

Carbon Neutral

In June 2019, parliament passed legislation requiring the government to reduce the UK's net emissions of greenhouse gases by 100% relative to 1990 levels by 2050.¹¹ Doing so would make the UK a 'net zero' emitter. Prior to this, the UK was committed to reducing net greenhouse gas emissions by at least 80% of their 1990 levels, also by 2050.

What does 'net zero' mean?

Net zero refers to achieving a balance between the amount of greenhouse gas emissions produced and the amount removed from the atmosphere. There are two different routes to achieving net zero, which work in tandem: reducing existing emissions and actively removing greenhouse gases.

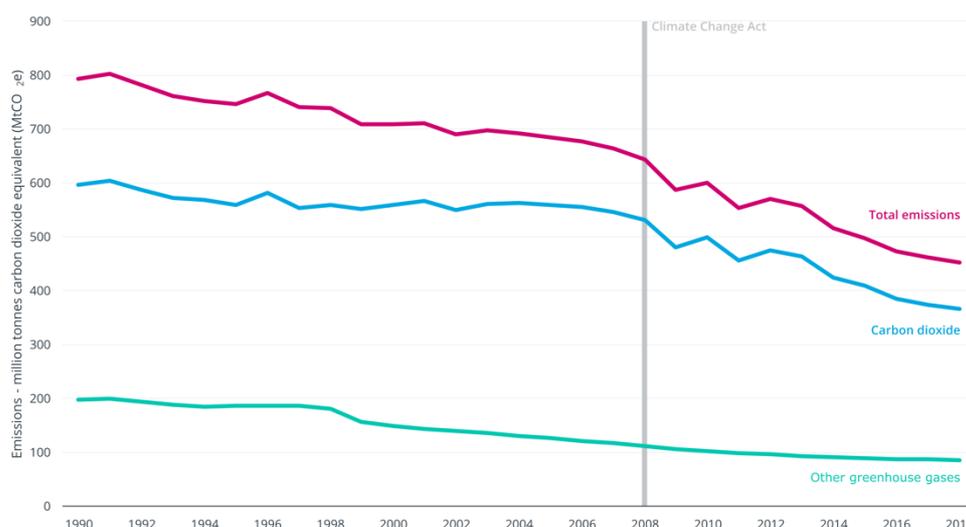
A *gross-zero* target would mean reducing all emissions to zero. This is not realistic, so instead the *net-zero* target recognises that there will be some emissions but that these need to be fully offset, predominantly through natural carbon sinks such as oceans and forests. (In the future, it may be possible to use artificial carbon sinks to increase carbon removal, research into these technologies is ongoing.)

When the amount of carbon emissions produced are cancelled out by the amount removed, the UK will be a net-zero emitter. The lower the emissions, the easier this becomes.

What are the UK's greenhouse gas emissions?

The Climate Change Act 2008¹² named six major greenhouse gases: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride.* Carbon dioxide makes up the bulk of these. This is principally produced by burning fossil fuels in, for example, coal power stations; the main sources for the other greenhouse gases include industrial processes and waste management, such as agriculture and landfill sites. Combined, these accounted for around 19% of all UK emissions in 2018.

The UK's emissions of all greenhouse gases have been falling steadily over the past 30 years, though levels have risen globally. In 2018, UK emissions stood at 57% of their 1990 levels.



Source: Institute for Government analysis of: *Final UK greenhouse gas emissions national statistics*, BEIS, February 2020



Why is the government trying to achieve net zero?

In May 2019, the Committee on Climate Change (CCC), a non-departmental public body that advises the government on the climate, recommended that the UK should aim to be net zero on all greenhouse gases by 2050. This would keep the UK in line with the commitments it made as part of the 2016 Paris Agreement to keep global warming under 2 degrees.

However, the UK's existing Nationally Declared Contribution (NDC), a central pillar of its commitment to the Paris Agreement, does not commit the UK to net zero – this will likely be changed in the run up to the climate talks. The CCC has concluded that “net-zero is necessary, feasible and cost-effective”.

The UK makes up less than 1% of global emissions. By demonstrating a path to net zero, the UK hopes to set an example that others can follow. Chris Skidmore, when minister for energy and clean growth, stated that the UK was:

“pioneering the way for other countries to follow in our footsteps, driving prosperity by seizing the economic opportunities of becoming a greener economy”.^[4]

A strong domestic record is also vital to the UK's credibility when it tries to persuade other countries to commit to their own efforts on climate change.

The government also recognises that climate change is an existential threat and that there is a moral case stemming from the UK's history as a major producer of greenhouse gases. Michael Gove, a former environment secretary, has described the UK as having a “moral responsibility” to lead the international effort against climate change, due to its role in the industrial revolution.^[5]

The UK will also hope to benefit from ‘first-mover advantages’ in embracing its net-zero targets early, for instance by taking a lead in developing specific technical innovations.^[6]

What is the legal status of the net-zero target?

The Climate Change Act 2008 committed the UK to an 80% reduction in carbon emissions relative to the levels in 1990, to be achieved by 2050. In June 2019, secondary legislation was passed that extended that target to “at least 100%”.

While the amended Climate Change Act imposes a legal obligation on the government, it is not clear how this will be enforced. The proposed Office for Environmental Protection would have enforcement powers – and the courts have also shown they are willing to intervene where they do not think the government has taken proper account of its climate change commitments. This happened in February 2020, for example, when the UK Court of Appeal [ruled that the government’s policy statement in favour of Heathrow expansion was unlawful](#)

Is the 2050 net-zero target feasible?

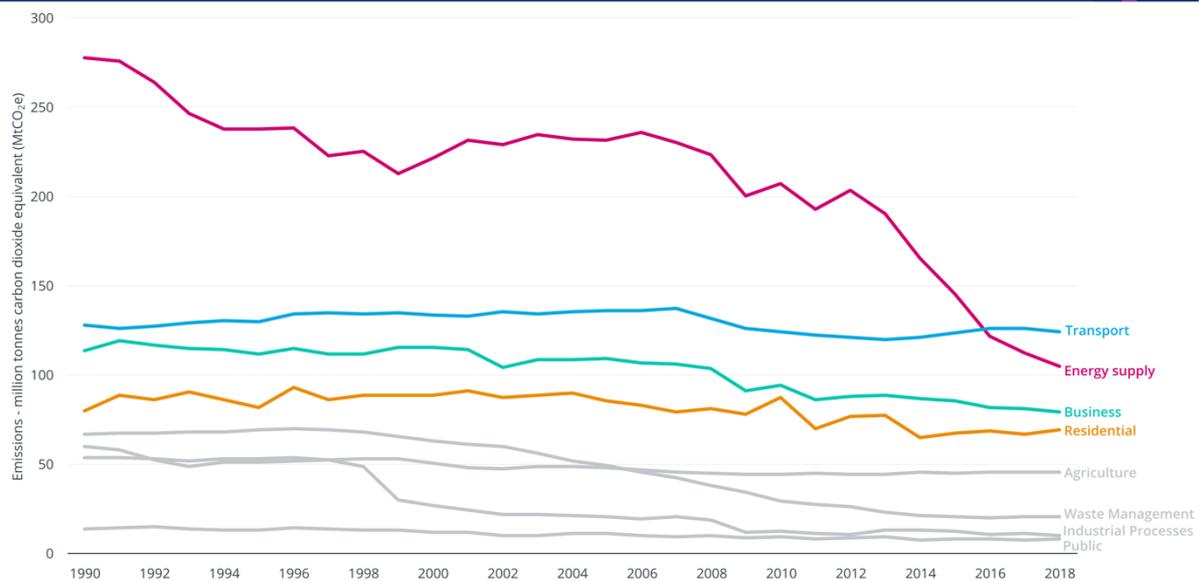
The UK is currently not on track to meet its previous, less ambitious, target of 80% emissions reductions by 2050. The CCC has said that getting to net zero (i.e. meeting the 100% target) is “technically feasible but highly challenging”.^[8] Doing so will require sustained policy interventions across several sectors – many of which will be complex, costly and time-consuming.

And the initial signs are not positive: in its July 2019 progress report, the CCC said the UK government’s policy actions “[fell] well short of those required for the net-zero target”.^[9] The UK is also not on track to meet some of its pre-existing future carbon budgets, set before the net-zero target was adopted (more on carbon budgets is found below).

The government has announced some policy changes in response, such as bringing forward the ban on the sale of new petrol and diesel cars from 2040, but more is needed.^[10]

Which sectors will be most affected by net zero?

The four highest-emitting sectors are transportation, energy supply (generating electricity from burning fuels such as coal, oil and natural gas), business (commercial use of electricity), and residential (heating homes). Together these account for around 78% of current emissions.



Source: Institute for Government analysis of: *Final UK greenhouse gas emissions national statistics*, BEIS, February 2020
 Note: Net negative emissions from LULUCF not shown.



UK emissions by sector (Updated: 20 Apr 2020)

Since 1990, the UK has achieved steep emissions reductions in the energy-supply sector, historically the worst offender, particularly in the last eight years as a result of phasing out coal and increasing the use of renewables, such as wind and solar. But in other areas – such as transport, homes and agriculture – emissions remain largely unchanged. Decarbonising these areas will be more difficult.

Some regions of the UK will also find getting to net zero more achievable than others. The Scottish government has set itself a target of net zero by 2045 in line with recommendations by the CCC.^{[11], [12]} Its abundant land, with potential for afforestation (planting trees to create forests, which are natural carbon sinks), means it has more potential capacity to remove emissions from the atmosphere than the rest of the UK.^[13]

In contrast, Wales has a much more difficult path to reach net zero, even by 2050, in part because it has high agricultural emissions. The CCC recommended that Wales aim for a 95% reduction by 2050, which the Welsh government accepted. This wouldn't stop the UK as a whole from being net zero by 2050.

Does the UK have to reach its target only through domestic efforts?

The carbon budgets allow for the use of international carbon units traded outside the EU's Emissions Trading System (ETS).^[17] Participating in this system means that the UK may produce more emissions than are accounted for, as some can be offset by trading 'carbon credits' with other countries. The government has stated that the UK will remain a part of EU ETS until January 2021.^[18]

What are the costs – and benefits – of reaching net zero by 2050?

Reaching net zero will bring the UK important benefits – but will incur large costs. Estimating either of these with any accuracy is difficult, given the level of uncertainty around new and emerging technologies, and changes in the economy and people's behaviour.

In 2019, the CCC estimated that the total costs of getting to net zero would be £50bn per year, less than 1% of projected GDP over that period. The Treasury and the Department for Business, Energy and Industrial Strategy (BEIS) put the figure at £70bn per year, or over £1 trillion by 2050.^[19] The economic analysis of net zero will undoubtedly change in the wake of the coronavirus pandemic, however.

Models that attempt to calculate costs have a degree of uncertainty because the underlying economics are constantly shifting. One example is the changing price of offshore wind, whose cost fell by over 30% in 2019 alone, greatly exceeding expectations. This suggests that the UK could potentially accelerate moves to electrify other parts of the economy that have previously relied on energy from fossil fuels, such as surface transport and heating for homes and offices.^[20]

Net zero will also bring wider societal benefits, for instance to human health as a result of improved air quality and a better-protected natural environment. The CCC says these could “partially or fully offset costs”, for instance by reducing hospital admissions, and enabling people to be more productive.^[21] In November 2019, the Treasury launched a review into the costs and opportunities of reaching net zero, this is due to report in late 2020.^[22]