

Towards Net Zero by 2050

A Challenging But Necessary Goal

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Rob Broom (associate) and Ray O'Connor (partner) take a look at the Climate Change Committee May 2019 Report, why a UK net zero emissions target by 2050 is necessary and the associated challenges in meeting this target.

The Lead Up to the UK's Net Zero 2050 Target

The UK is a member of the key forum that oversees international action to tackle climate change – the United Nations Framework Convention on Climate Change (UNFCCC). In 2015, 196 parties to the UNFCCC adopted the Paris Agreement, a new legally binding framework for an internationally coordinated effort to tackle climate change and set a limit to global warming of below 2C above pre-industrial temperatures in which signatory members also agreed to pursue efforts to keep warming to 1.5C, which is considered the threshold for dangerous climate change. The Paris Agreement does not formulate country-specific emissions targets. Instead, the Paris Agreement depends on voluntary mitigation contributions and a series of processes that seek to ensure collective and individual progress in meeting the initial and progressively more ambitious mitigation contributions.¹

The UK's pledge to reduce its emissions under the Paris Agreement was made as part of a joint pledge by members of the European Union (EU). EU member states jointly agreed to a 2030 target of at least a 40% reduction in emissions below 1990 levels, supported by an EU-wide climate and energy package. This follows on from the 2020 package, which aims to achieve a 20% reduction in emissions relative to 1990, a 20% energy efficiency improvement and a 20% share of renewables in energy consumption by 2020. Several major EU-wide measures to meet these targets have also been agreed, which apply to the UK, such as the EU Emissions Trading System (ETS).

Through the Climate Change Act 2008 (**CCA**), the UK was the first country to introduce long-term, legally binding national legislation to tackle climate change. The CCA requires the UK to achieve an 80% reduction in greenhouse gas (GHG) levels (below 1990 levels) by 2050. Under the CCA, the UK has legally binding, five-yearly carbon budgets to restrict the amount of GHG the UK can legally emit in a five-year period, which mark staging posts towards the 2050 goal. To date, the first five carbon budgets have been set down in legislation, covering 2008 to 2032. The UK is currently in the third carbon budget period (2018 to 2022).

Carbon Budget Levels to Date

Budget	Carbon Budget Level	Reduction Below 1990 Levels
First carbon budget (2008 to 2012)	3,018 MtCO2e	25%
Second carbon budget (2013 to 2017)	2,782 MtCO2e	31%
Third carbon budget (2018 to 2022)	2,544 MtCO2e	37% by 2020
Fourth carbon budget (2023 to 2027)	1,950 MtCO2e	51% by 2025
Fifth carbon budget (2028 to 2032)	1,725 MtCO2e	57% by 2030

Source: Committee on Climate Change website.²

According to the Committee on Climate Change (**CCC**), an independent statutory body established under the CCA to advise the UK government on emissions targets, UK emissions were 44% below 1990 levels in 2018. The first carbon budget (2008 to 2012) was met, as was the second (2013 to 2017), and the UK is on track to outperform the third (2018 to 2022). However, *it is not on track to meet the fourth (2023 to 2027)*.

The UK's 2050 net zero target – one of the most ambitious in the world – was recommended by the CCC in its May 2019 report (please see part 3). In that report, the CCC noted that achieving this target would end the UK's contribution to global warming within 30 years. On 12 June 2019, the government laid the draft CCA (2050 Target Amendment) Order 2019 (**2050 Order**) to amend the CCA by introducing a target for at least a 100% reduction of GHG emissions (compared to 1990 levels) in the UK by 2050. The 2050 Order came into force on 27 June 2019. The Queen's Speech in late December last year confirmed that the UK government will continue to take steps to meet the target of net zero GHG emissions by 2050.

1 ClimateFocus, "The Paris Agreement Summary," 28 December 2015, available at: <https://www.climatefocus.com/sites/default/files/20151228%20COP%202021%20briefing%20FIN.pdf>, accessed 10 February 2020.

2 <https://www.theccc.org.uk/tackling-climate-change/reducing-carbon-emissions/carbon-budgets-and-targets/>

What Does Net Zero GHG Emissions Mean, and Why Net Zero?

In simple terms, net zero means a 100% reduction on the UK's 1990 GHG emission levels. This does not mean stopping all GHG emissions. It simply means that all gases released into the atmosphere are absorbed or compensated for, to the extent that the effect of the emission is negated, i.e. emissions would be balanced by schemes to offset an equivalent amount of GHGs from the atmosphere, such as planting trees or using technology like carbon capture and storage³ and/or by trading in carbon units.⁴

In many sectors of the economy, technologies exist that can bring emissions to zero. In the electricity sector, this can be done using renewable and nuclear generation. A transport system that runs on electricity or hydrogen, well-insulated homes and industrial processes based on electricity rather than gas can all help to bring sectoral emissions to absolute zero. However, in industries such as aviation, the technological options are limited; in agriculture, too, it is highly unlikely that emissions will be brought to zero. Therefore, some emissions from these sectors will likely remain. In order to offset these, an equivalent amount of CO₂ will need to be taken out of the atmosphere – negative emissions. Therefore, the target becomes net zero for the economy as a whole.⁵

The Climate Change Committee May 2019 Report

Following the wake of the raised ambition of the Paris Agreement and the report from the Intergovernmental Panel on Climate Change (IPCC)⁶ that warned that faster action is needed to limit global warming to 1.5C, on 15 October 2018, the governments in Westminster, Cardiff and Edinburgh (collectively) invited the CCC to provide advice on when the UK should cut its emissions to net zero. On 2 May 2019, the CCC released a 277-page report⁷ providing an in-depth analysis and recommendations on achieving a net zero target for UK GHG emissions by 2050. The report, titled "Net Zero – The UK's contribution to stopping global warning," provided that:

- It was necessary, feasible and cost effective to reach this target – necessary to halt the UK's contribution to rising global temperatures and to meet the UK's obligations in the Paris Agreement, feasible with the tried and tested technologies available to date, and cost effective, as the cost of those technologies have fallen since 2008.
- The net zero target should cover all GHGs and should include international aviation and shipping, but exclude the use of emissions credits,⁸ which would put the UK "at the top of the pile" relative to other net zero goals (which the CCC noted would be a significant increase on the existing target of an 80% cut by 2050). If adopted, the target would fully meet the UK's obligations under the Paris Agreement, with the UK reaching net zero some 20 years ahead of the global average on a pathway to a 1.5C temperature limit.

3 Gov.uk website, "UK becomes first major economy to pass net zero emissions law," 27 June 2019, available at: [https://www.gov.uk/government/news/uk-becomes-first-major-economy-to-pass-netzero-emissions-law](https://www.gov.uk/government/news/uk-becomes-first-major-economy-to-pass-net-zero-emissions-law), accessed 10 February 2020.

4 House of Commons Library, "Net Zero in the UK," 16 December 2019, available at: <https://researchbriefings.parliament.uk/ResearchBriefing/Summary/CBP-8590>, accessed 10 February 2020.

5 Energy & Climate Intelligence Unit, "Net zero: why is it necessary?" available at: <https://eci.u.net/analysis/briefings/net-zero/net-zero-why>, accessed 10 February 2020.

6 On 8 October 2018, the IPCC published a special report on 1.5C that clearly set out the risks of allowing warming to exceed this level. This report also summarised the latest scientific evidence on what would be needed to stay below 1.5C.

7 Committee on Climate Change Report, "Net Zero – The UK's contribution to stopping global warning," May 2019, available at: <https://www.theccc.org.uk/wp-content/uploads/2019/05/Net-Zero-The-UKs-contribution-to-stopping-global-warming.pdf>, accessed 10 February 2020.

8 The CCC noted that it is essential that the UK commitment is comprehensive, achieved without the use of internal credits and covering international aviation and shipping.



- The net zero goal could be met at a manageable cost, equivalent to 1% to 2% of GDP each year, but this advice came with the proviso from the CCC that net zero is only credible if policies are introduced to match.
- Low-carbon electricity must quadruple by 2050, with an Energy White Paper promised for early next year. The transition to electric vehicles (EVs) is already underway, although progress is slower than in other countries, with EV sales making up just 2% of new car sales in the 12 months up to September 2018.
- Afforestation targets are not being delivered, with less than 10,000 hectares planted on average over the last five years.
- Heat pumps are established in other nations, but they are not yet in the UK – strong progress in this is required by the mid-2020s if net zero is to be reached.
- 2040 is too late for the phase-out of petrol and diesel vehicles. The infrastructure network will have to be adapted to account for the increased demand that EV charging will bring – we note that since the May 2019 report, the government unveiled that a ban on selling new petrol, diesel or hybrid cars in the UK will be brought forward from 2040 to 2035 (at the latest).⁹
- One potentially decisive factor in the race to reach net zero will be carbon capture storage (CCS), i.e. the capturing of carbon from some forms of electricity generation, industrial processes or even out of the air in order to lock it out of the atmosphere.¹⁰ The CCC noted that there are 43 large-scale projects operating worldwide, but none in the UK. The need for CCS has since been echoed by UK system operator National Grid following the CCC report, which estimates that UK electricity demand is almost set to double by 2050 under a net zero emissions scenario, further necessitating the use of CCS in hydrogen production, power generation and industry.¹¹ In National Grid's 2019 Future Energy Scenarios Report, it mentioned that achieving net zero GHG emissions by 2050 implies a 140% increase in UK generation capacity, from 108GW in 2018 to 264GW in 2050, with nearly 50GW of natural gas-fired capacity fitted with CCS. According to Aurora Energy Research, the UK will need up to 30GW of short-duration storage and at least 20GW of firm back-up generation by 2050 to support a net zero carbon emissions power system built on renewables; 107GW of new wind and solar capacity would be required by 2050 (up from 33GW today), as well as 20GW of new nuclear and 3GW of carbon capture and storage capacity.¹²

9 BBC News, "Petrol and diesel car sales ban brought forward to 2035," 4 February 2020, available at: <https://www.bbc.com/news/science-environment-51366123>, accessed 10 February 2020.

10 Good Energy, "What does the CCC's net zero 2050 report mean for you?" 2 February 2019, available at: [https://www.goodenergy.co.uk/blog/2019/02/what-does-the-cccs-netzero-2050-report-mean-for-you/](https://www.goodenergy.co.uk/blog/2019/02/what-does-the-cccs-net-zero-2050-report-mean-for-you/), accessed 10 February 2020.

11 Platts European Power Daily, UK net-zero 2050 goal implies massive CCS drive: National Grid, 12 July 2019.

12 Henry Edward Evans, Platts European Gas Daily, "UK will need 30 GW of short-duration storage by 2050: report," 15 October 2019.

According to Good Energy, while the May 2019 report rightly acknowledged the need for efficiency first and foremost as a grounding for extensive electrification of systems like transport, this is the one area in which the report is lacking. Emphasis is placed on large-scale renewables – huge investment in offshore wind, in particular, while “low carbon” (meaning nuclear) still has a place in the recommendations made. It misses the potential of people power and small-scale generation; choosing clean power supply is not listed as a personal action, nor is there mention of self-generation, which Good Energy regards as an oversight.¹³

The Upcoming Carbon Budget for 2033 to 2037

Carbon budgeting will have to be carefully managed in the next decades. The CCC intends to publish its Sixth Carbon Budget Advice to the government in September 2020 – which will set strict guidance on the volume of GHGs the UK can emit during the period 2033 to 2037. As the first carbon budget to be set into law following the net zero commitment, the impact of the CCC’s May 2015 report next year may prove key to determining the course of net zero policies in successive Parliaments.



¹³ Good Energy, “What does the CCC’s net zero 2050 report mean for you?” 2 February 2019, available at: [https://www.goodenergy.co.uk/blog/2019/02/what-does-the-ccc-s-netzero-2050-report-mean-for-you/](https://www.goodenergy.co.uk/blog/2019/02/what-does-the-ccc-s-net-zero-2050-report-mean-for-you/), accessed 10 February 2020.

Examples of How Corporates and Energy Sector Players Are Helping With the UK’s Net Zero Target

As elaborated on in our Corporate Power Purchase Agreement (CPPA) Report,¹⁴ apart from entering into CPPAs, corporate sustainability and procurement leaders can meet their decarbonisation and emissions reduction objectives through various means, including energy efficiency measures, signing up to green tariffs when purchasing electricity from their electricity supplier, purchasing renewable energy certificates (RECs) from verified generators to offset their non-renewable energy consumption and/or directly investing in renewable energy projects or carbon offset schemes.

There is a far bigger role for corporates to play and net zero/ decarbonisation is increasingly high up on the corporate agenda; a survey of 502 UK businesses by YouGov, conducted in the summer of 2019, found that almost half are aiming to be carbon-neutral by 2030, with 8% claiming they had already reached this milestone. Overall, 46% of respondents said their organisation had plans – either public or internally published – to become carbon-neutral by 2030. Just 5% said this milestone was feasible for their firm within the next year, with most targeting a timespan between two and five years.¹⁵

Net zero has also become a key consideration for generators and transmission system operators. By way of example, UK generator Drax (which has 2.6GW of converted biomass-fired capacity across four units at Selby and plans to convert two remaining coal units there to combined cycle gas generation) has upped the ante in its biomass strategy. It aims to boost self-supply to 80%, develop alternative viable biomass fuels and service global wood pellet markets in Europe, North America and Asia. These measures, coupled with carbon capture, will “enable negative emissions, helping the UK on its path to net zero by 2050”, its CEO, Will Gardiner, said in December last year.¹⁶ Scottish and Southern Electricity Networks (SSEN), which manages two distribution networks and one transmission network, unveiled its RIIO-T2 business plan, which focuses on four areas it will deliver on, the first being a network for net zero. This is to be achieved by enabling the growth of renewable generation and the electrification of heat and transport. By the end of RIIO-T2, SSEN expects there to be 8.1GW of generation connected to the north of Scotland transmission system, with connected generation required to increase to between 13.6GW and 15.7GW by 31 March 2026 for net zero.¹⁷

Implications of the Vote to Leave the EU

Leaving the EU would change how UK carbon budgets are delivered: where policies previously agreed at EU level no longer apply or are weakened, new UK policies will need to replace them. However, leaving the EU does not change the need to cut GHG emissions, the level of carbon budgets (which are set in UK law) or the duty on the UK government to act to tackle climate change. The precise scope and nature of such new policies may be delimited by the degree of alignment resulting from the UK’s negotiation for a new relationship with the EU during the course of 2020.

¹⁴ Rob Broom, Peter Wright, Henry Davey, Igor Hanas, Paul O’Hop, Manuel Mingot, Squire Patton Boggs Report, “Corporate Power Purchase Agreements – The Preferred Route for Corporates to Secure Renewable Energy Supplies in a Decarbonized World”, 6 February 2020, available at <https://www.squirepattonboggs.com/-/media/files/insights/publications/2020/02/corporate-power-purchase-agreements/encorporate-power-purchase-agreementspitch.pdf>.

¹⁵ Sarah George, Half of UK Business “targeting carbon neutrality by 2030”, eddie.net.

¹⁶ Henry Edwards-Evans, Platts Power in Europe, “Drax ups biomass self-supply target”, 2 December 2019.

¹⁷ SSEN Business Plan, available at: [https://www.ssen-transmission.co.uk/media/3761/a-network-for-netzero-final-business-plan.pdf](https://www.ssen-transmission.co.uk/media/3761/a-network-for-net-zero-final-business-plan.pdf), accessed 10 February 2020.

Further Guidance Expected in 2020

Since passing the 2050 Order, the government has announced a HM Treasury Net Zero Review. This included a priority to ensure a fair balance of contributions from all those who will benefit, including considering how to reduce costs for low-income households. The review will also consider how to avoid offshoring emissions, i.e. how to reduce UK emissions without causing those emissions to be created by another country. A final report is expected in autumn 2020.

In addition, the Energy White Paper is due to be published in "a matter of weeks", according to junior energy minister Lord Duncan. Lord Duncan also mentioned that following the publication of the white paper, there is also set to be a transportation decarbonisation plan, a heat policy road map, a net zero consultation, an aviation consultation and an English tree strategy.¹⁸

We will keep you posted on the upcoming Net Zero Review and Energy White Paper once published.

Authors' Conclusions

Fundamentally, the longer it takes to stabilise climate change by bringing CO₂ emissions to zero, the more the climate will change – time really is of the essence and further policy developments in reaching this target and new accompanying legislation will be critical. The UK's net zero commitment will also make little difference in itself to the underlying problem, however successfully it is implemented. Our emissions represent only some 1% of the global tally. Annulling them completely will not slow rising temperatures,¹⁹ but the UK has set a good example for others to follow.

Our Event "Delivering Net Zero: New Thinking on a Fit for Purpose Institutional Framework"

With a clear political majority secured, a binding legal target in place and a clear consensus from the election campaign for urgent action to address climate change, the new Parliament must hit the ground running. To help this process and to try to develop some much-needed momentum, New Anglia Energy is partnering with Trilemma's Simon Skillings to host a discussion forum on a new framework for the delivery of net zero on behalf of the Association for Distributed Energy, which will be held at our London office on 27 February 2020. For further information on this event, or to register your interest in how we can help with your decarbonisation goals, please contact a member of the team:



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¹⁸ Alice Grundy, Current News, "Energy white paper set for publication in 'matter of weeks'", 7 February 2020, available at: <https://www.current-news.co.uk/news/energy-white-paper-set-for-publication-in-matter-of-weeks>, accessed 10 February 2020.

¹⁹ Christopher Clement-Davies, International Energy Law Review, "Net Zero by 2050; the Need for Sustained Political Leadership", July 2019.