

## Review of the Fourth Carbon Budget - Call for Evidence: WWF-UK Response, August 2013

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### 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?**

The latest scientific evidence confirms that addressing climate change remains as urgent as ever and that this would be a particularly bad time for the international community (and key influential countries within it like the UK) to reduce efforts to prevent temperature rises in excess of 2°C compared to pre-industrial levels, the formally stated objective of the international negotiation process to avoid dangerous levels of climate change.

**1/A better understanding of environmental impacts**

The scientific evidence on climate change has remained broadly unchanged since 2010 but recent reports are providing a much clearer picture of the significant environmental impacts that climate change is currently causing and will cause in the future if not urgently and adequately mitigated. For example:

*Impacts on equatorial regions*

- the scientific analysis published in the World Bank's second *Turn Down the Heat* report<sup>1</sup>, found that whilst climate change has and will have impacts on all parts of the world, these impacts are likely to be more greatly felt in the equatorial parts of the world than in regions of higher latitudes. Regions that are likely to be particularly affected include parts of Sub-Saharan Africa, South-East Asia and South Asia. The report notes that future impacts of climate change in these regions (some of which are already being observed at the current level of 0.8C of warming) include the growing occurrence of extreme heat waves, changes to rain patterns and likely reduction of water availability, a reduction in crop yields such as rice, wheat and maize, significant changes to terrestrial ecosystems which could lead to the extinction of some species, risk of sea level rises and the increased acidification of oceans which is projected to cause major damage on coral reef systems and losses in fish production. The report notes that these projected impacts are likely to seriously undermine food security and could "*push households below the poverty trap threshold*". Importantly however, "*many of the worst projected climate impacts could still be avoided by holding warming below 2°C*".

<sup>1</sup> World Bank, *Turn Down the Heat*, June 2013: <http://www.worldbank.org/en/news/feature/2013/06/19/what-climate-change-means-africa-asia-coastal-poor>

### *Impact on the Arctic region*

- The Arctic has warmed at about twice the rate of the global average over the past few decades<sup>2</sup> with much of the Arctic reaching temperatures above 0°C in summer. As a result, climate change is already de-stabilising important arctic systems, including sea ice, the Greenland Ice Sheet, mountain glaciers and aspects of the arctic carbon cycle including methane release from soils, permafrost, lakes and wetlands.

The Arctic is predicted to be virtually free of summer sea ice within a generation<sup>3</sup>. Sea ice extent has decreased sharply in all seasons, with summer sea ice declining most dramatically – beyond the projections of IPCC 2007. The minimum 2012 sea ice extent was 1.32 million square miles<sup>4</sup>, 18% below the previous record low of 2007 and 49% below the 1979 to 2000 average. **The six lowest seasonal minimum ice extents in satellite record have all occurred in the last six years (2007 to 2012).**

Thicker multi-year ice is declining in extent meaning that arctic sea ice is becoming increasingly vulnerable to melting, opening the Arctic region and in particular the Arctic ocean to commercial pressures. Ice-free conditions existed in 2008 in both the Northeast and Northwest passages for the first time on record<sup>5</sup>.

Arctic change is unequivocal and has affected the Arctic earlier than predicted. A return to previous Arctic conditions in the foreseeable future is unlikely<sup>6</sup>.

### *Latest understanding on heat waves*

- a recent study from the Potsdam Institute of Climate Research and UCM university in Madrid found that heat extremes in summer months are already observed on 5% of the world's land surface and that this is likely to double by 2020 and quadruple by 2040<sup>7</sup>. The study also observed that such heat extremes were likely to cover 85% of the global land area in summer by 2100 if CO<sub>2</sub> emissions continue at today's levels, which would have detrimental impacts on both human health and food production. In addition and under the same business as usual assumptions, even hotter

<sup>2</sup> Sommerkorn, M and Hassol, SJ (Eds) Arctic Climate Feedbacks: Global Implications. WWF International Arctic Programme, Oslo, 2009. 97 pp..

<sup>3</sup> Wang, M., and J. E. Overland (2009). A sea ice free summer Arctic within 30 years?, *Geophys. Res. Lett.*, 36, L07502, doi:10.1029/2009GL037820.

<sup>4</sup> <sup>4</sup> National Snow and Ice Data Centre (2012) <http://nsidc.org/arcticseaicenews/2012/09/arctic-sea-ice-extent-settles-at-record-seasonal-minimum/>

<sup>5</sup> Richter-Menge, J., and J.E. Overland (Eds.), 2010: Arctic Report Card 2010, <http://www.arctic.noaa.gov/reportcard>.

<sup>6</sup> Richter-Menge, J., and J.E. Overland (Eds.), 2010: Arctic Report Card 2010, <http://www.arctic.noaa.gov/reportcard>.

<sup>7</sup> Coumou, D., Robinson, A. (2013): Historic and future increase in the global land area affected by monthly heat extremes. *Environmental Research Letters* 8 034018: <http://iopscience.iop.org/1748-9326/8/3/034018/article>

extremes that are virtually non-existent today are likely to affect 60% of the global land area by then.

## **2/ A greater understanding of impacts on the world economy & the development of the world's poorest countries**

A range of reports published at the end of 2012 from the World Bank<sup>8</sup>, the International Energy Agency<sup>9</sup> (IEA) and the United Nations Environment Programme (UNEP)<sup>10</sup> show that the challenge of tackling climate change is as urgent as ever. Key points from these reports show that:

- **If current trends continue, the world is on track for a warming far in excess of 2°C**, with the World Bank warning that *“even with the current mitigation commitments and pledges fully implemented, there is roughly a 20 percent likelihood of exceeding 4°C by 2100”* and *“if they are not met, a warming of 4°C could occur as early as the 2060s”*<sup>11</sup>. UNEP notes in particular that current global emissions of greenhouse gases (GHGs) are considerably higher than the maximum level of emissions that could be allowable in 2020 (44Gt CO<sub>2</sub>e) to stay within a *“likely”* chance (greater than 66%) of preventing temperature increases of more than 2°C.
- **The impact of projected levels of global warming would disproportionately impact “many of the world’s poorest regions, which have the least economic, institutional, scientific and technical capacity to cope and adapt”**<sup>12</sup>. These impacts would also severely undermine the provision of ecosystem services on which human society and the world economy are highly dependent. The World Bank notes in particular that *“in a 4°C world climate change seems likely to become the dominant driver of ecosystem shifts, surpassing habitat destruction as the greatest threat to biodiversity. (...) Ecosystem damage would be expected to dramatically reduce the provision of ecosystem services on which society depends (for example, fisheries and protection coast-line afforded by coral reefs and mangroves)”*<sup>13</sup>.

<sup>8</sup> The World Bank, ‘Turn Down the Heat: Why a Warmer 4°C World Must Be Avoided’, November 2012: [http://climatechange.worldbank.org/sites/default/files/Turn\\_Down\\_the\\_heat\\_Why\\_a\\_4\\_degree\\_centrigrade\\_warmer\\_world\\_must\\_be\\_avoided.pdf](http://climatechange.worldbank.org/sites/default/files/Turn_Down_the_heat_Why_a_4_degree_centrigrade_warmer_world_must_be_avoided.pdf)

<sup>9</sup> The International Energy Agency, ‘World Energy Outlook 2012’, November 2012: <http://iea.org/publications/freepublications/publication/English.pdf>

<sup>10</sup> United Nations Environment Programme, ‘The Emissions Gap Report 2012’, November 2012: <http://www.unep.org/publications/ebooks/emissionsgap2012/>

<sup>11</sup> See World Bank report, page xiii.

<sup>12</sup> See World Bank Report, page xiii.

<sup>13</sup> See World Bank report, page xvi.

- It is still possible to prevent temperature increases in excess of 2°C but the window of opportunity for doing so is rapidly closing, with the IEA warning in its latest World Energy Outlook report that “if action to reduce CO<sub>2</sub> emissions is not taken before 2017, all the allowable CO<sub>2</sub> emissions would be locked-in by energy infrastructure existing at that time.”<sup>14</sup>

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

Despite the publication of a few recent papers suggesting possible changes to climate sensitivity, the latest evidence still confirms the validity of the IPCC’s central estimation that a doubling of carbon dioxide in the atmosphere compared to pre-industrial levels will ultimately result in average global temperatures increasing by a range of 2°C to 4.5°C (equilibrium climate sensitivity), a conclusion recently supported for instance in a paper on climate sensitivity in *Nature Geoscience*<sup>15</sup> and a series of three reports by the Met Office Hadley Centre examining the recent apparent pause in warming<sup>16</sup>. The third report published by the Met Office<sup>17</sup> states in particular that “***The recent pause in global surface temperature rise does not materially alter the risks of substantial warming of the Earth by the end of this century. Nor does it invalidate the fundamental physics of global warming, the scientific basis of climate models and their estimates of climate sensitivity.***”

The third report from the Met Office also notes that changes to the expected transient climate response (which is more relevant to measuring the warming in temperatures expected in the coming decades) are likely to be minimal:

*“When projections from the newer climate models are combined with observations, including those from the last 10 years, the uncertainty range for warming out to 2050 is reduced. The very highest values of projected warming are eliminated, but the lower bound is largely unchanged. The most likely warming is reduced by only 10%, indicating that the warming that we might previously have expected by 2050 would be delayed by only a few years.” (emphasis added)*

<sup>14</sup> See World Energy Outlook 2012 Report, page 3.

<sup>15</sup> Nature Geoscience, *Energy Budget Constraints to Climate Response*, 19 May 2013: <http://www.nature.com/ngeo/journal/vaop/ncurrent/full/ngeo1836.html>

<sup>16</sup> Met Office Hadley Centre Reports on “the recent pause in warming”, July 2013: <http://www.metoffice.gov.uk/research/news/recent-pause-in-warming>

<sup>17</sup> Met Office Hadley Centre, *The recent pause in global warming (3): what are the implications for future projections of warming?*, July 2013: [http://www.metoffice.gov.uk/media/pdf/3/r/Paper3\\_Implications\\_for\\_projections.pdf](http://www.metoffice.gov.uk/media/pdf/3/r/Paper3_Implications_for_projections.pdf)

**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?**

Developments within and out of the EU shows that the climate objective remains in play and that important positive developments are now taking place in key countries such as the United States and China.

**Developments within the EU**

- Whilst international action to tackle greenhouse gas emissions falls far short of the action required to have a likely chance of preventing average temperature increases in excess of 2°C, several countries around the world have started taking positive action to reduce their emissions. Within the EU, countries like Germany (through the 'EnergieWende')<sup>18</sup> and Denmark<sup>19</sup> have set themselves ambitious emission reduction goals out to 2050 and embarked on a radical transition towards an energy system based on renewable energy and high levels of energy efficiency.

**Developments outside the EU**

- Outside of the EU and whilst recognising that more ambitious action is required, major emitting countries such as South Africa (with the introduction of a new carbon tax in 2015) and China are doing far more than they are regularly given credit for. In its 12<sup>th</sup> 5-year plan, the Chinese Government has set itself the following objectives for 2015: reducing its energy consumption per unit of GDP by 15% by 2015 compared to 2010 levels, reducing its emissions of CO<sub>2</sub> per unit of GDP by 17% compared to 2010 levels (and by 40% to 45% by 2020 compared to 2005 levels) and increasing the share of non-fossil fuel energy to 11.4% of its overall primary energy mix by 2015 and 15% by 2020.<sup>20</sup> The Chinese government is also

<sup>18</sup> See in particular German Government's Energy Concept, September 2010: <http://www.bmwi.de/English/Redaktion/Pdf/energy-concept.property=pdf,bereich=bmwi.sprache=en.rwb=true.pdf>. See in particular pages 4 and 5 and detailed sections on energy efficiency and renewable energy deployment.

<sup>19</sup> See latest Energy Agreement from March 2012. See the summary of Denmark's climate and energy policy on the Danish Energy Agency website: <http://www.ens.dk/en-US/policy/danish-climate-and-energy-policy/Sider/danish-climate-and-energy-policy.aspx>

<sup>20</sup> See 'China's Policies and Actions for Addressing Climate Change', The National Development and Reform Commission, The People's Republic of China, 2012: <http://ghs.ndrc.gov.cn/zcfg/W020121122588539459161.pdf>



considering the introduction of a carbon emissions cap for its next five-year plan (2016-2020)<sup>21</sup>, whilst the United States government is considering a range of regulatory actions to reduce its economy's emissions.

### **The international impact of the UK's Climate Change Act & the risks inherent in diluting ambition**

- In many cases, the UK's Climate Change Act has already had a role in influencing positive developments in other parts of the world, such as the adoption of a new Climate Change Act in Mexico<sup>22</sup>, the development of the Clean Energy Act in Australia (which legislated an emissions trading scheme, an 80% emissions reduction target by 2050 and a Climate Change Authority closely resembling the Committee on Climate Change)<sup>23</sup>, a White Paper from the Norwegian Parliament<sup>24</sup> committing to investigating the need for a climate change act similar to the UK's and recent consideration given by the Danish Government to develop a UK-style climate change act.

- WWF's own work in China shows that the UK's Climate Change Act coupled with engagement on climate change through the Department for International Development (DFID), the Foreign and Commonwealth Office (FCO) and the British Council in China have played an important role in helping build momentum in China towards prioritising climate change mitigation and low-carbon developments on the political agenda, as well as supporting current discussions around running an emissions trading pilot scheme in China and introducing a possible carbon tax.

- **As explained in answer to question 8 below, the minimum emission reduction goal set in the Climate Change Act and the carbon budgets amount to the minimum conceivable action that the UK should pursue as part of international efforts to tackle climate change. If the UK were to water down its emission reduction commitments, this would send a very negative signal to other major economies and would be detrimental to the building of a positive momentum towards a global deal on climate change in 2015. This is all the more the case given that 2014 will be a year of key milestones on the international climate change**

<sup>21</sup> <http://www.ft.com/cms/s/0/61cd4ec6-c6b1-11e2-a861-00144feab7de.html#axzz2c94p3Axx>

<sup>22</sup> See Globe International's 3<sup>rd</sup> Climate Legislation Study: <http://www.globeinternational.org/index.php/legislation-policy/studies/climate>

<sup>23</sup> See Clean Energy Act 2011, the Clean Energy Regulator Act 2011, the Climate Change Authority Act 2011, the Clean Energy (Consequential Amendments) Act 2011 at <http://www.cleanenergyregulator.gov.au/Carbon-Pricing-Mechanism/Legislation-and-regulations/Pages/default.aspx>

<sup>24</sup> See the Norwegian Parliament's White Paper (<http://www.regjeringen.no/pages/37858627/PDFS/STM201120120021000DD>) and the cross-party agreement to take forward the development of a new climate change law in Norway (<http://www.stortinget.no/Global/pdf/Innstillinger/Stortinget/2011-2012/inns-201112-390.pdf>).

agenda, including the climate change meeting hosted by Ban Ki-moon at the UN General Assembly in September 2014, the publication of the latest climate change science reports from the IPCC and a possible agreement at EU level on an agreed 2030 emission reduction goal to put forward at upcoming UNFCCC negotiations.

#### **The importance of strengthening the second and third interim carbon budgets**

- At the very least, the UK needs to enter international negotiations on the back of having adopted the Committee's original recommendations for the Fourth Carbon Budget. This would be made all the more credible if the UK Government also accepted to follow the CCC's recommendations on strengthening the second and third carbon budgets. As made clear by the Committee in its 2010 report: *"the [Fourth] Domestic Action budget recommended for 2023-2027, and the indicative 2030 target, will be difficult to achieve unless the UK enters the 2020s at a level of emissions consistent with the Intended budgets for the non-traded sector, rather than with the less ambitious Interim budgets. (...) From the third Intended budget to the fourth Domestic Action budget would entail a feasible reduction of 13% over a five-year period: from the third Interim budget to the fourth Domestic Action budget would require a much more challenging 23% reduction."*<sup>25</sup>

- Finally, it should also be stressed that the Committee's original advice in 2010 made clear that the Domestic Action Fourth Carbon Budget of 1950MtCO<sub>2</sub>e should be strengthened to a Global Offering of 1800MtCO<sub>2</sub>e once a global deal covering emissions in the 2020s has been agreed.

**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?*

#### **Developments in the EU**

Since 2010, the European Commission has started working on a new package of climate and energy legislation for 2030. The outcome of current discussions is hard to predict at this stage and it is very unlikely that a formal climate and energy package will be agreed until well after the Government's review of the Fourth Carbon Budget. However, we are encouraged to see the UK Government pushing the EU Commission to consider emission

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<sup>25</sup> Fourth Carbon Budget report, page 31.



reduction targets well above the 40% figure previously referred to by the Commission and it seems realistic to expect that the draft emission reduction scenarios that will be put forward in the next consultation paper by the Commission will include scenarios looking at 50% emission reductions or more by 2030.

It is important to stress here that the original analysis prepared for the Fourth Carbon Budget made clear that cutting UK emissions by 60% by 2030 was a pre-requisite to ensure that the UK could meet its legally binding goals for 2050 in the Climate Change Act. A key reason was that back-loading an even greater level of decarbonisation efforts to the 2030-2050 period (the Committee is already assuming 62% cuts in emissions over that period) would undermine the feasibility of the UK meeting the 2050 goal as well as significantly increase the costs of doing so. **Using the lack of a formal EU climate and energy package for 2030 as a reason to delay or dilute the pace of decarbonisation in the UK would therefore be a false economy.** As the International Energy Agency recently pointed in its World Energy Outlook 2011 report *“for every \$1 of investment avoided in the power sector before 2020 an additional \$4.3 would need to be spent after 2020 to compensate for the increased emissions.”*<sup>26</sup>

#### **Carbon budgets amount to the minimum conceivable action that the UK should be taking**

As elaborated in more detail in answer to question 8, it should be stressed here that the global emissions pathway on which the minimum 80% emission reduction figure in the Climate Change Act (and the carbon budgets) is based are predicated on a less than 50% chance of keeping average temperature rises to within 2C and also assume that the UK's carbon emissions in 2050 will be higher than what they should be under an equal allocation of emissions globally on a per capita basis. There is therefore a strong case for increasing the UK's emission reduction goals, not diluting them.

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

As explained in answer to question 8, it should be remembered that the ambition in the Climate Change Act and the carbon budgets to date represent the **minimum conceivable** contribution that the UK should make as part of a global effort to prevent dangerous climate change, both in environmental terms and in terms of international effort sharing. The recent political discourse suggesting the need to dilute the UK's emission reduction

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<sup>26</sup> International Energy Agency, 'World Energy Outlook 2011', November 2011: [http://www.iea.org/weo/docs/weo2011/executive\\_summary.pdf](http://www.iea.org/weo/docs/weo2011/executive_summary.pdf), page 2.

objectives appears to be completely detached from this reality.

### **The EU's ambition for 2020**

As made clear in section 21 of the Climate Change Act 2008, any changes to carbon budgets can only be made if there “*have been significant changes affecting the basis on which the previous decision was made*”. While the original budget developed in 2010 considered the pace of emission reductions in the EU over the 2020s, it was not predicated on the EU increasing its emission reduction ambitions from 20% to 30% for 2020. The fact that the EU has not done this to date is therefore not relevant in the context of this review. However, it should be pointed out for context that the EU has already met its 20% goal due to the impacts of the economic slowdown and could be set to exceed that objective quite markedly by 2020.

### **Post 2020 ambitions**

**Given that the UK Climate Change Act and its individual carbon budgets are predicated on a less than 50% chance of avoiding average temperature rises in excess of 2C as well as a very conservative approach towards international effort sharing, it is difficult to contemplate circumstances in which it would be appropriate to dilute the UK's emission reduction objectives.** In fact, it is critical that there is at least sufficient flexibility for the Committee to increase the ambition in the Fourth Carbon Budget from the “domestic action budget” of 1950GtCO<sub>2</sub>e to the Committee's suggested “global offering” of 1800GtCO<sub>2</sub>e as and when a global deal covering the 2020s is reached.

Even in the event that an international deal on emissions is not agreed in 2015, we would seriously question the wisdom of the UK diluting its carbon emission reduction ambitions at a time when the need to adequately tackle the climate change crisis would require political leadership from key countries like the UK, not a political race to the bottom.

## **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 4<sup>th</sup> 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?***

**Overview**

We are not aware of any new major evidence showing that a move to a low-carbon economy of the type described in the Fourth Carbon Budget would not be economically sensible. **Most of the recent international evidence that we have reviewed, most notably the work carried out by the IEA and UNEP in their recent World Energy Outlook and Emissions Gap reports (see response to question 1), makes clear that delaying action to decarbonise the economy would increase the costs of tackling climate change, thus reinforcing the earlier conclusions of the Stern Review back in 2006.**

**Power sector decarbonisation**

While there have been cost escalations in new nuclear projects being developed in Europe (and therefore upward revisions in the cost estimate for new nuclear in the UK), the evidence that has emerged since 2010 shows that several renewable energy technologies have significantly gone down in costs since 2010 whilst new technologies like offshore wind have a significant cost reduction potential if stable policies can be put in place to support the sector. A recent report from the Institute of Economic Research in Germany (DIW)<sup>27</sup> showed in particular that the models used by the European Commission in its energy roadmaps tend to overestimate the costs of renewable energies whilst underestimating the cost of other technologies.

Examples of cost reductions include:

- **onshore wind:** A report from Bloomberg New Energy Finance<sup>28</sup> showed that the global average levelised costs of onshore wind had fallen dramatically in recent years and that the best onshore wind farms in the world already produce power as economically as coal, gas and nuclear generators (although the economics will of course differ from one region to another).

<sup>27</sup> [http://www.diw.de/sixcms/detail.php?id=diw\\_01.c.424569.de](http://www.diw.de/sixcms/detail.php?id=diw_01.c.424569.de)

<sup>28</sup> Report from Bloomberg New Energy Finance on Onshore Wind: <http://www.bnef.com/PressReleases/view/172>

- **solar PV:** A report from Ernst & Young<sup>29</sup> found that non-domestic onsite solar installations would reach grid parity with UK retail prices by 2020 without subsidy. This was followed by analysis by the Pew Centre<sup>30</sup> showing that the price of solar modules fell by 50% in 2011 alone, whilst recent research by McKinsey (*'Darkness before the Dawn'*) predicts that solar PV in Europe will be at grid parity with other power technologies before 2020. A recent report from DIW in Germany also found that in some cases the capital costs of solar PV were already lower than those envisaged by the Commission for 2050<sup>31</sup>.
- **offshore wind:** The Crown Estate *Offshore Wind Cost Reduction Pathways Study*<sup>32</sup>, which is the most in depth review of offshore wind involving over 120 stakeholders across the industry, shows that there are several pathways that could result in the costs of offshore wind going down to £100/MWh or less by 2020, with further substantial cost reductions possible in the 2020s. The report makes clear that long-term predictability in terms of minimum volumes of deployment and financial support hold the key to delivering these costs reductions. As explained in question 7, a stable deployment of offshore wind would also provide a better macro-economic outcome to the UK economy than a heavy dependence on gas.

Conclusions from the Carbon Capture and Storage (CCS) Cost Reduction Taskforce<sup>33</sup> also suggest that that the costs of CCS technology could be brought down should the UK go ahead with a stable demonstration programme for the technology.

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

The possibility of shale gas in the UK does not alter the economic case for moving rapidly

<sup>29</sup> <http://www.oursolarfuture.org.uk/wp-content/uploads/The-UK-50kW-to-5-MW-solar-PV-market-190611-Final.pdf>

<sup>30</sup> The Pew Centre, *Clean Energy Race Report 2011*: <http://www.pewenvironment.org/news-room/reports/whos-winning-the-clean-energy-race-2011-edition-85899381106>

<sup>31</sup> [http://www.diw.de/sixcms/detail.php?id=diw\\_01.c.424569.de](http://www.diw.de/sixcms/detail.php?id=diw_01.c.424569.de)

<sup>32</sup> The Crown Estate, *Offshore Wind Cost Reduction Pathways Study*, May 2012: <http://www.thecrownestate.co.uk/media/305094/Offshore%20wind%20cost%20reduction%20pathways%20study.pdf>

<sup>33</sup> CCS Cost Reduction Taskforce – Final Report: <https://www.gov.uk/government/policy-advisory-groups/ccs-cost-reduction-task-force>

towards a low-carbon energy system.

### **Impacts of shale gas on future gas prices in the EU / UK: the need for a reality check**

- While the UK may have more shale gas reserves than previously thought, it is important to have a reality check on the impact that future shale gas exploration in the UK could have on future gas and electricity prices. It is unlikely that the low gas prices in the United States will last (indeed, prices have nearly doubled since the low in 2012<sup>34</sup>) or that they will be duplicated in Europe. A study by Deutsche Bank suggested that *“those waiting for a shale-gas “revolution” outside the US will likely be disappointed, in terms of both price and the speed at which high-volume production can be achieved<sup>35</sup>”*. The IEA published the indicative costs of shale gas developments in Europe and suggested that the costs will be up to three times higher per unit of gas than in the US and similar to those of conventional gas<sup>36</sup>.

- Most forecasts agree that the EU breakeven price will be higher than in the US, particularly as in countries like the UK shale gas is unlikely to be extracted as a by-product of shale oil as it has been in several locations in the United States<sup>37</sup>. There are also considerable question marks as to whether gas prices will be lower than they would have otherwise been. Gas prices are forecast to continue to rise steadily to 2035 even if projections from the IEA and others reflect the current view that these rises may be more moderate than originally projected<sup>38</sup>. This is of course against the backdrop that future gas forecasts can never be relied upon and that failing to reduce the EU's / UK's overall reliance on gas on the assumption that gas prices will be low is a highly risky strategy.

### **Economic case for decarbonisation remains with or without shale gas**

- **Regardless of where the UK may get its gas from to meet future demand, the economic case for rapidly decarbonising the power sector remains a strong one.** A recent report from Cambridge Econometrics showed for example that compared to another dash for gas generation, policies enabling a continued deployment of offshore wind farms in the UK over the next 20 years would increase UK GDP by £20bn/ year by 2030, create 70,000 more jobs by then, reduce gas imports by some £8bn/ year and produce emissions in the power sector that would be 3 times lower, with only minimum impact on UK electricity prices (in the

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<sup>34</sup> Point Carbon, 2 May 2013: <http://www.pointcarbon.com/news/1.2333221?&ref=searchlist>

<sup>35</sup> Hsueh M, Lewis M (2011) European Gas: A first look at EU shale gas prospects

<sup>36</sup> IEA, Golden rules for a Golden Age of Gas, 2012

<sup>37</sup> Professor Paul Ekins, University College London, UKERC Current Event Blogs, *“The Fracking Battle: No way to conduct energy policy”*, August 2013: <http://ukerc.wordpress.com/>

<sup>38</sup> JRC, ‘Unconventional Gas: potential energy market impacts in the European Union’ 2012.

order of 1% by 2030). Importantly, these conclusions remain valid under a wide range of assumptions on the future price of gas **39**.

**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?***

We are of view that the budget should be tightened for the reasons outlined below.

**Delaying action is a false economy**

A key conclusion from the Stern Review, the Fourth Carbon Budget report, the IEA World Energy Outlook reports and the UNEP's Emissions Gap Report is that the more action to decarbonise the economy is delayed, the more the UK / world economy will find itself locked-in to high carbon infrastructure and will leave itself with a lot to do to reduce emissions in a short period of time. This ultimately increases the costs of mitigating climate change. UNEP noted in particular that *"the increased lock-in of carbon-intensive technologies will lead to significantly higher mitigation costs over the medium- and long-term"***40**.

**The case for tightening the Fourth Carbon Budget**

Therefore, if future emission projections are significantly lower now than they were back in 2010, we would urge for the Fourth Carbon Budget to be tightened to ensure that it requires the UK economy to deliver at least the same level of effort to decarbonise its economy as originally envisaged by the Committee in 2010. This will ensure that the UK economy is "climate proofed" in the long-term and that future periods of economic growth can be accommodated within tight emission limits. **Given that the Fourth Carbon Budget emissions trajectory already requires the UK to reduce its emissions by 62% from 2030 to 2050, tightening ambition now will also ensure that the UK economy does not leave itself with an unfeasible level of emission reductions to be delivered in the 2030-2050 period**, which would make the 2050 emissions reduction goal more expensive to deliver.

**The carbon budgets only represent the minimum credible level of action that the UK**

**39** Cambridge Econometrics, A study into the Economics of Gas and Offshore Wind, November 2012: [http://www.wwf.org.uk/wwf\\_articles.cfm?unewsid=6342](http://www.wwf.org.uk/wwf_articles.cfm?unewsid=6342)

**40** See UNEP Emissions Gap report, page 4.



### should pursue

When considering the tightening of the Fourth Carbon Budget, it should be remembered that the ambition in the Climate Change Act and the carbon budgets to date represent the **minimum conceivable** contribution that the UK should make as part of a global effort to prevent dangerous climate change. In fact, the ambition currently contained in the Act and individual carbon budgets falls short of a fair contribution to address dangerous climate change for the following reasons:

- Insufficient ambition: It is not based on a global emissions pathway that would be at least likely (>66% chance) to avoid average global temperatures increasing by more than 2 °C, a longstanding UK and EU policy objective. The Committee's recommendations are instead based on limiting the central expectation of temperature rise "as close as possible" to 2°C (which in practice implies a less than 50% chance of preventing temperature rises in excess of 2 °C). In practice, its main criterion has been to select a pathway for global emissions which limits the risk that warming will exceed 4°C to less than 1%.

- A candid approach to effort sharing: According to recent research from Sandbag (including Sandbag's evidence to this call for evidence)<sup>41</sup>, the UK emissions trajectory described in the Fourth Carbon Budget finds the UK consuming 1.3% of global emissions for the 2010-2050 period. Given that the UK currently represents 0.9% of the global population and is expected by the Committee to represent 0.8% of the population in 2050, this essentially implies that the UK intends to exceed its fair share of the 'emissions space' to the detriment of other developing or emerging economies (this is essentially because whilst the Committee envisages equal global emissions to be set at 2tonnes CO<sub>2</sub> per capita by 2050, the annual rate of emission reductions that each country has to take will depend on each country's emissions in 2020, thus giving a greater emissions envelope to countries with higher emissions in 2020). **This matters as an environmentally adequate global deal on emissions is unlikely to be reached while rich industrialised countries are perceived to expropriate 'emissions space' from poorer, developing ones.**

## 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

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<sup>41</sup> Sandbag, Response to the Committee on Climate Change Call for Evidence on the Fourth Carbon Budget, August 2013: <http://www.sandbag.org.uk/reports/>

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?*

We are not aware of any new evidence suggesting that this is the case. As explained above, the economic case for rapidly decarbonising the power sector remains a strong one. A recent report from Cambridge Econometrics showed for example that compared to another dash for gas generation, policies enabling a continued deployment of offshore wind farms in the UK over the next 20 years would increase UK GDP by £20bn/ year by 2030, create 70,000 more jobs by then, reduce gas imports by some £8bn/ year and produce emissions in the power sector that would be 3 times lower, with only minimum impact on UK electricity prices (in the order of 1% by 2030).

However, we would make the following observations:

- Domestic consumers: in order to ensure that the bill impacts of low-carbon policies (and of future possible rises in the price of gas) remain manageable for consumers, it is critical that adequate policies be in place to fully exploit the potential to improve energy efficiency in households (estimated by the Committee in its latest Household Bills report to offer possible energy bill reductions worth around £135 for the average UK household by 2020<sup>42</sup>). Going forward, using the proceeds from measures such as the auctioning of EU emissions allowances and the carbon price floor (as advocated by groups such as the Energy Bill Revolution) would help address impacts on consumers and maximise the efficiencies of these policies in terms of delivering emission reductions.

- Energy Intensive Users (EIUs): as noted by the Committee in its latest Competitiveness Risks Report, the £250 million compensation fund that was announced by Government for this Spending Review period to protect EIUs against the costs of the EU ETS and the CFP appear to provide adequate protection in the period running to 2020<sup>43</sup>. While impacts on EIUs for the 2020 to 2030 period are less certain, DECC has announced in November 2012 that it was considering exempting some EIUs from additional costs arising from the introduction of CfDs “*where these have a significant impact on their competitiveness*” .

**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?*

n/a

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

Section 10 (2) I of the Climate Change Act requires that international aviation and shipping emissions be taken into account, although not formally included, when setting carbon budgets 1 through 4. Providing headroom for these emissions is also consistent with a 2050 target that includes international aviation and shipping, as per the recommendation of the

<sup>42</sup> [http://www.theccc.org.uk/wp-content/uploads/2012/12/1672\\_CCC\\_Energy-Bills\\_bookmarked.pdf](http://www.theccc.org.uk/wp-content/uploads/2012/12/1672_CCC_Energy-Bills_bookmarked.pdf)

<sup>43</sup> ‘*Reducing the UK’s carbon footprint and managing competitiveness risks*’, Committee on Climate Change, April 2013, see page 10: <http://www.theccc.org.uk/publication/carbon-footprint-and-competitiveness/>

CCC.

In December 2012, the Government deferred a decision on whether to include international aviation and shipping emissions within the net carbon account until 2016. However, the Government nonetheless made clear that it does not intend to alter the way in which international aviation and shipping emissions have been taken into account in existing carbon budgets.

We therefore stress the importance of continuing to account for international aviation and shipping emissions in the 4<sup>th</sup> Carbon Budget review as an essential prerequisite to eventual formal acceptance of these emissions into the Climate Change Act and carbon budgets. As stated previously, existing carbon budgets only represent the minimum credible level of action that the UK should pursue, especially as international aviation and shipping emissions, the two fastest growing sources of CO<sub>2</sub> contributing to climate change, are not included.