

Existential Stocktake



The cause of climate change is greenhouse gas emissions ^{1 2}, the cause of nature destruction including 90% of biodiversity loss is natural resource consumption ³. Only, uniquely Existential Stocktake gives all **197 nation Parties**' emissions, consumptions, capabilities, responsibilities and adequate, responsible reductions now to be within UN science limits to realize agreed

existential objectives of UN Climate & Biodiversity Treaties: “limit global warming to well below 2°C preferably 1.5°C” ⁴ and “humans live in harmony with nature by 2050” ⁵.

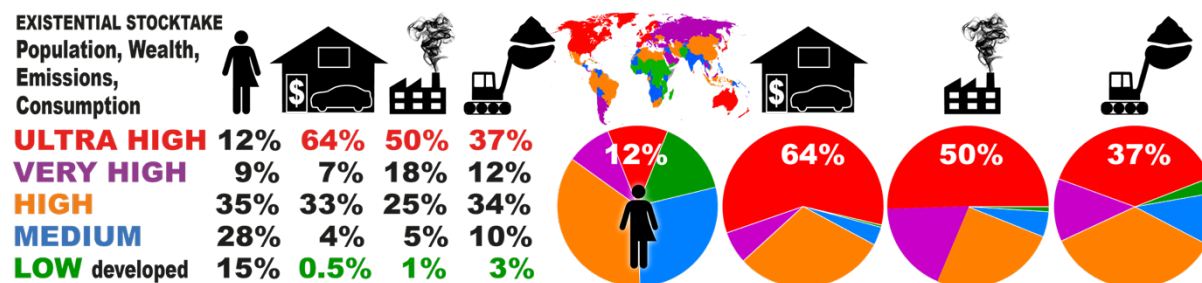
• Humanity’s existential problem is NOWISM.

Collapse. 50 years ago when science warnings began, global warming was a harmless 0.2°C ⁶ and natural resource consumption a safe 0.4 “Earths” ^{7 8}; today IPCC’s 83% (best) likelihood CO2 budget for 1.3°C has been emitted ⁹ and consumption exceeds 1.5 Earths ^{7 8}. Current actions and policy trends lead to dangerous 1.5°C emitted in just 4 years, catastrophic 2°C in only 17 years, and by 2055 a ruinous 2.5°C ¹⁰ and 3 Earths consumption ^{7 11}.

These are emission and consumption trends to massive global shortages of all essentials for life – food, water, energy, medicines, shelter – risking social-economic collapse with potentially hundreds of millions dead, billions forced from lands rendered uninhabitable, refugees overrunning even the wealthiest of nations, no one will be safe anywhere. ^{12 13}

Figure 1: Human development, capability and responsibility. ¹⁴

Five UNDP Human development groups (**Ultra High**, **Very High**, **High**, **Medium** and **Low**), shares of global population, wealth, emissions and resource consumption cumulatively.



UN Ultra High developed nations (*Figure 1, red in map*) are the most educated, healthiest and wealthiest with the highest per capita emissions and consumption, they set the standards for all countries. Ultra High are just 12% of humanity with an astonishing 64% of global wealth causing 50% of climate changing emissions and 37% of nature destroying consumption ¹⁴. In stunning contrast **Low** developed (*green in map*) are 15% of humanity with a nearly invisible 0.5% of wealth causing an insignificant 1% of emissions and 3% of consumption ¹⁴. In the 50 years of science warnings Ultra High have increased consumption 25%, and have NOT meaningfully reduced emissions. ¹⁴

NOWISM. The underlying cause of collapse is that Ultra High nations are leading humanity in NOWISM, “everything for the present, nothing for the future, maintain and increase living standards for us now”. Ultra High governments give the people what they think they want - cheap energy and cheap materials NOW, with no investment in the future.

Ultra High developed set the standards, and the basic commitment of all other governments is that in order to achieve the desired living standards (wealth, health, education) they will raise their consumption and emissions per capita toward the planet-destroying standards set by the Ultra High – therefore Ultra High must lead and reduce to sustainable limits, or no other nation will and social-economic collapse is ensured.

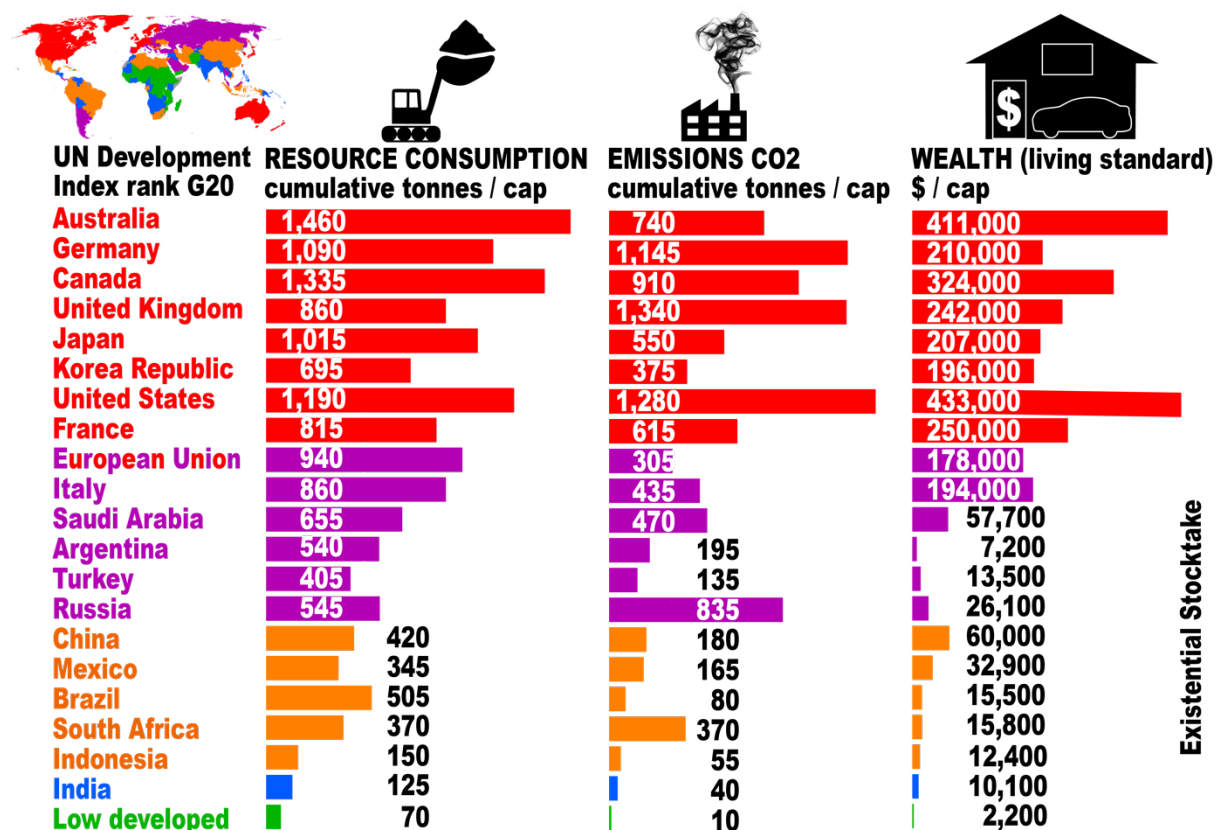
• **Humanity’s existential solution is RESPONSIBILITY.**

Existential Stocktake gives all nations’ per capita capabilities and responsibilities to be within UN science limits to realize the existential objectives of UN Climate & Biodiversity Treaties.

Since the first UN Environmental Conference in 1972, by international agreement, actions by nation Parties are to be by responsibility, national “contribution to global environmental degradation” – as we teach our children “clean up the mess you make”.^{15 16}

Figure 2: G20 nations’ responsibility and capability.¹⁷

Per capita development level (health, education, income), cumulative natural resource consumption (1970-2019), cumulative CO2 emissions (1850-2021), and wealth (2022) for G20 and the group of Low developed nations.



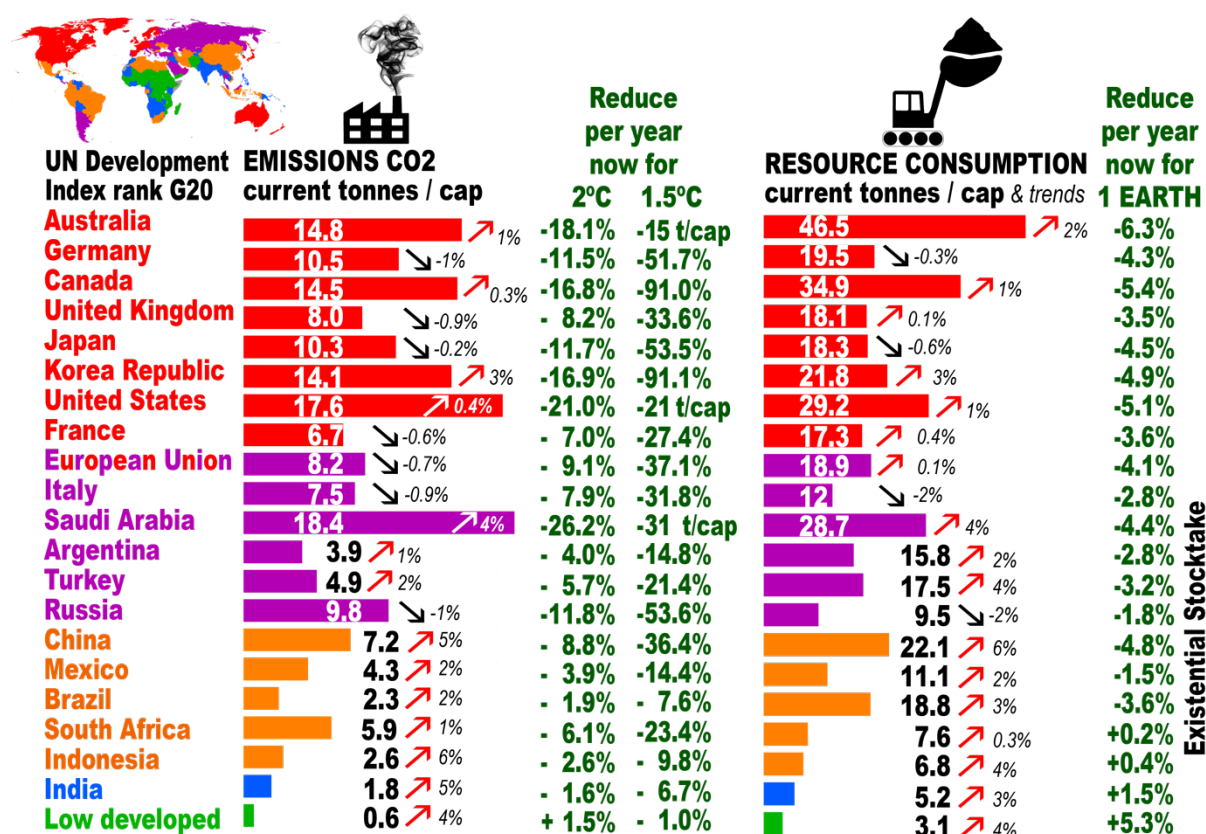
The 20 “largest economy” nations - **G20** - in Figure 2 above are 62% of humanity with **90%** of global wealth, causing **87%** of CO2 emissions and **80%** of natural resource consumption¹⁷. G20 are ordered by UN development rank, **Ultra High**, **Very High**, **High**, **Medium**; no **Low** developed nation is in the G20.

Ultra High nations dominate the G20, they are just 18% of G20 population with 67% of G20's wealth, causing 57% of G20's CO2 emissions and 43% of G20's resource consumption¹⁷.

National responsibility within the G20 varies enormously, **USA** per capita cumulative emissions - the cause of climate change - are **31 times** greater than **India's**. In capabilities, **USA** per capita wealth is **43 times India's**¹⁷. One-action-fits-all-nations – “halve CO2 by 2030, net zero by 2050”¹⁸, etc. – is literally absurd for G20 and all countries, it has not and will never be internationally agreed, let alone acted upon.

Figure 3: Reductions required for 2°C / 1.5°C, 1 Earth.^{19 20 21}

National per capita CO2 emissions and resource consumption, long term trends, and the reductions required to not exceed IPCC and IRP established emission and consumption limits, for G20 and the group of Low developed nations.



Arrows up-down show national emission and consumption trends; -X t/cap means “CO2 budget exceeded, remove from the atmosphere this year the equivalent of X tonnes CO2 per capita”.

Note above that most nations’ emission and consumption trends are increasing (red arrows), and the few reductions (black arrows) are insufficient compared to what is required.

1.5°C / 2°C emission limits, Intergovernmental Panel on Climate Change (IPCC). To limit global warming to 2°C or 1.5°C, IPCC’s remaining 83% (best) likelihood CO2 budget is 96 and 29 tonnes per capita from 1 January 2021 onward, now nearly 3 years ago.²⁰

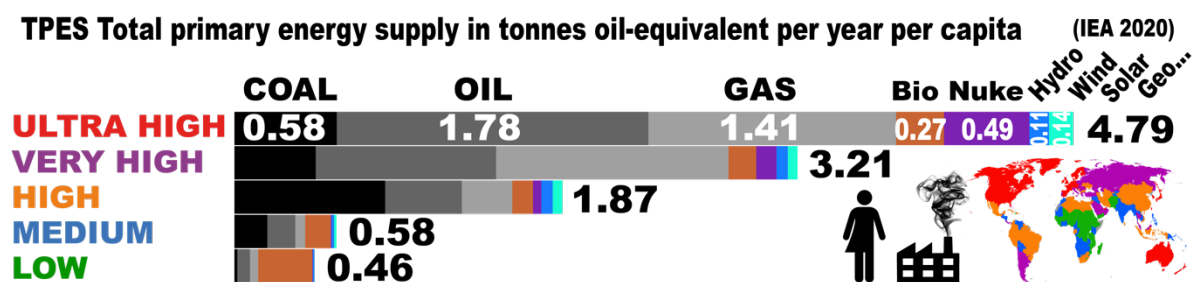
By current - not historic / cumulative - responsibility the average **Ultra High** developed nation (red in map) should reduce CO2 emissions **-15%** per year now for 2°C and **-75%** for 1.5°C to be within limits. In sharp contrast, **India** should reduce only **-1.6%** per year for 2°C, **-6.7%** for 1.5°C. The average **Low** developed nation can increase **+1.5%** per year for 2°C and need to reduce only **1%** per year for 1.5°C²⁰. Reductions for G20 nations are in Figure 3 above and at the end for all countries.

Note that some G20 Ultra High like the **USA** have such high current emissions (17.6 tCO₂/cap) that since 1 Jan 2021 they have emitted the 1.5°C limit (29 tCO₂/cap), and to be on-limit must now remove from the atmosphere the equivalent of 21 tonnes CO₂ per capita.)

1 Earth consumption limit. United Nations International Resource Panel (IRP) sustainable consumption limit for “harmony with nature” is 7 tonnes natural resource extraction per year per capita by 2050, “1 Earth”, this includes all fossil fuels, minerals, metals and biomass ²¹.

To be on-limit, the average **Ultra High** developed nation should reduce current consumption -5% per year now; in contrast **India** can increase consumption +1.5% per year, **Low** developed can increase up to +5.3% and still not exceed 7 tonnes / capita by 2050 ²¹. Reductions for G20 nations are in Figure 3 above, and at the end for all countries.

Figure 4. Total Primary Energy Supply per capita by fuel in tonnes of oil equivalent per year. ²²



Energy supply per capita ²²: Much is made of the importance of eliminating COAL, the most emitting fossil fuel. Extraordinarily **Ultra High** per capita energy supply of COAL alone equals or exceeds ALL energy used by **Medium** and **Low**. ²² Moreover, after 50 years of science warnings, **Ultra High's** coal+oil+gas+bio emitting energy supply is still **85%**; non-emitting nuclear is 10%, hydro 2%, wind-solar-geo-tidal-etc. is only 3%. ²²

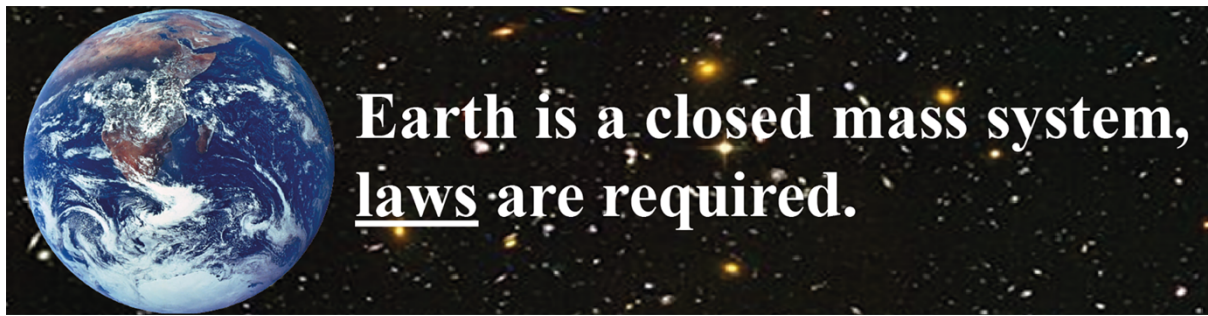
Figure 5: Compensation by Ultra High developed nations. ²³



Financial compensation. “African lands rendered uninhabitable”, “Pakistan one-third underwater”, “Hottest, day, month, year ever”... Compensation to “the least responsible, who suffer the most and are least capable to deal with it” by **Ultra High**, “the most responsible and capable”, for loss, damage and adaptation is necessary.

With an average annual income of \$54,000 per year, Ultra High developed citizens spend about \$3,000 per capita to purchase and benefit from energy causing climate changing emissions - and give a miniscule **\$176** per year, **50 cents** per day in total foreign aid (grants and loans, Figure 4). ²³

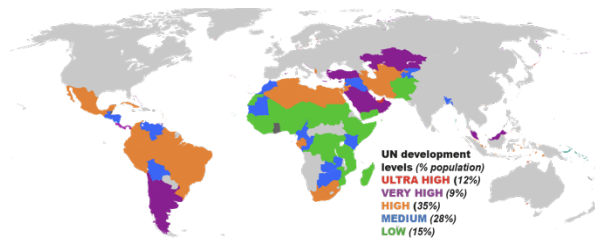
If all Ultra High nations match the “most generous” and give 0.9% of income, aid would increase 300% to about **\$500 billion** per year, however, compensation can never keep up with rates of loss and damage ²⁴ - relentlessly increasing emissions and consumption must be reduced adequately now to stop collapse and achieve humanity’s existential objectives.



Closed Mass Laws ²⁵, resources are not imported to – and emissions are not exported from earth.

As to the essentials of how national reductions are to be made, Earth is a closed mass system: sunlight (energy) comes in, but no meaningful mass (natural resources) is imported and atmospheric greenhouse gas emissions are held by gravity and not exported. Effective national emission and consumption action requires closed mass science laws: ²⁵

1. Change from quantity to quality by law.
2. Extract / consume the fewest possible natural resources by law.
3. Make only the very best, lasting, shared, repairable, cyclical products (*which does not include fossil fuel combustion*) by law. The reduction of products can be painless because after biological needs are met, happiness is first humans, activities and nature NOT products. ²⁶
4. Reduce human population - starting in Ultra High consuming / emitting nations.



Existential Stocktake is supported by Science Organizations / Academies of 88 nations, 3.2 billion people, 40% of humanity, “Global South” including • COMSTech, OIC Ministerial Committee on Science & Technology, Prof. Dr. Iqbal Choudhary Coordinator General, • IAS, Islamic World Academy of Sciences, Prof. Adnan Badran President, • NASAC, Network of African Science Academies, Prof. Norbert Hounkonnou President, • AAS, African Academy of Sciences, Prof. Felix Dakora President, • ACAL, Academy of Sciences Latin America, Prof. Claudio Bifano President.

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- COMSTech, OIC Ministerial Committee on Science & Technology, Prof. Dr. Iqbal Choudhary Coordinator General,
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- ACAL, Academy of Sciences Latin America, Prof. Claudio Bifano President.
- IAS, Islamic World Academy of Sciences, Prof. Adnan Badran President,

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Notes and References

- ¹ Eunice Foote (1856) Circumstances affecting the Heat of the Sun's Rays. Read before the American Association.
- ² Intergovernmental Panel on Climate Change (2023) 6th Assessment Synthesis Report, Climate Change 2023, Headline Statement A1
- ³ United Nations Environment International Resource Panel, Natural Resources for the Future We Want (2019). Key Fact: *"90% of biodiversity loss is caused by extraction and processing (consumption) of natural resources"*
- ⁴ United Nations Framework Convention on Climate Change (UNFCCC, 2015) Paris Agreement on Climate Change. Legally binding agreement adopted by 196 nations 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.
- ⁵ United Nations Convention of Biological Diversity (CBD, 1992), an international legal instrument ratified by 196 nations. The Kunming-Montreal Global Biodiversity Framework (2022) sets out the plan to ensure that the Convention's vision of living in harmony with nature by 2050 will be fulfilled.
- ⁶ GISTEMP Team, 2023: GISS Surface Temperature Analysis (GISTEMP), version 4. NASA Goddard Institute for Space Studies. Dataset accessed 2023-08-23 at <https://data.giss.nasa.gov/gistemp>
- ⁷ UNEP International Resource Panel (IRP), Managing and conserving the natural resource base for sustained economic and social development, 2014. *"Limit natural resource consumption per capita to 7 (6-8) tonnes per year by 2050"*, this is the equivalent of a total of 68 gigatonnes per year' (expressed as "1 Earth" consumption).
- ⁸ United Nations Material Flow Database (2022 update): Extraction and consumption of natural resources increased from 30 billion tonnes in 1970 (\approx "0.4 Earth") to 96 billion tonnes in 2019, an average annual increase of 2.4%. Projected forward at 2.4% growth per year, extraction of resources reaches 103 billion tonnes in 2022, and 106 billion tonnes in 2023 (102 Gt \approx "1.5 Earth").
- ⁹ Intergovernmental Panel on Climate Change, AR6, WG1, Climate Change (2021) The Physical Science Basis. Table 5.8: Assessed remaining carbon budget.
- The remaining Carbon Budget (83% probability) to limit global warming to 1.3°C (compared to 1850-1900) is 50 Gt CO₂ by 1/1/2020, this was emitted by April 2021:
Friedlingstein et al (2022) Global Carbon Budget (2022v1), CO₂ emissions: 2020: 39.3GtCO₂, 2021: 41.1 GtCO₂.
- ¹⁰ Intergovernmental Panel on Climate Change, AR6, WG1, Climate Change (2021) The Physical Science Basis. Table 5.8: Assessed remaining carbon budget.
- The remaining Carbon Budget (83% probability) to limit global warming to 1.5°C / 2°C / 2.4°C (compared to 1850-1900) is 300 / 900 / 1,400 Gt CO₂ by 1/1/2020. This does not include negative emissions or temperature overshoot. Of this 180 / 780 / 1,280 Gt CO₂ remains by 1/1/2023:
- Friedlingstein et al (2022) Global Carbon Budget (2022v1), CO₂ emissions: 2020: 39.3GtCO₂, 2021: 41.1 GtCO₂, 2022 estimate 41.8 GtCO₂
- United Nations Framework Convention on Climate Change, Synthesis Report (2022). *"NDCs cumulative CO₂ emissions in 2020-2030 are estimated to be around 430 GtCO₂"*. This is 43% over the limit for 1.5°C (83% likelihood), which will be exhausted in 2027 if NDCs are achieved. However, there is an 'implementation gap' and projected emissions under current policies are even higher (IPCC-AR6-SYR-A4.4).
- Climate Action Tracker, Global Emissions Timeseries November 2022 Update. In the "actions and current policies" scenarios, cumulative global CO₂ emissions (72%-77% of GHG) from 1/1/2020 exceed 300 Gt CO₂ in 2027, 900 Gt CO₂ in 2040 and 1,550 GtCO₂ in 2055.
- ¹¹ Krausmann F, Lauk C, Haas W, Wiedenhofer D. Data file Global material extraction, in-use stocks and outflows of wastes and emissions 1900-2015. From resource extraction to outflows of wastes and emissions: The socioeconomic metabolism of the global economy, 1900-2015. Global Environmental Change (2018); 52: 131–140, *"estimate what a global convergence of metabolic patterns at the current level in industrialized countries paired with a continuation of past efficiency gains might imply for global material demand. We find that .. until 2050 average global metabolic rates double to 22 t/cap/yr and material extraction increases to around 218 Gt/yr."* (210 Gt \approx "3 Earths")

¹² United Nations Secretary General's remarks to High Level Opening COP 27 (2022) *"We are in the fight of our lives. And we are losing. Greenhouse gas emissions keep growing. Global temperatures keep rising. And our planet is fast approaching tipping points that will make climate chaos irreversible. We are on a highway to climate hell with our foot still on the accelerator. .. Humanity has a choice: cooperate or perish. It is either a Climate Solidarity Pact – or a Collective Suicide Pact."*

¹³ Kemp L. et al. Climate Endgame: exploring catastrophic climate change scenarios. Proceedings National Academy of Sciences (2022) Vol. 119 No. 34.

¹⁴ Data Sources:

- Human Development: United Nations Development Programme, Human Development Index, 2022
Ultra High Developed (**red** on map): HDI > 0.900, **Very High** Developed (**purple** on map): HDI 0.800-0.900, **High** Developed (**orange** on map): HDI 0.700-0.800, **Medium** Developed (**blue** on map): HDI 0.550 – 0.700, **Low** Developed (**green** on map) <0.550
- Population: United Nations World Population Prospects, 2022 revision, medium estimate
- Credit Suisse Research Institute, Global Wealth Databook, 2022
- Global Carbon Budget 2022v1.0, National Fossil Carbon Emissions, Territorial emissions 1850-2021
- United Nations Environment Programme, International Resource Panel (IRP), Global Material Flows Database, 2022, Material footprint

¹⁵ United Nations (1972) Declaration on the Human Environment, principle 21

United Nations (1992) Rio Declaration on Environment and Development, principle 7

¹⁶ United Nations (1992) Framework Convention on Climate Change, principle 1.

¹⁷ Data Sources:

- Human Development: United Nations Development Programme, Human Development Index, 2022
- Population: United Nations World Population Prospects, 2022 revision, medium estimate
- Credit Suisse Research Institute, Global Wealth Databook, 2022
- Global Carbon Budget 2022v1.0, National Fossil Carbon Emissions, Territorial emissions 1850-2021
- United Nations Environment Programme, International Resource Panel (IRP), Global Material Flows Database, 2022, Material footprint

¹⁸ **"Halve global CO₂ by 2030, net zero by 2050 for 1.5°C"** is misleading.

- It omits that this is for just a > 50% chance to limit temperature to 1.5°C (AR6 SYR SPM B6)
- Includes temporary temperature overshoot risking irreversible tipping points (AR6 SYR SPM B6, B7)
- Requires massive amounts of speculative negative emissions at a scale scientists warn may not be technically, physically and socially feasible (AR6 SYR SPM B7, longer report 3.3.
- World Resource Institute, 2023, 10 big findings from the 2023 IPCC climate Report: *"The amount of carbon removal .. ranging from between 5 GtCO₂ to 16 GtCO₂ per year needed by mid-century"*. In comparison the **total** global terrestrial carbon sink is about 11 GtCO₂ per year (2012-2021 average per year, Global Carbon Project 2022.)
- It omits that most 1.5°C pathways rely on substantial reductions in consumption and population. (IAMC 1.5°C Scenario Explorer and Data hosted by IIASA. Integrated Assessment Modelling Consortium & International Institute for Applied Systems Analysis, (2019)).
- It further omits that in reality global GHG emissions are increasing, not decreasing, with 2021 emissions 3.8% above 2020 (<http://doi.org/10.1038/s41597-023-02041-1>), and 2022 estimated to be 1% above 2021.
- It omits that "halve CO₂ by 2030" requires an average reduction of about 7.8% each year between 2023 and 2030. This omission allows political leaders to focus on targets in the future, not on the deep reductions required now.
- Last but not least, it omits that wealthy Ultra High Developed countries with current per capita GHG emissions far above the global average must reduce much faster.
- United Nations Secretary General's message at launch AR6-SYR (2023): *"It starts with parties immediately hitting the fast-forward button on their net zero deadlines to get to global net zero by 2050 – in line with the principle of common but differentiated responsibilities and respective capabilities, in light of different national circumstances. Specifically, leaders of developed countries must commit to reaching net zero as close as possible to 2040, the limit they should all aim to respect."*

¹⁹ Data sources:

- Human Development: United Nations Development Programme, Human Development Index, 2022
- Population: United Nations World Population Prospects, 2022 revision, medium estimate

-
- Global Carbon Budget 2022v1.0, National Fossil Carbon Emissions, Consumption emissions (CO₂ emissions from the consumption of goods and services). Trend: average annual change 1990-2019.
 - United Nations Environment Programme, International Resource Panel (IRP), Global Material Flows Database, 2022, Material footprint (UN definition “Material footprint”: the total amount of raw materials extracted to meet final consumption demands.) Trend: average annual change 1990-2019.

²⁰ Intergovernmental Panel on Climate Change, AR6, WG1, Climate Change (2021) The Physical Science Basis. Table 5.8: Assessed remaining carbon budget.

- The remaining Carbon Budget (83% probability) to limit global warming to 1.5°C / 2°C (compared to 1850-1900) is 300 / 900 GtCO₂ by 1/1/2020, or 260 / 960 GtCO₂ by 1/1/2021.
- Land-use emissions are about 12% of total CO₂ emissions and therefore 88% of the budget is allocated to fossil fuels and industry, 228 / 756 GtCO₂ for 1.5°C / 2°C.
- Divided equally among humanity the per capita limit by 1/1/2021 is 29 tonnes CO₂ for 1.5°C and 96 tonnes CO₂ for 2°C.
- With 960 million people, Ultra High developed nations’ CO₂ budget was 27 / 91 GtCO₂ for 1.5°C / 2°C by 1.1.2021. As of 1.1.2023 only 4 / 68 GtCO₂ remained, and UHD CO₂ emissions must be reduced 75% / 15% per year to avoid exceeding their 1.5°C / 2°C budget.
- With 1.2 billion people Low developed nations’ carbon budget was 34 / 114 GtCO₂ for 1.5°C / 2°C by 1.1.2021. As of 1.1.2023, 33 / 113 GtCO₂ remained, and LD CO₂ emissions be reduced 1% / can increase 1.5% per year to avoid exceeding their 1.5°C / 2°C budget.

²¹ UNEP International Resource Panel (IRP), Managing and conserving the natural resource base for sustained economic and social development, 2014. To live in harmony with nature “*limit natural resource consumption per capita to 7 (6-8) tonnes per year by 2050.*”

United Nations Environment Programme, International Resource Panel (IRP), Global Material Flows Database, 2022, Material footprint:

- Ultra High developed nations average resource consumption is 26.3 tonnes per capita per year, more than twice the global average. To achieve 7 tonnes per capita by 2050, a reduction of 5% per year is required.
- Low developed nations average resource consumption is 3.1 tonnes per capita per year, about one quarter of the global average. To achieve 7 tonnes per capita by 2050, Low develop nations can increase consumption 5% per year.

²² Data Sources:

- TPES: International Energy Agency, Total primary energy supply by fuel (2020);
- Population: United Nations World Population Prospects (2022 revision) medium estimate,
- Human Development: United Nations Development Programme, Human Development Index, 2022.

²³ Data sources

- Aid received / donated: The World Bank, Databank World development indicators, Net official development assistance and official aid received / given. Data are in constant 2020 U.S. dollars.
- Human Development: United Nations Development Programme, Human Development Index, 2022
- Gross national Income: United Nations Development Programme, Human Development Index, 2022
- Population: United Nations World Population Prospects (2022 revision) medium estimate.

²⁴ Mann M. (2023) Our Fragile Moment, “there is no amount of adaptation that will prepare us for what is to come if we fail to deal with the underlying problem, which is the warming of the planet from the burning of fossil fuels and the increase of carbon emissions that is resulting from that.”

²⁵ Closed mass laws are an original concept based on physics fundamentals – “as simple as possible, but not too simple” (Albert Einstein).

²⁶ Kasser T. The high price of materialism. MIT Press. 2003