.

Early emissions are more damaging because emissions are cumulative and hence early emissions are around for longer. Corresponding to this, early measures to reduce emissions are of more benefit than later measures. This should lead us to the following general conclusions:

[1] refers to presentation made at that meeting by Professor Fankhauser

- Cumulative emissions, ie stocks, are the proper focus of policy, not annual emissions (flows); this needs more explicit recognition in an international and negotiation context.
- The profile of emissions reduction has a very large impact on cumulative CO_2 at any given future date, with a consequential impact for the policy options that will then be available.
- Many critical strategies to secure long term low carbon investment are based on a gradualist approach of increasing market prices. There are strong arguments for seeking to inject elements of a social cost of carbon (SCC) based approach, which would imply higher valuation of current emissions. A higher value needs to be reflected in policy choices for fuel substitution. Inter alia this tends to reinforce the case for early substitution of gas for coal in power generation. It might also become very significant in relation to carbon capture and storage.
- Early savings not only have a higher beneficial impact; they also "buy time" and can be considered to have an additional and substantial option value. This contradicts the common argument that it is always delay, to gain further information, that has a positive option value. It is early action that delivers option value in the context of climate policy.

Question 3 ***Does the climate objective remain in play given international developments? Has the likelihood of getting global agreement changed significantly since the budget was set, and if so why?***

ANSWER: Once again this and related questions were addressed in the current BIEE seminar series, at the meeting held on 24th April (see BIEE site).

The discussion recognised the realities of the growing importance of countries not included in the original Annex 1, and in particular of China. China clearly recognised the seriousness of its environmental and climate issues, and was

actively pursuing policies that addressed these, the development of several carbon market pilot schemes being a clear manifestation of these. .....

... to a significant degree, leadership was now inevitably moving to the BRICS. Although the UK and EU could take some pride in what they had achieved, to frame the debate in terms of EU leadership was no longer relevant and could be counter-productive.

The big problems reflect the global/ collective character and politically and institutionally intractable nature of the problems, noted in the first seminar and spelled out in the introduction to the series. These manifested themselves in particularly unhelpful aspects of the governance and processes of the various institutions attempting to attain global agreements. At the global level in particular, the ability of individual countries or small interest groups to veto agreement had substantially impeded progress, as delegates arrived with agendas that insisted not merely on protecting national self-interest, but on opportunistically "getting something for themselves" out of whatever could be agreed. The implication was that something would have to change in this aspect of global governance if substantial progress was to be made.

Specifically, international appreciation of the seriousness of the issue has grown markedly, and this ought to be reflected in the prospects for global agreement. However the relevant mechanisms for global governance have not improved to match the the threat, and the immediate prospects are poor. Tackling this issue must be seen as a priority.

However the widespread acceptance of the gravity of the issue by an increasing number of the major parties implies that global agreement ***will*** happen, even if crucial near term efforts to reach an accord fail. An accord, when it happens, is unlikely to suggest that the UK in particular should be allowed to work to less ambitious targets. If we combine this with the argument for enhanced focus on ***cumulative*** emissions, then this applies with equal force to short term, medium term and longer term targets.

Question 4 ***How have the prospects for a new EU package for 2030 changed since the Committee's advice and the setting of the budget? What implications do the latest expectations have for the fourth carbon budget?***

ANSWER: EU policy is in poor shape, and is compromising EU pretensions to global leadership in this field. This is partly because of conflicts with other aspects of EU energy policy, and partly because of the very negative and damaging stance on nuclear and coal adopted by Germany. Some of these issues are spelt out in two recent 2013 OIES publications, *Why Europe's energy and climate policies are coming apart* and *Current German energy policy. The Energiewende. A UK and climate change perspective*. The links are given below:

http://www.oxfordenergy.org/2013/07/why-europes-energy-and-climate-policies-are-coming-apart/

and

http://www.oxfordenergy.org/2013/04/current-german-energy-policy-the-energiewende-a-uk-and-climate-change-perspective/

There are some quite fundamental issues that relate to the conflict between EU single market and liberalisation objectives, as well as other short term political obsessions such as competitiveness, on the one hand, and climate policies which demand (usually) national government intervention, on the other. The failure of the EU carbon market to deliver a carbon price compatible with unsubsidised low carbon investment is one manifestation of this, and the failure to take even minimal corrective action in this area, is another.

The apparent inability to understand the intrinsically problematic nature of energy-only electricity wholesale markets, and the linked issues of capacity payments, reinforce a degree of disillusion with EU leadership on climate issues.

EU energy policy appears to be fixated on particular objectives and means for market liberalisation, which have been largely overtaken by events and by improved understanding of how energy markets actually operate.

All this is highly regrettable since strong EU policies, especially in relation to carbon markets, ought to be considered a vital part of UK policy, and are essential to the more efficient delivery of low carbon objectives.

However, since EU policy has failed to deliver a reliable carbon price mechanism, and with EU policy continuing to be dogged by indecision and uncertainty, a greater onus to promote low carbon investment necessarily falls on national governments, including the UK. This will be particularly true

for major investments in the power sector.

Question 5 ***What flexibilities are appropriate to reflect possible future changes in EU and international circumstances?***

ANSWER: Future international agreements are unlikely to result in the imposition or acceptance of less stringent targets for the UK. Moreover reduction targets (if agreements are expressed in those terms) are likely to be set from some past date such as 1990, not from the date of the agreement. This would imply that the UK should gain most in terms of maintaining future policy options by measures that promote early progress, particularly in the crucial sector of power.

As indicated in the answer to Question 2, above, it is early action that has "option value" and provides flexibility in relation to CO_2 and climate issues.

Specifically, given the current weakness of available market instruments such as the carbon price (a weakness attributable as much to the weakness of policy making as to any intrinsic problems with markets per se), flexibility should concentrate on the alternative policy instruments available to the UK government for the strategic direction of UK progress towards decarbonisation.

For example the ability to mandate suppliers in the power sector to reduce carbon emissions, or to assign responsibility to a single agency with the ability to offer long term contracts, could replace past practices of relying on a plethora of separate market interventions and subsidies.

Some of these arguments are addressed in a recent November 2012 OIES Working Paper, *Decarbonisation of the power sector. Is there still a place for markets?*, available at:

http://www.oxfordenergy.org/2012/11/decarbonisation-of-the-electricity-sector-is-there-still-a-place-for-markets/

B. Technology and economics

In recommending the level of the fourth carbon budget, the Committee developed scenarios which embodied cost-effective emissions reductions to meet the 2050 target.

These scenarios, set out in detail in the Committee's report *The Fourth Carbon Budget – Reducing emissions through the 2020s*, include substantial investment in low-carbon power generation, roll-out of low-carbon heat (heat pumps and district heating), development of the markets for ultra-low emissions vehicles and a combination of energy efficiency measures and fuel switching in industrial sectors.

They were based on official emissions projections together with an assessment of the cost and feasibility of abatement options. Since 2010, official emissions projections have been significantly reduced in the industry and waste sectors, meaning that meeting the legislated 4th carbon budget would require less effort than originally envisaged.

Question 6 ***Is there any new evidence to suggest that the type of scenarios upon which the budget was based are no longer feasible or cost effective?***

ANSWER: There are two particular issues that deserve examination in determining feasible pathways and scenarios to the low carbon economy.

The first is the question of whether the UK power sector can be decarbonised efficiently and economically with a high proportion of intermittent generation. The issue has been polarised in arguments between interest groups, notably those promoting renewable resources and those opposed. But this is primarily a technical issue that needs to be addressed by a body, such as the National Grid, that has both the professional expertise and actual responsibilities for system operations in this arena. There is little evidence that their views have been sought or that their voice has been heard.

Some of these issues, particularly the effect of intermittent wind, are highlighted by the detailed empirical analysis cited in the following OIES paper of August 2011, *The impact of import dependency and wind generation on UK gas demand and security of supply*, which can be found at:

http://www.oxfordenergy.org/2011/08/the-impact-of-import-dependency-and-wind-

generation-on-uk-gas-demand-and-security-of-supply-to-2025-2/

One of the weaknesses in the UK's decarbonisation plans for the power sector is that there is no clear indication of who will take responsibility for the strategic direction of the necessary investment or the associated coordination of infrastructure and the task of ensuring compatible mixtures of relatively inflexible or intermittent generation.

The second issue is that of carbon prices. The EU ETS has not delivered results that provide a secure basis for the long term investment that is demonstrably necessary to secure a low carbon future. This highlights the weakness of reliance purely on market signals to deliver results when there is no willingness to set market parameters that reflect the true long run costs of CO_2 emissions.

Question 7 ***In particular, does the possibility of shale gas in the UK change the economics of the fourth carbon budget?***

ANSWER: A recent July 2013 OIES study *UK shale gas. Hype, reality and difficult questions* concluded that shale gas in the UK is highly unlikely to influence UK wholesale gas prices, given the linkages to international markets. This study can be read, with supporting argument and evidence, at the following link.

http://www.oxfordenergy.org/2013/07/uk-shale-gas-hype-reality-and-difficult-questions/

If this is correct then the effect on the economics of the fourth carbon budget would be very limited. It is generally assumed (see for example recent observations by the CEO of Centrica also quoted in the above) that shale gas will not be the game changer that it has been in the US

In terms of climate policy in general, cheaper or more plentiful gas, if it were available, would enhance the case for and perhaps facilitate more and earlier switching from coal to gas, particularly where this can be achieved within existing plant. However there is already a strong case, at least in terms of global climate objectives, for further encouraging of this to happen. It is currently inhibited, inter alia, by the excessively low market value

attached to limiting carbon emissions.

Question 8 ***Should the budget be tightened to reflect headroom due to significantly lower emissions projections (e.g. due to slower than expected economic growth) since 2010?***

ANSWER: Prima facie some tightening would be the correct response, both as the right response in relation to global objectives and specifically in helping to ensure that the UK remained on an investment course compatible with its long term objectives.

The timescales and sequencing set for measures crucial to meet ambitious long term targets ought to be considered, and can be considered, as largely independent of the state of the economy in the short term. In particular the incentives to invest in the decarbonisation of the power sector should not be postponed or allowed to decline because of slower than expected growth. The time profile of required investment will still require substantial completion of this task by 2030, already a very challenging task.

C. Other issues

As required by the Climate Change Act, in designing the fourth carbon budget we considered impacts on competitiveness, fiscal circumstances, fuel poverty and security of energy supply, as well as differences in circumstances between UK nations. Previous high-level conclusions on these were:

- **Competitiveness** risks for energy-intensive industries over the period to 2020 can be addressed under policies already announced by the Government. Incremental impacts of the fourth carbon budget are limited and manageable.
- **Fiscal impacts**. The order of magnitude of any fiscal impacts through the 2020s is likely to be small, and with adjusted VED banding and full auctioning of EU ETS allowances could be neutral or broadly positive.
- **Fuel poverty**. Energy policies are likely to have broadly neutral impacts on fuel poverty to 2020, with the impact of increases in electricity prices due to

investment in low-carbon generation being offset by energy efficiency improvement delivered under the Energy Company Obligation. Incremental impacts through the 2020s are likely to be limited and manageable through a combination of further energy efficiency improvement, and possible income transfers or social tariffs.

- **Security of supply** risks due to increasing levels of intermittent power generation through the 2020s can be managed through a range of flexibility options including demand-side response, increased interconnection and flexible generation. Decarbonisation of the economy will reduce the reliance on fossil fuels through the 2020s and thus help mitigate any geopolitical risks of fuel supply interruption and price volatility.

- **Devolved administrations**. Significant abatement opportunities exist at the national level across all of the key options (i.e. renewable electricity, energy efficiency, low carbon heat, more carbon-efficient vehicles, agriculture and land use).

Question 9 ***Is there any new evidence to suggest that (incremental) impacts of the fourth carbon budget on competitiveness, the fiscal balance, fuel poverty and security of supply have become unmanageable?***

ANSWER: One answer to the question of competitiveness was summarised in the BIEE seminar discussions, referenced above.

Discussion touched on the competitiveness issue [for Europe]. *It was observed that the impact of energy prices on competitiveness was frequently overstated by political leaders, since factors such as the exchange rate and real wages were of much greater significance to most sectors of industry. Within the EU, the economy widely regarded as the most "competitive" was Germany, which had consistently had among the highest energy prices. Similar observations could have been applied to Japan at the height of its "competitiveness" in the 1980s.*

The essential point is that relative energy prices are a very minor or irrelevant feature in explaining the "dynamic" nature of "competitiveness" as between economies, with Germany as a prime example.

If one attempts to measure competitiveness purely in terms of relative prices and production costs, then other, familiar, factors such as the exchange rate tend to dominate any differences in energy prices. Comparisons of relative energy prices in any case depend on the exchange rate.

There are a small number of energy intensive industries which may well pose the problem of “carbon leakage”, with migration of production to jurisdictions which are more carbon intensive. When this can be shown to be a serious problem, there are arguments for dealing with it on a case by case basis.

Question 10 ***Is there any new evidence on differences in circumstances between England, Wales, Scotland and Northern Ireland that suggest the need to change the budget?***

ANSWER: I have no evidence to offer on this question.

Question 11 ***Is there anything else not covered in your answers to previous questions that you would like to add?***

ANSWER: I am a Senior Research Fellow at the Oxford Institute for Energy Studies. Previously I was Chief Economist at the Electricity Council, the body then charged with regulatory oversight and coordination of the state-owned electricity sector in England and Wales, and subsequently director for energy sector consulting with a leading economic consultancy firm NERA. I am also a Council Member of the British Institute of Energy Economics (BIEE) and act as Chair for the BIEE seminar series held on issues of climate change policy.

Any opinions expressed above are personal ones, and should not be assumed to reflect the views of any of the above bodies.

I have for the most part framed my observations above in fairly general terms applicable to the formulation of policy in relation to climate questions, without attempting to analyse detailed implications for the fourth budget.