

# TRAFFIC LIGHT ASSESSMENT REPORT 2023

2030 NDC EMISSION  
TARGETS'  
PARIS AGREEMENT  
ALIGNMENT

Assessment Commissioned by  
the Climate Vulnerable Forum

OCTOBER 2023

FAIR SHARE PATHWAYS TO COMBAT GLOBAL CLIMATE BREAKDOWN



PARIS EQUITY CHECK





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Global Climate Breakdown***

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In partnership with:



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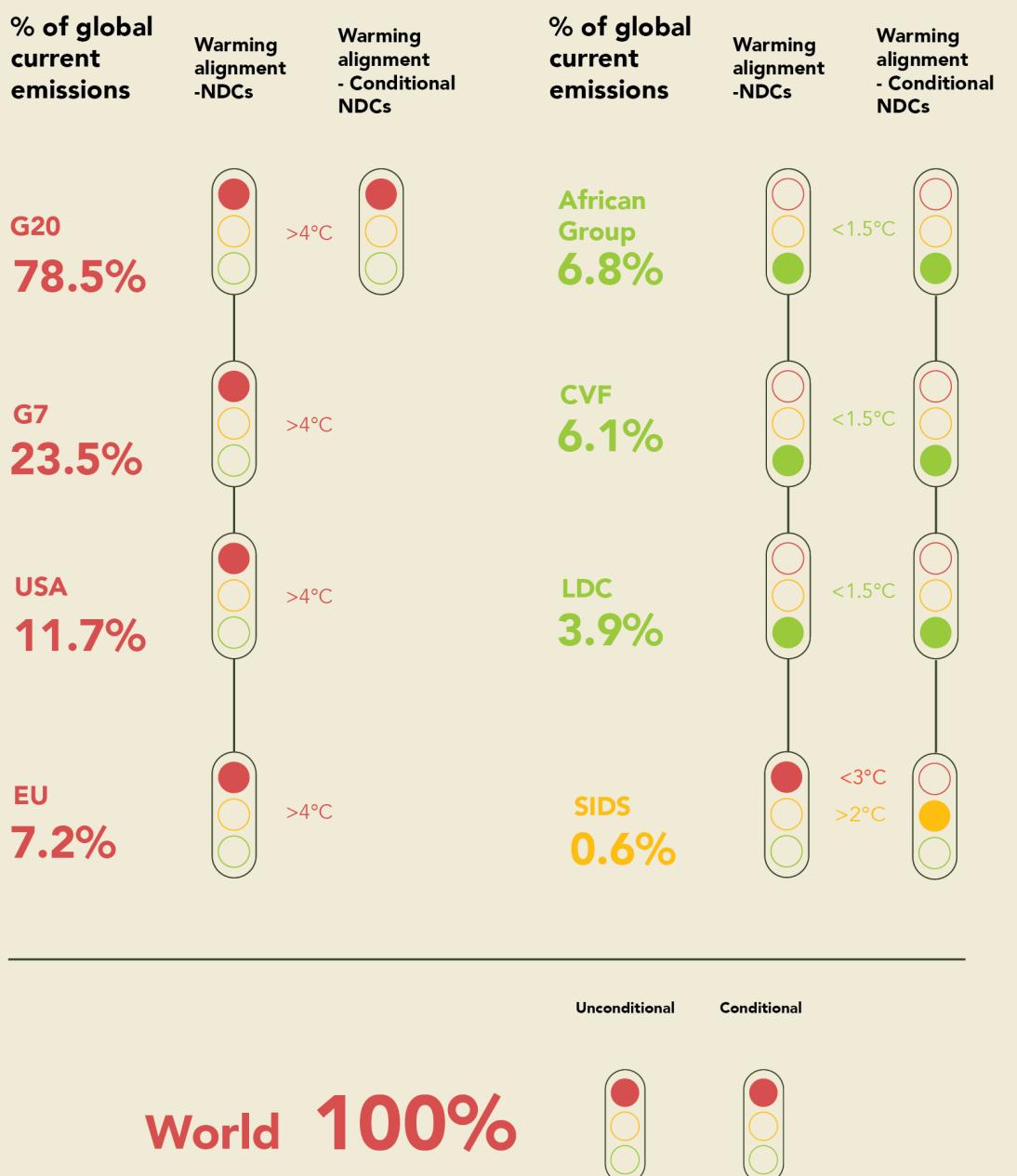
Laura Mejía

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# Traffic Light Assessment Paris Temperature Goal Alignment of 2030 NDCs

*What is the warming signal of the current Paris emissions targets?\**



\* Per an emissions envelope over the period 1990-2100 and using GDP as the capability variable, with implied warming of what each country is doing its fair share of.

# Executive Summary

The following points represent key findings stemming from this particular assessment of the 2030 emission targets of the Nationally Determined Contributions (NDCs) of Parties to the Paris Agreement, through the Traffic Light Assessment (TLA). The TLA has been commissioned by the Climate Vulnerable Forum (CVF), but developed as an independent study through the cooperation of the CVF secretariat hosted at the Global Center on Adaptation, Aroha, the Paris Equity Check and other partners.<sup>1</sup> It aims to explore the evaluation of NDCs according to equity criteria that commonly prevail in academic literature including population, wealth and human development, and past emissions. TLA analysis represents one framework for assessing alignment or compliance of Parties under the Paris Agreement with its temperature goal and related equity principles. The term "fair share" is used in the TLA to refer to the quality of different countries or country group's assessment under this framework. What the TLA does not assess is the credibility or delivery of action taken by any party to deliver its NDC in reality, the assessment being limited to evaluation of submitted emission targets alone.

<sup>1</sup> High-level communique of the CVF of July 2023: <https://thecvf.org/activities/program/declarations/high-level-communique-of-the-climate-vulnerable-forum/>



Marek Piwnicki

## Key Findings

1

**The majority of countries that are a Party to the Paris Agreement are doing their fair share to deliver a 1.5°C world under it:**

On the basis of the TLA, over half of all nations (that are Parties to the United Nations Framework Convention on Climate Change, UNFCCC) have set NDC targets that are fully compliant with the temperature goal and equity principles of the Paris Agreement. Specifically, 99 of the UNFCCC's 197<sup>2</sup> Parties have set 2030 targets<sup>3</sup> in their NDCs that are fully compliant with the Paris regime temperature goal, and are greenlight countries according to the TLA. A further 5 countries show near-compliance, with NDCs implying warming of between 1.5°C and 2°C. There are 9 Parties, who account for 0.1% of global emissions, that were omitted from the TLA due to data constraints.<sup>4</sup> The 99 Paris-compliant, green-light countries,

<sup>2</sup> Status of UNFCCC ratification—includes 197 Parties plus the EU (for 198 in total with the EU): <https://treaties.un.org/>; The Paris Agreement itself has 195 signatories and parties: UNFCCC, "Paris Agreement: Status of ratification". 2023: <https://unfccc.int/process/the-paris-agreement/status-of-ratification/> (Iran, Libya, and Yemen are yet to ratify the Paris Agreement but have signed it, are UNFCCC Parties, and have been assessed in the TLA).

<sup>3</sup> The calculation is based on encompassing NDCs of developing country Parties that are conditional upon receiving international support as foreseen under the Paris Agreement.

<sup>4</sup> The 9 countries omitted from the TLA include: Cook Islands, Holy See, Monaco, Nauru, Niue, Somalia, The Gambia, Liechtenstein, Occupied Palestinian Territory; the total emissions of these countries do not affect the results of the report.

however, represent just a fifth (21.2%) of current global climate pollution while orange-light, near-compliant countries, are responsible for only 1.5% of current global emissions. Paris-aligned countries likewise represent over half the global population (or 4.2 billion people), though just 15% of the world economy as measured by Gross Domestic Product (GDP, current US\$). These greenlight countries have in common their comparatively low emissions per capita and past emissions.

2

**The minority of countries that are not pledging their fair share to deliver the Paris Agreement are those responsible for most of the world's climate pollution to date:**

84 countries have set 2030 NDC targets that are non-compliant with the temperature goal and equity principles of the Paris Agreement. Constituting some 40% of the Parties to the Paris Agreement, this group nevertheless account for the overwhelming majority, and approximately 80% (77.2%) of current world climate pollution, and are red light countries according to the TLA. Such countries also have a combined population of 3.7 billion people or just below half



(46.9%) of the global population. These redlight countries have in common their comparatively high emissions per capita and past emissions.



### **Countries not pledging their fair share to deliver the Paris Agreement are overwhelmingly the world's wealthiest and highest capability nations (based on GDP/HDI), and include nearly all G7, G20 and developed countries:**

Non-Paris compliant, red light countries under the TLA collectively constitute most of the world's current wealth, with 84% of global gross domestic product (GDP). The non-compliant red light countries have an average human development index (HDI) score of 0.79, equivalent to "high human development". The G7 (23.4% of current global emissions), G20 (78.5%), EU (7.1%), and developed economies<sup>5</sup> (23.9%) Parties to the Paris Agreement all have set NDCs which, when assessed in their aggregate, are non-compliant with the temperature goal and equity principles of the Paris Agreement, and are red light groups according to the TLA. Just two of the thirty-six developed economies – Switzerland and the United Kingdom (UK) – are deemed fully compliant with 2030 NDC targets aligned with the temperature goal and equity principles of the Paris Agreement, representing 1.1% of current

<sup>5</sup> UN country classification [https://www.un.org/en/development/desa/policy/wesp/wesp\\_current/2014wesp\\_country\\_classification.pdf](https://www.un.org/en/development/desa/policy/wesp/wesp_current/2014wesp_country_classification.pdf)

global emissions.<sup>6</sup> Of the G7, only the UK is either partially or fully compliant. Of the G20, in addition to the UK, only India and Indonesia are fully compliant, while Brazil is partially compliant when its assessment is based on the parameters of a 1950 base year and HDI for capability.

<sup>6</sup> This is the case for the UK when the TLA variables of the 1990 base year and GDP, for capability, are selected. Switzerland is green-light regardless of the TLA variable selection. Sweden is also assessed as green-light when applying the 1990 and GDP variables, however it does not have a standalone country NDC as it is a member of the EU which presents a common NDC that is assessed as red light by the TLA.



### **The poorest and most climate-vulnerable countries of the world are virtually all, individually and in the aggregate, doing their fair share to deliver the Paris Agreement's temperature goal:**

In terms of the aggregate of each of these groups, the 48 nations within the UN category of the world's Least Developed Countries (LDCs) (3.9% of current global emissions), the 39 Small Island Developing States (SIDS) (0.6%),<sup>7</sup> the 58 Climate Vulnerable Forum (CVF) members (6.1%), the 54 African Group members (6.8%), and the 7 isthmus countries of Central America (0.3%), are all collectively assessed as fully compliant with the Paris Agreement temperature

<sup>7</sup> SIDS are collectively compliant with the 1950 and HDI parameters, based on conditional contributions. Countries not compliant are: Antigua and Barbuda, Bahamas, Guyana, Palau, Singapore, Suriname, Seychelles and Trinidad and Tobago. More information can be found here: [trafficlightclimate.org](http://trafficlightclimate.org)

goal and equity principles. The African Group, the CVF, SIDS, Central American countries and LDCs (108 countries) all have, in aggregate, a greenlight under the TLA, and collectively represent just 10.9% of global emissions, 6.1% of world GDP, and an average HDI score of 0.60 ("Medium Human Development") despite being home to 2.2 billion people, or more than one quarter (27.5%) of the global population.



### **Substantial increased near-term emissions reduction efforts are required from major developed and emerging economies, while for major developed economies like the G7 and the USA, carbon neutrality target dates should be advanced to between now and the early 2040s (country-dependent), all of which may necessitate enhanced international cooperation to achieve:**

According to the TLA, a number of countries have already exhausted or are close to exhausting their fair share burden allocation of the global atmosphere available to 2100 to achieve the Paris Agreement with respect to the temperature goal and its related equity principles. In order to remain compliant, net-zero emissions for the EU are estimated to need to occur between 2043 and 2057, while for the G7 it should occur between now and 2044.<sup>8</sup> For the

<sup>8</sup> In this context "carbon neutrality" means that

world's largest economy, the United States of America (USA) has maintained constant high-per capita climate pollution levels over the last three decades, in addition to its historical emissions profile and high levels of wealth and human development. Accordingly, the equivalent TLA carbon neutrality date for the USA is in all cases pre-2020, except when the variable selection is set at a 1990 base year with GDP for capability, in which case the USA should be carbon neutral by 2032.

Indeed, all countries with high responsibilities and capabilities, have continued to emit climate pollution at relatively high per capita levels since 1990 (and 1950) and are also marked by relatively high levels of capacity on the basis of GDP or HDI as indicators, all of which contribute to the depletion of these countries' equitable share of the global emissions space. The world's largest current emitter of climate pollution, and the second-largest economy, China, is allocated emissions reaching zero after 2050 which is broadly aligned with China's long-term target of achieving carbon neutrality before 2060. However, China's present NDC target of limiting pollution levels to around 15.5 gigatons of GHG in 2030 should be dramatically strengthened by a further reduction of nearly 10 gigatons to a level below 7 gigatons for full Paris Agreement alignment.<sup>9</sup> This highlights that

economy-wide greenhouse gas emissions reach zero.

<sup>9</sup> China's Mid-Century Long-Term Low Greenhouse Gas Emission Development Strategy, 2021. <https://unfccc.int/documents/307765> However, as has been pointed out by the Climate Action Tracker, it is unclear whether the 2060 carbon neutrality target





for major emerging economies net zero mid-century targets are aligned with the Paris Agreement whereas for certain major developed economies these need to be brought forward.

What is very clear, however, is that near-term 2030 NDC targets of both major developed and emerging economies should be strengthened, in some cases in very large measures, and essentially across the board. The great urgency of this ambition upscaling is underscored by the midpoint of the range of the IPCC's best estimate for when the world warms by 1.5°C being the year 2030<sup>10</sup>. International finance related to article 6 of the Paris Agreement, from emission reductions with countries that are already assessed as compliant, may be additionally availed of to facilitate further countries to reach compliance, especially if domestic possibilities for reducing emissions, in line with equity principles, become marginal or exhausted.

encompasses all GHGs or only CO<sub>2</sub> emissions. If all GHGs are not encompassed their might no longer be alignment with the TLA-assessed carbon neutrality date. See: <https://climateactiontracker.org/countries/china/net-zero-targets/> (the TLA does not specifically evaluate long-term targets though it does provide indications for national carbon neutrality timeframes)

<sup>10</sup> IPCC, 2022: Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegria, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press. Cambridge University Press, Cambridge, UK and New York, NY, USA, 3056 pp., doi:10.1017/9781009325844.



### A single equity framework among many is presented here, most of the other frameworks share the same key variables, while adjustments to the TLA variables (for emissions responsibility between 1950 and 1990; or capability: shifting from GDP to HDI) imply marginal changes to key findings:

The TLA represents a single framework for quantifying equitable emissions allocations and it is important to compare the findings of the TLA to other similar assessments. The Intergovernmental Panel on Climate Change (IPCC) has presented a basic set of shared ethical premises that apply to the climate problem and indicated that impartial reasoning can help put bounds on the plausible interpretations of equity in the burden sharing context. From the perspective of an international climate regime, the IPCC has highlighted three key equity principles: (1) responsibility, (2) capacity (or ability to pay), and (3) equality<sup>11</sup>. Accordingly, much like the

<sup>11</sup> Clarke L., K. Jiang, K. Akimoto, M. Babiker, G. Blanford, K. Fisher-Vanden, J.-C. Hourcade, V. Krey, E. Kriegler, A. Löschel, D. McCollum, S. Paltsev, S. Rose, P.R. Shukla, M. Tavoni, B.C.C. van der Zwaan, and D.P. van Vuuren, 2014: Assessing Transformation Pathways. In: Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Edenhofer, O., R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen, S. Schlömer, C. von Stechow, T. Zwickel and J.C. Minx (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

TLA, population has been a critical factor in virtually every single burden-sharing equity assessment, with GDP the most common variable used to gauge capability, while HDI is also recognized by the IPCC as an important capability indicator.<sup>12</sup>

The TLA demonstrates the extent to which the selection of variables: year of accounting for past emissions, GDP and/or HDI, can have important implications for individual countries, such as shifting the USA's carbon neutrality moment from 2032 to before 2020. However, regardless of the choice of TLA variables, the same global conclusions remain unchanged: that major developed and emerging economies, in particular, fall outside, often far outside, alignment or compliance with the Paris Agreement's temperature goal and related equity principles on the basis

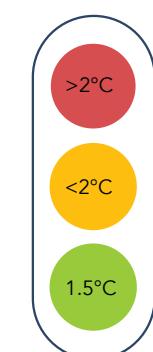
<sup>12</sup> Fleurbaey M., S. Kartha, S. Bolwig, Y.L. Chee, Y. Chen, E. Corbera, F. Lecocq, W. Lutz, M.S. Muylaert, R.B. Norgaard, C. Okereke, and A.D. Sagar, 2014: Sustainable Development and Equity. In: Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Edenhofer, O., R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen, S. Schlömer, C. von Stechow, T. Zwickel and J.C. Minx (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

<sup>13</sup> Clarke L., K. Jiang, K. Akimoto, M. Babiker, G. Blanford, K. Fisher-Vanden, J.-C. Hourcade, V. Krey, E. Kriegler, A. Löschel, D. McCollum, S. Paltsev, S. Rose, P.R. Shukla, M. Tavoni, B.C.C. van der Zwaan, and D.P. van Vuuren, 2014: Assessing Transformation Pathways. In: Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Edenhofer, O., R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen, S. Schlömer, C. von Stechow, T. Zwickel and J.C. Minx (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

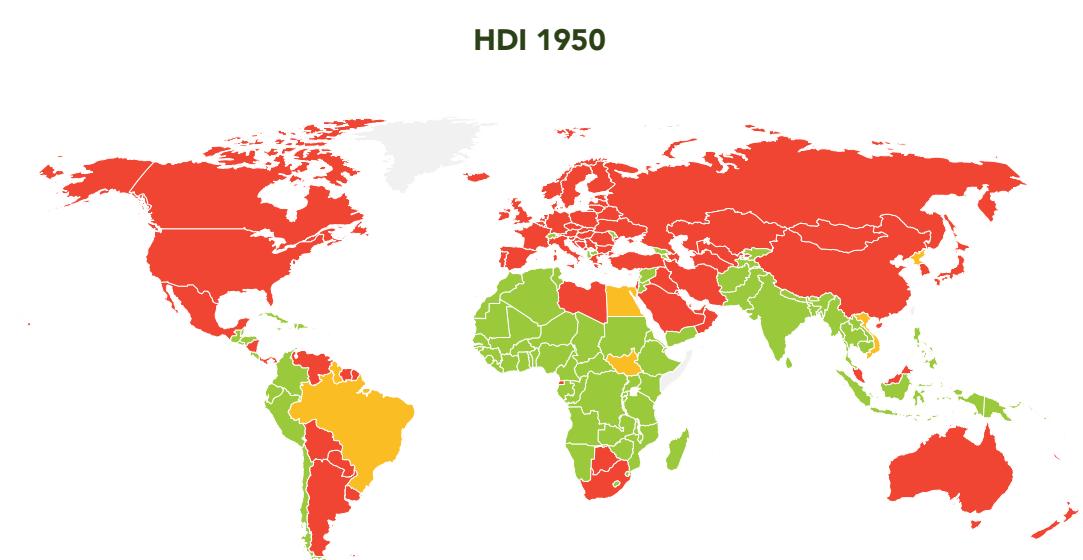
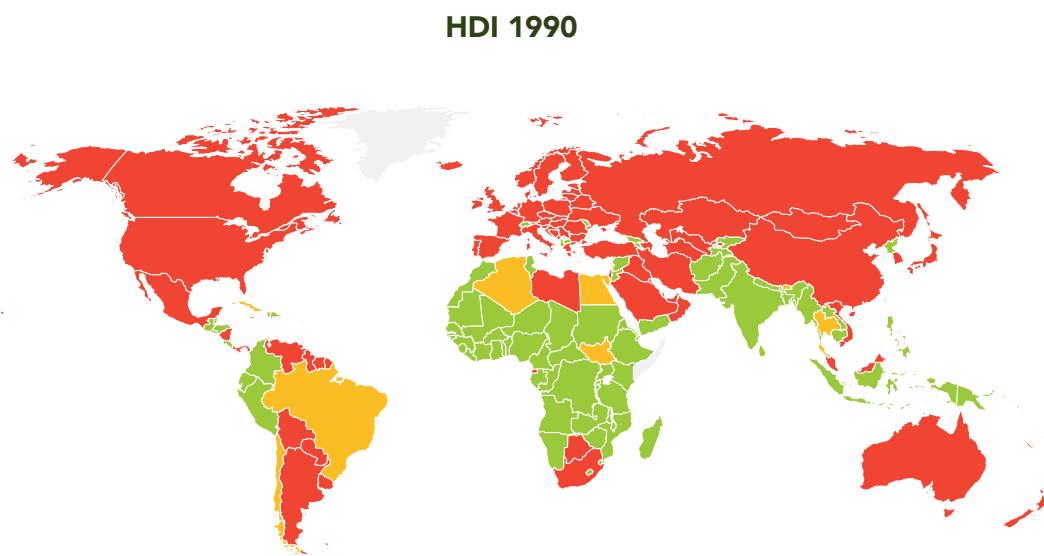
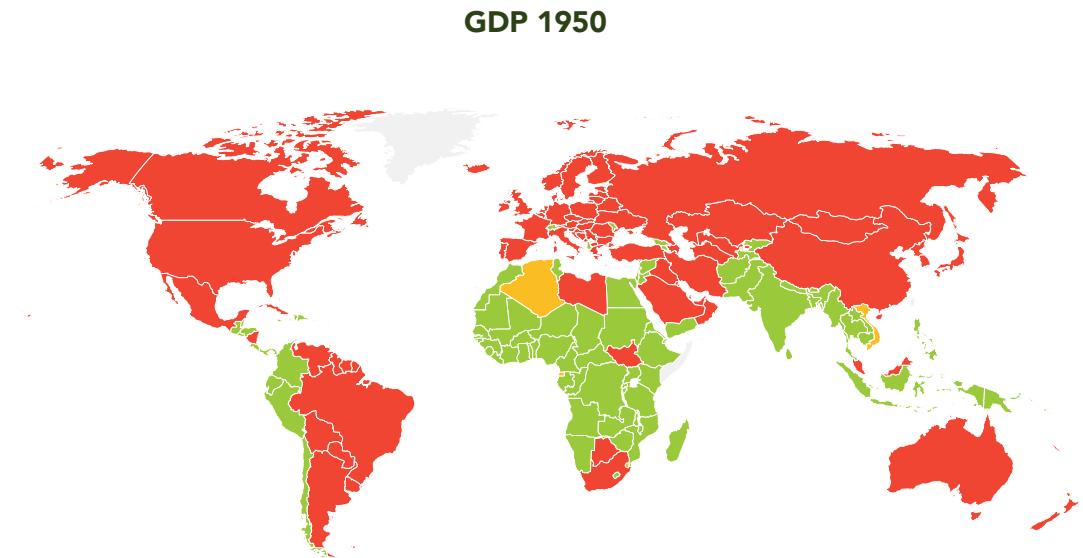
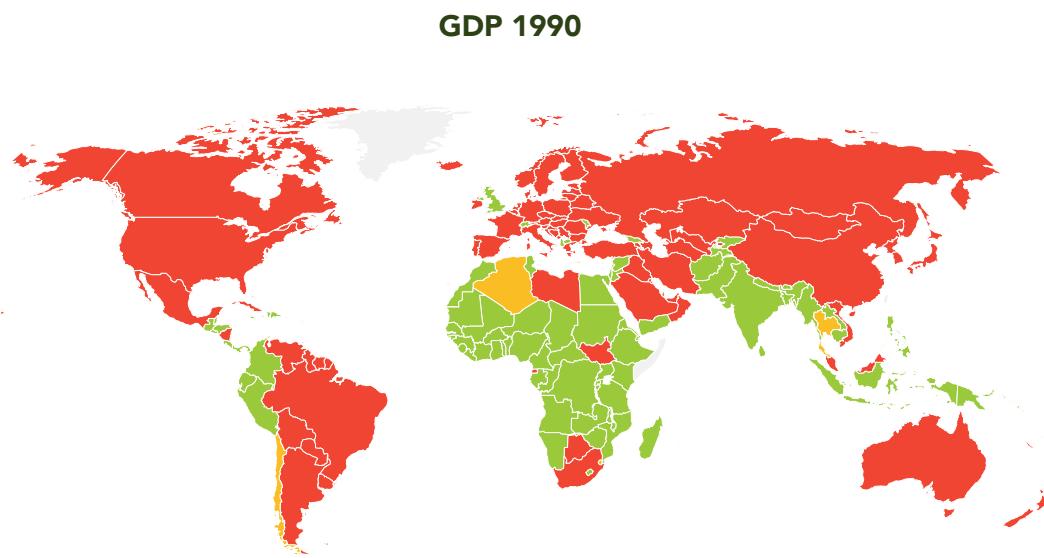
of their near-term 2030 NDC targets. On the flip side, most nations and UNFCCC/Paris Agreement Parties remain aligned regardless of TLA variable selection. This is because such countries have, on average, relatively low levels of wealth and human development and emitted comparatively low levels of climate pollution per head of population. Submitted NDCs of UNFCCC Parties could, moreover, significantly improve on their justification for how their emissions targets concur with prevailing equity criteria.<sup>14</sup>

<sup>14</sup> Winkler, H., Höhne, N., Cunliffe, G. et al. Countries start to explain how their climate contributions are fair: more rigour needed. *Int Environ Agreements* 18, 99–115 (2018). <https://doi.org/10.1007/s10784-017-9381-x>

### Traffic light assessment explained



- >2°C Non compliant
- <2°C Near compliant
- 1.5°C Fully compliant



If responsibility is set for the period 1990-2100 the above maps provide an illustration of the variation at the global level of using GDP versus HDI as the parameter for representing capability in the TLA (idem. for the top and bottom maps in the following page for a base year of 1950). Only a few key countries like Brazil, Egypt and the UK have a different TLA result for 1990 due to changing the capability variable of the assessment from GDP to HDI, while the overall results remain remarkably similar.

When the TLA base year is moved to 1950 in order to incorporate historical emissions prior to 1990, and emissions up until 2100, it is also possible to compare the impact of this adjustment on the over TLA results. As the similarities between the maps on both pages suggest, the impact of incorporating historical emissions has a limited effect on the overall picture, although a small number of individual countries, such as the UK, do change their country-specific TLA result.

**Table 1: TLA Results and characteristics of key countries and groups\***

Name (number of countries)	Current emissions per capita (CO2 e/p) (2021)	% Share of current global emissions (2021)	% Share of global emissions since 1950	% Share of global emissions since 1990	% Share of emissions 1950-1990 "historical emissions"	Warming alignment of NDCs - since 1990	Warming alignment - Conditional NDCs - 1990
CVF (58)	2.2	6.1%	4.6%	5.2%	3.7%		
G20 (20+EU)	8.1	78.5%	78.6%	76.9%	80.9%		
EU (27)	8.1	7.2%	15.2%	12.2%	19.1%		
G7 (7+EU)	11.7	23.5%	43.7%	38.1%	50.8%		
United States of America (1)	17.5	11.7%	20.3%	18.4%	22.7%		
China (1)	10.1	28.5%	9.4%	10.4%	8.2%		
Australasia (2)	20.1	1.2%	1.9%	1.8%	1.9%		
African Group (54)	2.5	6.8%	6%	6.8%	4.8%		
SIDS (39)	4.3	0.6%	0.7%	0.8%	0.6%		
LDC (46)	1.8	3.9%	3.1%	3.5%	2.7%		
Vulnerable countries (108)	3.8	10.9%	9.9%	11.3%	8.0%		
World (197)	6.4	100%	100%	100%	100%		

Warming alignment NDCs - 1950	Warming alignment - Conditional NDCs - 1950	% Share of world GDP (2022)	HDI score (2021)	HDI level (2021)	2030 NDC Implied Warming <sup>15</sup>	% Share of global population	Neutrality Timeframe <sup>16</sup>
		3.2%	0.59	Medium human development	<1.5°C	17.7%	>2050
		86.8%	0.76	High human development	> 4°C	62.2%	>2050
		16.8%	0.90	Very high human development	> 4°C	5.6%	2043–2057
		51.9%	0.91	Very high human development	> 4°C	12.7%	Pre-2020 - >2050
		25.7%	0.92	Very high human development	> 4°C	4.2%	Pre-2020–2032
		18.1%	0.77	High human development	> 4°C	17.9%	>2050
		1.9%	0.95	Very high human development	> 4°C	0.4%	Pre-2020 - >2050
		2.7%	0.55	Medium human development	<1.5°C	17%	>2050
		0.9%	0.68	Medium human development	>2°C - <3°C	1.03%	>2050
		1.4%	0.52	Low human development	<1.5°C	13.7%	>2050
		6%	0.6	Medium human development	N.A.	27.5%.	N.A.
		100%	0.71	-	>3°C - <4°C	100%	-

Table 1: the country group composition is detailed in section 7

\*The percentage of historical global emissions is expressed as a fraction of the sum of countries' emissions, it does not include non country specific emissions.

<sup>15</sup> Data has been calculated based on the source from Gütschow, Johannes ; Pflüger, Mika (2023): The PRIMAP-hist national historical emissions time series (1750-2021) v2.4.2. Zenodo. <https://doi.org/10.5281/zenodo.7727475>. Implied warming represents what level of global warming each country is doing its fair share of.

<sup>16</sup> Neutrality timeframe is based on the different scenarios for 1990, 1950 and the variables GDP and HDI.



**Table 2. Results based on traffic light colours**

Categorization	Number of countries	Average current emissions per capita (CO <sub>2</sub> e/p) (2021)	% Share of current global emissions (2021)	% Share of global emissions since 1950	% Share of global emissions since 1990	% Share of emissions 1950-1990 "historical emissions"	% Share of world GDP (2022)	HDI score (2021)	HDI level (2021)
Red	84	11.5	77.2%	80.1%	77.6%	82.9%	83.5%	0.79	High human development
Green	99	2.7	21.2%	18.4%	20.5%	15.8%	15.5%	0.62	Medium human development
Orange	5	5.3	1.5%	1.4%	1.8%	1.3%	0.9%	0.78	High human development
Omitted	9	3.4	0.1%	0.1%	0.1%	0.01%	0.1%	N.A.	N.A.

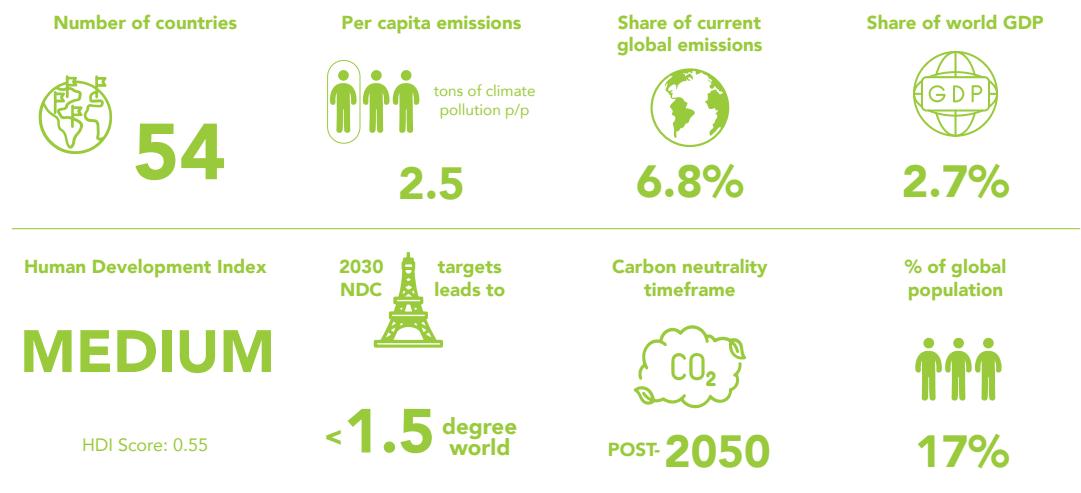
### Traffic light assessment explained



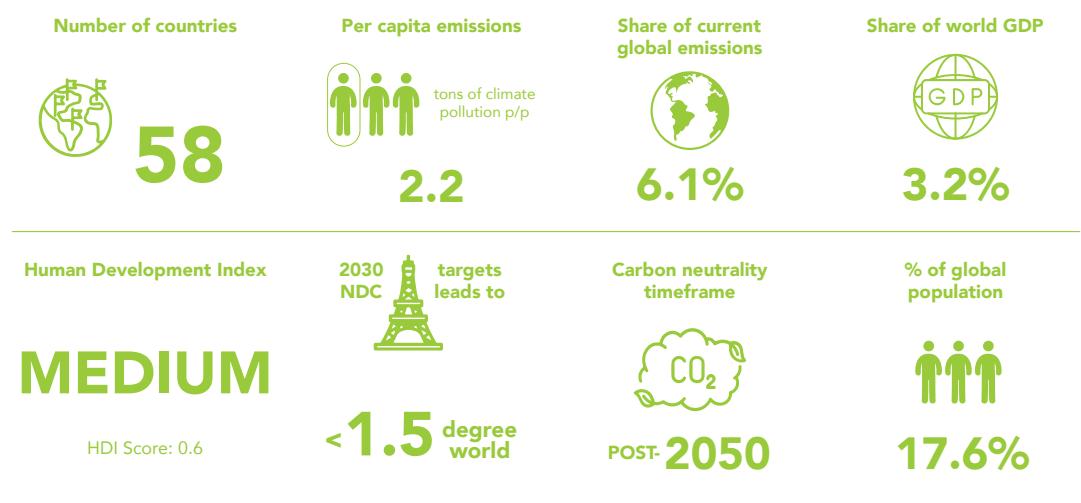
Non compliant

Near compliant

Fully compliant



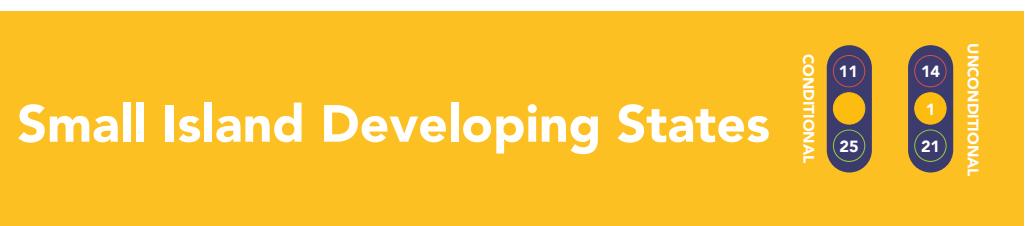
Algeria, Angola, Benin, Botswana, Burkina Faso, Burundi, Cabo Verde, Cameroon, Central African Republic, Chad, Comoros, Congo, Côte d'Ivoire, Democratic Republic of the Congo, Djibouti, Egypt, Equatorial Guinea, Eritrea, Eswatini, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Libya, Madagascar, Malawi, Mali, Mauritania, Mauritius, Morocco, Mozambique, Namibia, Niger, Nigeria, Rwanda, São Tomé and Príncipe, Senegal, Togo, Uganda, Seychelles, Sierra Leone, Somalia, South Africa, South Sudan, Sudan, Togo, Tunisia, Uganda, United Republic of Tanzania, Zambia, Zimbabwe.



Afghanistan, Bangladesh, Barbados, Benin, Bhutan, Burkina Faso, Cambodia, Chad, Colombia, Comoros, Costa Rica, Côte d'Ivoire, Democratic Republic of the Congo, Dominican Republic, Eswatini, Ethiopia, Fiji, Ghana, Grenada, Guatemala, Guinea, Guyana, Haiti, Honduras, Kenya, Kiribati, Kyrgyzstan, Lebanon, Liberia, Madagascar, Malawi, Maldives, Marshall Islands, Mongolia, Morocco, Nepal, Nicaragua, Niger, Palau, Occupied Palestinian Territory, Papua New Guinea, Philippines, Rwanda, Saint Lucia, Samoa, Senegal, South Sudan, Sri Lanka, Sudan, United Republic of Tanzania, The Gambia, Timor-Leste, Tunisia, Tuvalu, Uganda, Vanuatu, Vietnam, Yemen.



Afghanistan, Angola, Bangladesh, Benin, Burkina Faso, Burundi, Cambodia, Central African Republic, Chad, Comoros, Democratic Republic of the Congo, Djibouti, Eritrea, Ethiopia, Gambia, Guinea, Guinea-Bissau, Haiti, Kiribati, Lao People's Democratic Republic, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Myanmar, Nepal, Niger, Rwanda, São Tomé and Príncipe, Senegal, Sierra Leone, Solomon Islands, Somalia, South Sudan, Sudan, Timor-Leste, Togo, Tuvalu, Uganda, United Republic of Tanzania, Yemen, Zambia.



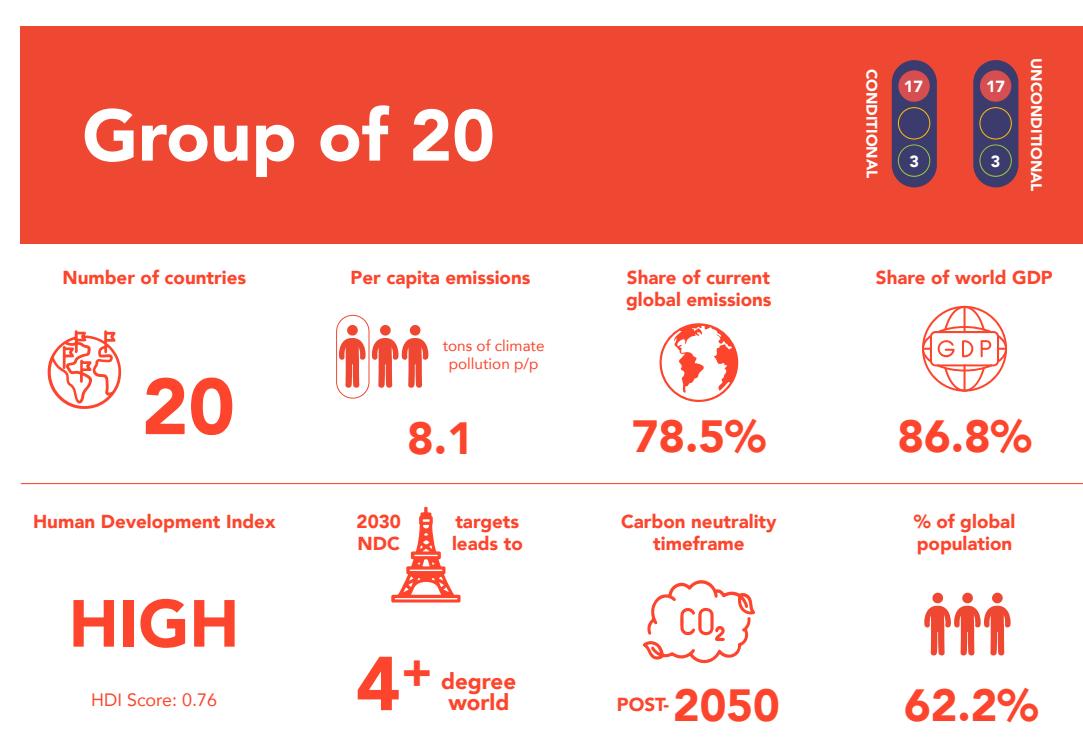
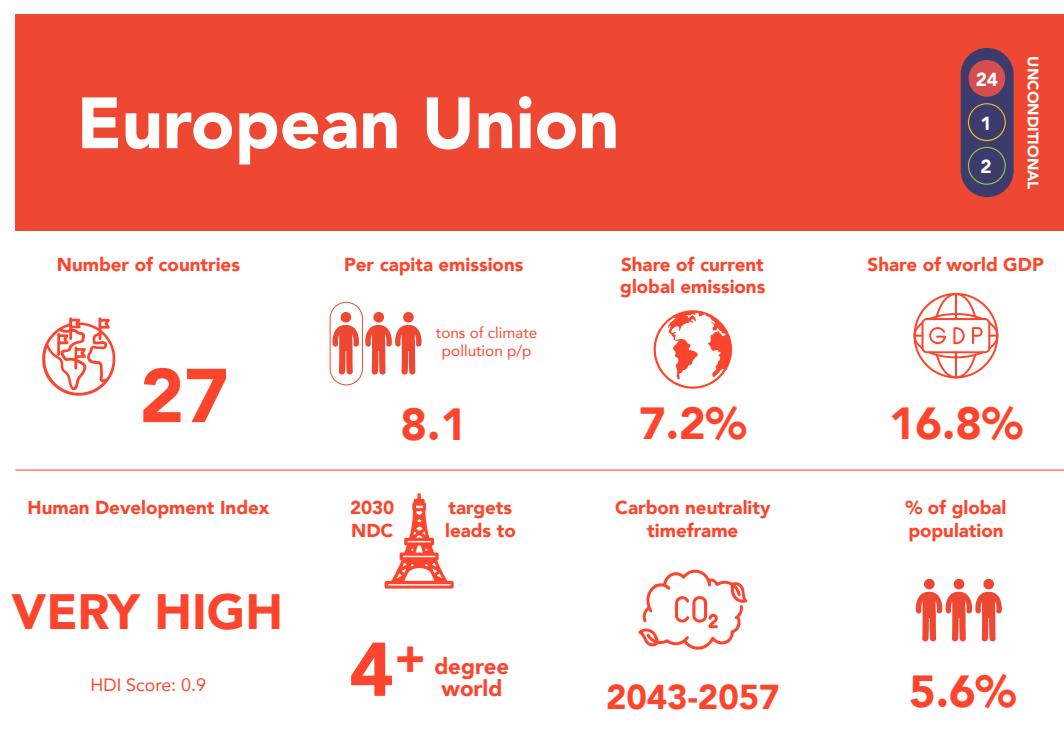
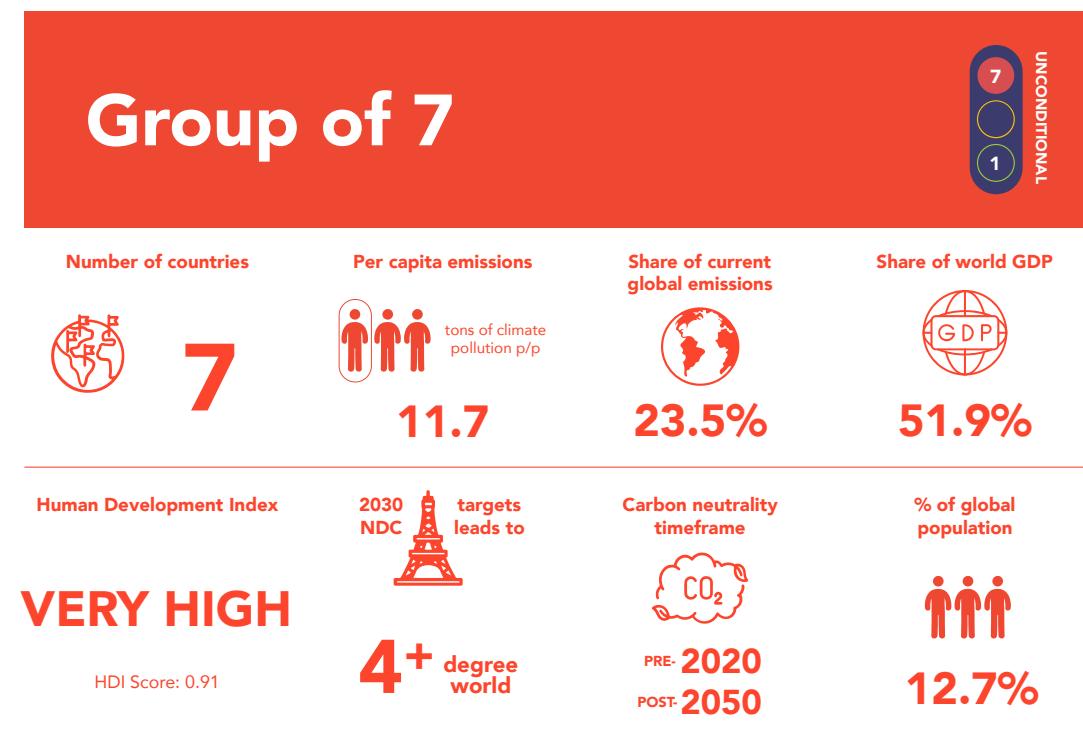
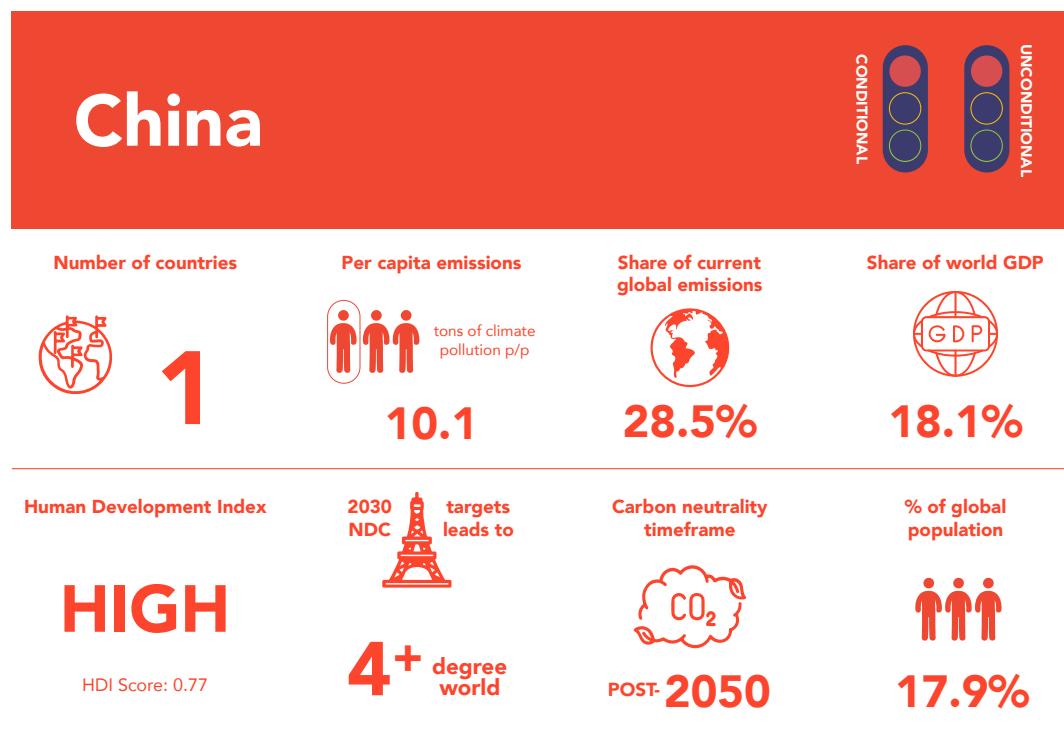
Antigua and Barbuda, Bahamas, Barbados, Belize, Cabo Verde, Comoros, Cook Islands, Cuba, Dominica, Dominican Republic, Federated States of Micronesia, Fiji, Grenada, Guinea Bissau, Guyana, Haiti, Jamaica, Kiribati, Maldives, Marshall Islands, Mauritius, Nauru, Niue, Palau, Papua New Guinea, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Samoa, São Tomé and Príncipe, Seychelles, Singapore, Solomon Islands, Suriname, Timor-Leste, Tonga, Trinidad and Tobago, Tuvalu, Vanuatu.



Afghanistan, Angola, Antigua and Barbuda, Burundi, Benin, Burkina Faso, Bangladesh, The Bahamas, Belize, Barbados, Bhutan, Central African Republic, Côte d'Ivoire, Cameroon, Democratic Republic of Congo, Congo, Cook Islands, Colombia, Comoros, Cape Verde, Costa Rica, Cuba, Djibouti, Dominica, Dominican Republic, Algeria, Egypt, Eritrea, Ethiopia, Fiji, Micronesia, Gabon, Ghana, Guinea, The Gambia, Guinea-Bissau, Equatorial Guinea, Grenada, Guatemala, Guyana, Honduras, Haiti, Jamaica, Kenya, Kyrgyzstan, Cambodia, Kiribati, Saint Kitts and Nevis, Laos, Lebanon, Liberia, Libya, Saint Lucia, Sri Lanka, Lesotho, Morocco, Madagascar, Maldives, Marshall Islands, Mali, Myanmar, Mongolia, Mozambique, Mauritania, Mauritius, Malawi, Namibia, Niger, Nigeria, Nicaragua, Niue, Nepal, Nauru, Panama, Philippines, Palau, Papua New Guinea, Occupied Palestinian Territory, Rwanda, Sudan, Senegal, Singapore, Solomon Islands, Sierra Leone, El Salvador, Somalia, South Sudan, Sao Tome and Príncipe, Suriname, Eswatini, Seychelles, Chad, Togo, Timor-Leste, Tonga, Trinidad and Tobago, Tunisia, Tuvalu, United Republic of Tanzania, Uganda, Saint Vincent and the Grenadines, Vietnam, Vanuatu, Samoa, Yemen, South Africa, Zambia, Zimbabwe.

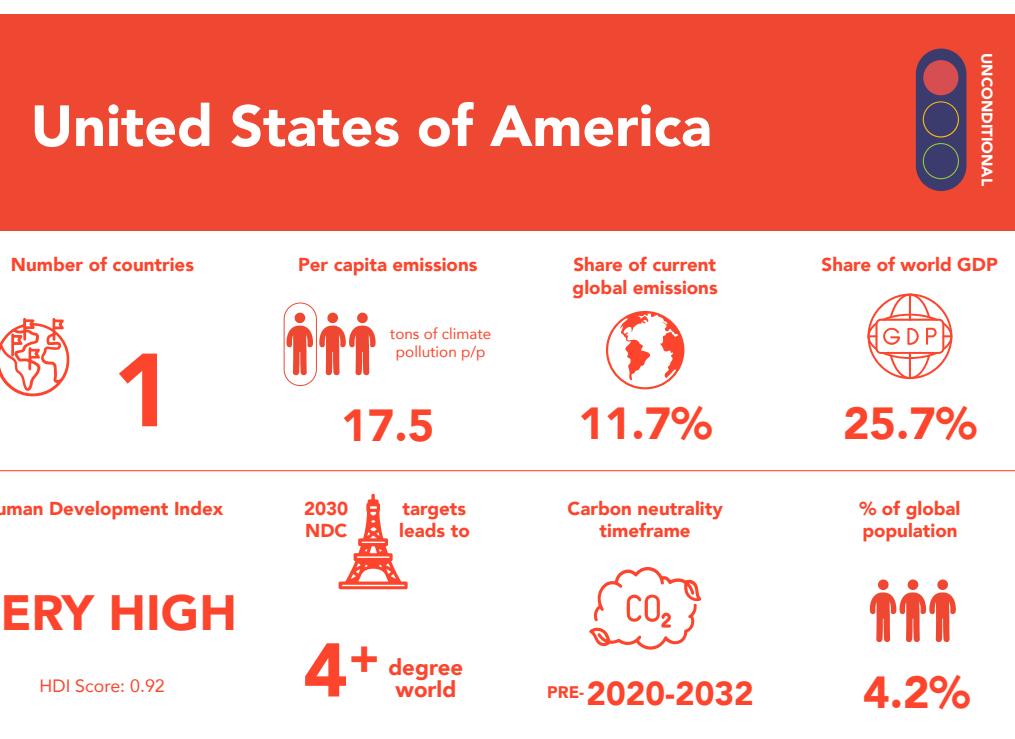


Australia, New Zealand.



Austria, Belgium, Bulgaria, Croatia, Republic of Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain and Sweden.

Argentina, Australia, Brazil, Canada, China, European Union, France, Germany, India, Indonesia, Italy, Japan, Mexico, Russian Federation, Saudi Arabia, South Africa, South Korea, Türkiye, United Kingdom, United States of America.



# About the Assessment

The Traffic Light Assessment (TLA) evaluates the alignment of every country's national emissions pledge, known as Nationally Determined Contributions (NDCs), for their compliance with the Paris Agreement (temperature goal and relating equity principles). This assessment is a quantitative interpretation of the equity principles according to one specific equity framework, which itself aims to capture core equity considerations of the extent to which different countries are doing their fair share to deliver the Paris Agreement's temperature goal.

Specifically, the TLA evaluates countries' 2030 NDC targets to limit and reduce climate pollution (measured by CO<sub>2</sub> equivalent/greenhouse gas emissions) in terms of their alignment and compliance with the temperature goal and related equity principles, with virtually every Paris Agreement Parties' (countries') NDC being assessed.<sup>17</sup> The results of the TLA can be compared with other equity assessments available, such as frameworks

<sup>17</sup> The temperature goal of the Paris Agreement aims to hold the increase in the global average temperature to well below 2°C above pre-industrial levels and pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels. Whereas the guiding equity principles of the Paris Agreement include both the principle of equity itself and the principle of common but differentiated responsibilities and respective capabilities (CBDR-RC), in the light of different national circumstances. Only 9 Parties, representing just 0.1% of current global climate emissions, are excluded due to data limitations.

featuring in the Paris Equity Check<sup>18</sup> in addition to the Climate Action Tracker,<sup>19</sup> and the Civil Society Equity Review,<sup>20</sup> among other comparable assessments.

The temperature goal of the Paris Agreement aims to hold the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels. The TLA uses the average of the two lowest of the latest "below 1.5°C" warming scenario groups (C1 and C2) of the IPCC to equate to this goal (for a TLA green-light). This does include a range of both no and of limited and high temporary overshoot of 1.5°C scenarios that imply absolute peak 21st century warming levels of between 1.6 and 1.7°C (1.4-1.8°C) and end-of-century, 2100, warming levels of between 1.3°C and 1.4°C (1.1-1.5°C)<sup>21</sup>. Near-alignment or compliance

<sup>18</sup> Paris Equity Check: <https://paris-equity-check.org/>

<sup>19</sup> Climate Action Tracker: <https://climateactiontracker.org/>

<sup>20</sup> Civil Society Equity Review: <https://www.equityreview.org/>

<sup>21</sup> IPCC, 2022: Summary for Policymakers [P.R. Shukla, J. Skea, A. Reisinger, R. Slade, R. Fradera, M. Pathak, A. Al Khourdajie, M. Belkacemi, R. van Diemen, A. Hasija, G. Lisboa, S. Luz, J. Malley, D. McCollum, S. Some, P. Vyas, (eds.)]. In: Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [P.R. Shukla, J. Skea, R. Slade, A. Al Khourdajie, R. van Diemen, D. McCollum, M. Pathak, S. Some, P. Vyas, R. Fradera, M. Belkacemi, A. Hasija, G. Lisboa, S. Luz, J. Malley, (eds.)]. Cambridge University



(a TLA orange-light) is bounded by the third lowest of the latest IPCC scenario groups, the “likely below 2°C” category, which implies peak warming of 1.7°C (1.6-1.8°C) and 2100 warming of 1.6°C (1.5-1.8°C).<sup>22</sup> While overall climate pollution (CO<sub>2</sub> and other greenhouse gas emissions) are considered in the TLA, land-use, land-use change and forestry (LULUCF) related emissions are not part of this assessment methodology.

The TLA considers the guiding equity principles of the Paris Agreement to include both the principle of equity itself and the principle of common but differentiated responsibilities and respective capabilities (CBDR-RC), in the light of different national circumstances. Per capita national climate pollution emissions over the time-periods of 1950 and 1990 to 2100 are used to reflect equity considerations with the variables of gross domestic product (GDP) or human development index (HDI) specifically used to represent varying capabilities.

The dimensions of the TLA are:

- Emissions envelope of responsibility (1950/1990-2100 cumulative): Consideration of the available atmospheric budget for limiting warming to 1.5°C, or higher levels, cumulatively up until 2100.
- Responsibility distribution (equal per capita over the considered time period): The emissions envelope from 1950/90 to 2100 is distributed to countries on a population basis. In this assessment, each person is considered to hold equal responsibility for safeguarding the Earth’s atmosphere, and therefore every nation is attributed an equal per head of

Press, Cambridge, UK and New York, NY, USA. doi: 10.1017/9781009157926.001

<sup>22</sup> This corresponds to IPCC AR6 scenario category C3.

population (per capita) share of the global atmospheric space over the entire period 1950/90-2100.

Capability (GDP or HDI): Given substantial variations globally in the capabilities and wealth of countries for taking action, the assessment separately employs both GDP and HDI as variables to account for differences in capability based on economic factors alone (GDP), or the broader human development metric (of the HDI). In this TLA methodology, negative emissions required globally are allocated according to a country’s GDP or HDI level.

The assessment introduces an innovative approach to evaluating the NDC emission targets of all countries and categorises them based on the assessment results into red (outside of Paris Agreement bounds), orange (just outside Paris Agreement bounds) and green (full alignment with the Paris Agreement). Results are presented in the format of the traffic light, as follows:

● **Green:** Full compliance of the Party (country) with the Paris Agreement temperature goal and equity principles. The NDC assessed implies equitably derived consistency with a 50% chance of limiting warming to 1.5°C (with no or limited temporary overshoot). Greenlight countries can be said to be doing their fair share to deliver the Paris Agreement, according to this assessment.

● **Orange:** Near compliance of the Party (country) with the Paris Agreement temperature goal and equity principles. The NDC assessed implies equitably derived consistency with limiting warming to just below 2°C. Such countries are close to doing their fair share to deliver the Paris Agreement, according to this assessment.

● **Red:** Non-compliance of the Party (country) with the Paris Agreement temperature goal and equity principles. The NDC assessed implies equitably derived consistency with warming of 2°C or above. Red light countries can be said to not be doing their fair share to deliver the Paris Agreement, according to this assessment.

In many cases, greenlight countries’ individual NDCs are well within their countries’ fair share of the below 1.5°C scenarios, in light of equity principles. Conversely, red light countries’ individual NDCs are sometimes far outside the minimum assessment thresholds, implying warming sometimes well beyond 2°C, as evaluated together with equity principles.

The default TLA analysis of this report employs the parameters of a 1990 base year (when the IPCC publishes its First Assessment Report) to account for responsibility and the capability metric of GDP. Conditional NDC targets are used as the reference point for developing countries given the Paris Agreement commitments on the international provision of finance and other support. To recall that unconditional NDCs represent what a government is promising to deliver independently, whereas conditional NDCs depend on various forms of international cooperation and support, such as finance, technology, and capacity-building, each of which are also dealt with as means of implementation and support, and are integral to the Paris Agreement regime.

When the TLA combines countries into political groups, such as the G7, G20 or EU, the aggregate assessment is applied based on the combination of all members of these groups, some of whose individual assessments may differ from the overall group

assessment. As this analysis was performed prior to September 2023, group memberships are based on their status and NDC before this date, which excludes, among others, the announcement of the African Union joining the G20 (the G20 is considered in this report to comprise its original membership of major economies plus the EU).

The TLA provides critical information to enrich the Global Stocktake (GST) of the international community’s efforts under the Paris Agreement, and be a source of information for discussions on how NDCs should address equity principles. The first GST runs from 2021 to 2023 and will be repeated every 5 years thereafter,<sup>23</sup> and it is the primary mechanism within the UNFCCC to assess the collective progress towards achieving the purpose of the Paris Agreement and its long-term goals such as the temperature goal. The TLA was specifically commissioned by the Climate Vulnerable Forum (CVF) whose 2022-24 Chair, Ghana, formally submitted the initial 2022 TLA report as part of a submission to the first GST in March 2023.<sup>24</sup>

The TLA has been developed by the CVF, Aroha and researchers from Climate Resource, Paris Equity Check and Utrecht University. The underlying methodology is based on a Robiou du Pont, Yann, Dekker, Mark, van Vuuren, Detlef, & Schaeffer, Michiel (2023) paper, which was submitted for peer-review to the academic journal, Nature Communications, in June 2023.<sup>25</sup> The approach used in the article

<sup>23</sup> UNFCCC, Paris Agreement, 2015: [https://unfccc.int/sites/default/files/english\\_paris\\_agreement.pdf](https://unfccc.int/sites/default/files/english_paris_agreement.pdf)

<sup>24</sup> UNFCCC, CVF Global Stocktake submission, 2023: <https://unfccc.int/sites/default/files/resource/202303061951--CVF%20Submission%20to%20the%20GST%20.pdf>

<sup>25</sup> Robiou du Pont, Yann, Dekker, Mark, van Vuuren, Detlef, & Schaeffer, Michiel. (2023). Effects of emissions allocations and ambition assessments immediately



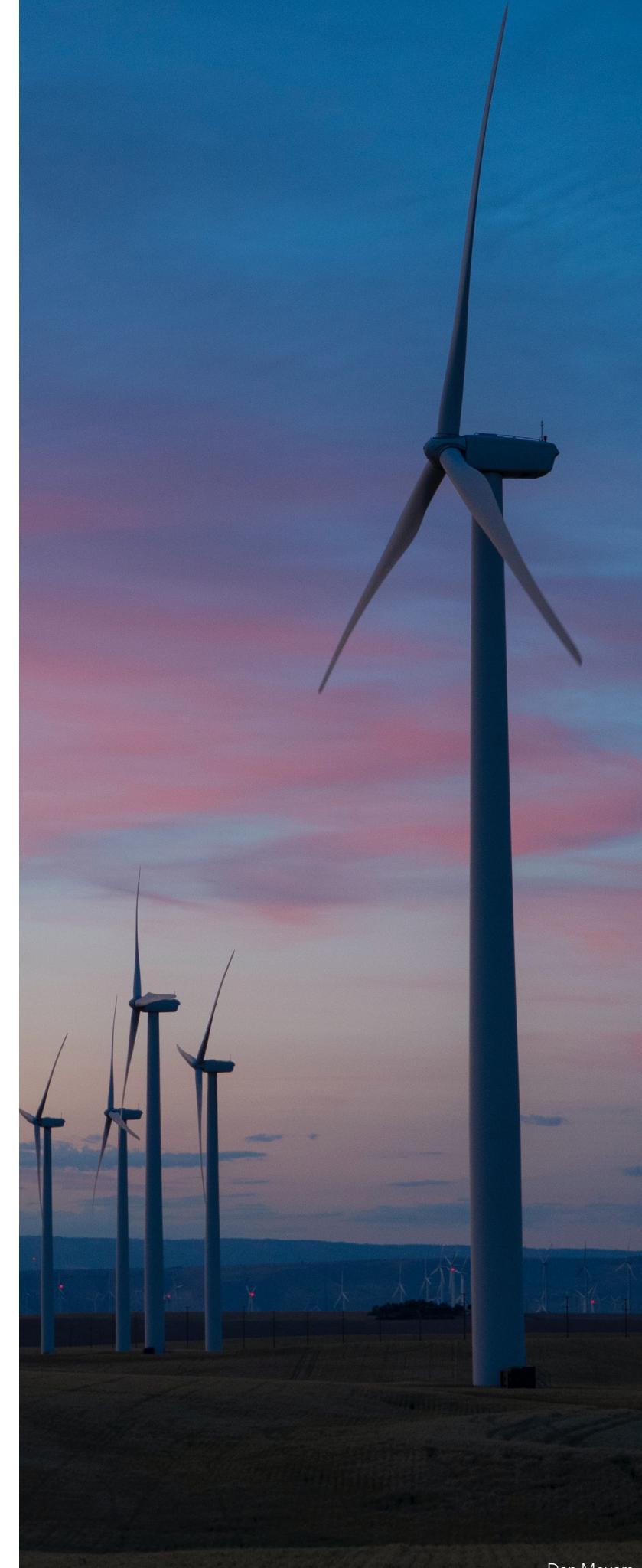
applied to the TLA is Approach 1. The TLA represents a single methodology for assessing the alignment of countries' NDCs with the Paris Agreement. Most approaches do employ similar variables and/or present similar results to the TLA. The Paris Equity Check<sup>26</sup> assembles a number of approaches in one shared tool. Further assessments include the Climate Action Tracker<sup>27</sup> (limited to a subset of Paris Agreement Parties) and the Civil Society Equity Review<sup>28</sup>.

based on equity (First submission). Zenodo. <https://doi.org/10.5281/zenodo.8003393>

<sup>26</sup> Paris Equity Check: <https://paris-equity-check.org/>

<sup>27</sup> Climate Action Tracker: <https://climateactiontracker.org/>

<sup>28</sup> Civil Society Equity Review: <https://www.equityreview.org/>



Dan Meyers

# Introduction



An independent research project that was commissioned by the CVF, the TLA offers an innovative, fair share approach to assessing emissions targets, in line with core principles of the UNFCCC and the Paris Agreement. The approach considers equity, responsibility and capability when allocating global positive and negative emissions reported by the IPCC as necessary to deliver on the Paris Agreement's temperature goal over the present century. The TLA aims at applying a limited and basic set of highly robust equity metrics together in an intuitively straightforward Paris Agreement climate target (NDC) evaluation format. The goal is to promote understanding and further public discourse as well as information of use to the ongoing UNFCCC negotiations, particularly the first GST of the Paris Agreement.

The TLA stands out as an innovative approach in particular because of its immediate treatment of different countries' responsibilities to deliver the Paris Agreement, where countries' emissions allocation start at levels that may be immediately different from current emissions, and are directly based on countries' responsibility and capability. This leads to a situation whereby countries' emissions levels, and current mitigation efforts, are already far within or far outside their fair share allocations.

Because it is a provision of the Paris Agreement that every new NDC (and its emission targets) must represent a strengthening versus the previous one. Countries that are already meeting their fair share allocation, will incrementally reach the limit of their equitable burden-sharing, they will be required to submit ever stronger NDC targets which would tend to ensure compliance is maintained over time.

For countries with NDC outside their emissions allocation, simply enhancing the ambition of their NDC, as required by the Paris Agreement, may not be enough to ensure new targets comply with their fair share. In the TLA, as equity-based allocations are presented as immediately decoupled from the current emissions of the evaluated countries, an emissions level is suggested for 2030 for each country to encourage nations to achieve full compliance independently.

Other hallmarks of this TLA include:

**Comprehensive Evaluation:** The TLA evaluates the NDC emission targets of nearly all countries and categorises them based on the assessment results into red (outside of Paris Agreement bounds), orange (just outside Paris Agreement bounds) and green (full



alignment with the Paris Agreement). A limited number of countries (9)<sup>29</sup> included in the global assessment presented input data concerns and are therefore reported on differently.

- **Based on Capacity:** The use of the emissions budget as constrained by countries' responsibilities is driven by their capacity to take action (based on either GDP or HDI). Countries with higher capacity are allocated a higher share of the needed global negative emissions to comply with given global temperature regimes until 2100. By allocating wealthier and higher human development countries a higher share of negative emissions, their share of positive emissions is then reduced to ensure equal cumulative per capita emissions are respected over 1950/90-2100, with the resulting biases that this entails.
- **Consideration of Past Emissions:** The assessment accounts for past emissions (using 1990 or 1950 as a starting year) and considers an emissions envelope for each country that spans to 2100, assuming equal per capita responsibility, and cumulative equal per capita emissions allocations, over this period to combating climate change.

- **Technological change discounting:** The TLA approach includes a discounting of part of past emissions to reflect technological improvements that enable emitting less for a given service over time. The addition of this discounting parameter favours high historical emitters.

- **Online web tool:** The results of the TLA are presented through the Online Web Tool and offers a map format with toggle parameters, enabling accessibility to explore the results for every country assessed worldwide, and to

<sup>29</sup> Cook Islands, Holy See, Monaco, Nauru, Niue, Somalia, The Gambia, Liechtenstein, Occupied Palestinian Territory.

evaluate the alignment of all Paris Agreement Parties' 2030 NDC emission targets with the 1.5°C goal. The Online Web Tool can be accessed via: trafficlightclimate.org.

## Methods



This section presents the methodology used to address allocation of global emissions and historical responsibility. The methodology for the TLA has been developed by Robiou du Pont, Yann, Dekker, Mark, van Vuuren, Detlef, & Schaeffer, Michiel (2023), in the first submitted paper: "Effects of emissions allocations and ambition assessments immediately based on equity", presented to the academic journal, Nature Communications<sup>30</sup>. The data for the country groups and country cases in this research are based on the submitted paper.

For this analysis, the following emissions scopes were taken into account:

- Positive emissions refer to release of greenhouse gas (GHG) into the atmosphere (here excluding those from LULUCF), such as: burning fossil fuels, industrial processes, deforestation and agriculture, among others.
- Negative emissions refer to the removal of GHG Carbon Dioxide (here excluding those from LULUCF) and Direct Air Capture from the atmosphere. It is important to highlight that negative emissions have an essential role in mitigating climate change by offsetting and

<sup>30</sup> Can be found here: Zenodo <https://doi.org/10.5281/zenodo.8003393>.

reducing the overall concentration of GHG in the atmosphere to achieve the 1.5°C goal.

In the submitted paper by Robiou du Pont et. al. 2023, two approaches are explored: Approach 1, which is explained below, and Approach 2, which focuses on a capability-driven allocation of positive emissions and a responsibility-driven allocation of negative emissions. This latter modelling approach can reflect a greater contribution to the funding of near-term transition, predominantly by countries with greater financial capacities. The present report focuses on Approach 1 as the cumulative equal per capita emissions is only ensured in Approach 1.





# TLA Approach Described

- A combination of a capability-driven allocation of global negative emissions & a historical responsibility-driven allocation of global positive emissions**

The approach combines a capability-driven allocation of global negative emissions and a historical responsibility-driven allocation of global positive emissions to achieve cumulative equal per capita emissions across countries' populations. First, the allocation of negative emissions assumed in the global emissions mitigation scenario is based on the capabilities of countries, meaning that countries with greater capabilities are expected to contribute more to the reduction of negative emissions. Then, the allocation of the positive part of the global emissions mitigation scenario is based on countries' responsibilities for past emissions. The goal is to correct for historical responsibility and equalise per capita emissions rights over the considered period. The historical period to account for responsibility starts the analysis from 1950

(reflecting recent historical emissions) or 1990 (reflecting on observed emissions since the publication of the first IPCC report).

Here, the capability of countries does not affect their total net emissions budget by 2100, but rather how the budget is used over time.

Achieving negative emissions in the future requires development of new technologies yet to be advanced and do not offer the additional co-benefits of reducing positive emissions (such as energy security or health benefits). The capability-driven allocation of negative emissions increases near-term net emissions allocations for wealthier countries, while reducing their net allocations later in the century.

In an alternative parameterization of this approach, the HDI is used instead of the GDP to reflect other dimensions of countries' development and their development needs. The HDI has multiple development indicators (of education, life expectancy and income), while the GDP considers only one of its factors.

Some key points of the TLA approach:

- This approach "combines a capability-driven allocation of global negative emissions with a historical responsibility-driven allocation

of global positive emissions to correct for historical responsibility and equalise per capita emissions rights over the considered period" (Robiou du Pont et al. 2023).

- This approach annually allocates countries' negative emissions (excluding positive and negative LULUCF emissions) of the global scenario proportionally to their respective GDP projection (and thus indirectly based on their populations).

## TLA grading categorization

The TLA "traffic light" system of categorization itself is determined by comparison of countries' or groups of countries' 2030 NDC emissions targets in relation to the dynamic fair share burden allocation for those countries/groups as established per the foregoing methodology. The boundary conditions for a 'green', 'orange' and 'red' light are established according to the parameters in the following table, which indicate the corresponding IPCC AR6 warming scenarios used to define each boundary.

**Table: TLA Grading system boundary conditions**

TLA Grading	Category	Upper boundary	Projections
●	Full compliance	Average of C1 & C2 scenarios	1.5°C scenarios, with possible overshoot
○	Near compliance	Average of C3 scenario	Likely below 2°C
●	Non-compliance	None, above C3	2°C and above

# Results



The results section provides country groups and country cases results. It focuses on equitable distribution of emissions responsibilities among all countries. The information from the data tables and the report was reviewed and agreed by the lead author of the underlying technical study.<sup>31</sup>

<sup>31</sup> Robiou du Pont, Yann, Dekker, Mark, van Vuuren, Detlef, & Schaeffer, Michiel (2023). Effects of emissions allocations and ambition assessments immediately based on equity (First submission). Zenodo. <https://doi.org/10.5281/zenodo.8003393> & <https://www.researchsquare.com/article/rs-3050295/v1>



**G7****VS**

%  
WORLD CLIMATE  
POLLUTION

**23.5%**

of all climate pollution

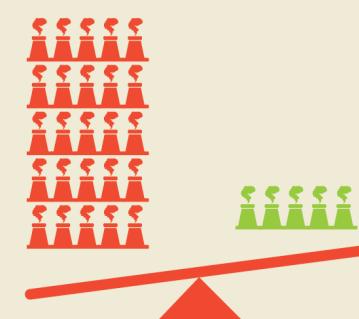
**6.1%**

of all climate pollution

GLOBAL POPULATION &  
CLIMATE POLLUTION

**12.7%**

of global population

**0.8 billion people****11.7**tons  
of climate pollution  
per person**17.6%**

of global population

**1.5 billion people****2.2**tons  
of climate pollution  
per person

## FAIR SHARE 1.5°C ALLOCATION

**73%**  
**ABOVE**  
fair share effort

1.5°C

**60%**  
**BELOW**  
fair share effort

**51.9%**  
**GDP**

**0.91**  
**HDI**

Share of global wealth

CAPABILITY

**3.21%**  
**GDP**

**0.59**  
**HDI**

Human development level

**G20****VS****LDCs**

%  
WORLD CLIMATE  
POLLUTION

**78.5%**

of all climate pollution

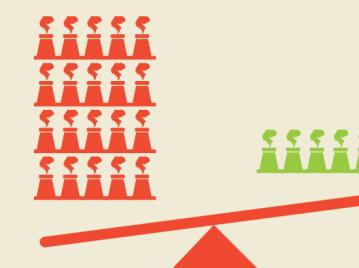
**3.9%**

of all climate pollution

GLOBAL POPULATION &  
CLIMATE POLLUTION

**61.2%**

of global population

**4.69 billion people****8.1**tons  
of climate pollution  
per person**13.7%**

of global population

**880 million people**

## FAIR SHARE 1.5°C ALLOCATION

**47.5%**  
**ABOVE**  
fair share effort

1.5°C

**63%**  
**BELOW**  
fair share effort

**86.8%**  
**GDP**

**0.76**  
**HDI**

Share of global wealth

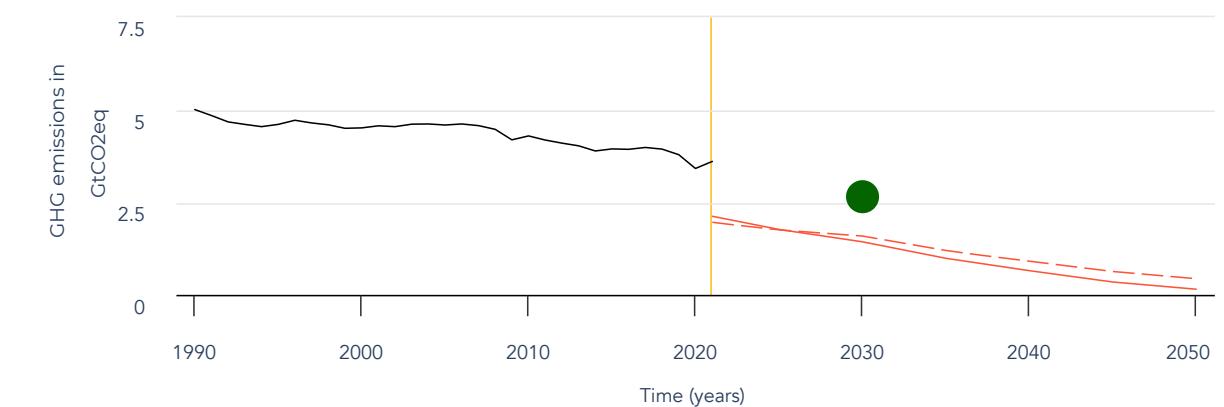
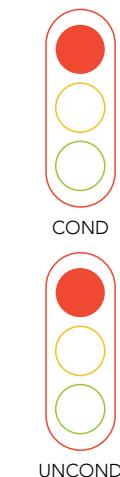
CAPABILITY

**1.42%**  
**GDP**

**0.52**  
**HDI**

Human development level

# Country Groups



Legend

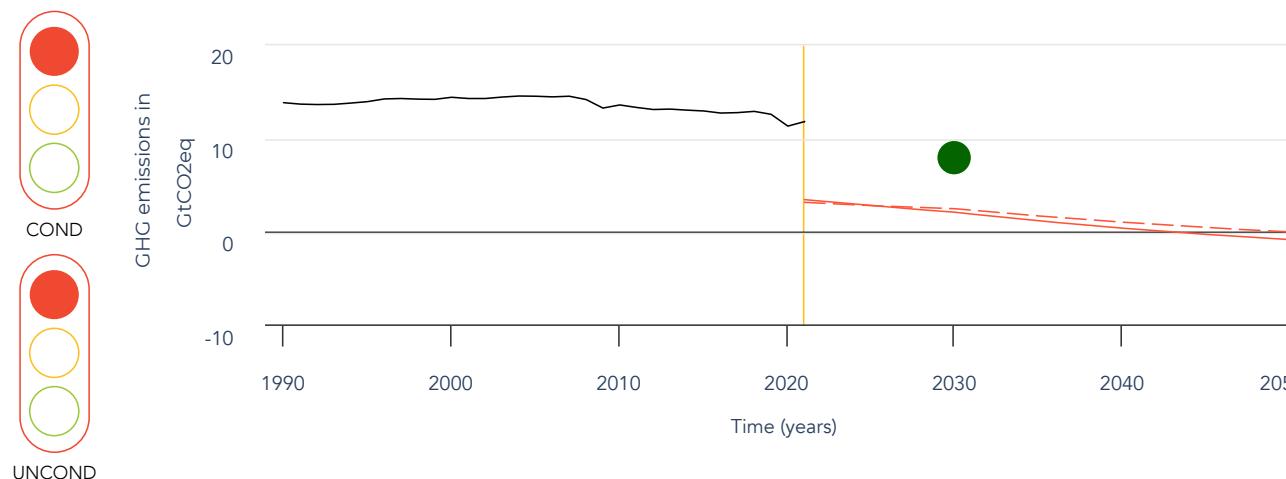
- Historical emissions
- NDC unconditional
- NDC conditional
- … Approach GDP (2°C, 1990)
- Approach GDP (1.5°C, 1990)

## European Union

	Responsibility since 1990	Responsibility since 1950
Current per capita emissions		EU per capita emissions are at 8.1 tCO <sub>2</sub> e/p, higher than the world's average at 6.4 tCO <sub>2</sub> e/p
% of global emissions (2021)		The European Union collectively accounted for approximately 7.2% of global emissions
Fair Share 1.5°C in 2030 - Capability GDP (2021)		The EU allocation is 60% below 2021
Fair Share 2°C in 2030 - Capability GDP (2021)		EU allocation is 56% below 2021
Fair Share 1.5°C in 2030 - Allocation using HDI (2021)		EU allocation is 62% below 2021
Fair share 2°C in 2030 - Allocation using HDI (2021)		EU allocation is 58% below 2021
NDC alignment under a fair share scenario		 NDC alignment under a fair share scenario is red, meaning that EU countries are currently on a trajectory that may result in a global warming above C3 scenario. It indicates that current NDCs are not aligned with the Paris Agreement's temperature goal with the 1.5°C target.

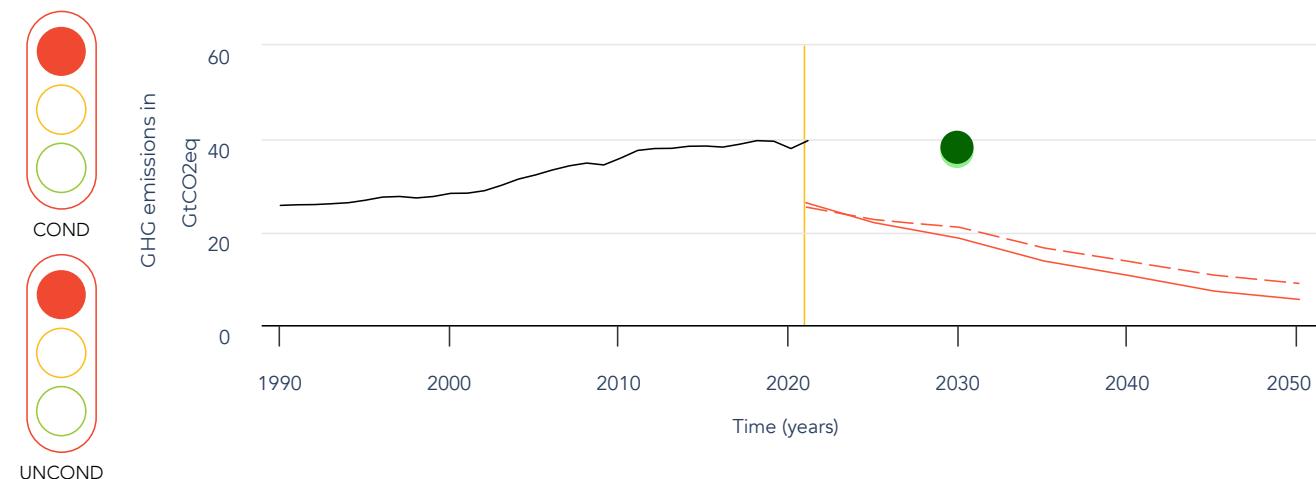
# G7

	<b>Responsibility since 1990</b>	<b>Responsibility since 1950</b>
Current per capita emissions		G7 per capita emissions are at 11.7 tCO <sub>2</sub> e/p, higher than the world's average at 6.4 tCO <sub>2</sub> e/p
% of global emissions (2021)		The G7 collectively accounted for approximately 23.5% of global emissions
Fair Share 1.5°C in 2030 - Capability GDP (2021)		G7 allocation is 82% below 2021
Fair Share 2°C in 2030 - Capability GDP (2021)		G7 allocation is 98% below 2021
Fair Share 1.5°C in 2030 - Allocation using HDI (2021)		G7 allocation is 106% below 2021
Fair share 2°C in 2030 - Allocation using HDI (2021)		G7 allocation is 103% below 2021
NDC alignment under a fair share scenario		NDC alignment under a fair share scenario is red, meaning that G7 countries are currently on a trajectory that may result in a global warming above C3 scenario. It indicates that current NDCs are not aligned with the Paris Agreement's temperature goal with the 1.5°C target.



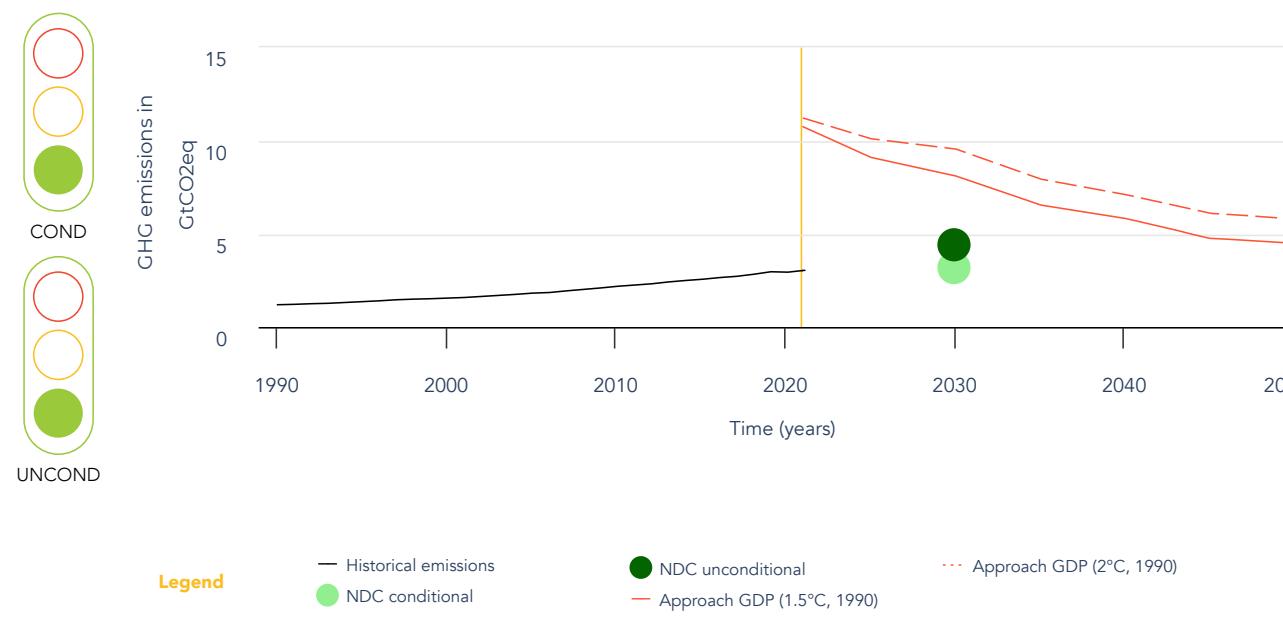
# G20

	<b>Responsibility since 1990</b>	<b>Responsibility since 1950</b>
Current per capita emissions		G20 per capita emissions are at 8.1 tCO <sub>2</sub> e/p, higher than the world's average at 6.4 tCO <sub>2</sub> e/p
% of global emissions (2021)		The G20 countries collectively accounted for approximately 78.5% of global emissions
Fair Share 1.5°C in 2030 - Capability GDP (2021)		G20 allocation is 53% below 2021
Fair Share 2°C in 2030 - Capability GDP (2021)		G20 allocation is 47% below 2021
Fair Share 1.5°C in 2030 - Allocation using HDI (2021)		G20 allocation is 52% below 2021
Fair share 2°C in 2030 - Allocation using HDI (2021)		G20 allocation is 46% below 2021
NDC alignment under a fair share scenario		NDC alignment under a fair share scenario is red, meaning that G20 countries are currently on a trajectory that may result in a global warming above C3 scenario. It indicates that current NDCs are not aligned with the Paris Agreement's temperature goal with the 1.5°C target.



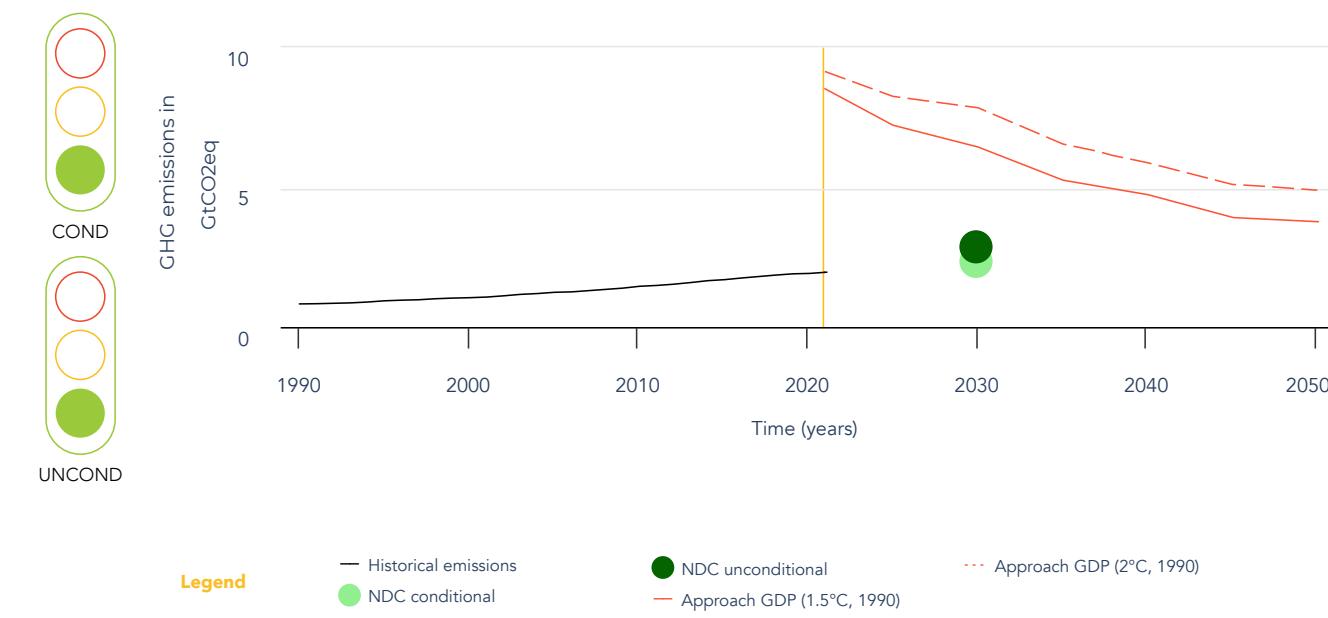
# CVF

	<b>Responsibility since 1990</b>	<b>Responsibility since 1950</b>
Current per capita emissions	 CVF per capita emissions are at 2.2 tCO <sub>2</sub> e/p, lower than the world's average at 6.4 tCO <sub>2</sub> e/p	
% of global emissions (2021)		The CVF collectively accounted for approximately 6.1% of global emissions
Fair Share 1.5°C in 2030 - Capability GDP (2021)	 CVF allocation is 164% above 2021	 CVF allocation is 185% above 2021
Fair Share 2°C in 2030 - Capability GDP (2021)	 CVF allocation is 213% above 2021	 CVF allocation is 234% above 2021
Fair Share 1.5°C in 2030 - Allocation using HDI (2021)	 CVF allocation is 170% above 2021	 CVF allocation is 190% above 2021
Fair share 2°C in 2030 - Allocation using HDI (2021)	 CVF allocation is 218% above 2021	 CVF allocation is 239% above 2021
NDC alignment under a fair share scenario		 NDC alignment under a fair share scenario is green, meaning that CVF countries are fully compliant and on a trajectory average of scenarios C1 & C2, and are currently on a trajectory aligned with the Paris Agreement goals.



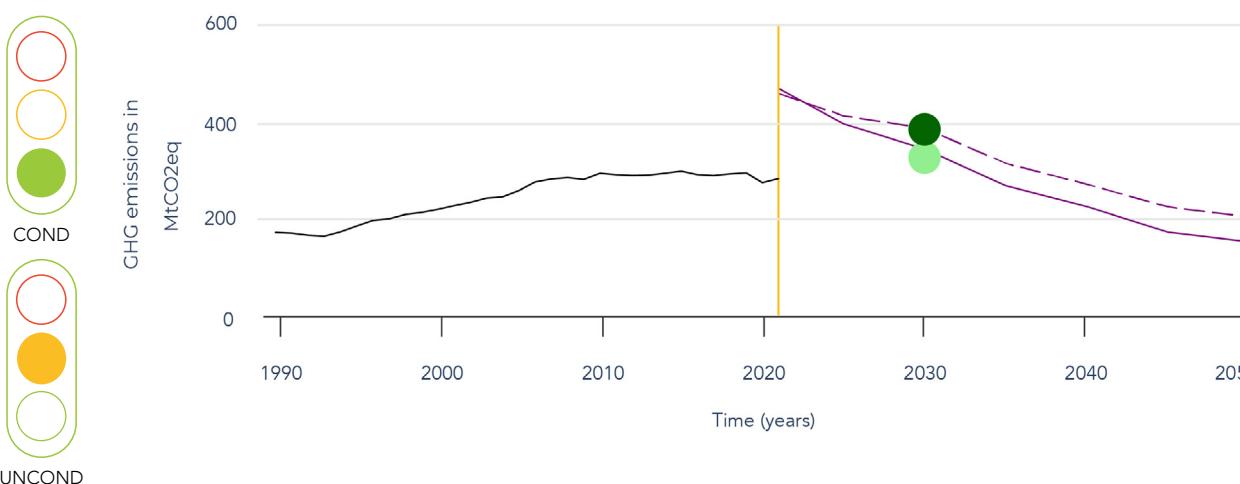
# LDCs

	<b>Responsibility since 1990</b>	<b>Responsibility since 1950</b>
Current per capita emissions	 LDCs per capita emissions are at 1.8 tCO <sub>2</sub> e/p, lower than the world's average at 6.4 tCO <sub>2</sub> e/p	
% of global emissions (2021)		The LDCs collectively accounted for approximately 3.9% of global emissions
Fair Share 1.5°C in 2030 - Capability GDP (2021)	 LDCs allocation is 224% above 2021	 LDCs allocation is 247% above 2021
Fair Share 2°C in 2030 - Capability GDP (2021)	 LDCs allocation is 293% above 2021	 LDCs allocation is 317% above 2021
Fair Share 1.5°C in 2030 - Allocation using HDI (2021)	 LDCs allocation is 231% above 2021	 LDCs allocation is 254% above 2021
Fair share 2°C in 2030 - Allocation using HDI (2021)	 LDCs allocation is 300% above 2021	 LDCs allocation is 323% above 2021
NDC alignment under a fair share scenario		 NDC alignment under a fair share scenario is green, meaning that LDC countries are fully compliant and on a trajectory average of scenarios C1 & C2, and are currently on a trajectory aligned with the Paris Agreement goals.



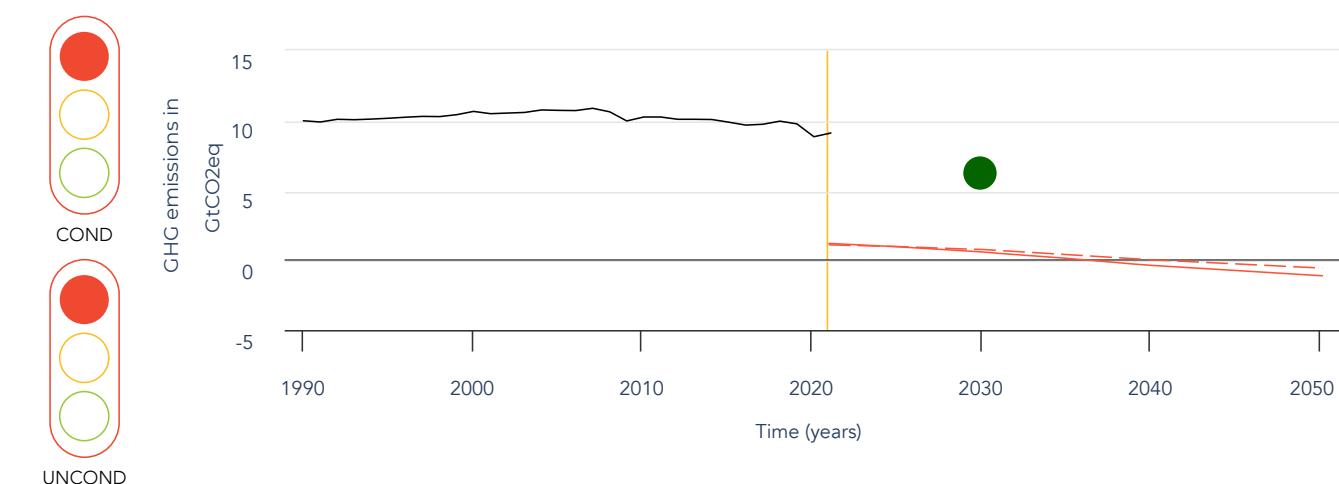
# SIDS

	<b>Responsibility since 1990</b>	<b>Responsibility since 1950</b>
Current per capita emissions		SIDS per capita emissions are at 4.3 tCO <sub>2</sub> e/p, lower than the world's average at 6.4 tCO <sub>2</sub> e/p
% of global emissions (2021)		The SIDS collectively accounted for approximately 0.6% of global emissions
Fair Share 1.5°C in 2030 - Capability GDP (2021)		SIDS allocation is 9% above 2021
Fair Share 2°C in 2030 - Capability GDP (2021)		SIDS allocation is 17% above 2021
Fair Share 1.5°C in 2030 - Allocation using HDI (2021)		SIDS allocation is 25% above 2021
Fair share 2°C in 2030 - Allocation using HDI (2021)		SIDS allocation is 33% above 2021
NDC alignment under a fair share scenario		NDC alignment under a fair share scenario is green (conditional) using 1950 and HDI, meaning that based on those scenarios SIDS countries are compliant and on a trajectory average of scenarios C1 & C2, and are currently on a trajectory aligned with the Paris Agreement goals.



# Umbrella Group

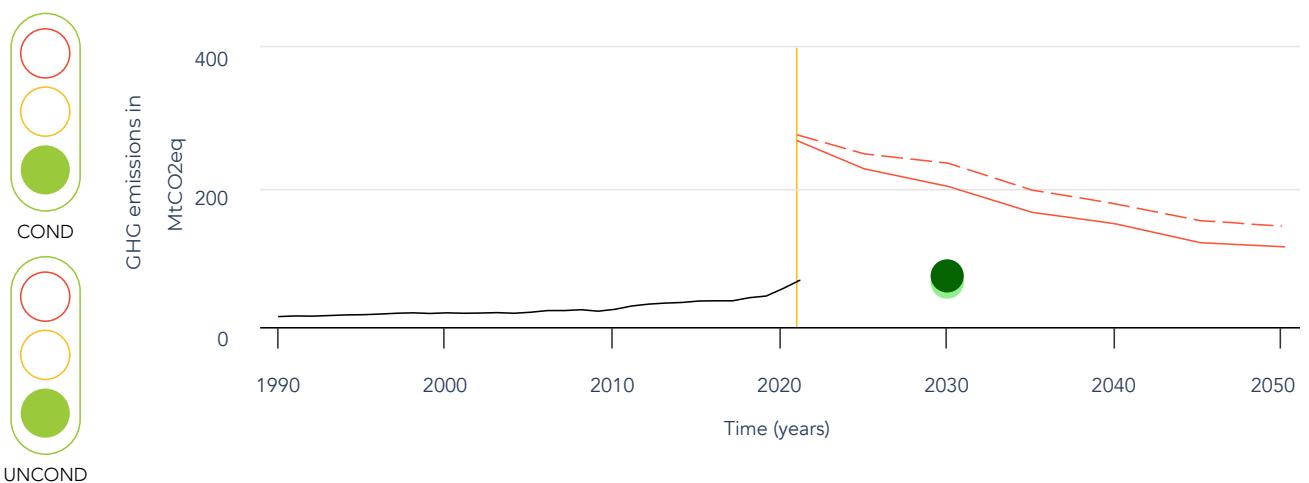
	<b>Responsibility since 1990</b>	<b>Responsibility since 1950</b>
Current per capita emissions		The Umbrella Group per capita emissions are at 15.1 tCO <sub>2</sub> e/p, higher than the world's average at 6.4 tCO <sub>2</sub> e/p
% of global emissions (2021)		The Umbrella Group collectively accounted for approximately 18.2% of global emissions
Fair Share 1.5°C in 2030 - Capability GDP (2021)		Umbrella Group allocation is 93% below 2021
Fair Share 2°C in 2030 - Capability GDP (2021)		Umbrella Group allocation is 113% below 2021
Fair Share 1.5°C in 2030 - Allocation using HDI (2021)		Umbrella Group allocation is 25% below 2021
Fair share 2°C in 2030 - Allocation using HDI (2021)		Umbrella Group allocation is 33% below 2021
NDC alignment under a fair share scenario		NDC alignment under a fair share scenario is red, meaning that Umbrella Group is currently on a trajectory that may result in a global warming above C3 scenario. It indicates that current NDCs are not aligned with the Paris Agreement's temperature goal with the 1.5°C target.



## Ghana

	Responsibility since 1990	Responsibility since 1950
Current per capita emissions		Ghana per capita emissions are at 2.11 tCO <sub>2</sub> e/p, lower than the world's average at 6.4 tCO <sub>2</sub> e/p
% of global emissions (2021)		Ghana accounted for approximately 0.14% of global emissions
Fair Share 1.5°C in 2030 - Capability GDP (2021)		Ghana allocation is 194.18% above 2021
Fair Share 2°C in 2030 - Capability GDP (2021)		Ghana allocation is 243.6% above 2021
Fair Share 1.5°C in 2030 - Allocation using HDI (2021)		Ghana allocation is 192.27% above 2021
Fair share 2°C in 2030 - Allocation using HDI (2021)		Ghana allocation is 242.59% above 2021
NDC alignment under a fair share scenario		NDC alignment under a fair share scenario is green, meaning that Ghana is fully compliant and on a trajectory average of scenarios C1 & C2, and are currently on a trajectory aligned with the Paris Agreement goals.

# Country Cases

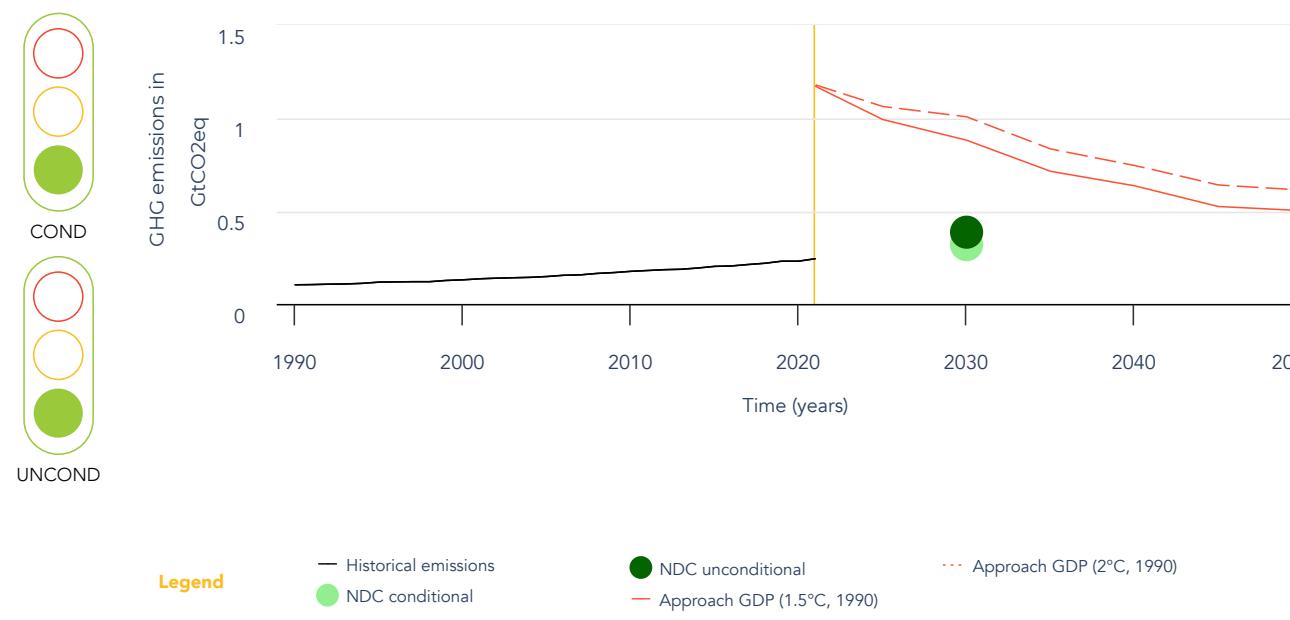


Legend

— Historical emissions  
 NDC unconditional  
 NDC conditional  
 ... Approach GDP (2°C, 1990)  
 ... Approach GDP (1.5°C, 1990)

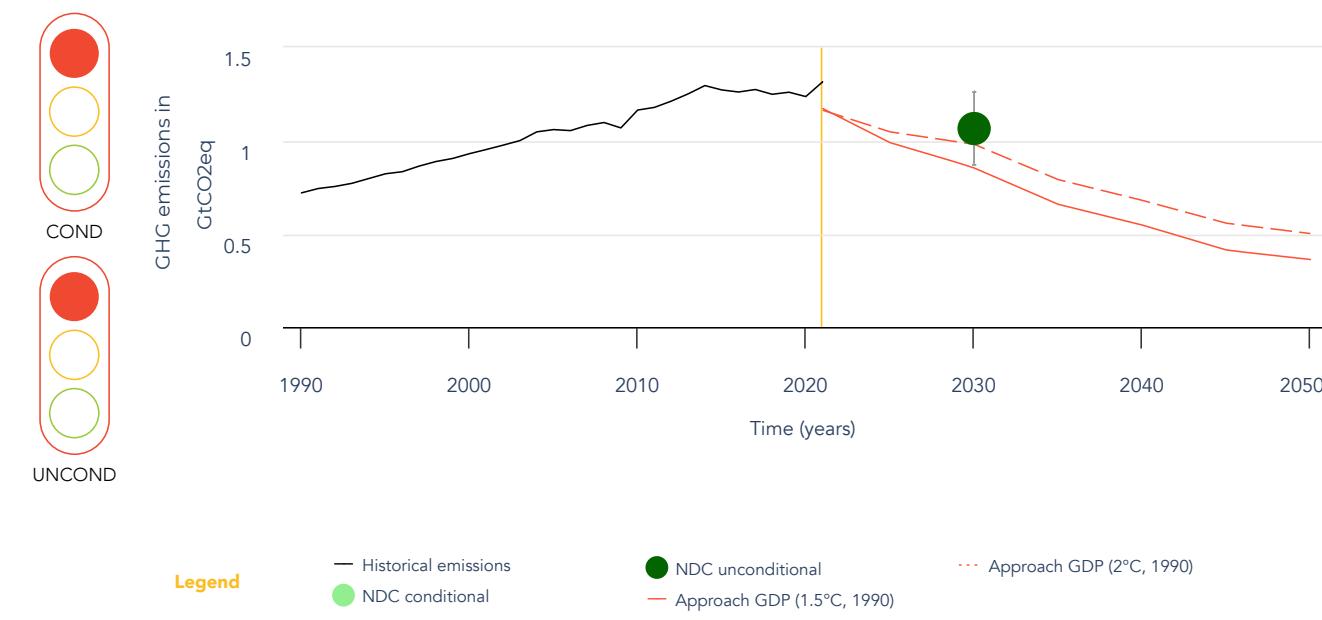
# Bangladesh

	<b>Responsibility since 1990</b>	<b>Responsibility since 1950</b>
Current per capita emissions		Bangladesh per capita emissions are at 1.48 tCO <sub>2</sub> e/p, lower than the world's average at 6.4 tCO <sub>2</sub> e/p
% of global emissions (2021)		Bangladesh accounted for approximately 0.50 % of global emissions
Fair Share 1.5°C in 2030 - Capability GDP (2021)		Bangladesh allocation is 251.67% above 2021
Fair Share 2°C in 2030 - Capability GDP (2021)		Bangladesh allocation is 297.63% above 2021
Fair Share 1.5°C in 2030 - Allocation using HDI (2021)		Bangladesh allocation is 302.12% above 2021
Fair share 2°C in 2030 - Allocation using HDI (2021)		Bangladesh allocation is 348.65% above 2021
NDC alignment under a fair share scenario		NDC alignment under a fair share scenario is green, meaning that Bangladesh is fully compliant and on a trajectory average of scenarios C1 & C2, and are currently on a trajectory aligned with the Paris Agreement goals.



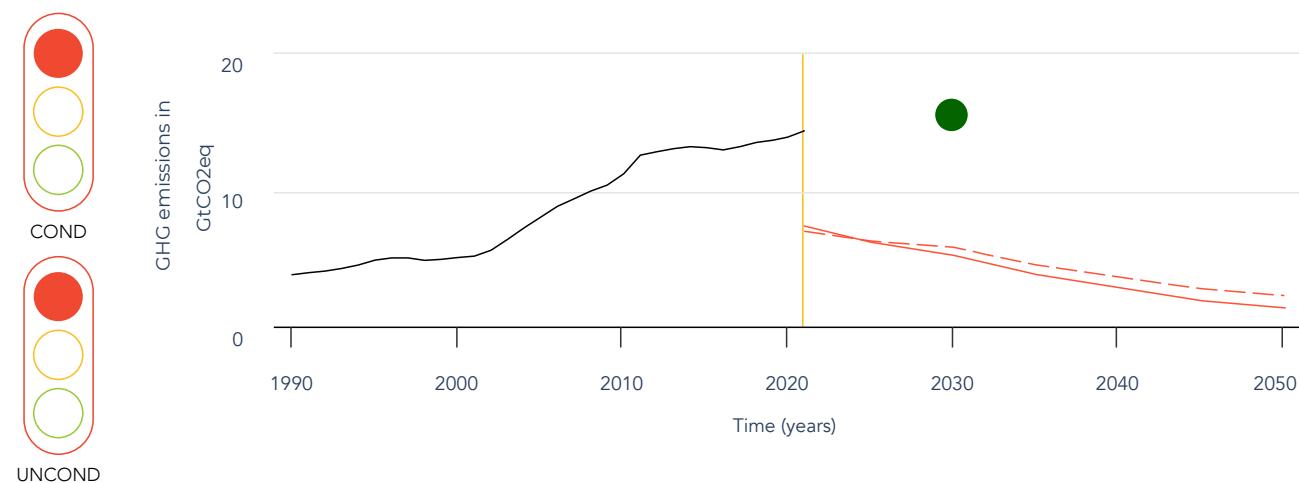
# Brazil

	<b>Responsibility since 1990</b>	<b>Responsibility since 1950</b>
Current per capita emissions		Brazil per capita emissions are at 6.16 tCO <sub>2</sub> e/p, lower than the world's average at 6.4 tCO <sub>2</sub> e/p
% of global emissions (2021)		Brazil accounted for approximately 2.61 % of the global emissions
Fair Share 1.5°C in 2030 - Capability GDP (2021)		Brazil allocation is 35.05% below 2021
Fair Share 2°C in 2030 - Capability GDP (2021)		Brazil allocation is 30.31% below 2021
Fair Share 1.5°C in 2030 - Allocation using HDI (2021)		Brazil allocation is 25.66% below 2021
Fair share 2°C in 2030 - Allocation using HDI (2021)		Brazil allocation is 20.85% below 2021
NDC alignment under a fair share scenario		NDC alignment under a fair share scenario is yellow, meaning that Brazil is near compliance, average of C3 scenarios.



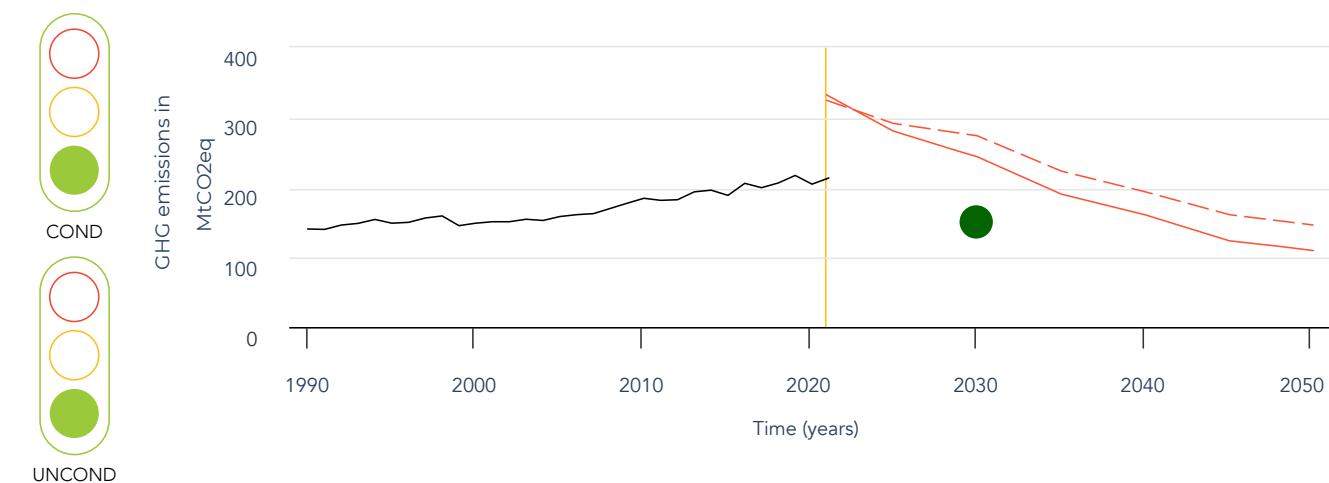
# China

	<b>Responsibility since 1990</b>	<b>Responsibility since 1950</b>
Current per capita emissions		China per capita emissions are at 10.08 tCO <sub>2</sub> e/p, higher than the world's average at 6.4 tCO <sub>2</sub> e/p
% of global emissions (2021)		China accounted for approximately 28.5 % of global emissions
Fair Share 1.5°C in 2030 - Capability GDP (2021)		China allocation is 63.38% below 2021
Fair Share 2°C in 2030 - Capability GDP (2021)		China allocation is 56.19% below 2021
Fair Share 1.5°C in 2030 - Allocation using HDI (2021)		China allocation is 59.39% below 2021
Fair share 2°C in 2030 - Allocation using HDI (2021)		China allocation is 52.11% below 2021
NDC alignment under a fair share scenario		NDC alignment under a fair share scenario is red, meaning that China is currently on a trajectory that may result in a global warming above C3 scenario. It indicates that current NDCs are not aligned with the Paris Agreement's temperature goal with the 1.5°C target.



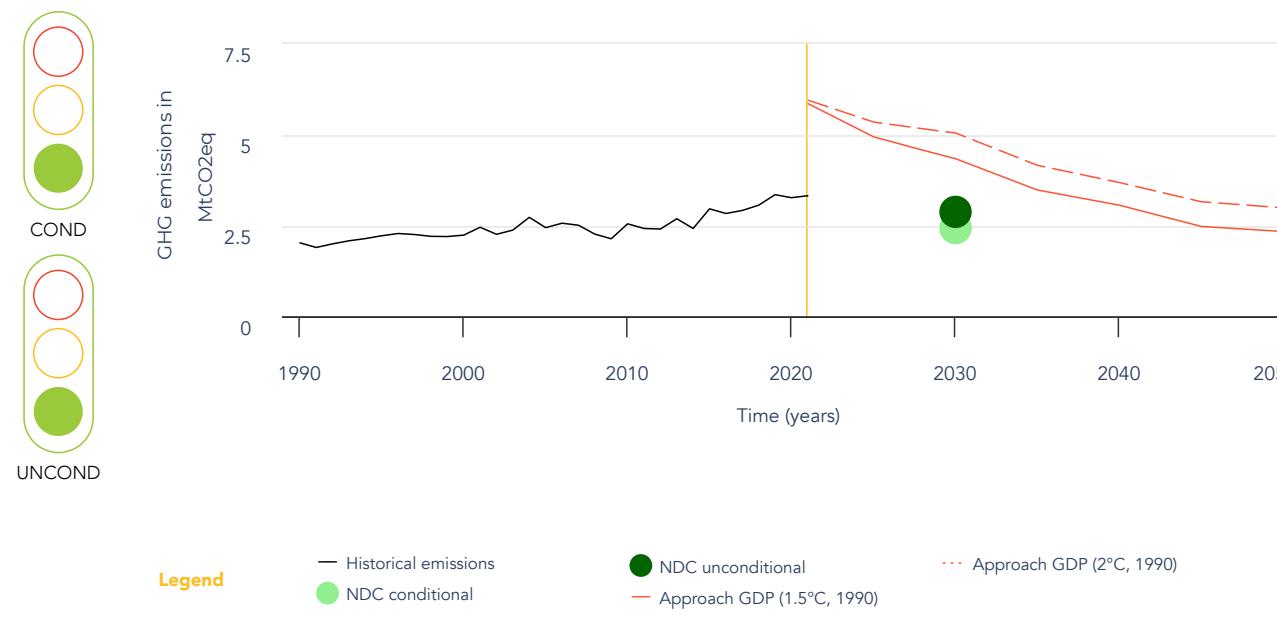
# Colombia

	<b>Responsibility since 1990</b>	<b>Responsibility since 1950</b>
Current per capita emissions		Colombia per capita emissions are at 4.18 tCO <sub>2</sub> e/p, lower than the world's average at 6.4 tCO <sub>2</sub> e/p
% of global emissions (2021)		Colombia accounted for approximately 0.42 % of global emissions
Fair Share 1.5°C in 2030 - Capability GDP (2021)		Colombia allocation is 14.46% above 2021
Fair Share 2°C in 2030 - Capability GDP (2021)		Colombia allocation is 20.68% above 2021
Fair Share 1.5°C in 2030 - Allocation using HDI (2021)		Colombia allocation is 28.29% above 2021
Fair share 2°C in 2030 - Allocation using HDI (2021)		Colombia allocation is 34.58% above 2021
NDC alignment under a fair share scenario		NDC alignment under a fair share scenario is green, meaning that Colombia is fully compliant and on a trajectory average of scenarios C1 & C2, and are currently on a trajectory aligned with the Paris Agreement goals.



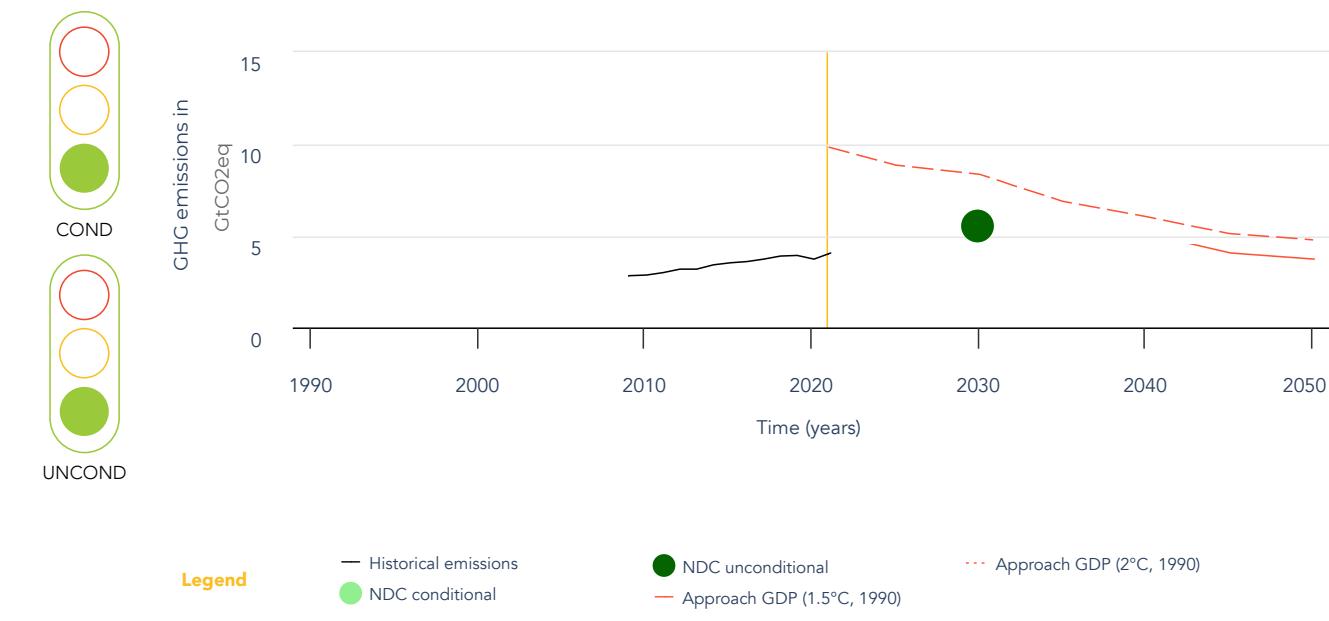
# Fiji

	<b>Responsibility since 1990</b>	<b>Responsibility since 1950</b>
Current per capita emissions		Fiji per capita emissions are at 3.6 tCO <sub>2</sub> e/p, lower than the world's average at 6.4 tCO <sub>2</sub> e/p
% of global emissions (2021)		Fiji accounted for approximately 0.01 % of global emissions
Fair Share 1.5°C in 2030 - Capability GDP (2021)	 Fiji allocation is 31.21% above 2021	 Fiji allocation is 51.28% above 2021
Fair Share 2°C in 2030 - Capability GDP (2021)	 Fiji allocation is 52.21% above 2021	 Fiji allocation is 72.54% above 2021
Fair Share 1.5°C in 2030 - Allocation using HDI (2021)	 Fiji allocation is 60.70% above 2021	 Fiji allocation is 80.78% above 2021
Fair share 2°C in 2030 - Allocation using HDI (2021)	 Fiji allocation is 77.94% above 2021	 Fiji allocation is 98.27% above 2021
NDC alignment under a fair share scenario		NDC alignment under a fair share scenario is green, meaning that Fiji is fully compliant and on a trajectory average of scenarios C1 & C2, and are currently on a trajectory aligned with the Paris Agreement goals.



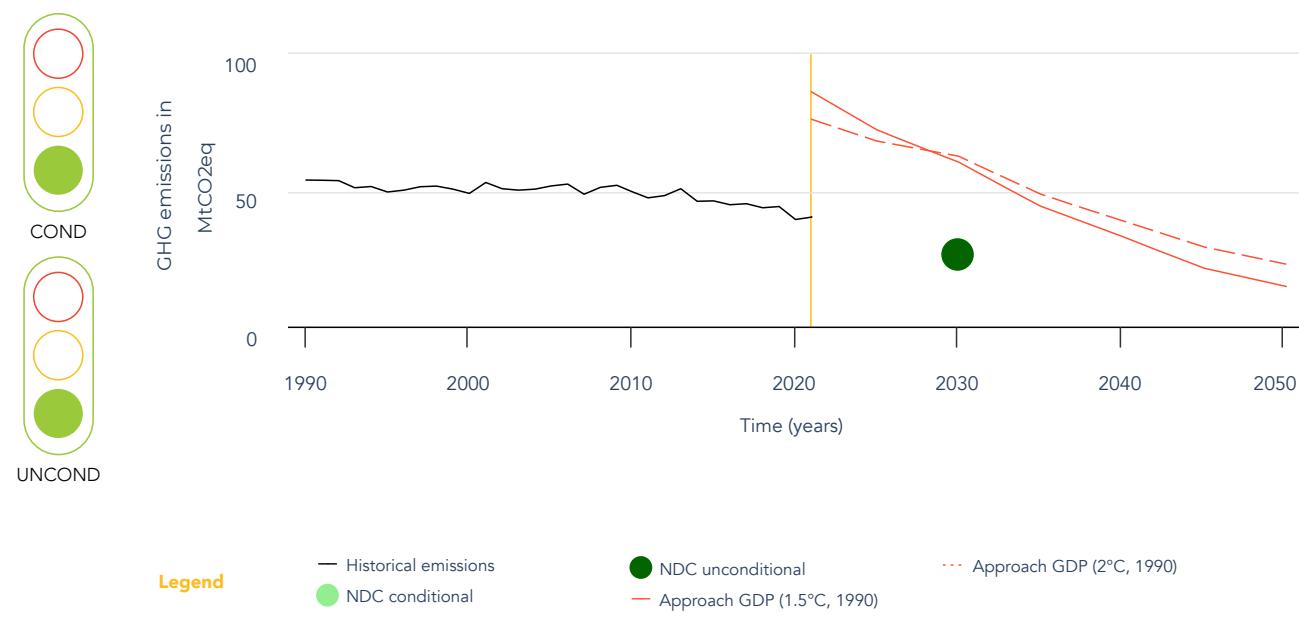
# India

	<b>Responsibility since 1990</b>	<b>Responsibility since 1950</b>
Current per capita emissions		India per capita emissions are at 2.93 tCO <sub>2</sub> e/p, lower than the world's average at 6.4 tCO <sub>2</sub> e/p
% of global emissions (2021)		India accounted for approximately 8.15 % of global emissions
Fair Share 1.5°C in 2030 - Capability GDP (2021)	 India allocation is 80.33% above 2021	 India allocation is 101.89% above 2021
Fair Share 2°C in 2030 - Capability GDP (2021)	 India allocation is 103.43% above 2021	 India allocation is 125.26% above 2021
Fair Share 1.5°C in 2030 - Allocation using HDI (2021)	 India allocation is 89.26% above 2021	 India allocation is 110.82% above 2021
Fair share 2°C in 2030 - Allocation using HDI (2021)	 India allocation is 111.48% above 2021	 India allocation is 133.31% above 2021
NDC alignment under a fair share scenario		NDC alignment under a fair share scenario is green, meaning that India is compliant and on a trajectory average of scenarios C1 & C2, and are currently on a trajectory aligned with the Paris Agreement goals.



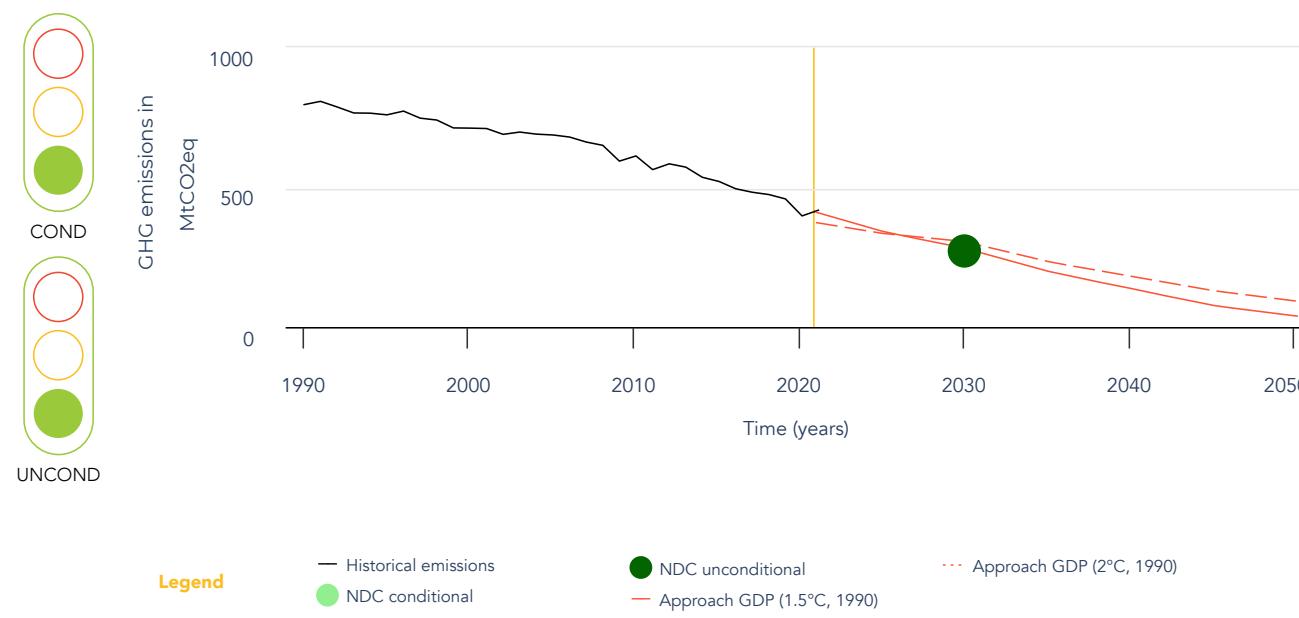
# Switzerland

	<b>Responsibility since 1990</b>	<b>Responsibility since 1950</b>
Current per capita emissions		Switzerland per capita emissions are at 4.66 tCO <sub>2</sub> e/p, lower than the world's average at 6.4 tCO <sub>2</sub> e/p
% of global emissions (2021)		Switzerland accounted for approximately 0.08% of global emissions
Fair share 1.5°C in 2030 – Capability GDP (2021)		Switzerland allocation is 49.91% above 2021
Fair share 2°C in 2030 – Capability GDP (2021)		Switzerland allocation is 55.37% above 2021
Fair Share 1.5°C in 2030 – Allocation using HDI (2021)		Switzerland allocation is 3.95% above 2021
2030 fair 2°C in 2030 – Allocation using HDI (2021)		Switzerland allocation is 14.73% above 2021
NDC alignment under a fair share scenario		NDC alignment under a fair share scenario is green, meaning that Switzerland is fully compliant and on a trajectory average of scenarios C1 & C2, and are currently on a trajectory aligned with the Paris Agreement goals.



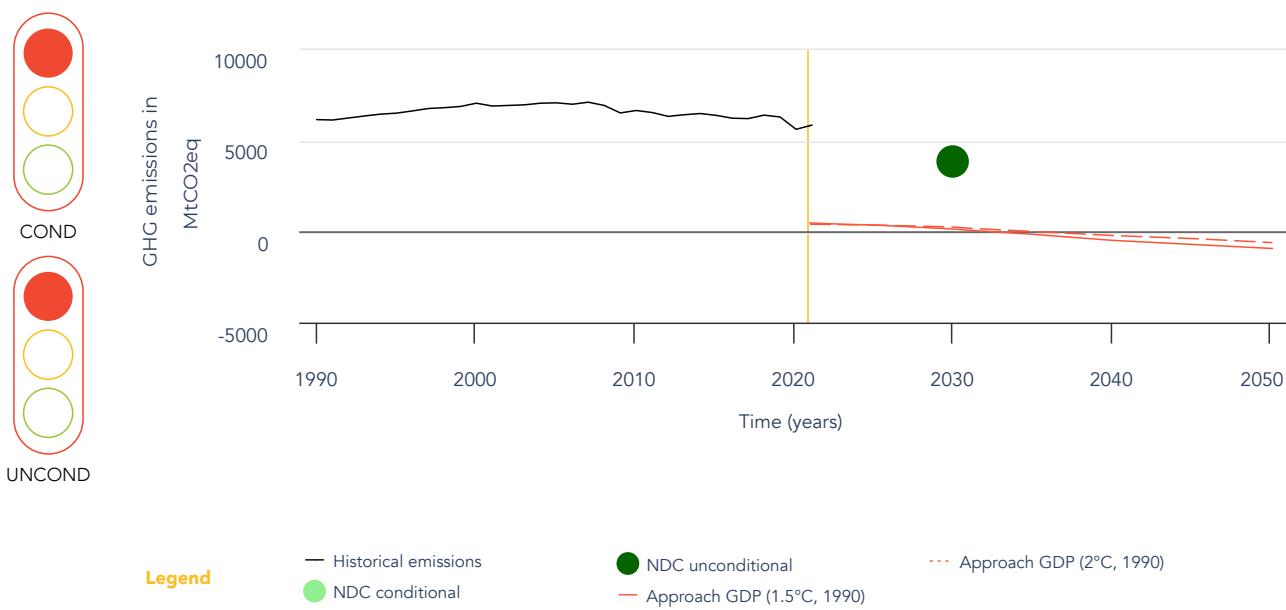
# UK

	<b>Responsibility since 1990</b>	<b>Responsibility since 1950</b>
Current per capita emissions		UK per capita emissions are at 6.22 tCO <sub>2</sub> e/p, lower than the world's average at 6.4 tCO <sub>2</sub> e/p
% of global emissions (2021)		The UK accounted for approximately 0.83% of global emissions
Fair Share 1.5°C in 2030 - Capability GDP (2021)		UK allocation is 31.81% below 2021
Fair Share 2°C in 2030 - Capability GDP (2021)		UK allocation is 26.48% below 2021
Fair Share 1.5°C in 2030 - Allocation using HDI (2021)		UK allocation is 47.44% below 2021
Fair share 2°C in 2030 - Allocation using HDI (2021)		UK allocation is 40.35% below 2021
NDC alignment under a fair share scenario		NDC alignment under a fair share scenario is green, only using 1990 and GDP scenarios, meaning that the UK is compliant and on a trajectory average of scenarios C1 & C2, and are currently on a trajectory aligned with the Paris Agreement goals. However, NDC alignment under a fair share scenario is red, using 1950 and GDP & HDI, meaning that the UK is currently on a trajectory that may result in a global warming above C3 scenario.



# USA

	Responsibility since 1990	Responsibility since 1950
Current per capita emissions		USA per capita emissions are at 17.47 tCO <sub>2</sub> e/p, higher than the world's average at 6.4 tCO <sub>2</sub> e/p
% of global emissions (2021)		USA accounted for approximately 11.66% of global emissions
Fair Share 1.5°C in 2030 - Capability GDP (2021)		USA allocation is 97.16% below 2021
Fair Share 2°C in 2030 - Capability GDP (2021)		USA allocation is 118.97% below 2021
Fair Share 1.5°C in 2030 - Allocation using HDI (2021)		USA allocation is 95.56% below 2021
Fair share 2°C in 2030 - Allocation using HDI (2021)		USA allocation is 117.64% below 2021
NDC alignment under a fair share scenario		USA allocation is 105.82% below 2021
		USA allocation is 127.63% below 2021
		USA allocation is 103.34% below 2021
		USA allocation is 125.43% below 2021
NDC alignment under a fair share scenario		NDC alignment under a fair share scenario is red, meaning that the United States is currently on a trajectory that may result in a global warming above C3 scenario.



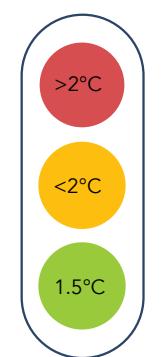
# Results for the equity approach



The assessment evaluates the NDC emission targets of all countries and categorises them based on the assessment results into red (outside of Paris Agreement bounds), orange (just outside Paris Agreement bounds) and green (full alignment with the Paris Agreement). A limited number of countries (9)<sup>32</sup> included in the global assessment presented input data concerns and are therefore reported on differently.

<sup>32</sup> Cook Islands, Holy See, Monaco, Nauru, Niue, Somalia, The Gambia, Liechtenstein, Occupied Palestinian Territory.

## Traffic light assessment explained



- >2°C Non compliant
- <2°C Near compliant
- 1.5°C Fully compliant



# Results for the equity approach accounting for observed emissions since 1990

	Name	Current emissions per capita (tCO <sub>2</sub> e/p)	% of global current emissions	2030 fair 1.5°C allocation using GDP (in % change to 2021)	2030 fair 2°C allocation using GDP (in % change to 2021)	Warming alignment -NDCs	Warming alignment - Conditional NDCs	2030 fair 1.5°C allocation using HDI (in % change to 2021)	2030 fair 2°C allocation using HDI (in % change to 2021)
1	Afghanistan	0.8	0.06	659	824			646	815
2	Albania	2.8	0.02	49	68			106	117
3	Algeria	4.58	0.4	-5	14			5	21
4	Andorra	7.63	0	-76	-67			-57	-51
5	Angola	2.66	0.18	119	179			115	176
6	Antigua and Barbuda	6.83	0	-61	-50			-34	-27
7	Argentina	8.71	0.78	-50	-45			-56	-50
8	Armenia	3.99	0.02	19	33			50	59
9	Australia	20.78	1.06	-101	-100			-111	-109
10	Austria	8.84	0.16	-58	-55			-70	-66
11	Azerbaijan	5.8	0.12	-47	-36			-28	-20
12	Bahrain	20.59	0.06	-118	-117			-129	-126
13	Bangladesh	1.48	0.5	252	303			306	350
14	Barbados	5.45	0	-30	-21			-17	-9
15	Belarus	10.9	0.21	-79	-76			-76	-73
16	Belgium	11.25	0.26	-71	-69			-81	-78
17	Belize	3.51	0	52	74			53	74
18	Benin	1.48	0.04	321	423			322	425
19	Bhutan	4.5	0.01	57	64			19	32
20	Bolivia	11.57	0.28	-63	-57			-66	-59
21	Bosnia and Herzegovina	8.03	0.05	-66	-59			-45	-42
22	Botswana	5.61	0.03	-17	-4			-25	-10
23	Brazil	6.16	2.61	-36	-26			-25	-17
24	Brunei Darussalam	35.34	0.03	-104	-104			-113	-112
25	Bulgaria	9.01	0.12	-78	-74			-67	-65
26	Burkina Faso	1.75	0.08	259	332			230	307
27	Burundi	0.52	0.01	1040	1328			1083	1367
28	Cambodia	2.76	0.09	94	120			99	124

Name	Current emissions per capita (tCO <sub>2</sub> e/p)	% of global current emissions	2030 fair 1.5°C allocation using GDP	2030 fair 2°C allocation using GDP	Warming alignment -NDCs	Warming alignment - Conditional NDCs	2030 fair 1.5°C allocation using HDI	2030 fair 2°C allocation using HDI	
			(in % change to 2021)	(in % change to 2021)			(in % change to 2021)	(in % change to 2021)	
29	Cameroon	1.46	0.08	338	431			321	417
30	Canada	19.38	1.46	-96	-94			-104	-101
31	Cape Verde	1.91	0	178	218			253	284
32	Central African Republic	3.59	0.04	34	80			45	90
33	Chad	2.42	0.08	142	208			116	186
34	Chile	5.98	0.23	-21	-14			-22	-14
35	China	10.08	28.5	-64	-60			-60	-57
36	Colombia	4.18	0.42	15	29			24	37
37	Comoros	0.64	0	801	962			843	1000
38	Congo	1.2	0.01	407	502			326	434
39	Cook Islands	5.63	0	N.A.	N.A.			N.A.	N.A.
40	Costa Rica	3.24	0.03	67	84			75	91
41	Côte d'Ivoire	1.2	0.06	537	639			426	544
42	Croatia	6.49	0.05	-51	-44			-34	-30
43	Cuba	3.98	0.09	-8	6			27	36
44	Cyprus	6.5	0.02	-44	-35			-35	-28
45	Czech Republic	11.2	0.23	-79	-76			-86	-83
46	DRC	2.75	0.51	143	210			178	241
47	Denmark	7.21	0.08	-51	-46			-64	-58
48	Djibouti	1.65	0	245	294			230	282
49	Dominica	3.57	0	2	22			52	66
50	Dominican Republic	3.78	0.08	41	58			46	62
51	Ecuador	4.22	0.15	27	42			24	40
52	Egypt	3.31	0.71	90	115			73	100
53	El Salvador	2.01	0.03	152	182			191	216
54	Equatorial Guinea	8.11	0.03	-36	-26			-67	-53
55	Eritrea	2.01	0.01	138	202			185	243
56	Estonia	16.59	0.04	-101	-100			-104	-102
57	Eswatini	3.78	0.01	45	69			71	92
58	Ethiopia	1.63	0.38	264	342			263	342
59	Fiji	3.6	0.01	32	53			61	78
60	Finland	11.89	0.13	-88	-85			-92	-89
61	France	6.64	0.85	-30	-25			-43	-37
62	Gabon	2.79	0.01	55	85			7	43
63	Georgia	3.21	0.02	39	56			79	90
64	Germany	8.96	1.48	-69	-66			-74	-71

	Name	Current emissions per capita (tCO <sub>2</sub> e/p)	% of global current emissions	2030 fair 1.5°C allocation using GDP	2030 fair 2°C allocation using GDP	Warming alignment -NDCs	Warming alignment - Conditional NDCs	2030 fair 1.5°C allocation using HDI	2030 fair 2°C allocation using HDI
				(in % change to 2021)	(in % change to 2021)			(in % change to 2021)	(in % change to 2021)
65	Ghana	2.11	0.14	195	244			193	243
66	Greece	9.08	0.19	-67	-64			-68	-65
67	Grenada	2.97	0	30	57			98	116
68	Guatemala	2.39	0.08	146	179			140	175
69	Guinea	2.42	0.06	201	244			136	188
70	Guinea-Bissau	1.65	0.01	253	322			246	316
71	Guyana	6.66	0.01	-52	-42			-32	-24
72	Haiti	1.39	0.03	282	344			314	373
73	Holy See	N.A.	N.A.	N.A.				N.A.	N.A.
74	Honduras	2.29	0.05	146	182			147	183
75	Hungary	7.17	0.14	-51	-45			-46	-41
76	Iceland	12.45	0.01	-70	-68			-85	-81
77	India	2.93	8.15	81	104			90	112
78	Indonesia	4.37	2.37	23	37			24	38
79	Iran (Islamic Republic of)	12.26	2.13	-76	-71			-74	-70
80	Iraq	9.1	0.78	-50	-37			-48	-36
81	Ireland	12.58	0.12	-76	-73			-89	-86
82	Israel	9.53	0.17	-17	-14			-61	-52
83	Italy	6.73	0.79	-52	-47			-47	-43
84	Jamaica	3.5	0.02	6	20			39	49
85	Japan	9.53	2.36	-80	-77			-73	-71
86	Jordan	2.55	0.06	136	162			104	134
87	Kazakhstan	17.77	0.67	-96	-92			-94	-90
88	Kenya	1.87	0.19	217	273			215	273
89	Kiribati	0.89	0	427	555			605	711
90	Kuwait	35.03	0.3	-106	-106			-115	-114
91	Kyrgyzstan	3.31	0.04	58	87			77	104
92	Laos	4.89	0.07	9	26			18	33
93	Latvia	6.64	0.02	-46	-41			-37	-33
94	Lebanon	4.27	0.05	33	39			10	19
95	Lesotho	2.05	0.01	149	189			168	206
96	Liberia	0.97	0.01	508	634			513	640
97	Libya	13.88	0.18	-81	-78			-90	-85
98	Liechtenstein	4.45	0	N.A.	N.A.			N.A.	N.A.
99	Lithuania	9.47	0.05	-75	-71			-64	-62
100	Luxembourg	14.61	0.02	-75	-75			-102	-98

	Name	Current emissions per capita (tCO <sub>2</sub> e/p)	% of global current emissions	2030 fair 1.5°C allocation using GDP	2030 fair 2°C allocation using GDP	Warming alignment -NDCs	Warming alignment - Conditional NDCs	2030 fair 1.5°C allocation using HDI	2030 fair 2°C allocation using HDI
				(in % change to 2021)	(in % change to 2021)			(in % change to 2021)	(in % change to 2021)
101	Madagascar	1.34	0.08	330	430			341	440
102	Malawi	0.81	0.03	715	877			675	844
103	Malaysia	10	0.66	-49	-44			-63	-57
104	Maldives	4.44	0	15	27			18	30
105	Mali	2.28	0.1	170	245			165	241
106	Malta	4.5	0	-1	10			2	10
107	Marshall Islands	3.91	0	13	35			58	75
108	Mauritania	3.55	0.03	70	109			62	103
109	Mauritius	5.63	0.01	-12	-4			-3	5
110	Mexico	5.61	1.4	-20	-11			-25	-15
111	Micronesia	2.13	0	106	147			199	228
112	Moldova (Republic of)	3.35	0.02	49	67			83	97
113	Monaco	2.67	0	N.A.	N.A.			N.A.	N.A.
114	Mongolia	27.05	0.18	-93	-91			-96	-93
115	Montenegro	5.07	0.01	-31	-21			-9	-2
116	Morocco	3	0.22	93	114			89	112
117	Mozambique	1.46	0.09	334	434			312	415
118	Myanmar	2.74	0.29	61	88			102	124
119	Namibia	5.76	0.03	-15	2			-20	-3
120	Nauru	4.86	0	N.A.	N.A.			N.A.	N.A.
121	Nepal	1.71	0.1	198	246			245	287
122	Netherlands	11.04	0.38	-75	-73			-85	-82
123	New Zealand	16.66	0.17	-94	-92			-100	-97
124	Nicaragua	3.03	0.04	72	98			87	112
125	Niger	1.77	0.09	331	462			277	415
126	Nigeria	1.88	0.78	282	337			205	271
127	Niue	5.22	0	N.A.	N.A.			N.A.	N.A.
128	North Korea	2.36	0.12	39	69			98	121
129	North Macedonia	4.78	0.02	-30	-21			-11	-4
130	Norway	9.91	0.11	-69	-66			-88	-83
131	Occupied Palestinian Territory	1.77	0.02	N.A.	N.A.			N.A.	N.A.
132	Oman	27.02	0.24	-90	-89			-99	-96
133	Pakistan	2.58	1.17	123	165			125	166
134	Palau	19.31	0	-114	-111			-105	-103
135	Panama	4.02	0.03	79	91			40	57
136	Papua New Guinea	1.9	0.04	204	254			196	248

	Name	Current emissions per capita (tCO <sub>2</sub> e/p)	% of global current emissions	2030 fair 1.5°C allocation using GDP	2030 fair 2°C allocation using GDP	Warming alignment -NDCs	Warming alignment - Conditional NDCs	2030 fair 1.5°C allocation using HDI	2030 fair 2°C allocation using HDI
				(in % change to 2021)	(in % change to 2021)			(in % change to 2021)	(in % change to 2021)
137	Paraguay	6.67	0.09	-26	-16			-31	-21
138	Peru	3.1	0.21	102	121			88	109
139	Philippines	2.26	0.51	148	186			164	201
140	Poland	10.77	0.82	-84	-81			-79	-76
141	Portugal	5.55	0.11	-42	-35			-31	-26
142	Qatar	46.09	0.25	-108	-109			-125	-124
143	Romania	5.93	0.23	-48	-40			-29	-23
144	Russian Federation	18.5	5.34	-100	-98			-99	-97
145	Rwanda	0.6	0.02	943	1145			948	1152
146	Saint Kitts and Nevis	6.78	0	-58	-48			-32	-26
147	Saint Lucia	3.02	0	52	71			81	96
148	Saint Vincent and the Grenadines	3.37	0	37	55			76	89
149	Samoa	2.46	0	104	148			154	192
150	San Marino	5.81	0	-63	-52			-34	-28
151	Sao Tome and Principe	1	0	593	695			535	647
152	Saudi Arabia	16.51	1.17	-90	-87			-96	-93
153	Senegal	1.78	0.06	274	355			242	328
154	Serbia	9.85	0.14	-85	-80			-71	-69
155	Seychelles	6.16	0	-57	-44			-28	-20
156	Sierra Leone	0.91	0.02	517	640			541	661
157	Singapore	9.64	0.11	-42	-41			-74	-70
158	Slovakia	8.33	0.09	-60	-56			-61	-57
159	Slovenia	7.82	0.03	-58	-54			-61	-57
160	Solomon Islands	0.85	0	649	793			632	780
161	Somalia	1.89	0.06	N.A.	N.A.			N.A.	N.A.
162	South Africa	9.08	1.06	-70	-64			-72	-65
163	South Korea	13.56	1.39	-78	-77			-87	-84
164	South Sudan	3.61	0.08	-13	23			15	46
165	Spain	6.51	0.61	-45	-40			-42	-37
166	Sri Lanka	1.8	0.08	216	243			244	269
167	Sudan	2.62	0.23	140	189			115	168
168	Suriname	6.99	0.01	-46	-36			-39	-30
169	Sweden	5.33	0.11	8	14			-22	-12
170	Switzerland	4.66	0.08	50	56			4	15
171	Syrian Arab Republic	2.45	0.1	157	200			132	180
172	Tajikistan	1.81	0.03	225	282			243	299

	Name	Current emissions per capita (tCO <sub>2</sub> e/p)	% of global current emissions	2030 fair 1.5°C allocation using GDP	2030 fair 2°C allocation using GDP	Warming alignment -NDCs	Warming alignment - Conditional NDCs	2030 fair 1.5°C allocation using HDI	2030 fair 2°C allocation using HDI
				(in % change to 2021)	(in % change to 2021)			(in % change to 2021)	(in % change to 2021)
173	Tanzania	1.58	0.2	328	425			322	420
174	Thailand	5.88	0.83	-26	-19			-21	-14
175	The Bahamas	6.31	0.01	-23	-16			-31	-23
176	The Gambia	1.06	0.01	N.A.	N.A.			N.A.	N.A.
177	Timor-Leste	1.98	0.01	207	244			182	223
178	Togo	1.36	0.02	328	430			352	451
179	Tonga	3.05	0	58	86			102	123
180	Trinidad and Tobago	35.11	0.11	-130	-129			-127	-127
181	Tunisia	3.25	0.08	71	88			68	87
182	Turkey	7.11	1.19	-30	-23			-35	-28
183	Turkmenistan	23.28	0.29	-94	-92			-98	-95
184	Tuvalu	2.13	0	99	141			175	207
185	Uganda	1.14	0.1	531	640			442	564
186	Ukraine	6.21	0.54	-74	-69			-62	-58
187	United Arab Emirates	25.25	0.47	-91	-91			-106	-104
188	United Kingdom	6.22	0.83	-32	-27			-48	-41
189	United States of America	17.47	11.66	-98	-96			-106	-104
190	Uruguay	12.46	0.08	-82	-79			-80	-77
191	Uzbekistan	5.85	0.39	-32	-18			-24	-12
192	Vanuatu	1.87	0	249	316			220	292
193	Venezuela	5.82	0.33	-37	-26			-44	-32
194	Vietnam	4.17	0.8	17	33			27	41
195	Yemen	1.12	0.07	394	497			400	504
196	Zambia	2.04	0.08	233	297			189	260
197	Zimbabwe	1.78	0.06	188	255			232	294

## Results for the equity approach for country groups accounting for observed emissions since 1990

	Name	Current emissions per capita (CO <sub>2</sub> /e/p) (2021)	% of global current emissions (2021)	2030 fair 1.5°C allocation using GDP (2021)	2030 fair 2°C allocation using GDP (2021)	Warming alignment -NDCs	Warming alignment - Conditional NDCs	2030 fair 1.5°C allocation using HDI (2021)	2030 fair 2°C allocation using HDI (2021)
1	African Group	2.5	6.8	146	195			131	182
2	Australasia	20.1	1.2	-100	-98			-109	-106
3	CVF	2.2	6.1	164	213			170	218
4	EU	8.1	7.2	-60	-56			-62	-58
5	European Group	7.8	8.2	-56	-52			-60	-56
6	G20	8.1	78.5	-53	-47			-52	-46
7	G7	11.7	23.5	-82	-79			-87	-84
8	LDCs	1.8	3.9	224	293			231	300
9	Northern America	17.7	13.1	-97	-95			-106	-103
10	SIDS	4.3	0.6	9	25			14	29
11	Umbrella	15.1	18.2	-93	-91			-99	-97
12	World	6.4	100	-31	-21			-31	-21

## Results for the equity approach accounting for historical emissions since 1950

Name	Current emissions per capita (tCO <sub>2</sub> e/p)	% of global current emissions	2030 fair 1.5°C allocation using GDP		2030 fair 2°C allocation using GDP		Warming alignment -NDCs	Warming alignment - Conditional NDCs	2030 fair 1.5°C allocation using HDI		2030 fair 2°C allocation using HDI	
			(in % change to 2021)	(in % change to 2021)	(in % change to 2021)	(in % change to 2021)			(in % change to 2021)	(in % change to 2021)	(in % change to 2021)	(in % change to 2021)
1	Afghanistan	0.8	0.06	706	873					694	863	
2	Albania	2.8	0.02	71	90					128	139	
3	Algeria	4.58	0.4	-1	16					7	24	
4	Andorra	7.63	0	-83	-74					-64	-59	
5	Angola	2.66	0.18	122	182					118	179	
6	Antigua and Barbuda	6.83	0	-59	-49					-33	-26	
7	Argentina	8.71	0.78	-55	-50					-61	-55	
8	Armenia	3.99	0.02	50	64					81	91	
9	Australia	20.78	1.06	-119	-117					-128	-126	
10	Austria	8.84	0.16	-68	-65					-81	-76	
11	Azerbaijan	5.8	0.12	-66	-56					-48	-40	
12	Bahrain	20.59	0.06	-135	-135					-146	-144	
13	Bangladesh	1.48	0.5	298	349					351	396	
14	Barbados	5.45	0	-15	-6					-1	6	
15	Belarus	10.9	0.21	-94	-91					-92	-89	
16	Belgium	11.25	0.26	-93	-91					-103	-100	
17	Belize	3.51	0	60	82					60	83	
18	Benin	1.48	0.04	349	452					350	453	
19	Bhutan	4.5	0.01	70	77					32	44	
20	Bolivia	11.57	0.28	-62	-55					-65	-58	
21	Bosnia and Herzegovina	8.03	0.05	-52	-46					-32	-28	
22	Botswana	5.61	0.03	-21	-8					-29	-14	
23	Brazil	6.16	2.61	-30	-21					-20	-12	
24	Brunei Darussalam	35.34	0.03	-112	-112					-121	-120	
25	Bulgaria	9.01	0.12	-96	-92					-85	-83	
26	Burkina Faso	1.75	0.08	283	356					253	330	
27	Burundi	0.52	0.01	1140	1430					1183	1469	
28	Cambodia	2.76	0.09	111	137					116	141	

	Name	Current emissions per capita (tCO <sub>2</sub> e/p)	% of global current emissions	2030 fair 1.5°C allocation using GDP	2030 fair 2°C allocation using GDP	Warming alignment -NDCs	Warming alignment - Conditional NDCs	2030 fair 1.5°C allocation using HDI	2030 fair 2°C allocation using HDI
				(in % change to 2021)	(in % change to 2021)			(in % change to 2021)	(in % change to 2021)
29	Cameroon	1.46	0.08	361	455			344	440
30	Canada	19.38	1.46	-110	-109			-118	-115
31	Cape Verde	1.91	0	222	262			297	329
32	Central African Republic	3.59	0.04	37	83			48	93
33	Chad	2.42	0.08	150	216			124	194
34	Chile	5.98	0.23	-15	-8			-16	-8
35	China	10.08	28.5	-56	-52			-52	-49
36	Colombia	4.18	0.42	21	35			29	42
37	Comoros	0.64	0	887	1049			929	1087
38	Congo	1.2	0.01	420	515			339	446
39	Cook Islands	5.63	0	N.A.	N.A.			N.A.	N.A.
40	Costa Rica	3.24	0.03	79	96			87	103
41	Côte d'Ivoire	1.2	0.06	566	668			456	574
42	Croatia	6.49	0.05	-49	-43			-32	-28
43	Cuba	3.98	0.09	-1	12			33	42
44	Cyprus	6.5	0.02	-40	-31			-31	-23
45	Czech Republic	11.2	0.23	-117	-115			-124	-121
46	Democratic Republic of the Congo	2.75	0.51	155	223			191	254
47	Denmark	7.21	0.08	-81	-77			-95	-88
48	Djibouti	1.65	0	258	308			243	295
49	Dominica	3.57	0	42	63			92	106
50	Dominican Republic	3.78	0.08	54	71			59	75
51	Ecuador	4.22	0.15	35	50			33	49
52	Egypt	3.31	0.71	103	128			86	113
53	El Salvador	2.01	0.03	195	226			235	260
54	Equatorial Guinea	8.11	0.03	-31	-22			-62	-49
55	Eritrea	2.01	0.01	160	224			207	265
56	Estonia	16.59	0.04	-132	-131			-135	-134
57	Eswatini	3.78	0.01	55	79			81	102
58	Ethiopia	1.63	0.38	284	363			283	362
59	Fiji	3.6	0.01	51	73			81	98
60	Finland	11.89	0.13	-104	-102			-108	-106
61	France	6.64	0.85	-51	-46			-64	-58
62	Gabon	2.79	0.01	29	58			-19	17
63	Georgia	3.21	0.02	79	96			118	130
64	Germany	8.96	1.48	-102	-100			-108	-104

	Name	Current emissions per capita (tCO <sub>2</sub> e/p)	% of global current emissions	2030 fair 1.5°C allocation using GDP	2030 fair 2°C allocation using GDP	Warming alignment -NDCs	Warming alignment - Conditional NDCs	2030 fair 1.5°C allocation using HDI	2030 fair 2°C allocation using HDI
				(in % change to 2021)	(in % change to 2021)			(in % change to 2021)	(in % change to 2021)
65	Ghana	2.11	0.14	217	267			215	266
66	Greece	9.08	0.19	-67	-64			-68	-65
67	Grenada	2.97	0	72	99			140	158
68	Guatemala	2.39	0.08	165	199			159	195
69	Guinea	2.42	0.06	220	262			155	207
70	Guinea-Bissau	1.65	0.01	280	350			273	344
71	Guyana	6.66	0.01	-46	-36			-26	-18
72	Haiti	1.39	0.03	330	393			363	422
73	Holy See	N.A.	N.A.	N.A.	N.A.			N.A.	N.A.
74	Honduras	2.29	0.05	162	198			163	200
75	Hungary	7.17	0.14	-66	-61			-62	-57
76	Iceland	12.45	0.01	-86	-85			-101	-98
77	India	2.93	8.15	102	125			111	133
78	Indonesia	4.37	2.37	37	51			38	52
79	Iran (Islamic Republic of)	12.26	2.13	-75	-71			-73	-69
80	Iraq	9.1	0.78	-51	-39			-50	-37
81	Ireland	12.58	0.12	-88	-86			-102	-98
82	Israel	9.53	0.17	-24	-21			-67	-59
83	Italy	6.73	0.79	-55	-50			-51	-47
84	Jamaica	3.5	0.02	20	33			53	62
85	Japan	9.53	2.36	-84	-80			-77	-74
86	Jordan	2.55	0.06	141	167			108	139
87	Kazakhstan	17.77	0.67	-119	-115			-117	-113
88	Kenya	1.87	0.19	233	290			232	290
89	Kiribati	0.89	0	515	645			694	801
90	Kuwait	35.03	0.3	-115	-115			-124	-123
91	Kyrgyzstan	3.31	0.04	65	94			84	111
92	Laos	4.89	0.07	20	36			28	43
93	Latvia	6.64	0.02	-55	-50			-45	-42
94	Lebanon	4.27	0.05	45	50			21	31
95	Lesotho	2.05	0.01	182	223			202	240
96	Liberia	0.97	0.01	559	686			565	692
97	Libya	13.88	0.18	-97	-94			-105	-101
98	Liechtenstein	4.45	0	N.A.	N.A.			N.A.	N.A.
99	Lithuania	9.47	0.05	-88	-84			-78	-75
100	Luxembourg	14.61	0.02	-111	-111	<img			

	Name	Current emissions per capita (tCO <sub>2</sub> e/p)	% of global current emissions	2030 fair 1.5°C allocation using GDP	2030 fair 2°C allocation using GDP	Warming alignment -NDCs	Warming alignment - Conditional NDCs	2030 fair 1.5°C allocation using HDI	2030 fair 2°C allocation using HDI
				(in % change to 2021)	(in % change to 2021)			(in % change to 2021)	(in % change to 2021)
101	Madagascar	1.34	0.08	348	448			359	458
102	Malawi	0.81	0.03	772	936			732	902
103	Malaysia	10	0.66	-45	-41			-60	-54
104	Maldives	4.44	0	25	38			28	40
105	Mali	2.28	0.1	186	262			181	257
106	Malta	4.5	0	13	23			15	24
107	Marshall Islands	3.91	0	37	60			82	99
108	Mauritania	3.55	0.03	72	112			64	105
109	Mauritius	5.63	0.01	6	14			15	22
110	Mexico	5.61	1.4	-17	-8			-22	-12
111	Micronesia	2.13	0	152	193			245	274
112	Moldova (Republic of)	3.35	0.02	61	79			95	108
113	Monaco	2.67	0	N.A.	N.A.			N.A.	N.A.
114	Mongolia	27.05	0.18	-97	-94			-99	-97
115	Montenegro	5.07	0.01	-26	-16			-3	4
116	Morocco	3	0.22	113	135			110	133
117	Mozambique	1.46	0.09	362	462			339	443
118	Myanmar	2.74	0.29	87	115			128	151
119	Namibia	5.76	0.03	-19	-3			-24	-7
120	Nauru	4.86	0	N.A.	N.A.			N.A.	N.A.
121	Nepal	1.71	0.1	238	286			285	328
122	Netherlands	11.04	0.38	-93	-90			-103	-99
123	New Zealand	16.66	0.17	-110	-108			-117	-114
124	Nicaragua	3.03	0.04	86	112			101	126
125	Niger	1.77	0.09	345	476			291	429
126	Nigeria	1.88	0.78	298	354			222	288
127	Niue	5.22	0	N.A.	N.A.			N.A.	N.A.
128	North Korea	2.36	0.12	29	58			88	110
129	North Macedonia	4.78	0.02	-49	-39			-30	-23
130	Norway	9.91	0.11	-90	-87			-109	-104
131	Occupied Palestinian Territory	1.77	0.02	N.A.	N.A.			N.A.	N.A.
132	Oman	27.02	0.24	-91	-89			-99	-97
133	Pakistan	2.58	1.17	140	181			141	183
134	Palau	19.31	0	-128	-125			-118	-116
135	Panama	4.02	0.03	85	98			46	64
136	Papua New Guinea	1.9	0.04	223	273			215	267

	Name	Current emissions per capita (tCO <sub>2</sub> e/p)	% of global current emissions	2030 fair 1.5°C allocation using GDP	2030 fair 2°C allocation using GDP	Warming alignment -NDCs	Warming alignment - Conditional NDCs	2030 fair 1.5°C allocation using HDI	2030 fair 2°C allocation using HDI
				(in % change to 2021)	(in % change to 2021)			(in % change to 2021)	(in % change to 2021)
137	Paraguay	6.67	0.09	-24	-15			-29	-19
138	Peru	3.1	0.21	116	135			101	123
139	Philippines	2.26	0.51	168	207			184	221
140	Poland	10.77	0.82	-107	-103			-101	-99
141	Portugal	5.55	0.11	-31	-23			-20	-14
142	Qatar	46.09	0.25	-111	-112			-128	-127
143	Romania	5.93	0.23	-68	-60			-48	-43
144	Russian Federation	18.5	5.34	-117	-115			-115	-114
145	Rwanda	0.6	0.02	1040	1244			1045	1250
146	Saint Kitts and Nevis	6.78	0	-38	-28			-12	-5
147	Saint Lucia	3.02	0	81	100			110	125
148	Saint Vincent and the Grenadines	3.37	0	82	101			122	135
149	Samoa	2.46	0	145	190			195	233
150	San Marino	5.81	0	-65	-54			-37	-31
151	Sao Tome and Principe	1	0	659	762			601	714
152	Saudi Arabia	16.51	1.17	-93	-90			-100	-96
153	Senegal	1.78	0.06	294	375			262	348
154	Serbia	9.85	0.14	-88	-84			-75	-72
155	Seychelles	6.16	0	-44	-31			-16	-7
156	Sierra Leone	0.91	0.02	580	703			604	725
157	Singapore	9.64	0.11	-47	-46			-79	-75
158	Slovakia	8.33	0.09	-81	-77			-82	-78
159	Slovenia	7.82	0.03	-73	-69			-76	-72
160	Solomon Islands	0.85	0	704	849			687	835
161	Somalia	1.89	0.06	N.A.	N.A.			N.A.	N.A.
162	South Africa	9.08	1.06	-78	-71			-79	-72
163	South Korea	13.56	1.39	-74	-72			-83	-80
164	South Sudan	3.61	0.08	-17	17			9	40
165	Spain	6.51	0.61	-44	-38			-40	-36
166	Sri Lanka	1.8	0.08	268	296			297	322
167	Sudan	2.62	0.23	153	202			128	181
168	Suriname	6.99	0.01	-48	-39			-42	-33
169	Sweden	5.33	0.11	-18	-12			-47	-38
170	Switzerland	4.66	0.08	43	49			-3	8
171	Syrian Arab Republic	2.45	0.1	167	211			143	191
172	Tajikistan	1.81	0.03	242	300			260	316

	Name	Current emissions per capita (tCO <sub>2</sub> e/p)	% of global current emissions	2030 fair 1.5°C allocation using GDP	2030 fair 2°C allocation using GDP	Warming alignment -NDCs	Warming alignment - Conditional NDCs	2030 fair 1.5°C allocation using HDI	2030 fair 2°C allocation using HDI
				(in % change to 2021)	(in % change to 2021)			(in % change to 2021)	(in % change to 2021)
173	Tanzania (United Republic of)	1.58	0.2	349	446			342	441
174	Thailand	5.88	0.83	-16	-9				-10
175	The Bahamas	6.31	0.01	-47	-41				-56
176	The Gambia	1.06	0.01	N.A.	N.A.			N.A.	N.A.
177	Timor-Leste	1.98	0.01	243	280			217	259
178	Togo	1.36	0.02	361	463			385	484
179	Tonga	3.05	0	97	125			140	163
180	Trinidad and Tobago	35.11	0.11	-134	-133			-132	-132
181	Tunisia	3.25	0.08	87	105			85	103
182	Turkey	7.11	1.19	-24	-17			-29	-21
183	Turkmenistan	23.28	0.29	-99	-97			-103	-100
184	Tuvalu	2.13	0	143	186			219	252
185	Uganda	1.14	0.1	564	674			475	598
186	Ukraine	6.21	0.54	-124	-120			-112	-109
187	United Arab Emirates	25.25	0.47	-94	-94			-109	-107
188	United Kingdom	6.22	0.83	-70	-65			-86	-79
189	United States of America	17.47	11.66	-119	-118			-128	-125
190	Uruguay	12.46	0.08	-90	-87			-88	-85
191	Uzbekistan	5.85	0.39	-35	-21			-27	-15
192	Vanuatu	1.87	0	265	332			236	308
193	Venezuela (Bolivarian Republic of)	5.82	0.33	-49	-39			-57	-45
194	Vietnam	4.17	0.8	34	49			43	58
195	Yemen	1.12	0.07	426	531			433	537
196	Zambia	2.04	0.08	238	302			194	264
197	Zimbabwe	1.78	0.06	205	272			248	311

## Results for the equity approach for country groups accounting for historical emissions since 1950

	Name	Current emissions per capita (CO <sub>2</sub> e/p) (2021)	% of global current emissions (2021)	2030 fair 1.5°C allocation using GDP (2021)	2030 fair 2°C allocation using GDP (2021)	Warming alignment -NDCs	Warming alignment - Conditional NDCs	2030 fair 1.5°C allocation using HDI (2021)	2030 fair 2°C allocation using HDI (2021)
1	African Group	2.5	6.8	157	206			143	194
2	Australasia	20.1	1.2	-117	-116			-127	-124
3	CVF	2.2	6.1	185	234			190	239
4	EU	8.1	7.2	-79	-75			-81	-77
5	European Group	7.8	8.2	-77	-73			-81	-77
6	G20	8.1	78.5	-54	-48			-54	-48
7	G7	11.7	23.5	-101	-98			-106	-103
8	LDCs	1.8	3.9	247	317			254	323
9	Northern America	17.7	13.1	-118	-117			-127	-124
10	SIDS	4.3	0.6	17	33			22	37
11	Umbrella	15.1	18.2	-113	-111			-119	-116
12	World	6.4	100	-31	-21			-31	-21

# Data sources

The research data has been meticulously selected from multiple reliable sources, ensuring both credibility and relevance. Below you will find the specifics origins of the data:

- **Global emissions:** The report presents the allocations of emissions of global emissions scenarios of the categories C1 to C3 from the IPCC AR6 database.<sup>33</sup>

- **GDP data:** The GDP data used for the calculation of allocations is in purchasing power parity (PPP), taken from the Social Socioeconomic Pathways<sup>34</sup> associated with the global emissions scenarios, specifically assuming the Shared Socioeconomic Pathway 2 scenario (SSP2) "middle of the road", which represents a middle-ground approach between adaptation and mitigation challenges.

The GDP data referring to countries' current GDP per capita and fraction of global GDP is from the WorldBank<sup>35</sup>.

- **Historical emissions:** The future emissions allocations are calculated in the underlying

<sup>33</sup> IIASA 2022, AR6 Scenario Explorer and Database hosted by IIASA, <https://data.ece.iiasa.ac.at/ar6/>

<sup>34</sup> NAVIGATE, 2020. <https://www.navigate-h2020.eu/navigator/apply/>

<sup>35</sup> WB, 2022.GDP. <https://data.worldbank.org/indicator/NY.GDP.MKTP.CD>

paper using the historical emissions (until 2020) from the Potsdam Real-time Integrated Model for the Probabilistic Assessment of emission Paths (PRIMAP).<sup>36 37</sup> The displayed historical emissions are taken from the more recent NDC factsheets<sup>38 39</sup> update (until 2021) adapted from the historical data from the PRIMAP<sup>40 41</sup> to ensure consistency with the reporting of NDCs.

- **Human Development Index (HDI):** The HDI data for 2020 is from the UN Development Programme.<sup>42</sup>

<sup>36</sup> Gütschow, Johannes; Jeffery, M. Louise; Gieseke, Robert; Gebel, Ronja; Stevens, David; Krapp, Mario; Rocha, Marcia (2016): The PRIMAP-hist national historical emissions time series, *Earth Syst. Sci. Data*, 8, 571-603, <https://doi.org/10.5194/essd-8-571-2016> Dataset Download (Version 2.4.2)

<sup>37</sup> Gütschow, Johannes ; Pflüger, Mika (2023): The PRIMAP-hist national historical emissions time series (1750-2021) v2.4.2. Zenodo. <https://doi.org/10.5281/zenodo.7727475>

<sup>38</sup> Meinshausen, M. et al. Realization of Paris Agreement pledges may limit warming just below 2 °C. *Nature* 604, 304–309 (2022).

<sup>39</sup> Meinshausen, M., Lewis, J., Nicholls, R. & Guetschow, J. NDC factsheets. <https://doi.org/10.5281/zenodo.8010081> doi:10.5281/zenodo.5571277.

<sup>40</sup> Gütschow, Johannes; Jeffery, M. Louise; Gieseke, Robert; Gebel, Ronja; Stevens, David; Krapp, Mario; Rocha, Marcia (2016): The PRIMAP-hist national historical emissions time series, *Earth Syst. Sci. Data*, 8, 571-603, <https://doi.org/10.5194/essd-8-571-2016> Dataset Download (Version 2.4.2)

<sup>41</sup> Gütschow, Johannes ; Pflüger, Mika (2023): The PRIMAP-hist national historical emissions time series (1750-2021) v2.4.2. Zenodo. <https://doi.org/10.5281/zenodo.7727475>

<sup>42</sup> UNDP, Human Development Index (HDI) <https://hdr.undp.org/data-center/human-development-index/#/indicies/HDI>

**Population data:** Population data is obtained from the UN World Population Prospects 2022.<sup>43</sup>

- **Quantification of NDCs:** The quantification of the Nationally Determined Contributions (NDCs) for the present report is taken from peer reviewed publications (updated in March 2023).<sup>44 45</sup>

Considerations and limitations:<sup>46</sup>

- It is relevant to highlight that the country-level results are influenced by the limitations of the methods used and the data projections. Data for population and GDP projections present inherent uncertainty, specifically for small countries, and should be considered as best estimates.

- Considering groups of small countries collectively as their negotiating groups can reduce sensitivity to data uncertainties.

- The allocation methods described in the paper from Robiou du Pont et. al. 2023 can be applied with alternative data projections, including governmental sources. Parties for which data is missing are summarised in the Supplementary Information of the paper.

- The analysis covers the 198 countries that are Parties to the UNFCCC.

<sup>43</sup> World Population Prospects, 2022. Population Division <https://population.un.org/wpp/>

<sup>44</sup> Meinshausen, M. et al. Realization of Paris Agreement pledges may limit warming just below 2 °C. *Nature* 604, 304–309 (2022).

<sup>45</sup> Meinshausen, M., Lewis, J., Nicholls, R. & Guetschow, J. NDC factsheets. <https://doi.org/10.5281/zenodo.8010081> doi:10.5281/zenodo.5571277.

<sup>46</sup> Robiou du Pont, Yann, Dekker, Mark, van Vuuren, Detlef, & Schaeffer, Michiel. (2023). Effects of emissions allocations and ambition assessments immediately based on equity (First submission). Zenodo. <https://doi.org/10.5281/zenodo.8003393> & <https://www.researchsquare.com/article/rs-3050295/v1>

- Emissions allocations are conducted among countries with available data, and the EU's allocation is the sum of its member states' allocation. The approach of treating the EU as a single entity could produce slightly varying outcomes because of the non-linear nature of the effort-sharing formulae used in this analysis. Similar considerations are applicable when dealing with other country groups.

# Country groups



Those countries considered to be within the analytical country groups of the TLA is based on the status of UNFCCC/Paris Agreement parties at the time of submission of the underlying TLA technical paper on 11 June 2023.

## African Group (54 countries)

Algeria, Angola, Benin, Botswana, Burkina Faso, Burundi, Cabo Verde, Cameroon, Central African Republic, Chad, Comoros, Congo, Côte d'Ivoire, Democratic Republic of the Congo, Djibouti, Egypt, Equatorial Guinea, Eritrea, Eswatini, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Libya, Madagascar, Malawi, Mali, Mauritania, Mauritius, Morocco, Mozambique, Namibia, Niger, Nigeria, Rwanda, São Tomé and Príncipe, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, South Sudan, Sudan, Togo, Tunisia, Uganda, United Republic of Tanzania, Zambia, Zimbabwe.

## Australasia (2 countries)

Australia, New Zealand.

## CVF

(58 countries)

Afghanistan, Bangladesh, Barbados, Benin, Bhutan, Burkina Faso, Cambodia, Chad, Colombia, Comoros, Costa Rica, Côte d'Ivoire, Democratic Republic of Congo, Dominican Republic, Eswatini, Ethiopia, Fiji, Ghana, Grenada, Guatemala, Guinea, Guyana, Haiti, Honduras, Kenya, Kiribati, Kyrgyzstan, Lebanon, Liberia, Madagascar, Malawi, Maldives, Marshall Islands, Mongolia, Morocco, Nepal, Nicaragua, Niger, Palau, Palestinian Territory, Papua New Guinea, Philippines, Rwanda, Saint Lucia, Samoa, Senegal, South Sudan, Sri Lanka, Sudan, United Republic of Tanzania, The Gambia, Timor-Leste, Tunisia, Tuvalu, Uganda, Vanuatu, Vietnam, Yemen.

## G7

(7 countries and the EU)

Canada, European Union (all of its member states), France, Germany, Italy, Japan, United Kingdom, United States of America.

## G20

(20 countries including the EU)

Argentina, Australia, Brazil, Canada, China, European Union (and all its members), Germany, India, Indonesia, Italy, Japan, Mexico, Russian Federation, Saudi Arabia, South Africa, South Korea, Türkiye, United Kingdom, United States of America.

## LDC

(46 countries)

Afghanistan, Angola, Bangladesh, Benin, Bhutan, Burkina Faso, Burundi, Cambodia, Central African Republic, Chad, Comoros, Democratic Republic of the Congo, Djibouti, Eritrea, Ethiopia, Gambia, Guinea, Guinea-Bissau, Haiti, Kiribati, Lao People's Democratic Republic, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Myanmar, Nepal, Niger, Rwanda, São Tomé and Príncipe, Senegal, Sierra Leone, Solomon Islands, Somalia, South Sudan, Sudan, Timor-Leste, Togo, Tuvalu, Uganda, United Republic of Tanzania, Yemen, Zambia.

## SIDS

(39 countries not including "Associate Members")

Antigua and Barbuda, Guyana, Saint Lucia, Bahamas, Haiti, Saint Vincent and the Grenadines, Barbados, Jamaica, Samoa, Belize, Kiribati, São Tomé and Príncipe,

Cabo Verde, Maldives, Singapore, Comoros, Marshall Islands, Seychelles, Cook Islands, Mauritius, Solomon Islands, Cuba, Micronesia (Federated States of), Suriname, Dominica, Nauru, Timor-Leste, Dominican Republic, Niue, Tonga, Fiji, Palau, Trinidad and Tobago, Grenada, Papua New Guinea, Tuvalu, Guinea Bissau, Saint Kitts and Nevis, Vanuatu.

## Vulnerable countries

(108 countries)

Afghanistan, Angola, Antigua and Barbuda, Burundi, Benin, Burkina Faso, Bangladesh, The Bahamas, Belize, Barbados, Bhutan, Central African Republic, Côte d'Ivoire, Cameroon, Democratic Republic of Congo, Congo, Cook Islands, Colombia, Comoros, Cape Verde, Costa Rica, Cuba, Djibouti, Dominica, Dominican Republic, Algeria, Egypt, Eritrea, Ethiopia, Fiji, Micronesia, Gabon, Ghana, Guinea, The Gambia, Guinea-Bissau, Equatorial Guinea, Grenada, Guatemala, Guyana, Honduras, Haiti, Jamaica, Kenya, Kyrgyzstan, Cambodia, Kiribati, Saint Kitts and Nevis, Laos, Lebanon, Liberia, Libya, Saint Lucia, Sri Lanka, Lesotho, Morocco, Madagascar, Maldives, Marshall Islands, Mali, Myanmar, Mongolia, Mozambique, Mauritania, Mauritius, Malawi, Namibia, Niger, Nigeria, Nicaragua, Niue, Nepal, Nauru, Panama, Philippines, Palau, Papua New Guinea, Palestinian Territory, Occupied, Rwanda, Sudan, Senegal, Singapore, Solomon Islands, Sierra Leone, El Salvador, Somalia, South Sudan, Sao Tome and Principe, Suriname, Eswatini, Seychelles, Chad, Togo, Timor-Leste, Tonga, Trinidad and Tobago, Tunisia, Tuvalu, Tanzania, United Republic of, Uganda, Saint Vincent and the Grenadines, Vietnam, Vanuatu, Samoa, Yemen, South Africa, Zambia, Zimbabwe.



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