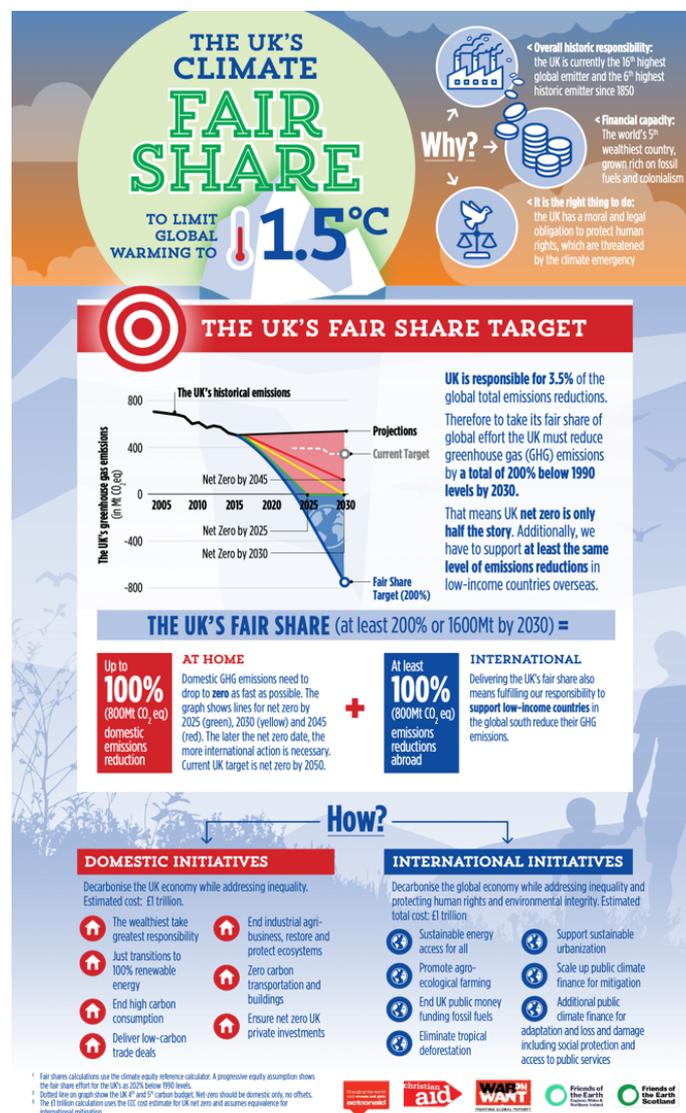


BACKGROUND MATERIALS FOR FAIR SHARES INFOGRAPHIC

Below are two documents that provide background information, about the approaches, assumptions, and choices that were made to calculate the figures in the infographic "The UK's Climate Fair Share To Limit Global Warming to 1.5°C." (available: <https://www.christianaid.org.uk/resources/about-us/uks-climate-fair-share>)

The first document is a memo provided by the Climate Equity Reference Project, which carried out the fair shares analysis based on the Climate Equity Reference Framework, using the Climate Equity Reference Calculator.¹ The memo describes the global mitigation pathway and the effort sharing framework used, and shows results for the UK.

The second document briefly describes the assumptions and judgements taken by the UK groups that jointly produced the infographic, for making conclusions about the amount of financial resources implied in the UK implementing its fair share as calculated using the Climate Equity Reference framework.



1 The interactive calculator is available at calculator.climateequityreference.org

The calculator code is open source and has been published: Holz, Christian; Eric Kemp-Benedict; Tom Athanasiou and Sivan Kartha (2019) "The Climate Equity Reference Calculator" in *Journal of Open Source Software*, 4(35), 1273. [doi: [10.21105/joss.01273](https://doi.org/10.21105/joss.01273)]

CONSTRUCTING AN EQUITY-BASED U.K. GREENHOUSE GAS EMISSIONS TARGET FOR 2030 IN LINE WITH 1.5°C

Climate Equity Reference Project | www.climateequityreference.org

November 25, 2019

This short memo provides an overview of data sources and an approach for constructing a U.K. greenhouse gas (GHG) emissions target for the year 2030 that is in line with the global agreement of "pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels."²

GLOBAL EMISSIONS CONSISTENT WITH LIMITING WARMING TO 1.5°C.

Our starting point is the October 2018 Special Report on Global Warming of 1.5°C by the Intergovernmental Panel on Climate Change (IPCC) that analyzed global greenhouse gas (GHG) emissions pathways consistent with limiting temperature increase to 1.5°C.³ Specifically, we base our analysis on one of the four pathways featured in the Summary of the IPCC's 1.5°C report, "P1", or the Low Energy Demand (LED) Scenario, developed at the International Institute for Applied Systems Analysis.

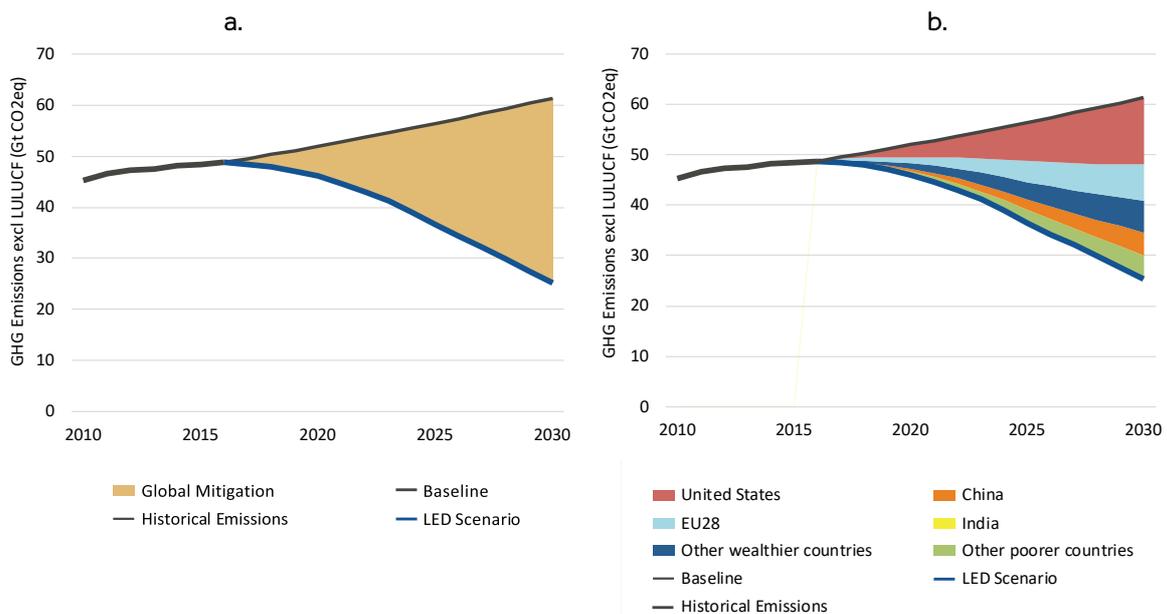


Figure 1: The LED Pathway, and fair shares of the global effort. a. LED Pathway and baseline, showing necessary global mitigation (orange shading). b. LED Pathway and baseline, showing necessary global mitigation divided into the national shares of the selected countries and groups

² UNFCCC (2015) Paris Agreement. Geneva: United Nations Office.

[\[http://unfccc.int/files/meetings/paris_nov_2015/application/pdf/paris_agreement_english.pdf\]](http://unfccc.int/files/meetings/paris_nov_2015/application/pdf/paris_agreement_english.pdf)

³ IPCC (2018) Special Report on the Impacts of Global Warming of 1.5°C Above Pre-Industrial Levels and Related Global Greenhouse Gas Emission Pathways, in the Context of Strengthening the Global Response to the Threat of Climate Change, Sustainable Development, and Efforts to Eradicate Poverty. Geneva: Intergovernmental Panel on Climate Change. [\[http://www.ipcc.ch/report/sr15/\]](http://www.ipcc.ch/report/sr15/)

Under this pathway⁴, global emissions would fall to about 25 billion tons of CO₂eq (GtCO₂eq) in 2030.^{5,6} Figure 1 shows how achieving an emissions level of 25 GtCO₂eq in 2030 would compare to current emission levels and a baseline reference case for future emissions if no mitigation were undertaken.

As shown in Figure 1, achieving a 1.5°C scenario with low temperature overshoot, as the LED scenario, would see global emissions being reduced by 36 GtCO₂eq, which is more than 50% relative to baseline emissions in that year (approx. 61 GtCO₂eq).

TRANSLATING THE GLOBAL EMISSION REDUCTIONS FOR A 1.5°SCENARIO TO U.K. FAIR SHARE

The global effort of reducing emissions – as displayed as the yellow shading in Figure 1a – can be divided among all countries according to their responsibility (for causing the problem) and capacity (to help deal with it), as shown in Figure 1b.

This approach reflects core long-standing equity principles in the United Framework Convention on Climate Change (UNFCCC). They were summed up nicely by Al Gore in a [New York Times](#) Op-Ed on climate change in the run-up to the Copenhagen climate negotiations in 2009:

“Countries will be asked to meet different requirements based upon their historical share or contribution to the problem and their relative ability to carry the burden of change. This precedent is well established in international law, and there is no other way to do it.”

Here, we translate *capacity* and *responsibility* to GHG emissions pledges using a straight-forward approach developed and applied by the Civil Society Equity Review (CSER) Coalition, a coalition of more than 200 groups spanning the global North and South and multiple perspectives.⁷

In that approach, capacity is based on national income, and responsibility is represented by cumulative historic GHG emissions. The CSER coalition defined these in modestly progressive terms (akin to a progressive tax), reasoning that it would not be fair to treat a rich person’s millionth dollar of income the same as a poor person’s first dollar⁸. (See Annex for details.)

Based on this benchmark, responsibility and capacity are calculated for each country over time, and each country’s fair share of the global mitigation effort in each year is determined by its share of global responsibility and capacity (averaged together). For the U.K., the share comes to 3.5% of the total global mitigation effort, which is roughly 1.3 GtCO₂eq of the 36 GtCO₂eq total emissions reduction required globally, which is 1,544 Mt, or 193%, below 1990 levels. (Note that using a more progressive approach to capacity, i.e. one that weights the income of each country’s richer people even slightly more than that of its poorer (see appendix), implies a UK

4 All pathways and annual emission figures here are given including non-CO₂ greenhouse gas emissions (NO₂, CH₄, etc.), excluding LULUCF.

5 Rogelj, J. et al. (2018) “Chapter 2: Mitigation pathways compatible with 1.5°C in the context of sustainable development.” in IPCC: Special Report on the Impacts of Global Warming of 1.5°C Above Pre-Industrial Levels and Related Global Greenhouse Gas Emission Pathways, etc. [<https://www.ipcc.ch/sr15/chapter/chapter-2/>]

6 Bertoldi, P. et al. (2018) “Cross-Chapter Box 11 – Consistency Between Nationally Determined Contributions and 1.5°C Scenarios,” in IPCC: Special Report on the Impacts of Global Warming of 1.5°C Above Pre-Industrial Levels and Related Global Greenhouse Gas Emission Pathways, etc. [<https://www.ipcc.ch/sr15/chapter/chapter-4/>]

7 CSO Equity Review (2015) Fair Shares: A Civil Society Equity Review of INDCs. Manila, London, Cape Town, Washington, et al.: CSO Equity Review Coalition. [civilsocietyreview.org/report]

8 Capacity was calculated in a modestly progressive way by exempting the first \$20/day of income earned per person. Analogously, Responsibility was calculated by exempting greenhouse gas emissions from consumption corresponding to income up to the first \$20/day per person. The CSER coalition also calculated a somewhat more progressive fair share, where income above a threshold of \$50,000/yr per person was considered more heavily than income below that threshold. Results for both the less progressive and more progressive fair share calculations are shown in the table.

fair share of 3.7% of the global total, amounting to about 1.4 GtCO₂eq below baseline in 2030, or 1.6 GtCO₂eq or 203% below 1990 levels)

While 1.3 GtCO₂eq of emission reduction in 2030 below baseline is the U.K.'s fair share of the global effort, it could not practically be undertaken within the U.K., as it exceeds total domestic emissions in the UK, which is currently about 0.5 GtCO₂eq. It is not surprising that the U.K.'s fair share of the necessary global mitigation is greater than its current share of global emissions. After all, the UK has been contributing GHGs for well more than a century, and – not unrelatedly – is among the wealthier countries of the world.

The U.K.'s fair share of the mitigation effort is pictured in Figure 2 below as if it was carried out domestically (the light blue line), which would require U.K. emissions to plummet to zero well before 2025 and continue to rapidly become increasingly negative thereafter. Clearly, it would be wholly unrealistic for the U.K. to achieve this fair share through domestic reductions alone. However, even if the U.K. were to completely eliminate domestic emissions, the additional effort required to fulfill the U.K.'s fair share amounting to *well more than half* of the U.K.'s fair share by 2030. Therefore, it cannot be neglected if the U.K. is to be seen as carrying its weight in the global effort to combat climate change.

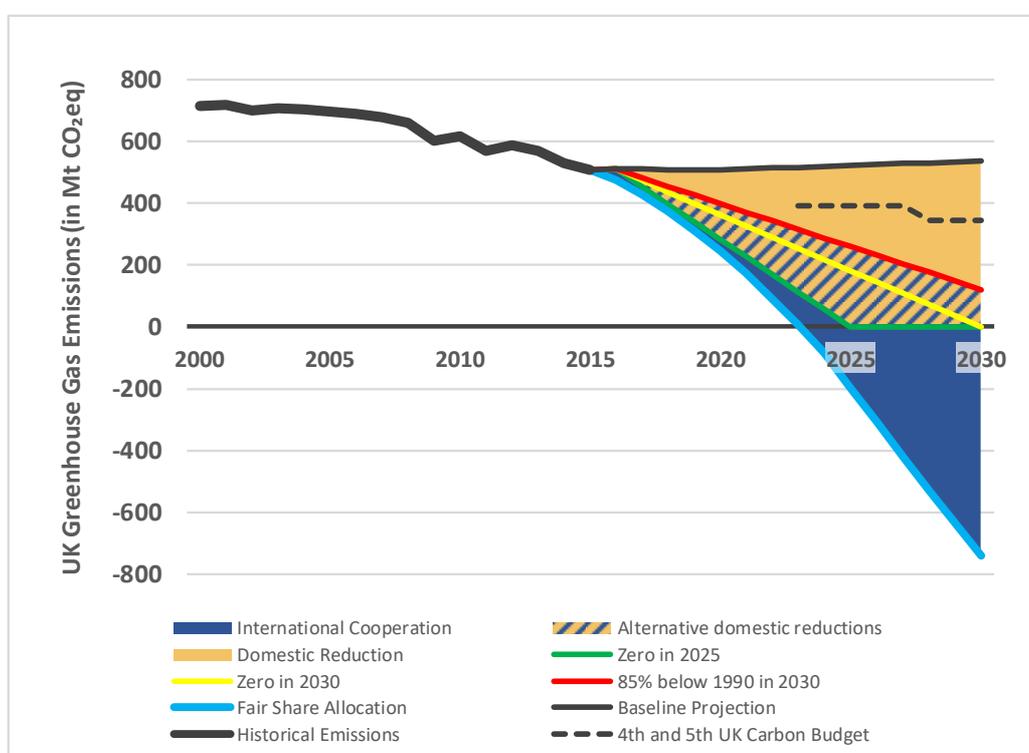


Figure 1. U.K. greenhouse gas emissions in a reference scenario without mitigation effort (grey line) and a range of proposed domestic levels of reduction (spanning the striped area), and the U.K. fair share (blue line). The red line shows an 85% reduction in domestic emissions below 1990 levels in 2030, one option for proceeding to zero emissions in the 2045-2050 time frame. The yellow line shows zero domestic emissions by 2030. The green line shows zero domestic emissions by 2025. In each case, the remainder of the U.K.'s fair share would be met through additional internationally supported reductions sufficient to add up to the blue line. This shows the fair share based on the less progressive equity assumption, which amounts to a total reduction in 2030 equivalent to 193% below 1990 levels. The more progressive equity assumption would imply a slightly larger fair share effort for the U.K.'s, a total reduction equivalent to 202% below 1990 levels. (See the Annex for more details.)

However, the entire fair share need not be undertaken within the borders of the U.K. Indeed, a significant portion of it would need to be undertaken in other countries through international cooperation. In the Figure 2, the equivalent of the U.K.'s full fair share is shown, divided into a portion that is undertaken domestically, plus a portion that is undertaken through international cooperation to enable poorer countries to reduce emissions even more than their own fair share.

The figure shows three different possible targets for the domestic emission reductions: 85% below 1990 reduction by 2030 (red line), 100% reduction by 2030 (yellow line), and 100% reduction by 2025 (green line). Any one of these targets would require a massive transformation to unfold in the U.K. Yet, they all still fall far short of the U.K.'s fair share. The internationally supported reductions amount to well more than half of the U.K.'s fair share.

This suggests two things. First, that dramatic reductions would need to be undertaken domestically, consistent with the IPCC observation that pathways consistent with keeping warming below 1.5°C would require transformative shifts of "unprecedented" scale. To build a robust national consensus in support of climate action at such a scale would require a program of climate action that is not only effective but also fair, and does not place the burden of change on those who can least afford it.

Second, the need for a huge scale of international cooperation would require very large flows of technological and financial support for emission reductions in poorer countries. The considerable scale of finance required for this international support would need to be generated via progressive revenue mechanisms that, again, do not allow the burden of change to be placed on those who can least afford it.

ANNEX: NOTES ON THE EQUITY ANALYSIS USED HERE

Capacity – a nation's financial ability to contribute to solving the climate problem – can be captured by a quantitative benchmark defined in a more or less progressive way, making the definition of national capacity dependent on national income distribution. This means a country's capacity is calculated in a manner that can explicitly account for the income of the wealthy more strongly than that of the poor, and can exclude the incomes of the poorest altogether.

Similarly, **Responsibility** – a nation's contribution to the planetary GHG burden – can be based on cumulative GHG emissions since a range of historical start years, and can consider the emissions arising from luxury consumption more strongly than emissions from the fulfilment of basic needs, and can altogether exclude the survival emissions of the poorest. Of course, the 'right' level of progressivity, like the 'right' start year, are matters for deliberation and debate.

This memo uses two CSER equity benchmarks (details for both are given in the table below). The "more progressive" benchmark uses a responsibility start date of 1850 and calculates national capacity in a progressive manner, based on a \$7,500 development threshold and a \$50,000 luxury threshold. The "less progressive" benchmark uses a responsibility start date of 1950 and calculates national capacity in a less progressive manner, relying only on the \$7,500 development threshold⁹.

⁹ For more details, including how progressivity is calculated and a description of the standard data sets upon which our calculations are based, see About the Climate Equity Reference Project Effort-sharing Approach: <https://climateequityreference.org/about-the-climate-equity-reference-project-effort-sharing-approach/>. For an interactive experience and a finer set of controls, see the Climate Equity Reference Calculator (<https://calculator.climateequityreference.org>).

Table 1. U.K.'s fair share of the emissions reductions for a 1.5°C pathway.

(Figures here are for 2030.)

Global Baseline emissions	61 GtCO ₂ eq					
Global 1.5°C pathway emissions	25 GtCO ₂ eq					
Global emission reductions required	36 GtCO ₂ eq					
U.K. share of global Responsibility and Capacity						
- less progressive	3.50%					
- more progressive	3.70%					
U.K. total fair share of global emission reductions	<i>expressed in reductions below baseline in 2030</i>			<i>expressed in reductions below 1990 levels in 2030</i>		
- less progressive	1.28 GtCO ₂ eq			1.54 GtCO ₂ eq		
- more progressive	1.35 GtCO ₂ eq			1.60 GtCO ₂ eq		
	85%	100%	100%	85%	100%	100%
	below	below	below	below	below	below
	1990 in	1990 in	1990 in	1990 in	1990 in	1990 in
	2030	2030	2025	2030	2030	2025
Domestic portion of U.K. fair share (GtCO ₂ eq)	0.42	0.54	0.54	0.68	0.80	0.80
International portion of U.K. fair share (GtCO ₂ eq)						
- less progressive	0.86	0.74	0.74	0.86	0.74	0.74
- more progressive	0.93	0.81	0.81	0.92	0.80	0.80

Table 1. Results of fair share calculation for the U.K., for two different equity benchmarks ("less progressive" and "more progressive"). The table shows total fair share of emission reductions, split into a domestic and international portion, for three different hypothetical domestic targets.

ActionAid; Christian Aid; War on Want; Friends of the Earth England, Wales and Northern Ireland; Friends of the Earth Scotland

February 2020

For the purpose of providing the information on the scale of the financial resources needed to support the U.K. contributing its fair share to address the global climate emergency, we need to make a few assumptions and judgements:

We take guidance from the UK Committee on Climate Change report on achieving net zero emissions in the UK by 2050. They estimate that achieving the UK current net zero target will cost the 1% to 2% of GDP each year between now and 2050ⁱ.

UK GDP is \$2.7 trillion, so it may cost about \$27 - \$54 billion per year for 30 years to achieve net zero. Using the mid-point of this estimate we calculate this to be approximately \$1.2tn, or £1tn in total.

While this cost is based on development over a 30 years' time span, the analysis here recommends a much more rapid decline in UK carbon emissions over the next 5 to 10 years, therefore would recommend that much more of this investment be brought forward to the coming decade.

Our analysis shows that at least (and likely much more) of the UK's emissions reduction fair share will have to occur in the global south. Therefore, we use the same figure as the UK as our best guess estimate for costs in the global south. We understand this is a big assumption, but in the absence of accurate estimates we use this as an estimate of scale of resourcing to be transferred. We realize this will be in many forms, of investment, including scaled up climate finance for mitigation, private investments, changing supply chains to zero carbon production, and zero carbon trade deals.

ⁱ <https://www.theccc.org.uk/wp-content/uploads/2019/05/Net-Zero-Chris-Stark-Presentation.pdf>
<https://www.theccc.org.uk/wp-content/uploads/2019/05/Advisory-Group-on-Costs-and-Benefits-of-Net-Zero.pdf>