Opportunities and challenges of harnessing 4IR technologies for climate resilience

Maki Kawai

Member, United Nations' Ten-Member Group supporting Technology Facilitation Mechanism for SDGs

President, National Institutes of Natural Sciences

Professor Emeritus, The University of Tokyo, Japan

2030 Agenda

https://sdgs.un.org/2030agenda

CURRENT STATE OF PROGRESS TOWARD THE SUSTAINABLE DEVELOPMENT GOA BASED ON SELECT TARGETS

GOAL	INDICATOR	DISTANCE FROM TARGET (2023)[1] (1 Very far from target, 2 Far from target, 3 Moderate distance to target, 4 Close to target, 5 Target met or almost met)	TREND OF SDG PROGRESS (2023)[1]	CHANGE IN TREND OF SDG PROGRESS BETWEEN 2020 AND 2023[2]
1	1.1.1 Eradicate extreme poverty	3	Limited or no progress	Backward
	1.3.1 Implement social protection systems	3	Fair progress but acceleration needed	N/A
2	2.1.2 Achieve food security	2	Deterioration	None
	2.2.1 End malnutrition (stunting)	2	Fair progress but acceleration needed	None
3	3.1.2 Increase skilled birth attendance	4	Fair progress but acceleration needed	Backward
	3.2.1 End preventable deaths under 5	3	Fair progress but acceleration needed	Backward
	3.3.3 End malaria epidemic	2	Limited or no progress	None
	3.b.1 Increase vaccine coverage	3	Deterioration	Backward
4	4.1.2 Ensure primary education completion	3	Limited or no progress	Backward
5	5.3.1 Eliminate child marriage	3	Fair progress but acceleration needed	None
	5.5.1 Increase women in political positions	3	Fair progress but acceleration needed	None
6	6.1.1 Universal safe drinking water	3	Limited or no progress	None
	6.2.1 Universal safe sanitation and hygiene	3	Fair progress but acceleration needed	None
7	7.1.1 Universal access to electricity	3	Fair progress but acceleration needed	Backward
	7.3.1 Improve energy efficiency	3	Fair progress but acceleration needed	None
8	8.1.1 Sustainable economic growth	3	Deterioration	Backward
	8.5.2 Achieve full employment	4	Limited or no progress	None
9	9.2.1 Sustainable and inclusive industrialization	4	Limited or no progress	None
	9.5.1 Increase research and development spending	3	Fair progress but acceleration needed	Forward
	9.c.1 Increase access to mobile networks	4	Substantial progress/on track	None
10	10.4.2 Reduce inequality within countries	3	Fair progress but acceleration needed	N/A
11	11.1.1 Ensure safe and affordable housing	2	Fair progress but acceleration needed	Forward
12	12.2.2 Reduce domestic material consumption	3	Limited or no progress	N/A
	12.c.1 Remove fossil fuel subsidies	3	Deterioration	Backward
13	13.2.2 Reduce global greenhouse gas emissions	2	Deterioration	None
14	14.4.1 Ensure sustainable fish stocks	1	Deterioration	N/A
	14.5.1 Conserve marine key biodiversity areas	3	Limited or no progress	N/A
15	15.1.2 Conserve terrestrial key biodiversity areas	3	Limited or no progress	None
	15.4.1 Conserve mountain key biodiversity areas	3	Limited or no progress	N/A
	15.5.1 Prevent extinction of species	3	Deterioration	None
16	16.1.1 Reduce homicide rates	2	Limited or no progress	Backward
	16.3.2 Reduce unsentenced detainees	2	Deterioration	None
	16.a.1 Increase national human rights institutions	3	Fair progress but acceleration needed	None
17	17.2.1 Implement all development assistance commitments	2	Fair progress but acceleration needed	Forward
	17.8.1 Increase internet use	4	Substantial progress/on track	None
	17.18.3 Enhance statistical capacity	3	Limited or no progress	None

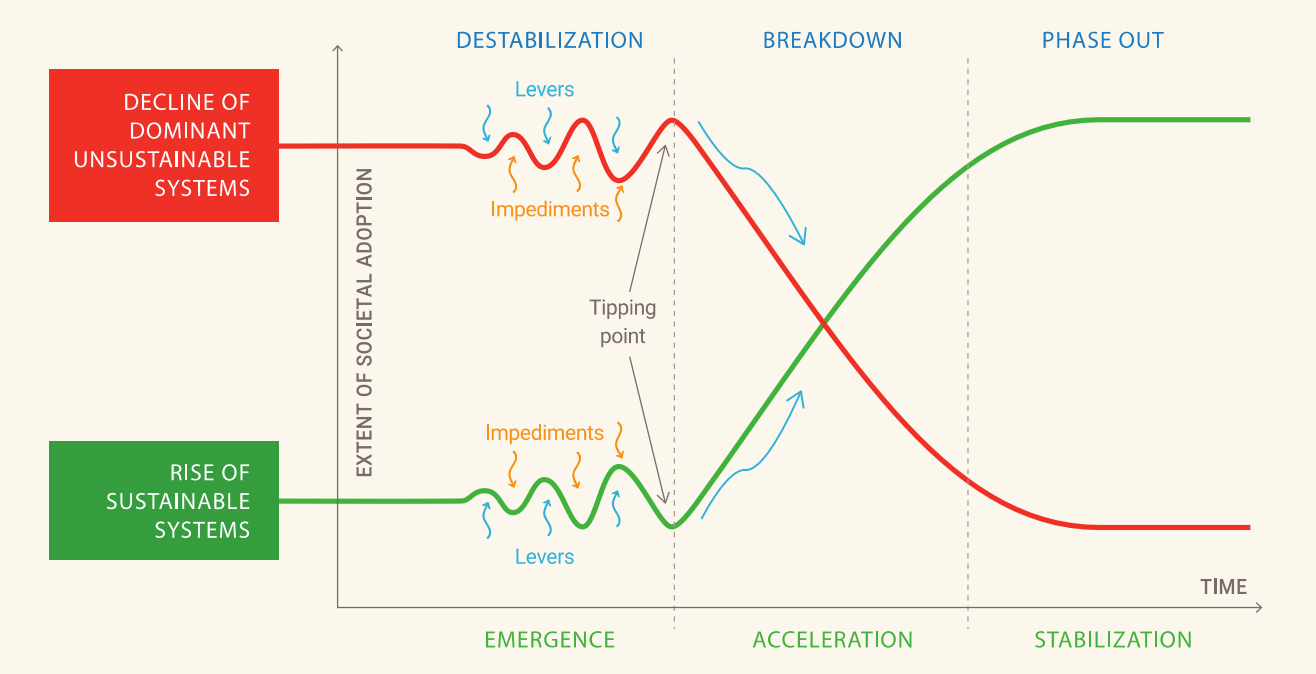
https://sdgs.un.org/sites/default/files/2023-09/FINAL%20GSDR%202023-Digital%20-110923_1.pdf

FRAMING THE FUTURE

The world is **far off track** on achieving the Sustainable Development Goals at the halfway point on the 2030 Agenda. But it is **possible to actively improve future prospects for action and progress by 2030 and beyond**. Leveraging scientific knowledge, strengthening governance for the Goals and unleashing the full potential of the Sustainable Development Goals framework for promoting sustainable development can make this happen. SDG interlinkages, and international spillovers and dependencies must be systematically considered.

ACCELERATING TRANSFORMATIONS TO THE SUSTAINABLE DEVELOPMENT GOALS

THREE PHASES OF TRANSFORMATION



Emergence (destabilization) phase
innovative ideas slowly give rise to new technologies and practices

Acceleration (breakdown) phase
innovations gain momentum and reach tipping points beyond which they are widely shared and adopted, leading to rapid, non-linear growth.

Stabilization (phase out) phase
technologies and practices become embedded in daily life as the new normal

2023

The Sustainable Development Goals Report

Special edition

United Nations

Towards a Rescue Plan for People and Planet

https://unstats.un.org/sdgs/report/2023/

Goal 13

Climate action

1. **Urgent global greenhouse gas emission reductions are needed** to avert 1.5° C tipping point

2. Global climate change education has so far not kept up with youth demand

3. Record-setting rising sea levels are a severe threat to hundreds of millions of people

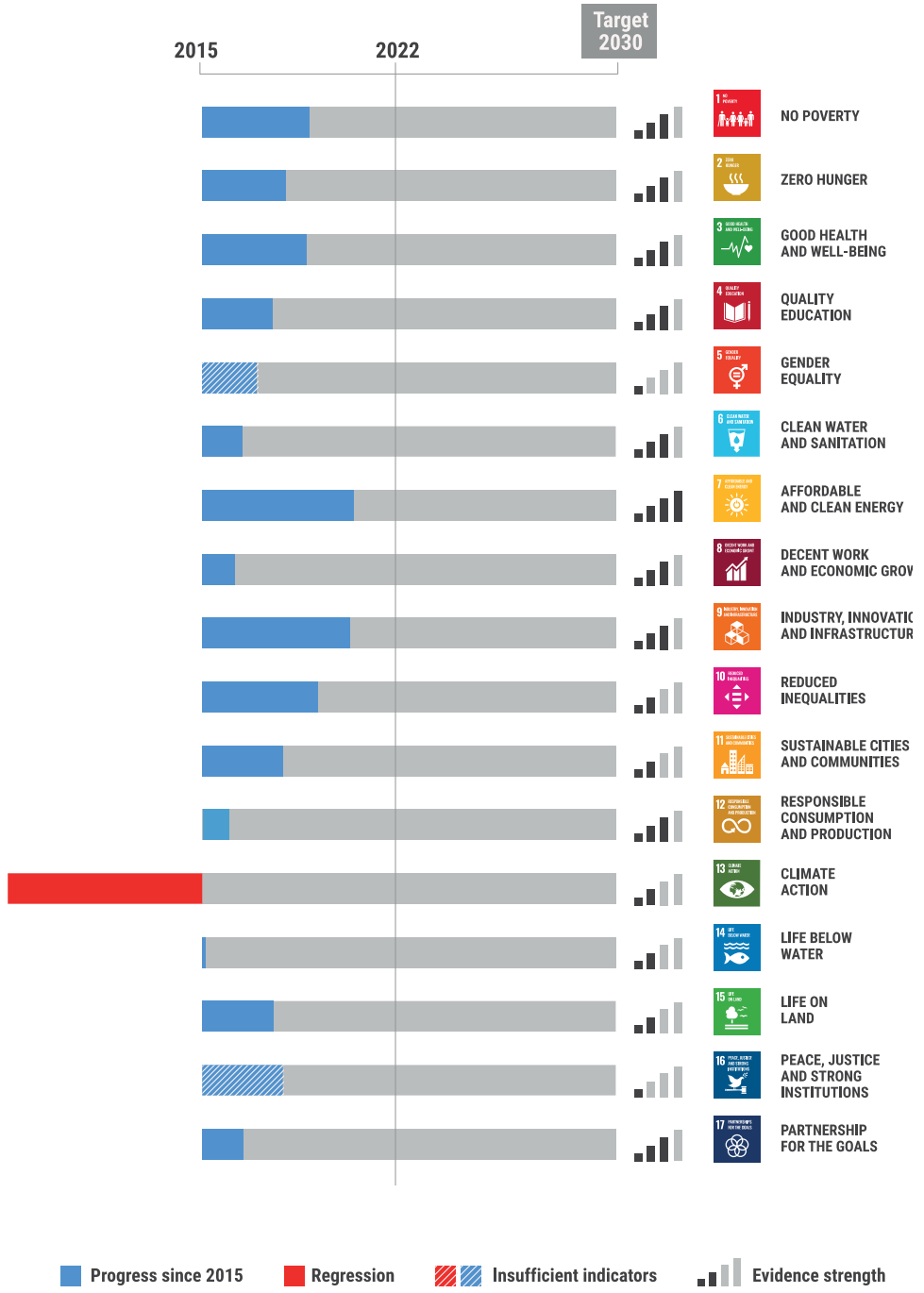
4. The $100-billion-a-year climate finance goal by developed countries has yet to be met

ESCAP 2023

ECONOMIC AND SOCIAL COMMISSION
FOR ASIA AND THE PACIFIC

- **Progress towards climate action (Goal 13) is slipping away. The region is both a victim of the impact of climate change and a perpetrator of climate change, with a responsibility to reduce greenhouse gas emissions.**
- **Across countries in special situations as in the region overall, performance on climate action (Goal 13) is unequivocally worse than on any other goal.**

Figure 1.2 Snapshot of progress in Asia and the Pacific, 2022



What are needed

Maintain a sustainable environment

- Reduce: Global Greenhouse Gas Emission

Prepare for disasters caused by environmental changes :

- Heat waves, droughts, flooding and wildfires
- Rising sea levels : hundreds of millions of people in coastal communities

fourth industrial revolution (4IR) technologies

Predictive science ：

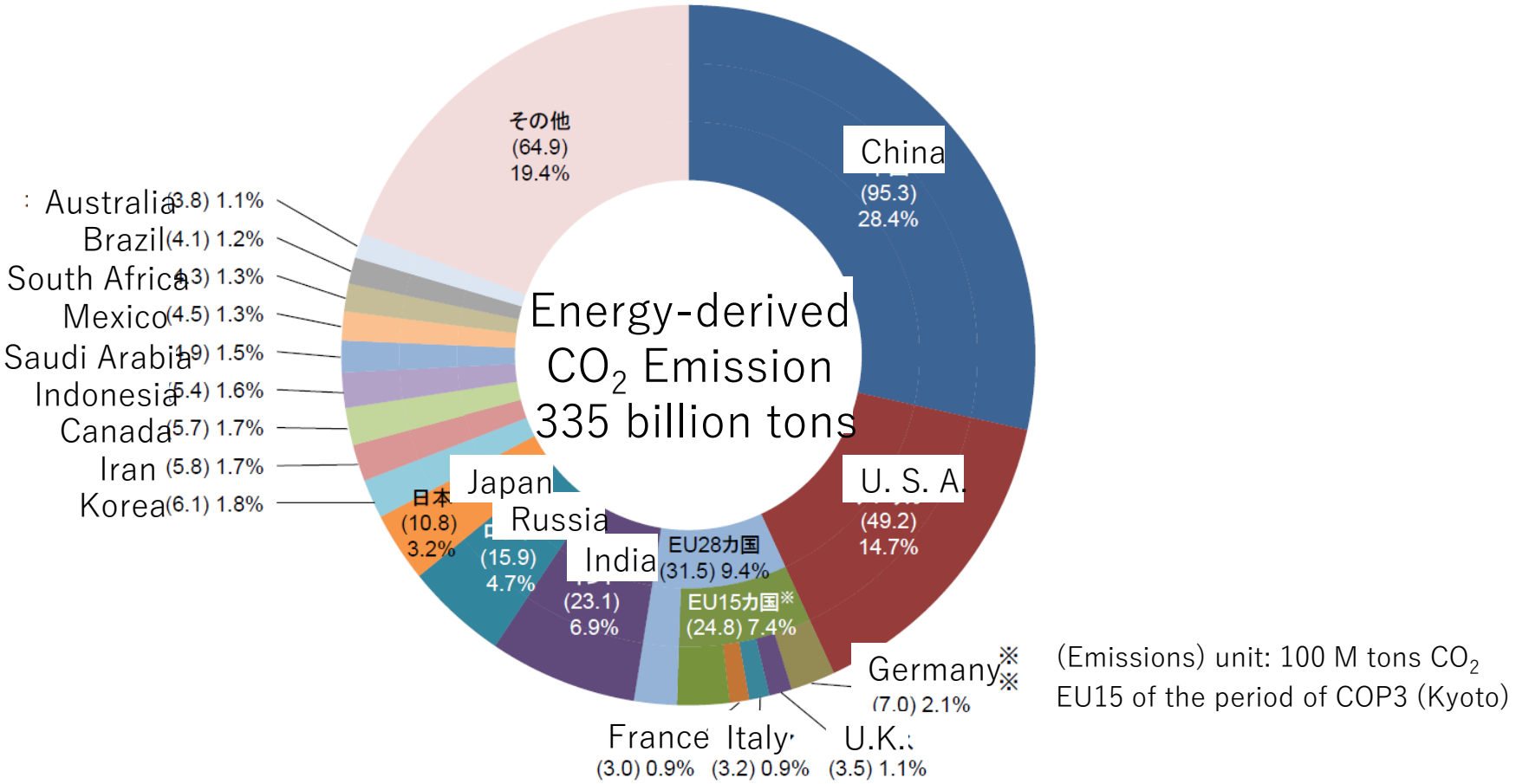
Typhoons, cyclones, earthquakes, extreme heat and extreme sensations

Weather forecast, Earthquake,

Preparation for Disasters :

global greenhouse gas emission

World Wide: Energy-derived CO_2 Emission (2018)



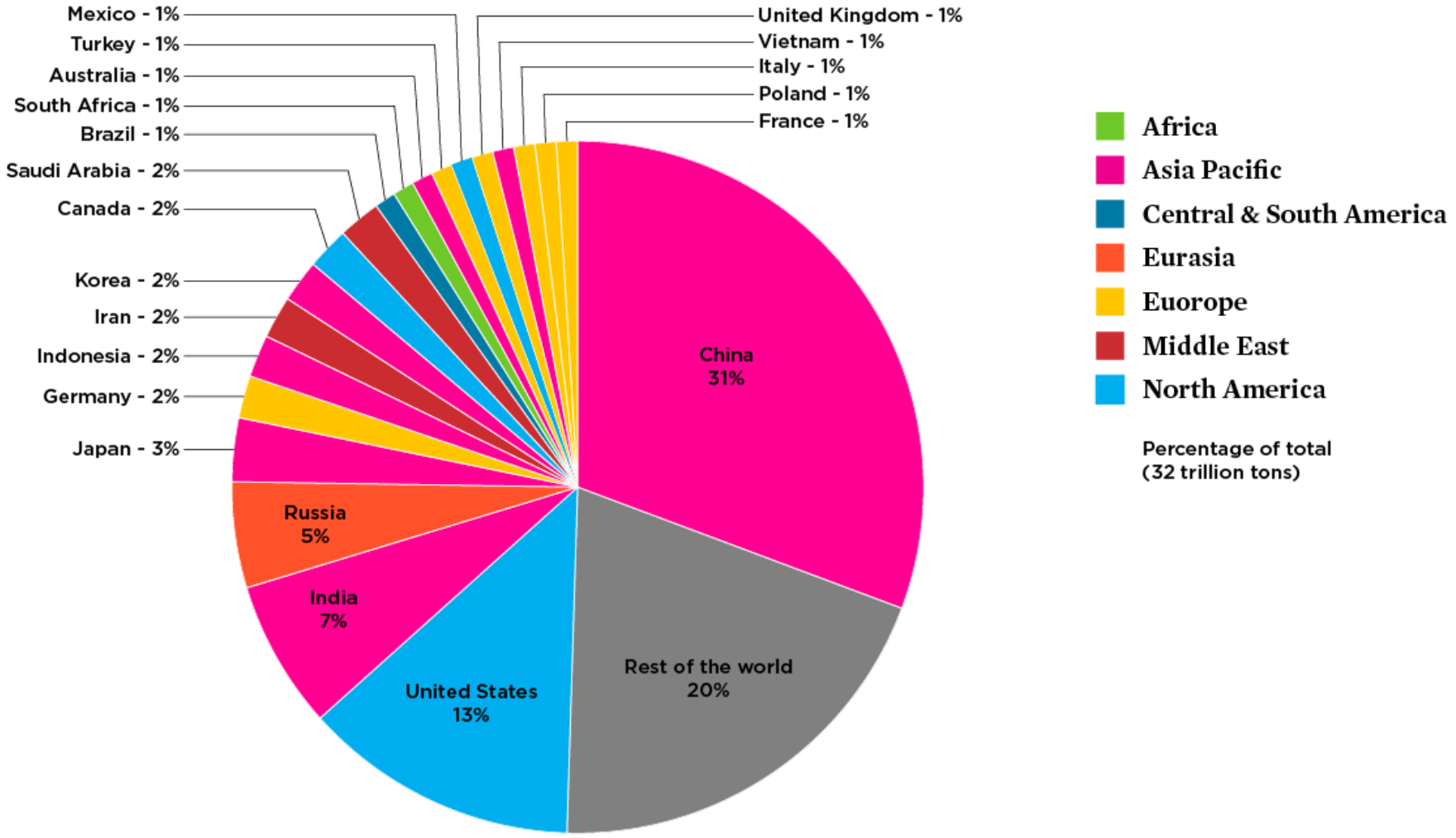
(Emissions) unit: 100 M tons CO_2
EU15 of the period of COP3 (Kyoto)

出典：IEA「CO_2 EMISSIONS FROM FUEL COMBUSTION」2020 EDITIONを元に環境省作成

global greenhouse gas emission

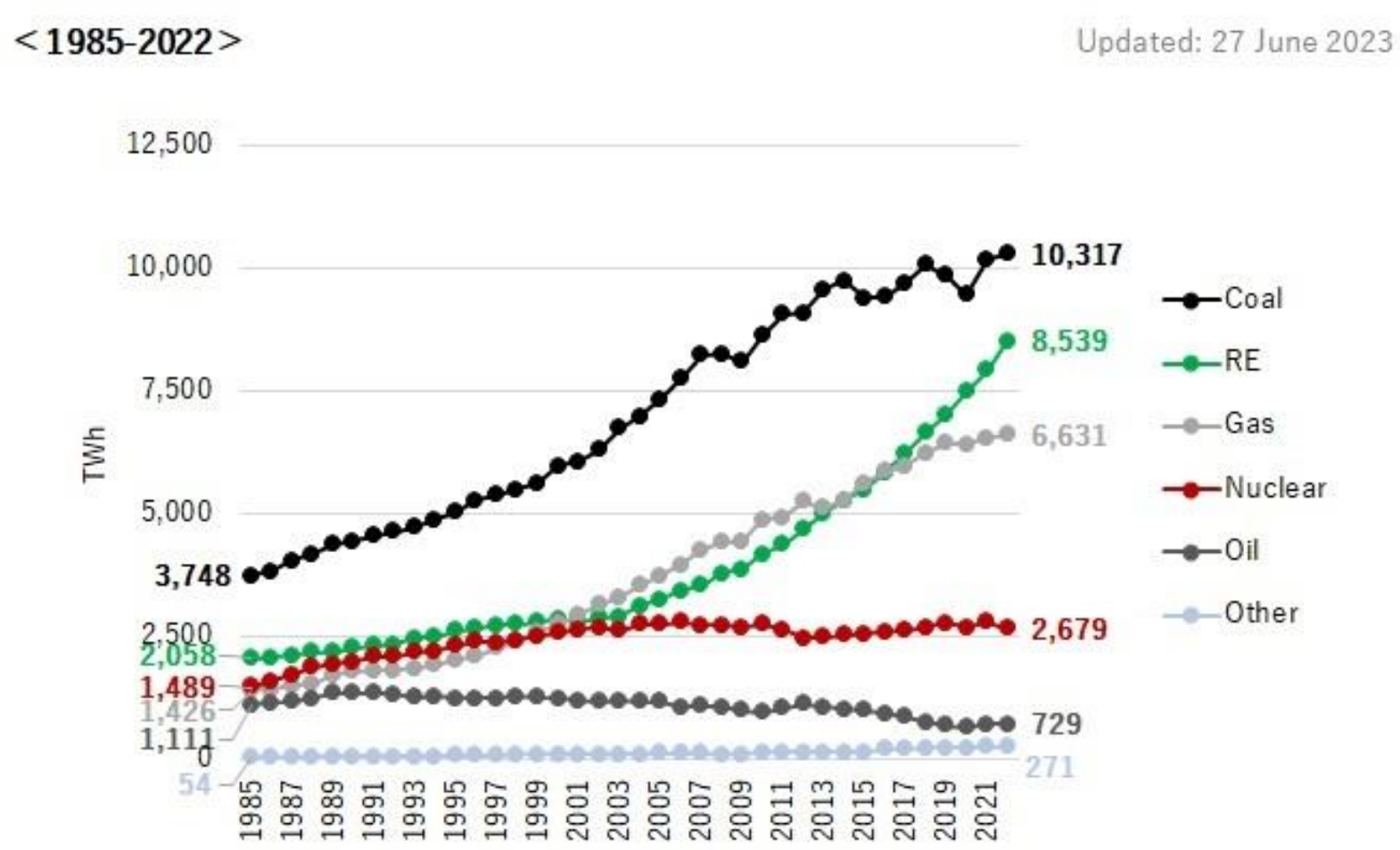
Top Annual CO_2 Emitting countries, 2020

(from fossil fuels)



Data: IEA Atlas of Energy

Global Energy Resources

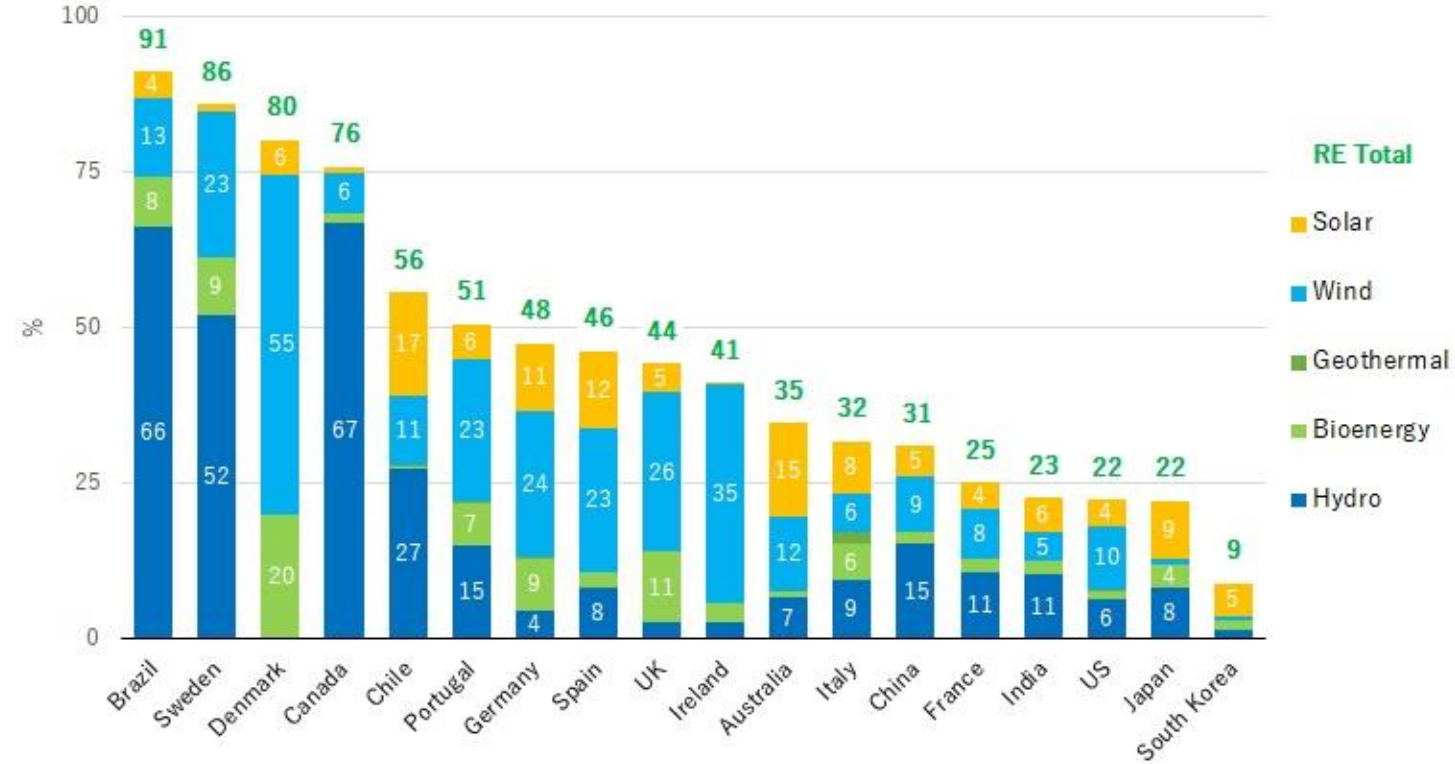


Notes: "RE" (renewable energy) includes hydro, wind, solar, bioenergy and geothermal. "Other" includes pumped hydro, other fossil generation, and statistical differences. Based on "gross" generation.

Source: Energy Institute, Statistical Review of World Energy 2023 (June 2023) (downloaded 27 June 2023).

<2022>

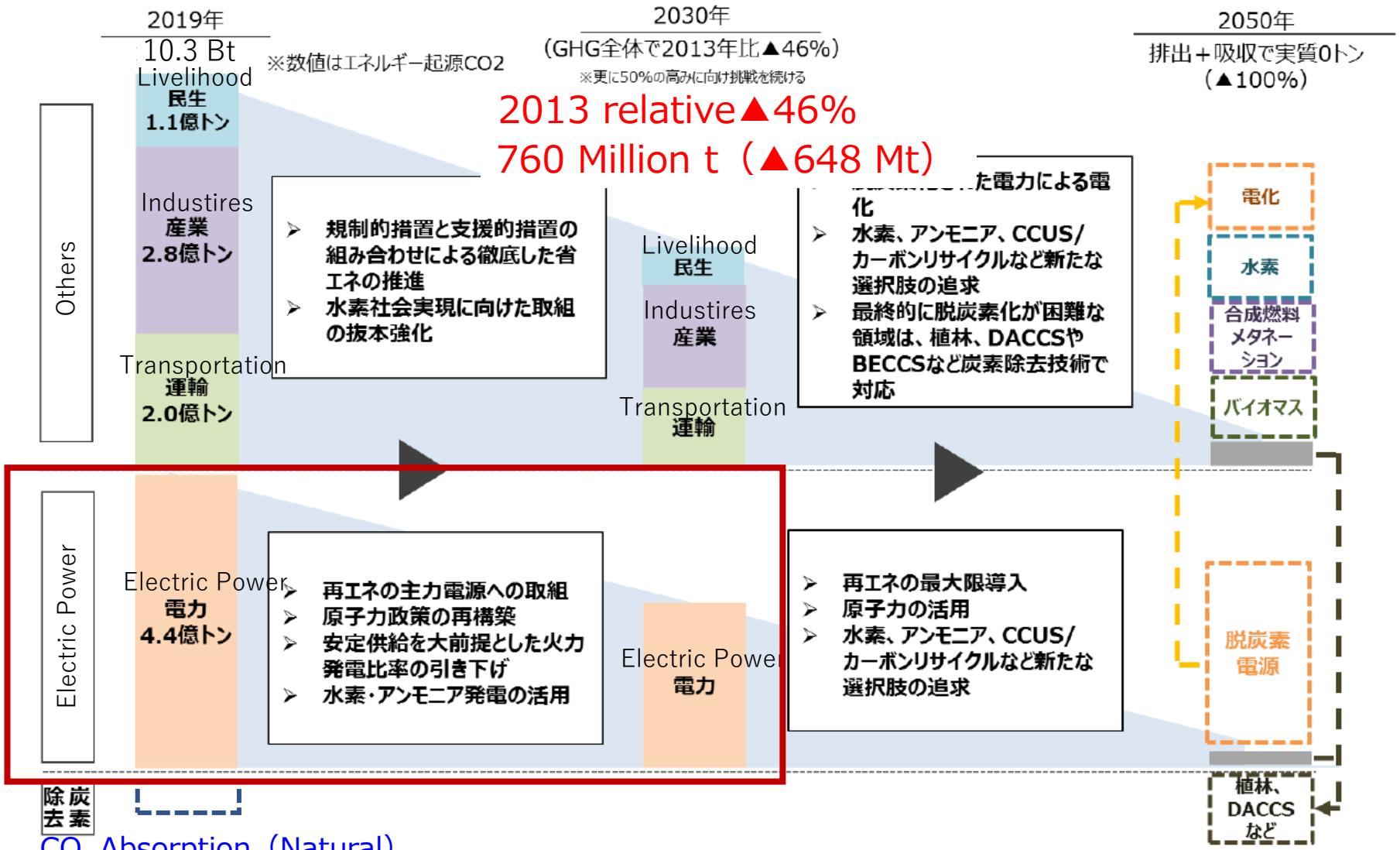
As of 22 March 2023



- Notes: Electricity consumption = electricity generation + imports - exports. Based on “net” generation.
- Sources: Based on International Energy Agency, Monthly Electricity Statistics: Data up to December 2022 (March 2023) [downloaded 17 March 2023]. Modified by Renewable Energy Institute.

JAPAN Carbon Neutral (Net Zero) by 2050
～Target for 2030 and 2050～

2013 12.35 B t



CO_2 Absorption（Natural）
0.5 Billion t

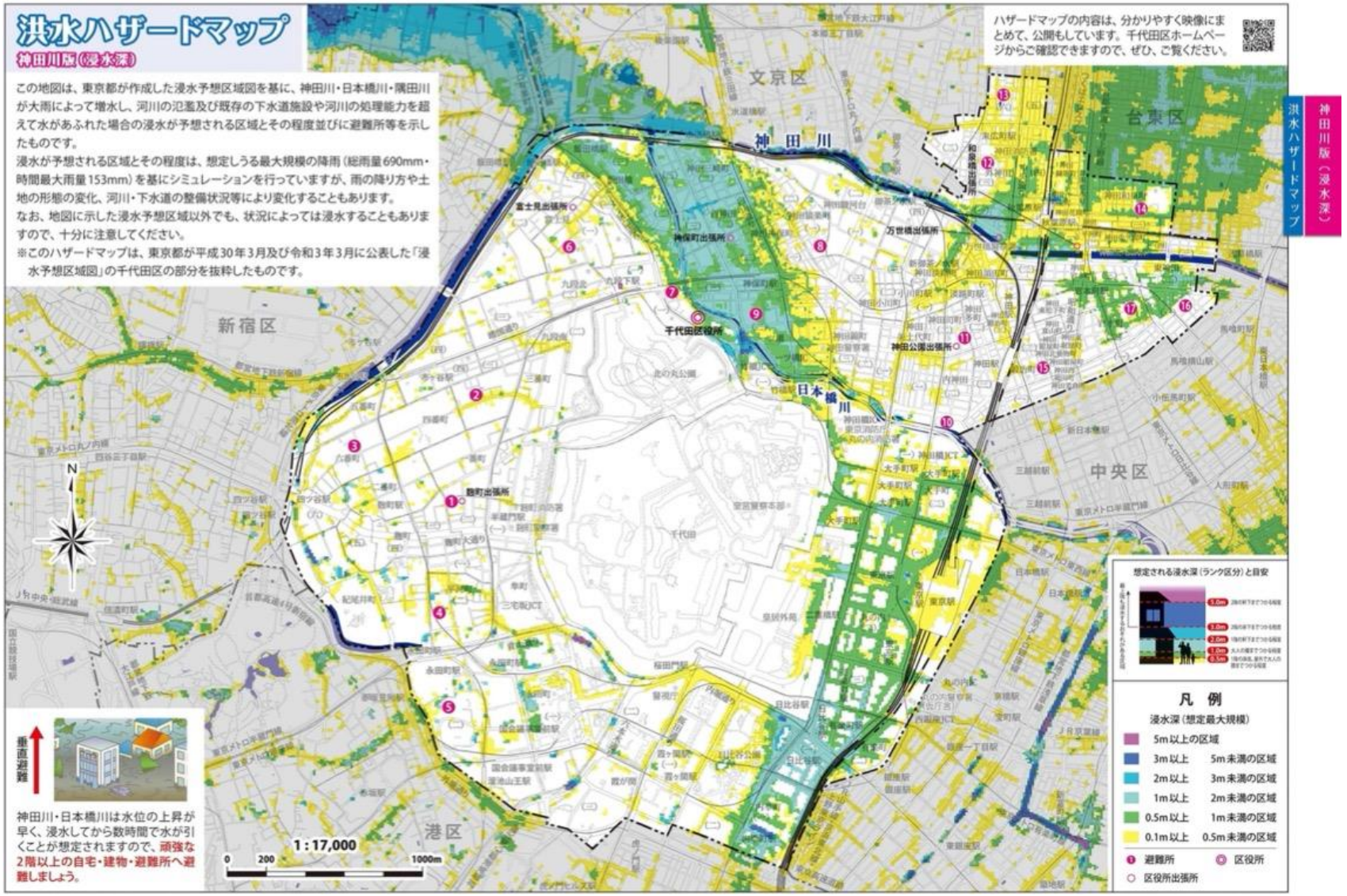
Cabinet Office Japan

Prepare for disasters

An example for Japan

Every Local Government provides Hazard Map to the Citizen

Hazard map for Flooding: Chiyoda-ku, Imperial Palace at the center



Research Cooperation for Sustainable Development in JST

1. SATREPS (**S**cience **a**nd **T**echnology **Re**search **P**artnership for **S**ustainable Development)

SATREPS aims to resolve global common challenges through STI cooperation with developing economies supported by ODA. The program generates new technology, knowledge, and innovations for social implementation and fosters self-reliant R&D capacity and sustainable research ecosystems.

2. e-ASIA Joint Research Program

e-ASIA JRP aims to develop STI community to promote STI to resolve regional common challenges through multilateral research cooperation including capacity building on an equal partnership basis among regional funders.

3. AJ-CORE (**A**frica-**J**apan **Co**llaborative **Re**search)

AJ-CORE aims to bring multiple stakeholders together to co-develop new knowledge and values needed for decision-making and societal change and facilitate STI cooperation among researchers from Japan, South Africa, and SGCI member countries on an equal partnership basis.

4. STAND (Pilot Phase) (‘**S**cience, **T**echnology and **A**ction’ **N**exus for **D**evelopment)

STAND is a pilot program that aims to foster multinational research cooperation among partner funders from the North and South by integrating similar but separate individual research activities for effective and efficient outcomes that faster addresses SDGs.

Think Globally, Act Locally

Thank you for your kind attention.