

## The Fifth Carbon Budget - Call for Evidence

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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**

Climate science and international circumstances are important criteria in setting carbon budgets.

- The science indicates the impacts associated with different levels of climate change and the limit on emissions globally if these risks are to be contained.
- International circumstances inform the prospects of future action to reduce emissions globally, potential requirements of the UK to contribute to those actions, and prospects for low-carbon technology development and carbon pricing.
- The EU places obligations on Member States to reduce emissions to contribute to reductions in the bloc as a whole. These imply a minimum level of effort for the UK's carbon budgets.

The Committee intends to draw primarily on the work of the IPCC, as published in the Fifth Assessment Report, in assessing the implications of climate science for the budget advice

The Committee's advice is based on 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 GHG emissions would have to peak around 2020, 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. Individual parties are submitting pledges for effort beyond 2020, with the details of the agreement to be discussed in Paris late in 2015.

The EU has agreed a package that requires a reduction in GHG emissions of at least 40% on 1990 levels by 2030, on the way to an 80-95% reduction by 2050. The government supported this package, while arguing for an increase to 50% in the context of a global deal.

The US and China have jointly made pledges for the period beyond 2020. The US has pledged a reduction of 26-28% by 2025 versus 2005, requiring a doubling of the rate of carbon reduction compared to 2005-2020 and on a trajectory to economy-wide cuts of the order of 80% by 2050. China has pledged to peak CO<sub>2</sub> emissions around 2030, and to make best efforts to do so earlier.

**Question 1** *The IPCC's Fifth Assessment Report will form the basis of the Committee's assessment of climate risks and global emissions pathways consistent with climate objectives. What further evidence should the Committee consider in this area?*

The IPCC's Fifth Assessment Report (IPCC AR5) remains the most appropriate basis for the Committee's assessment.

#### Pathways to Decarbonisation

The Committee could also consider the UNEP Emissions Gap reports. The 2014 report suggests that global carbon emissions must be net-zero by 2055.<sup>1</sup> UNEP note that the best case global pathways still have only a 49% chance of meeting the 2°C limit.

#### Environmental & Economic Impacts

The Committee could also consider research on the impacts of climate change. For example:

**1. Climate change is likely to have a significant impact on national economies, and will disproportionately affect equatorial regions.** The World Bank and the Global Centre for Disaster Reduction and Recovery has published analysis for 85 countries to enable future development that considers climate change adaptation<sup>2</sup> Risks include habitat loss, extreme weather, and resource scarcity- with serious socioeconomic consequences.<sup>3</sup>

**2. Climate Change will strongly impact the resilience of food systems.** Climate change and is affecting food systems themselves a source of GHG emissions. The

<sup>1</sup> UNEP, *Emissions Gap Report* (2014), Pg. 4:

[http://www.unep.org/publications/ebooks/emissionsgapreport/pdfs/EMISSIONS\\_GAP\\_TECH\\_NICAL\\_SUMMARY.pdf](http://www.unep.org/publications/ebooks/emissionsgapreport/pdfs/EMISSIONS_GAP_TECH_NICAL_SUMMARY.pdf)

<sup>2</sup> World Bank and GFDRR, *Climate Risk and Adaptation Country Profiles* (2015):

[http://sdwebx.worldbank.org/climateportalb/home.cfm?page=country\\_profile](http://sdwebx.worldbank.org/climateportalb/home.cfm?page=country_profile)

<sup>3</sup> *Ibid*; See Also: WWF International, *Living Planet Report* (2014)

IPCC connects climate change to rising prices and political instability, for instance the riots in Asia and Africa after food price shocks in 2008<sup>4</sup>. If food is not part of the climate change narrative the 2°C pathway will be missed<sup>5</sup>.

**3. If global temperatures continue to rise there will be considerable impacts on species and habitats.** A paper in *Science*, analysing 131 previous studies suggested that 16% of global species become extinct due to climactic factors if temperatures rise on their current trajectory [3]

**4. Arctic change is unequivocal and a return to previous conditions is unlikely<sup>6</sup>.** Temperatures have warmed at twice the global average, with much of the Arctic above 0°C in summer<sup>7</sup>. The last eight summer sea ice extents were the lowest on satellite record. The evidence suggests that Arctic Amplification (the observed enhanced warming in high northern latitudes relative to the northern hemisphere) is linked to more persistent weather patterns in mid-latitudes and extreme weather<sup>8</sup>.

**5. The majority of known fossil fuel reserves must stay in the ground in order to keep within the 2°C limit.** Research published in *Nature*<sup>9</sup> indicated that known and extractable coal, oil and gas cannot be exploited if the world wishes to stay within 2°C of warming.

*The Committee should note that there may be more evidence from the International Scientific Conference Our Common Future Under Climate Change in Paris 7-10 July 2015<sup>10</sup>.*

<sup>4</sup> IPCC, *Climate Change 2014 Impacts, Adaptation, and Vulnerability* (2014): <http://www.ipcc.ch/report/ar5/wg2/>

<sup>5</sup> Chatham House, *Livestock: Climate Change's Forgotten Sector* (2014): [http://www.chathamhouse.org/sites/files/chathamhouse/field/field\\_document/20141203LivestockClimateChangeBaileyFroggattWellesley.pdf?dm\\_i=1TY5,30JL0,BHZILT,AUGSP,1](http://www.chathamhouse.org/sites/files/chathamhouse/field/field_document/20141203LivestockClimateChangeBaileyFroggattWellesley.pdf?dm_i=1TY5,30JL0,BHZILT,AUGSP,1)

<sup>6</sup> WWF UK, *Written Submission to HoL Arctic Committee* (2014); Richter-Menge, J., and J.E. Overland (Eds.), 2010: *Arctic Report Card* (2010):

[http://www.arctic.noaa.gov/reportcard/ArcticReportCard\\_full\\_report.pdf](http://www.arctic.noaa.gov/reportcard/ArcticReportCard_full_report.pdf)

<sup>7</sup> Sommerkorn, M and Hassol, SJ (Eds), *Arctic Climate Feedbacks: Global Implications*. WWF International Arctic Programme (Oslo, 2009), 97 pp

<sup>8</sup> Francis, J.A. and S.J. Vavrus, *Evidence linking Arctic amplification to extreme weather in mid-latitudes* (2012): *Geophys. Res. Lett.* 39, LO6801, doi:10.1029/2012GL051000

<sup>9</sup> McGlade, C. and Ekins, P: *The geographical distribution of fossil fuels unused when limiting global warming to 2°C* (2015): *Nature.Lett.*51, doi:10.1038/nature14016

<sup>10</sup> Ref: <http://www.commonfuture-paris2015.org/>

**Question 2 To what extent are the UN talks in Paris likely to have implications for the Committee's advice beyond the pledges and positions announced in advance of the talks?**

The government must develop policies in recognition that GHG emissions reductions in the IPCC AR5 are a minimum, and give only a 49% chance of avoiding dangerous climate change<sup>11</sup>. At the 1.5/2°C limit agreed at the 2010 Cancún conference there remain many impacts of climate change.

The UK's Climate Change Act is a unilateral policy framework and we recommend that the UK continues to maximise the economic and social benefits that will result from its cost-effective low-carbon transition by following the clear emissions trajectory in its 5-yearly carbon budgets. Government could also consider:

UK Action in the Global Context

The government must increase its GHG emissions reduction trajectory in order to undertake its "fair share" of emissions reductions. The fourth carbon budget is also not yet in line with a pathway consistent with a global 2°C limit<sup>12</sup>, so the Committee should continue to push the government to show leadership globally by at least increasing the ambition of the domestic action budget of 1950GtCO<sub>2</sub>e set for the fourth carbon budget to 1800GtCO<sub>2</sub>e<sup>13</sup>.

Adaptation

The evidence of impacts of climate change is increasingly clear and adaptation is an important of the UNFCCC negotiations. In the UK, temperatures are on average 0.5-2°C higher than the 1970s and in 2007<sup>14</sup>, and severe weather events have already cost an average £1.5 billion per year over the past twenty years<sup>15</sup>. An increased focus on adaptation at both national and international level may lead to a more rounded approach to setting the UK's targets and actions of climate change.

Land Use

A global deal in Paris that covers the land-use sector could impact on future supply and demand of biomass for bioenergy. It is likely that more countries will be looking to this energy source, and that more countries will be looking to maximise the domestic mitigation potential of their carbon sinks. Furthermore, there is considerable

<sup>11</sup> UNEP, *Emissions Gap Report* (2014), Pg. 4:

[http://www.unep.org/publications/ebooks/emissionsgapreport/pdfs/EMISSIONS\\_GAP\\_TECHNICAL\\_SUMMARY.pdf](http://www.unep.org/publications/ebooks/emissionsgapreport/pdfs/EMISSIONS_GAP_TECHNICAL_SUMMARY.pdf)

<sup>12</sup> CCC, *Fourth Carbon Budget Review: "Global Offer Budget"* (2013):

[http://www.theccc.org.uk/wp-content/uploads/2013/12/1785a-CCC\\_AdviceRep\\_Singles\\_1.pdf](http://www.theccc.org.uk/wp-content/uploads/2013/12/1785a-CCC_AdviceRep_Singles_1.pdf)

<sup>13</sup> *Ibid*

<sup>14</sup> CCC, *Adapting to Climate Change*; Met Office, *UK Climate Projections (UKCP09)*:

<http://ukclimateprojections.metoffice.gov.uk/21708>

<sup>15</sup> *Ibid*

uncertainty over the value of many bioenergy pathways for climate mitigation when accounting for the global warming impact (or carbon debt) of biogenic CO<sub>2</sub><sup>16</sup> It would be prudent for the UK 5<sup>th</sup> carbon budget to plan for only limited use of biomass for energy, targeted in sectors where other low-carbon energy is not viable (e.g. industrial heat, long haul freight, shipping and aviation).

**Question 3 Based on the available evidence, does the EU 2030 package reflect the best path to its stated 2050 ambition? How might this package change, specifically its targeted emissions reduction, either before the end of Paris or after Paris?**

It is encouraging to see the UK pushing for an EU-wide emissions reduction target of 50% by 2030 compared to 1990 levels. The EU “at least 40%” wording of Council Conclusions and the Intended Nationally Determined Contribution submitted to the UNFCCC gives some room for the EU or some of its Member States to increase ambition at a later date

#### EU Package across European Member States

There is good reason for the UK to continue to push for a more ambitious emissions target. In agreeing “at least” 40% greenhouse gas emission reductions by 2030, the EU falls short of delivering an emissions reduction target which makes an adequate contribution to preventing dangerous climate change based on the EU's capacity for mitigation.

A more sensible approach would be to continue the current reduction rate of 2% a year, leading to 55% greenhouse gas reductions by 2030 and on track to reaching 95% in 2050. This would require more ambitious and nationally binding targets on the delivery of energy efficiency and renewables (38% and 40% respectively) to translate any EU package into national delivery.<sup>17</sup>

The EU target should align with the UNFCCC, depending on the outcome of COP21, by implementing an initial 2025 target, subject to revision for 2030. In the lead up

<sup>16</sup> European Commission JRC, *Carbon accounting of forest bioenergy* (2014)  
[http://publications.jrc.ec.europa.eu/repository/bitstream/JRC70663/eur25354en\\_online.pdf](http://publications.jrc.ec.europa.eu/repository/bitstream/JRC70663/eur25354en_online.pdf)

<sup>17</sup> WWF EU, *Putting the EU on Track for 100% Renewable Energy* (2013):  
[http://www.wwf.eu/what\\_we\\_do/climate/publications\\_climate/?207608/WWF-report-Putting-the-EU-on-Track-for-100-Renewable-Energy](http://www.wwf.eu/what_we_do/climate/publications_climate/?207608/WWF-report-Putting-the-EU-on-Track-for-100-Renewable-Energy)

COP21, the EU is supporting an assessment of the likely gap between pledged reductions and those required to stay within 2°C<sup>18</sup>. This assessment must push countries to deepen their commitments, and the EU itself should be a candidate for such a review.

#### Bioenergy

The EU 2030 package will introduce “a new policy for sustainable bio-energy<sup>19</sup>”. This must ensure that any support for biomass is coupled with comprehensive sustainability criteria drawing on robust certification schemes such as Forestry Stewardship Council (FSC) and Roundtable for Sustainable Biomaterials (RSB). The greenhouse gas criteria must also fully address direct and indirect land use change and the carbon debt of biogenic CO<sub>2</sub>.

**Question 4 How does the UK’s legislated 2050 target affect its ability to support international efforts to reduce emissions, including its position in negotiations? Does the level of UK carbon budgets have any additional impact (over-and-above the 2050 target) for the UK in international discussions?**

The Climate Change Act places the UK in a strong position to influence developments. While global negotiations to tackle GHG emissions are yet falling short of the required ambition for a 2°C, ever more countries are acting unilaterally, to both mitigate the risks of climate change and to take advantage of the economic opportunities arising out of the low carbon transition. In 2013 China invested \$56 billion in renewable energy, more than the whole of Europe, and Asia-Oceania saw a 47% growth in investment in renewables.<sup>20</sup> The low carbon economy is a global opportunity that the UK should be part of.

As the bilateral US-China communication on climate change of November 2014<sup>21</sup> and recent commitments<sup>22</sup> by India on renewable generation indicate, global efforts on climate change action are accelerating. The decision to include climate change objectives amongst the UN Sustainable Development Goals<sup>23</sup> will also be a key moment for global action in the build up to the Paris COP.

<sup>18</sup> WWF EU *Position on EU 2030 Climate & Energy Policy* (2014): [http://www.wwf.eu/what\\_we\\_do/climate/publications\\_climate/?209335/WWF-position-on-2030-EU-Climate-and-Energy-policy](http://www.wwf.eu/what_we_do/climate/publications_climate/?209335/WWF-position-on-2030-EU-Climate-and-Energy-policy)

<sup>19</sup> Speech by Cañete, European Commission, March 2015 [http://europa.eu/rapid/press-release\\_SPEECH-15-4615\\_en.htm](http://europa.eu/rapid/press-release_SPEECH-15-4615_en.htm)

<sup>20</sup> IEA, *Medium Term Renewable Energy Market Report* (2014):

<http://www.iea.org/topics/renewables/renewablesiea/medium-termmarketreportmtrmr/>

<sup>21</sup> Ref: <https://www.whitehouse.gov/the-press-office/2014/09/30/us-india-joint-statement>

<sup>22</sup> For example: Mercom Capital Group: *India Solar Market Update* (2015)

<sup>23</sup> Ref: <https://sustainabledevelopment.un.org/index.php?menu=1300>

In Europe, we recently submitted evidence on the UK carbon budgets to the Norwegian Government's consultation on establishing emissions reduction targets, and the Danish Government recently passed their Climate Change Act. Internationally, we know that the adoption of Mexico's Climate Change Act, the development of the Clean Energy Act in Australia, and discussions in China around carbon tax and emissions trading (through the Department for International Development, the Foreign and Commonwealth Office, and the British Council) were all influenced favourably through the UK Climate Change Act<sup>24</sup>

Finally, as stated in Question 1, the UK's legislated targets are only credible at the international level in so far as they properly reflect the global trajectory towards 2°C. In particular, the Committee should be willing to advise the government that the current "domestic action budget" of 1950 GtCO<sub>2</sub>e set for the fourth carbon budget should be increased to the 1800 GtCO<sub>2</sub>e that the Committee suggested is in line with a global 2020s pathway consistent with the 2°C limit<sup>25</sup>.

This action should be considered the minimum, as the best-case global emissions pathway currently indicates the likelihood of staying below a 2°C rise as just 49%, with greenhouse gas levels far higher than the 44 billion (Gt CO<sub>2</sub>e) limit by 2020.<sup>26</sup>

## B. The cost-effective path to the 2050 target

The carbon budgets need to set a path that is achievable from today without being over-optimistic about what is achievable in later periods to prepare for the 2050 target.

The Committee has previously set out scenarios for 2030 that balance effort before 2030 with potential opportunities from 2030 to 2050. The scenarios aim to include ways of reducing emissions that are likely to be relatively low cost and actions that will develop options that may need to be deployed at scale by 2050.

These scenarios, reviewed in detail in the Committee's report *The Fourth Carbon Budget Review – the cost-effective path to the 2050 target*, include substantial investment in low-carbon power generation, roll-out of low-carbon heat (heat pumps

<sup>24</sup> Globe International, *A Review of Climate Change Legislation in 33 Countries*:

[http://cdkn.org/wp-content/uploads/2013/01/3rd\\_GLOBE\\_Report-1.pdf](http://cdkn.org/wp-content/uploads/2013/01/3rd_GLOBE_Report-1.pdf)

<sup>25</sup> CCC, *Fourth Carbon Budget Review: "Global Offer Budget"* (2013):

[http://www.theccc.org.uk/wp-content/uploads/2013/12/1785a-CCC\\_AdviceRep\\_Singles\\_1.pdf](http://www.theccc.org.uk/wp-content/uploads/2013/12/1785a-CCC_AdviceRep_Singles_1.pdf)

<sup>26</sup> UNEP, *Emissions Gap Report* (2014), Pg. 4:

[http://www.unep.org/publications/ebooks/emissionsgapreport/pdfs/EMISSIONS\\_GAP\\_TECHNICAL\\_SUMMARY.pdf](http://www.unep.org/publications/ebooks/emissionsgapreport/pdfs/EMISSIONS_GAP_TECHNICAL_SUMMARY.pdf)

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.

The scenarios also reflect detailed assessments of what is practically deliverable, and the Committee monitors progress towards them as part of its statutory duties. The *2014 Progress Report to Parliament* indicated that current policy would not be enough to meet the fourth carbon budget, but that the 'policy gap' could be closed at affordable cost.

The set of policy options required to close the gap include:

- Strengthening the EU Emissions Trading System.
- Setting a clear objective for Electricity Market Reform (EMR) beyond 2020.
- Focusing on low-cost residential energy efficiency.
- Simplifying policies targeting commercial energy efficiency.
- Tackling financial and non-financial barriers to low-carbon heat.
- Pushing for strong EU targets for new vehicle efficiency in 2030.

The government has subsequently published various documents, including its formal response, as required under the Climate Change Act, and the National Infrastructure Plan. The Plan includes investments of around £100 billion in low-carbon power generation in the 2020s, in line with the scenarios from the EMR Delivery Plan that reach 100 gCO<sub>2</sub>/kWh by 2030. It also has significant investments in offshore oil and gas and in the road network. This includes £15 billion of new spending on roads and around £50 billion on offshore oil and gas.

**Question 5** *In the area(s) of your expertise, what are the opportunities and challenges in reducing emissions to 2032, and at what cost? What may be required by 2032 to prepare for the 2050 target, recognising that this may require that emissions in some areas are reduced close to zero?*

#### Macro-Economy

Evidence from the Stern Review, the Fourth Carbon Budget Report, the IEA World Outlook reports and the UNEP Emissions Gap reports<sup>27</sup> shows that early intervention is the only way to achieve decarbonisation cost effectively. Research from UCL and Cambridge Econometrics<sup>28</sup> suggests that reducing emissions to 60% by 2030 would

<sup>27</sup> Stern, FCB, IEA, UNEP: all from WWF 4<sup>th</sup> CB response

<sup>28</sup> Cambridge Econometrics, *The Economics of Climate Change Policy in the UK* (2014), [http://www.camecon.com/Libraries/Downloadable\\_Files/WWF\\_Final\\_Report\\_1.sflb.ashx](http://www.camecon.com/Libraries/Downloadable_Files/WWF_Final_Report_1.sflb.ashx)

increase UK GDP by 1.1% (net), produce 190,000 additional jobs, increase government revenues by £5.7bn p.a., and reduce fossil fuel imports by £8.5bn p.a. [ref]. This clear economic case remains strong even with shale gas in the energy mix. Cambridge Economics analysis<sup>29</sup> showed that against gas, deploying offshore wind over the next 20 years would increase UK GDP by £20bn/ year by 2030, create 70,000 jobs, and reduce gas imports by £8bn/ year, with minimum impact on the electricity price.

#### Energy Efficiency

Analysis by Verco Economics<sup>30</sup> suggests that an infrastructure investment in the retrofit of the UK building stock to bring domestic buildings up to the Energy Performance Certificate Band C by 2035 would have a high value for money ratio of 2.27:1. In addition, there are numerous social benefits to such investment, like reduced fuel poverty; a recent pilot scheme in Sunderland demonstrated a link between more efficiency homes and reduced A&E admissions<sup>31</sup>.

#### Heat

The 70% of UK homes on gas is a technological challenge for decarbonisation<sup>32</sup>. Government should set a long-term policy framework for renewable heat; conduct pilot projects to overcome barriers, and roll-out successful models from 2022-2030<sup>33</sup>. Certainty about post-2020 funding for the Renewable Heat Incentive for consumers and investors would support deployment.

#### Power Sector Decarbonisation

The growth of low carbon generation must continue, alongside a strengthened EU ETS. The government could also set a power sector decarbonisation target of 50-100 g/CO<sub>2</sub> by 2030, and remove the cap on the Carbon Floor Price. We have seen some excellent examples of the cost reductions associated with increased deployment, such as the dramatic decrease in the cost of solar PV.<sup>34</sup> It is vital that

<sup>29</sup> Cambridge Econometrics, *A Study into the Economics of Gas and Offshore Wind* (2012): [http://www.camecon.com/libraries/downloadable\\_files/a\\_study\\_into\\_the\\_economics\\_of\\_gas\\_and\\_offshore\\_wind.sflb.ashx](http://www.camecon.com/libraries/downloadable_files/a_study_into_the_economics_of_gas_and_offshore_wind.sflb.ashx)

<sup>30</sup> VERCO and Cambridge Econometrics, *The economic and fiscal impacts of making homes energy efficient* (2014): <http://www.energybillrevolution.org/wp-content/uploads/2014/10/Building-the-Future-The-Economic-and-Fiscal-impacts-of-making-homes-energy-efficient.pdf>

<sup>31</sup> Ref: <http://www.theguardian.com/environment/2014/dec/09/boiler-on-prescription-scheme-transforms-lives-saves-nhs-money>

<sup>32</sup> WWF UK, *Warm Homes not Warm Words* (2014): [http://assets.wwf.org.uk/downloads/wwf\\_heat\\_report\\_summary\\_web.pdf](http://assets.wwf.org.uk/downloads/wwf_heat_report_summary_web.pdf)

<sup>33</sup> *Ibid*

<sup>34</sup> Imperial College, *The impact of policy on technology innovation and cost reduction* (2014): <http://www.imperial.ac.uk/media/imperial-college/grantham-institute/publications/working-papers/The-impact-of-policy-on-technology-innovation-and-cost-reduction-WP.pdf>

there is clarity over funding to enable other forms of technology to enjoy similar patterns of cost reduction and ultimately achieve parity. For investor certainty, the Levy Control Framework should be extended past 2020 with clarity over the support for renewables in this period.

### 1. Onshore wind

The Contracts for Difference auction confirmed that onshore wind is a cost-effective renewable technology: the average strike price of onshore projects was £82/MWh<sup>35</sup>. Onshore wind has a current installed capacity of 8.1GW and there is around 11.5GW of viable capacity in the pipeline<sup>36</sup>. Without support, however, industry will struggle to provide the 25GW of capacity recommended by the Committee under Electricity Market Reform<sup>37</sup>.

### 2. Coal

A 2014 paper by Imperial College<sup>38</sup> suggests that up to half the UK's coal power stations could still be running in 2030 without intervention. Running one large coal plant full time in 2030 would provide 3% of UK electricity but around 50% of the emissions target: coal must be off the grid by 2023<sup>39</sup>. Policy options include: removing coal from the Capacity Market; removing the cap on the carbon floor price; and introducing an Emissions Performance Standard for existing plants.

<sup>35</sup> Allocation round results Ref:

[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/407059/Contracts\\_for\\_Difference\\_-\\_Auction\\_Results\\_-\\_Official\\_Statistics.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/407059/Contracts_for_Difference_-_Auction_Results_-_Official_Statistics.pdf)

<sup>36</sup> RenewableUK, *Wind Energy Database*: [energy/uk-wind-energy-database/index.cfm](http://energy/uk-wind-energy-database/index.cfm)

<sup>37</sup> CCC, *Next steps on Electricity Market Reform – securing the benefits of low-carbon investment* (2013): [http://www.theccc.org.uk/wp-content/uploads/2013/05/1720\\_EMR\\_report\\_web.pdf](http://www.theccc.org.uk/wp-content/uploads/2013/05/1720_EMR_report_web.pdf)

<sup>38</sup> Gross R., Speira J, Hawkes A., Skillings S. and Heptonstall P., *Could retaining old coal lead to a policy own goal?* (2014):

[http://assets.wwf.org.uk/downloads/wwf\\_coal\\_report\\_imperial\\_college\\_final.pdf](http://assets.wwf.org.uk/downloads/wwf_coal_report_imperial_college_final.pdf)

<sup>39</sup> *Ibid*

**Question 6** *What, if any, is the role of consumer, individual or household behaviour in delivering emissions reductions between now and 2032? And, separately, after 2032?*

Energy Bills

Prioritising energy efficiency for domestic households is vital, not simply because of the macroeconomic opportunity it offers<sup>40</sup> but because of the savings for individual consumers. While oil and gas prices are currently unusually low, it is likely that the fossil fuel price (and energy bills) will continue to rise over time<sup>41</sup>: reducing volumes of energy consumption should offer clear benefits to individual householders.

The government could decouple the relationship between low-carbon investment, benefits, and the individual consumer by minimising the use of energy bill levies as a funding mechanism. Some groups have suggested alternative sources of public finance such as the proceeds from auctioning EU ETS allowances or the carbon floor price, and in the case of energy efficiency, recycling funding for low carbon measure from the Allowable Solutions component of Building Regulations.

Behaviour Change

Out to 2030, tackling building level emissions through energy efficiency and renewable heat will be crucial. DECC estimates that cost effective demand reduction in the domestic sector could reduce annual energy demand by 56TWh in 2020 and 62TWh in 2025<sup>42</sup>. DECC assumes that policies are in place to deliver most of this reduction, but current deployment as insufficient<sup>43</sup>. The key barrier has been consumer awareness and policy complexity<sup>44</sup>: more effort should be made on consumer engagement and up-skilling the installer base to deliver low-carbon solutions. The government cannot rely on consumer behaviour change to deliver significant emissions reduction.

The smart meter rollout, increasing decentralised generation and storage, and

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<sup>40</sup> VERO and Cambridge Econometrics, *The economic and fiscal impacts of making homes energy efficient* (2014): <http://www.energybillrevolution.org/wp-content/uploads/2014/10/Building-the-Future-The-Economic-and-Fiscal-impacts-of-making-homes-energy-efficient.pdf>

<sup>41</sup> DECC, *Estimated impacts of energy and climate change policies on energy prices and bills* (2012): [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/172923/130326\\_-\\_Price\\_and\\_Bill\\_Impacts\\_Report\\_Final.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/172923/130326_-_Price_and_Bill_Impacts_Report_Final.pdf)

<sup>42</sup> DECC, *How much energy could be saved by making small changes to everyday household behaviours?* (2012)

<sup>43</sup> CCC, *Fourth Carbon Budget Review* (2014); Energy Bill Revolution, *Left Out In the Cold* (2015): [http://www.energybillrevolution.org/wp-content/uploads/2015/02/ACE-and-EBR-fact-file-2015-01-Left-out-in-the-cold\\_FINAL.pdf](http://www.energybillrevolution.org/wp-content/uploads/2015/02/ACE-and-EBR-fact-file-2015-01-Left-out-in-the-cold_FINAL.pdf)

<sup>44</sup> DECC, *Behaviour Change and Energy Use* (2011)

smarter appliances and controls offer a tantalising opportunity in the 2020s for consumers to become much more empowered in their own energy management<sup>45</sup>. This will require better communication with consumers, effective regulation, and behavioural change nudges to encourage consumers to take up energy efficiency measures<sup>46</sup>. Critically, the field trials of heating controls to date have not yet shown any benefit in terms of overall energy savings<sup>47</sup> suggesting that behaviour change will require education and communication, as well as technological advances. Above all, it is important that consumers hear a positive narrative about the societal and economic benefits of the low carbon transition from central government.

**Question 7 Is there evidence to suggest that actions to further reduce emissions after 2032 are likely to be more or less challenging to achieve than actions in the period up to 2032?**

The most cost effective emissions reduction pathways assume that the power sector will be near decarbonised by 2030. This implies that reductions thereafter must come from more challenging sectors, or from sectors not currently captured by the carbon budgets. However, early intervention and tightening the existing pathways should ensure that actions beyond 2032 are achievable.

**Food & Agriculture**

There is a strong case for including food and agricultural emissions in the low carbon pathways from the fifth carbon budget onwards. As stated in Question 1, if food is not part of the global climate change narrative the 2°C target would be missed<sup>48</sup>. Agricultural emissions will take up the entire global carbon budget by 2050<sup>49</sup>. Every

<sup>45</sup> Electricity Storage Network & Ecuity Consulting, *Smart Grids, Microgeneration & Storage, Commercialising the Benefits* (2013): [http://www.ecuity.com/wp-content/uploads/2013/10/SGrid-Report-v\\_final3.0.pdf](http://www.ecuity.com/wp-content/uploads/2013/10/SGrid-Report-v_final3.0.pdf)

<sup>46</sup> Citizens Advice, *Raising standards, cutting bills* (2014): [https://www.citizensadvice.org.uk/global/migrated\\_documents/corporate/raising-standards-cutting-bills-june14.pdf](https://www.citizensadvice.org.uk/global/migrated_documents/corporate/raising-standards-cutting-bills-june14.pdf)

<sup>47</sup> DECC, *How heating controls affect domestic energy demand* (2014): [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/277552/FINAL\\_How\\_heating\\_controls\\_affect\\_domestic\\_energy\\_demand\\_-\\_A\\_Rapid\\_Evidence\\_Assessment.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/277552/FINAL_How_heating_controls_affect_domestic_energy_demand_-_A_Rapid_Evidence_Assessment.pdf)

<sup>48</sup> Chatham House, *Livestock: Climate Change's Forgotten Sector* (2014): [http://www.chathamhouse.org/sites/files/chathamhouse/field/field\\_document/20141203LivestockClimateChangeBaileyFroggattWellesley.pdf?dm\\_i=1TY5,30JL0,BHZILT,AUGSP,1](http://www.chathamhouse.org/sites/files/chathamhouse/field/field_document/20141203LivestockClimateChangeBaileyFroggattWellesley.pdf?dm_i=1TY5,30JL0,BHZILT,AUGSP,1)

<sup>49</sup> Bajzelj, B et al., *Importance of food-demand management for climate mitigation* (2014) [http://www.nature.com/articles/nclimate2353.epdf?referrer\\_access\\_token=WVXCdXDhXAircCWkFhSX5dRgN0jAjWel9jnR3ZoTv0NlTeOOXpRG5bZ0W0svZ8g2c428ui7nBJcNYmaQvXtKPL05qh\\_nHvlzq63o0LYfRy-fSmEAZ\\_XKnpW8NtbvKb0h](http://www.nature.com/articles/nclimate2353.epdf?referrer_access_token=WVXCdXDhXAircCWkFhSX5dRgN0jAjWel9jnR3ZoTv0NlTeOOXpRG5bZ0W0svZ8g2c428ui7nBJcNYmaQvXtKPL05qh_nHvlzq63o0LYfRy-fSmEAZ_XKnpW8NtbvKb0h)

other sector would have to be zero carbon to accommodate for emissions from agriculture<sup>50</sup>. The Climate Change Act and its system of carbon budgets are an opportunity for the government to continue to show global leadership on emissions reduction by finding an appropriate pathway for agriculture and food.

#### Aviation & Shipping (IAS)

International aviation and shipping emissions must be accounted for in carbon budgets as soon as is practicable. If it is not practicable at the time of setting the fifth carbon budget due to uncertainty over the international accounting framework for aviation, the IAS question should be in early in 2017 (following the ICAO Assembly and the EU's decision on aviation within the EU ETS). Until IAS emissions are accounted for, there governments may make short term decisions about expansion without considering the additional costs of meeting carbon budgets and the impact on other sectors' emissions reduction pathways.

#### Bioenergy & Forestry

In the period 2028-32, the government should be aiming to incentivise biomass in the energy system only where other low-carbon energy sources are not viable, such as industrial heating, long haul freight, and aviation and shipping. It is important to refocus support into these sectors in a phased manner that does not undermine investor confidence in renewable energy support schemes more generally. In order to realise substantial carbon savings through enhanced carbon sinks during the term of the fifth carbon budget, the government needs to act now to incentivise investment in sustainable forestry management, restoration and afforestation.

### **Question 8 *Are there alternatives for closing the 'policy gap' to the fourth carbon budget that could be more effective? What evidence supports that?***

In addition to the interventions outlined in Question 5, we note the following opportunities for meeting the emissions reduction trajectory:

#### Smart Technologies

By the fifth carbon budget period, decentralised energy production, electrified heating systems, and innovations in smart technologies and storage may produce further benefits as the role of the demand side in the UK's energy mix increases. For

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<sup>50</sup> Hedenus F. et al *The importance of reduced meat and dairy consumption for meeting stringent carbon targets* (2014) *Climate Change* 2014 124:79-91  
[http://download.springer.com/static/pdf/147/art%253A10.1007%252Fs10584-014-1104-5.pdf?auth66=1424361609\\_81a099918fcce7c8af986929f2b519ae&ext=.pdf](http://download.springer.com/static/pdf/147/art%253A10.1007%252Fs10584-014-1104-5.pdf?auth66=1424361609_81a099918fcce7c8af986929f2b519ae&ext=.pdf)

instance, of the new business models currently being piloted by the Low-carbon Network Fund<sup>51</sup> if rolled out at scale, could see commercial and domestic consumers reducing their bills through flexible self-consumption of stored electricity, or bidding into future capacity markets on an aggregate level<sup>52</sup>. Suppliers are already trialling innovative new demand-side led models. Maximising the potential for innovation in the energy system would require changes to the Capacity Market in particular, which has so far failed to provide sufficient support to the demand side<sup>53</sup>.

#### R&D for Key Technologies

The government must invest now in the technologies that will be required at scale in order to meet the carbon budget pathways beyond 2030. Following the decarbonisation of the power sector, other sectors will become focal points for decarbonisation. Many of these will require innovative methods of decarbonisation, and are so far absent from the National Infrastructure Plan, with the exception of Swansea Bay tidal lagoon, which the Government named in the plan. The Government is currently in commercial negotiations with the developers over whether Swansea Bay lagoon will be able to access a CfD.<sup>54</sup>

For other projects that would be of key importance we await clarification over funding and efficacy. For example, until from the CCS White Rose and Golden Eye trials, we cannot yet say whether it will be commercially viable, desirable, or applicable to other sectors (e.g. industrial emissions). Similarly, storage is vital for ensuring security of supply in a renewables-led future and for capturing the value for consumers of self-consumption of on-site generation – yet it currently lacks any clear policy framework at all.

#### Agriculture

As stated in Question 7, agriculture could be a risk to future emissions reduction. The government should consider how early intervention in UK food and agriculture will support delivery of emissions reductions from the fifth carbon budget period onwards, investing in research and development for this throughout the 2020s.

<sup>51</sup> UK Power Networks, *IFI/LCNF Report, April 2013-March 2014*): <http://www.ukpowernetworks.co.uk/internet/asset/34e66d6f-c468-4bb7-811b-aac1dc9f7480/UKPN+IFI+report+2013-14+v1.0+PXM+300714.pdf>

<sup>52</sup> Electricity Storage Network & Ecuity Consulting, *Smart Grids, Microgeneration & Storage, Commercialising the Benefits* (2013): [http://www.ecuity.com/wp-content/uploads/2013/10/SGrid-Report-v\\_final3.0.pdf](http://www.ecuity.com/wp-content/uploads/2013/10/SGrid-Report-v_final3.0.pdf)

<sup>53</sup> WWF UK, *Energy Bill and the Capacity Market Briefing* (2015): [http://www.wwf.org.uk/wwf\\_articles.cfm?unewsid=6644](http://www.wwf.org.uk/wwf_articles.cfm?unewsid=6644)

**Question 9 Are the investments envisaged in the National Infrastructure Plan consistent with meeting legislated carbon budgets and following the cost-effective path to the 2050 target? Would they have wider implications for global emissions and the UK's position in international climate negotiations?**

Renewables

The end of the LCF in 2020 and the uncertainty around the EU ETS, the UK Carbon Floor Price, an Emissions Performance Standard for coal and the available funding for renewables under the Contracts for Difference arrangements, means that the case for investment in low carbon generation past 2020 is uncertain. These policies will need careful monitoring to ensure that £100 billion for low-carbon generation in the 2020s is delivered. As stated above, the Government has named Swansea Bay tidal lagoon within the National Infrastructure Plan but has not, as yet provided clarity over its funding nor over the wider amounts of funding available to renewable technologies post 2020.<sup>55</sup>

Energy Efficiency

As stated in Question 5, making the retrofit of the UK building stock a priority in the National Infrastructure plan, with appropriate capital investment, to bring domestic buildings up to the EPC Band C by 2035 would have a value for money ratio of 2.27:1, outpacing other government infrastructure projects such as HS2<sup>56</sup>.

Oil and Gas

As stated in Question 1, the majority of known fossil fuel reserves must stay in the ground in order to keep within the 2°C limit of warming. Research published in *Nature* in 2014<sup>57</sup> indicated that known and extractable coal, oil and gas cannot be exploited if the world wishes to pursue cost effective decarbonisation pathways [ref]. As stated in Question 7 and in our submission to the *Fourth Carbon Budget Call for Evidence*<sup>58</sup>, the best way to ensure that emissions after 2032 are achievable is to invest in activity from now until 2030.<sup>59</sup> It makes little fiscal or environmental sense for the government to have allocated £50bn of support to the offshore oil & gas industries through the National Infrastructure Plan, when it should be preparing these

<sup>55</sup> DECC, news story, *commercial negotiations to start on Swansea Bay tidal lagoon* (March 2015), <https://www.gov.uk/government/news/commercial-negotiations-to-start-on-swanea-bay-tidal-lagoon>

<sup>56</sup> VERC0 and Cambridge Econometrics, *The economic and fiscal impacts of making homes energy efficient* (2014): <http://www.energybillrevolution.org/wp-content/uploads/2014/10/Building-the-Future-The-Economic-and-Fiscal-impacts-of-making-homes-energy-efficient.pdf>

<sup>57</sup> McGlade, C. and Ekins, P: *The geographical distribution of fossil fuels unused when limiting global warming to 2°C* (2015): *Nature*.Lett.51, doi:10.1038/nature14016

<sup>58</sup> WWF UK, <http://www.theccc.org.uk/wp-content/uploads/2013/07/WWF-Latest-4th-CB-response.pdf> (2013)

<sup>59</sup> CCC, *Fourth Carbon Budget Review: "Global Offer Budget"* (2013): [http://www.theccc.org.uk/wp-content/uploads/2013/12/1785a-CCC\\_AdviceRep\\_Singles\\_1.pdf](http://www.theccc.org.uk/wp-content/uploads/2013/12/1785a-CCC_AdviceRep_Singles_1.pdf)

industries and the workers they support for the low carbon transition that must come. A clear indication from the government of the approximate timelines for the transition from gas to low carbon in 2050 would provide clarity about whether this is consistent with the 2°C limit of warming.

#### Airport Expansion

Expansion of UK airports capacity will significantly increase the relative burden for other sectors to meet the targets laid out in the fourth carbon budget and beyond, and it may be economically unviable for these sectors to meet that burden<sup>60</sup>. Existing capacity is adequate to accommodate the maximum 60% increase in passenger demand by 2050 that is recommended by the CCC<sup>61</sup>. Moreover, the argument that airport expansion in the south east is necessary for economic growth does not stand up to scrutiny<sup>62</sup>.

### C. Budgets and action

The UK's statutory 2050 target requires actions across the economy to reduce emissions. Many of these actions will be driven by (UK and devolved) Government policy and implemented by businesses and consumers. There will be an important role for Local Authorities in successful delivery.

Although the carbon budgets do not require specific actions, they provide an important indication of the overall direction that policy will take in future. Once set, carbon budgets can only be changed if there has been a significant change in the relevant circumstances set out in the Climate Change Act.

Feedback from businesses as part of the Committee's 2013 Call for Evidence for the review of the fourth carbon budget was that stability is an important and valuable characteristic of carbon budgets.

**Question 10 As a business, as a Local Authority, or as a consumer, how do carbon budgets affect your planning and decision-making?**

N/A

<sup>60</sup> Committee on Climate Change, *Letter to Sir Howard Davies re: Airports Commission* (2013) [http://www.theccc.org.uk/wp-content/uploads/2013/07/CCC\\_letter\\_aviation\\_commission.pdf](http://www.theccc.org.uk/wp-content/uploads/2013/07/CCC_letter_aviation_commission.pdf)

<sup>61</sup> WWF-UK/AEF, *Available UK airport capacity under a 2050 CO2 target for the aviation sector* (2011), [http://assets.wwf.org.uk/downloads/airport\\_capacity\\_report\\_july\\_2011.pdf](http://assets.wwf.org.uk/downloads/airport_capacity_report_july_2011.pdf)

<sup>62</sup> WWF-UK/CE Delft, *The Economics of airport expansion* (2013), [http://assets.wwf.org.uk/downloads/economics\\_of\\_airport\\_expansion\\_march\\_2013.pdf?\\_ga=1.262866122.736520801.1416495376](http://assets.wwf.org.uk/downloads/economics_of_airport_expansion_march_2013.pdf?_ga=1.262866122.736520801.1416495376)

**Question 11** *What challenges and opportunities do carbon budgets bring, including in relation to your ability to compete internationally? What evidence do you have for this from your experience of carbon budgets to date?*

N/A

**Question 12** *What would you consider to be important characteristics of an effective carbon budget? What is the evidence for their importance?*

The Climate Change Act (CCA) and the carbon budgets have, in short, three basic important characteristics: they offer long-term clarity over the pathway to meeting the 2 degrees of warming limit; this pathway is optimised to be cost-effective; and both the CCA and the carbon budgets are legally binding. 33 countries in the world are known to have used the UK CCA as an exemplar<sup>63</sup>, and in that sense they also offer the indirect benefit of positioning the UK as a global leader on climate change.

#### Legally-binding nature of the targets

Government is under a clear legal duty to achieve both the 2050 target of an 80% reduction in greenhouse gases on 1990 levels and each carbon budget established to get there. Further, each carbon budget must be set at a level which seeks to achieve the 2050 target in a cost effective manner. Any attempt to set an unambitious target for the 5<sup>th</sup> carbon budget could be viewed as:

- making it immediately clear that the 2050 target will be missed; and/or
- imposing an unacceptable economic and environmental burden on future governments and indeed generations in the UK; and
- pursuing such a course may not conform with the CCA obligations

The previous government's decision to make the fourth carbon budget subject to a subsequent review caused uncertainty, which was opposed by many in the business sector<sup>64</sup>. We would be strongly opposed to any similar proposal in relation to the fifth carbon budget if the intent were to consider the reduction of the budget's ambition.

#### Pathway to 2 degrees

As stated in Question 1, the UK's legislated targets are only credible at the international level in so far as they properly reflect the global trajectory towards 2°C. In particular, the Committee should be willing to advise the government that the

<sup>63</sup> Globe International, *A Review of Climate Change Legislation in 33 Countries* (2013), [http://cdkn.org/wp-content/uploads/2013/01/3rd\\_GLOBE\\_Report-1.pdf](http://cdkn.org/wp-content/uploads/2013/01/3rd_GLOBE_Report-1.pdf) p.

<sup>64</sup> WWF, *Major businesses call on UK government to back a low carbon economy* (Dec 2013), [http://www.wwf.org.uk/wwf\\_articles.cfm?unewsid=6943](http://www.wwf.org.uk/wwf_articles.cfm?unewsid=6943)

current “domestic action budget” of 1950 GtCO<sub>2</sub>e set for the fourth carbon budget should be increased to the 1800 GtCO<sub>2</sub>e that the Committee suggested is in line with a global 2020s pathway consistent with the 2°C limit<sup>65</sup>.

This action should be considered the minimum, as the best-case global emissions pathway currently indicates the likelihood of staying below a 2°C rise as just 49%, with greenhouse gas levels far higher than the 44 billion (Gt CO<sub>2</sub>e) limit by 2020<sup>66</sup>.

#### Cost effectiveness & long-term trajectories

As stated in Question 5, early intervention is the only way to achieve decarbonisation cost effectively<sup>67</sup>. The carbon budget system helps to keep this long-term perspective when external timelines, such as government terms, can be much shorter in term. This long-term perspective is crucial to ensure that action to cut emission in the fifth carbon budget period and beyond remains economically viable.

#### **D. Other issues**

The Climate Change Act requires that in designing the fifth carbon budget we consider impacts on competitiveness, fiscal circumstances, fuel poverty and security of energy supply, as well as differences in circumstances between UK nations. High-level conclusions on these from our advice on the fourth carbon budget 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.

<sup>65</sup> CCC, *Fourth Carbon Budget Review: “Global Offer Budget”* (2013):

[http://www.theccc.org.uk/wp-content/uploads/2013/12/1785a-CCC\\_AdviceRep\\_Singles\\_1.pdf](http://www.theccc.org.uk/wp-content/uploads/2013/12/1785a-CCC_AdviceRep_Singles_1.pdf)

<sup>66</sup> UNEP, *Emissions Gap Report* (2014), Pg. 4:

[http://www.unep.org/publications/ebooks/emissionsgapreport/pdfs/EMISSIONS\\_GAP\\_TECH\\_NICAL\\_SUMMARY.pdf](http://www.unep.org/publications/ebooks/emissionsgapreport/pdfs/EMISSIONS_GAP_TECH_NICAL_SUMMARY.pdf)

<sup>67</sup> WWF UK, <http://www.theccc.org.uk/wp-content/uploads/2013/07/WWF-Latest-4th-CB-response.pdf> (2013)

- **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 13** *What evidence should the Committee draw on in assessing the (incremental) impacts of the fifth carbon budget on competitiveness, the fiscal balance, fuel poverty and security of supply?*

There is good evidence that setting a system of cost effective carbon budgets can support (rather than impact) the fiscal balance, fuel poverty reduction, and security of supply. Evidence from the Stern Review, the Fourth Carbon Budget Report, the IEA World Outlook reports and the UNEP Emissions Gap Reports all support the idea that early intervention and a planned low-carbon trajectory is consistent with the 2°C limit of warming<sup>68</sup>.

As stated in answer to Question 7, pursuing an emissions reduction to 2032 along carbon budget pathways offers clear economic benefit versus low-ambition pathways. According to a 2014 report produced by UCL and Cambridge Econometrics, using the MDM-E3 model, reducing emissions to around 60% by 2030 would increase UK GDP by 1.1% in net terms (or 0.8% under low fossil fuel price scenarios), result in at least 190,000 additional jobs, increase government revenues by £5.7bn per annum, and improve energy security by reducing fossil fuel imports by £8.5bn pa<sup>69</sup>

The UK has some of the highest rates of fuel poverty in Europe, which is in large part due to the quality of our building stock<sup>70</sup>. In other words, the volume of the energy consumed by fuel poor households is a bigger problem than the price per unit of energy consumed. The roll out of energy efficiency measures to UK homes is therefore crucial to reducing fuel poverty<sup>71</sup>. The Committee has stated that the government must go beyond the current legislative framework for energy efficiency in particular in order to meet the fourth carbon budget<sup>72</sup>- this is welcome, and we hope will be recognised by the incoming government.

<sup>68</sup> UNEP, *Emissions Gap Report* (2014), Pg. 4:

[http://www.unep.org/publications/ebooks/emissionsgapreport/pdfs/EMISSIONS\\_GAP\\_TECH\\_NICAL\\_SUMMARY.pdf](http://www.unep.org/publications/ebooks/emissionsgapreport/pdfs/EMISSIONS_GAP_TECH_NICAL_SUMMARY.pdf)

<sup>69</sup> Cambridge Econometrics, *The Economics of Climate Policy in UK* (September 2014), [http://www.camecon.com/Libraries/Downloadable\\_Files/MWF\\_Final\\_Report\\_1.sflb.ashx](http://www.camecon.com/Libraries/Downloadable_Files/MWF_Final_Report_1.sflb.ashx), p.5

<sup>70</sup> Association for the Conservation of Energy, *The Cold Man of Europe* (March 2013), <http://www.energybillrevolution.org/wp-content/uploads/2013/03/ACE-and-EBR-fact-file-2013-03-Cold-man-of-Europe.pdf>, p.2

<sup>71</sup> DECC, *Cutting the cost of keeping Warm: A new fuel poverty strategy for England* (July 2014), [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/335099/fuel\\_poverty\\_consultation.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/335099/fuel_poverty_consultation.pdf), p.4

<sup>72</sup> Committee on Climate Change, *Fourth Carbon Budget Review* (2013), [http://www.theccc.org.uk/wp-content/uploads/2013/12/1785a-CCC\\_AdviceRep\\_Chap3.pdf](http://www.theccc.org.uk/wp-content/uploads/2013/12/1785a-CCC_AdviceRep_Chap3.pdf)

Finally, we would like to note that the government should consider transitional arrangements for groups likely to be particularly affected in the short term by the low carbon transition. For energy intensive sectors, for example, we supported the principle EII Compensation Package. However, it is important to be clear that such compensatory or transitional arrangements are temporary in nature, and that these sectors are also expected to achieve viable emissions reductions.

**Question 14 *What new evidence exists on differences in circumstances between England, Wales, Scotland and Northern Ireland that should be reflected in the Committee's advice on the fifth carbon budget?***

Scotland GHG emissions reduction

There are a significant number of areas in which Scotland presents different challenges and opportunities in the reduction of GHG emissions. For instance, the proportion of homes off the gas grid is higher in Scotland than elsewhere in the UK and the number of households in fuel poverty is higher now than when the 4<sup>th</sup> CB was set<sup>73</sup>. Alongside these challenges are significant opportunities for growth in both large scale renewables and community/local renewable generation. The Committee's recent visits to Scotland to meet with stakeholders were a welcome attempt to engage with the Scottish evidence base and reflect on the need for distinctive approaches. We would encourage the Committee to continue this approach as they develop their advice on the 5<sup>th</sup> Carbon Budget and beyond

Scottish Aviation Sector:

Scottish climate change legislation formally accounts for GHG emissions from international transport, using formulae based on departing flights (for aviation) and ports traffic (for shipping)<sup>74</sup>. WWF-UK encourages the Committee to examine the effect of formal inclusion of IAS in Scottish climate legislation on both the transition to a low-carbon economy and the economic competitiveness of the Scottish aviation sector.

Welsh Future Generations Bill

In Wales, the recent passing of the Future Generations Bill<sup>75</sup> means that Wales now has a global exemplar piece of legislation which successfully integrates climate

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<sup>74</sup> Scottish Government, *The Climate Change (International Aviation and Shipping) (Scotland) Order 2010*, [http://www.legislation.gov.uk/ssi/2010/218/pdfs/ssi\\_20100218\\_en.pdf](http://www.legislation.gov.uk/ssi/2010/218/pdfs/ssi_20100218_en.pdf)

<sup>75</sup> Welsh Government, *The Well-being of Future Generations (Wales) Act 2015*, <http://www.legislation.gov.uk/anaw/2015/2/contents/enacted>

change and development issues. This is proposed to be effected at international level when the UN Sustainable Development Goals are discussed in New York in September 2015. We would encourage the Committee to engage with the Welsh Government on this piece of legislation, and also as climate change indicators are drafted for the Welsh Government's Environment Bill<sup>76</sup>.

**Question 15** *Is there anything else not covered in your answers to previous questions that you would like to add?*

N/A

For more information on this response, please contact:



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EPinchbeck@wwf.org.uk

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<sup>76</sup> Welsh Government, *The Environment (Wales) Bill*,  
<http://gov.wales/topics/environmentcountryside/consmanagement/natural-resources-management/environment-bill/?lang=en>