Committee on Climate Change

Independent advice to government on building a low-carbon economy and preparing for climate change

7 December 2018

Dear Sir/Madam,

Re: Evidence from Oil Change International

I have pleasure in submitting my response to your call for evidence on Building a Zero-Carbon Economy. I commend the government on requesting this review and am confident it will maintain the UK's world-leading role through the Climate Change Act.

Revision of the 2050 target should reflect the Paris goal of pursuing efforts to limit warming to 1.5°C, with the UK allocated its fair share of effort in line with its historic responsibility for climate change and greater capacity than most countries to devote to climate action.

I am Research Director at Oil Change International, a research and campaign group that aims to speed the transition from fossil fuels to clean energy. My research focuses on the implications of the Paris goals for fossil fuel extraction, with a particular focus on oil and gas. At a global level, this was published in *The Sky's Limit: Why the Paris Climate Goals Require a Managed Decline of Fossil Fuel Production,* by fifteen civil society organisations internationally. Together with other researchers, we are currently working on a paper for the peer reviewed literature, building on that analysis. I am also currently researching the specific implications for the UK energy sector and would be happy to share that research with the Committee in the early part of 2019.

As well as the UK, over the last 20 years I have researched, written and advised on energy and/or climate in Azerbaijan, Canada, Germany, Iraq, Kazakhstan, Norway, Russia and the United States. I was recently an expert witness for the Irish parliament's scrutiny of its Climate Emergency Measures Bill.

I would be happy to provide any further information as required by the Committee.

Yours faithfully,

Greg Muttitt

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?

ANSWER:

The IPCC Special Report on 1.5°C (SR15) provides valuable new evidence. In particular, I draw the Committee's attention to the rapid decline in oil and gas use in low-BECCS scenarios.

I also encourage the Committee to consider the nascent but growing body of literature on how restricting fossil fuel extraction can be an effective part of efforts to mitigate climate change. Indeed, restricting supply has been the approach to addressing the impacts of other harmful substances, from ozone-depleting chemicals to landmines.

Findings from this literature include:

- In Norway, emissions can be reduced by tackling fossil fuel supply at less than half the cost of tackling demand (Fæhn et al 2017, https://doi.org/10.5547/01956574.38.1.tfae).
- In both economic and political efficiency, supply-side mitigation has several advantages over demand-side (Green and Denniss 2018, https://doi.org/10.1007/s10584-018-2162-x).
- By ceasing issuance of permits for new oil wells, California could reduce CO2 emissions substantially (Erickson et al 2018, https://doi.org/10.1038/s41558-018-0337-0).

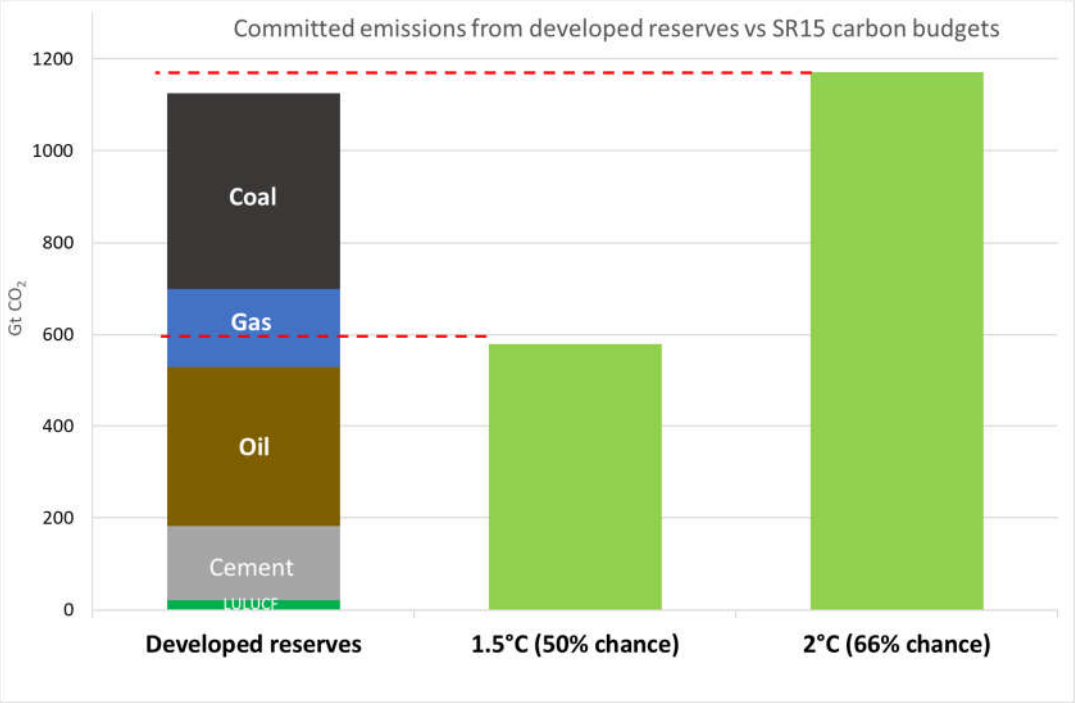
Some argue that if the UK (for instance) stopped extracting oil and gas, another country would extract the same amount instead. This is not true, although *part* of the mitigation effect is lost to leakage, on both supply and demand sides. Stockholm Environment Institute (SEI) has assessed the relative leakage from supply-side and demand-side and examined effective policies for restricting supply.

New fossil fuel supply investment can in fact make emissions mitigation harder, because of the problem of *carbon lock-in*: once capital-intensive infrastructure is built, it is very difficult for alternative energy sources to compete. It creates political/institutional obstacles as well as perverse economic incentives (Seto et al 2016, https://doi.org/10.1146/annurev-environ-110615-085934; Geels et al 2014, https://doi.org/10.1177%2F0263276414531627).

There have been several studies (eg Meinshausen et al 2009, https://doi.org/10.1038/nature08017; McGlade & Ekins 2015, https://doi.org/10.1038/nature14016) finding that the world's stock of fossil fuel reserves significantly exceeds the carbon budget aligned with 2°C: hence a large share of oil, gas and coal will need to be left in the ground.

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?

My own research focuses on *developed reserves*, those in already-producing fields and mines where the infrastructure has been built and the capital invested. It finds that emissions from those reserves of oil, gas and coal would significantly exceed the 1.5°C budget, and exhaust almost all of the 2°C budget. The implication is that any investment in new development of fields, mines and infrastructure risks either creating stranded assets, or given the problem of lock-in, making achievement of climate goals more difficult.



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?

ANSWER:

On effort sharing, I would encourage the committee to go beyond the equal-per-capita basis used in calculating the previous 2050 target. At the heart of the UNFCCC and Paris Agreement is the understanding that efforts should be shared according to common but differentiated responsibilities and respective capabilities. This means that the greatest efforts should be made by countries like the UK that have the greatest responsibility for contributing to climate change (the largest historic emissions) and the greatest capability to act (in terms of financial and technical resources).

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?

The per capita principle is not consistent with the Paris Agreement and is unlikely to lead to an effective global mitigation effort, because it will not be seen as fair. The UK must move faster than the global average.

There have been significant efforts to quantify what a more equitable effort-sharing might look like. Many civil society groups have unified around a practical approach (website and calculator) that calculates each country's fair share of effort in proportion to its historic responsibility and per capita income (above a threshold to remove poor people's income from the calculation). It combines emissions reduction and climate finance, allowing countries to meet part of their fair share of emissions reduction at home and part in poorer countries through provision of climate finance.

To assess fair mitigation efforts alone, the Tyndall Centre takes a different approach, starting with the most ambitious plausible rate of emissions reduction in non-OECD countries, leaving the remainder to be carried out in OECD, with various bases for then allocating within the OECD.

I welcome the Committee's proposal to look more broadly than territorial emissions. Consumption emissions are a valuable part of the picture. There are two other bases for emissions accounting that I recommend the Committee also consider:

1) **Extraction basis**: Counting carbon at the point of extraction has accounting advantages over the point of combustion, in that it reduces the number of point sources from tens of billions to tens of thousands (about 95% of fossil fuels are combusted).
2) **Committed emissions basis**: Since high-carbon infrastructure such as power stations, pipelines and oil platforms locks in future emissions over its lifetime, Davis and Socolow (2014, http://dx.doi.org/10.1088/1748-9326/9/8/084018) have proposed accounting for a piece of infrastructure's committed emissions at the time the infrastructure is built. Matthews (2014, http://dx.doi.org/10.1088/1748-9326/9/11/111001) has built on that work to apply it to reserves and extraction.

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?

ANSWER:

The UK has demonstrated the value of building momentum among a group of countries through its leadership in the Powering Past Coal Alliance. Since it was launched in 2017, 28 national and 19 subnational governments have committed through the initiative to phasing out coal, which also puts pressure on others to follow suit.

There is an opportunity for similar momentum-building leadership, with the emerging trend towards ending new oil and gas licensing. France legislated a licensing ban in December 2017, joining Costa Rica and soon after Belize joined too. In April 2018, New Zealand ended offshore licensing of oil and gas. Ireland is currently legislating a bill. We know from private conversations that several governments are considering following suit. While these are relatively small producers of oil and gas, it is common sense that smaller players can be the first to move. The UK should end new licensing of oil and gas, which would give significant momentum to this grouping.

As the number of such jurisdictions grows, it will put increasing pressure on the largest producers, in many of which there is already an active debate. In Norway, a 2018 opinion poll found 44 percent of respondents favoured curbing oil production to protect the climate, compared to only 42 percent opposed; the oil question became central in Norway's election debates. In Canada, public opposition to pipelines that would expand tar sands production has created a political crisis for the Trudeau government. In California, over 750 environmental, labour, health and social justice groups called on (outgoing) Governor Jerry Brown to stop issuing permits for oil drilling and begin the phase-out of fossil-fuel production within the state.

A further important role for the UK is in international finance. While coal funding is generally excluded already, export finance via UKEF and bilateral development aid should both cease support for fossil fuel projects generally, following the lead of the World Bank Group, which has committed to end upstream oil and gas finance in 2019, and Sweden, which announced in 2017 that the Swedish development finance institution, Swedfund, would no longer finance fossil fuels.

Question 5: no answer

Part 3: Reducing emissions

Question 6: no answer

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?

ANSWER:

There is an important need for reforestation and ecosystem restoration, which can offset modest amounts of unavoidable emissions.

Novel carbon dioxide removal (CDR) technologies may ultimately offer a useful route to further reduce the extent of climate change and deserve research. However, while novel CDR technologies such as BECCS work very well in the models – they suit the models' cost-optimising logic – they have seen little practical demonstration (in some cases none), and all face significant challenges.

The IPCC Special Report stated, "Carbon cycle and climate system understanding is still limited about the effectiveness of net negative emissions to reduce temperatures after they peak" (p.SPM-23) adding that carbon dioxide removal "deployed at scale is unproven and reliance on such technology is a major risk in the ability to limit warming to 1.5°C" (p.2-6).

Bioenergy grown on the wrong soils, or replacing existing biomass, or using the wrong inputs (such as fertiliser and machinery) can emit more CO2 than it absorbs. CO2 injected in the wrong geological structure may not be safe over the long term. Thus to have an effective large-scale NETs system based on BECCS would require extensive monitoring and regulation, both of bioenergy growing and of CCS storage, in order to ensure emissions were actually negative. How this could be governed internationally, with what incentives, funding and penalties, is one of the largest uncertainties in the NETs assumptions.

Given these uncertainties and challenges, it would be imprudent to design emission pathways on the assumption that large-scale CDR will be available. If it ultimately turns out to be impractical, the world will be left with irreversible emissions. A more sensible, precautionary approach is to identify the emissions cuts needed on an assumption that novel CDR technologies will not be available, with the potential for safer outcomes if they do work out.

The European Academies Science Advisory Council advises that "Scenarios and projections of NET's future contribution to CDR that allow Paris targets to be met thus appear optimistic on the basis of current knowledge and should not form the basis of developing, analysing and comparing scenarios of longer-term energy pathways for the European Union…. The primary focus must be on mitigation, on reducing emissions of greenhouse gases."

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:

While there is much that government can contribute through science and technology policy, the most important driver of innovation lies in the old adage: necessity is the mother of invention. A tighter long-term emissions target will certainly drive innovation (as long as businesses believe the government is serious about meeting it).

This is another reason for addressing fossil fuel supply. When companies, entrepreneurs and markets perceive a real limitation in the availability of fossil fuels, they will see greater opportunities in innovating in zero-carbon technologies and businesses to deliver energy services. Conversely, as long as many hold a scepticism about whether climate change will successfully be addressed, and whether the fossil fuel economy will decline, there are weaker incentives to invest fully in alternatives.

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?

ANSWER:

I do not wish to diminish the importance of understanding behavioural patterns in order to optimise effective pathways to achieving a zero-carbon economy. However, I would qualify that by pointing out that relying primarily on behaviours and decisions by energy consumers is unlikely to deliver change at a pace consistent with the Paris goals. Several commentators (eg Smil 2016) have argued that energy transitions necessarily take many decades, pointing to past transitions from wood to coal, coal to oil and so on. Even in those cases, the old energy technology generally persisted, often continuing to grow in absolute terms, while only reducing its dominant share of the overall energy mix.

If it were unqualifiedly true that energy transitions are slow and partial, prospects for achieving the Paris goals would be dim. However, there is another lesson from those studies, that in each case the transition was largely bottom-up, driven by behaviours and choices. Other studies (eg Sovacool 2016, http://dx.doi.org/10.1016/j.erss.2015.12.020) have shown that much faster transitions are (thankfully) possible: what enables them is a concerted effort by government to pull numerous policy levers, including regulation, public investment, subsidies and training. A good example is the French transition to nuclear power generation: driven by government strategic prioritisation and concerted and coordinated policy efforts, nuclear's share of French power generation increased from 4% in 1974 to over 60% in 1984 and nearly 75% in 1994. To be clear, I am not advocating nuclear power, but rather drawing from this the lesson that a rapid transition is possible if a government is determined to deliver it.

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?

I believe the lesson is that while it is important to understand behavioural dynamics, government must take an active approach in both enabling and driving the transition, including through regulatory measures.

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?

ANSWER:

As outlined above, restricting fossil fuel extraction is an important part of the climate policy mix; that is what I will focus on here. In particular, the UK's current policy towards oil and gas extraction is to Maximise Economic Recovery (MER). Given the lock-in effects, the misdirection of capital and the impact on energy markets, a policy of maximising fossil fuel extraction is not consistent with efforts to achieve the Paris goals. I recommend that the MER policy be dropped, in favour of a policy that explicitly aligns fossil fuel extraction volumes with the Paris goals.

The UK government has recognised the climate impacts of fossil fuel extraction in its decision to reject the application for a coal mine at Druridge Bay. The Welsh Government has stated that it will reject coal mine applications as a matter of policy. The Scottish and Welsh Governments have enacted moratoria on oil and gas extraction by hydraulic fracturing (fracking). These positive moves should be extended to offshore oil and gas, and to fracking in England.

More specifically, the UK should stop licensing new oil and gas fields, offshore or onshore, and instead focus on managing the decline of existing production, in order to minimise disruption to jobs and economy. Given that oil and gas licenses are generally operated for 20 or 30 years, a 2050 net-zero target would imply no new licensing rounds as of now.

Furthermore, fiscal policy towards North Sea extraction is shaped by MER, notably the major tax breaks granted in the 2015 and 2016 budgets, and the Transferable Tax History policy in the 2018 Finance Bill. The UK has adopted a far narrower definition of subsidies, limited to those that directly reduce prices for consumers; as such the UK has claimed it has no fossil fuel subsidies, putting its approach at odds with the more constructive efforts to disclose and review subsidies among other G20 members. The Overseas Development Institute has estimated UK subsidies to oil and gas exploration and production at US$660 million per year and public finance for fossil fuels at $840 million, as part of $11 billion of fossil fuel subsidies.

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?

ANSWER:

I would encourage the Committee to consider this question alongside the costs of not cutting emissions. Estimates since the Stern Review of 2006 have commonly put the impact at several percent of global GDP by the late twenty-first century, and a more recent study of historic correlations between temperature and economic activity suggested that unmitigated climate change could cause as much as a 20 percent reduction in 2100 output. A study by the Economist Intelligence Unit, commissioned by Aviva Investors, estimated that $4.3 trillion of today's financial assets are at risk from climate change (or $43 trillion at public sector discount rates).

Furthermore, given that global *developed* reserves significantly exceed what can be burned while achieving the Paris goals (and taking a precautionary approach to the unknowns of CDR technologies), developing new UK oilfields and gasfields can logically lead to only two possibilities: either a failure to meet the Paris goals, or a larger proportion of existing extraction assets being stranded. Either route leads to significant economic disruption.

The least costly path is to begin planning now for a managed decline of extraction: to stop developing new oil and gas fields (and coal mines) and associated infrastructure, and to redirect all energy investment into clean energy technologies. Delaying the transition, or proceeding too slowly, will require a costlier and more disruptive change at a later date.

At the heart of a managed decline must be a just transition for workers and communities currently dependent on oil and gas extraction. Scotland's Just Transition Commission is a promising start towards this.

The International Trade Union Confederation has recommended that key elements of a just transition should include:

- Sound investments in low-emission and job-rich sectors and technologies.
- Social dialogue and democratic consultation of social partners (trade unions and employers) and other stakeholders (such as communities).
- Research and early assessment of the social and employment impacts of climate policies.
- Training and skills development to support the deployment of new technologies and foster industrial change.
- Social protection alongside active labour markets policies.
- Local economic diversification plans that support decent work and provide community stability in the transition.

Question 12: no answer

Part 5: Devolved Administrations

Question 13: no answer

Part 6: CCC Work Plan

Question 14: no answer