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	December 7th 2018

### 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.

#### Short introduction and bio

I am an independent environmental consultant at Climate Friendly Policy and Planning (CFPP), Norwich, UK. Over a forty-year career, I have worked in biophysics, electronics, computing, and environmental activism. I was a Green Party councillor on Norfolk County Council from 2005 to 2017, and on Norwich City Council between 2012 and 2016 including being opposition leader. I am an activist working in climate change and air quality with an emphasis on where policy and planning meet the law, scientific, and computational positions. In response to the global climate crisis, CFPP have the mission to help shape development of climate friendly policy at all levels of governance and jurisdiction – local, national and international. I specialise in advocating an integrated, systems approach that takes the best science, law, technology in developing policy to tackle social and environmental issues, particularly climate change, energy, air quality and housing.

My recent article “Strengthening the Precautionary Principle in the Post-Paris Climate Regime”, in Environment journal, Volume 59, 2017 at <https://doi.org/10.1080/00139157.2017.1350007> explores applying the Precautionary Principle in national and international legal/policy frameworks in detail.

I have made effort to keep within the word limit within the boxes. In some case, this has required substantive information to be placed in the footnotes.

## **Part 0: International Obligations and Precautionary Principle**

**Question 0 (International Obligations and Precautionary Principle):** This additional ‘question’ is inserted at the start as it provides the foundation for my subsequent responses.

This preface ‘answer’ provides the context for subsequent responses below. It is now time for the international community and the UK to apply the strongest precautionary principle to policy and action on climate change. This includes the resetting of the UK Climate Change Act target, and also the 5-year budgets from now.

Whilst these are not legally binding, the Oslo Principles<sup>1</sup> set out the direction of travel that is needed, and, in particular, set out a strong Precautionary Principle which is reproduced below:

**“Oslo” Precautionary Principle:** There is clear and convincing evidence that the greenhouse gas (GHG) emissions produced by human activity are causing significant changes to the climate and that these changes pose grave risks of irreversible harm to humanity, including present and future generations, to the environment, including other living species and the entire natural habitat, and to the global economy.

a. The Precautionary Principle requires that:

- 1) GHG emissions be reduced to the extent, and at a pace, necessary to protect against the threats of climate change that can still be avoided; and
- 2) the level of reductions of GHG emissions required to achieve this, *should be based on any credible and realistic worst-case scenario accepted by a substantial number of eminent climate change experts.*

b. *The measures required by the Precautionary Principle should be adopted without regard to the cost, unless that cost is completely disproportionate to the reduction in emissions that will be brought about by expending it.*

*(my emphasis)*

**Recommendation 1: Strong Precautionary Principle:** All future CCC advice to Government on climate policy, including the current issue of future CCA targets, should be consistent with the strong precautionary principle of the Oslo Principles (2015).

**Recommendation 2: 1.5°C:** There has been confusing messages previously in the CCC advice to Government post-Paris as to what the Paris target is – these were well-evident at the various PlanB legal hearings during 2018. However, since the IPCC SR15 report which showed substantially higher and dire impacts above 1.5°C, **it is recommended CCC’s fundamental advice to government must be consistent with planning for meeting 1.5°C.**

**Recommendation 3: No overshoot:** Further, **CCC’s fundamental advice to government must be consistent** to meeting the Paris 1.5°C obligation *without overshoot*. This is because of the increased risks of feedbacks and runaway climate change at higher temperatures than 1.5°C. Further evidence is given later on why there should be planning for no overshoot. This is also consistent with the Oslo precautionary principle being the credible worst-case scenario accepted by climate scientists.

**Recommendation 4: No less, ambitious “cheaper” options:** Further, Oslo PP b) requires that the measures to achieve *1.5°C & no overshoot* are adopted *without regard to cost*, and CCC future advice to Government should not provide less ambitious, cheaper options.

<sup>1</sup> On March 1, 2015, a group of experts in international law, human rights law, environmental law, and other law adopted the Oslo Principles on Global Obligations to Reduce Climate Change. The full principles may be found at <https://globaljustice.yale.edu/oslo-principles-global-climate-change-obligations> and <https://globaljustice.yale.edu/sites/default/files/files/OsloPrinciples.pdf>

## Part 1: Climate Science

**Question 1 (Climate Science):** The IPCC's Fifth Assessment Report and the Special Report on 1.5°C will form an important part 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?

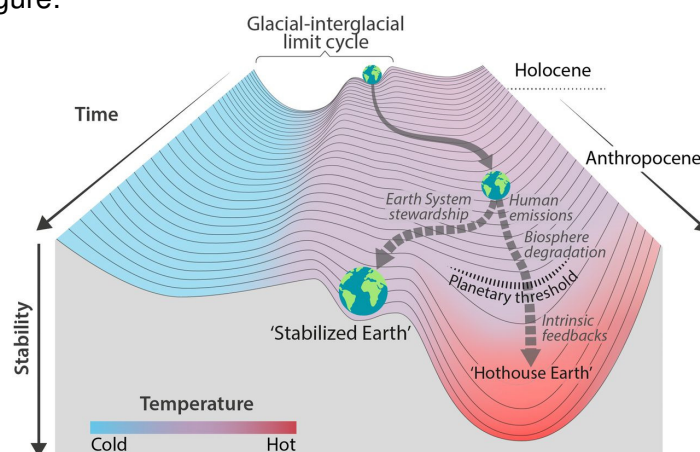
The IPCC SR15 report laid out the much greater human, social and economic impacts on global temperature increases of 2.0°C compared to 1.5°C. Apart from these much greater impacts, any increase over 1.5°C, also introduces risks to Earth system feedbacks (eg: permafrost melting). The IPCC models and carbon budget calculations do not take these into account<sup>2</sup>, and are therefore conservative in evaluating risk.

The UNEP Emission Gap Report 2018 (see more under Q3) states on page 18 “Recent research also showed that Earth system feedbacks could cause additional warming, both during (Comyn-Platt et al., 2018; Lowe et al., 2018) and beyond the 21st century (Fischer et al., 2018). This new literature on additional feedbacks therefore suggests that carbon budgets consistent with warming of 1.5°C or 2°C *may be approximately 100 GtCO<sub>2</sub> smaller.*” This is also mentioned in the IPCC SR15 report<sup>3</sup>.

However, the current presentation in both the above reports fall shorts of the real potential reality. The best summary is the Hothouse Earth paper<sup>4</sup>. This starkly states:

*“This analysis implies that, even if the Paris Accord target of a 1.5 °C to 2.0 °C rise in temperature is met, we cannot exclude the risk that a cascade of feedbacks could push the Earth System irreversibly onto a “Hothouse Earth” pathway. The challenge that humanity faces is to create a “Stabilized Earth” pathway that steers the Earth System away from its current trajectory toward the threshold beyond which is Hothouse Earth”.*

The associated figure:



clearly shows humanity's current landscape and the precariousness of the situation.

**Recommendation 5: Feedbacks must be realistically assessed and presented to Government with target options:** CCC should include a review of the latest literature on biogeophysical feedbacks as “further evidence”<sup>5</sup>.

<sup>2</sup> see IPCC SR15, [http://ipcc.ch/pdf/special-reports/sr15/sr15\\_draft.pdf](http://ipcc.ch/pdf/special-reports/sr15/sr15_draft.pdf), section 2.2.2, 2.2.2.1, 2.2.2.2

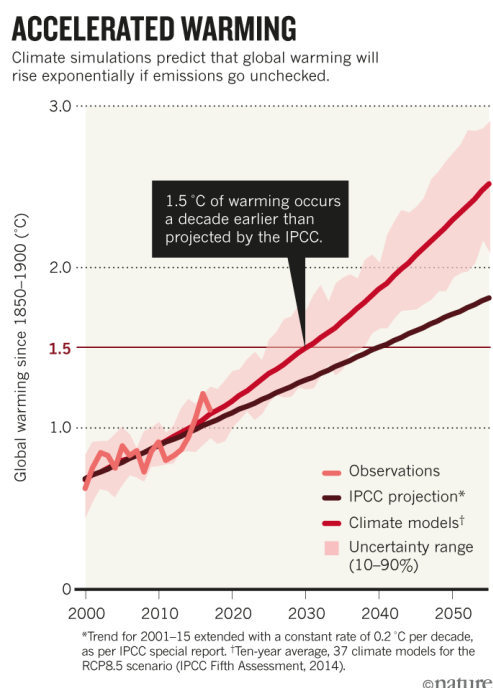
<sup>3</sup> Ibid, at page 108, lines 9-13.

<sup>4</sup> “Trajectories of the Earth System in the Anthropocene”, Steffan et al, PNAS (2018), <https://doi.org/10.1073/pnas.1810141115>.

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Literally, on eve of consultation close two new pieces of evidence have appeared:

- 1) A Nature commentary<sup>6</sup> stating "Three trends — rising emissions, declining air pollution and natural climate cycles — will combine over the next 20 years to make climate change faster and more furious than anticipated."



- 2) The Global Carbon Project reported<sup>7</sup> emissions were expected to grow in 2018 by 2.7% (1.8% - 3.7%), the fastest rate for 7 years.

**Recommendation 6: Risk of early 1.5°C demands Climate Emergency:** The triple lock above of growing emissions, faster overheating and irreversible feedbacks in 1.5°C - 2.0°C range require that CCC advise Government that there is a Climate Emergency. Long term planning with budgets to 2050 is no longer sufficient. Deep emission descent towards net-zero in timeframe to 2025-2030 is now necessary.

CCC must not duck from making a stark, clear message to Government including risks from feedbacks and early overheating. They should be considered with strong weight as the *credible and realistic worst-case scenario* under Oslo PP a)2) above.

Climate science demands government to take a reality check and give up their addiction to complacency and soft-denialism: otherwise, we are close to an unprecedented disaster for which future generations will hold them responsible. CCC must advise this strongly.

<sup>5</sup> The "Hothouse Earth" paper should be just the starting place. Whilst further papers may not be available, the scientists involved, some UK based, should be interviewed as to their latest research.

<sup>6</sup> Yangyang Xu et al, "Global warming will happen faster than we think", Nature 564, 30-32 (2018), <https://www.nature.com/articles/d41586-018-07586-5>

<sup>7</sup> See summary at <https://www.carbonbrief.org/analysis-fossil-fuel-emissions-in-2018-increasing-at-fastest-rate-for-seven-years>

**Question 1 (Climate Science):** The IPCC's Fifth Assessment Report and the Special Report on 1.5°C will form an important part 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?

Recommendations 1 ,2 ,3, & 4 for Strong Precautionary Principle, 1.5°C, no overshoot, and no less ambitious cheaper options are “no brainers” in this context.

**Question 2 (CO<sub>2</sub> and GHGs):** Carbon dioxide and other greenhouse gas gases have different effects and lifetimes in the atmosphere, which may become more important as emissions approach net-zero. In setting a net-zero target, how should the different gases be treated?

No time to respond in detail on this. Mitigation strategies must follow steep descent as for CO<sub>2</sub>, and recommendations 1 ,2 ,3, & 4 for Strong Precautionary Principle, 1.5°C, no overshoot, and no less ambitious cheaper options.

## **Part 2: International Action**

**Question 3 (Effort share):** What evidence should be considered in assessing the UK's appropriate contribution to global temperature goals? Within this, how should this contribution reflect the UK's broader carbon footprint (i.e. 'consumption' emissions accounting, including emissions embodied in imports to the UK) alongside 'territorial' emissions arising in the UK?

Recommendations 1 ,2 ,3, & 4 are for Strong Precautionary Principle, 1.5°C, no overshoot, and no less ambitious cheaper options. A UK policy contribution based by apportionment<sup>8</sup> on a global carbon budget for 1.5 degrees at 66% probability would be consistent with this. However, the IPCC is conservative on feedbacks and before the Nature paper on more rapid temperature increases. The primary evidence is from IPCC scenarios but needs to go beyond them where they are conservative.

The IPCC SR15 SPM, C1.3 sets out evidence for global carbon budgets whilst a CarbonBrief blog<sup>9</sup> provides a further narrative on the range, uncertainties of budget. Large uncertainties remain concerning non-CO<sub>2</sub> forcings, negative emission technologies (NETs), overshoot. The SPM gives a remaining budget of 420 GtCO<sub>2</sub> (from beginning of 2018) for 66% of meeting 1.5degrees. However, there is still large uncertainties in this – still being widely discussed by science community.

The IPCC SR15 widely quoted “12 years” is clearly just one possible timespan for remaining budget within a large error range. Given more rapid temperature increases (Nature paper above) and risks from feedbacks, other timespans such as net-zero by 2025 (Extinction Rebellion<sup>10</sup>) are quite likely to be more realistic. The UK contribution should be to decarbonise on a war like footing immediately. Effort should not be spared, and UK should proceed with “no less ambitious cheaper options” (Oslo PP).

<sup>8</sup> I am not addressing different apportionment methods here

<sup>9</sup> <https://www.carbonbrief.org/analysis-why-the-ipcc-1-5c-report-expanded-the-carbon-budget>

<sup>10</sup> <https://rebellion.earth/demands/>

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The UNEP Emission Gap Report 2018<sup>11</sup> showed that existing international climate pledges needed to be “roughly tripled” to limit warming to well below 2°C, and “increased around fivefold” to meet 1.5°C. Again, the UK should not spare effort to bridge this emission gap and proceed with “no less ambitious cheaper options”.

The UK's effort should be based on both consumption and territorial emissions. We have to be honest as a nation as to our real carbon footprint and take the necessary actions to decarbonise fully in respect of that honest appraisal.

The UK should support moves for international emission inventories to be based on both consumption and territorial emissions per country. A recent report<sup>12</sup> stated that “*one quarter of global CO2 emissions are embodied in imported goods, thus escaping attribution in the consuming country (the end user) and instead being debited at the producer side.*”

**Question 4 (International collaboration):** Beyond setting and meeting its own targets, how can the UK best support efforts to cut emissions elsewhere in the world through international collaboration (e.g. emissions trading schemes and other initiatives with partner countries, technology transfer, capacity building, climate finance)? What efforts are effective currently?

no answer

**Question 5 (Carbon credits):** Is an effective global market in carbon credits likely to develop that can support action in developing countries? Subject to these developments, should credit purchase be required/expected/allowed in the UK's long-term targets?

ANSWER: First question – down to UNFCCC COP24 and other negotiations. Developing countries should be helped financially but not by rich countries avoiding emissions cuts.

Second question - No. UK should be self-sufficient in reducing its emissions and set an example to the world. Ultimately, offsetting and credits are a scam that fronts denial of the need for maximum emissions descent.

The UK led the way in carbonisation during 19<sup>th</sup> and 20<sup>th</sup> centuries, we should now lead the way in decarbonisation and not buy it elsewhere.

<sup>11</sup> <https://www.unenvironment.org/resources/emissions-gap-report-2018>

<sup>12</sup> The August 2018 “CARBON LOOPHOLE IN CLIMATE POLICY” report, <https://buyclean.org/media/2016/12/The-Carbon-Loophole-in-Climate-Policy-Final.pdf>. Figure 2.4 (2015 data from worldmrio.com) of this report shows UK imports at 37 MtCO<sub>2</sub>eq/yr, exports 11MtCO<sub>2</sub>eq/yr – net 26MtCO<sub>2</sub>eq/yr unaccounted. Key databases are listed at Appendix A5.2.



### **Part 3: Reducing emissions**

**Question 6 (Hard-to-reduce sectors):** Previous CCC analysis has identified aviation, agriculture and industry as sectors where it will be particularly hard to reduce emissions to close to zero, potentially alongside some hard-to-treat buildings. Through both low-carbon technologies and behaviour change, how can emissions be reduced to close to zero in these sectors? What risks are there that broader technological developments or social trends act to increase emissions that are hard to eliminate?

**Recommendation 7: A Land Use report, V2, is urgently needed:** The recent CCC Land Use reports goes in the right direction, and I welcome it. However, Climate Emergency planning is now required, and further evidence and research should be done of making an 80% emissions reduction in the Land Use sector by 2030 (as opposed to the 35%-80% reduction by 2050 in report).

Rapid downscaling livestock/dairy consumption<sup>13</sup> is essential. This does involve behavioural change to help the population to transition, in bulk, to plant-based diets, and for agricultural communities to be helped to transition to other low carbon farming and economic activity. Further related comments accelerating AFOLU but no reliance on BECCS are made at question 7.

**Recommendation 8: Aviation – rapid reduction with help for public to transition:** The aviation sector also requires behavioural change supported by innovative transport policy. This is not just about not building Heathrow runway 3, but actively downscaling aviation dependence due to Climate Emergency. Research on communicating the right messages, and helping people drastically reduce flying, are urgently needed.

**Recommendation 9: The IT sector needs close monitoring.** The global IT carbon footprint is believed to be around 1GtCO<sub>2</sub>eq per year, or 2%-2.5% of global total. Reductions are difficult to foresee, and this becomes significant as maximum emissions descent occurs in other sectors. For example, at 75% total reduction, the current c.2.5% for IT with no reduction would be 10% of total.

IT emissions must not be allowed to expand, and decarbonisation planning is required. Profligate technologies such as some blockchain implementations should be banned<sup>14</sup> globally.

Generally, server farm efficiency has improved in recent years, for example in hyperscale data centres studied by Dr Shehabi<sup>15</sup> in the US. Situation is UK unknown, however, note this warning in Shehabi's report at section 6.5, 'Beyond 2020', "*The key efficiency strategies identified in this report, improved PUE, increased server utilization rates, and better power proportionality all have theoretical and practical limits and the current rate of improvement indicates that these limits may be reached in the not too distant future.*" (my emphasis)

<sup>13</sup> <https://www.grain.org/article/entries/5825-big-meat-and-dairy-s-supersized-climate-footprint> - This research shows globally, there are a few corporations which have very significant, and growing, carbon footprints in the Big Meat and Big Dairy sectors. Agricultural emissions should be treated as a "carbon major".

<sup>14</sup> Also, CCC should advise Government to ban IT strategies which are profligate and non-essential, such as some blockchain implementations (eg: Bitcoin) – users of these systems amount to climate criminals (and often real-world criminals too). Note, I believe that there are non-profligate blockchain algorithms being developed for benign scientific applications, and this distinction is required!

<sup>15</sup> Dr Arman Shehabi of US Lawrence Livermore Labs, [https://eta.lbl.gov/sites/all/files/publications/lbnl-1005775\\_v2.pdf](https://eta.lbl.gov/sites/all/files/publications/lbnl-1005775_v2.pdf).

**Question 6 (Hard-to-reduce sectors):** Previous CCC analysis has identified aviation, agriculture and industry as sectors where it will be particularly hard to reduce emissions to close to zero, potentially alongside some hard-to-treat buildings. Through both low-carbon technologies and behaviour change, how can emissions be reduced to close to zero in these sectors? What risks are there that broader technological developments or social trends act to increase emissions that are hard to eliminate?

I suspect that the current generation of processors with meltdown/spectre security fixes<sup>16</sup> will have brought Shehabi's limit for server farm utilisation closer, as the fixes reduce server utilisation rates. Research is needed here on server farm efficiency general, and the UK (CCC) should commission similar work to Shehabi's, also taking into account microprocessor design<sup>17</sup>.

As well as efficiencies in IT design, server farms must be migrated to zero-carbon energy sources<sup>18</sup>.

There are emissions elsewhere in IT not covered here (lack of time to research properly).

More work is required in UK in understanding IT emissions, risks of their escalation and barriers to decarbonisation.

**Question 7 (Greenhouse gas removals):** Not all sources of emissions can be reduced to zero. How far can greenhouse gas removal from the atmosphere, in the UK or internationally, be used to offset any remaining emissions, both prior to 2050 and beyond?

The main CDR technology is CCUS: there are many issues with it, considered below. The PP must be applied to the risks outlined.

But first, CDR must not be used as a reason for any complacency: the recommendation below is key:

**Recommendation 10: Deep, Non-CCUS Emission Reductions before 2030 are critical:** Although this consultation is on longer term targets, the most vital question is still “*what can we do before 2030?*”. CCUS in the UK can contribute little by this date<sup>19</sup>. Further, the European Academies' Science Advisory Council (EASAC) stated that negative emission technologies (NETs) offer only “limited realistic potential”<sup>20</sup> and called on

*“all actors to strengthen mitigation measures, which are currently inadequate, rather than assuming that future technologies will be able to remove large amounts of carbon dioxide from the air”.*

<sup>16</sup> Note that changes in microprocessor design may also have impacts – the across-the-board fixing of the recent meltdown/spectre security flaws meant that in some applications processors to do more work (increased CPU cycles and, therefore, more energy) to achieve the same output. The impacts of this are unknown, or have not been widely studied yet, and are also under legal protection by microprocessor manufacturers (see for example, <https://www.zdnet.com/article/intel-gags-linux-distros-from-revealing-performance-hit-from-spectre-patches/>)

<sup>17</sup> Microprocessor design may also be used to bring down energy use, and possibly quantum computer for certain applications, and research in these areas should be encouraged where there is a climate benefit.

<sup>18</sup> See excellent piece of reporting at <https://kuow.org/stories/what-amazon-doesn-t-want-you-know-about-cloud/> on Amazon in US. Related UK situation unknown to author.

<sup>19</sup> CCC in responding to the Clean Growth Strategy estimated that CCUS could “save around 2.5MtCO<sub>2</sub>e in 2030”

<sup>20</sup> <https://easac.eu/press-releases/details/negative-emission-technologies-will-not-compensate-for-inadequate-climate-change-mitigation-efforts/>



**Question 7 (Greenhouse gas removals):** Not all sources of emissions can be reduced to zero. How far can greenhouse gas removal from the atmosphere, in the UK or internationally, be used to offset any remaining emissions, both prior to 2050 and beyond?

**Therefore, CCC should focus on front-loaded emission reduction trajectories between now and 2030 that maximise reductions without reliance on CCUS.**

**Recommendation 11: IPCC SR15 P1 + demand reduction + revolution in land use:**

The above means taking the IPCC SR15 P1 model pathway<sup>21</sup> as a basis for the UK and modifying it with **the highest possible levels** of demand reduction and decarbonisation in the energy and transport sectors - this suggests the best aspects of pathway P2 are also included - combined with increased CDR from Agriculture, Forestry and Other Land Use (AFOLU) **beyond current UK ambitions**<sup>22</sup>.

**Recommendation 12: Build in NO reliance on CCUS or BECCS:** Extreme caution is required on BECCS for these general reasons:

- The critical role played by *land-use emissions*. Harper<sup>23</sup> paper states:  
***“If BECCS involves replacing high-carbon content ecosystems with crops, then forest-based mitigation could be more efficient for atmospheric CO2 removal than BECCS”.***
- The general effects of CO2 removal on the *global carbon cycle*. Keller<sup>24</sup> paper states:  
***“We also identify future research that will be needed if CDR is to play a role in climate change mitigation”***<sup>25</sup>
- Biodiversity impacts, bioenergy food price impacts, bioenergy water demands<sup>26</sup>

**Recommendation 13: BECCS: Ensure that climate, pollution and health policies work together:** Bioenergy produces air pollutants such as black carbon, PM2.5 and SO2. This poses an emission rebound effect associated with large scale BECCS roll-out: it will differ with different combustion technologies and CCS extraction technologies, **but we currently lack an adequate evidence base**<sup>27</sup> **to support any reliance on BECCS on this reason alone.**

<sup>21</sup> IPCC SR15 Summary for Policymakers, SPM-18

<sup>22</sup> CCC's recent report on Land Use emissions saved 35% - 80% of the current footprint of 53 MtCO<sub>2</sub>e by 2050. However, the Climate Emergency demands further evidence and research should be done of making 80% reduction in this sector by 2030. To some extent, this may be done by pushing the envelope on the policies in the report – for example, maximising from 2019 peatland restoration, afforestation, hedgerow/woodland planting, livestock reduction, transition to plant-based diets. **The advised targets for each of these should be doubled or tripled.** Please revisit the economic projections in the Land Use report for maximum emissions descent in the sector (under the Oslo PP b) maximum descent should be adopted without regard to cost).

<sup>23</sup> Harper et al, Nature Communications (2018) - <https://www.nature.com/articles/s41467-018-05340-z.pdf>

<sup>24</sup> Keller et al, Current Climate Change Reports (2018) - <https://doi.org/10.1007/s40641-018-0104-3>

<sup>25</sup> these include coordinated studies to better understand (i) the underlying mechanisms of each method, (ii) how they could be explicitly simulated, (iii) how reversible changes in the climate and carbon cycle are, and (iv) how to evaluate and monitor CDR.

<sup>26</sup> see: [https://fern.org/sites/default/files/news-pdf/Fern%20BECCS%20briefing\\_0.pdf](https://fern.org/sites/default/files/news-pdf/Fern%20BECCS%20briefing_0.pdf)

<sup>27</sup> For an exception see (“Exploring the 2°C target scenarios by considering climate benefits and health benefits – role of biomass and CCS”, Tatsuya Hanaoka et al, Energy Procedia 114 ( 2017 ) [https://ac.els-cdn.com/S1876610217316090/1-s2.0-S1876610217316090-main.pdf?\\_tid=87348a02-dbc4-471e-9310-c40ecb0b8c49&download=true&acdnat=1539776620\\_bae8f62ce7d01895e303eb9d00d4808a](https://ac.els-cdn.com/S1876610217316090/1-s2.0-S1876610217316090-main.pdf?_tid=87348a02-dbc4-471e-9310-c40ecb0b8c49&download=true&acdnat=1539776620_bae8f62ce7d01895e303eb9d00d4808a) ). This figure from the Hanaoka paper for PM2.5 generation with BECCS in Asia is very telling, and shows the modelled non-CO2 emissions rebound effect in deploying CCS with coal and biomass.

**Question 7 (Greenhouse gas removals):** Not all sources of emissions can be reduced to zero. How far can greenhouse gas removal from the atmosphere, in the UK or internationally, be used to offset any remaining emissions, both prior to 2050 and beyond?

Given IPCC promotion of BECCS, it is a major omission that the PM2.5 rebound effect (see figure in footnote) is not mentioned in the IPCC SR15 report<sup>28</sup>. A detailed scientific assessment of the air pollution rebound from BECCS is urgently required to ensure that climate, pollution and health policies are really joined up – the UK science and medical community could lead on this<sup>29</sup>.

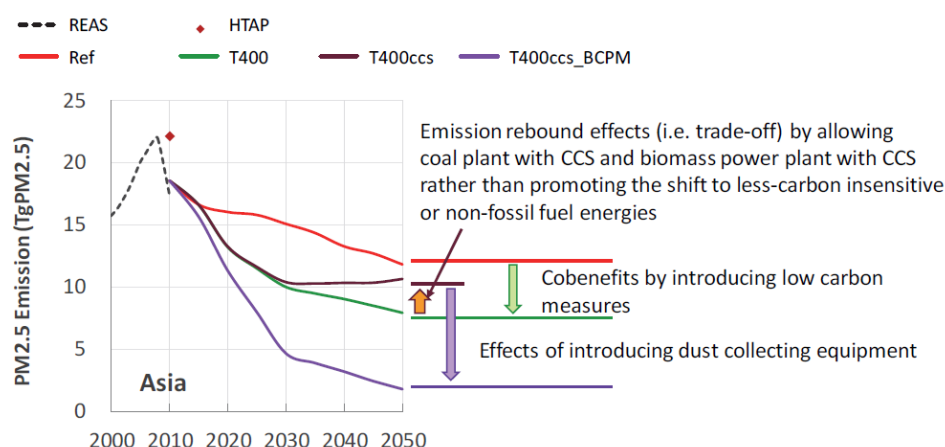
In summary, no reliance should be placed on BECCS – instead maximal emissions descent *without regard to cost* from all existing sectors – front-loaded to 2030 - must be factored into the new CCA target(s).

**Question 8 (Technology and Innovation):** How will global deployment of low-carbon technologies drive innovation and cost reduction? Could a tighter long-term emissions target for the UK, supported by targeted innovation policies, drive significantly increased innovation in technologies to reduce or remove emissions?

ANSWER:

First question, not answered. Yes, to second question – stretched targets will support innovation and technology advance.

However, there is an immediate need for rapid change faster than neo-liberal, free-market, technology innovation can produce. Demand reduction, change of economic system, 2<sup>nd</sup> world war like approach to climate emergency are required.



<sup>28</sup> page 5-27, section 5.4.2.1 discusses air pollution and health, but only the benefits of reducing fossil-fuel burning.

<sup>29</sup> Given the precarious legal position on the UK Government regarding air pollution, and the growing realisation that no level of PM2.5 is safe, I strongly urge CCC to commission such research for the impact of BECCS take up in the UK and European Union.

**Question 9 (Behaviour change):** How far can people's behaviours and decisions change over time in a way that will reduce emissions, within a supportive policy environment and sustained global effort to tackle climate change?

Behavioural change will come when the politicians move out of soft-denial and take climate change seriously and act. Politicians need to take responsibility for the long-term future, and then communicate with people why tough climate policy is required. They need to do it now by declaring a Climate Emergency.

The Green Alliance report by Rebecca Willis<sup>30</sup> may be useful<sup>31</sup> here. There is some circularity here as people need to make it clear to politicians that they want them to act and are prepared to vote for them if they do. The people are starting give this message to the politicians.

The narrative and landscape have moved rapidly in last few months, and recent declarations of Climate Emergency at the local government level are encouraging.

**Question 10 (Policy):** Including the role for government policy, how can the required changes be delivered to meet a net-zero target (or tightened 2050 targets) in the UK?

Covered elsewhere, I think.

#### **Part 4: Costs, risks and opportunities**

**Question 11 (Costs, risks and opportunities):** How would the costs, risks and economic opportunities associated with cutting emissions change should tighter UK targets be set, especially where these are set at the limits of known technological achievability?

Currently we are in a Climate Emergency situation and must apply the Oslo PP including adopting the most risk averse policy *without regard to cost*.

**Question 12 (Avoided climate costs):** What evidence is there of differences in climate impacts in the UK from holding the increase in global average temperature to well below 2°C or to 1.5°C?

No answer

#### **Part 5: Devolved Administrations**

**Question 13 (Devolved Administrations):** What differences in circumstances between England, Wales, Scotland and Northern Ireland should be reflected in the Committee's advice on long-term targets for the Devolved Administrations?

All devolved administrations need to need to recognise and declare a Climate Emergency

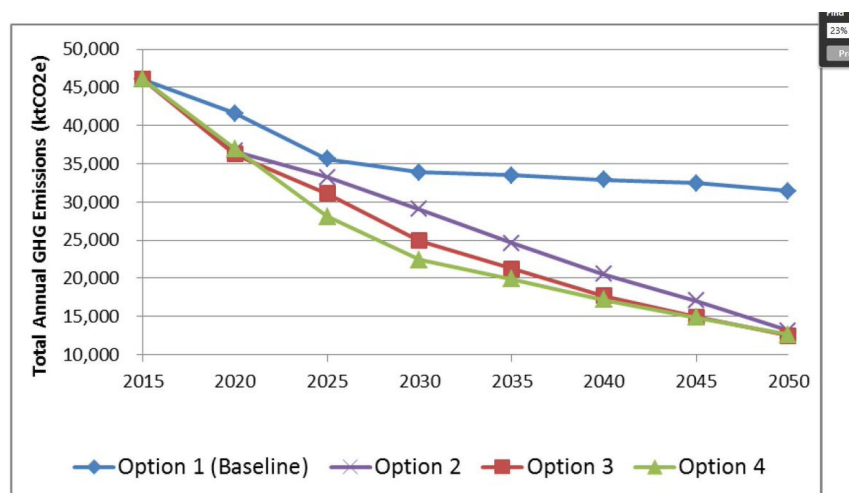
<sup>30</sup> [https://www.green-alliance.org.uk/resources/Building\\_a\\_political\\_mandate\\_for\\_climate\\_action.pdf](https://www.green-alliance.org.uk/resources/Building_a_political_mandate_for_climate_action.pdf)

<sup>31</sup> I see @ChiefExecCCC likes it today in a tweet!

**Question 13 (Devolved Administrations):** What differences in circumstances between England, Wales, Scotland and Northern Ireland should be reflected in the Committee's advice on long-term targets for the Devolved Administrations?

and follow the Oslo PP in developing the most risk averse policy that they can. Whilst this second-guesses the consultation outcome, net-zero is required as soon as possible – 2025-2030.

It is deeply disappointing that Wales has this week set unambitious carbon budgets choosing Option 2 in the graph below<sup>32</sup>.



**Figure 3: Comparison of predicted emission levels under the four options**

Wales need to be brought into line with rest of UK and Scotland with the CCC target refresh and given necessary help to catch up where needed. Further Wales is poised to start an M4 expansion scheme that by their own calculation increases transport carbon emissions across South Wales by 10% by 2036 (against CCC advice to government that 44% reduction in transport emissions is required by 2030) – a reality check is required by Welsh government.

## Part 6: CCC Work Plan

**Question 14 (Work plan):** The areas of evidence the Committee intend to cover are included in the 'Background' section. Are there any other important aspects that should be covered in the Committee's work plan?

**Recommendation 14: The CCC should advise government on how to increase the contribution by local government.**

First, the extremely divergent, inconsistent practice across the local government sector on climate change needs to be addressed.

Second, some serious work needs doing in communicating to local authorities what can be achieved through local plan making. A legal obligation is set on local authorities that<sup>33</sup>:

*"Development plan documents must (taken as a whole) include policies designed to*

<sup>32</sup> Documents to Welsh Assembly members - <http://www.assembly.wales/laid%20documents/sub-ld11810-em/sub-ld11810-em-e.pdf>

<sup>33</sup> <http://www.legislation.gov.uk/ukpga/2004/5/section/19>

**Question 14 (Work plan):** The areas of evidence the Committee intend to cover are included in the 'Background' section. Are there any other important aspects that should be covered in the Committee's work plan?

*secure that the development and use of land in the local planning authority's area contribute to the mitigation of, and adaptation to, climate change."*

This was introduced by the Planning Act 2008<sup>34</sup> at the same time as the Climate Change Act. The legislative intention was entirely clear at the time<sup>35</sup> but has subsequently been almost completely ignored.

I suggest strongly that a four-fold best practice could be developed as in provided footnote<sup>36</sup> which would restore the original legislative intention, and bring more uniformity in local authority policy, methodology and ambition. This is based in part on a recent TCPA/RTPI<sup>37</sup> report and expanded to a generic, top-level methodology by me.

I would also highlight these suggestions for the CCC's work plan from the various questions:

- 1) Recommendation 13: BECCS: Ensure that climate, pollution and health policies work together, as described in section Q7.

I emphasise that the potential impact of PM2.5 emissions for large scale roll-out of BECCS appear not to have been addressed widely by the science and medical community as yet. This needs urgently addressing. As suggested UK science and medicine could lead in producing a detailed scientific assessment of the air pollution rebound from BECCS to ensure that climate, pollution and health policies are really joined up.

- 2) Recommendation 7 for A Land Use report, V2 as described in section Q6.

<sup>34</sup> <http://www.legislation.gov.uk/ukpga/2008/29/section/182>

<sup>35</sup> <https://publications.parliament.uk/pa/cm200708/cmhansrd/cm080125/debtext/80125-0005.htm>

"We need to ensure that every element of our economy and society can reinforce our ambitions to cut carbon emissions and tackle climate change throughout the fields of transport, buildings and industry. The new planning rules set out stronger environmental requirements for local authorities, putting the tackling of climate change at the heart of the planning system for the first time. ... clause 147, which is entitled, "Development plan documents: climate change policies" ... sets out that local authorities must include policies in their development plan documents that are:

"designed to secure that the development and use of land in the local planning authority's area contributes to the mitigation of, and adaptation to, climate change."

**In effect, the clause puts a duty on councils to take action on climate change in preparing their local plans. It does precisely what it says on the tin ... "**

Iain Wright, MP, DCLG minister Hansard, 25 January 2008

<sup>36</sup>

1. Councils set about understanding their baseline CO2 emissions, and particularly those which are shaped by their policies and by strategic planning decisions. This requires:

⇒ **rigorous, cost-effective, fit-for-purpose, carbon footprinting**

2. Councils set about understanding the actions needed to reduce emissions over time, and particularly work on those that are shaped by their decisions and plans. This requires:

⇒ **carbon forecasting against policy/strategy options using carbon footprint models developed at 1**

3. Councils demonstrate how policy options contribute to the Climate Change Act target regime:

⇒ **select options against forecasts developed at 2. In current Climate Emergency, the selected option must be the one with maximum emissions reductions (Oslo PP etc).**

4. Councils develop serious and informative annual monitoring including ongoing assessments of carbon performance against the CCA target:

⇒ **monitoring against carbon footprinting forecast for selected option.**

<sup>37</sup> "Planning for Climate Change, A Guide for Local Authorities", [bit.ly/TCPA-RTPI-CC](http://bit.ly/TCPA-RTPI-CC), section 2.2

**Question 14 (Work plan):** The areas of evidence the Committee intend to cover are included in the 'Background' section. Are there any other important aspects that should be covered in the Committee's work plan?

3) Recommendation 9 for more work on IT sector at section Q7.

## **Part 7: Summary**

### **Recommendations**

Recommendation 1: Strong Precautionary Principle

Recommendation 2: 1.5°C

Recommendation 3: No overshoot

Recommendation 4: No less, ambitious "cheaper" options

Recommendation 5: Feedbacks must be realistically assessed and presented to Government with target options

Recommendation 6: Risk of early 1.5°C demands Climate Emergency

Recommendation 7: A Land Use report, V2, is urgently needed

Recommendation 8: Aviation – rapid reduction with help for public to transition

Recommendation 9: The IT sector needs close monitoring

Recommendation 10: Deep, Non-CCUS Emission Reductions before 2030 are critical

Recommendation 11: IPCC SR15 P1 + demand reduction + revolution in land use

Recommendation 12: Build in NO reliance on CCUS or BECCS

Recommendation 13: BECCS: Ensure that climate, pollution and health policies work together

Recommendation 14: The CCC should advise government on how to increase the contribution by local government