

Achieving the SDGs and Carbon Neutrality

Strengthening Science-Policy-Business Interface towards Resource Circulation and Circular Economy

11th Regional 3R and Circular Economy Forum in Asia and the Pacific

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Flooding (July 2018) (Mabi-cho, Kurashiki City, Okayama)



※国土地理院提供の図から作製



Typhoon Jebi (No.21) (Sept. 2018) (Kansai International Airport, Osaka)



Typhoon Jebi (No.21) (Sept. 2018) (Sennan City, Osaka)



Typhoon Hagibis (No. 19) (Oct. 2019)

Roughly \$4 billion of the \$10 billion damage in insured losses caused by the rainfall can be attributed to climate change (Otto and Li, 2022) . Event attribution.



2018 Top 10 Global Economic Loss Events

Date (s)	Event	Location	Deaths	Economic Loss (billion USD)	Insured Loss (billion USD)
October 10-12	Hurricane Michael	US	32	17.0	10.0
September 13-18	Hurricane Florence	US	53	15.0	5.3
November	Camp Fire	US	88	15.0	12.0
September 4-5	Typhoon Jebi (No. 21)	Japan	17	13.0	8.5
July 2-8	Flooding	Japan	246	10.0	2.7
Spring & Summer	Drought	Central & Northern Europe	N/A	9.0	0.3
September 10-18	Typhoon Mangkhut	Oceania, East Asia	161	6.0	1.3
July - September	Flooding	China	89	5.8	0.4
November	Woolsey Fire	US	3	5.8	4.5
August 16-19	Tropical Storm Rumbia	China	53	5.4	0.3
	All Other Events		-	123.0	45
Source : AON, 2019		Totals		225.0	90.0

2019 Top 10 Global Economic Loss Events

Date (s)	Event	Location	Deaths	Economic Loss (USD billions)	Insured Loss (USD billions)
October 6-12	Typhoon Hagibis (No. 19)	Japan	99	15.0	9.0
June - August	Monsoon Floods	China	300	15.0	0.7
September 7-9	Typhoon Faxai (No. 15)	Japan	3	10.0	6.0
May - July	Mississippi Basin Floods	United States	0	10.0	4.0
August 25 – Sep 7	Hurricane Dorian	Bahamas, Caribbean, US, Canada	83	10.0	3.5
March 12-31	Missouri Basin Floods	United States	10	10.0	2.5
June - October	Monsoon Floods	India	1750	10.0	0.2
August 6-13	Typhoon Lekima	China, Philippines, Japan	101	9.5	0.8
March - April	Flooding	Iran	77	8.3	0.2
May 2-5	Cyclone Fani	India, Bangladesh	81	8.1	0.5
		All Other Events		126 billion	44 billion
		Totals		232 billion	71 billion

Source : AON, 2020

Significant 2022 economic loss events



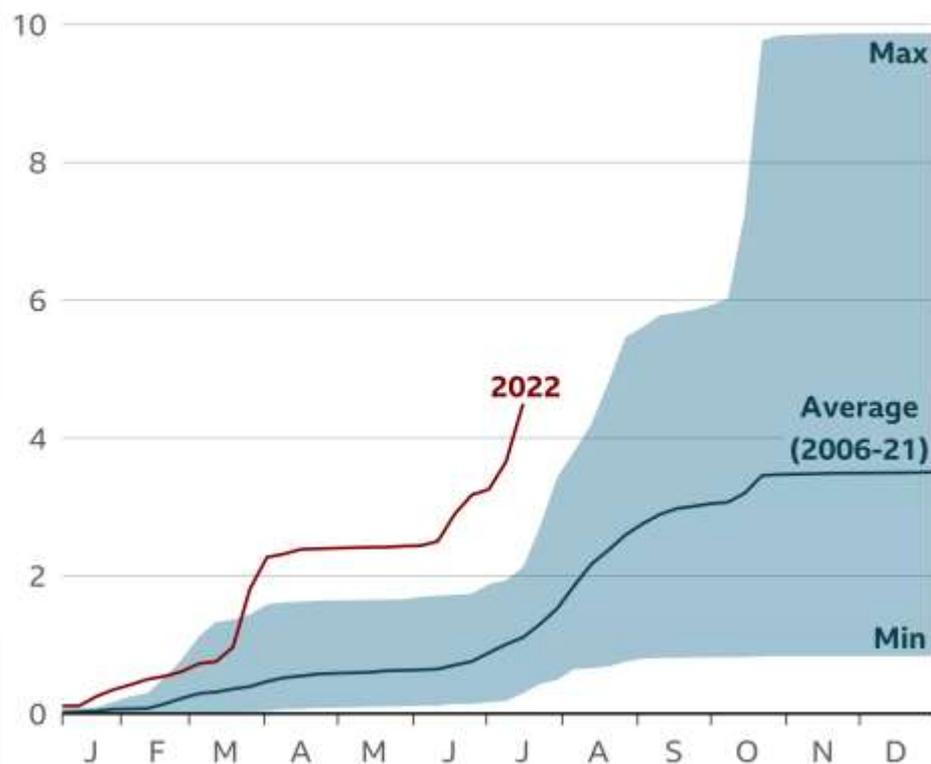


右下はGIRONDE FIREBRIGADE/
EPA-EFE/SHUTTERSTOCK



EU's wildfire season so far

Cumulative burnt areas, in thousand sq km



Source: EFFIS, as of 16 July 2022



2022 Top 10 economic loss events

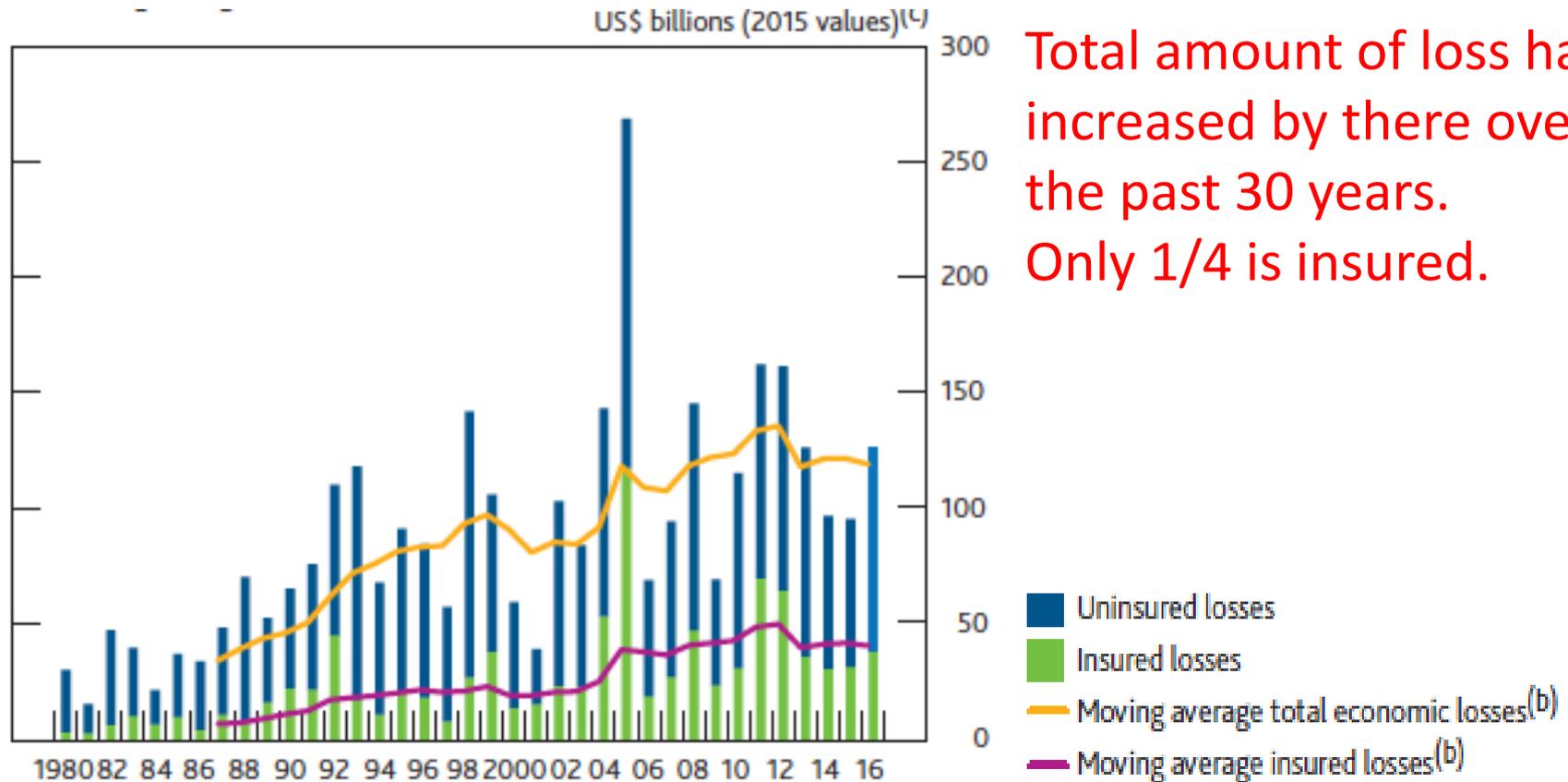
			Deaths	Economic Loss (\$ billion)	Insured loss (\$ billion)
27 September – 1 October	Hurricane Ian	U.S., Cuba	157	95.5	52.5
Annual	European Drought	Southern, Western and Central Europe	N/A	22.0	3.0
Annual	U.S. Drought	U.S.	N/A	16.0	8.0
14 June -30 October	Pakistan Seasonal Floods	Pakistan	1739	15.0	0.1
1 June -30 September	China Seasonal Floods	China	195	15.0	0.4
16 March	Fukushima Earthquake	Japan	4	9.1	2.9
23 February – 31 March	QLD & NSW Floods	Australia	22	8.0	4.0
	China Drought	China	N/A	7.6	0.2
18 – 19 February	Windstorm Eunice	Western and Central Europe	17	4.5	3.4
17 May – 31 October	India Seasonal Floods	India	2135	4.2	0.1
	All other events		27100	115.6	57.4
Source : AON, 2023		Totals	31300	313	132

2022 Top 10 Human fatality events

			Deaths	Economic loss (\$ billion)
10-20 July	Heatwave	Western, Southern and Central Europe	15450	N/A
13 – 19 June	Heatwave	Western, Southern and Central Europe	3750	N/A
17 May -31 October	India Seasonal Floods	India	2135	4.2
14 June -30 October	Pakistan Seasonal Floods	Pakistan	1739	15.0
22 June	Earthquake	Afghanistan, Pakistan	1163	0.1
1 July -31 October	Nigeria Seasonal Floods	Nigeria	660	2.3
21 November	Cianjur Earthquakes	Indonesia	603	0.4
8 -15 April	KwaZulu-Natal Floods	South Africa	455	3.6
15-16 February	Rio de Janeiro Floods	Brazil	232	<0.1
8-13 April	Tropical Storm Megi	Philippines	214	<0.1
	All other events		4900	287.0
		Totals	31300	313 billion

Source : AON, 2023

Global Climate related Economic Loss Trends (1980-2016)



Sources: Geo Risks Research, Munich Reinsurance Company and NatCatSERVICE 2017 (data does not account for reporting bias).

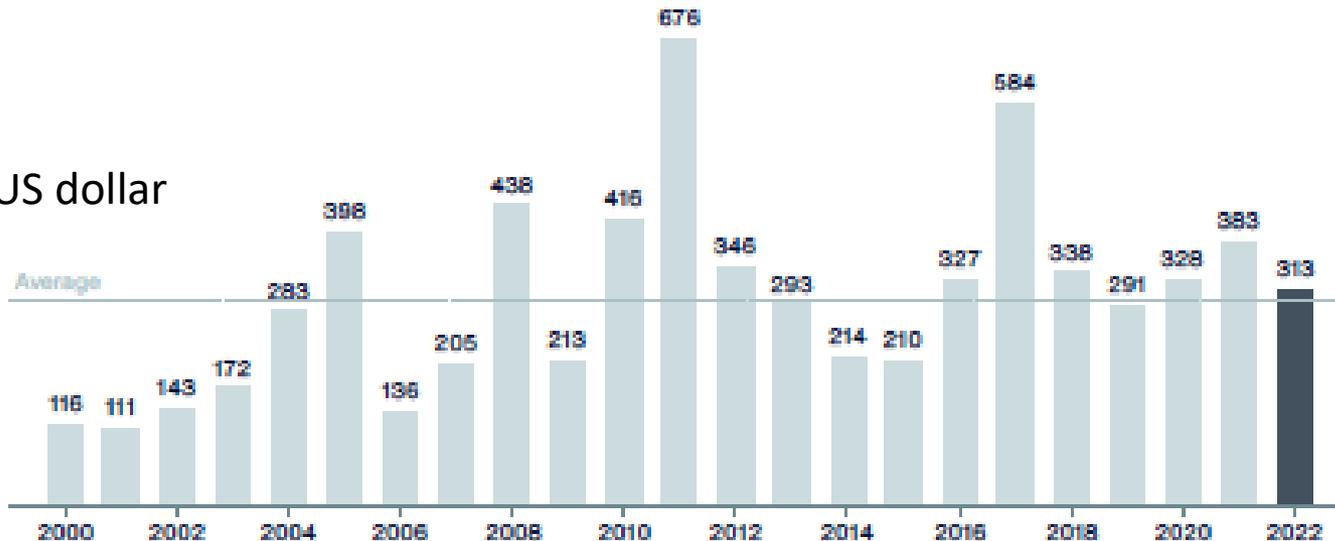
Source : Bank of England, Quarterly Bulletin 2017 Q2, 2017

Global economic losses from natural disasters (since 2000)

Global economic losses in 2022 = 313 billion US dollars in 2022, close to the 21st century average.

Losses from weather related disasters were 17% above the average since 2000.

Billion US dollar



Data: Catastrophe Insight, Aon

Projected changes in extremes are larger in frequency and intensity

1850-1900		Present 1°C	1.5°C	2°C	4°C
Hot temperature extremes over land: 10-year event	Intensity increase	1.2°C hotter	1.9°C hotter	2.6°C hotter	5.1°C hotter
	Frequency per 10 years	2.8 times	4.1 times	5.6 times	9.4 times
Hot temperature extremes over land: 50-year event	Intensity increase	1.2°C hotter	2.0°C hotter	2.7°C hotter	5.3°C hotter
	Frequency per 50 years	4.8 times	8.6 times	13.9 times	39.2 times
Heavy precipitation over land: 10-year event	Intensity increase	6.7% wetter	10.5% wetter	14.0% wetter	30.2% wetter
	Frequency per 10 years	1.3 times	1.5 times	1.7 times	2.7 times
Agricultural & ecological droughts in drying regions: 10 year event	Frequency per 10 years	1.7 times	2.0 times	2.4 times	4.1times

Source: IPCC AR6, 2021

Impact, Vulnerability and Adaptation (IPCC AR6 WG2 Summary for Policy Makers, 2022)

- *The cumulative **scientific evidence is unequivocal**: Climate change is a threat to human well-being and planetary health. **Any further delay in concerted anticipatory global action on adaptation and mitigation will miss a brief and rapidly closing window of opportunity to secure a liveable and sustainable future for all.***
- 「気候変動は人類の福利と地球の健全さの脅威である—これまで積み上げられた科学的証拠は明白である。**すべての人が普通に生活できる持続可能な未来を確かなものとする可能性は私たちの目前で急速に小さくなっているが、世界が協力して排出削減策と適応策を先駆けてとることをこれ以上遅らせるならば、その限られた可能性を失うこととなる**」

Toward climate neutrality

Paris Agreement (2015) stipulating clear long-term goal for decarbonization

- Holding the increase in the global average temperature to well below 2 °C and pursuing efforts to limit the temperature increase to 1.5 °C above pre-industrial levels (Art. 2.1 (a))
- “Net zero emission” “De-carbonization” in the second half of this century (Art. 4.1)

Japan's pledge: reduce GHG emission to net zero by 2050

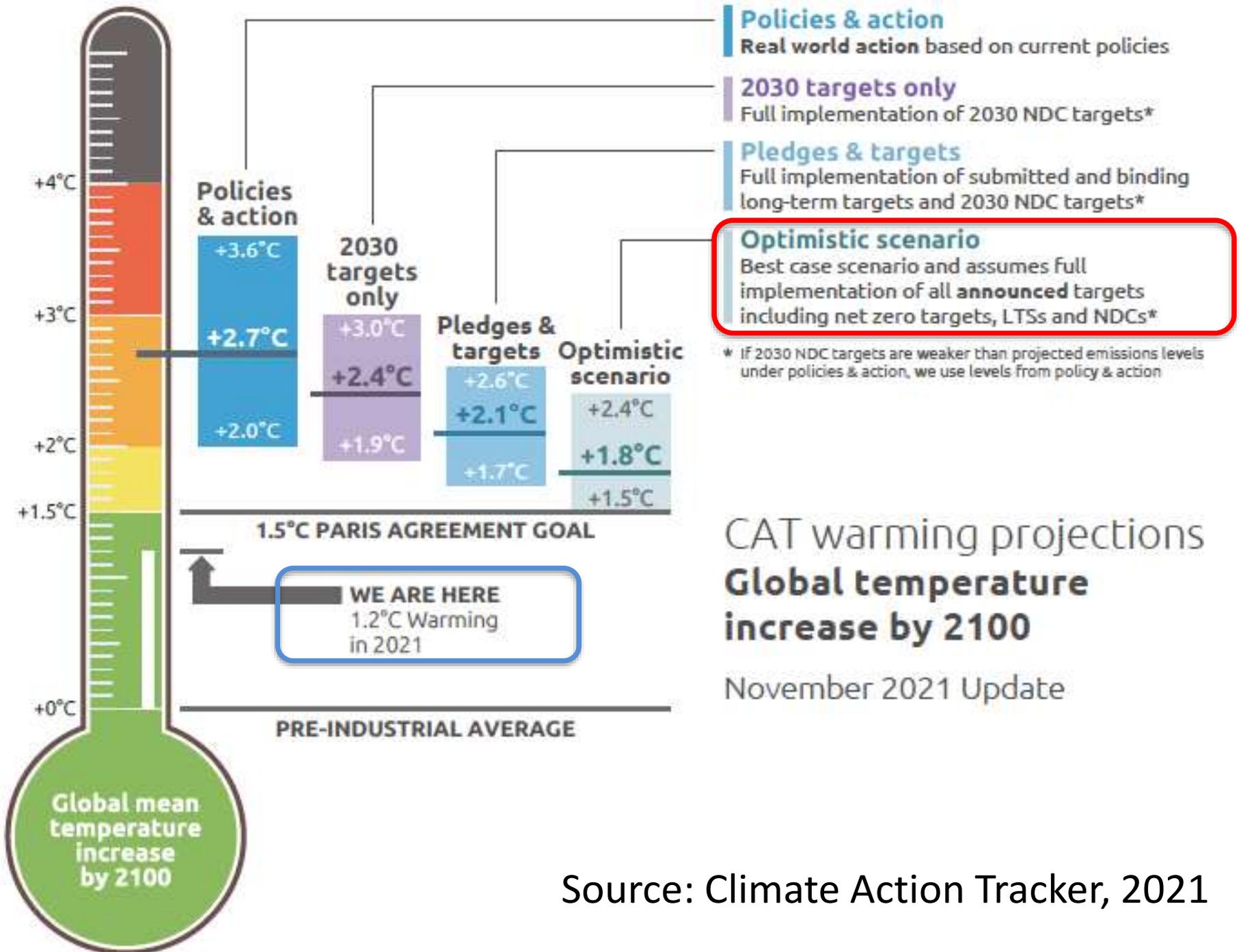
- “Japan pledges to, by 2050, reduce GHG emission in Japan to net zero, namely become carbon neutral and achieve a decarbonized society”.
- The pledge is now legalized under the 1998 Law to promote measures to cope with global warming.

More than 140 countries and EU have now pledge to reduce emission to net zero

- All G7 countries, Brazil, South Korea, Viet Nam, pacific countries etc.: net zero by 2050 at the latest
- China, Russia, Saudi Arabia etc.: net zero by 2060 at the latest
- India: net zero by 2070
- Many countries update their 2030 climate target upward in line with net zero by 2050.

COP26: "resolves to pursue efforts to limit the temperature increase to 1.5 °C"

- "recognizes that this requires accelerated action in this critical decade, on the basis of the best available scientific knowledge and equity"



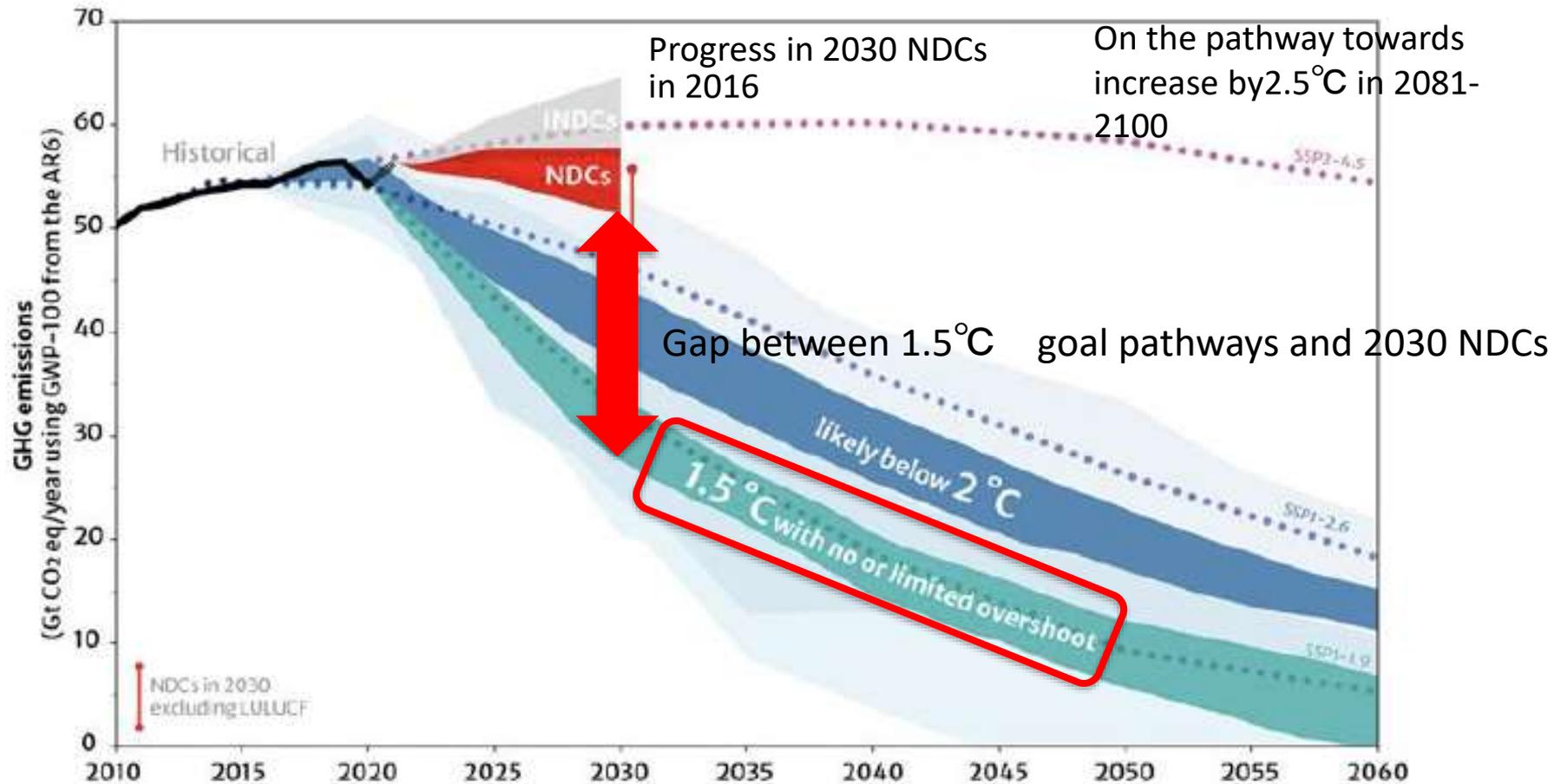
Source: Climate Action Tracker, 2021

Gap between pathways toward 1.5°C goal and 2030 NDCs (Sept. 2022)

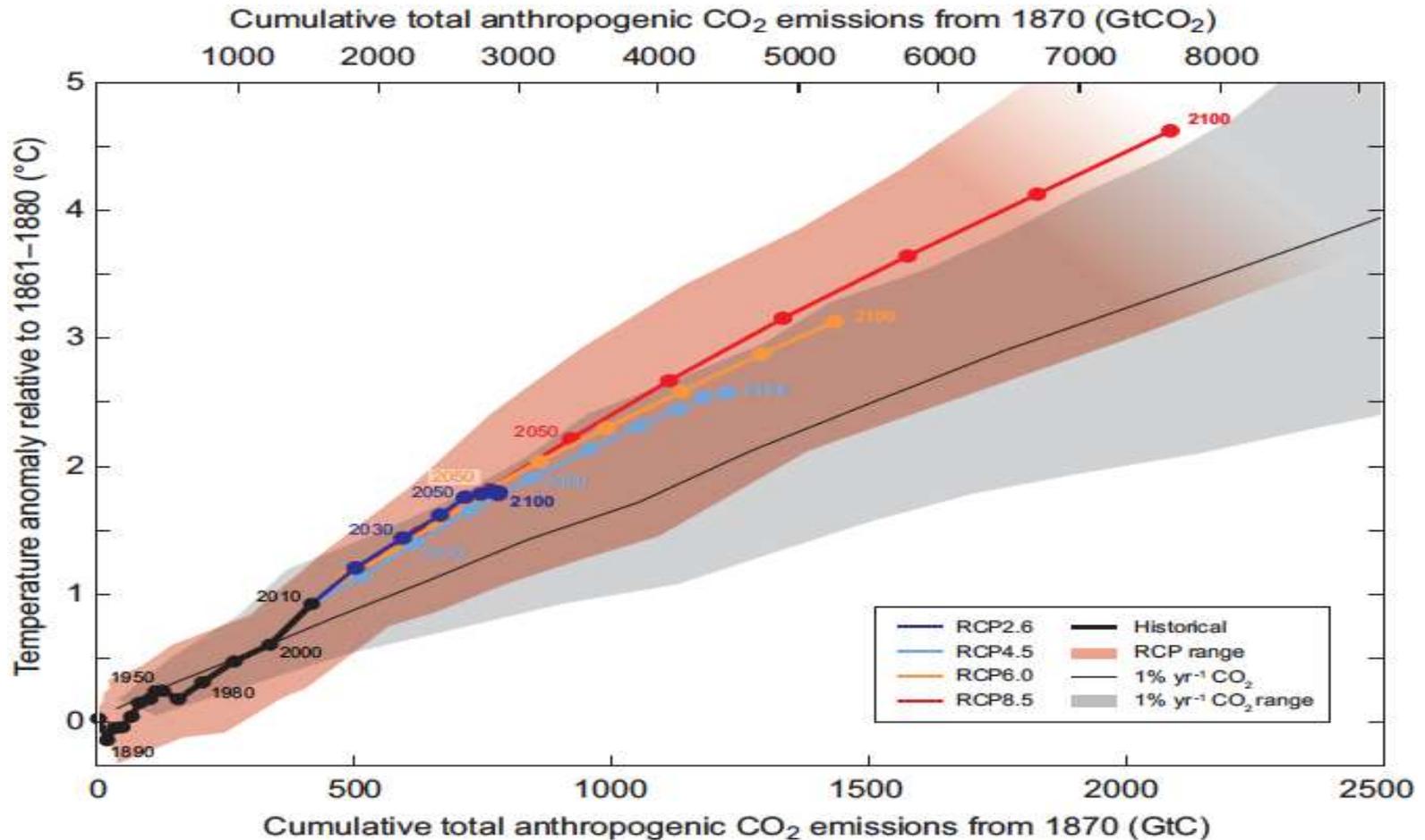
Extension of our present society will not lead to a sustainable society in future.

= need "systems transitions"

Clear long term vision/goal for future society makes us identify and understand challenges.



Global mean surface temperature increase as a function of cumulative total global CO₂ emissions



Source: IPCC, 2014

2030 NDCs and carbon budget

Urgent need for a **significant increase in the level of NDCs by 2030**
or a **significant overachievement of the latest NDCs**

Climate actions by 2030 are critical for 1.5°C and 2°C.

Raise issues of climate justice, Intergenerational equity.

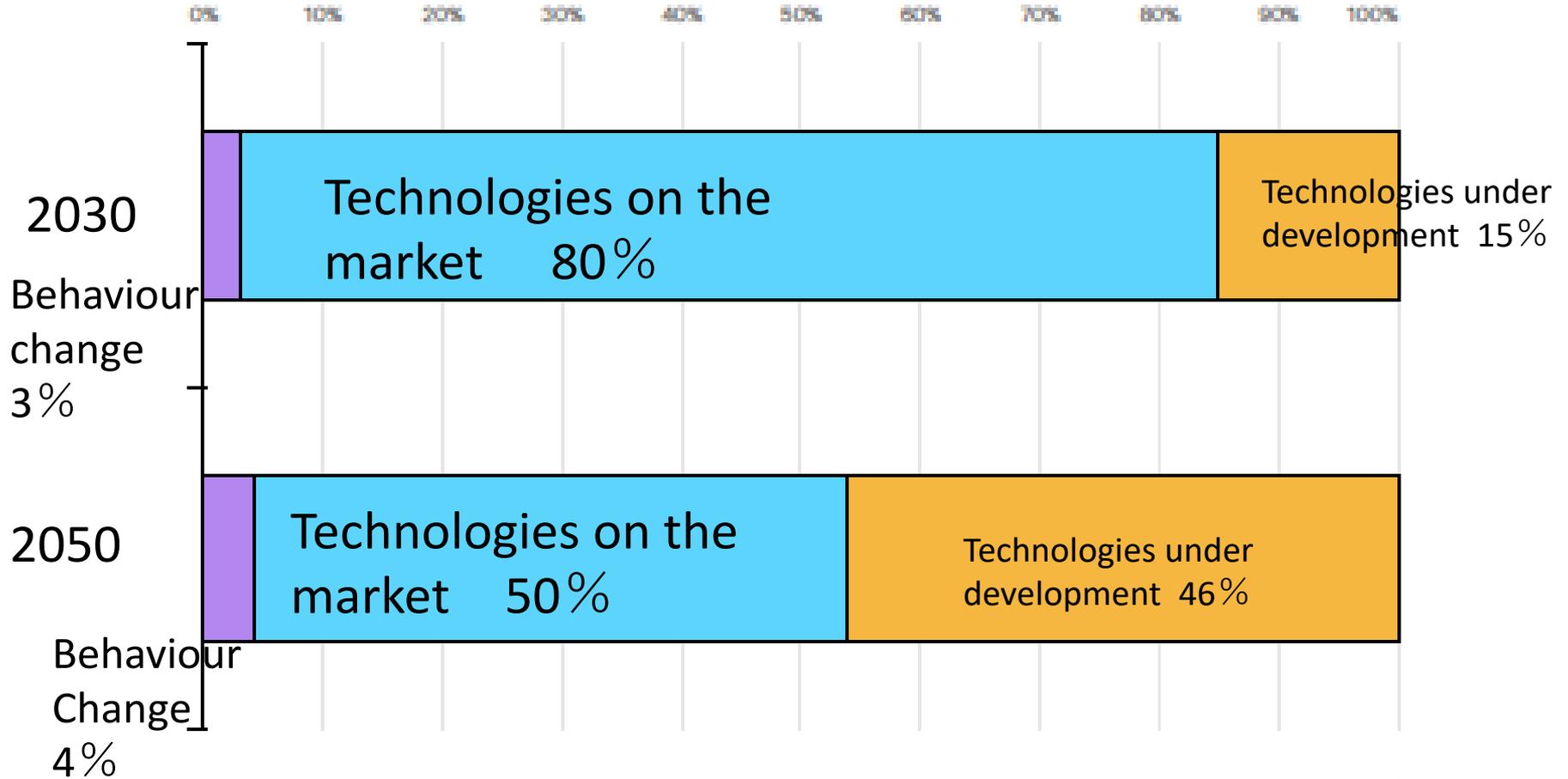
Carbon budget for a 50 per cent chance of limiting warming to 1.5 °C



Carbon budget for a 67 per cent chance of keeping warming below 2 °C

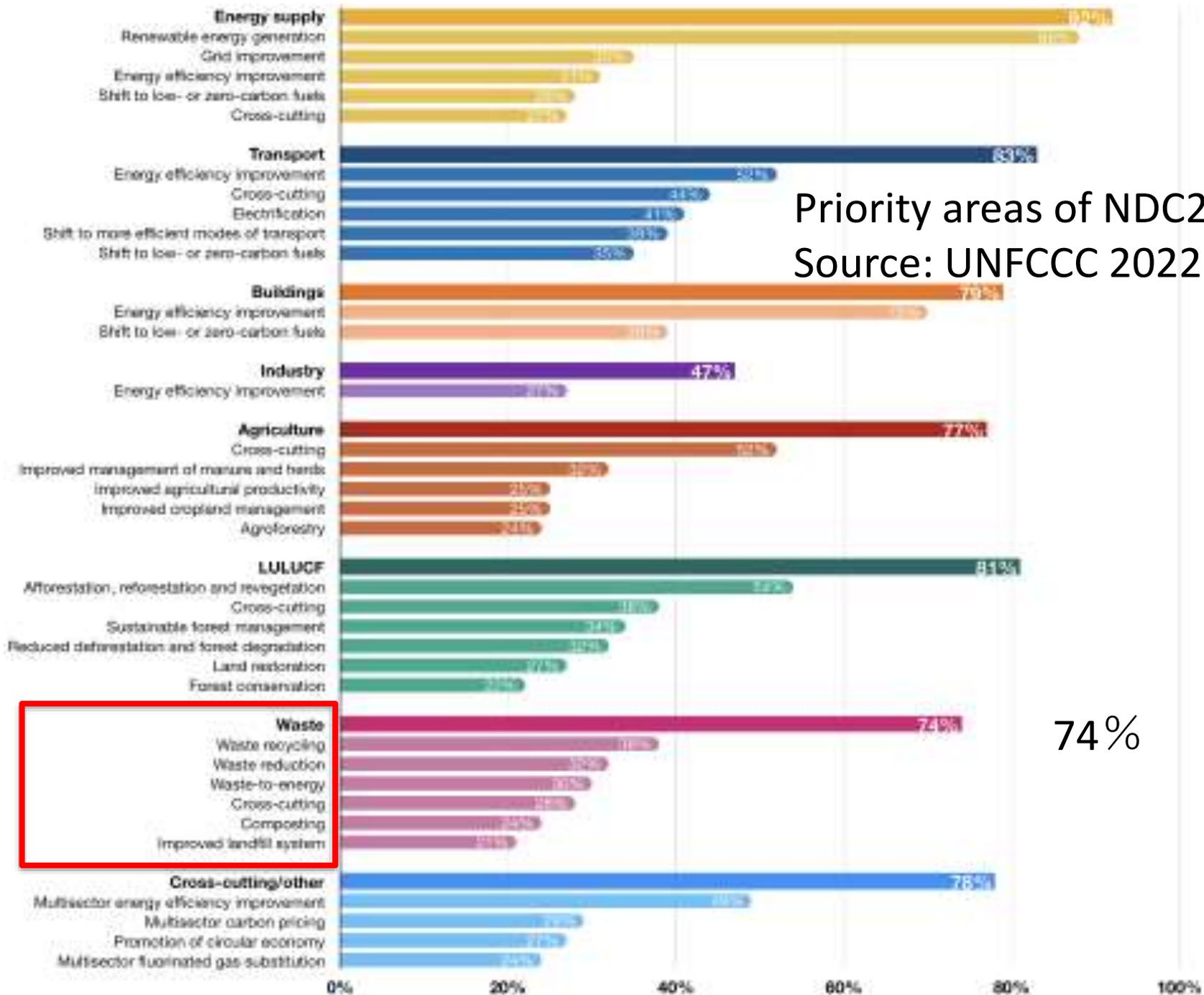


How we could fill the gaps in 2030 and 2050



Source : IEA, 2021

IEA. All Rights Reserved



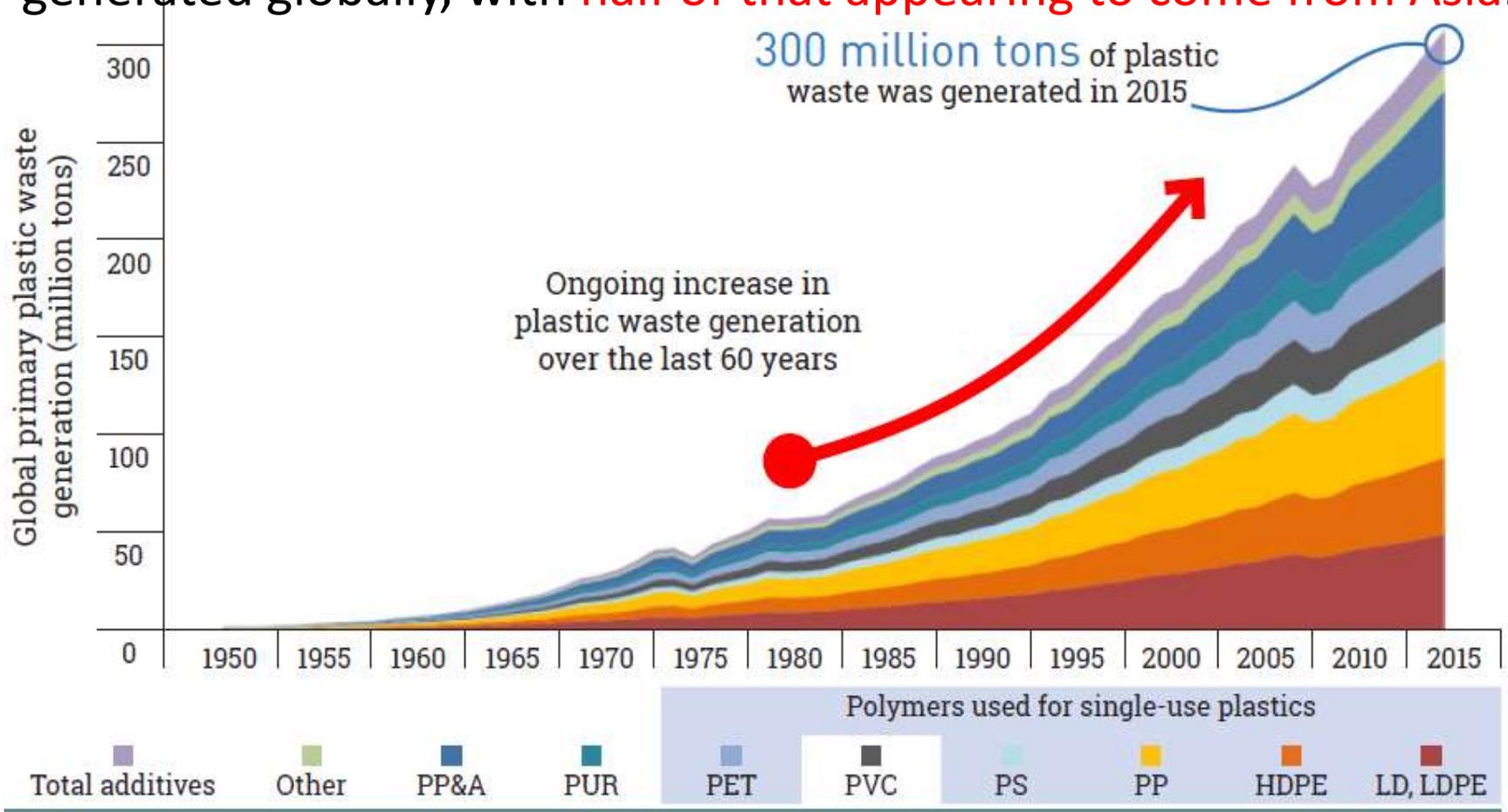
74%

Plastic production

- Since the 1950s, growth in the production of plastic has largely outpaced that of any other material.
- The world produces more than 400 million tons of plastics every year.
- Forecast: If the growth in plastic production continues at the current rate, by 2050 the plastic industry may account for 20% of the world's total oil consumption (Ellen MacArthur Foundation, The New Plastic Economy, 2016)

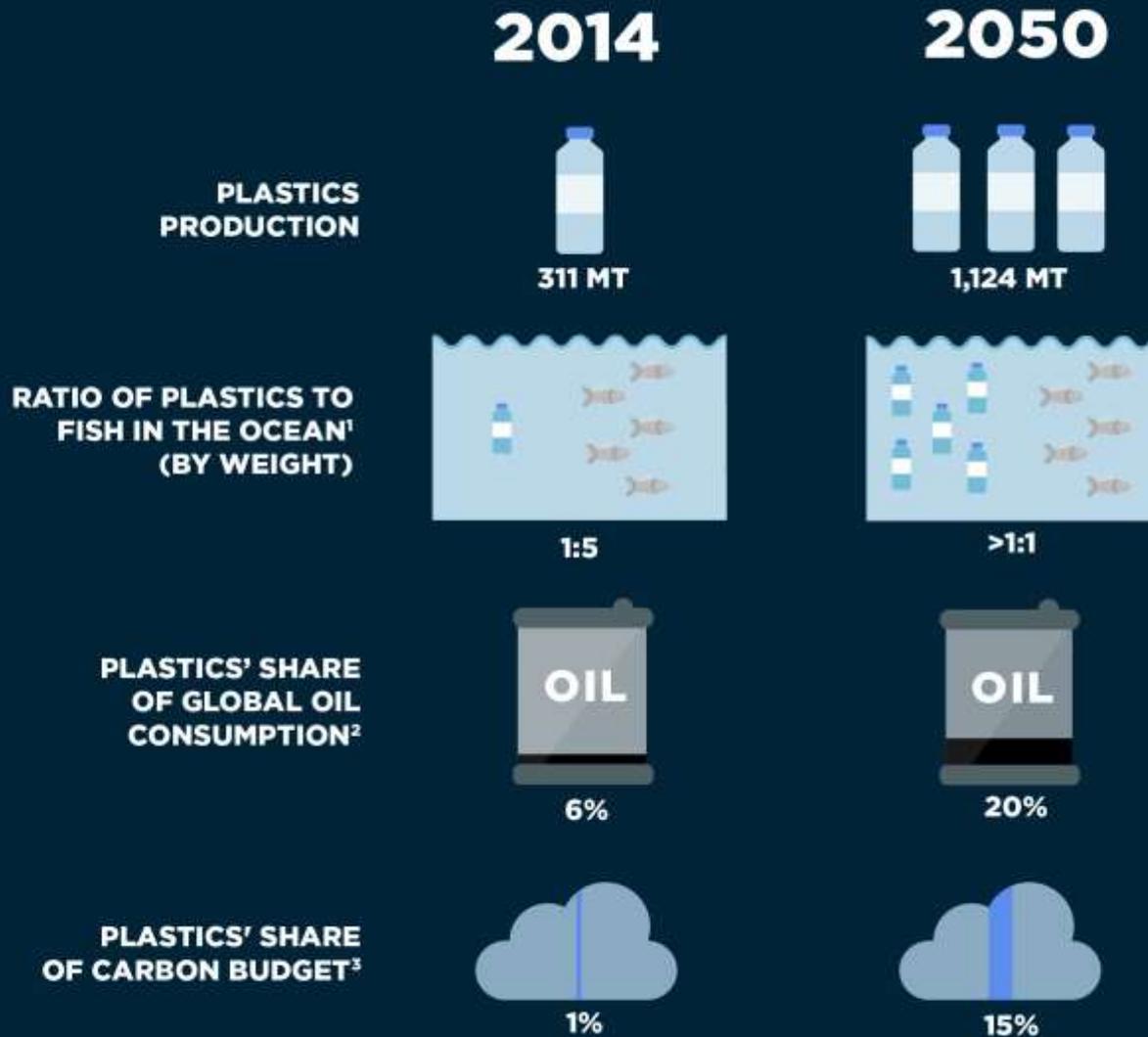
Global primary plastics waste generation, 1950-2015

In 2015, packaging waste accounted for 47% of the plastic waste generated globally, with half of that appearing to come from Asia.



Source: Adapted from Geyer, Jambeck, and Law, 2017

WITH AN EXPECTED SURGE IN CONSUMPTION, NEGATIVE EXTERNALITIES RELATED TO PLASTICS WILL MULTIPLY



Top 10 polluters

Top 10 Polluters

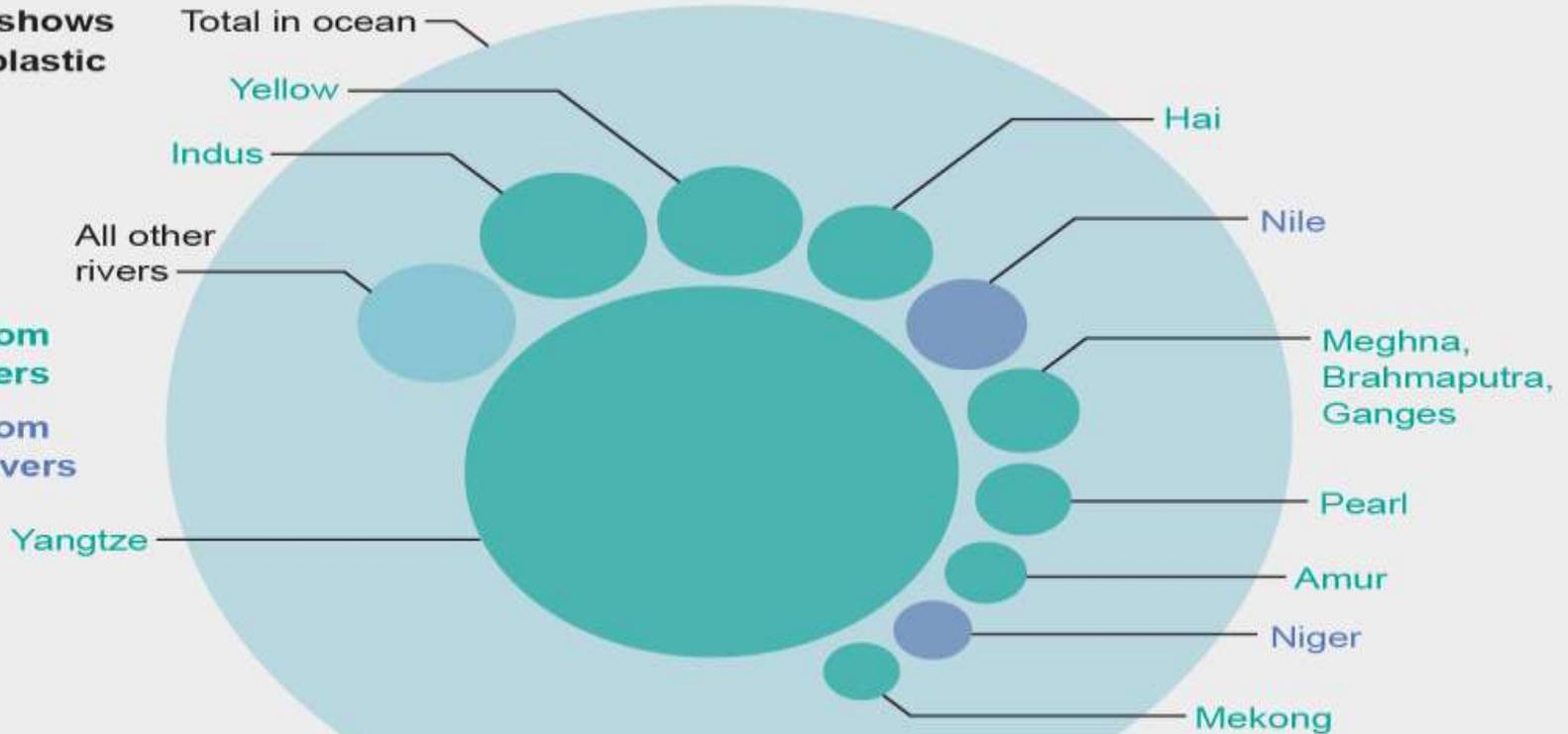
Circle area shows amount of plastic



100,000 metric tons

● Plastic from Asian rivers

● Plastic from African rivers



Credit: Amanda Montañez; Source: "Export of Plastic Debris by Rivers into the Sea," by Christian Schmidt et al., in Environmental Science & Technology, Vol. 51, No. 21; November 7, 2017

Impacts of unsound management of plastic wastes



Tourism



Threats to economy



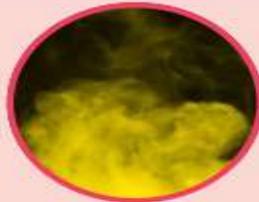
Fisheries



Agriculture



Aggravation of natural disasters (drainage system blockages)



Toxic fumes if burned



Impacts on human health



Contamination of water sources



Food chain contamination



Loss of biodiversity



Ocean pollution



Impacts on environment



Land pollution

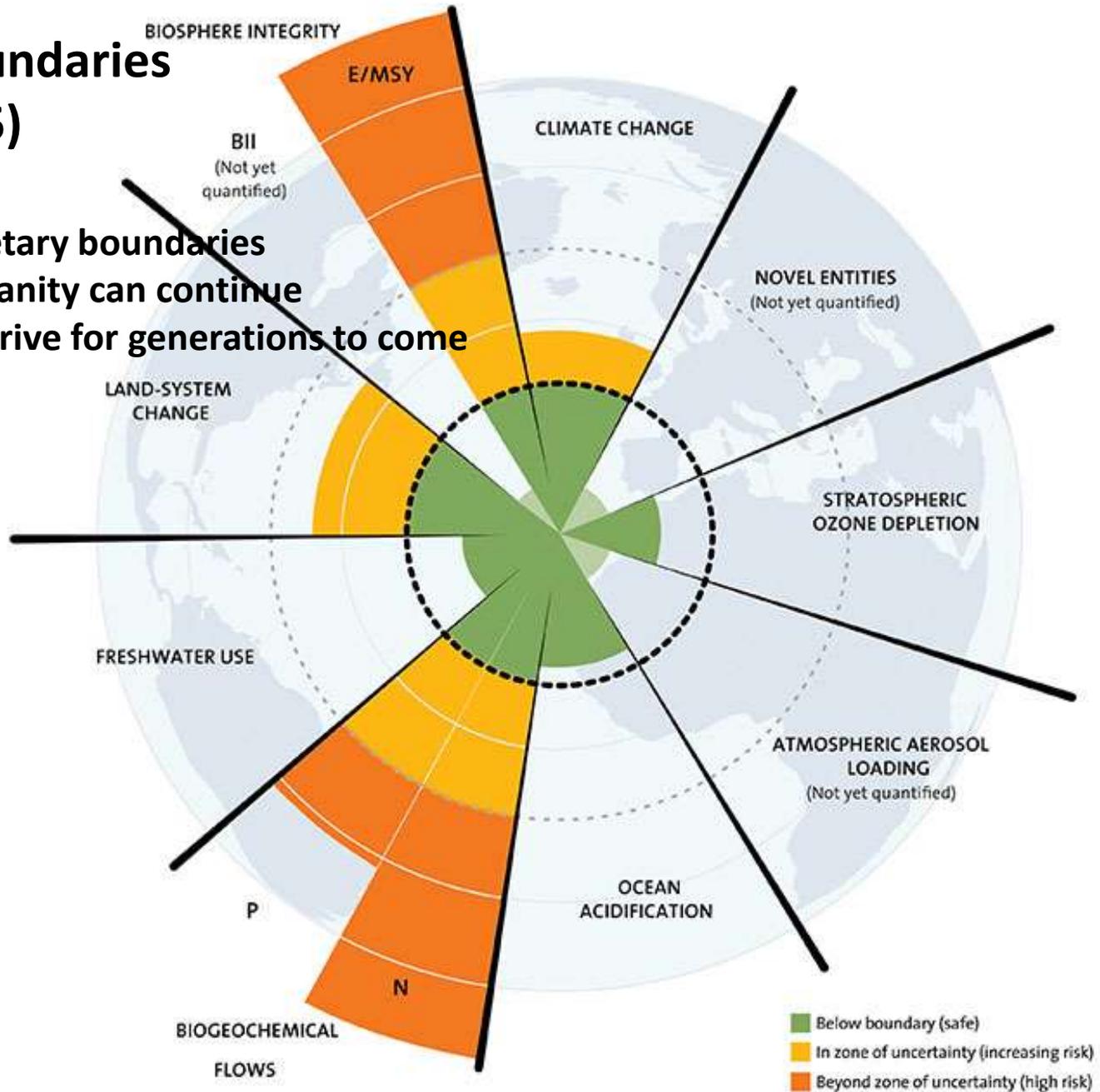


Climate Change

- Unsound management of plastic wastes **impacts on the environment including climate and ecosystem.**
- **Wasting economic values** of material especially through single-use
- **Externalities:** Asia-Pacific Economic Cooperation (APEC) estimates that **the cost of ocean plastics to the tourism, fishing and shipping industries** was USD 1.3 billion in that region alone.
- **Linkage between circular economy, climate and nature.**

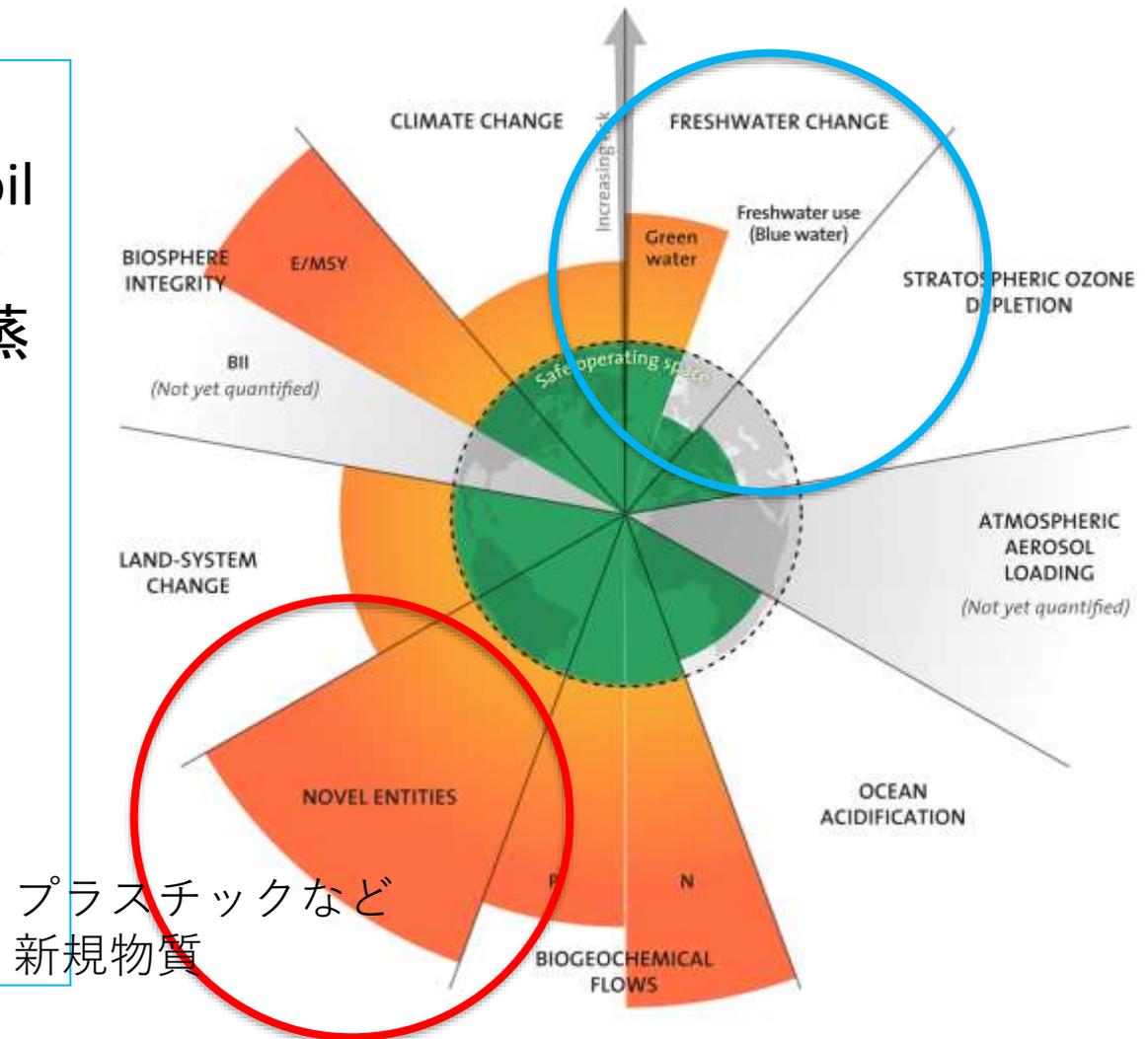
Planetary boundaries (Steffen, 2015)

a set of nine planetary boundaries
within which humanity can continue
to develop and thrive for generations to come



Planetary boundaries

- 「green water」= rainfall (降水量), soil moisture (土壤水分量), evaporation (蒸発乾燥)
- Novel entities including plastics



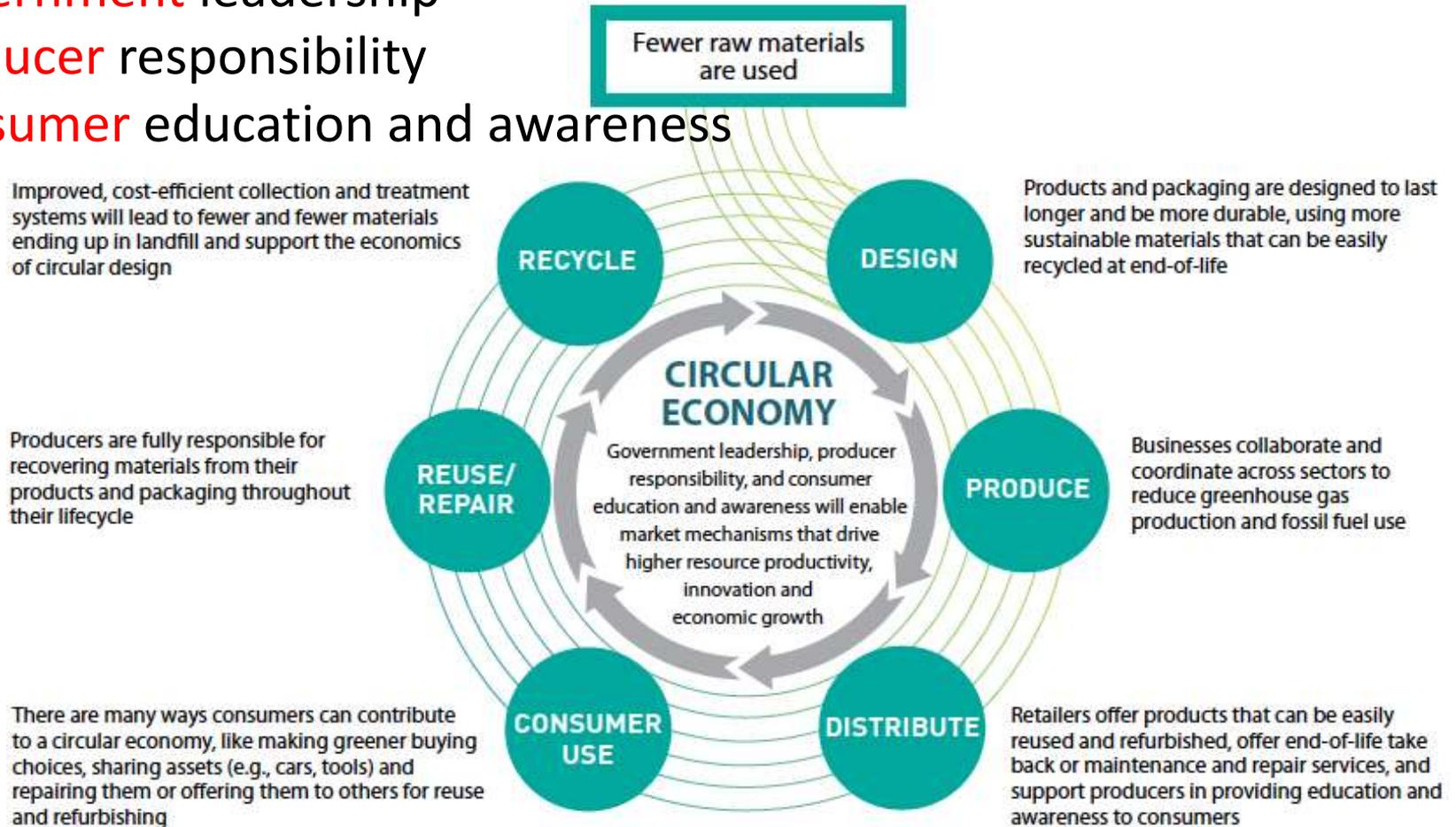
Circular Economy

A linear « make-use-dispose » process to « circular economy »

Government leadership

Producer responsibility

Consumer education and awareness



Why Build a Circular Economy?

- **What is « Circular Economy »?**
 - an economy in which participants strive,
 - (a) to **minimize the use of raw materials**,
 - (b) to **maximize the useful life of materials** and other resources through resource recovery, and
 - (c) to **minimize waste generated** at the end of life of products and packaging.
- **Why Build a « Circular Economy»?**
 - A Circular Economy will
 - Protect the **environment**;
 - Help businesses stay **competitive**;
 - Drive **innovation**.

Why move toward circular economy?

- A circular economy protects the **environment**.
 - **Waste sector: one of the source of emitting GHGs**
 - Especially, **methane emissions, formed by anaerobic breakdown of organic matter, which is one of the short-lived climate pollutants (SLCPs)**.
 - Emission (reduction) from waste management process (ex. collection, transport, sorting, treatment, reuse, recovery, disposal).
- A circular economy helps stay **competitive**.
 - Businesses can minimize costs and maximize diversion by leveraging economies of scale to find the most efficient ways of recovering materials and returning increased volumes of recovered materials back into the economy.
- A circular economy drives **innovation**.

The road to a net-zero greenhouse gas economy

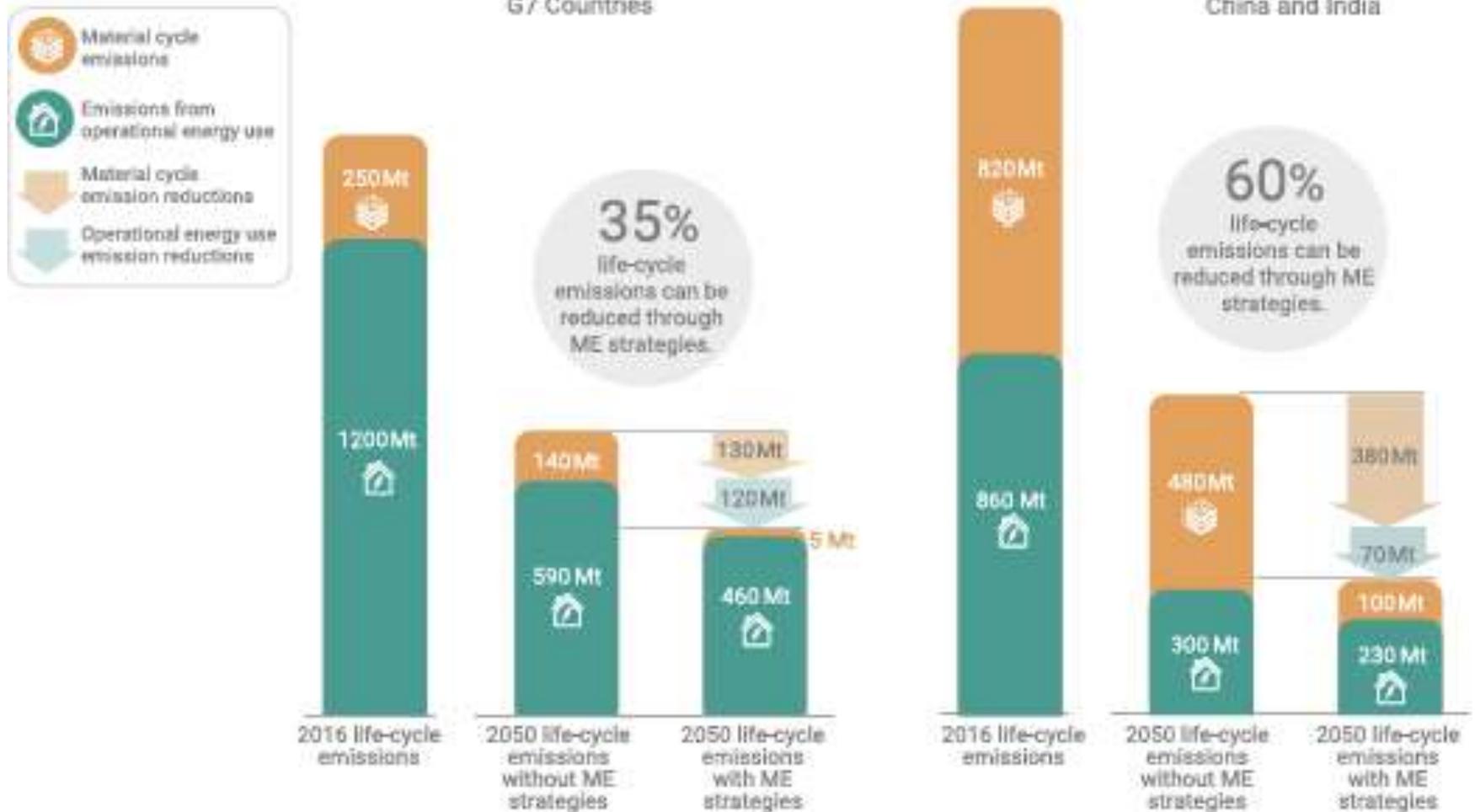
- joint action along a set of seven main strategic building blocks

Seven main strategic building blocks	Examples of actions
1. Maximise the benefits from Energy Efficiency including zero emission buildings	<ul style="list-style-type: none"> Digitalization, home automation, labelling, efficiency standard setting, higher renovation rate, fuel switching for heating to renewables, diffusion of the most efficient products and appliances, smart building/appliances management systems, and improved materials for insulation
2. Maximise the deployment of renewables and the use of electricity to fully decarbonise Europe's energy supply	<ul style="list-style-type: none"> Large-scale electrification, share of renewable generation, use for heating, transport and industry through direct use of electricity or indirectly through the production of e-fuels, use CO₂ as a feedstock, large-scale deployment of energy storage, management by digitalization, protection from cyber attacks
3. Embrace clean, safe and connected mobility	<ul style="list-style-type: none"> A combination of decarbonised, decentralised and digitalised power, more efficient and sustainable batteries, highly efficient electric powertrains, connectivity and autonomous driving, bio-fuels and bio-gas, e-fuels, hydrogen-based technologies, City planning, safe cycling and walking paths, clean local public transport, the introduction of new delivery technologies such as drones, and mobility as a service, behavioural changes, video conferencing
4. A competitive EU industry and the circular economy as a key enabler to reduce greenhouse gas emissions	<ul style="list-style-type: none"> re-use and recycling, recovery and recycling of raw materials, new materials, modernising existing installations or completely replacing them, digitalisation and automation, increased use of hydrogen, biomass and renewable synthetic gas, Carbon Capture and Utilisation in industry, use of renewable hydrogen and sustainable biomass as a feedstock new business concepts develop with re-use and additional services
5. Develop an adequate smart network infrastructure and inter-connections	<ul style="list-style-type: none"> Increased cross-border and regional cooperation smart electricity and data/information grids, and where needed, hydrogen pipelines, accelerated deployment of relevant infrastructure, increased synergy between transport and energy systems with smart charging or refuelling stations that enable seamless, cross-border services.
6. Reap the full benefits of bio-economy and create essential carbon sinks	<ul style="list-style-type: none"> Digitalisation and smart technologies for precision farming and precision agriculture, increasing the natural sink of forests, soils, and agricultural lands and coastal wetlands Afforestation and restoration of degraded forest lands and other ecosystems
7. Tackle remaining CO₂ emissions with carbon capture and storage	<ul style="list-style-type: none"> Increased R & D, new infrastructure, including related to transport and storage networks

Emissions caused by material production as a share of total global emission (1995 v. 2015)

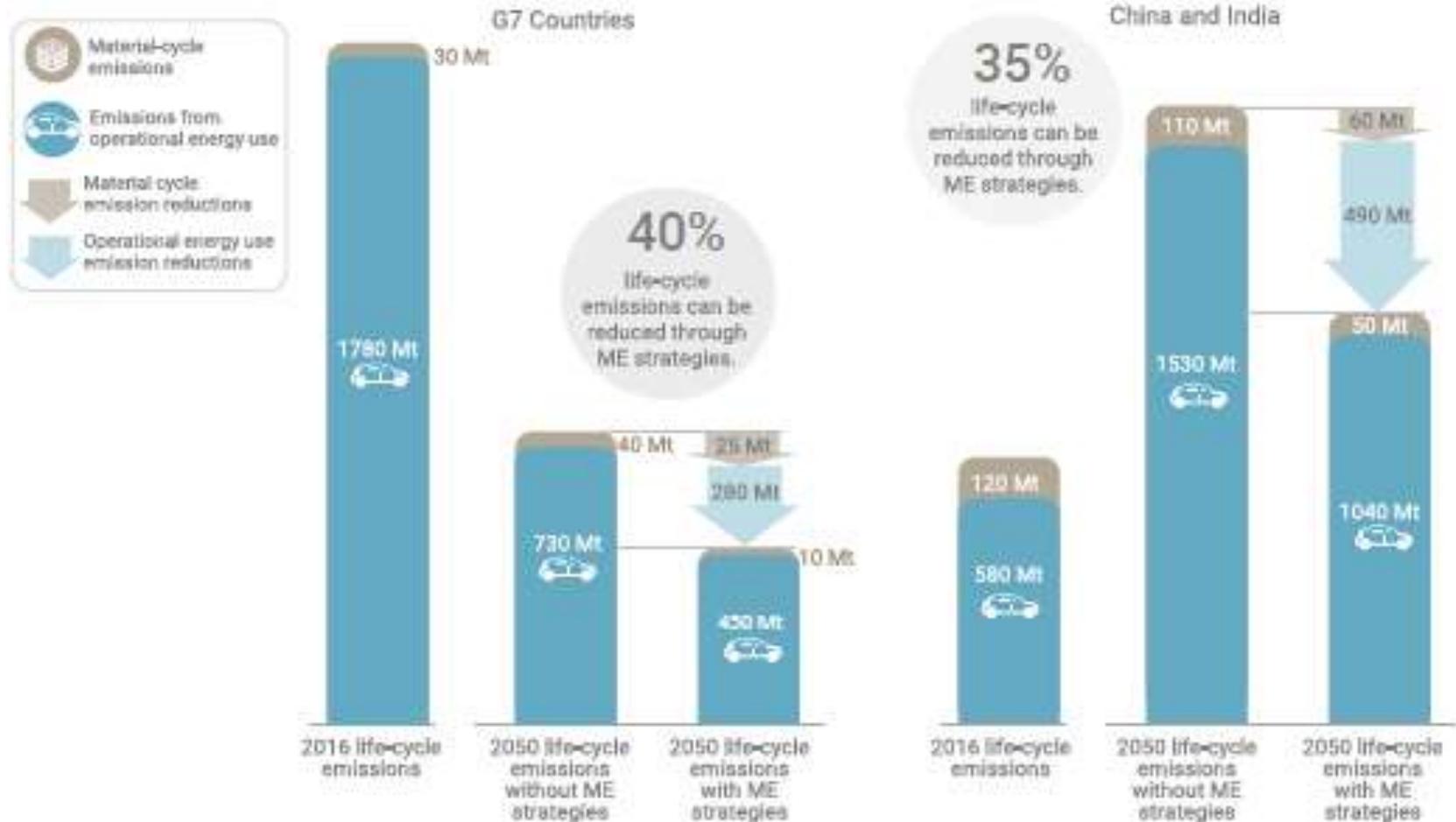


Lifecycle emissions from home with and without material efficiency strategies in 2050



Source : Hertwich et al., Resource Efficiency and Climate Change (2020)

Lifecycle emissions from cars with and without material efficiency strategies in 2050



Material Efficiency Strategies for Housing and Policy Options

- Using less material by design
- Material substitution
 - Ex. By timber wood
- Fabrication yield improvement
- More intensive use
- Enhanced end-of-life recovery and recycling of materials
- Reuse of materials and components
- Product lifetime extension
- In addition, for automobile, sharing and share ride

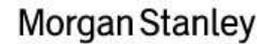
"New normal" towards net zero

- "New normal": Dynamic and drastic changes in businesses towards green economy, especially "net zero by 2050"
 - Most of large companies and of listed companies based in Japan commit themselves to "net zero by 2050", decarbonization goal.
 - Companies, including banks and financial institutions, do also commit themselves to **reducing scope 3 emissions (emissions from their supply chain and value chain)**, which means that companies **request/encourage its suppliers to reduce their emissions**.
 - Ex: Microsoft: (Potential) suppliers are requested to submit its scope 1 and 2 emissions plus scope 3 emissions for being selected as its supplier
 - Ex: Apple: requests its suppliers to produce Apple product by renewables by 2030
 - Ex: Hitachi: its carbon neutrality by 2030 and **100% reduction of its scope 3 emission by 2050**
 - Ex: Banking corporations: **net zero by 2050 of its portfolio of investment and loan** with interim target of 2030 (around 50%)
- **Energy transition to net zero will now enhance competitiveness of companies in the region.**

Science Based Target initiative (SBTi)

- Initiative created by CDP, UN Global Compact, WRI, and WWF
 - **Targets adopted by companies** to reduce greenhouse gas (GHG) emissions are **certified as “science-based”** if they are in line with the level of decarbonization required to keep global temperature increase well below 2 degrees Celsius compared to pre- industrial temperatures.
 - **4525** companies have committed to having such targets, **2241** of which have set certified science-based targets and **1671** of which have pledged net zero (as of 3 February 2023)
 - **Japanese companies setting certified science-based targets: 361** (as of 3 February 2023)
 - **263** of which have **pledged target in line with 1.5 degree**
 - **217** of which are **small and medium companies** (with less than 500 employees)
 - **69 more companies are preparing its science-based targets**
- <https://sciencebasedtargets.org>

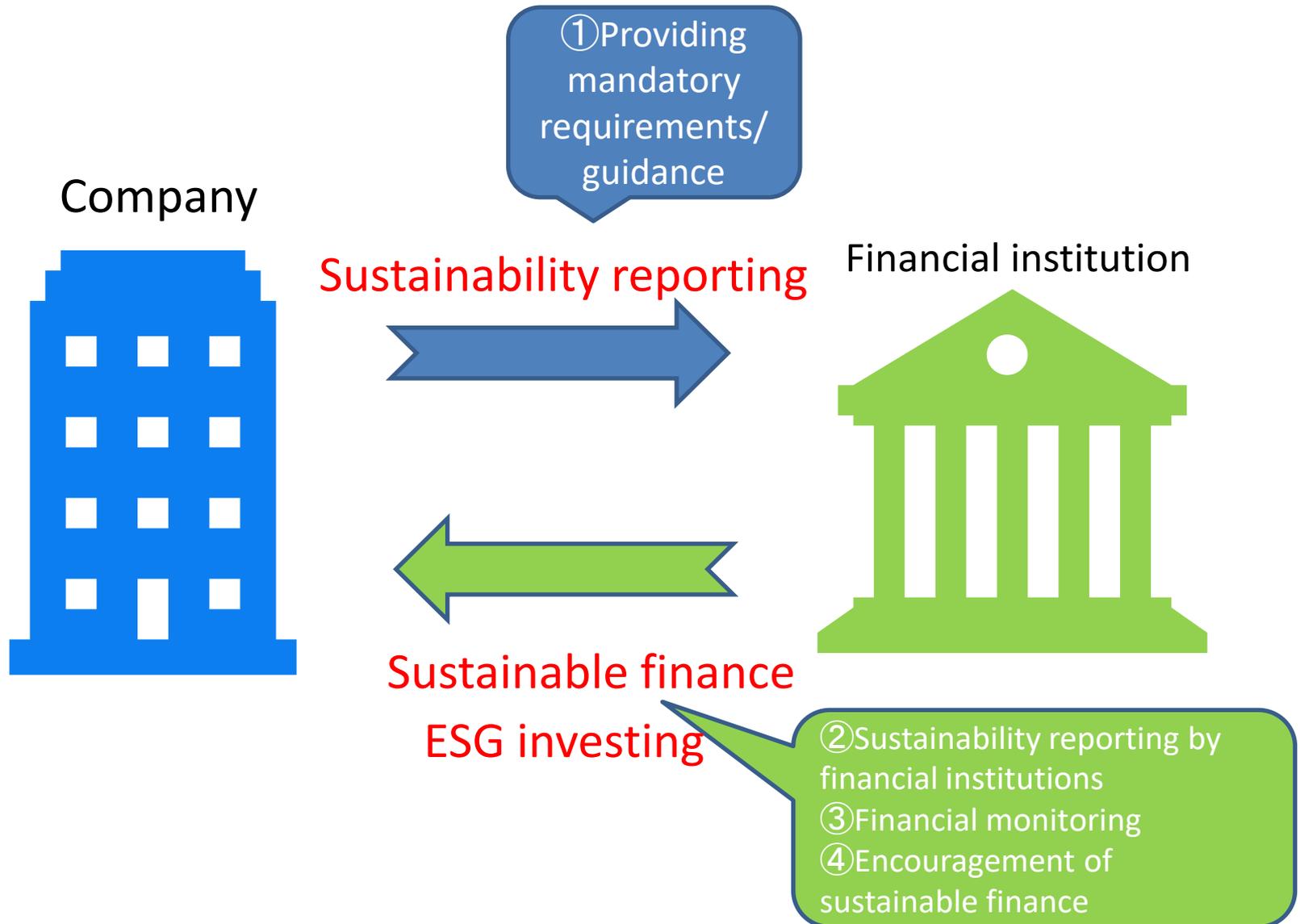
RE100: 397 companies to go '100% renewable'. (3 Feb. 2023)



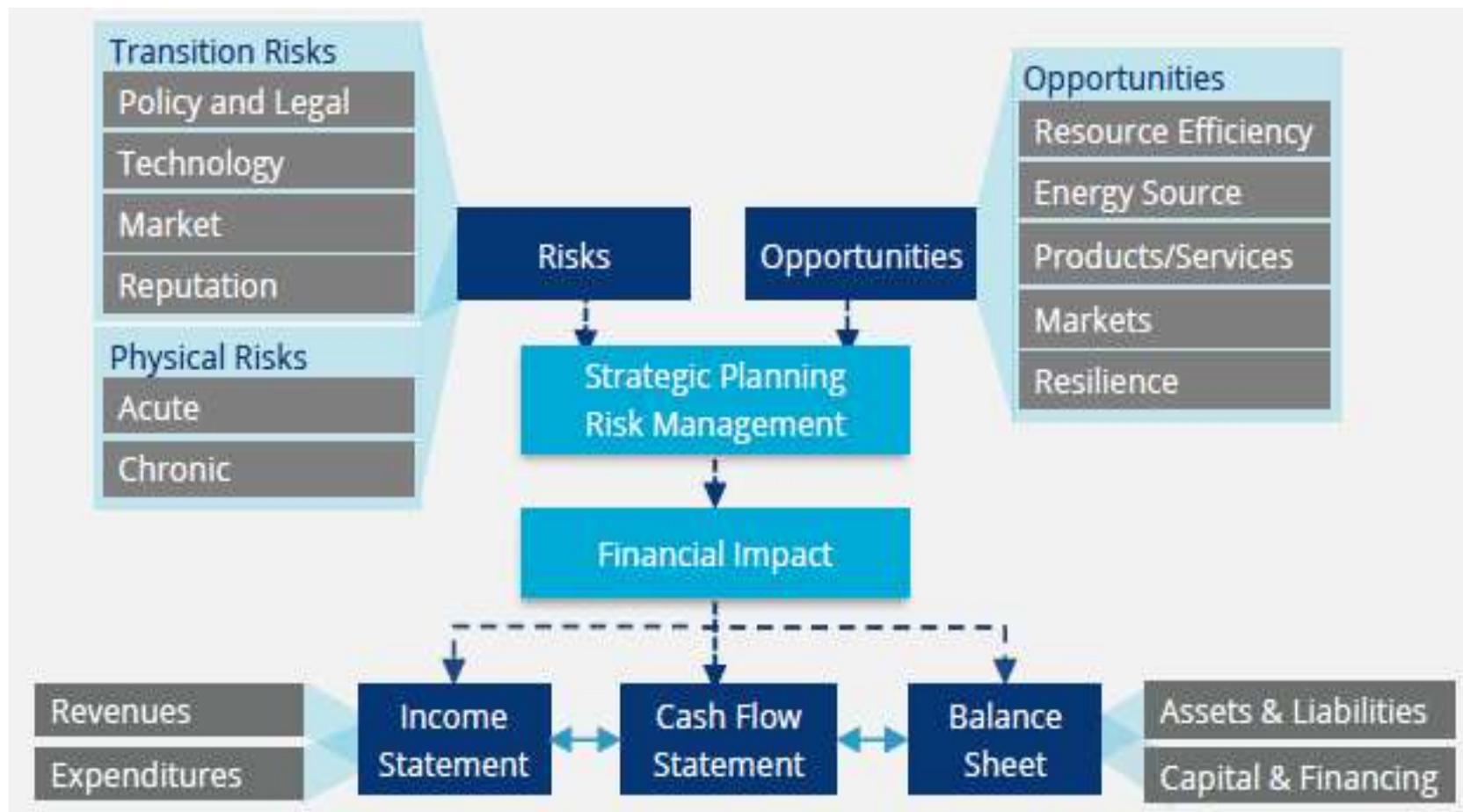
Financial institution and investors are changing and change business behavior

- UNPRI (Principles for Responsible Investment) and ESG investing
- Request companies to undertake disclosure of climate related risk, covering the whole supply chain
 - CDP (previously, Carbon Disclosure Project)
 - Recommendations by Task Force on Climate-related Financial Disclosures (TCFD) (June 2017)
- “Engagement, Voting and Divestment”
 - For instance, Norwegian Government Pension Fund (with about One trillion US dollar) has made divestment (about 8 billion US dollar) from 122 companies, more than 30% of business of which depends on coal exploitation and power generation (since 2016)
 - Engagement: Climate Action 100+
 - Proposals put forward by shareholders, including institutional investors
- GFANZ (Glasgow Financial Alliance for Net Zero)
 - Net zero asset owner alliance, Net zero asset managers initiative, Net zero banking alliance, Net zero insurance alliance, Net zero financial service providers alliance, Net zero investment consultants initiative, Paris Aligned asset owners

Governments push companies to integrate climate risks into their business.



TCFD: Financial impact of climate related risks and opportunities



Financial institutions and investors move toward net zero of investment portfolio

Net-Zero Asset Owner Alliance (launched in Sep. 2019)

Net Zero Asset Managers Initiative (launched in Dec. 2020)

Net-Zero Banking Alliance (launched in Apr. 2021)

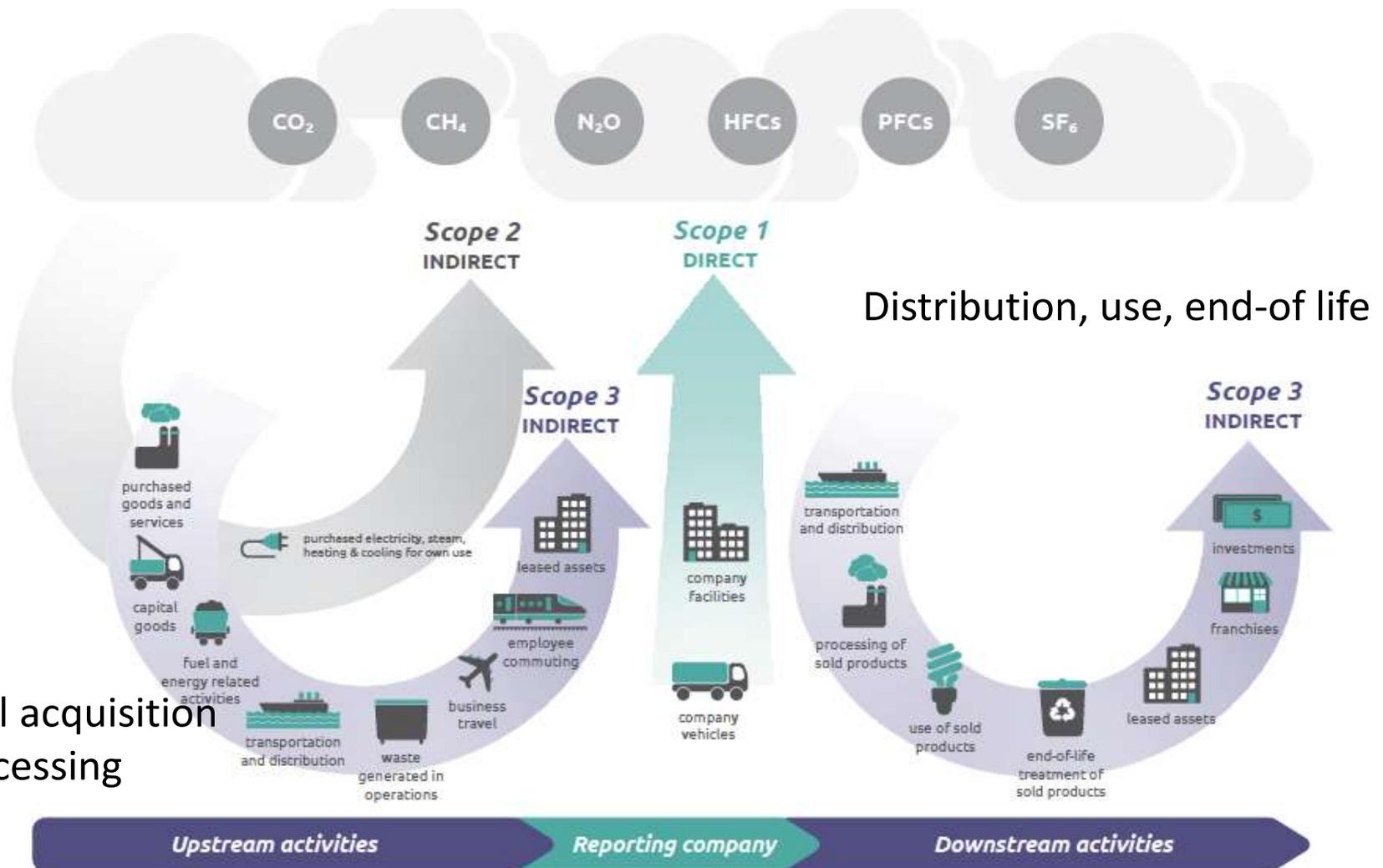
Net-Zero Insurance Alliance (NZIA) (launched in July 2021)

Sustainability Reporting Standards

	International	Japan domestic
June 2021	<ul style="list-style-type: none"> ▪ Launch of Task Force on Nature Related Financial Disclosure (TNFD) 	<ul style="list-style-type: none"> ▪ Amendment of Corporate Governance Code, requiring companies to undertake climate related financial disclosure in line with TCFD recommendations
September 2021		<ul style="list-style-type: none"> ▪ Financial Council starts deliberation on sustainability reporting standard
November 2021	<ul style="list-style-type: none"> ▪ IFRS (International Financial Reporting Standards) Foundation establishes International Sustainability Standards Board (ISSB) ↓ 	
January 2022		<ul style="list-style-type: none"> ▪ Financial Accounting Standards Foundation (FASF) decides to establish Sustainability Standards Board of Japan (SSBJ)
March 2022	<ul style="list-style-type: none"> ▪ TNFD publishes its first version ▪ US Security Exchanges Committee (SEC) issues draft of climate related disclosure regulation ▪ ISSB publishes its draft on sustainability reporting requirements and climate disclosure requirements 	
June 2022	<ul style="list-style-type: none"> ▪ TNFD publishes its draft ver.2. 	<ul style="list-style-type: none"> ▪ Financial Council recommend to include sustainability reporting in companies' financial statement
July 2022		<ul style="list-style-type: none"> ▪ SSBJ established
2023	<ul style="list-style-type: none"> ▪ Expected release of TNFD recommendations ▪ Expected release of sustainability reporting requirements and climate disclosure requirements 	<ul style="list-style-type: none"> ▪ Expected to amend Financial Instrument Act and its relevant regulations to oblige companies to sustainability reporting

Scope 3 emissions

Value chain emissions



Source : WRI/WBCSD Corporate Value Chain (Scope 3) Accounting and Reporting Standard, 2011

Microsoft: “Climate Moonshot” (16 January 2020)

- Carbon negative by 2030
- Remove our historical carbon emission by 2050
- \$1 billion climate innovation fund
- Scope 1 and 2 emissions to near zero by the middle of this decade
 - By 2025, shift to 100 percent supply of renewable energy.
- Reduce scope 3 emissions by more than half by 2030 through new steps
 - Since 2021, MS begins to implement **new procurement processes and tools to enable and incentivize our suppliers to reduce their scope 1, 2, and 3 emissions.**



<https://blogs.microsoft.com/blog/2020/01/16/microsoft-will-be-carbon-negative-by-2030/>

Apple: carbon neutral 2030 (16 July 2020)

- Apple commits to be 100% carbon neutral for its supply chain and products
 - Low carbon product design
 - Energy efficiency
 - Renewable energy
 - Process and material innovations
 - Carbon removal
- Already 100% renewable energy for its operations
- Focusing on creating new projects and moving its entire supply chain to clean power.
- More than 200 manufacturing partners including 29 Japanese companies have committed to 100 percent renewable energy for Apple production
- Apple monitors and evaluates progress of its suppliers based on their emission reporting.



<https://www.apple.com/newsroom/2020/07/apple-commits-to-be-100-percent-carbon-neutral-for-its-supply-chain-and-products-by-2030/>

Background

- The current **Fundamental Plan for Establishing a Sound Material-Cycle Society** states that evaluation and review - based on the progress of measures pursuant to the Plan - should be conducted approximately once every two years.
- The **Plan for Global Warming Countermeasures** revised on October 22, 2021 states that “specific consideration shall be conducted toward the future formulation of a roadmap in order to accelerate the transition to a circular economy.”
- The **Medium- to Long-Term Scenario (Proposal) toward 2050 Greenhouse Gas Emissions Net Zero in the Waste and Resource Circulation Sector** discussed by the Circular Subcommittee in August 2021 states that it is important to progress exchanging opinions with various sectors regarding the possibility of decarbonization based on resource circulation throughout the life cycle.

Overview

- As well as designating “thorough resource circulation throughout the life cycle” in the Circular Plan as the focal sector for review, review and evaluation shall also be conducted for closely-related sectors (integrated initiatives with creating a sustainable society, regional revitalization through creating diverse regional circular zones of symbiosis, environmental regeneration and further promotion of proper disposal, building appropriate international resource circulation structures and promoting the overseas expansion of circular industries, etc.)
- **The evaluation and review of the progress** of the current **Fundamental Plan for Establishing a Sound Material-Cycle Society** were compiled as a **Circular Economy Roadmap**.
- After **public consultation** to reflect as many people’s opinions as possible from the proposal advance consideration stage, the Circular Subcommittee held discussions and then final deliberations toward a formalized position in August 2022.

Schedule

December 9	Circular Society Subcommittee: Second review of the 4th Fundamental Plan for Establishing a Sound Material-Cycle Society and formulation of a circular economy roadmap
January 18 - February 28	Advance call for opinions
March 16	Workshop
April 5	Circular Society Subcommittee: Deliberations about the Critical Element Proposal and the Progress Table regarding Central Government Initiatives
May 23	Circular Society Subcommittee: Deliberations about the Critical Element Proposal
June 27	Circular Society Subcommittee: Deliberations about the Proposal
July 1-30	Public comment
August 25	Circular Society Subcommittee: Deliberations toward a formalized position
September 6	Circular Economy Roadmap publication

Submission Period

Tuesday, January 18 to Monday, February 28, 2022

Content of Call for Opinions

Please think about the following three questions regarding the future image of a circular society which maximizes utilization of a circular economy and the approach to achieve it, working toward a sustainable society such as carbon neutrality by 2050.

Question 1: What are your thoughts about the necessity of initiatives (including regulation of consumption of natural resources and initiatives to reduce environmental impact) about appropriate resource circulation throughout the life cycle - including manufacturing, distribution, sales, consumption and use, disposal, etc. - toward building a sustainable society such as carbon neutrality by 2050?

Question 2: To date, many initiatives regarding the 3 Rs (Reduce, Reuse, Recycle) have been taken in Japan. In recent years, new business models such as sharing and subscription have become more prominent. What sort of initiatives do you envisage so that circular economy initiatives are incorporated into the core practices of businesses and a range of other organizations, further deepened, and spread throughout society?

Question 3: The 4th Fundamental Plan for Establishing a Sound Material-Cycle Society includes not only environmental, but also economic and social aspects. Related measures are currently being incorporated in order to achieve integrated improvements in these aspects. What sort of initiatives do you envisage that would promote a circular economy as well as contribute to achieving Sustainable Development Goals (SDGs), which include welfare, education, and poverty?

Submission Methods

Electronic government web portal (e-Gov), post

Overview

Date and time: Wednesday, March 16, 2022, 1:00PM to 4:00PM

Held at: Online

Participants: 143 people (123 presenters and members of the general public)

Content: (1) Keynote address, (2) Group session (presentation of case studies and exchange of opinions), (3) Overall exchange of opinions

Content

(1) Keynote address “Building a Circular Society: Japan’s Track Record and Future Prospects”

Ms. Misuzu ASARI, Associate Professor,

Kyoto University Graduate School of Global Environmental Studies

(2) Group session (presentation of case studies and exchange of opinions)

- Group A: Necessity of initiatives for resource circulation throughout the life cycle

Facilitator: Ms. Chika AOKI-SUZUKI, Senior Researcher, Institute for Global Environmental Strategies

Presentation of initiative case studies: AEON Co., Ltd., JX Nippon Mining & Metals Corporation,

Sumitomo Chemical Co., Ltd., TOTAL CARE SYSTEM Co., Keidanren (Japan Business Federation)

- Group B: Approaches to promoting a circular economy and contribution to SDGs

Facilitator: Ms. Ryoko KIZAWA, Chair, GENKI Net for Creating a Sustainable Society

Presentation of initiative case studies: airCloset, Inc., Osaki Town, Kagoshima Prefecture, Sharing Economy Association, Japan, JFE Engineering Corporation, Tokyo Organising Committee for the Olympic and Paralympic Games

(3) Overall exchange of opinions

Moderator: Misuzu ASARI, Associate Professor, Kyoto University Graduate School of Global Environmental Studies

The facilitators introduced the exchange of opinions in each group, comments from youth representatives, and exchange of opinions



(Top: Associate Professor ASARI,
Left: Senior Researcher AOKI-SUZUKI,
Right: Chair KIZAWA)

Workshop Outcomes

Many forward-looking initiatives were showcased. In addition, the importance of companies, residents, consumers, and governments to address and take action on various issues as their own issues was underlined in order to overcome them.

Circular Economy Roadmap

Direction toward 2050

- Realizing a **Circular Economy** and achieving **Carbon Neutrality in 2050**

Ascertaining and
evaluating the
current situation

Results of the Review
of Fourth Plan

2030

2050

Circular economy-related business
At least 80 trillion yen

Plastic strategy milestone
Plastic recovery volume doubled

Food loss
4 million tons or less

Metal recycling
Raw materials volume processed doubled

Direction of measures toward 2030

- The direction of measures has been laid out in each sector. These include types of material (plastic, metals, etc.), products, (automobiles, fashion, etc.), circular economy-related business, waste disposal systems, regional circular systems, proper disposal, international resource circulation promotion, as well as collaboration and human resources development by a wide range of organizations

Current State and Evaluation of Progress in Circular Society Overall Image Representative Indicators

- Through initiatives across all of society, **resource productivity will be improved** and **final disposal amount will be steadily decreased**, but at the same time, **further initiatives for engagement in circular usage will be demanded in the future**.
- It is estimated that **the share of the sector that resource circulation has room to contribute to is about 36%** of Japan's total **greenhouse gas emissions volumes**.

Item	Type	Indicator	Numerical Targets (Objective Year)	Latest Values	Prospects of Reaching Objectives in Fourth Plan	Notes etc.
Inlet	Material flow indicator	Resource Productivity	490,000 yen/ton (FY 2025)	436,000 yen/ton (FY 2019)	○	Objectives projected to be reached in both short and long term
Circulation		Cyclical use rate at inlet	Approx. 18% (FY 2025)	15.7% (FY 2019)	△	Objectives projected to be reached in long via increasing trend. However, recent years have seen a plateauing trend. Objectives projected to be unlikely to be reached based on short-term trends.
		Cyclical use rate at outlet	Approx. 47% (FY 2025)	43.0% (FY 2019)	△	On a long-term increasing trend, but decreased from FY 2018 to FY 2019.
Outlet		Final disposal amount	Approx. 13 million tons (FY 2025)	13.04 million tons (FY 2019)	◎	Objective standard has almost been reached. Objectives projected to be reached in both short and long term

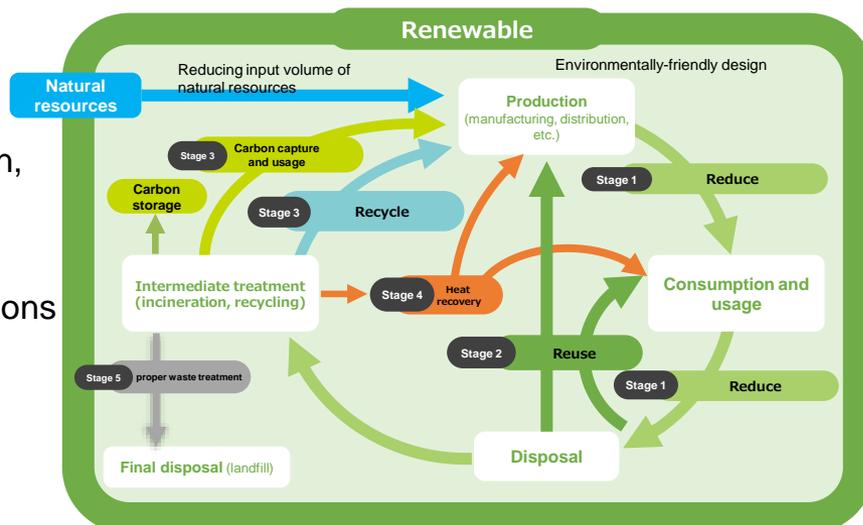
Resource Productivity = GDP/Input of natural resources

Cyclical use rate at inlet = amount of cyclical use/(input of natural resources + amount of cyclical use)

cyclical use rate at outlet = amount of cyclical use/generation of waste, etc.

Toward a 2050 Circular Society

- Initiatives based on the Basic Act on Establishing a Sound Material-Cycle Society which integrate the three Rs, economic aspects, and social aspects
- Transition to a **Circular Economy** (maximizing value, restricting resource input and consumption volumes, minimizing waste generation):
Conversion of overall economic activities including core practices, 3 Rs + renewables (transition to biomass, usage of recycled materials, etc.)
- Advancing resource circulation through promotion of a circular economy approach etc., **contributing to overall life-cycle greenhouse gas reductions**
- Reducing the overall environmental burden (biodiversity, air, water, and soil)
- Making circular economy-related business a **growth engine**, leading to **GX** investment
- Fundamental strengthening of **economic security**.
Contributes to the stable supply of materials necessary for a sustainable society.
- Addressing social issues such as regional revitalization, international circular economy structure, collaboration, transformation in awareness, behavioral change between a wide range of organizations
- Supplying the necessary items and services to the people who need them, when they need them, and as much as they need them

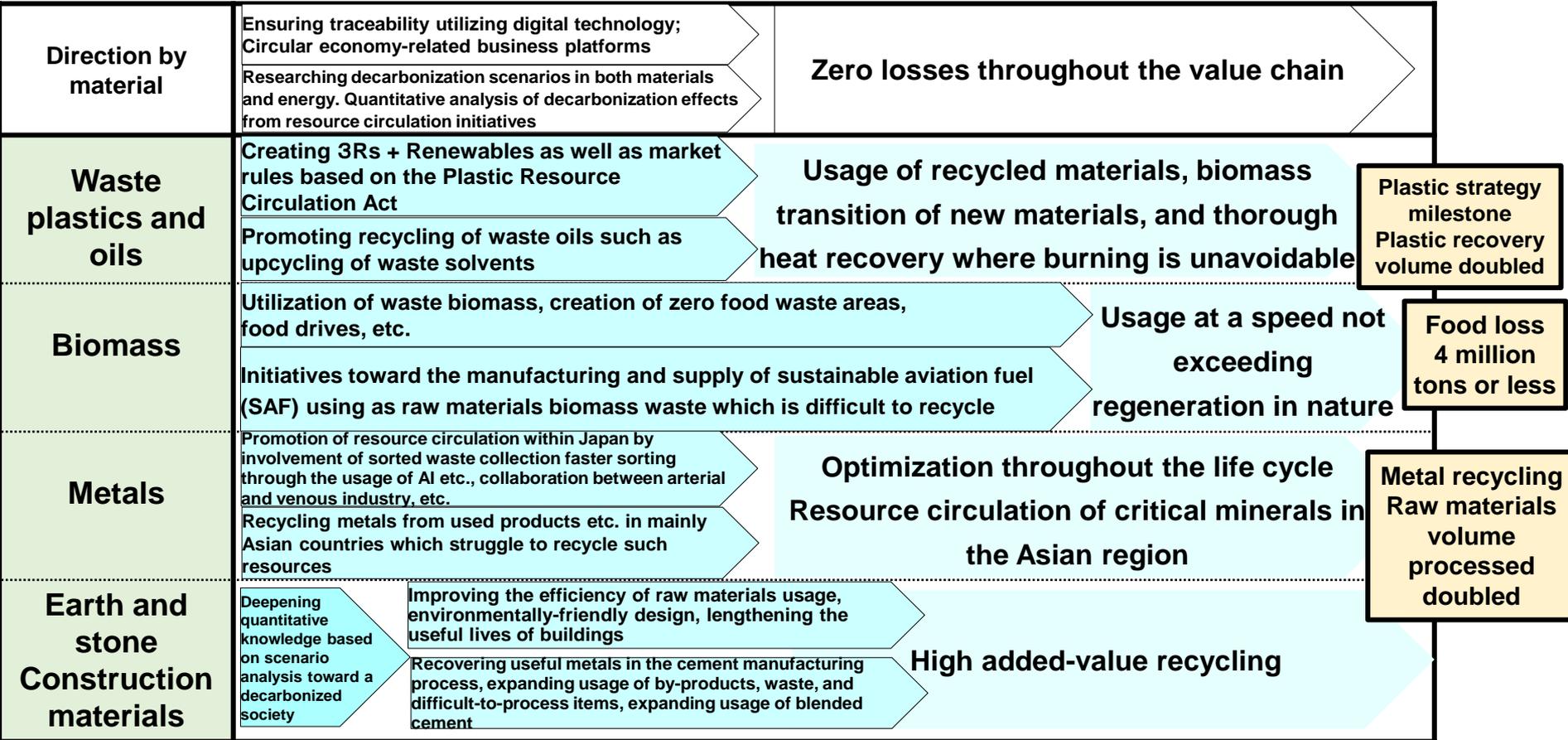
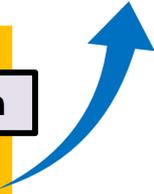


Initiatives for effective utilization of resources upon realization of the circular economy

Direction of measures in each sector

2030

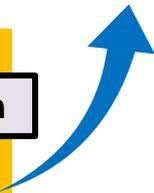
Circular economy-related business: At least 80 trillion yen



Direction of measures in each sector

2030

Circular economy-related business: At least 80 trillion yen

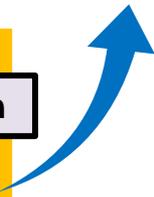


Direction by product	Environmentally-friendly design at the production stage, promoting the use of renewable resources New business models such as subscriptions as well as reuse, repair, and maintenance at the usage stage	Optimization to a flow which creates thorough resource circulation throughout the life cycle
Buildings	Reducing the need for construction by creating and maintaining quality social stock, reuse of highly-usable construction materials Urgent consideration including the legal framework such as a construction recycling law in order to recycle etc. waste plastic from construction	Creating compact and resilient cities Consider measures from the perspectives of improving resiliency to disasters and reducing the amount of waste generated in the event of a disaster in regions vulnerable to disasters which are excluded from the target areas
Automobiles	Urgently ascertaining the current emissions situation The benefits of reduction, impact of electrification, analysis of the state of discharge from storage batteries	Consideration of decarbonization strategies in the vehicle recycling sector Decarbonization across the vehicle life cycle Decarbonization of the vehicle recycling process itself
Small and home appliances	Annual recovery of 140,000 tons of small-size home appliances Increased volume of HFC recovery by promoting domestic air-conditioning recovery	Working to maximize the service transition and added value New circular economy-related business models
New products and materials popularized as measures against climate change	Urgent consideration including the legal framework to promote the reuse and recycling of solar power generation equipment Appropriate reuse and recycling of lithium-ion and lead-acid batteries: Comprehensive measures aimed at preventing fires occurring, etc.	Technological development and equipment deployment related to the three Rs including increasing the sophistication of recycling technology
Fashion	Labeling and information dissemination New business models and environmentally-friendly design Ascertaining the present situation toward increasing the sophistication of recycling technology and clothing collection systems Creating a structure bringing together all related government agencies	Ordering, producing, and purchasing the appropriate volume plus circular usage for all of society Achieving sustainable fashion

Direction of measures in each sector

2030

Circular economy-related business: At least 80 trillion yen



<p>Circular economy-related business</p>	<p>Supporting initiatives related to disclosure and dialog with businesses, investors, etc., evaluation initiatives across the supply chain</p> <p>New support measures for all-encompassing technological development and implementation throughout society</p>	<p>Field trial countries of circular economy-related businesses</p> <p>A society attracting ESG investment</p> <p>Spreading new circular economy-related business models to the regions and all of society, ensuring traceability, improving efficiency</p>
<p>Waste disposal systems</p>	<p>Decarbonization technology verification and evaluation, considering the directionality of public-private partnerships</p> <p>Considering waste disposal systems, facilities installation direction, etc.</p> <p>Formulating action plans</p>	<p>Initiatives toward achieving carbon neutrality by 2050</p>
<p>Regional circular systems</p>	<p>Formulating guidance for promoting the building of regional circular zones of symbiosis within the resource circulation sector</p> <p>Considering measures including operational and functional aspects toward distributed resource recovery base stations and attendant facilities installation</p>	<p>Utilizing waste as a community resource</p>
<p>proper treatment</p>	<p>Product safety, toxic substance risk management, as well as preventing illegal dumping and improper treatment in terms of the Three Rs + Renewables</p> <p>Maintaining the remaining lifespan of final waste disposal sites at FY 2019 levels (17 years' worth) in FY 2025</p>	<p>Firmly adhering to the systems, structures, and technologies for proper treatment of waste</p>
<p>International circular economy promotion</p>	<p>Support for formulating long-term strategies and plans, support for preparing related frameworks, human resources development, standardization of circular infrastructure, and overseas rollout of the Fukuoka model of semi-aerobic landfill concept</p> <p>Bilateral cooperation, overseas rollout of environmental infrastructure, utilization of the G7 and G20, building and expanding an Asia-Pacific regional platform</p>	<p>Overseas rollout of Japanese models of circular industries and resource circulation</p> <p>Growth of circular economy-related business</p> <p>Building an appropriate international resource circulation structure</p>
<p>Collaboration and human resources development by a wide range of organizations</p>	<p>Utilizing circular economy partnerships (J4CE)</p> <p>Utilizing various educational forums, human resources development, development of materials circulation and greenhouse gas calculation tools</p>	<p>Appropriate division of roles between various organizations, diverse inter-organization collaborations spanning industries and sectors</p>

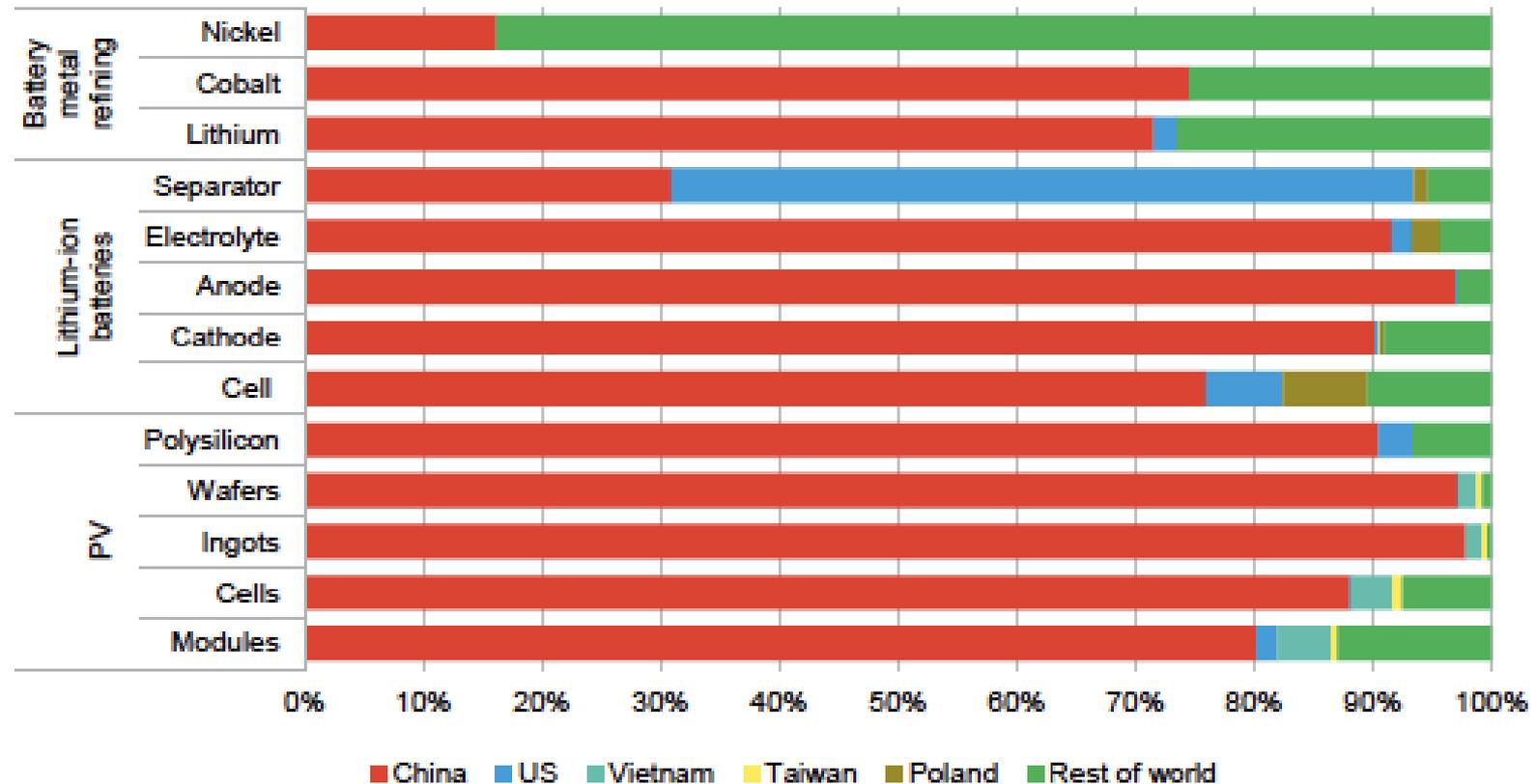
New values of circular economy policy

- Better waste management policy could improve living standard of population.
- Large potentials for co-benefits exist with better policies incorporating consideration of synergies, for instance, with climate change
 - ex. Plastics
 - ex. Material efficiency
 - Critical minerals for energy transition. Enhancing economic security
- Actions in urban areas.
- Especially important for businesses and businesses, because it will
 - Improve competitiveness and resilience through cost efficiency and resource efficiency
 - Create new markets and businesses. Co-innovation
 - Enhance corporate value in the financial market and in supply chain
 - Good opportunities for inducing private investment

Battery and solar commodities production remains highly geographically concentrated

Current production capacity by location

Source : BloombergNEF, 2022

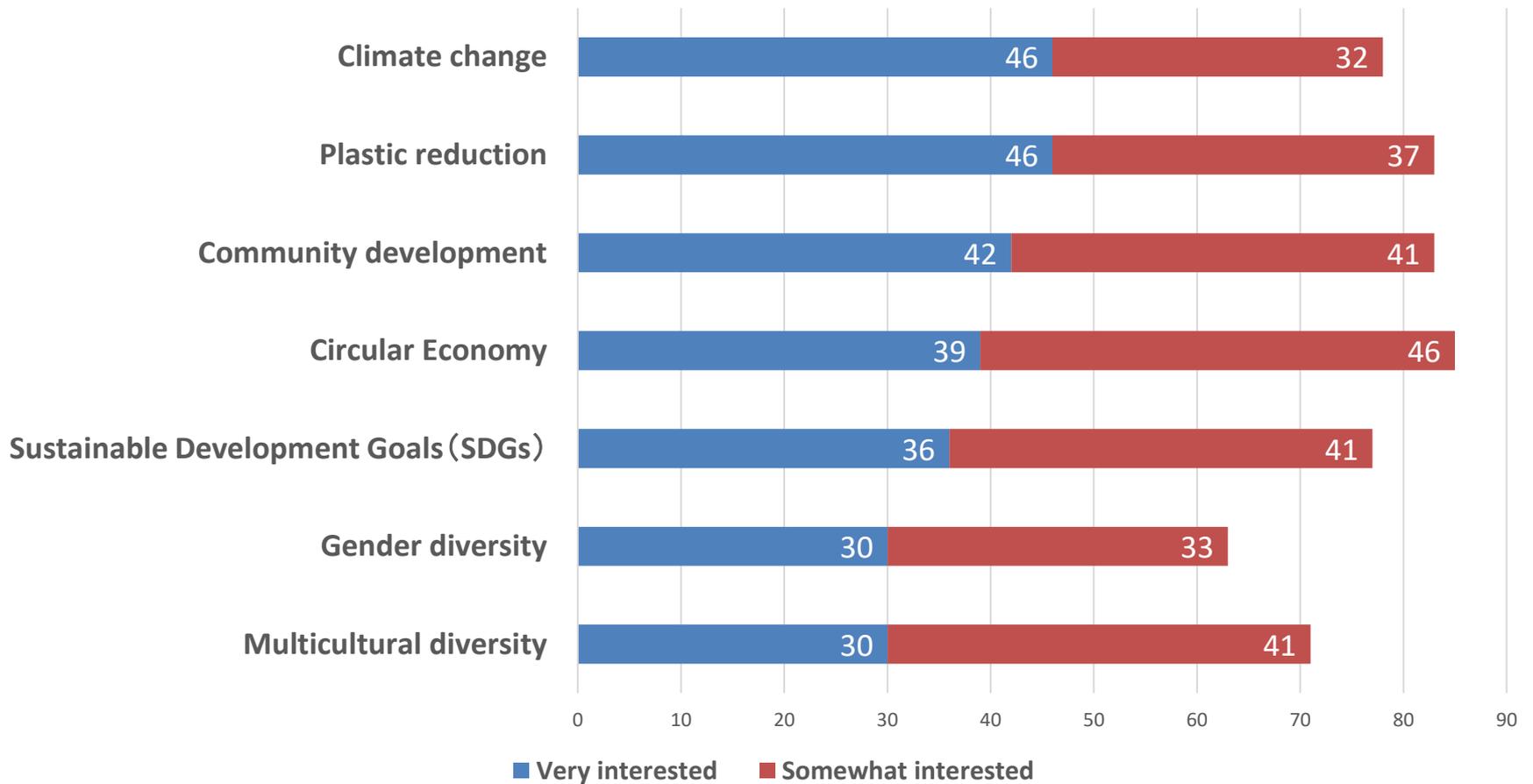


Source: BNEF. Note: PV components expressed in MW; separators in m²; battery metals and other battery components in tons. Data for August 2022 except metal refining which is 2021. Oversupply in the solar sector is such that nameplate capacity for most segments of the PV value chain far exceeds yearly output. Nickel is the battery-grade class 1 variety.

Importance of actions by urban areas (IPCC AR6, 2022)

- Urban areas can create opportunities to increase resource efficiency and significantly reduce GHG emissions through the systemic transition of infrastructure and urban form through low-emission development pathways towards net-zero emissions.
- Ambitious mitigation efforts for established, rapidly growing and emerging cities will encompass
 - 1) reducing or changing energy and material consumption,
 - 2) electrification, and
 - 3) enhancing carbon uptake and storage in the urban environment.
- Cities can achieve net-zero emissions, but only if emissions are reduced within and outside of their administrative boundaries through supply chains, which will have beneficial cascading effects across other sectors.

Individual investors shows the most interest in targeting Climate change and Plastic reduction



Reframing policies and strategy

- Review, revisit and reframe current policies and strategy towards toward circular economy
 - The government plays an essential role.
 - Accelerating public and private clean investment is key.
 - The Government should indicate clear long-term policy guidance, for instance, by showing long term decarbonization goal, vision for circular economy etc. and mid-term milestones.
 - The Government should take measures to facilitate investment and to remove investment barriers.
 - Participatory approach: involve stakeholders, including local authorities and private sector
 - Science and technologies contribute to such policy direction.
- Discover and share new values of circular economy policies

Thank you for your attention!

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