Climate Change and International Order

November, 2023

KATO Atsushi

Director of Climate Change Division

International Cooperation Bureau

Ministry of Foreign Affairs of Japan

Scientific findings of the Intergovernmental Panel on Climate Change (IPCC) 2

- The IPCC is an intergovernmental organization established in 1988 by the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) to provide scientific knowledge to policy makers and others around the world and to support the activities of the United Nations Framework Convention on Climate Change.
- Approximately 800 of the world's leading researchers (WG1-3) participated in the writing of the latest 6th Assessment Report (AR6).

SPECIAL REPORT: GLOBAL WARMING OF 1.5 ºC : October 2018

- Human activities are estimated to have caused approximately 1.0°C of global warming above pre-industrial levels, with a likely range of 0.8°C to 1.2°C. Global warming is likely to reach 1.5°C between 2030 and 2052 if it continues to increase at the current rate.
- In model pathways with no or limited overshoot of 1.5°C, global net anthropogenic CO2 emissions decline by about 45% from 2010 levels by 2030 (40–60% interquartile range), reaching **net zero around 2050.**
- **Provides the scientific basis for each country's 2050 carbon neutrality declaration and the Paris Agreement's 1.5°C goal.**

WG1 contribution to the Sixth Assessment Report : August 2021

- **It is unequivocal that human influence has warmed the atmosphere, ocean and land.** Widespread and rapid changes in the atmosphere, ocean, cryosphere and biosphere have occurred

WG2 contribution to the Sixth Assessment Report: Feb 2022

- **Human-induced climate change**, including more frequent and intense extreme events, **has caused widespread adverse impacts and related losses and damages to nature and people, beyond natural climate variability.**

WG3 contribution to the Sixth Assessment Report: April 2022

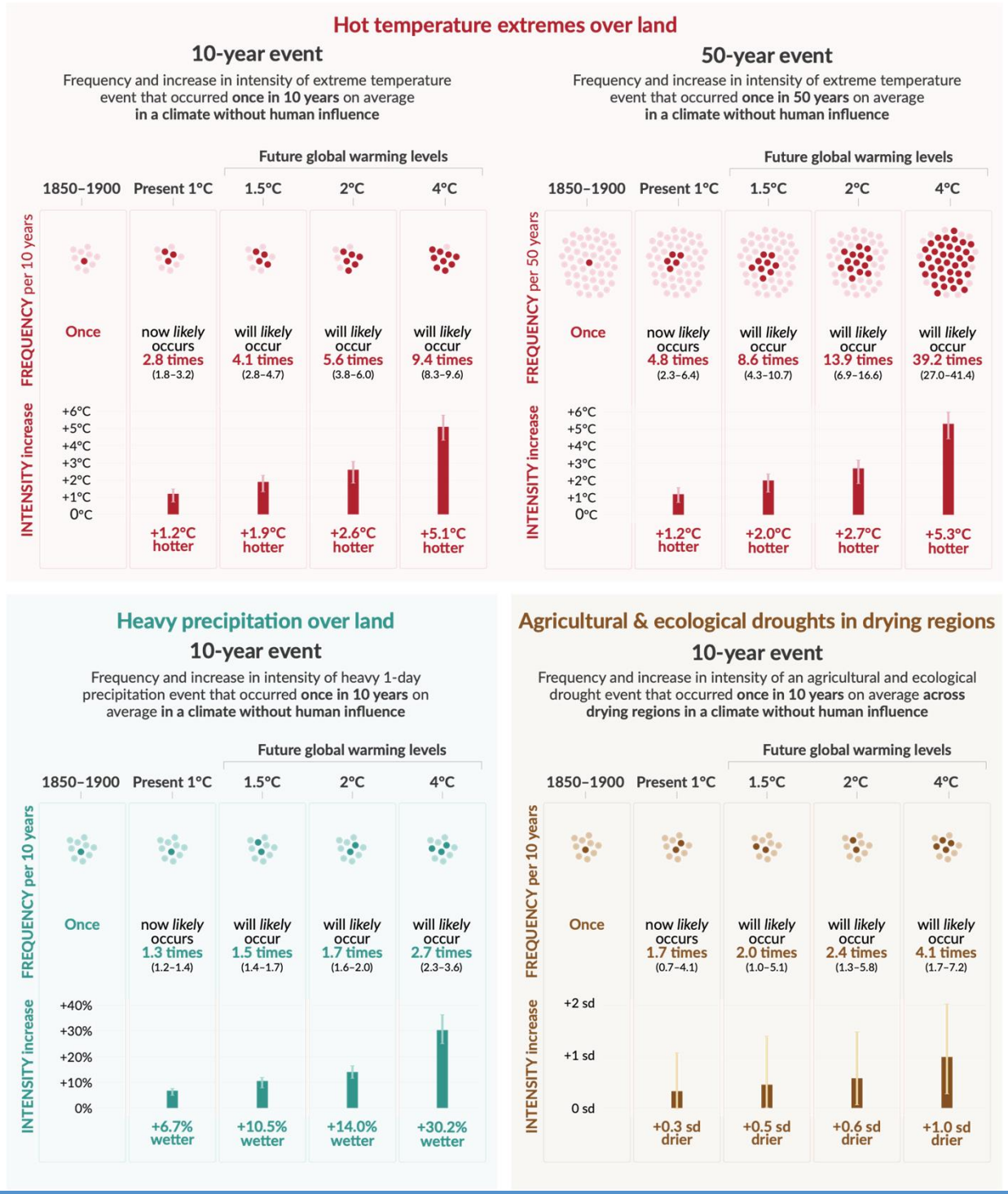
- **Global GHG emissions are projected to peak between 2020 and at the latest before 2025 in global modelled pathways** that limit warming to 1.5°C (>50%) with no or limited overshoot and in those that limit warming to 2°C (>67%) and assume immediate action

AR6 Synthesis Report: March 2023

- Continued greenhouse gas emissions will lead to increasing global warming, with the best estimate of reaching 1.5°C in the near term in considered scenarios and modelled pathways.
- All global modelled pathways that limit warming to 1.5°C (>50%) with no or limited overshoot, and those that limit warming to 2°C (>67%), **involve rapid and deep and, in most cases, immediate greenhouse gas emissions reductions in all sectors this decade.**

Figure SPM.6

Projected changes in extremes are larger in frequency and intensity with every additional increment of global warming



Extreme weather events around the world

環境省資料

- Extreme weather events now occur frequently around the world and it is pointed out that some of the events may have been caused by climate change.
- It is anticipated that these extreme weather events may become **more intense and frequent** in the future.

Arctic area

Sea ice area

The second smallest value of sea ice area was observed by satellite in September, 2019.
Precipitation at the highest point (3,216m latitude) was observed on the ice sheet in Greenland in August 2021.

Europe

Exceptional heatwaves

Markedly high temperatures, especially in the western part of the country, from early July 2022. In Cordoba, southern Spain, a maximum temperature of **43.6°C** was observed on July 12 and 13, and in Toulouse, southern France, a maximum temperature of **39.4°C** was observed on July 17. In Coningsby in eastern England, a maximum temperature of **40.3°C** was reported as a provisional record on July 19 (Met Office, England).

Japan

High Temperatures

Record high temperatures in late June and early July 2022, mainly in eastern and western Japan.

Heavy rainfall

Heavy rainfall with record amounts of precipitation in many areas from July to mid-August 2022

North America

Tropical Cyclones

In September 2022, Hurricane IAN reportedly killed more than 100 people in the southeastern United States (European Commission).Orlando, Florida, USA, received 570 mm of monthly precipitation (356% of normal).

Exceptional heatwaves

Lytton, in south-central British Columbia, reached **49.6°C** on 29 June, 2021, breaking the previous Canadian national record by 4.6°C
*The average monthly temperature for June in Lytton is 18.3°C.

Around Pakistan

Heavy Rainfall and Flooding

Heavy rains during June-August 2022 **reportedly killed a total of more than 2,130 people** in South Asia-Iran (Government of Pakistan, Government of India, Government of Nepal, European Commission).
In Jacobabad, southern Pakistan, monthly precipitation in July was **290 mm** (1025% of normal) and in August was **493 mm** (1793% of normal).

Africa

Tropical Cyclones

More than 900 related deaths in Mozambique and Zimbabwe in March 2019. This is the worst damage caused by a tropical cyclone in the Southern Hemisphere in the last 100 years.

Antarctic area

High temperature

In February 2020, the highest temperature ever recorded was **18.4°C.**

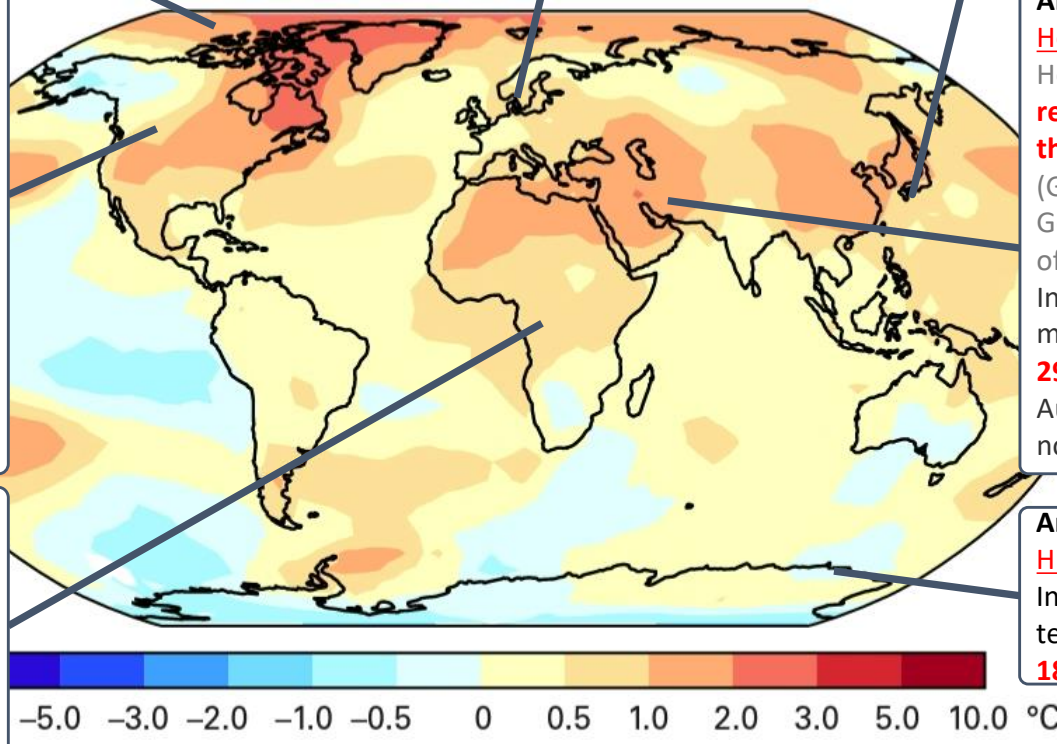


Figure: Mean temperature anomalies in 2021 from mean temperature from 1981 to 2010

資料：
「WMO State of Global Climate in 2021」、
気象庁HPより環境省作成

Climate Change in the cabinet decision documents

National Security Strategy of Japan (Dec. 2022)

Ⅵ Strategic Approaches Prioritized by Japan

1 Strategic Approaches and Major Ways and Means

(1) Develop Efforts centered on Diplomacy to Prevent Crises, Proactively Create a Peaceful and Stable International Environment, and Strengthen a Free and Open International Order

2 Climate Actions

- **Climate change is a security issue that affects the very existence of humankind.** Extreme weather events due to climate change significantly impact Japan's national security in various ways including through more frequent and severer natural disasters, increased responses to disasters, more serious energy and food problems, a decrease in national land area, and increased use of the Arctic sea routes.
- Japan will lead the way in advancing efforts both at home and abroad with all stakeholders, including its ally and like-minded countries. Specifically, Japan will embark on initiatives toward the realization of a decarbonized society through structural transformation of the energy and industrial sectors, including maximizing the use of renewable and nuclear energies, and the creation of innovation through bold investments in order to **reduce greenhouse gas emissions by 46% from FY 2013 in FY 2030**, and **realize net-zero by 2050**.
- Japan will also stand at the forefront in galvanizing global efforts for minimizing negative impacts of climate change upon the international security environment. **As part of these efforts, Japan will provide assistance to island nations and other developing countries where climate change poses imminent threats so that sustainable and resilient economies and societies can be built.**

Development Cooperation Charter (June, 2023)

３． Leading international efforts to addressing increasingly complex and serious global issues

(2) Climate change and environment: **Climate change is a threat to the sustainable development of all countries** in the world. We will **align our development cooperation with the goals of the Paris Agreement**, and in order to improve the capacity of developing countries to respond to climate change, Japan will promote assistance for both mitigation measures (such as emissions reduction and removals enhancement of greenhouse gases) and adaptation measures (such as avoidance and reduction of damage caused by climate change), and contribute to both addressing the various development challenges of developing countries and promoting measures against climate change. To this end, Japan will further promote the mobilization of private finance and cooperation with international organizations and others to expand the scale of international assistance.

Japan's Climate Actions

Nationally Determined Contributions (NDC)

At the Climate summit in April 2021, Japan announced that it will aim to reduce its greenhouse gas emissions by 46% in FY2030 from its FY2013 levels, and will continue strenuous efforts in its challenge to meet the lofty goal of cutting its emissions by 50%. On 22th October 2021, Japan submitted its NDC.

Source: PM Office

Climate Finance

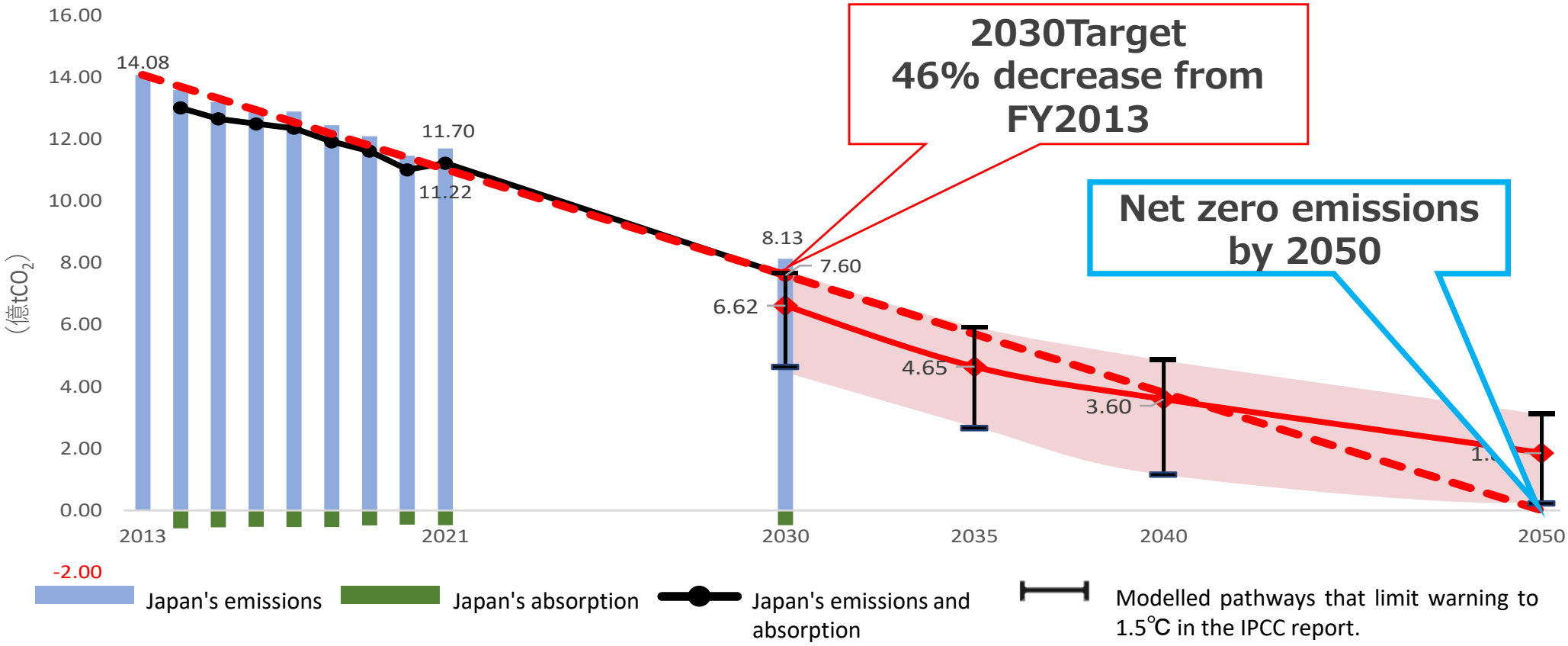
At COP16, developed countries committed to achieving a collective goal of mobilizing USD 100 billion per year by 2020 from a wide variety of sources, both public and private. At COP21, developed countries intend to continue their existing collective goal through 2025, and prior to 2025 the Parties shall set a new collective quantified goal from a floor of USD 100 billion per year.

- At the G7 Cornwall Summit, the Prime Minister Suga announced that Japan will provide climate finance, both public and private, totaling JPY 6.5 trillion over the next 5 years, from 2021 to 2025, and that it will further enhance its assistance for adaptation.
- At COP26 of World Leaders Summit, Prime Minister Kishida announced that Japan will double our assistance for adaptation, totaling approximately USD 14.6 billion in the coming 5 years.
- **Green Climate Fund**: Japan committed to contribute approximately 484 billion yen to the GCF, which supports developing countries in reducing GHG emissions (mitigation) and addressing the impacts of climate change (adaptation).

Joint Crediting Mechanism (JCM)

The JCM aims to facilitate diffusion of leading decarbonizing technologies through investment by Japanese entities, thereby contributing to the achievement of both countries' NDCs. Japan has established the JCM with 28 countries such as Indonesia and Viet Nam and will continue consultations with relevant countries, aiming to increase the JCM partner countries to around 30 countries by 2025.

Progress Toward Net Zero by 2050 (Japan)



*1: The red band in the above figure represents the hypothetical allocation of global GHG emission reductions (%) to Japan under the 1.5° C pathway shown in the IPCC 6th Assessment Synthesis Report released in March 2023.

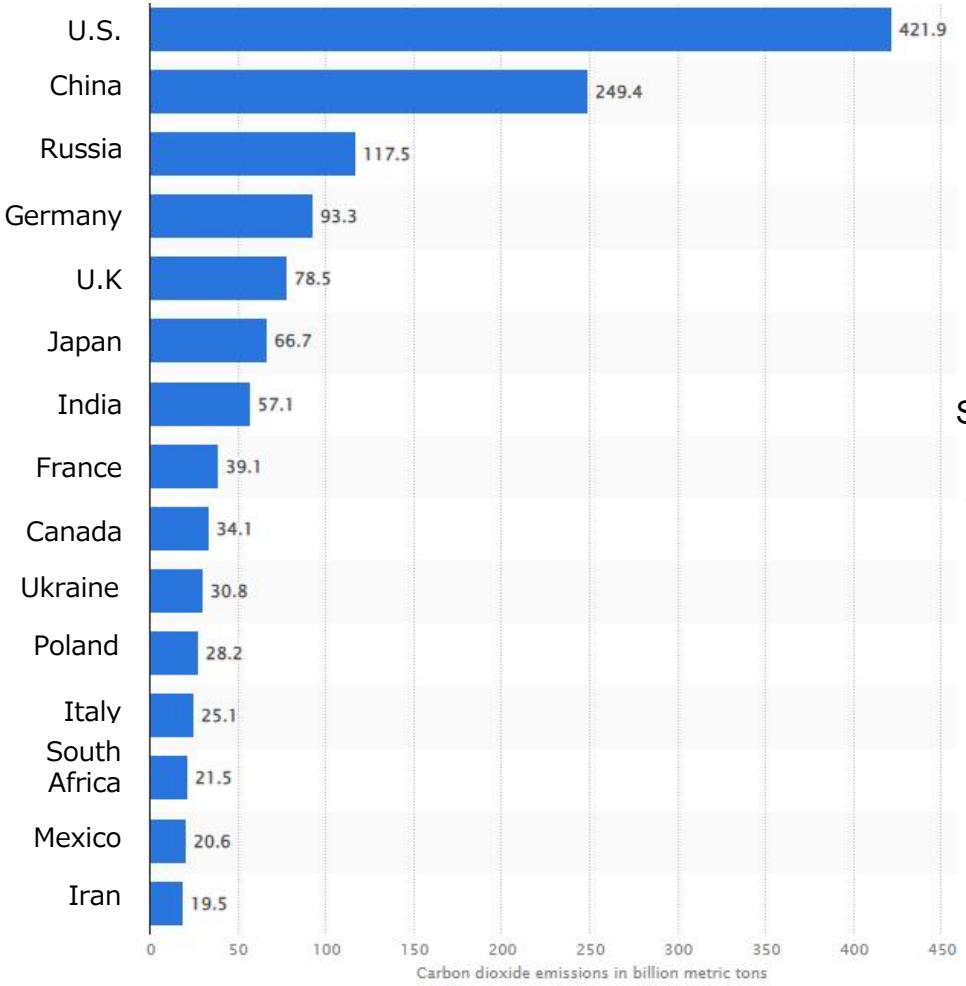
*2: In this report, the 1.5° C reduction pathway is shown as a range, taking into account model uncertainties, etc. Therefore, emissions in 2030, 2035, 2040, and 2050 are shown as a yellow line. The representative values are connected by a solid red line.

Greenhouse gas and CO2 emission reductions from 2019, median and 5-95 percentiles

		Reductions from 2019 emission levels (%)			
		2030	2035	2040	2050
Limit warming to1.5°C (>50%) with no or limited overshoot	GHG	43 [34-60]	60 [49-77]	69 [58-90]	84 [73-98]
	CO_2	48 [36-69]	65 [50-96]	80 [61-109]	99 [79-119]
Limit warming to 2°C (>67%)	GHG	21 [1-42]	35 [22-55]	46 [34-63]	64 [53-77]
	CO_2	22 [1-44]	37 [21-59]	51 [36-70]	73 [55-90]

CO2 emissions overview (by country)

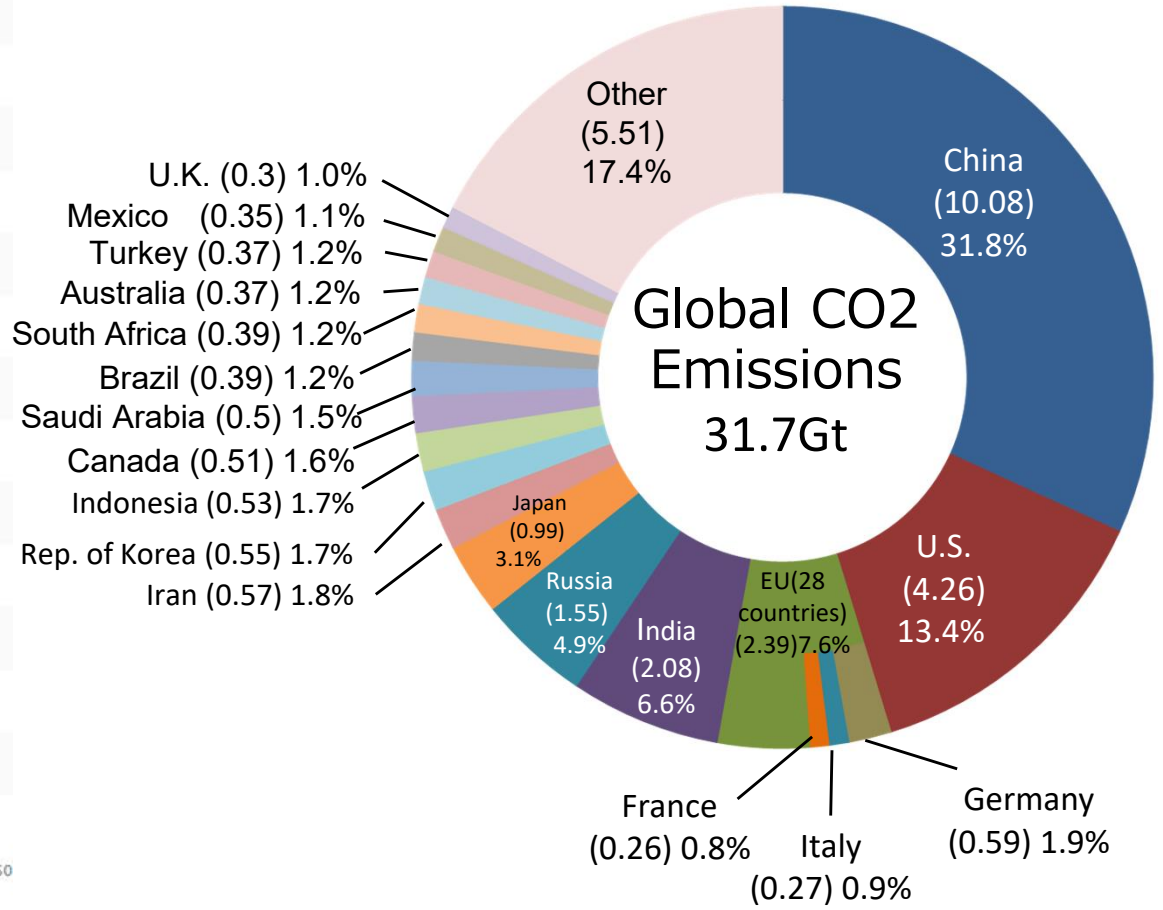
Cumulative CO2 emissions from fossil fuel combustion worldwide (1750－2021) ※



※ Unit: 1 billion tons of CO2

Source: Statista HP

CO2 emissions from fuel combustion (2020)



※ Unit: 1 giga tons of CO2

※ Due to rounding, the total emissions of each country may not match the total global emissions

Source：Created by Ministry of the Environment based on IEA "Greenhouse Gas Emissions from Energy" 2022EDITION

2030 Target and 2050 Net Zero by G20 Countries

As of November 2022

Country/region	2030 Emission Reduction Target	2030 target [Submission of NDC]	2050 net zero [Submission of LTS]
Japan	-46% in FY2030 (from FY2013) (Continue strenuous efforts in its challenge to meet the lofty goal of cutting its emission by 50%)	Statement at the Leaders Summit on Climate (22 April 2021) [22 October 2021]	Expressed [29 October 2021]
Argentina	Not exceeding a net emission of 359 million t-tCO2eq	[2 November 2021]	Expressed
Australia	-43% (from 2005)	[16 June 2022]	[29 October 2021]
Brazil	-50% (from 2005)	[7 April 2022]	Expressed
Canada	-40% to -45% (from 2005)	Statement at the Leaders Summit on Climate (22 April 2021) [12 July 2021]	Expressed
China	(1) Strive to reach the peak of CO2 emissions by 2030 (2) Lower CO2 emissions per unit of GDP by over 65% (from 2005)	(1) Statement at the UN General Assembly (22 September 2020) (2) Statement at the Climate Ambition Summit (20 December 2020) [28 October 2021]	Expressed net zero CO2 by 2060
EU	At least -55% (from 1990)	[18 December 2020]	[6 March 2020]
India	Reduce Emissions Intensity of its GDP by 45 percent by 2030 (from2005)	[26 August 2022]	Expressed net zero by 2070 by PM at COP26
Indonesia	-31.89% (from BAU) (unconditional) -43.2% (from BAU) (conditional)	[23 September 2022]	Net zero by 2060 [22 July 2021]
Republic of Korea	-40% (from 2018)	Announcement by the government (18 October 2021) [23 December 2021]	[30 December 2020]
Mexico	-35% (from BAU) (unconditional) -40% (from BAU) (conditional)	[17 November 2022]	Expressed
Russia	70% relative to the 1990 level (-30%)	[25 November 2020]	Expressed net zero by 2060 (13 October 2021)
Saudi Arabia	-2.78 Mt by 2030 (from 2019)	[23 October 2021]	Expressed net zero by 2060 (23 October 2021)
South Africa	In a range between 3.5 and 4.2 Mt (2026 and 2030)	[27 September 2021]	[23 September 2020]
Turkey	-21% (from BAU)	INDC (11 October 2021)	Expressed net zero by 2053 (September 2021)
UK	At least -68% (from 1990)	Announcement by PM (4 December 2020) [12 December 2021]	[19 October 2021]
USA	-50% to -52% (from 2005)	Statement at the Leaders Summit on Climate (22 April 2021) [22 April 2021]	[1 November 2021]

History of Climate Change

1992 : Rio Declaration on Environment and Development
appeared as a principle in addressing global environmental issues (Principle 7)

1992 : United Nations Framework Convention on Climate Change (UNFCCC)
preamble, Article 3, paragraph1 and Article 4, paragraph 2
Adopted in May 1992, endorsed from March 1994. Parties to the Convention: 197
CBDR-RC: common but differentiated responsibilities and respective capabilities
⇒ distinguishes between 'developed' and 'developing' countries

- Annex I Parties: Parties mentioned as having greenhouse gas reduction targets
  (Note: There is no reduction obligation.)
- Non-Annex I Parties: Developing countries not mentioned as having greenhouse gas reduction targets
- Annex II Parties: Countries (developed countries) with an obligation to provide financial support for the fulfillment of obligations under the Convention by non-Annex I Parties

1997 : Kyoto Protocol Article 10
Basis for the provision that only developed countries are obligated to reduce GHG emissions (i.e., Annex I countries as a whole, 5% reduction from 1990 levels between 2008 and 2012). Only 27% of global COP2 emissions (as of 2008) were captured.

Emissions of developing countries increase
(China surpassed the U.S. as the world's largest emitter in 2005)
⇒Efforts to create an effective framework
in which all countries can participate

Developing countries
use CBDR to argue for a bifurcation

2015 : Paris Agreement preamble, Article 2, paragraph 2 and article 4, paragraph 3
Based on the language of the US-China Joint Statement on Climate Change (2014), the Paris Agreement refers to CBDR with the addition of **"in the light of different national circumstances" (CBDR-RC-LDNC)**
As a legal framework involving all countries, including major emitters, it is distinct from the UNFCCC and the Kyoto Protocol.

＊CBDR: Common But Differentiated Responsibilities

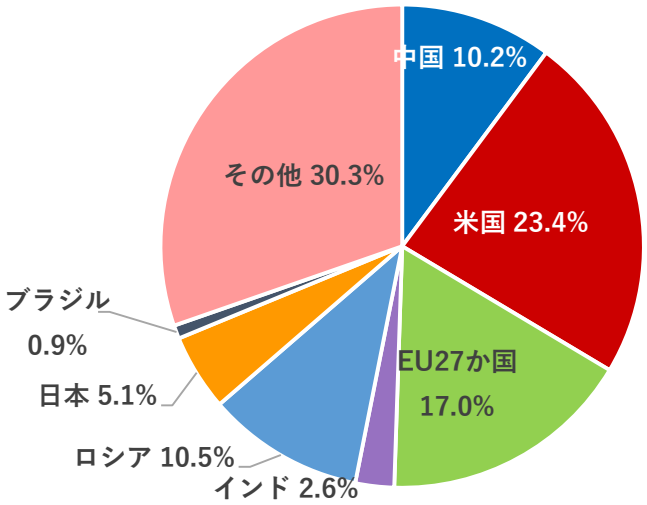
while there's a duty on all countries to take climate action, the types of action they take will depend on their differing national circumstances.

Energy-derived CO2 emissions in each country

- CO2 emissions of each country have changed significantly from 1990 to present. Actions by major emitters as China, the US, India, etc are key to global CO2 emissions reductions.
- At COP21 in 2015, the Paris Agreement was adopted. Unlike "Kyoto Protocol", all parties to the Paris Agreement (193 countries and regions) set the greenhouse gas reduction targets without differentiating developed and developing countries.

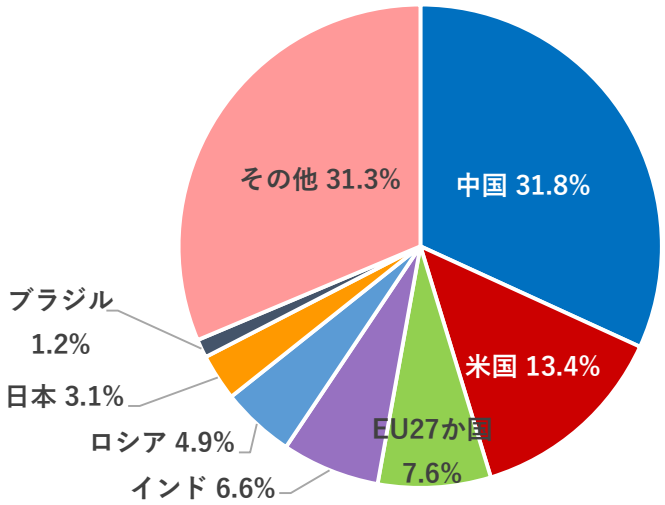
Comparison of energy-derived Co2 emissions of each country

Year 1990



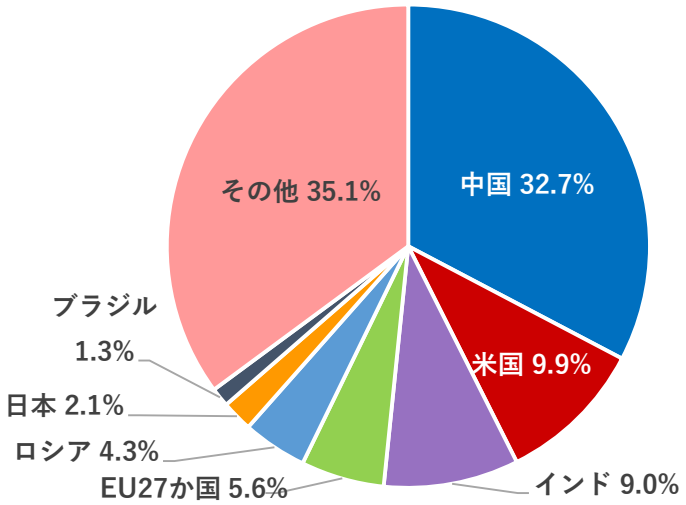
20.5billion tons

Year 2020年 (Present)



31.7billion tons

Year 2030年 (estimate)



36.2billion tons

Source: IEA「Greenhouse Gas Emissions from Energy (2022)」「World Energy Outlook (2022)」

Climate Change and International Relations

Policy Development through Climate Change

Domestic Policy | **Foreign Policy** | **Defense Policy**

The essense of climate change inseperable from eonomic strategy

EU ：In Dec. 2019, announced "The European Green Deal" to achieve both net-zero by 2050 and economic growth.
In Jul. 2021, announced "Fit for 55" in order to achieve 55% GHG reduction by 2030 compared to its 1990.

US ：In Nov. 2021, enacted "Bipartisan Infrastrcuture Law" to adress climate change and job creation through development and improvement of transport, power and others.

Japan：In Dec. 2020, formulated "Green Growth Strategy" to link carbon neutrality in 2050 to a "virtulous circle between economy and environment.

⇒ Trends in International Community **to develop economic strategies based on climate actions.**

Addressing climate change is a factor of stability or instability for international society?

Climate change as a driver of cooperation：While the IPCC 6th assessment report indicates that it is unequivocal that human influence has warmed the atmosphere, addressing climate change is a common goal and interests. Common frameworks as the Paris Agreement were established as global solidarity.

⇕

Climate change as a means of "pressure"：May become as means of labelling (balaming each other, color-coding, good/evil, etc) in international community, or source of conflicts over energy resources and minerals (ex. rare earths)