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Faster, deeper, and fairer carbon pollution cuts needed

Faster, deeper and fairer carbon pollution cuts than those recommended by the Committee on Climate Change are possible and necessary.

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The Net Zero report¹ by the Committee on Climate Change (CCC) is an impressive summary of evidence to inform the transition to net zero greenhouse gas emissions in the UK. But the Committee wasn't asked to identify the fastest speed the UK could deliver net zero².

The CCC identified what it considered to be the UK's fair share of global emissions reductions to deliver the Paris Agreement. And it made recommendations within the same spending parameters (around 1-2% of GDP) used when parliament agreed a target of 80% greenhouse gas emissions reduction by 2050.

Friends of the Earth believes the CCC has been too generous to the UK in its assessment of how much carbon pollution the UK can emit.

This short briefing identifies where deeper, faster and fairer emissions cuts are possible. The CCC itself admitted that its assessment adopted a "conservative approach".

The Climate Coalition of environment and development NGOs has previously identified that the UK could reach net zero emissions by 2045. There's nothing in the CCC report that seriously contradicts this view, and if anything it provides hope that achieving net zero even faster may be possible.

Phase-out of petrol and diesel vehicles

The CCC report reiterates that the cut-off date for halting the sale of new petrol and diesel cars, vans and motorcycles should be brought forward to 2035 at the latest. It additionally suggests that after 2050, these vehicles shouldn't be used. This later date is

required because although the average lifespan of a car is 15 years, many are used for longer. Friends of the Earth and others are calling for an earlier cut-off date for new sales of 2030. A ban on all petrol and diesel vehicles on the road after 2045 is needed, and any remaining vehicles should be scrapped.

The CCC also suggests that nearly all HGVs should be zero carbon by 2060. Yet their report cites a claim by truck-maker Scania that battery electric trucks will have cost parity by 2027 and fuel-cell hydrogen trucks by 2045. Given the speed of innovation and experimentation in this area, a much earlier date than 2060 for all HGVs to be zero carbon should be feasible.

Roll-out of heat pumps

The CCC has firmly backed heat pumps as the primary technology for home heating in the future, suggesting at least 19 million should be fitted by 2050. This is a blow to those in the gas industry who want all home heating to be provided by hydrogen made from natural gas³. The CCC suggests 10 million heat pumps should be fitted by 2035. But with 1.6 million gas boilers installed every year, the rate of this transition to heat pumps seems almost leisurely. France already deploys 240,000 heat pumps annually, whereas the UK only achieves 20,000. Friends of the Earth believes we should be aiming to fit an average of at least 1 million heat pumps annually over the next 20 years⁴.

More renewable energy and faster growth

The CCC's indicative energy mix for electricity production in 2050 is only 57% variable renewable energy. It says this is not "an upper bound for renewables deployment in the UK" and that "multiple studies demonstrate that penetration of over 60-80% can be integrated into the UK's electricity system".

This mix for electricity production includes a significant amount from natural gas power plants with carbon capture and storage (CCS), as well as new nuclear plants. But natural gas with CCS is not low carbon, because the capture rate for CO₂ is not 100% and there are fugitive emissions from gas extraction.

Friends of the Earth argues that a diverse mix of renewable energy could produce all the electricity needed, and also produce hydrogen (or ammonia) as an energy store for use

in winter periods of low wind, as well as for use with hybrid heat pumps. A renewables-only scenario would need a much faster increase in deployment of renewables.

Electricity demand in the CCC's indicative mix is 645 TWh, of which 23% is natural gas with CCS. The latter could be substituted with a mix of electricity produced directly from renewable power and from stored hydrogen. The hydrogen itself could be produced by renewable energy. In other words, Friends of the Earth advocates an electricity supply without the use of fossil fuels.

In total, electricity demand in Friends of the Earth's scenario could be around 1200 TWh, if all the hydrogen needed for industry, transport, heating and electricity production is produced from electricity. This is almost double the demand in the CCC's energy mix.

But we don't just disagree with the CCC on the quantity of renewable power needed, we also think we need much faster growth than it recommends.

The CCC does point out that the government's current plans for deployment of new renewable energy by 2030 needs to be scaled up. Currently 22% (35 GW) of electricity comes from wind and solar. It suggests that 50-65% of electricity should come from these sources in 2030. By 2035 it suggests that 85 GW of additional wind and 54 GW of additional solar power could be needed. This would require around 9 GW new capacity per year over the next 15 years. The annual build rate of renewable energy between 2012 and 2017 averaged 7.7 GW.

But we argue that a necessarily faster transition to electric vehicles and heat pumps will require a faster build rate of renewable power. For example, we estimate that we need to achieve the extra capacity the CCC suggests within 10 years rather than 15 years (ie, around 14 GW of new capacity a year).

Hydrogen from renewable energy

Hydrogen has an important role in decarbonising industry, where it can replace most combustion processes, but also in some transport options (eg, long-distance HGVs, trains) and in supporting heating (eg, in the form of hybrid heat-pumps).

The CCC recommends that the majority of this hydrogen should be made from natural gas using a process called steam methane reformation, coupled with CCS. But without a

very high level of carbon capture (95%), it says that the role of CCS would need to be limited. The Global CCS Institute says achieving very high rates of carbon capture is very expensive, stating that “costs are prone to increase almost linearly up to a capture rate of around 80-90% (depending on system), but as the rate goes beyond 90% and approaches 100% the cost will go sky high.”⁵

The emissions from this approach are avoided when hydrogen is made from water using renewable energy (electrolysis). While this is more expensive, it’s also zero carbon. Producing all this hydrogen from renewables will require an addition 305 TWh of electricity, according to the CCC. This additional electricity demand would be much higher if hydrogen from renewables was also to replace all natural gas with CCS, which Friends of the Earth advocates.

Natural gas with CCS does not only release emissions because a 100% capture rate isn’t possible (80-85% is the norm) but also due to fugitive emissions from extraction. The CCC accounts for fugitive emissions from UK extraction of natural gas, but not from imported natural gas. Hydrogen produced using renewable energy is a much cleaner fuel.

Much less aviation

The CCC maintained its existing recommendation on aviation demand (60% greater demand than 2005 by 2050, equating to emissions of around 30 MtCO₂e), but it did model deeper cuts. By reducing demand to 20-40% above 2005 levels, 2050 emissions would be reduced to 22 MtCO₂e. Most emissions come from long-haul flights and leisure travel. Friends of the Earth believes emissions from this sector need to be below 22 MtCO₂e, not least because the CCC doesn’t consider emissions that indirectly cause warming⁶. We advocate a frequent flier levy to discourage multiple flights per year. The production of synthetic fuel, from captured atmospheric CO₂, could enable the industry to reach zero carbon by 2050, but the costs are currently estimated to be extremely high.

Less meat and dairy consumption

The CCC only suggests very conservative reductions in meat and dairy consumption, and only of lamb and beef (by 20%), although greater reductions were modelled. But

much greater reductions in meat and dairy consumption would align with the government's Eatwell Guidance. The Eating Better alliance⁷ is calling for 50% reduction in consumption of all meat and dairy by 2030, including pork and poultry, and for the remainder to be "better" production. Pork and poultry are included because of the high imports of animal feed, which are associated with overseas deforestation and carbon dioxide emissions.

A much greater reduction in meat and dairy and better production systems would not only directly reduce emissions, but also free up land for tree planting for nature and timber production, as well as through agroforestry farming systems. The CCC is recommending 30,000 hectares of tree planting every year, but Friends of the Earth is calling for four times this level. This ambitious target would double UK tree cover in the next 25 years.

The date net zero is achieved rests to a large extent on how much carbon can be absorbed from the atmosphere through tree planting and other means (such as artificial trees and bioenergy with CCS).

A fairer, safer and more equitable budget

The Intergovernmental Panel on Climate Change (IPCC) has identified 5 different approaches for sharing out the global carbon budget. The CCC's choice of net zero greenhouse gas emissions by 2050 maps most closely to the "capability" approach, where countries with high GDP per capita have greater emissions reductions targets than poorer countries. While this is an improvement on the methodology the CCC has previously used, it isn't the most equitable.

An equal cumulative per capita approach, where the global carbon budget is shared equally between nations based on their population size from 1990 to 2050, would require the UK to cut emissions by 120% in 2050 (ie, reach net zero earlier), whereas the Greenhouse Development Rights approach, which takes into account historical emissions since the industrial revolution, would require the UK to reduce emissions by around 160% by 2050 (ie, net zero even earlier). A net zero date of 2045 or even earlier would not therefore represent the UK doing more than its fair share.

Conclusions

The CCC was asked to provide advice on the UK government's response to the Paris Agreement. It has done this using the scenarios produced by the IPCC. But given that every fraction of a degree of global warming matters, particularly for the poorest and for future generations, a better terms of reference for the CCC's work would have asked the Committee to identify how quickly and deeply the UK could cut emissions and what the cost would be.

The Paris Agreement to limit global warming to 1.5 degrees doesn't imply 1.5 degrees is safe, and the IPCC scenarios only provide a roughly 50:50 chance of avoiding this figure. If it's possible to go faster, then it's prudent to do so.

Our review of the CCC's work suggests not only that the net zero date could be achieved earlier than 2050, but that deeper and faster emissions reductions could be achieved on the pathway to this endpoint as well. This is crucial, because cumulative greenhouse gas emissions matter much more than the net zero date.

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- 1.** Committee on Climate Change, Net Zero, the UK's response to stopping global warming, 2019, <https://www.theccc.org.uk/publication/net-zero-the-uks-contribution-to-stopping-global-warming/>
 - 2.** BEIS, UK climate targets: request for advice from the Committee on Climate Change, 2018, <https://www.gov.uk/government/publications/uk-climate-targets-request-for-advice-from-the-committee-on-climate-change>.
 - 3.** Friends of the Earth, How the gas industry is trying to kill off eco-heating, February 2019 <https://policy.friendsoftheearth.uk/blog/how-gas-industry-trying-kill-eco-heating>.
 - 4.** Friends of the Earth, The Future of Heating, August 2018, <https://policy.friendsoftheearth.uk/publications/future-heating>.
 - 5.** Global CCS Institute, Capture rates of CCS, 2011, accessed May 24 2019, <https://hub.globalccsinstitute.com/publications/roadmap-demonstration-carbon-capture-and-storage-ccs-china/53-capture-rate-ccs>
 - 6.** Friends of the Earth, Aviation and Climate Change: Our position, May 2019, <https://policy.friendsoftheearth.uk/policy-positions/aviation-and-climate-change-our-position>
 - 7.** Eating Better is an alliance of more than 50 environmental, health, animal welfare,

farming and development organisations united around the need to encourage “less and better” meat production and consumption. See www.eating-better.org