

A Planning Number for Cumulative Anthropogenic CO2 Emissions from 2020 Through 2100

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Based on projections of (1) US EIA, (2) Climate Action Tracker, and (3) IEA, a reasonable (and optimistic) planning number for cumulative CO2 emissions from 2020 through 2100 appears to be 1,500 GTCO2. (This does not include either CO2 removed by CCS or any CDR technique). Note that this number well below the estimates of two of the three organizations.

1. US EIA

1A World CO2 emissions are projected to increase

EIA’s International Energy Outlook 2021 (IEO2021) Reference case projects that if current policy and technology trends continue, global energy consumption and energy-related CO2 emissions will increase from 2020 through 2050 as a result of population and economic growth. However, projected future growth in energy-related CO2 emissions is not evenly distributed across the world, and the majority of the projected future growth in energy-related CO2 emissions is among the group of countries outside the Organization for Economic Cooperation and Development (OECD).

Cumulative Emissions (2020-2100 - GT CO2)

Global energy-related carbon dioxide emissions (2010–2050)
billion metric tons

<https://www.eia.gov/energyexplained/energy-and-the-environment/outlook-for-future-emissions.php>

1C EIA - If CO2 emissions increase by 0.8% per year from the current rate (about 40 GTCO2/year if emissions from cement and land-use changes are included) through 2040 and then decline to zero by 2070 then cumulative emissions from 2020 to 2100 would then be about 1,500 GTCO2

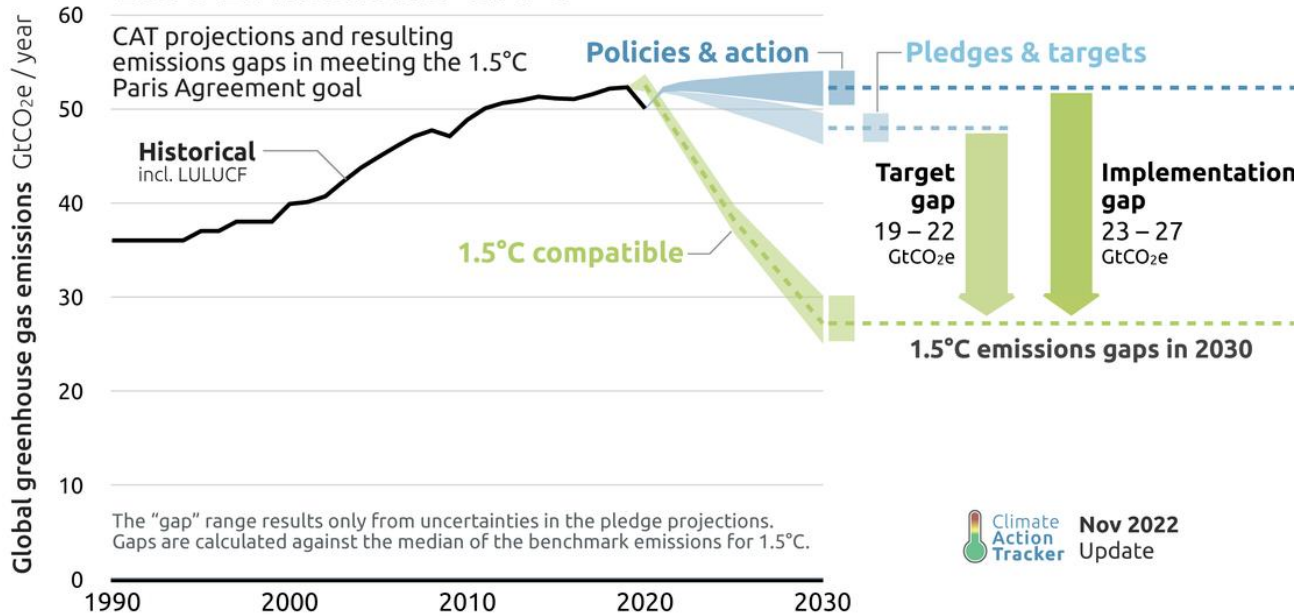
Peak Year	2030	2035	2040	2045	2050		2030	2035	2040	2045	2050
Zero Year	2060	2065	2070	2075	2080		2070	2075	2080	2085	2090
Cum Emissions 2020-2100	1050	1274	1499	1724	1949		1266	1498	1731	1964	2197

EIA – Cumulative CO2 emissions where annual CO2 emissions increase by 0.8% per year from the current rate through “peak year” and then decline to zero in “zero year”

2. Climate Action Tracker

2A **Climate Action Tracker** (<https://climateactiontracker.org/>) analyzes the NDC data submitted to the IPCC to develop possible greenhouse gas emission pathways

2030 EMISSIONS GAPS

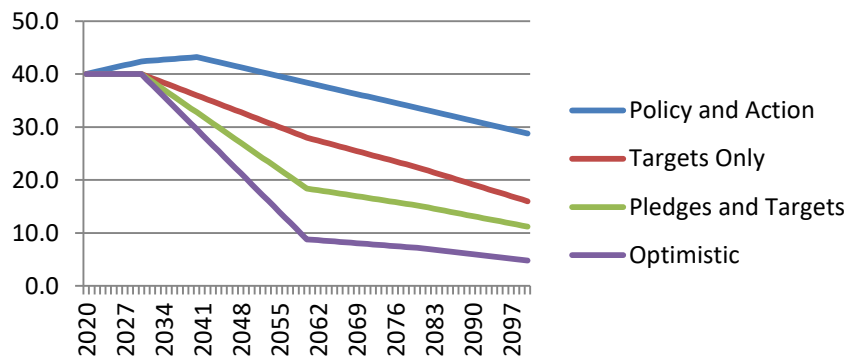


<https://climateactiontracker.org/global/cat-emissions-gaps/>

2B

Cumulative Emissions (GtCO ₂)	
Policy and Action	3034
Targets Only	2336
Pledges and Targets	1902
Optimistic	1434

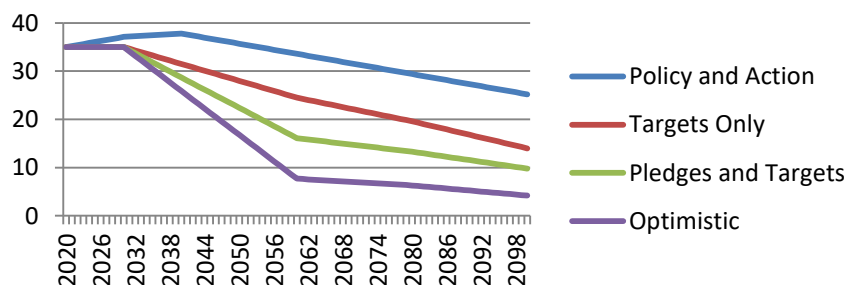
Climate Action Tracker CO₂ Emissions =80% of GHG Emissions



2C

Cumulative Emissions (GtCO ₂)	
Policy and Action	2655
Targets Only	2044
Pledges and Targets	1664
Optimistic	1255

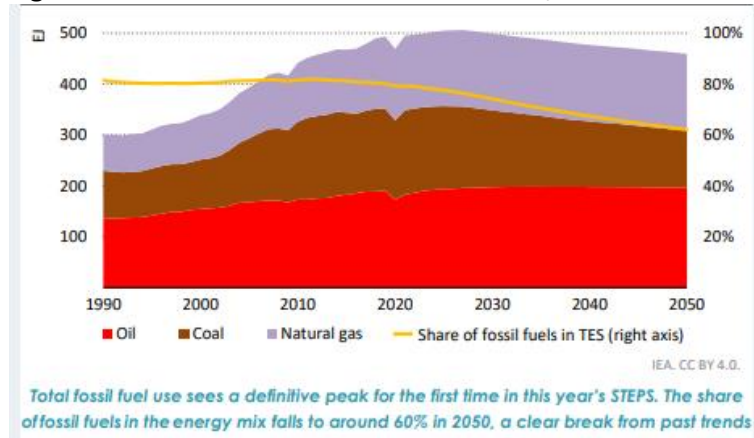
Climate Action Tracker CO₂ Emissions =70% of GHG Emissions



3. IEA

3A IEA - World Energy Outlook 2022
 The Stated Policies Scenario in this Outlook is the first WEO scenario based on prevailing policy settings that sees global demand for each of the fossil fuels exhibit a peak or plateau. Coal demand peaks within the next few years, natural gas demand reaches a plateau by the end of the decade, and oil demand reaches a high point in the mid-2030s before falling. The result is that total demand for fossil fuels declines steadily from the mid-2020s by around 2 exajoules (EJ) (equivalent to 1 million barrels of oil equivalent per day [mboe/d]) every year on average to 2050 (Figure 1.9).

Figure 1.9 ► Fossil fuel demand in the STEPS, 1990-2050

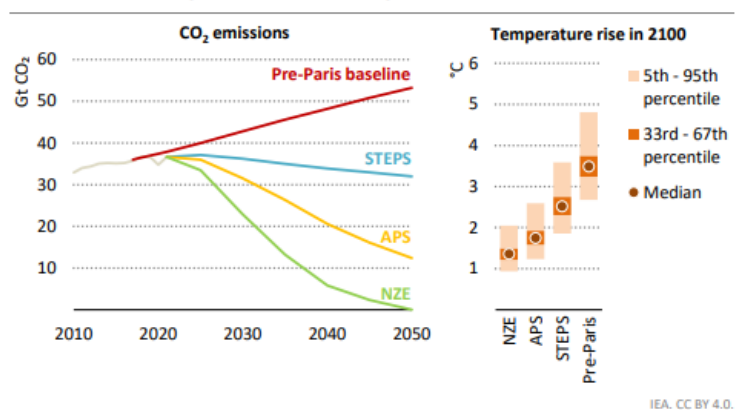


(Note: The above figure in “Exajoules”, not “MTCO2”)

Changes in fossil fuel use have broadly followed changes in GDP for decades, and global fossil fuel demand has remained at around 80% of total demand for decades. The 2022 STEPS projections are now putting the world on a path towards a significant break with these trends within a few years. By 2030, fossil fuels account for less than three-quarters of total energy supply, and by 2050 their share falls to just above 60%. These trends are emblematic of a shift in the energy landscape since the Paris Agreement. In the WEO-2015, for example, the scenario equivalent to the STEPS (then called the New Policies Scenario) saw a steady rise in demand for each of the fossil fuels to 2040, and total fossil fuel use in 2040 was projected to be nearly 20% larger than in 2040 in this year’s STEPS projections (IEA, 2015). The biggest single change since then has been in the power sector: the STEPS in this Outlook sees a much higher level of renewables deployment to 2030 and beyond than its predecessor scenario did in 2015, and this comes at the expense of coal and natural gas.

3B IEA

Figure 1.19 ► Energy-related and process CO₂ emissions, 2010-2050 and temperature rise in 2100 by scenario



Policy and technology advances since 2015 have shaved 1 °C off the temperature rise in 2100 but stated policies still lead to a temperature rise well above the Paris Agreement goals

If total CO₂ emissions decline from 40 GTCO₂ in 2020 to 36 GTCO₂ on 2050 and then to 0 in 2080, cumulative CO₂ emissions would be 1,680 GTCO₂