CARBON INEQUALITY IN 2030

Per capita consumption emissions and the 1.5ºC goal

'Over the past 25 years, the richest 10% of the global population has been responsible for more than half of all carbon emissions… Rank injustice and inequality on this scale is a cancer. If we don't act now, this century may be our last.'

Antonio Guterres, UN Secretary General[1]

'[The world's rich] consume and consume and consume with no thought.'

Patricia Espinosa, UN Executive Secretary, UNFCCC[2]

The world's richest 1% are set to have per capita consumption emissions in 2030 that are still 30 times higher than the global per capita level compatible with the 1.5ºC goal of the Paris Agreement, while the footprints of the poorest half of the world population are set to remain several times below that level. By 2030, the richest 1% are on course for an even greater share of total global emissions than when the Paris Agreement was signed. Tackling extreme inequality and targeting the excessive emissions linked to the consumption and investments of the world's richest people is vital to keeping the 1.5ºC Paris goal alive.

INTRODUCTION

The climate and inequality crises are closely interwoven. In 2020, Oxfam and the Stockholm Environment Institute (SEI) estimated that between the first Intergovernmental Panel on Climate Change (IPCC) report in 1990 and the 2015 Paris Agreement, the consumption of the world's richest 1% drove twice the carbon emissions of the poorest half of the global population combined.[3]

In that era of extreme carbon inequality in which the climate crisis accelerated, around a third of the global carbon budget for limiting global heating to the Paris Agreement's 1.5ºC goal was squandered just to expand the consumption of the richest 10% of the world population.[4]

Now, at COP26 in Glasgow, the world is facing a looming gap between the level of expected global emissions in 2030 – based on the Nationally Determined Contributions (NDCs) of emissions reductions made by countries under the Paris Agreement – and the level needed in 2030 to keep alive the chance of limiting global heating to 1.5ºC above pre-industrial levels.[5]

Joint agency briefing note

This report was commissioned by Oxfam and authored by Tim Gore, IEEP, based on research carried out by IEEP and SEI.

Institute for European Environmental Policy

OXFAM

In this new briefing commissioned by Oxfam based on analysis by the Institute for European Environmental Policy (IEEP) and SEI, we provide estimates of the impact of the NDCs on the per capita consumption emissions of different global income groups in 2030 – revealing the stark inequality between the people whose carbon footprints are set to be compatible with the 1.5ºC Paris goal, and those whose are not. We estimate that:

- People in the richest 1% of the global population are set to have per capita consumption emissions footprints in 2030 that are still 25% higher than in 1990, 16 times higher than the global average, and 30 times higher than the global per capita level compatible with the 1.5ºC goal, while the footprints of the poorest half of the global population are set to remain well below the 1.5ºC-compatible level.
- The share of total global emissions associated with the consumption of the richest 1% is set to continue to grow, from 13% in 1990, to 15% in 2015 and 16% in 2030.
- In 2015–30, the global 'middle classes'[8] are on course for per capita emissions cuts that are closest to (though still far from) the global 1.5ºC-compatible per capita level – which, given this global income group saw the fastest emissions growth rates in 1990–2015, is a sign of the so-called 'Paris effect'[9] in transforming the course of emissions trends.
- The geography of global carbon inequality is set to change, with an increasing share of the emissions of the world's richest 1% linked to citizens in middle-income countries.
- At national level in each of the major emitting countries, the richest 10% of citizens are set to have per capita emissions in 2030 that are substantially higher than the global average per capita level compatible with the 1.5ºC goal.

Per capita consumption emissions

Consumption-based accounting allocates emissions to the country of final consumption of the goods and services for which the emissions were produced. Per capita consumption emissions reflect an individual's share of the total national consumption emissions of their country, including the emissions linked to their household consumption, capital investments and use of government services.

The 2030 per capita emissions level consistent with the 1.5ºC goal reflects the total global emissions in 2030 compatible with a global emissions pathway that can limit global heating to 1.5ºC divided by the projected global population in 2030.[6] In this sense, it is an alternative way of looking at the total global 'emissions gap', such as that presented in UNEP's Emissions Gap Report.[7] See also Box 2 on 'fair shares' and the 1.5ºC goal.

Carbon inequality is extreme, both globally and within most countries. If the 1.5ºC goal is to be kept alive, then carbon emissions must be cut far faster than currently proposed. But critically, these efforts must go hand-in-hand with measures to cut pervasive inequality and ensure that the world's richest citizens – wherever they live – lead the way. Four of our key findings are further explored below.

Box 1: Methodology for deriving 2030 consumption emissions estimates

Our method for deriving a global distribution of per capita consumption emissions by income groups is set out in our work last year,[10] and similar to recent work by Chancel.[11]

To estimate per capita consumption emissions in 2030, we used national territorial emissions estimates based on unconditional NDCs and other national policies from Climate Action Tracker (CAT).[12] We converted CO2e into CO2 based on the 2018 ratio for each country. We converted territorial into consumption emissions estimates (assuming no change in overall trade patterns) by adjusting countries' net imported emissions by the global average emissions reductions for 2015–30, and net exported emissions by their national emissions reduction in their NDCs.

We allocated these national consumption emissions estimates in 2030 to individuals within each country, based on the same method as previously, and assuming a change in national income distributions consistent with SSP2 (per Rao, et al. 2019), which are minimal through 2030, before sorting into a single global distribution by income. We scaled to 2030 income and population levels and gap-filled for countries without 2030 CAT estimates using the RCP1.9 scenario from our previous work modified by SSP2. More detail on the method, sensitivities and limitations is available at the SEI website.[13]

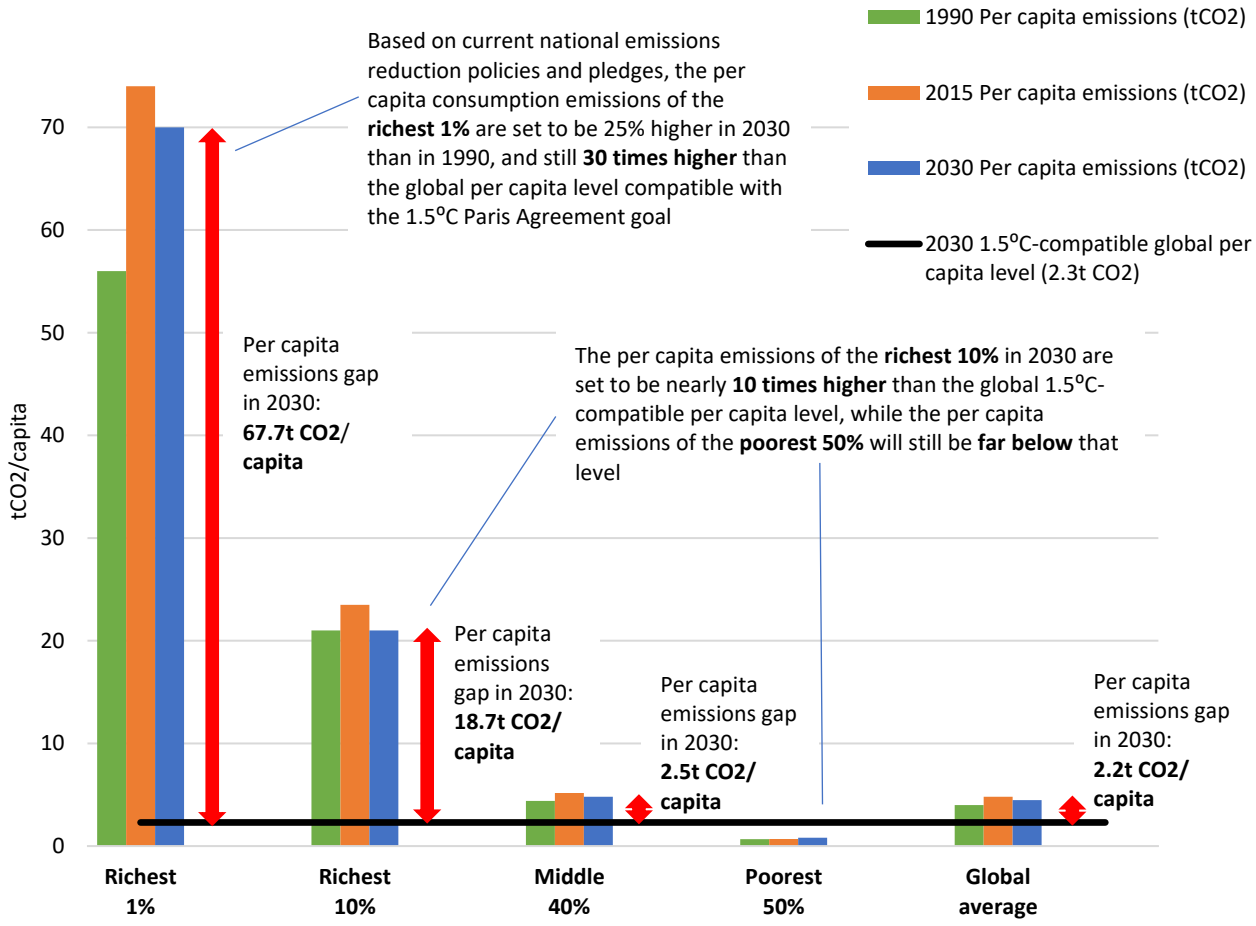
ANALYSIS

1. IN 2030, THE EMISSIONS OF THE RICHEST 1% ARE SET TO BE 30 TIMES THE 1.5ºC-COMPATIBLE PER CAPITA LEVEL, WHILE THE EMISSIONS OF THE POOREST 50% ARE SET TO REMAIN WELL BENEATH IT

The current NDCs[14] will result in only marginal cuts in total global emissions, leaving a total emissions gap between expected emissions in 2030 and the level needed compatible with limiting global heating to 1.5ºC of at least 17Gt CO2.[15] On a per capita basis – based on the projected global population in 2030 – this translates into a gap of approximately 2.2t CO2/capita.[16] But behind this global average lies stark inequality between the expected per capita consumption emissions in 2030 of richer and poorer people around the world.

Based on the NDCs and other national policies, we estimate that by 2030, the richest 1% of the world population (c.80 million people) will have emissions footprints that are still 25% higher than in 1990, 16 times above the global per capita average in 2030, and some 30 times higher than the global 1.5ºC-compatible per capita level. The footprint of the richest 10% (c.800 million people) is set to be nine times the 1.5ºC per capita level, and of the middle 40% (c.3.2 billion people) to be around twice that level. By contrast, the average footprint of the poorest half of the world population (c.4 billion people) is set to remain substantially below that level (see **Figure 1**).

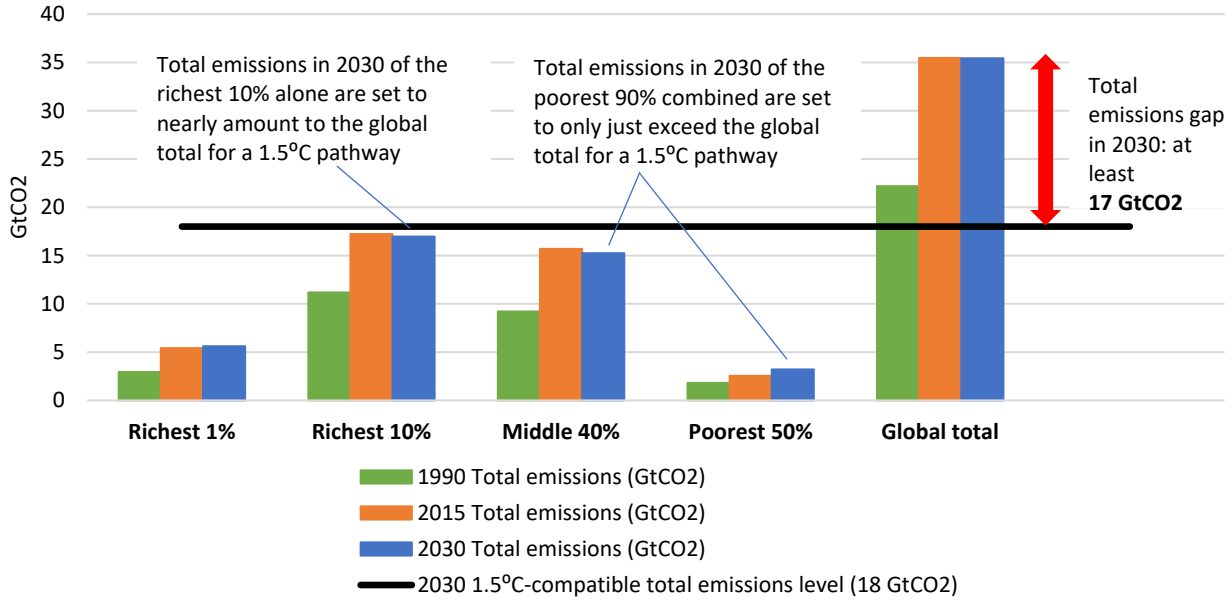
Figure 1: Per capita consumption emissions of global income groups 1990–2030 and the 2030 1.5ºC-compatible global per capita goal



Source: IEEP and SEI analysis. Annual income in 2030 ($2011PPP) of richest 1%: >$172k; richest 10%: >$55k; middle 40%: $9.8k; poorest 50%: <$9.8k. Total population in 2030: c.7.9 billion.

In absolute terms, we find that despite the small total emissions cuts globally from 2015 to 2030, the total emissions associated with the richest 1% are set to continue to increase (see **Figure 2**). Notably, we also estimate that the total emissions associated with 90% of the global population combined will only just exceed the total global 1.5ºC-compatible emissions level in 2030, while the total emissions associated with the consumption of just the richest 10% of the world population alone will nearly amount to that level.

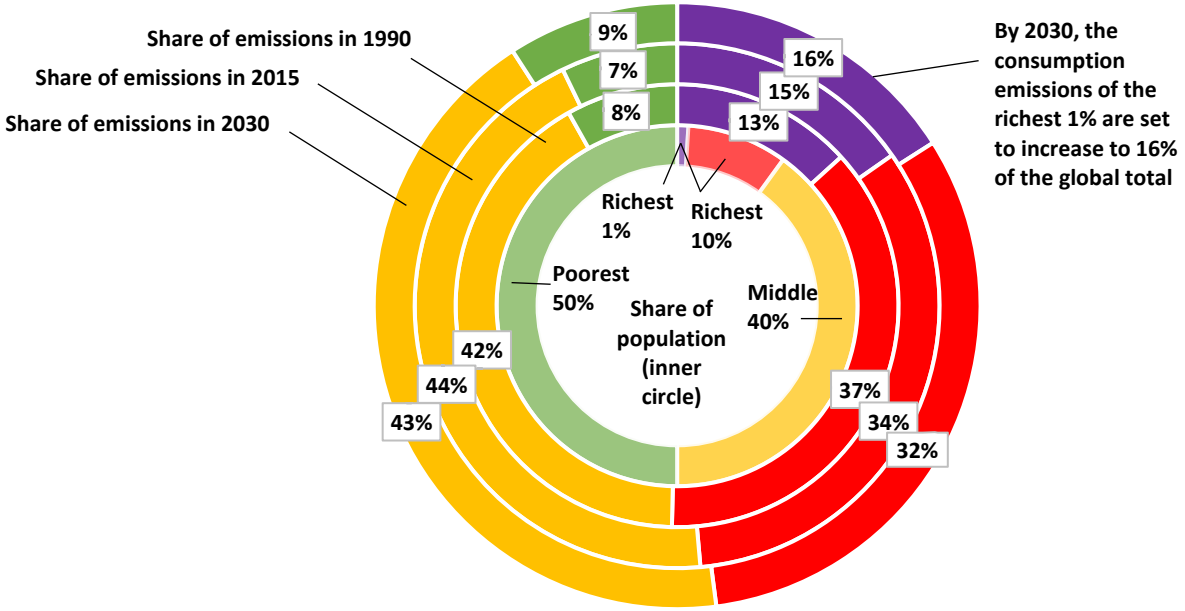
Figure 2: Total consumption emissions 1990–2030 of global income groups and the 2030 1.5ºC-compatible total global emissions level



Source: IEEP and SEI analysis

This growth in the absolute emissions linked to the richest 1% also translates into a continued growth in their share of total global emissions, which we estimate will continue to grow from 13% in 1990 to 15% in 2015 and is set to reach over 16% by 2030 (see **Figure 3**).[17] This continued increase is a reflection of the fact that in countries that are home to most of the world's richest 1%, the carbon intensity of the economy is not set to improve sufficiently to offset the expected increase in income and consumption of those countries' richest citizens.

Figure 3: Share of global emissions from consumption of global income groups 1990–2030



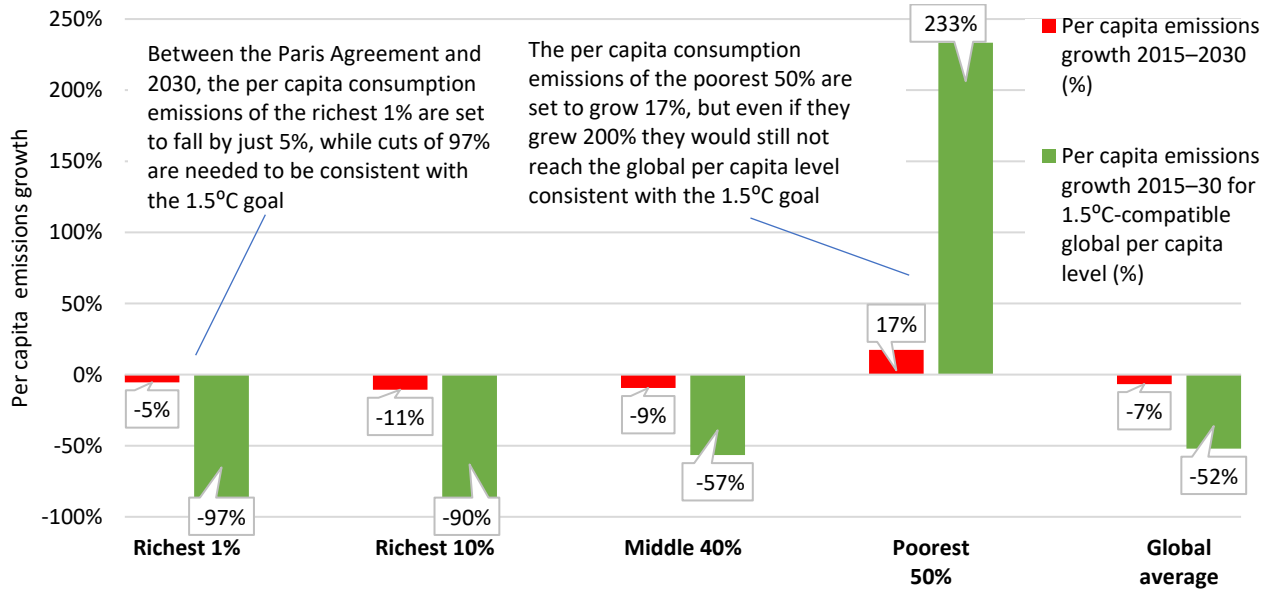
Source: IEEP and SEI analysis

2. PER CAPITA EMISSIONS IN THE GLOBAL 'MIDDLE CLASSES' ARE SET FOR THE BIGGEST TURNAROUND

Between 2015 and 2030, the richest 1% are set to reduce their per capita consumption emissions by just 5%, compared with the 97% cuts needed to align with the global per capita level compatible with the 1.5ºC goal (see **Figure 3**). We estimate that the per capita emissions of the poorest half of the world population may increase[18] – from an extremely low baseline – by 17%, but even if they grew by 200% they would still be within the 1.5ºC-compatible per capita level.

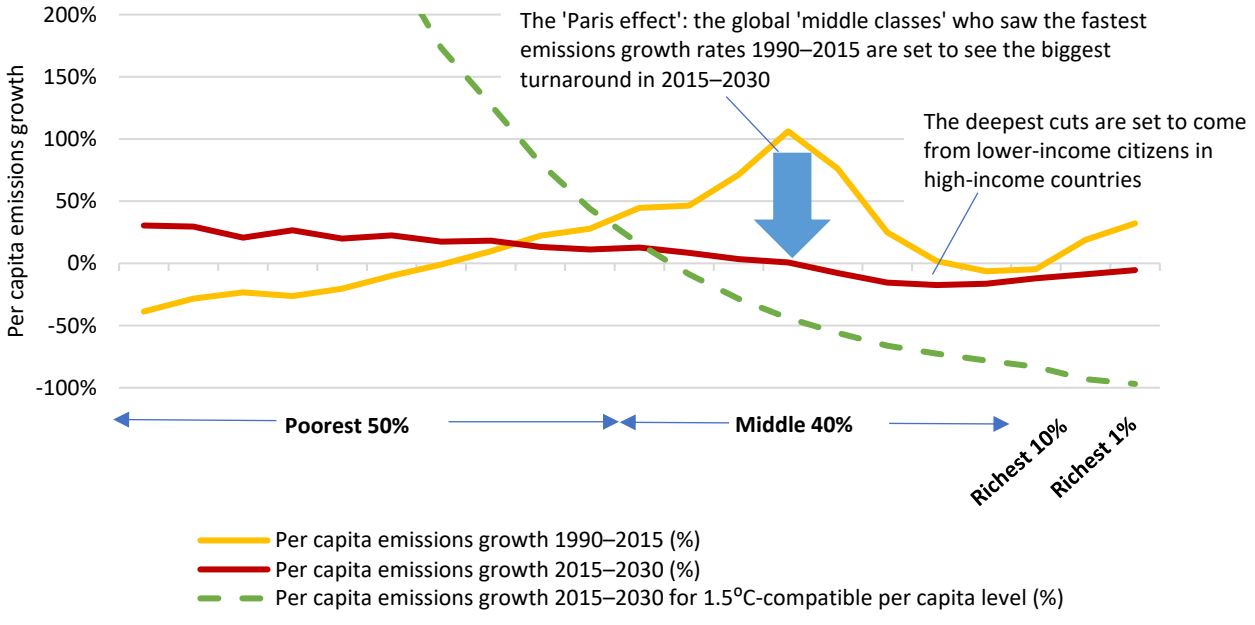
The deepest cuts are set to be achieved among the global upper and lower-middle classes – between the richest 1% and the poorest 50% of the world population. The 40% of the world population between the richest 10% and the poorest 50% are set to see cuts (of 9% below 2015 levels) that are closest to, though still very far from, the cuts needed to meet the 1.5ºC-compatible per capita level (of 57% below 2015 levels). This is significant given that emissions growth rates were fastest in this global income group from 1990–2015 – signalling a major turnaround in emissions trends, and a clear sign of the so-called 'Paris effect'[19] (see **Figure 4**).

Figure 4: Per capita emissions growth 2015–30 and the 1.5ºC-compatible global average



Source: IEEP and SEI analysis

Figure 5: Per capita emissions growth 1990–2015 and 2015–2030



Source: IEEP and SEI analysis

This is largely a reflection of the NDCs of middle-income countries (where the largest share of people in this global income group live) such as China and South Africa, where national emissions – having grown rapidly from 1990-2015 – are set to peak in the 2020s. The deepest cuts relative to 2015 are set to be found around the 80th–90th percentiles of the world income distribution, largely a reflection of the impact of absolute national emissions reductions in higher-income countries/regions on their middle- and lower-income citizens.[20]

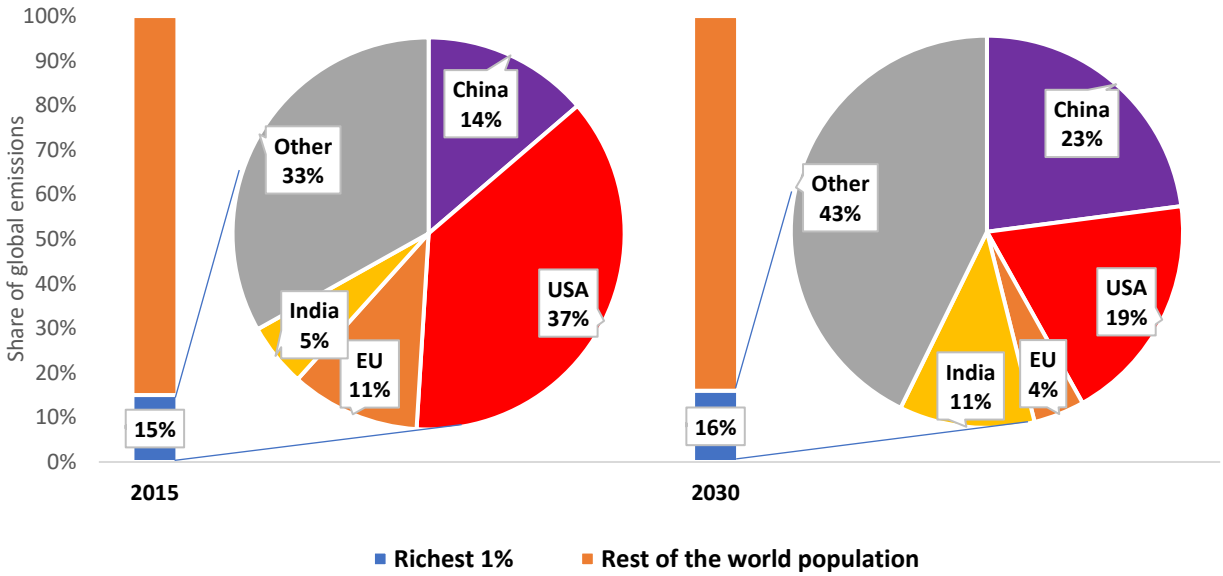
3. THE GEOGRAPHY OF CARBON INEQUALITY IS CHANGING

As discussed in our previous work, there has been a significant shift since 1990 in the extent to which citizens of different countries contribute to the emissions of different global income groups.[21] Those trends are set to continue, and are particularly notable in the geographic composition of the emissions of the richest 1% (see **Figure 6**).

We estimate that by 2030, citizens of China will contribute a bigger share of the emissions of the richest 1% than citizens of the USA, and citizens of India will contribute a bigger share than citizens of the EU. It is also notable that the share of emissions from other countries is set to increase substantially by 2030, with major contributions coming from citizens of countries such as Saudi Arabia and Brazil (whose citizens are set to account for, respectively, 9% and 3% of the emissions of the richest 1% in 2030).

These trends reflect both the increase in the numbers of citizens from middle-income countries among the world's richest, and the slower pace of those countries' emissions reductions relative to high-income countries.

Figure 6: Changing geographic source of emissions of world's richest 1% 2015–2030



Source: IEEP and SEI analysis

4. IN ALL OF THE MAJOR EMITTING COUNTRIES, THE RICHEST CITIZENS' PER CAPITA CONSUMPTION EMISSIONS ARE SET TO REMAIN SIGNIFICANTLY ABOVE THE 1.5ºC-compatible per capita level

While carbon inequality is often most stark at the global level, inequalities within countries are also very significant. They increasingly drive the extent of global inequality,[22] and likely have a greater impact on the political and social acceptability of national emissions reduction efforts. It is therefore notable that in all of the major emitting countries, the richest 10% and 1% *nationally* are set to have per capita consumption footprints substantially above the 1.5ºC global per capita level.

Of the major emitters shown in **Figure 7**, only India is set to have national per capita consumption emissions within the 1.5ºC-compatible per capita level in 2030, although the emissions of the richest 10% of Indian citizens are set to rise to a level over five times above it. In China, while half the population is set to remain well below the 1.5ºC per capita level in 2030, the per capita emissions of the richest 1% could rise dramatically. While the USA, EU and UK will each see substantial cuts in their national per capita consumption emissions – with the poorest 50%

in the EU and UK set to achieve the 1.5ºC-compatible global level – the richest 10% of citizens in all three will still have footprints that are significantly over this level.

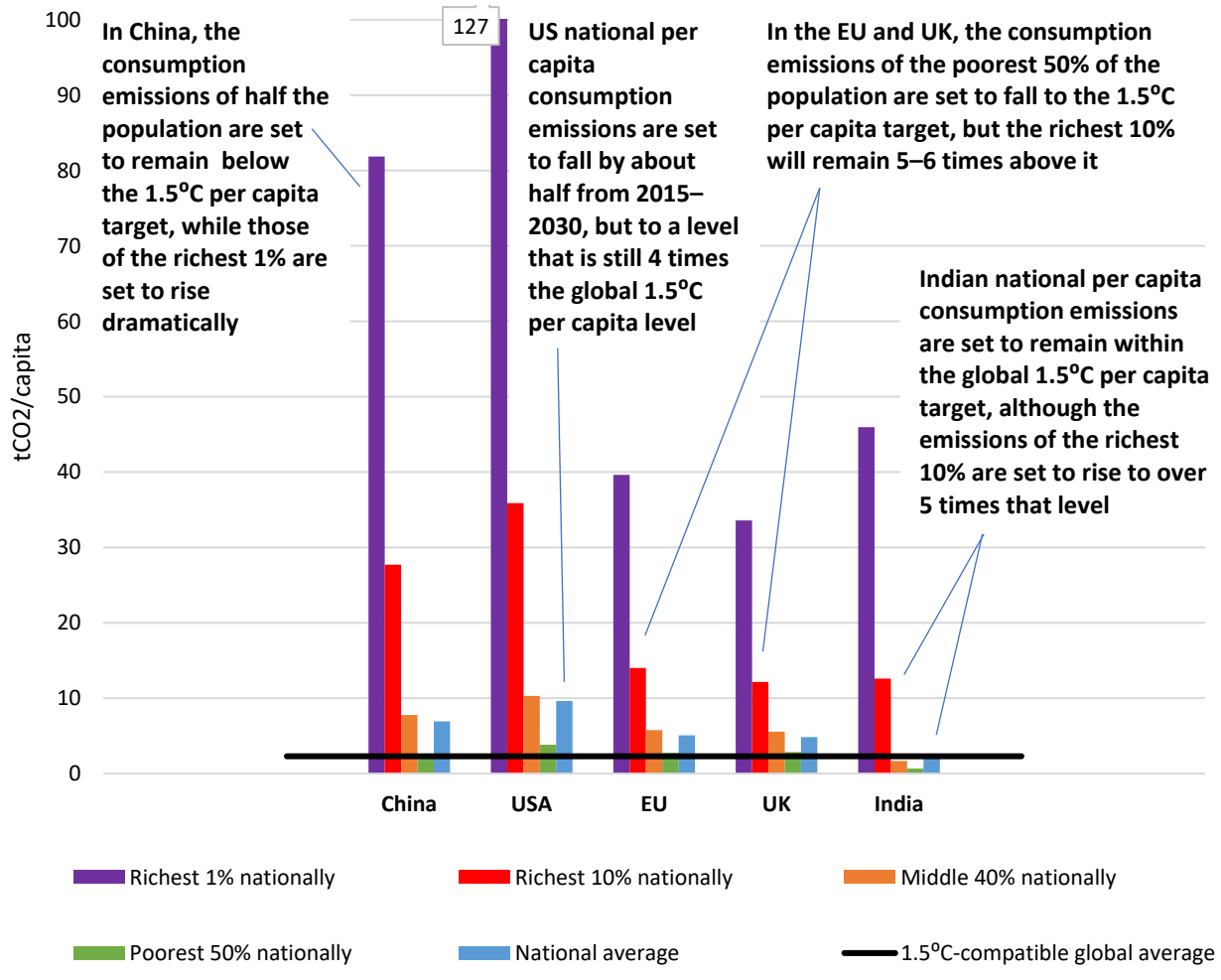
Box 2: 'Fair shares' and the 1.5ºC-compatible per capita level

It is vital to stress that achieving the 1.5ºC-compatible per capita level does not reflect any country's 'fair share' of the global effort to address the climate crisis. After all, high-income countries and regions like the USA, EU and UK have benefited from centuries of carbon-intensive growth and have the greatest economic capacity to act.

For such countries, a 'fair share', in line with the analysis of the Civil Society Equity Review group,[23] requires *both* deep domestic emissions reductions – *at a minimum* – to the 1.5ºC-compatible per capita level, *and in addition* the provision of adequate, new and additional international climate finance to support low- and middle-income countries who require it to limit their emissions to the same level. Furthermore, given the worsening impacts of the climate crisis, a fair share for such countries also entails the provision of adequate financing for climate adaptation and to address climate-related loss and damage.

The fact that these countries are still not on track to reach the 1.5ºC per capita level by 2030, *and* have still not delivered the minimal commitment to mobilize $100bn per year in international climate finance by 2020, is a double indictment of their moral and legal failure in view of the equity principle at the heart of the UNFCCC and its Paris Agreement.[24]

Figure 7: Per capita consumption emissions of national income groups in 2030 and the global average 1.5ºC-compatible per capita level



Source: IEEP and SEI analysis[25]

Box 3: How do the world's richest people generate such high carbon footprints?

Estimating the carbon footprints of the world's richest people is no easy task. While there are robust methods to estimate individual footprints by applying carbon emissions coefficients to the goods and services reported in household surveys, these are widely recognized to under-represent the consumption of the world's richest citizens. However, a number of recent studies shine new light on this question, helping to confirm our estimates of the extent of high-income emissions.

Wilk and Barros drew on 82 databases of public records to document billionaires' houses, vehicles, aircraft and yachts. Applying carbon coefficients, they found billionaire carbon footprints easily run to thousands of tonnes per year, with superyachts the biggest contributor, each adding around 7,000 tonnes per year, for example.[26]

Earlier studies also established the major contribution to carbon footprints of the rich and famous from flights, especially via private jets. Gösling's study constructed aviation emissions estimates based on tracking the international travel of celebrities via their social media postings. Footprints – from aviation alone – were found to be in excess of a thousand tonnes per year.[27]

Most egregiously, 2021 has heralded the dawn of a new form of hyper-carbon-intensive luxury travel, space tourism, in which hundreds of tonnes of carbon can be burned in just a ten-minute flight for around four passengers.[28]

Outside the mega-rich, numerous studies have identified transport as the biggest contributor to the footprints of high emitters. For example, Ivanova and Wood found that the majority of emissions of the EU's highest emitters are transport-related.[29] Gösling and Humpe found that no more than 1% of the world population likely accounts for half of aviation emissions.[30]

Critically for our analysis, the footprints of the world's richest people do not only relate to their direct consumption, but also to the carbon emissions associated with their capital investments. Here data is also scarce, although the drive for greater climate-related disclosures in capital markets is set to rapidly change this.[31]

Chancel's recent paper adds new insights by allocating national consumption emissions associated with capital investments to individuals within each country based on their share of asset ownership, derived from the latest wealth inequality datasets. He finds that emissions from investments make up an increasing share – up to 70% in 2019 – of the footprints of the world's 1% highest emitters.[32]

And beyond the emissions associated with direct consumption and investments, researchers like Nielsen, et al. have identified the disproportionate influence of high-income high emitters resulting from their status as role models and, critically, their political power and access to decision makers.[33] While further research is still needed in all these areas, it seems undeniable that government policies to address the climate crisis should pay far greater attention to the outsized role of the world's richest, highest emitters.

CONCLUSIONS

The extreme difference between the expected carbon footprints of a small minority of the world's population in 2030 and the global average level needed to keep the Paris Agreement's 1.5ºC goal alive is not tenable. Maintaining such high carbon footprints among the world's richest people either requires far deeper emissions cuts by the rest of the world's population, or it entails global heating in excess of 1.5ºC above pre-industrial levels. There is no other alternative.

At COP26, governments must commit to a timetable to strengthen near-term NDCs in line with the 1.5ºC goal, and critically to do so on the basis of equity. That means the world's richest, highest-emitting countries must finally commit to their fair share: leading the way in cutting emissions far faster by the end of this decade, and providing the substantial, new and additional finance needed by low- and middle-income countries to further limit their

emissions too. In view of the decades of delay in cutting emissions sufficiently, substantially scaled-up finance for adaptation and loss and damage are also vital.

At the national and regional level, analysis of carbon inequality must move urgently to the heart of government efforts to implement strengthened NDCs, with a far clearer focus than has been the case to date on measures to reduce inequality and address the excessive emissions of the richest, while supporting those on the lowest incomes. Our work last year set out a number of public policy options available.[34]

Undoubtedly – as argued by several others[35] – it is time for governments to raise major taxes on or to outright ban highly carbon-intensive luxury consumption, from SUVs to mega yachts, private jets and space tourism, that represent a morally unjustified depletion of the world's scarce remaining carbon budget.

But as discussed in Box 3, the emissions of the world's richest people linked to their capital investments are likely even greater than those associated with their direct consumption.[36] With wealth inequality likely further widening in the wake of the COVID-19 crisis, coordinated and substantial taxation of wealth is urgently required to reduce inequality and at the same time curb the emissions of the richest. It is time to use regulation and taxation to end extreme wealth altogether, to protect people and the planet.

Such measures alongside wider progressive tax reforms are critical to reduce the wealth of the richest substantially, to shift the behaviour of the polluter elite and to generate the revenues needed to fund the wider fight against the climate and inequality crises. The climate crisis has been driven by extreme inequality to this point. But now governments must urgently reach for solutions which address both.

NOTES

1 TED. (2020). *The race to a zero-emission world starts now*. António Guterres. [video content]. https://www.youtube.com/watch?v=a-_FuwTkFhI

2 L. Goering. (2020, October 6). *Political 'retreat' on climate action harms all nations, says U.N. climate chief.* Reuters. https://www.reuters.com/article/us-climatechange-politics-idUSKBN26R00N

3 Gore, T. (2020) *Confronting Carbon Inequality: Putting climate justice at the heart of the COVID-19 recovery*. Oxfam. https://policy-practice.oxfam.org/resources/confronting-carbon-inequality-putting-climate-justice-at-the-heart-of-the-covid-621052/; Kartha, S. et al. (2020). *The Carbon Inequality Era: An assessment of the global distribution of consumption emissions among individuals from 1990 to 2015 and beyond*. Oxfam and SEI. https://policy-practice.oxfam.org/resources/the-carbon-inequality-era-an-assessment-of-the-global-distribution-of-consumpti-621049/; Capstick, S. et al. (2020) 'Bridging the gap – the role of equitable, low carbon lifestyles', in UNEP. (2020). *The Emissions Gap Report 2020*. UNEP. https://wedocs.unep.org/xmlui/bitstream/handle/20.500.11822/34432/EGR20ch6.pdf?sequence=1&isAllowed=y

4 Gore. (2020). Ibid.; Kartha, et al. (2020). Ibid.

5 UNEP. (2021). *The Emissions Gap Report 2021*. UNEP. https://www.unep.org/resources/emissions-gap-report-2021

6 According to the *UNEP Emissions Gap Report 2021*, the median estimate of the emissions level in 2030 consistent with limiting global heating to 1.5ºC is 25Gt CO2e (range 17–33).

7 UNEP. (2021). Op. cit.

8 By 'global middle class' we refer to the 'middle 40%' of the global income distribution, between the poorest 50% and the richest 10% of the world population. The largest share of the people that fall into this income group are citizens of middle-income countries, although this group also includes some lower-income citizens in high-income countries.

9 By 'Paris effect', we refer to the significant socio-economic impact of the Paris Agreement. See: Systemiq. (2020). *The Paris Effect: How the climate agreement is reshaping the global economy*. Systemiq. https://www.systemiq.earth/paris-effect/

10 Gore. (2020). Op. cit.; Kartha, et al. (2020). Op. cit.

11 Chancel, L. (2021). *Climate change and the global inequality of carbon emissions 1990-2019*. WID. https://wid.world/document/climate-change-the-global-inequality-of-carbon-emissions-1990-2020-world-inequality-lab-working-paper-2021-21/

12 See https://climateactiontracker.org/

13 https://www.sei.org/

14 Assuming unconditional NDCs are fully implemented.

15 The *UNEP Emissions Gap Report* estimates the gap at 28Gt CO2e, which is approximately 20Gt CO2. In our estimates, we find a gap of approximately 17Gt CO2, using a slightly later cut-off point to consider NDCs than the *UNEP Emissions Gap Report*, and using RCP1.9 SSP2 projections for a selection of countries, which may result in a slight over-estimation of emissions reductions through 2030 based on unconditional NDCs.

16 According to the *UNEP Emissions Gap Report 2021*, the median estimate of the emissions level in 2030 consistent with limiting global heating to 1.5ºC is 25Gt CO2e (range 17–33), which is approximately 18Gt CO2. We use a global population estimate in 2030 of approximately 7.9 billion people.

17 This finding is consistent with Chancel, L. (2021). Op. cit. Chancel finds the top 1% of global emitters have steadily increased their share of global emissions since 1990, reaching 17% in 2019.

18 Note that the majority of the people in the poorest 50% of the world population live in lower- and lower middle-income countries, whose NDCs are often made conditional on receipt of international climate finance. Subject to the provision of such finance, we would anticipate that emissions growth would be lower and/or could be negative in this period.

19 See endnote 10.

20 We identified the same trend in our analysis of the inequality of emissions reductions in the EU 1990–2015, in which EU consumption emissions reductions were achieved among lower- and middle-income EU citizens, while the emissions of the richest EU citizens continued to increase in this period. See Gore, T. and Alestig, M. (2020). *Confronting Carbon Inequality in the European Union: Why the European Green Deal must tackle inequality while cutting emissions*. Oxfam. https://www.oxfam.org/en/research/confronting-carbon-inequality-european-union#:~:text=New%20xfam%20analysis%20reveals%20huge,the%20richest%2010%25%20actually%20grew. Chancel.

(2021). Op. cit. also finds a similar trend.

21 Gore. (2020). Op. cit.; Kartha, et al. (2020). Op. cit.

22 Chancel, L. and Piketty, T. (2015). *Carbon inequality from Kyoto to Paris: Trends in the global inequality of carbon emissions 1998-2013 and prospects for an equitable adaptation fund*. WID. https://wid.world/document/chancel-l-piketty-t-carbon-and-inequality-from-kyoto-to-paris-wid-world-working-paper-2015-7/; Kartha, et al. (2020). Op. cit.; Chancel. (2021). Op. cit.

23 Civil Society Equity Review Group. (2015). *Fair Shares: A civil society equity review of INDCs*. http://civilsocietyreview.org/report/

24 Article 1 of the UNFCCC reads: 'The Parties should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities. Accordingly, the developed country Parties should take the lead in combatting climate change and the adverse effects thereof.'

25 The income thresholds for the national income groups in 2030 are as follows (in $2011PPP). China: richest 1% - $189k, richest 10% - $67k, middle 40% - $20k, bottom 50% - <$20k; EU: richest 1% - $114k, richest 10% - $46k, middle 40% - $19k, bottom 50% - <$19k; India: richest 1% - $125k, richest 10% -$17k, middle 40% - $5k, bottom 50% - <$5k; UK: richest 1% - $179k, richest 10% - $79k, middle 40% - $42k, bottom 50% - <$42k; USA: richest 1% - $1.8m; richest 10% - $117k, middle 40% - $44k, bottom 50% - <$44k.

26 R. Wilk and B. Barros. (2021, February 16). *Private planes, mansions and superyachts: What gives billionaires like Musk and Abramovich such a massive carbon footprint*. The *Conversation*. https://theconversation.com/private-planes-mansions-and-superyachts-what-gives-billionaires-like-musk-and-abramovich-such-a-massive-carbon-footprint-152514

27 S. Gössling. (2019). *Celebrities, air travel, and social norms. Annals of Tourism Research*, 79. https://www.sciencedirect.com/science/article/abs/pii/S016073831930132X

28 E. Marais. (2021, July 19). *Space tourism: rockets emit 100 times more C02 per passenger than flights – imagine a whole industry*. The *Conversation*. https://theconversation.com/space-tourism-rockets-emit-100-times-more-co-per-passenger-than-flights-imagine-a-whole-industry-164601

29 D. Ivanova and R. Wood. (2020). *The unequal distribution of household carbon footprints in Europe and its link to sustainability*. Cambridge University Press. https://www.cambridge.org/core/journals/global-sustainability/article/unequal-distribution-of-household-carbon-footprints-in-europe-and-its-link-to-sustainability/F1ED4F705AF1C6C1FCAD477398353DC2

30 S. Gössling and A. Humpe. (2020). *The global scale, distribution and growth of aviation: Implications for climate change. Global Environmental Change*, 65. https://www.sciencedirect.com/science/article/pii/S0959378020307779

31 See for example: GOV.UK. (2021, October 29). *UK to enshrine mandatory climate disclosures for largest companies in law.* Press release. https://www.gov.uk/government/news/uk-to-enshrine-mandatory-climate-disclosures-for-largest-companies-in-law#:~:text=From%206%20April%202022%2C%20over,on%20Climate%2DRelated%20Financial%20Disclosures.

32 Chancel. (2021). Op. cit.

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