OLLI Study Group 395
Climate Policies: what works, what doesn't.

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Class # 7:International climate policies and climate justice

https://givingcompass.org/article/taking-action-on-climate-justice

Outline

- Games of climate change
- A short history of international climate policy: Rio Summit (1992), Kyoto Protocol (1997), Copenhagen (2009), Paris (2015), Glasgow (2021), Sharm El Sheikh (2022).
- Global inequality in climate emissions
- Equity and climate justice
- How to share the common atmosphere.

The Prisoner's dilemma

		Prisoner A	
		Stay Silent	*Confess and betray*
Prisoner B	*Stay Silent*	**Each serves one year in jail**	**Prisoner A goes free** **Prisoner B serves 10 years in jail**
	Confess and betray	**Prisoner A serves 10 years in jail** **Prisoner B goes free**	**Each serves three years in jail**

Two criminals have been arrested

- If A and B each betray the other, each of them serves 3 years in prison.
- If A betrays B but B remains silent, A will be set free and B will serve 10 years in prison.
- If A remains silent but B betrays A, A will serve 10 years in prison and B will be set free.
- If A and B both remain silent, both of them will serve one year in prison.

• The rational, self-interested behavior of both A and B is to betray – this is their dominant strategy (the best response in all circumstances). Showing loyalty to each other is irrational.

They end up serving 3 years in jail.

However, if they could cooperate and stay silent, they would get only one year in prison.

See: Prisoner's dilemma - Wikipedia

Coordination: the stag and rabbit game

Hunter 2

Hunter 1	Stag	Rabbit
Stag	10, 10	0,8
Rabbit	8,0	7,7

Assumptions: (i) Even half a stag is better than a rabbit; (2) hunting a stag requires 2 hunters

- **If both hunters cooperate in hunting for the stag** → each gets to take home half a stag.
- **If one hunts for the stag, while the other wanders off and gets a rabbit** → the defector gets a rabbit, and the other gets nothing.
- **If both hunters decide not to go for the stag**, → each gets to take home a rabbit.
- There are two pure strategy equilibria. Both players prefer one equilibrium to the other - it is both Pareto optimal.
- However, the inefficient equilibrium is less risky.

Source: https://courses.engr.illinois.edu/ece448/sp2020/slides/lec35.pdf

Games of Climate Change

Is global climate protection more like a Prisoner's Dilemma or a Coordination Game?

- Both games are a classic collective action problem:
  - In the Prisoner's dilemma the worst outcome for a player is to abate emissions while the other player is a free rider.
- In the **Coordination Game**, the highest-valued outcome for both parties is achieved when they cooperate.
- A=column; B= Row. B's worst payoff from playing Abate is 3, which is greater than 1, the worst payoff if A plays Pollute. Similarly, A's worst payoff from playing Abate is 3, better than the worst payoff A could get from playing Pollute.
- The higher the risk, the higher the payoff from cooperating
- The lower the risk, the higher the incentive to defect.

A / B	Abate	Pollute
Abate	4,4	1,3
Pollute	3,1	2,2

Source: De Canio, S.J., A. Fremstad, Game theory and climate policy, Ecologic Economics, June 2011. Read pages 177-182.

International Climate Policy

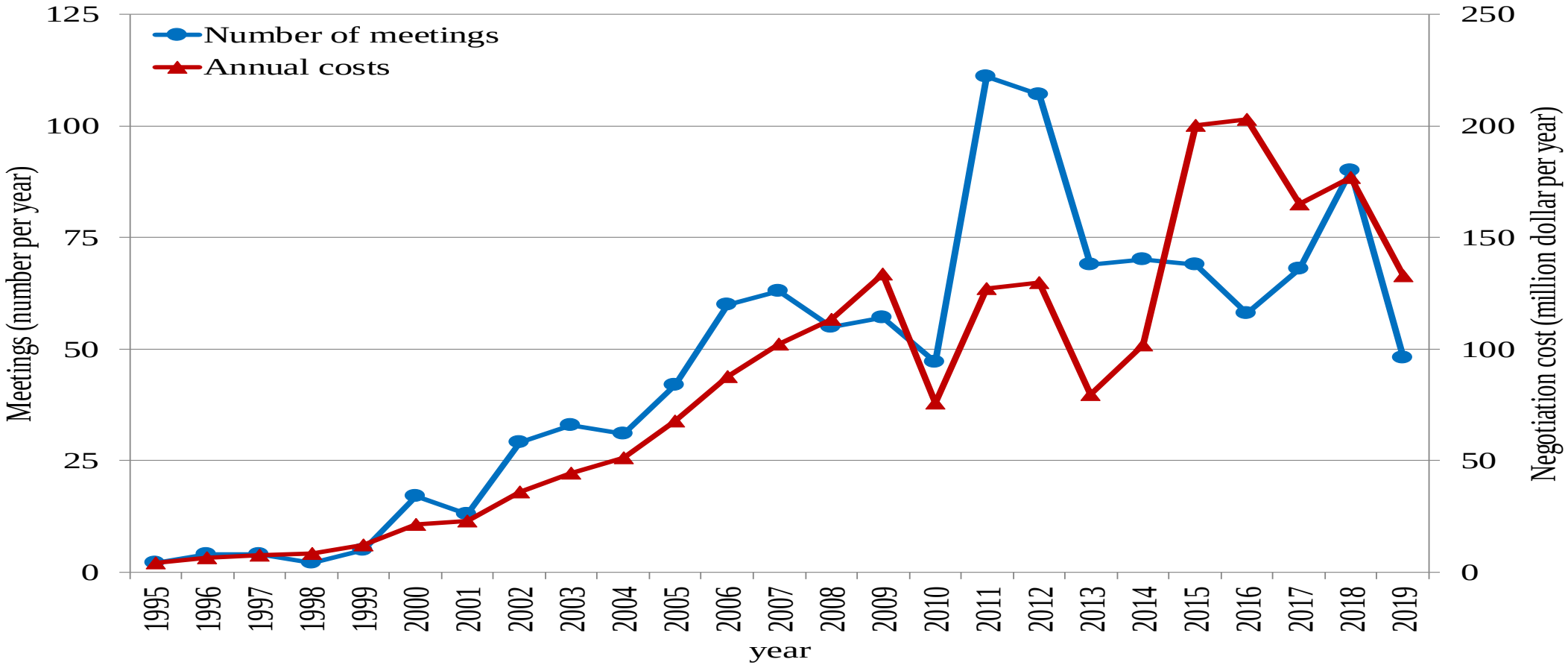
International climate policy has a long history but few successes

Climate change has been a scientific concern since the the beginning of the 20th century but it became a major topic on the **United Nations Conference on Environment and Development, Rio de Janeiro, 1992.**

1992 the UN Framework Convention on Climate Change was negotiated **at the Rio Summit** and entered into force in 1994. It was ratified by all countries (except South Sudan).

- Art. 2. It declared the goal of achieving **the stabilization of greenhouse gas concentration** with the objective of "preventing dangerous anthropogenic interference with Earth's climate system".
- Art. 3.1. It established the principle of "***common but differentiated responsibilities and respective capabilities";*** and committed developed countries to assist developing countries in reducing emissions and coping with climate impacts.
- Art. 4.1 It set up an international system to standardize and report measurements of GHG emissions (to permit international comparisons of data and performance).
- ……..
- Article 7.2 establishes international climate negotiations.

Rising number of meetings and costs of UNFCCC negotiations



Source: Tol R., Climate Economics (2019), 2nd edition, Edward Elgar Publishing limited, page 229

United Nations Convention on Climate Change: Key events

1995 First **conference of the parties***, **Berlin.**

Adopted the **Berlin Mandate**, a ruling that established a process for dealing with matters of climate change.

- It required the parties to initiate talks to reduce emissions by means of quantitative objectives and specific deadlines, but no new commitments for developing countries. There were 55 countries that did not have to take actions.
- The U.S. rejected this premise, saying the agreement should also include new greenhouse gas limits for developing countries.

* The COP is the decision-making body of the Convention: all States that are Parties to the Convention are represented.

1997-The Kyoto Protocol

The Kyoto Protocol:

- Committed 37 industrialized countries and the EU to reducing their GHG by an average of 5% against 1990 levels, over the 2008-2012 period. Adopted on November 1997, the Protocol came into force in 2005, ratified by 55% of parties.
- Many emitting countries, including China, India, Brazil, Korea, South Africa were not expected to reduce emissions.
- It allowed cap and trade trading (Article 17) among Annex 1 countries.
- Canada withdrew from the Kyoto Protocol in 2012. The US signed the document in 1998, but Congress failed to ratify the agreement, which meant the US never officially signed on to the pact.
- The Kyoto Protocol did not specify: (i) how to define and measure emissions; (ii) What happens if targets are violated.

Outcomes:

- Aggregate GHG emissions from all Annex I countries were reduced by 13.6% from 1990 to 2011 if land-use and forestry-sector changes are taken into account and 8.5% if they are not taken into account.
- However, most of these reductions were due to the economic restructuring in Russia and former soviet countries.

https://encrypted-tbn0.gstatic.com/images?q=tbn:ANd9GcRp-OBLU6GwXKhwpU_Fy9vzuc-Njm_vIIJzJe_7T-K8GET-Oa2bVWRUPqb4W1h503onEkU&usqp=CAU

Source: https://unfccc.int/resource/docs/convkp/kpeng.pdf

Departure point for post-Kyoto international regime: Copenhagen, COP-15 (2009)

Last-minute, direct negotiations among **President Obama, and leaders of China, India, Brazil, and South Africa saved COP-15 from complete collapse.**

Reached a non-binding agreement to:

- Implement economy-wide emissions targets for 2020
- Mitigation actions by developing nations
- Support forests and to establish a mechanism(REDD+) to enable the mobilization of financial resources.
- Developed countries would raise funds of $30 billion from; goal for the world to raise $100 billion per year by 2020

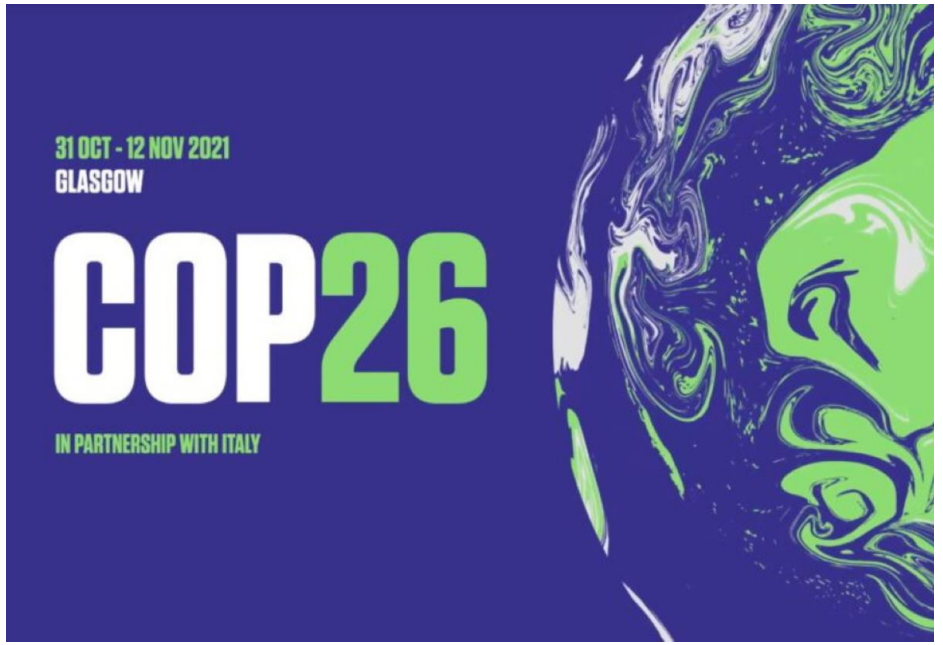
https://www.politico.com/story/2009/12/obamas-dramatic-climate-meet-030801

https://www.groupesclavo.fr/actualites/conference-des-nations-unies-sur-les-changements-climatiques/

Paris 2015

- The Paris Agreement is a **legally binding international treaty on climate change**, adopted by 196 Parties at COP 21 in Paris, on 12 December 2015, entered into force on 4 November 2016.
- **Ambition**: Holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels (Art. 2.1. a).
- **Differentiated roles & responsibilities**: The agreement maintains "common but differentiated (Art. 2.2) responsibilities and respective capabilities, in the light of different national circumstances."
  - Making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development. (Art. 2.1.c).
- **Dynamic process for reviewing and increasing the ambition of Parties' contributions**
  - **Enhanced Transparency Framework**: Under ETF, starting in 2024, countries will report transparently on actions taken and progress in climate change mitigation, adaptation measures and support provided or received.
  - **Global Stock-take:** The information gathered through the ETF will feed into Global stock-take, which is a two-year process that happens every five years.
  - **Facilitating compliance:** the Implementation and Compliance Committee facilitates compliance in a transparent, non-adversarial and non-punitive manner, paying particular attention to the respective national capabilities and circumstances of Parties.

Glasgow 2021: COP 26



The outcome of COP26 is a compromise. It reflects the interests, the contradictions and the state of political will in the world today. It is an important step, but it is not enough,

UN Secretary-General António Guterres

COP 26: Key outcomes

The Glasgow Climate Pact

- It is a "series of decisions and resolutions that build on the Paris accord", setting out what needs to be done to tackle climate change. However, it doesn't stipulate what each country must do and is not legally binding.

The Paris Rulebook

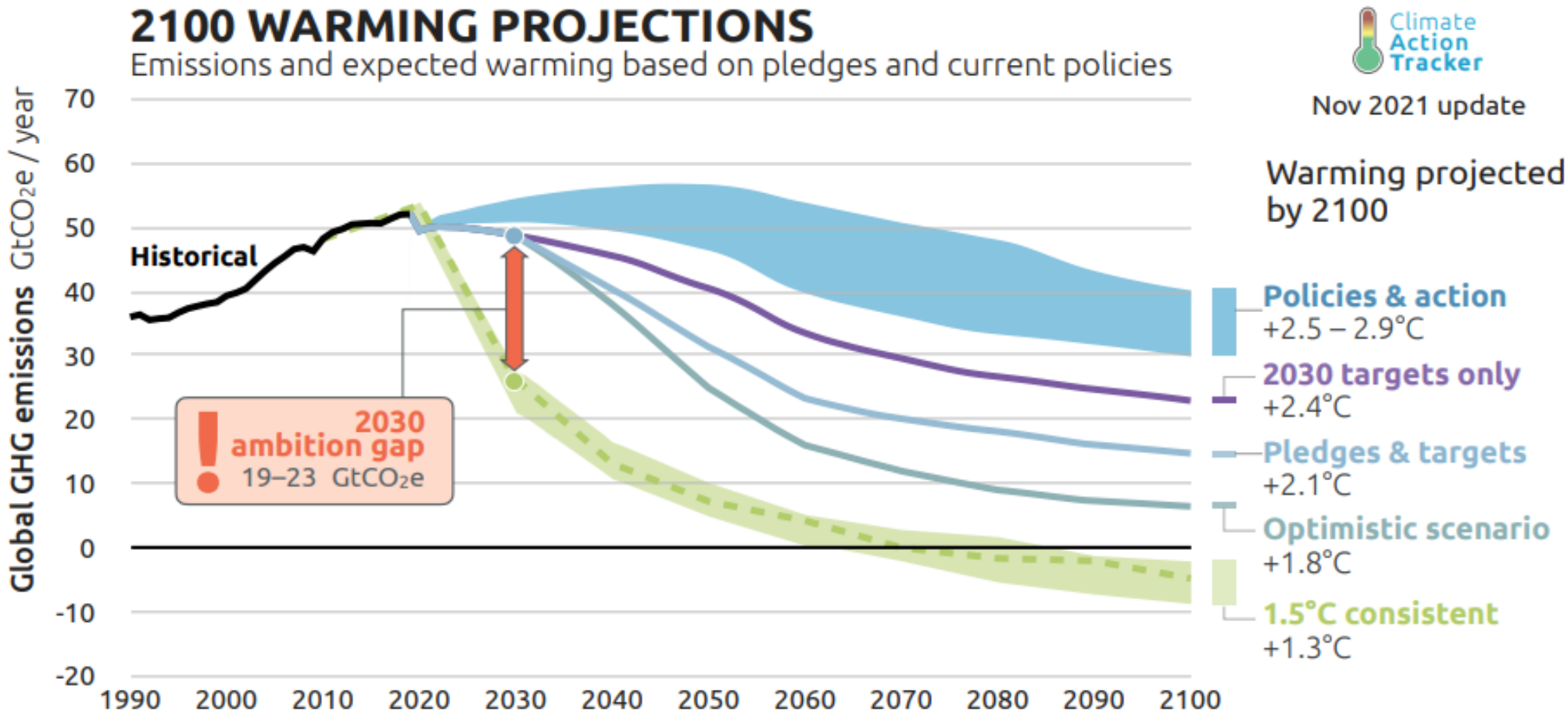
- The Paris Rulebook gives guidelines on how the Paris Agreement is delivered.

Other agreements

- Commitments from 137 countries to "halt and reverse forest loss and land degradation" by 2030.
- 190 countries agreed to phase down coal power, resulting in a 76% decrease in planned new coal power plants.
- The Clydebank Declaration, which aims to decarbonize shared shipping routes was signed by 22 countries. Agreements were also signed between private businesses, and cities as well as countries, such as a declaration on accelerating the transition to 100% zero emission cars and vans by "2040, and by no later than 2035 in leading markets".

See: https://www.carbonbrief.org/cop26-key-outcomes-agreed-at-the-un-climate-talks-in-glasgow/

Emissions pledges at COP26 would increase global temperatures by 2.5-2.9 degrees by 2100.



https://climateactiontracker.org/documents/1051/CAT_2022-06-03_Briefing_MidYearUpdate_DespiteGlasgowTargetUpdatesStalled.pdf

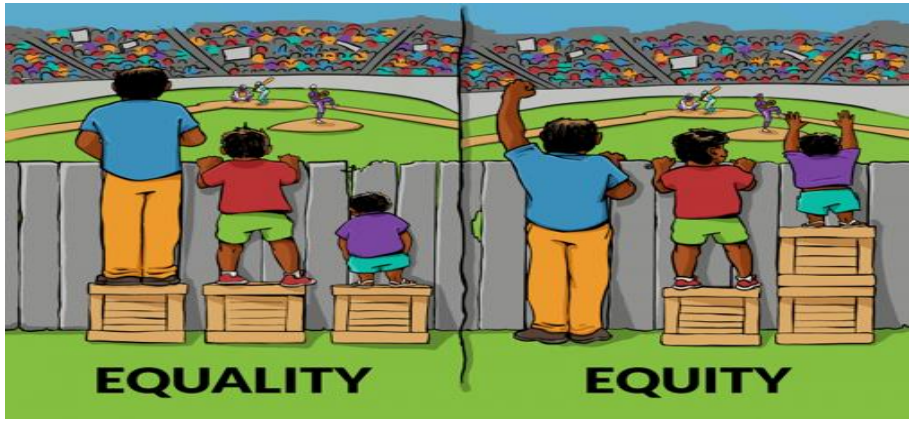
Sharm El-Sheikh, 7-18 November 2022: what to expect from COP 27

1. **Actions to bridge the mitigation gap to help limit global temperature rise to 1.5 degrees C.**
   - the **Glasgow Climate Pact** calls on countries to "revisit and strengthen" their commitments under the Paris Agreement by COP27, to align them with these global temperature goals.
2. **Clear finance targets for mitigation, adaptation and loss and damage finance.**
   - COP 26 noted the failure of developed countries to meet the $100 billion goal they originally promised to achieve by 2020.
3. **Stronger efforts to implement adaptation measures.**
   - The urgency for enhanced adaptation action is underscored by the IPCC Working Group II report,
4. **Finance for loss and damage**
   - COP 26 failed to agree on possible arrangements for loss and damage funding. Discussions will be continued at COP27.
5. **Implement the Paris Rulebook to hold countries and non-state actors accountable**.
   - This is crucial to ensure transparency and accountability for action

Source: https://www.bloomberg.com/news/articles/2019-02-12/the-green-new-deal-vs-the-old-green-deals

Equity and Climate Justice

Principles of equity



United Nations Framework Convention on Climate Change

- **Article 3.1:** "*The Parties should protect the climate system* ***for the benefit of present and future generations of humankind, on the basis of equity*** *and in accordance with their common but differentiated responsibilities and respective capabilities*."
- Article 3.3: "*The Parties should take precautionary measures to anticipate, prevent and minimize the causes of climate change and mitigate its adverse effects*."
  - Collective obligations of countries to undertake and support urgent and adequate global action to prevent dangerous impacts of climate change and provide effective adaptation to unavoidable impacts, without which there can be no justice.

https://unfccc.int/resource/docs/convkp/conveng.pdf

Dimensions of climate justice

Questions regarding unequal responsibilities and impacts of climate justice

- Who bears **greater responsibility** for the emissions of greenhouse gases?
- Who is **more adversely affected** by the extreme weather events that will increase in frequency and intensity?
- Who benefits and who bears the **costs and burdens of mitigation and adaptation policy**?
- Who has the **power to make and affect policy responses** to climate change?

Inequality is multi-dimensional based on:

- demographic characteristics, such as gender, race, ethnicity, religion, and age.
- assets and incomes.
- political power and access to public resources, such as public health, education, housing, and other services

Environmental and climate Justice

EPA (US): *"Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies".*

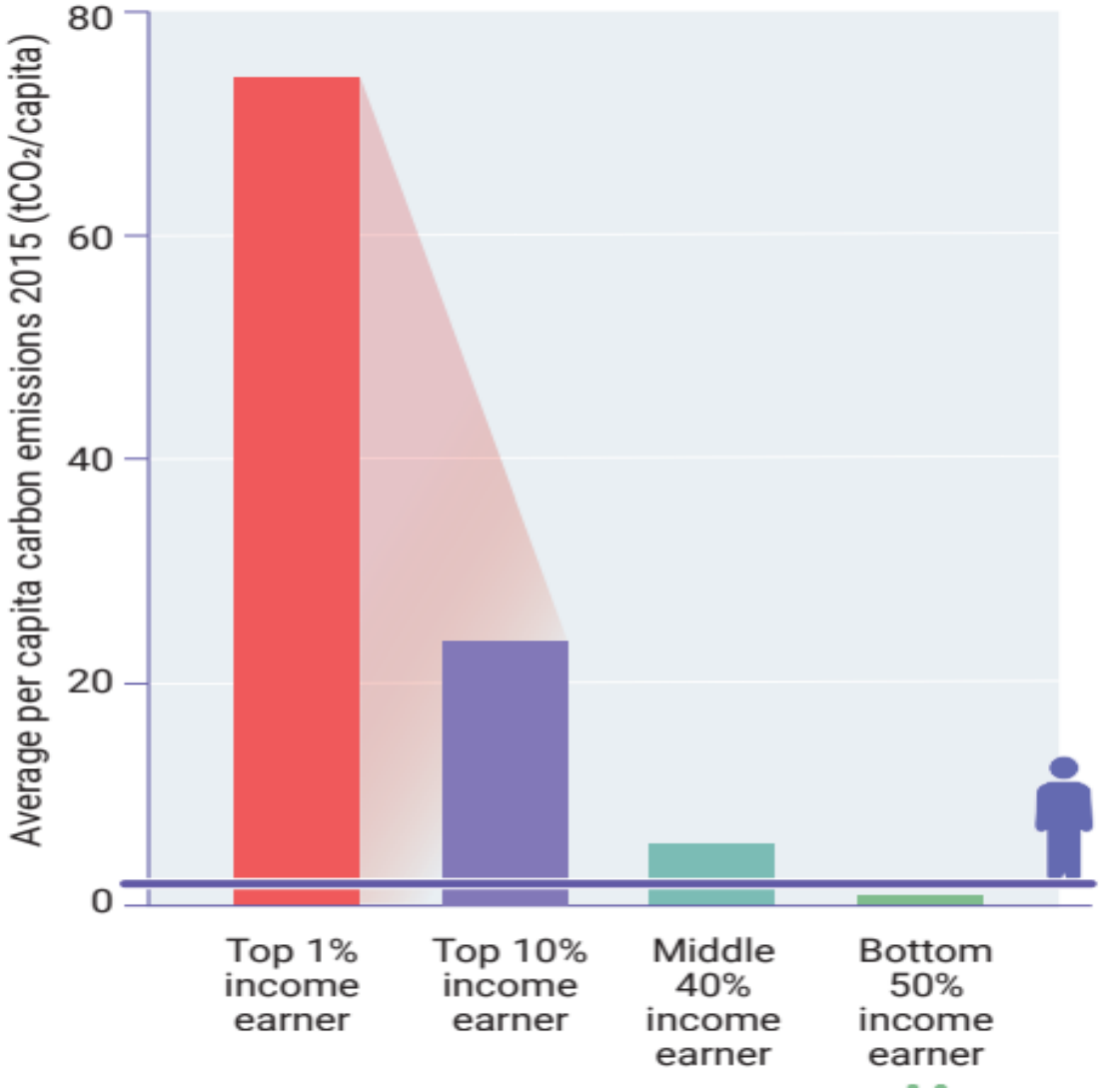
- It will be achieved when everyone enjoys the same degree of protection from environmental and health hazards and equal access to the decision-making process to have a healthy environment in which to live, learn, and work"

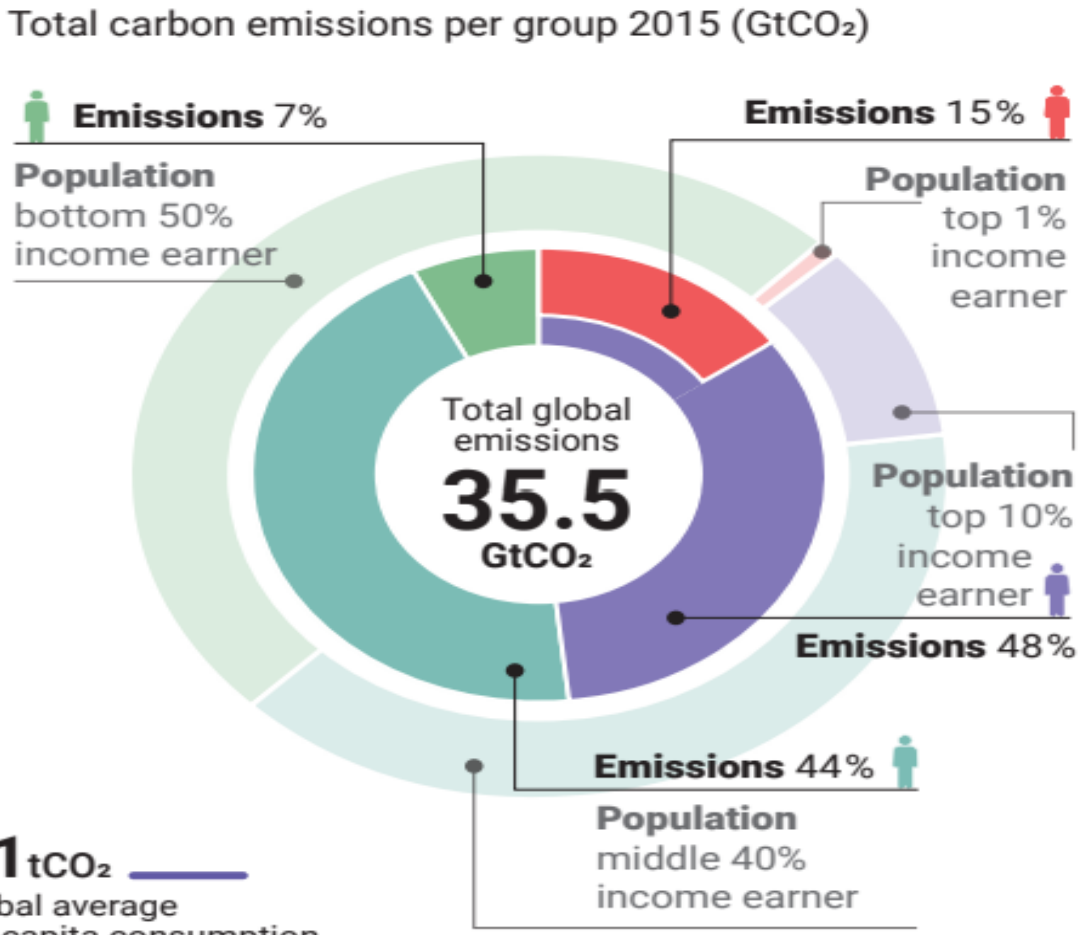
Approaches to climate justice

- **Responsibility**: Use of historical emissions to derive future reduction goals.
- **Capability** (or capacity) to pay for – or to contribute to – emissions reduction or approaches aiming at securing people's capability of leading a sufficiently good (decent) life.
- **Equity**: Allocation based on equal emissions per person, applying current and/or future population projections

Global inequality in carbon emissions

Per capita and absolute CO2 consumption emissions by four global income groups in 2015





Source: https://www.unep.org/emissions-gap-report-2020

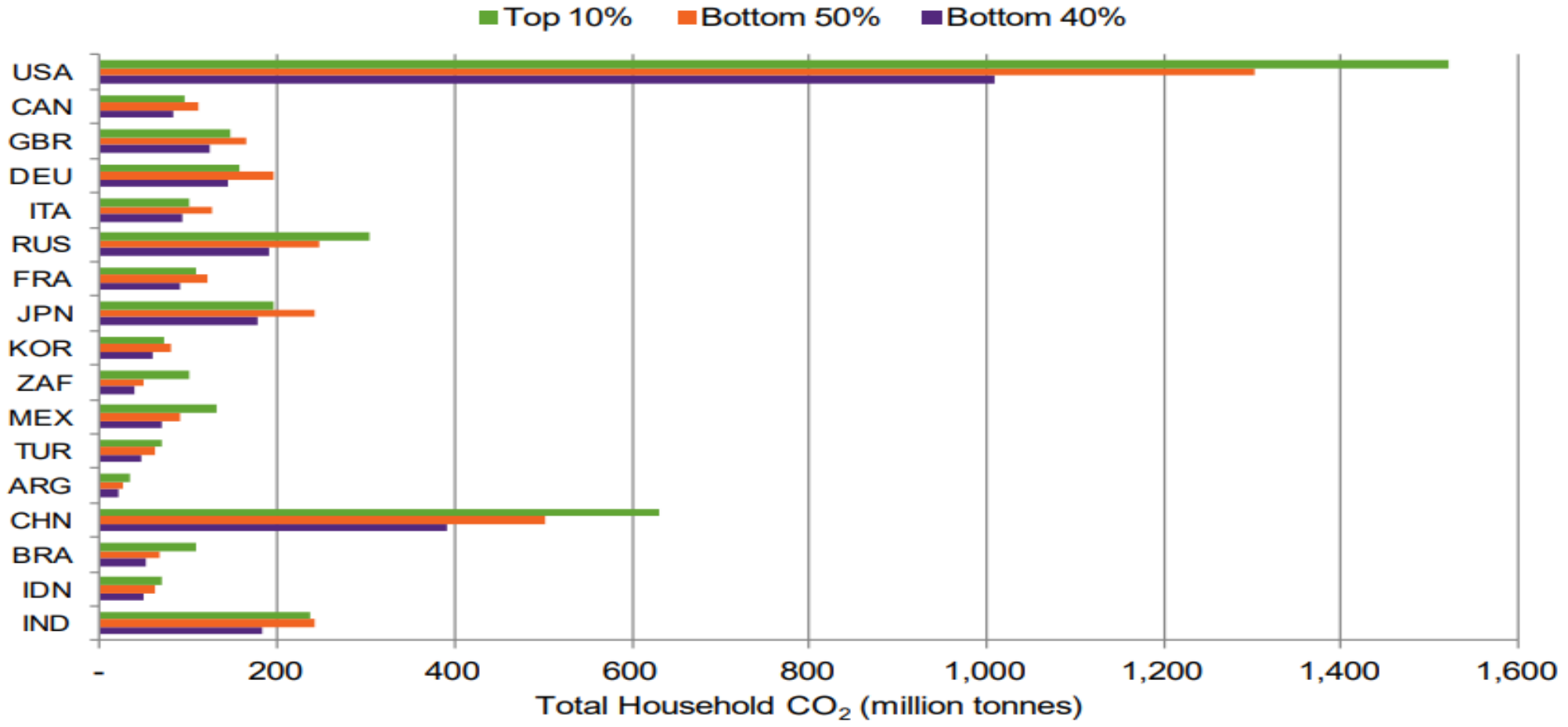
Total consumption emissions 1990–2030 of global income groups and the 2030 1.5°compatible total global emissions level

The total emissions of the world's richest 10% are set to amount to the global total for a 1.5 degrees pathway.

Carbon inequality is extreme, both globally and within most countries

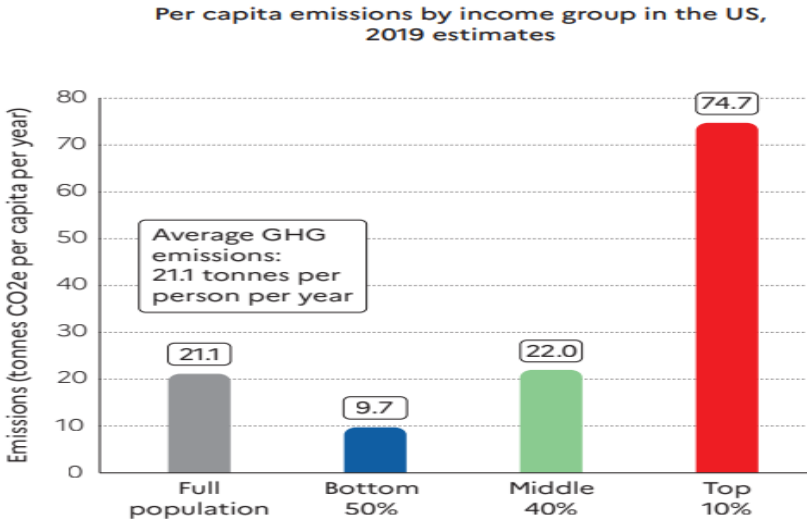
https://oxfamilibrary.openrepository.com/bitstream/handle/10546/621305/bn-carbon-inequality-2030-051121-en.pdf

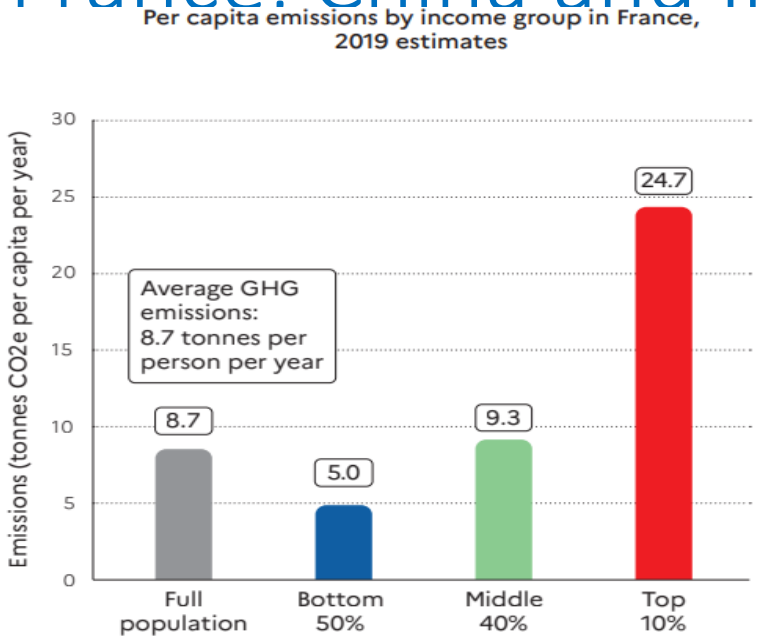
Climate inequality by country
Per capita household emissions in G20 countries



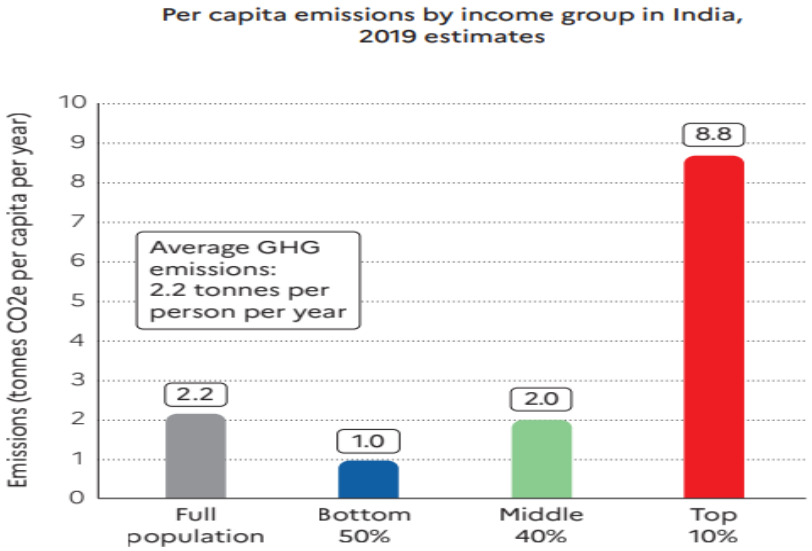
Source: https://oxfamilibrary.openrepository.com/bitstream/handle/10546/582545/tb-carbon-emissions-inequality-_1?sequence=2

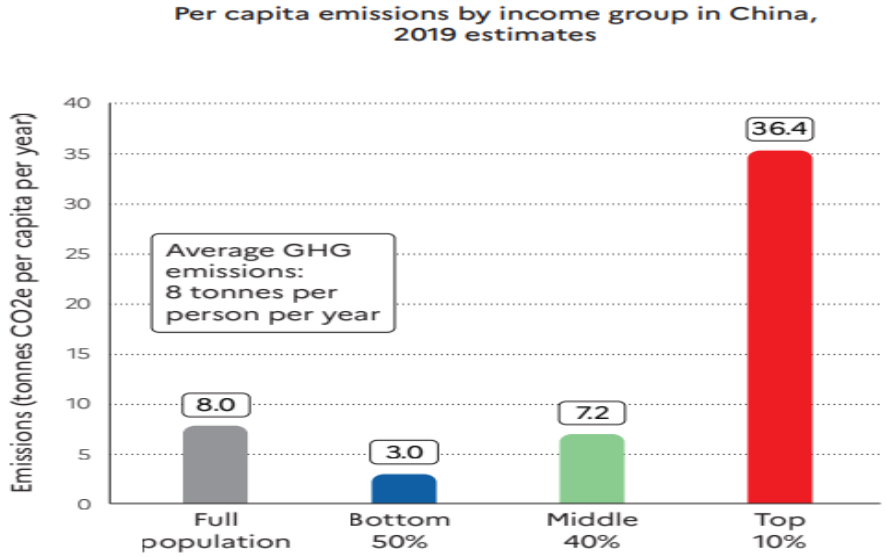
Per capita emissions in the US, France, China and India





Source: World Inequality Report : https://wir2022.wid.world/www-site/uploads/2022/03/0098-21_WIL_RIM_RAPPORT_A4.pdf





Climate Justice: Biden's Executive Order 14008

- Establishes White House EJ Advisory Council and White House EJ Interagency Council
- Requires Council on Environmental Quality to create screening and mapping tools – Justice40 Initiative
- Prepare recommendations for 40% of federal investments to go to disadvantaged communities – Clean energy, transit, workforce development, etc.
- Directs EPA to : (i)Strengthen enforcement of violations with disproportionate impacts on underserved communities; (ii) Create a community notification program and provide real-time data
- Directs DOJ: (i) Develop comprehensive EJ enforcement strategy; (ii) Create office of Environmental Justice

Quantifying national responsibility for climate breakdown

https://www.resilience.org/wp-content/uploads/2020/11/Tumbarumba_48763215491-384x253.jpg

An equality-based attribution of ‘fair share‘ of CO2 emissions

1. **Start from the “safe” level of carbon dioxide**: 350 parts per million (ppm).This level of crossed in 1990.
2. Calculate the total CO2 emitted from 1850 to 2015: 1516.2 gigatons
3. Calculate the total CO2 emitted from 1850 to 1990: this represents the cumulative historical emissions **within the planetary boundary**: 830 gigatons of CO2 (CO2 concentrations crossed 350 ppm in 1990.
4. **Calculate countries’ fair share** by distributing the cumulative budget among countries according to each country’s population as a share of the global population, with populations averaged from 1850 until today (or 2015).
5. **Subtract this fair share from countries’ actual historical emissions** (territorial emissions from 1850 to 1969, and consumption-based emissions from 1970 to 2015) to determine the extent to which each country has overshot or undershot its fair share.

Source: Hickel J. (2020). Quantifying national responsibility for climate breakdown: an equality-based attribution approach for carbon dioxide emissions in excess of the planetary boundary. The Lancet Planetary Health · September 2020.

Quantifying national responsibility for climate breakdown

Annual territorial CO2 emissions by rank, 2015				Cumulative territorial CO2 emissions, by rank, 1850–2015		
Country or Region	Mega tonnes of CO2	Proportion of total		**Country or Region**	Gigatonnes of CO2	Proportion of total
China	10300	29%		**USA**	410	26%
USA	5270	15%		**EU-28**	358	23%
EU-28	3473	10%		**China**	190	12%
India	2340	7%		**Russia**	116	8%
Russia	1740	5%		**Japan**	62	4%
Japan	1220	3%		**India**	46	3%

Source: Jason Hickel, '*Quantifying national responsibility for climate breakdown: an equality-based attribution approach for carbon dioxide emissions in excess of the planetary boundary';* Lancet Planet Health 2020; 4: e399–404

Overshooting of boundary fair shares

	Country	Allocated budget (gigatonnes of CO_2)	Cumulative emissions (gigatonnes of CO_2)	Overshoot or undershoot emissions (gigatonnes of CO_2)	Proportion of total national overshoots or undershoots (%)
World total	..	830·1	1516·2	686·1	..
Overshooters (climate debtors)					
1	USA	41·5	420·4	378·9	40%
2	Russia	27·2	105·1	78·0	8%
3	Germany	18·4	91·3	72·9	8%
4	UK	13·0	79·3	66·4	7%
5	Japan	21·5	70·0	48·6	5%
6	France	13·3	42·6	29·4	3%
7	Canada	4·1	30·2	26·2	3%
8	Ukraine	9·6	30·2	20·6	2%
Other overshooters	..	..	..	228·7	24%
Total national overshoots	..	..	..	949·6	100%

Source: Hickel J. (2020). Quantifying national responsibility for climate breakdown: an equality-based attribution approach for carbon dioxide emissions in excess of the planetary boundary. The Lancet Planetary Health · September 2020.

Undershooting of boundary fair shares

	Country	Allocated budget (gigatonnes of CO_2)	Cumulative emissions (gigatonnes of CO_2)	Overshoot or undershoot emissions (gigatonnes of CO_2)	Proportion of total national overshoots or undershoots (%)
Undershooters (climate creditors)					
1	India	133·4	43·2	−90·2	34%
2	China	189·0	159·6	−29·4	11%
3	Bangladesh	15·9	1·3	−14·5	5%
4	Indonesia	25·1	10·7	−14·4	5%
5	Nigeria	13·4	2·1	−11·2	4%
6	Pakistan	14·5	3·8	−10·7	4%
7	Ethiopia	7·0	0·1	−6·9	3%
8	Vietnam	9·4	2·9	−6·4	2%
Other undershooters	..	..	..	−81·3	31%
Total national undershoots	..	..	..	−265·0	100%

Source: Hickel J. (2020). Quantifying national responsibility for climate breakdown: an equality-based attribution approach for carbon dioxide emissions in excess of the planetary boundary. The Lancet Planetary Health · September 2020.

Summary of findings

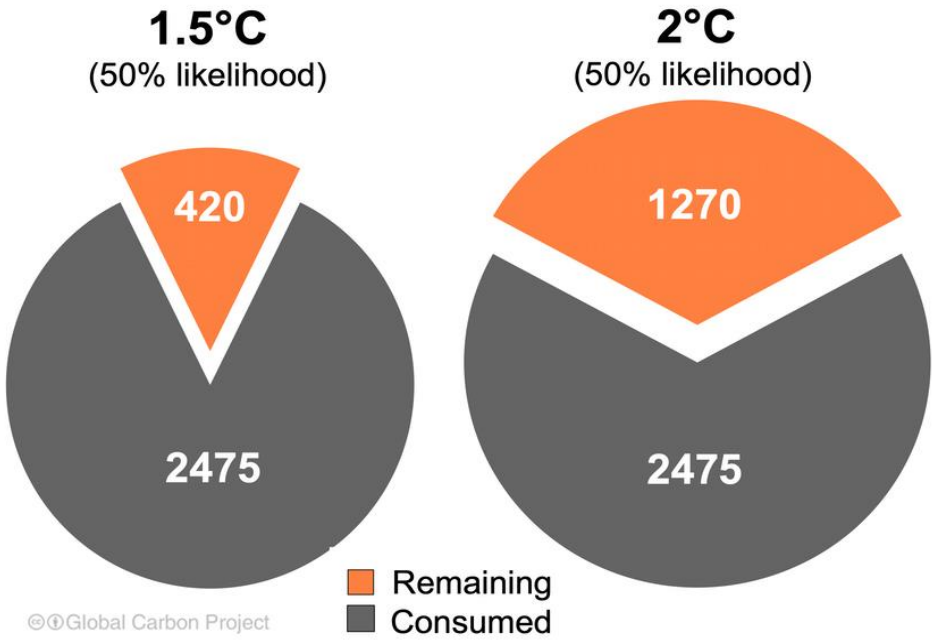
- **As of 2015, the G8 nations** (the USA, EU-28, Russia, Japan, and Canada) **were together responsible for 85% of excess global CO2 emissions.**
  - Proportion of total national overshoots: US (40%), Russia and Germany (8%), UK (7%), Japan (5%), France and Canada (3%).
  - Proportion of total national undershoots: India 34%, China (11%), Bangladesh and Indonesia (5%).
- This suggests that high-income countries have a great degree of responsibility for climate damages.

Source: Hickel J. (2020). Quantifying national responsibility for climate breakdown: an equality-based attribution approach for carbon dioxide emissions in excess of the planetary boundary. The Lancet Planetary Health · September 2020.

The remaining carbon budget: how do we share it?

What is the carbon budget?

The carbon budget is the amount of carbon dioxide that can be added to the atmosphere without causing global temperatures to rise above 1.5C The total amount that may still be emitted before the planet reaches an irreversible warming point.



The remaining carbon budgets to limit warming to 1.5°C and 2°C. Updated from IPCC 2021. Source: Global Carbon Project, https://www.globalcarbonproject.org/carbonbudget

Minimum fairness requirements

- **Responsibility**: Use of historical emissions to derive future reduction goals
- **Capability:** Capacity to pay for – or to contribute to – emissions reduction while leading a good (decent) life.
- **Equality**: Allocation based on equal emissions per person, applying current and/or future population projections

Alternative estimates of prospective CO2 emissions of the eight largest emitters

	Share in Global Emissions since 1990 (%)	2020 Population Share (%)	Estimated Share in the CO2 Budget* (%)		
			Glasgow pledges	Common targets for 2030 and 2050	Population-weighted CO2 budget distribution
	(1)	(2)	(3a)	(3b)	(3c)
China	18.9	18.5	50.4	25.5	19.8
US	16.8	4.2	13.2	14.1	4.5
Europe[1]	12.0	6.8	9.1	9.4	6.9
India	4.3	17.7	20.9	5.6	17.8
Russia	3.5	1.9	6.3	2.5	2.7
Japan	3.7	1.6	3.2	3.1	1.8
Indonesia	3.5	3.5	6.2	2.8	4.0
Brazil	4.2	2.7	3.5	3.9	2.9
Combined	*67*	*57*	*113*	*67*	*60*

Source: https://csep.org/wp-content/uploads/2022/02/Climate-Change-Policy-for-Developing-Countries-1.pdf

References

Climate games
Environmental and Resource Economics: a Contemporary approach, J. Harris and B, Roach, Global Development and Environment Institute, Tufts University.

Game Theory, Collective Action and Climate Change, By Susan Spierre, Global Institute for Sustainability, Arizona State University.

De Canio, S.J., A. Fremstad, Game theory and climate policy, Ecologic Economics, June 2011. Read pages 177-182.

International climate policy

UNFCCC (2005). A Summary of the Kyoto Protocol. http://unfccc.int/kyoto_protocol/background/items/2879.php.

Sunstein, Cass (2007). "Of Montreal and Kyoto: A tale of two protocols," Harvard Environmental Law Review 31, pp. 1-29.
UNFCCC (2011).

Chan G., R. Stavins and Z. Ji (2018), **International Climate Change Policy, Annual Review of Resource Economics ; resource.annualreviews.org https://doi.org/10.1146/annurev-resource100517-023321**

Levi, Michael (2011). A Misplaced Climate Celebration In Durban. http://blogs.cfr.org/levi/2011/12/11/a-misplaced-climate-celebration-indurban

The Paris Agreement: What are we getting? *Green (2015). Wondering what's different about the Paris climate change negotiations? Here's what you need to know.

References

https://www.washingtonpost.com/news/monkeycage/wp/2015/12/01/wondering-whats-different-about-the-paris-climatechange-negotiations-heres-what-you-need-to-know *Victor (2015)

Why Paris Worked: A Different Approach to Climate Diplomacy. https://e360.yale.edu/features/why_paris_worked_a_different_approach_to_climate_diplomacy

Climate justice, carbon inequality

Cazorla M. and M. Toman (2000) International Equity and Climate Change Policy, Resources for the Future, Climate Issue Brief No. 27. https://media.rff.org/documents/RFF-CCIB-27.pdf

UNEP (2020), Emissions Gap Report**,** https://www.unep.org/emissions-gap-report-2020

Gore T. (2020), Confronting carbon inequality- Putting climate justice at the heart of the COVID-19 recovery, OXFAM Working Papers, 21 September. https://www.oxfam.org/en/research/confronting-carbon-inequality

Gore T. (2020), Carbon Inequality in 2030- Per capita consumption emissions and the 1.5^{o}C goal, OXFAM Working Papers, 5 November 2021. https://www.oxfam.org/en/research/carbon-inequality-2030

Carbon budget issues

Hickel J. (2020). Quantifying national responsibility for climate breakdown: an equality-based attribution approach for carbon dioxide emissions in excess of the planetary boundary. The Lancet Planetary Health · September 2020.

Millar, Richard, Myles Allen, Joeri Rogelj, and Pierre Friedlingstein. 2016. “The Cumulative Carbon Budget and its Implications.” Oxford Review of Economic Policy, 32(2): 323–342. https://pure.iiasa.ac.at/id/eprint/12738/1/The%20cumulative%20carbon%20budget%20and%20its%20implications.pdf

Keith Willigesac K., L.H. Meyerc. K.W.Steiningerab, G. Kirchengasta, Fairness critically conditions the carbon budget allocation across countries, Global Environmental Change, Volume 74, May 2022. https://www.sciencedirect.com/science/article/pii/S095937802200019X

https://csep.org/event/flagship-seminar-climate-change-policy-for-developing-countries/

Ahluwalia, M. S., & Patel, U. (2022). Climate Change Policy for Developing Countries (CSEP Working Paper 23). New Delhi: Centre for Social and Economic Progress.

https://csep.org/wp-content/uploads/2022/02/Climate-Change-Policy-for-Developing-Countries-1.pdf

https://www.unep.org/emissions-gap-report-2020