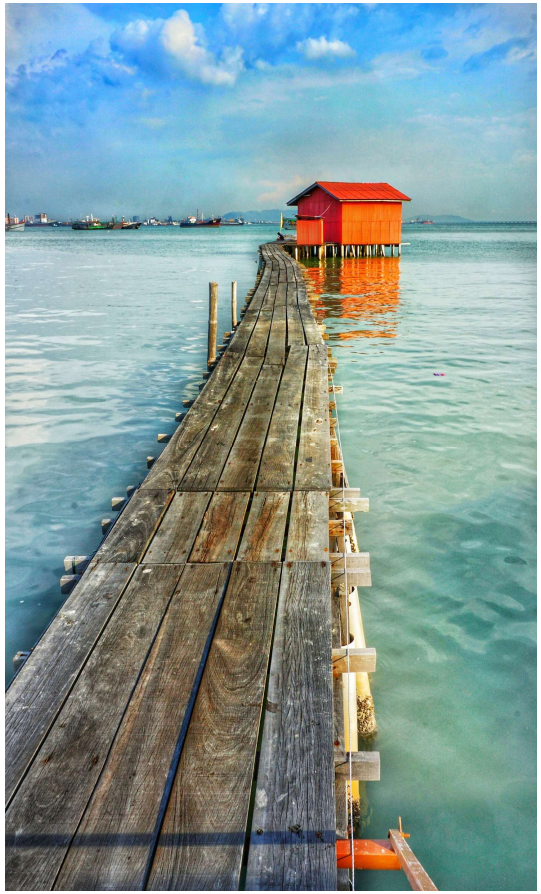
Challenges for the Chemical Fiber Industry in the Era of Climate Crisis

Presented by Jeong Changhun

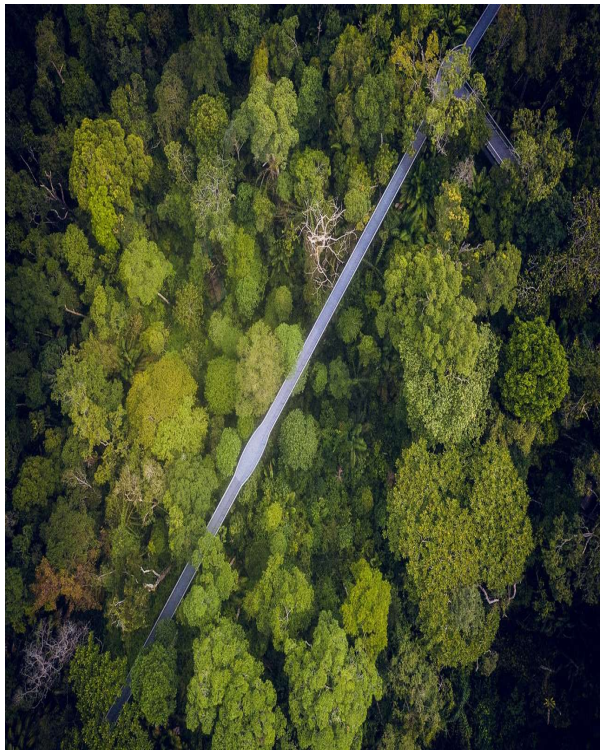
SG of Textile Industry Carbon Neutrality Center
Korea Chemical Fibers Association

May 15, 2026



Intro.

Penang Hill...~ing



Source: Richard Mc, jeniffertn

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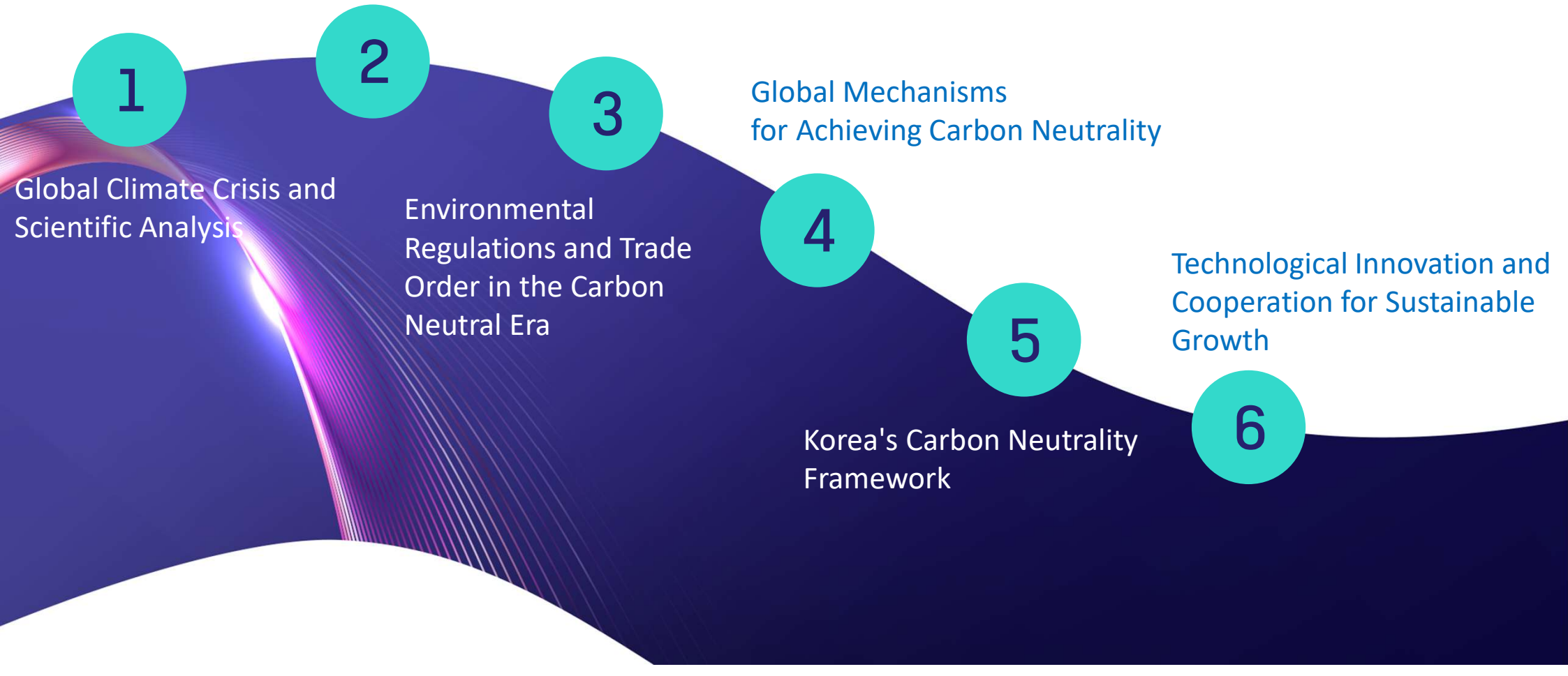
The 15th ACFIF Conference (Penang, Malaysia)



Intro. We...

Source: imbc, KBS, Sisain, hankyung

Global Climate Crisis and Scientific Analysis

The Reality of the Climate Crisis Driven by Climate Change

"Record-breaking rainfall in 120 years…" Heavy rains which started on 16 July 2025 have caused extensive flooding across South Korea, leading to the deaths of 23 people with a further nine reported missing."

In 2026, South Korea officially confirmed the reality of compound climate disasters, including the largest wildfires on record and extreme rainfall exceeding 100 mm per hour across multiple regions.

The Reality of the Climate Crisis Driven by Climate Change

Source: YONHAP NEWS

"Roads are flooded due to heavy rain in Kumamoto, southern Japan, on 11 August 2025"

"Streets and neighborhoods were submerged under about a meter of water, with rivers overflowing, vehicles swept away, and infrastructure heavily damaged…"

Source: AFP

"The thermometer shows 41.8 degrees Celsius in Isesaki City, Gunma Prefecture, Japan, on August 5, 2025"

"I don't really know what I should be doing, I'm just desperately getting through each day…."

Global Climate Crisis and Scientific Analysis

The Reality of the Climate Crisis Driven by Climate Change

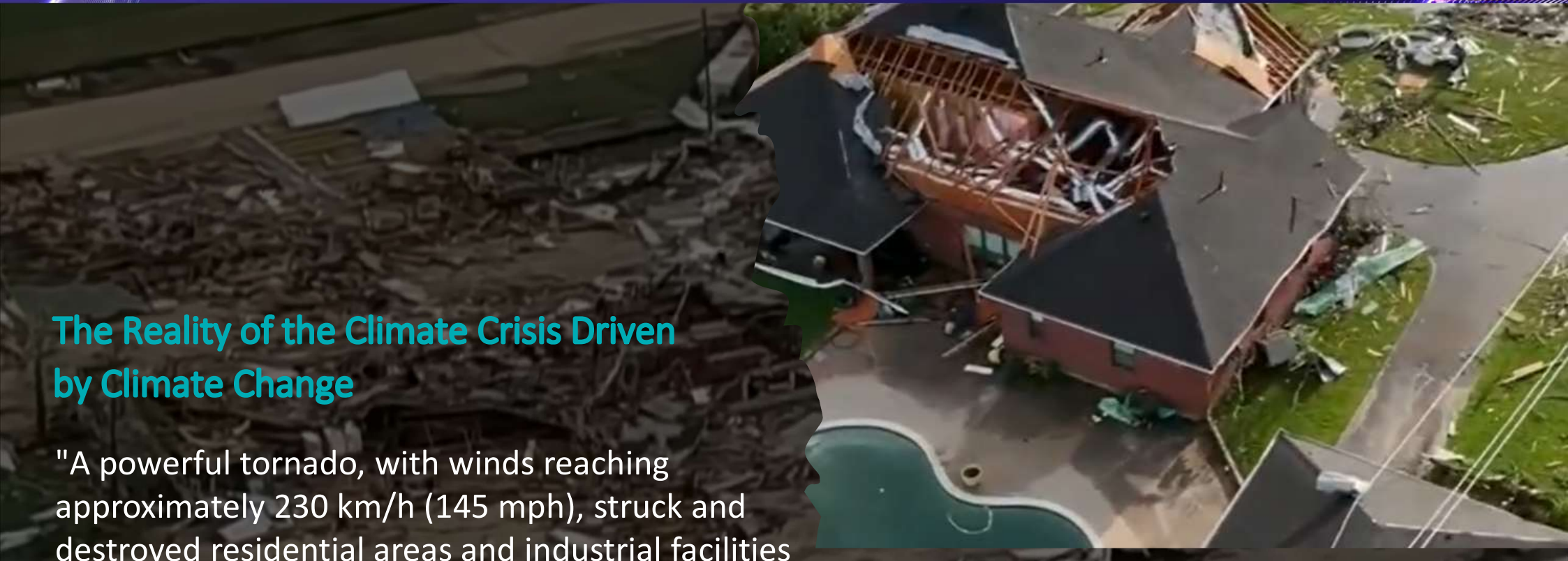
Source: Wikipedia, National Oceanic and Atmospheric Administration(USA)

Source: UPI

Global Climate Crisis and Scientific Analysis

The Reality of the Climate Crisis Driven by Climate Change

"A powerful tornado, with winds reaching approximately 230 km/h (145 mph), struck and destroyed residential areas and industrial facilities within seconds."



Global Climate Crisis and Scientific Analysis

The Reality of the Climate Crisis Driven by Climate Change

Source: UNIVERSITY OF LEEDS, IBTIMES

"When glaciers retreat, the pressure they place on the Earth's crust and magma chambers eases — making volcanic eruptions more likely.."

"A cooling event ~5,500 years ago grew Iceland's glaciers.600 years later, volcanic eruptions dropped sharply and stayed low for a thousand years. Today, the reverse is unfolding."

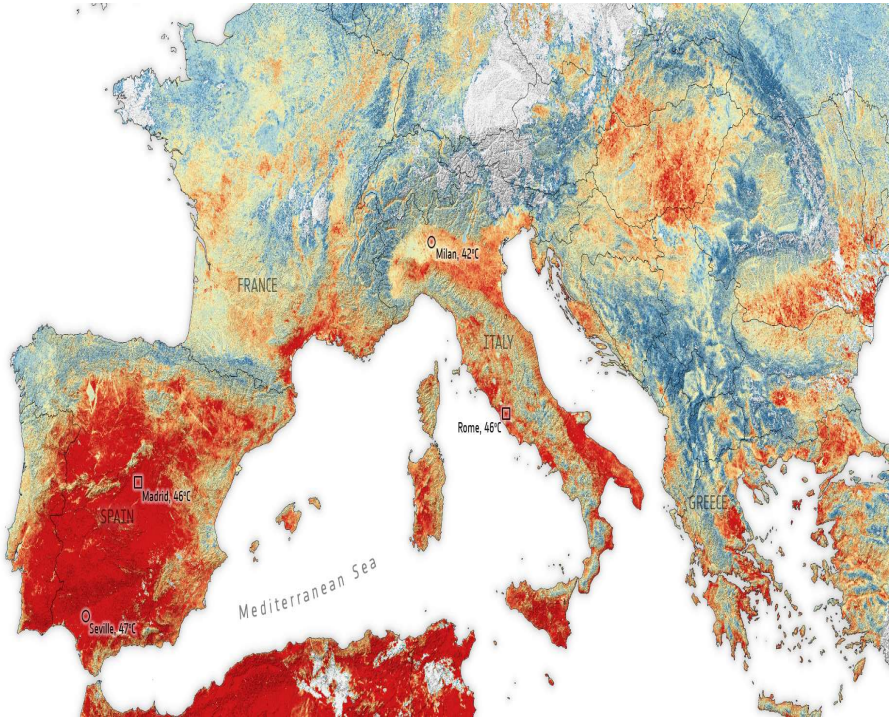
Source: FOX WEATHER

"The sky turned an ominous red as Tropical Cyclone Narelle moved in over Western Australia, On March 27, 2026, "

"The sky over Shark Bay turned blood-red ahead of the cyclone, as thick dust lifted by the system gave the sky its eerie color"

The Reality of the Climate Crisis Driven by Climate Change

Source: Yonhap News



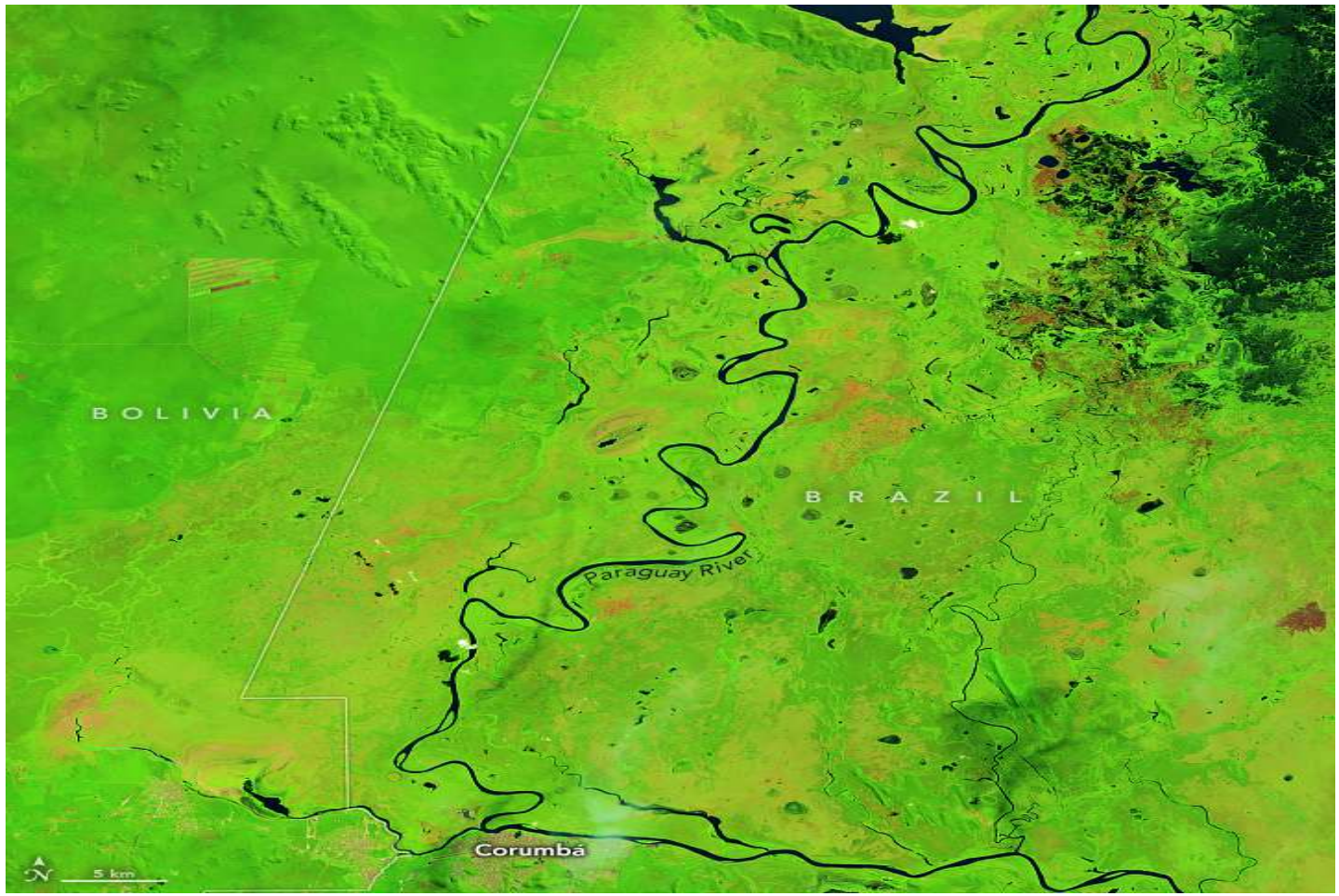
"Satellite imagery showing the surface temperatures of Europe... A glimpse of the continent heated by the heatwave."

"A heatwave is raging in Spain, with temperatures reaching 47 degrees Celsius in Madrid's Plaza de la Opera"

Source: ESA

The Reality of the Climate Crisis Driven by Climate Change

"According to MapBiomas Fire Monitor data, approximately 1.9 million hectares (19,000 sq km) of the Pantanal biome were burned in 2024."



"Unusually intense blazes spread over Brazil's Pantanal wetlands in late May and early June 2024. Lack of wet-season rainfall dried vegetation and helped the wildfires spread well before the region's fire season typically begins…."

Source: NASA(USA), GREENPEACE

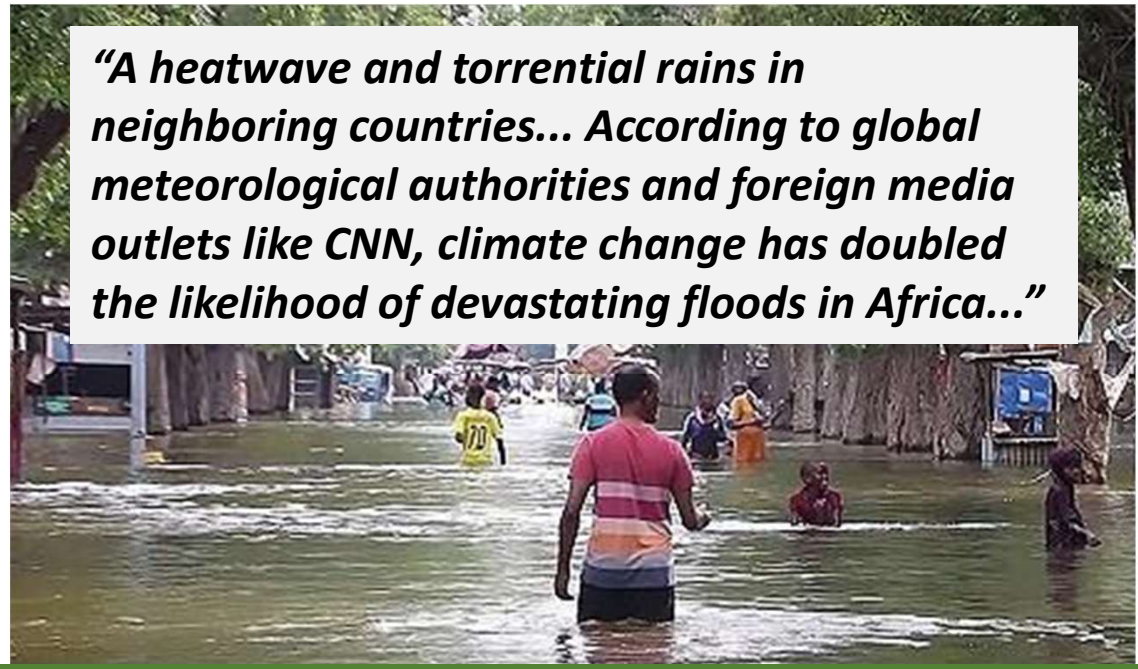
Global Climate Crisis and Scientific Analysis

The Reality of the Climate Crisis Driven by Climate Change

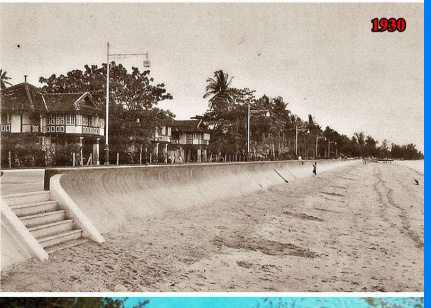
"With heat waves and floods alternating, Africa is now bearing the brunt of climate change"

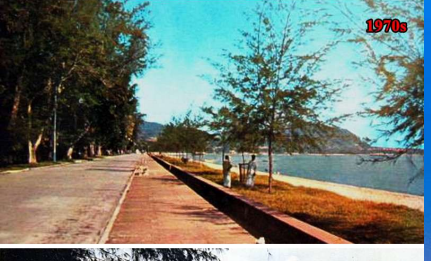
Source: YONHAP, UNICEF

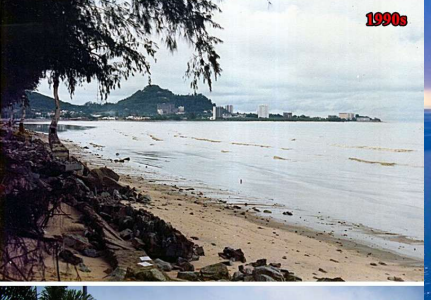
"A heatwave and torrential rains in neighboring countries... According to global meteorological authorities and foreign media outlets like CNN, climate change has doubled the likelihood of devastating floods in Africa..."



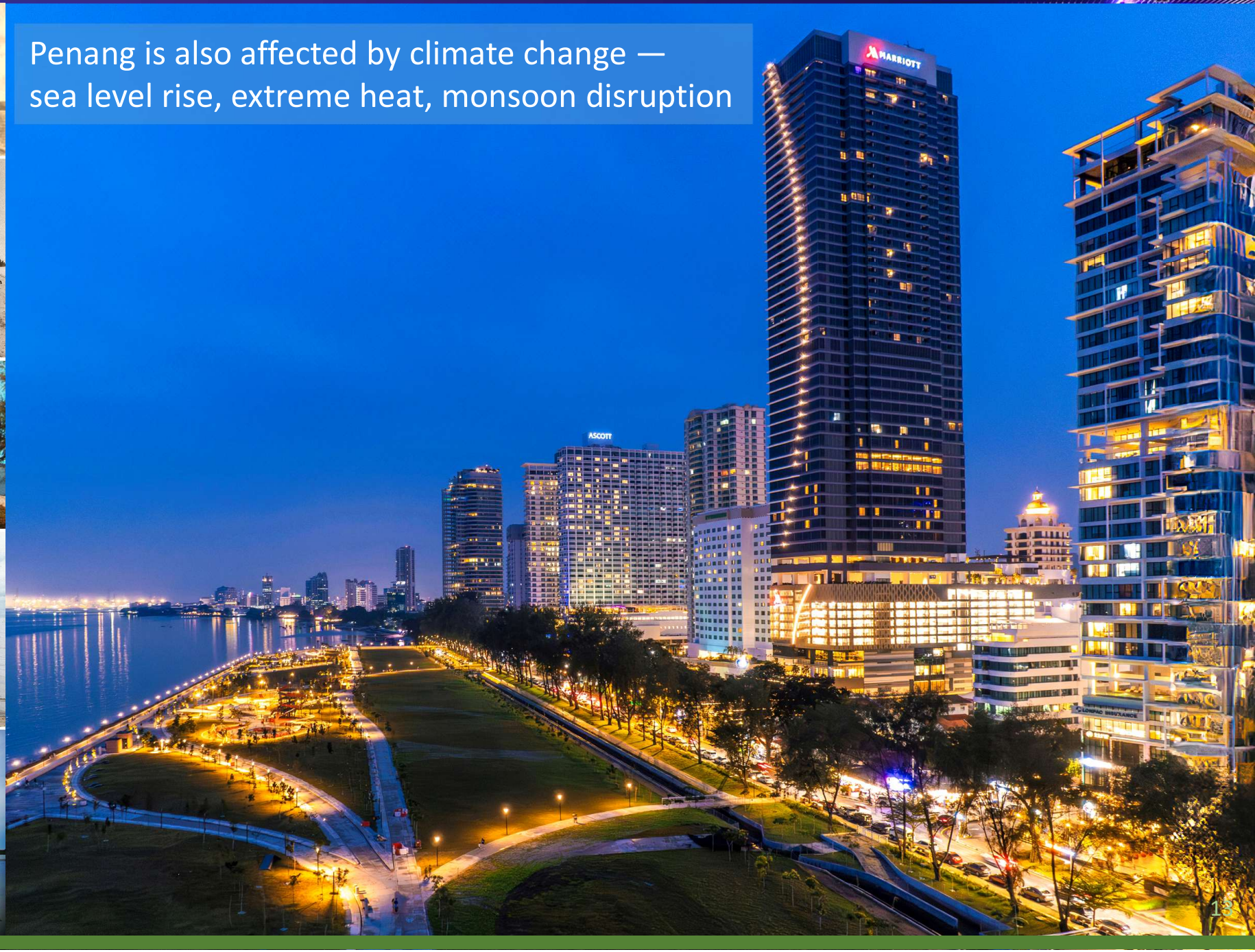
Gurney Bay: A Reimagined Coastal Waterfront for a Sustainable Future







Penang is also affected by climate change —
sea level rise, extreme heat, monsoon disruption



Gurney Bay: A Reimagined Coastal Waterfront for a Sustainable Future

Yet, Penang is acting proactively — Gurney Bay restoration, Penang2030 Green & Smart vision

PENANG 2030

A FAMILY-FOCUSED GREEN AND SMART STATE
THAT INSPIRES THE NATION

Source: penang2030.com, old.thinkcity.com

Global Efforts to Address Climate Change

COP3 Kyoto, Japan — 1997 — Kyoto System

COP 21 Paris, France — 2015 — 2020 — New Climate System

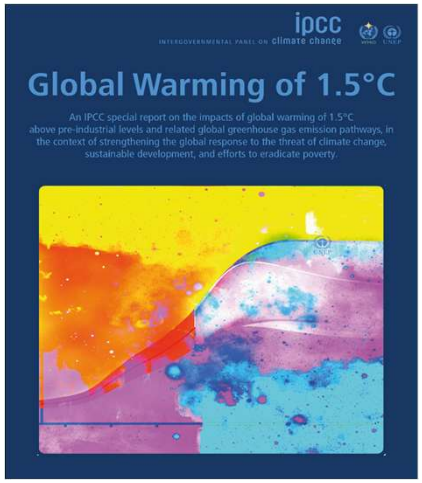
Kyoto Protocol	Sort	Paris Agreement
Reduction of Greenhouse Gas Emissions (1st : 5.2%, 2nd : 18%)	Goal	**Targeting 2°C and efforts to achieve 1.5°C**
Mainly focused on reducing Greenhouse Gases	Range	Not only just reducing greenhouse gases but also including adaptation, financial resources, technology transfer, capacity and etc.
Mainly Developed Countries	Duty States	**All Parties**
Top-down	Goal Setting way	Bottom-up
Punitive (1.3 times less than the sub-fulfillment volume will be added to the next pledge period)	Existence of Penalty	Unpunished
No Special mention	Standard of the goal	The principle of progress
Questionable	Sustainability	Sustainable Response can be occurred
The center of the country	Actor	Encourage the participation of various actors

In response to growing climate science, the world built two major frameworks

"Carbon neutrality is defined as the concept of setting net carbon emissions to "zero" so that the level of total greenhouse gases in the air stops increasing. Reducing the net amount of carbon emissions to "zero" by decreasing GHG emissions generated by human activities to the fullest extent (positive factor) and removing GHG emissions through forest absorption or CCUS (negative factor) is referred to as carbon neutrality (net zero)."

Global Efforts to Address Climate Change

- The path leading to the historic Paris Agreement was shaped by a series of significant events and growing global concerns about the escalating threat of climate change.



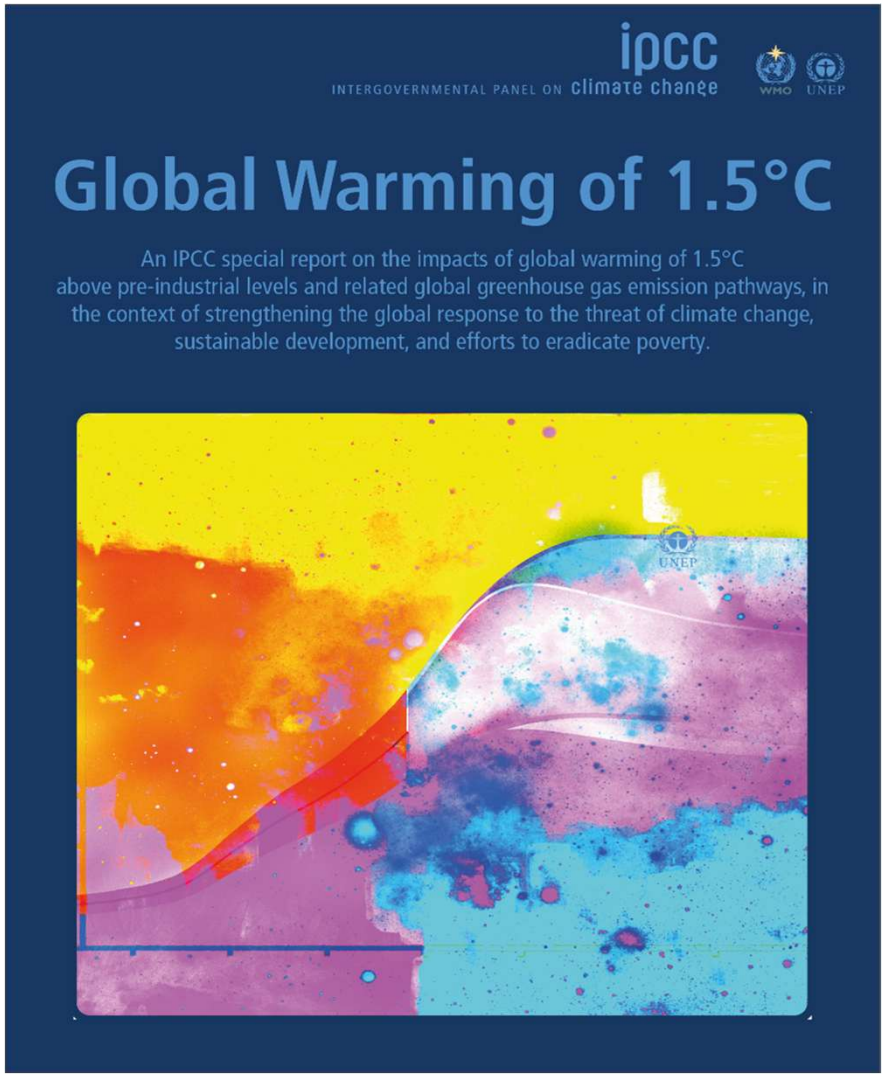
Source: ECIU, IPCC

Scientific Consensus on Climate Change

Over several decades, **an overwhelming consensus** among climate scientists emerged, highlighting the link between human activities, particularly the burning of fossil fuels, and the increase in greenhouse gas emissions. Reports, such as those from the **Intergovernmental Panel on Climate Change (IPCC)**, provided compelling evidence, demonstrating the urgency to take immediate action to limit global warming.

Global Efforts to Address Climate Change

"It is nearly impossible to achieve the 1.5 ℃ target using each country's reduction goals alone. Carbon neutrality is needed to achieve 1.5 ℃"



Source: IPCC

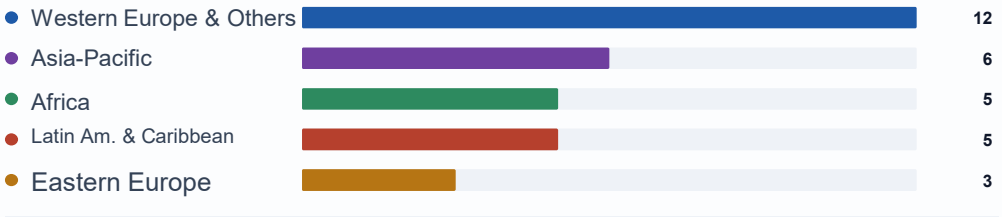
Global Efforts to Address Climate Change

Madrid, Spain	COP 25	UN Climate Change Conference – December 2019
Katowice, Poland	COP 24	Katowice Climate Change Conference – December 2018
Bonn, Germany	COP 23	UN Climate Change Conference – November 2017
Marrakech, Morocco	COP 22	Marrakech Climate Change Conference – November 2016
Paris, France	COP 21	Paris Climate Change Conference – November 2015
Lima, Peru	COP 20	Lima Climate Change Conference – December 2014
Warsaw, Poland	COP 19	Warsaw Climate Change Conference – November 2013
Doha, Qatar	COP 18	Doha Climate Change Conference – November 2012
Durban, South Africa	COP 17	Durban Climate Change Conference – November 2011
Cancun, Mexico	COP 16	Cancún Climate Change Conference – November 2010
Copenhagen, Denmark	COP 15	Copenhagen Climate Change Conference – December 2009
Poznan, Poland	COP 14	Poznan Climate Change Conference – December 2008
Bali, Indonesia	COP 13	Bali Climate Change Conference – December 2007
Nairobi, Kenya	COP 12	Nairobi Climate Change Conference – November 2006
Montreal, Canada	COP 11	Montreal Climate Change Conference – December 2005
Buenos Aires, Argentina	COP 10	Buenos Aires Climate Change Conference – December 2004
Milan, Italy	COP 9	Milan Climate Change Conference – December 2003
New Delhi, India	COP 8	New Delhi Climate Change Conference – October 2002
Marrakech, Morocco	COP 7	Marrakech Climate Change Conference – October 2001

A key task for the COP is to review the national communications and emission inventories submitted by Parties. Based on this information, the COP assesses the effects of the measures taken by Parties and the progress made in achieving the ultimate objective of the Convention.

Distribution by UN regional group

SESSIONS HOSTED, COP 1 — COP 30



1995 · COP 1 · Berlin
The Berlin Mandate
Negotiations launched for binding emissions targets

1997 · COP 3 · Kyoto
Kyoto Protocol
First legally binding emissions reductions for industrialized states

2015 · COP 21 · Paris
Paris Agreement
1.5 °C aspirational goal adopted by all 196 parties

2025 · COP 30 · Belém
Amazon Summit
First COP convened in the Amazon basin

Global Efforts to Address Climate Change

195 Parties adopted the 29-decision “Belém Package” by consensus, establishing a concrete basis for implementation across finance, adaptation, just transition, forests, and inclusion.

Source: Earth.org, UNFCCC Belém Political Package

Environmental Regulations and Trade Order in the Carbon Neutral Era

- Greenhouse gas regulations are expanding beyond corporate boundaries to encompass product-level carbon responsibilities.
- Product-specific emissions reduction and recyclability, along with transparent carbon data management, are crucial to export competitiveness.

Climate Change Response Strategies and Carbon Management Methods

Responding to climate change	Carbon Emission Reduction	Carbon Neutrality
Carbon footprint Management method	Scope 1, 2	Plus. Scope 3

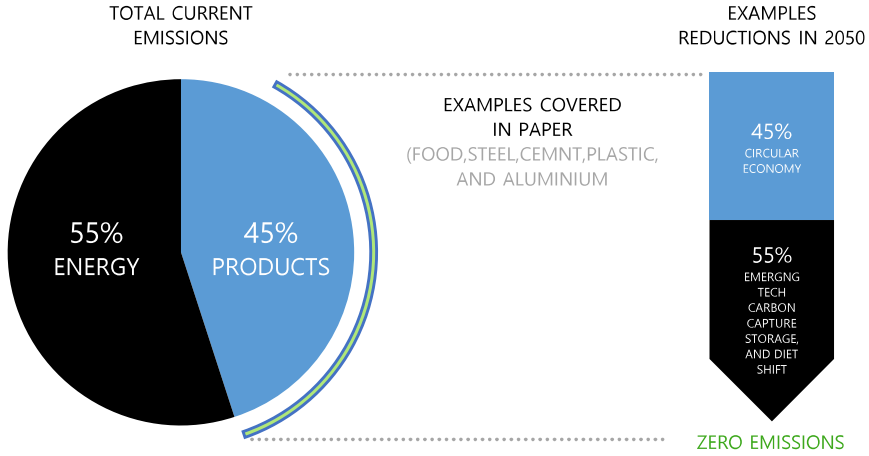
Comparison of workplace carbon emission management and product-oriented carbon management

Calculation range	Scope 1	Scope 2	Full-process emissions (Scope 3)
Calculation Overview	Greenhouse gases Direct discharge (Fuel combustion, etc.)	Internal Indirect Emissions (Electrical, Steam, etc.)	External emissions (Materials, parts processing, etc.)
Main target techniques	Business (Carbon emission calculation method of the emission trading system)		-
	System Process		

Product carbon management

Product-related carbon emissions account for 45% of the world's total greenhouse gas emissions

"A product-oriented management strategy is needed to achieve the goal of carbon neutrality"



Source: Completing the picture: how the circular economy tackles climate change, Ellen Macarthur Foundation, 2019

- On February 26, 2025, the European Commission presented the Omnibus simplification package, a set of legislative proposals designed to streamline sustainability-related regulations.

The EU's Omnibus simplification package aims to reduce companies' regulatory and reporting burden while maintaining the credibility of sustainability reporting and the EU's climate objectives. It streamlines key rules, including CSRD, CSDDD, CBAM and EU Taxonomy-related requirements, by narrowing the scope of application, simplifying requirements and adjusting implementation timelines.

Environmental Regulations and Trade Order in the Carbon Neutral Era

- The Omnibus Package, However, the direction of climate action remains unchanged, making carbon measurement, disclosure and management an increasingly important business priority.

CSDDD Amendment Comparison

Item	Before Amendment	After Amendment
Scope	Broader application to large EU and non-EU companies	Applies to companies with over 5,000 employees and net worldwide turnover above EUR 1.5 billion
Supplier Risk Assessment	Indirect suppliers included	Focus on direct suppliers; indirect suppliers assessed only where credible adverse -impact information exists
Supplier Monitoring Cycle	Annual monitoring	Monitoring cycle extended to every 5 years
Contract Termination	Contract termination required as a last resort	Mandatory termination requ irement removed; focus shifted to appropriate preve ntive or corrective measures
Civil Liability	EU-level civil liability framework included	EU-level civil liability clause removed; liability governed by member state law
Climate Transition Plan	Adoption and implement- tation required	Adoption obligation maintai ned; implementation-related requirements reduced
Sanctions	Fines up to 5% of global turnover	EU-level fixed fine threshold removed; details to be set through future guidance

CSRD Amendment Comparison

Item	Before Amendment	After Amendment
Reporting Scope	All large companies and listed SMEs included in phases	Applies to companies with over 1,000 employees and net annual turnover above EUR 450 million
Non-EU Companies	EU turnover threshold of EUR 150 million	Threshold raised to EUR 450 million in EU net turnover
Value Chain Reporting	Broad supplier data could be requested where reaso nable	Value-chain cap introduced to limit excessive data requests from out-of-scope companies
Assurance Level	Transition to reasonable assurance was planned	Limited assurance maintained ; no mandatory transition to reasonable assurance
Reporting Timeline	Phased reporting from 2025 onward	Reporting delayed for certain companies; many previously in-scope companies removed
Double Materiality	Mandatory	Maintained
Sector-Specific ESRS	Mandatory sector-specific standards planned	Mandatory sector-specific ESRS requirements removed

Source: European Commission

- The European Commission adopted and published the first ESPR and Energy Labelling Working Plan 2025–2030 on April 16, 2025.

European Commission | EN | Search | Search

Home > Press corner > Commission rolls out plan to boost circular and efficient products in the EU

Available languages: English

PRESS RELEASE | Apr 16, 2025 | Brussels | 2 min read

Commission rolls out plan to boost circular and efficient products in the EU

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Today, the European Commission adopted the **2025-2030 working plan** for the **Ecodesign for Sustainable Products Regulation (ESPR)** and **Energy Labelling Regulation**.

The plan provides a list of products that should be prioritised to introduce ecodesign requirements and energy labelling over the next five years. This will foster sustainable, repairable, circular and energy efficient products across Europe, in line with the Clean Industrial Deal and the Competitiveness Compass.

The priority products for ecodesign and energy labelling requirements are **steel and aluminium, textiles (with a focus on apparel), furniture, tyres and mattresses.** These were selected based on their potential to deliver on the circular economy.

Harmonised product sustainability requirements at EU level will reinforce the single market, prevent barriers to trade, improve the level playing field, reduce the administrative burden, and strengthen the global competitiveness of businesses offering sustainable products.

In addition, the Commission will introduce horizontal measures to **requirements on repairability for products such as consumer electronics and small household appliances. This will include** the introduction of a repairability score for products with the most potential, and **requirements on recyclability** of electrical and electronic equipment.

Priority Products and Expected Year of Delegated Act Adoption

Category	Product	Expected Year	Improvement Potential
Final Products	Textiles / Clothing	2027	Product lifespan, material efficiency, resource consumption, energy consumption, waste emissions, climate change impact, textile labeling (under review)
	Furniture	2028	Resource efficiency, climate change impact, waste emissions
	Tires	2027	Recyclability, recycled content, EU tire labeling (2020/740)
	Mattresses	2029	Product lifespan, material efficiency, waste emissions
Intermediate Products	Steel	2026	Climate change impact, air pollution, energy consumption, resource consumption, green steel labeling, ETS, CBAM
	Aluminum	2027	Climate change impact, air pollution, soil pollution, material efficiency, energy consumption, resource consumption, biodiversity, ETS, CBAM

Source: European Commission

Digital Product Passport (DPP)

Phased Rollout in the Textile Sector

*Under ESPR Chapter IV, DPP acts as a **"digital ID"** for products, components, and materials. Full rollout in textiles targets **2030**.*

Role of DPP — A Digital ID for Products

DPP serves as a digital identity for products, components, and materials. Model-level information is accessible via QR codes and similar carriers, providing the foundation for full lifecycle traceability.

Consumers
Transparent info for purchase decisions

Businesses
Standardized supply chain data

Governments
Market oversight & circular policy

Phased Implementation Timeline

Jul 2024	**ESPR enters into force** — Legal basis for DPP (Ch. IV)
2025-26	**Delegated act prep** — Sector-specific consultation
2027	**Textile delegated act** — Specific data fields confirmed
Jul 2027	**Initial enforcement** — DPP required for EU market
2030	**Full implementation** — Textile sector complete

Access Methods

QR Code	Instant access via smartphone scan
NFC	Near-field communication tags
RFID	Auto-detection in logistics & recycling
Data Carrier	Unique product ID + backup storage

Lifecycle Tracking Data

Raw Materials
Fiber composition, recycled content, hazardous substances

Production
Country of origin, key processes (spinning, dyeing, finishing)

Use & End-of-Life
Care instructions, repair, recycling guidance

Source: EU ESPR Chapter IV (Reg. 2024/1781) · EU Strategy for Sustainable & Circular Textiles

Environmental Regulations and Trade Order in the Carbon Neutral Era

- The DPP marks a significant turning point in significantly increasing transparency and circularity in the textile industry, and, together with the European Green Deal, serves as a tool to support the achievement of the 2050 carbon neutrality goal.

Article	*Provision Details*
Article 8 – DPP Overview	- Specifies the type and location of the data carrier, DPP attachment unit (by model or product type), method for consumers to check the DPP prior to purchase (including online purchases), product-related entities and their authority, data entry and update operator, and DPP retention period.
Article 9 – Conditions for DPP Validity	- The DPP must be connected to a data carrier via a unique product identifier. Such data carriers and unique identifiers must comply with international standards. - The DPP must also exist in a physical document including products, packaging, etc.
Article 10 – Technical Design and Operational Requirements	- DPP communication and data transmission must ensure interoperability with other DPPs. Stakeholders must be able to access DPPs according to their access rights. - Even in cases of insolvency or discontinuation of the DPP provider's activities, information integrity and availability must be maintained for the duration specified in the regulation.
Article 11 – Unique Operator Identifier and Unique Facility Identifier	- Unique operator identifiers and unique facility identifiers must comply with international standards (ISO/IEC 15459:2015).
Article 12 – DPP Registry Rules	- The Commission must establish and maintain a database to store product passport data. Stored data must be managed securely to ensure safe processing.
Article 13 – DPP Communication Rules	- The database under Article 12 must be connected with the EU's customs single window certification exchange system (EU CSW-CERTEX) to allow data exchange with national customs systems.

Key barriers ahead of textile DPP rollout

Industry Concerns

- Excessive information requirements
- Privacy conflicts
- EU standardization concerns
- Risk of trade secret exposure

SME Challenges

- High implementation costs
- Lack of data management personnel
- Complex design requirements
- Limited technical resources

Source: European Commission

- DPPs impact global supply chains across borders, requiring a proactive response.
- The DPP should be used not as a simple regulatory response tool, but as a strategic asset that enhances supply chain transparency and competitiveness.

Strategic Response to DPP Requirements

The complex, cross-border nature of textile supply chains means DPP regulations will impact companies worldwide. Proactive preparation is essential for both compliance and competitive advantage.

Source: UNECE

01

Monitor Progress

Stay informed about detailed regulatory requirements being discussed by EU companies and research institutes.

02

Strengthen Supply Chain Transparency

Secure data on raw materials, dyeing, and processing stages; understand the entire lifecycle from acquisition to recycling.

03

Implement Digital Solutions

Adopt technologies for digital recording and establish customized data platforms to secure data sovereignty.

04

Leverage Public-Private Partnerships

Utilize government incentives, R&D support, and standardization efforts to transform DPP compliance into competitive advantage.

Environmental Regulations and Trade Order in the Carbon Neutral Era

- On July 30, 2025, the European Commission adopted a Recommendation on a Voluntary Sustainability Reporting Standard for SMEs ("VSME").
- While mandatory ESG reporting under CSRD has been an excessive burden for SMEs, VSME offers a practical alternative that reflects the realistic capabilities of SMEs.

MODULE 1

Basic Module

46 data points

across 11 disclosures · minimum requirement

27 Mandatory points

15 Conditional (if applicable)

4 Voluntary points

COVERS

Scope 1 & 2 emissions, energy use, water management, and ba sic governance structure.

MODULE 2

Comprehensive Module

+42 data points

across 9 disclosures · expanded option

12 Mandatory points

24 Conditional (if applicable)

6 Voluntary points

ADDRESSES

Climate transition planning, Scope 3 emissions, biodiversity imp acts, and supply chain due diligence.

Key Success Factors and Market Adoption Strategy for VSME.

Jul 2025

Recommendation Adopted

European Commission adopted VSME as a non-binding Recommendation, encouraging voluntary use by SMEs and larger companies sourcing supplier data.

1

2

Mid-2026

Delegated Act Expected

Following Omnibus I entry into force (Mar 2026), the Commission is expected to adopt the VSME-based De legated Act to formalize the value-chain cap framework.

Beyond EU

Global Reference Model

Potential to evolve into a leading global benchmark for SME sustainability reporting, providing a practical alter native aligned with ISSB-based regimes.

3

- Success depends on market acceptance: large corporations adopting VSME for supplier requests, financial institutions utilizing VSME in loan assessments, and voluntary SME participation creating a virtuous cycle of adoption.

As the "Value Chain Cap" takes effect with Omnibus I approval, VSME will function as a standardized reporting framework, offering an alternative to countries currently implementing ISSB standards or expanding support programs.

Key Success Factors and Market Adoption Strategy for VSME.

STAGE 1

Jul 2025

Recommendation Adopted

European Commission adopted the VSME standard as a non-binding Recommendation on 30 July 2025, encouraging voluntary use by SMEs and large companies sourcing supplier data.

STAGE 2

Mid-2026

Delegated Act Expected

Following Omnibus I's entry into force (Mar 2026), the Commission is expected to adopt the VSME-based Delegated Act to formalize the value-chain cap framework.

STAGE 3

Beyond EU

Global Reference Model

Potential to evolve into a leading global benchmark for SME sustainability reporting, providing an alternative aligned with ISSB-based regimes.

46–88	1,000	€450M	FY 2027
VSME data points	Employee threshold	Turnover threshold	First mandatory reporting

VIRTUOUS CYCLE OF ADOPTION

Large Corporations
Use VSME for supplier requests

→

Financial Institutions
Apply VSME in loan assessments

→

SMEs
Voluntarily report on VSME basis

*With Omnibus I in force (Mar 2026), the **Value Chain Cap** allows companies under 1,000 employees to refuse data requests beyond the VSME scope.*

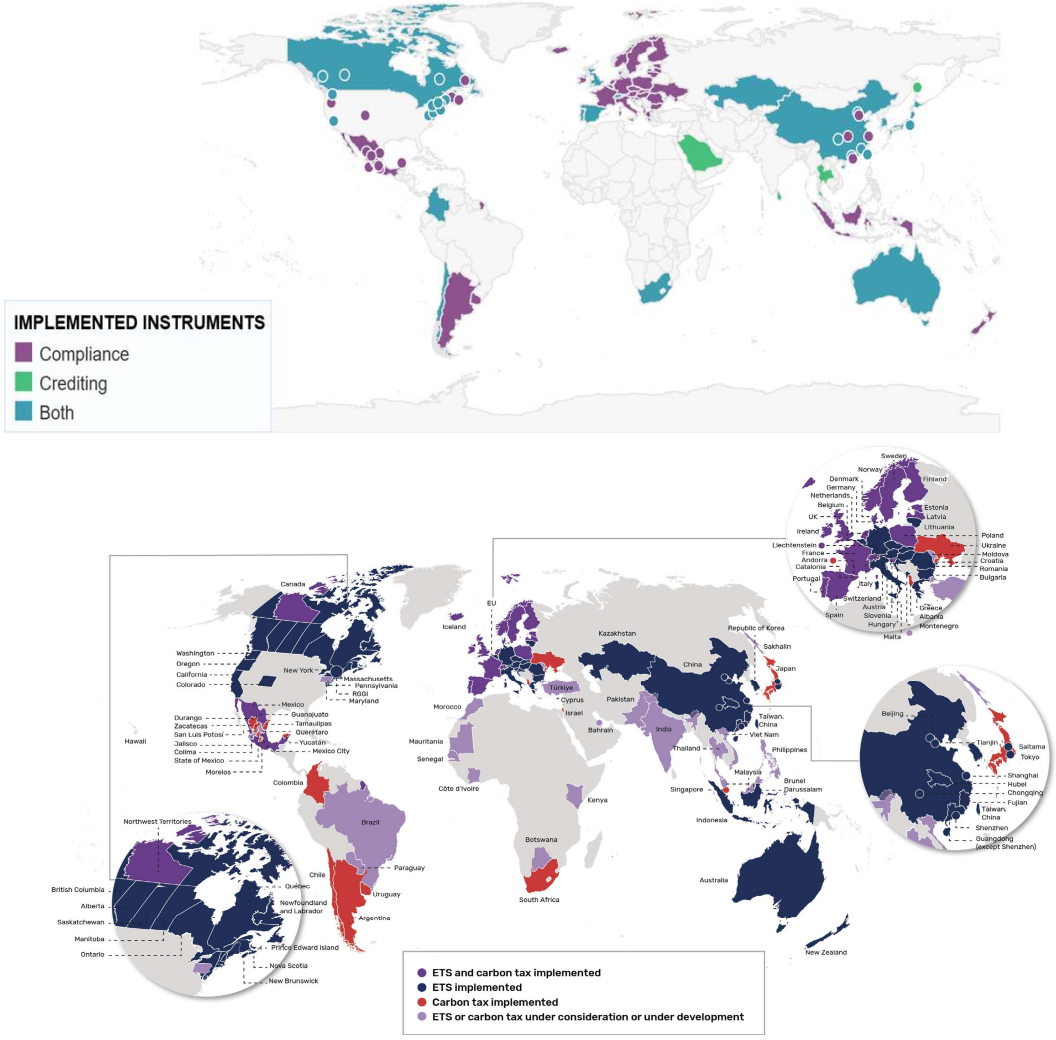
Sources: EU Commission Recommendation (30 Jul 2025) · Directive (EU) 2026/470 (Omnibus I) · EFRAG Work Programme 2026

Global Mechanisms for Achieving Carbon Neutrality

- Carbon emissions are increasingly becoming a business cost, and emission reduction efforts are becoming part of corporate competitiveness.

Carbon pricing instruments around the world, 2025

Map shows jurisdictions that have implemented Direct Carbon Pricing Instruments - Compliance instruments (Emissions Trading Systems (ETS) and Carbon taxes) and/or domestic carbon crediting mechanisms, subject to any filters applied. The year can be adjusted using the slider below the map.



Sources: World Bank State and Trends of Carbon Pricing 2024–2025 · Sylvera 2026 · ICAP 2026

CARBON PRICING — TWO PILLARS

1 Compliance Instruments

Government-mandated carbon pricing schemes

- **Carbon Taxes** — direct price on fossil-fuel carbon
- **ETS** — cap-and-trade tradable allowances

2025: ~28% emissions covered · **$100B+** revenues

2 Carbon Crediting Markets

Verified reductions outside compliance scope

International	Independent	Governmental
UN-led	Verra · Gold Std.	National / local

2026 trend: ***"Flight to Quality"*** — premium for high-integrity credits

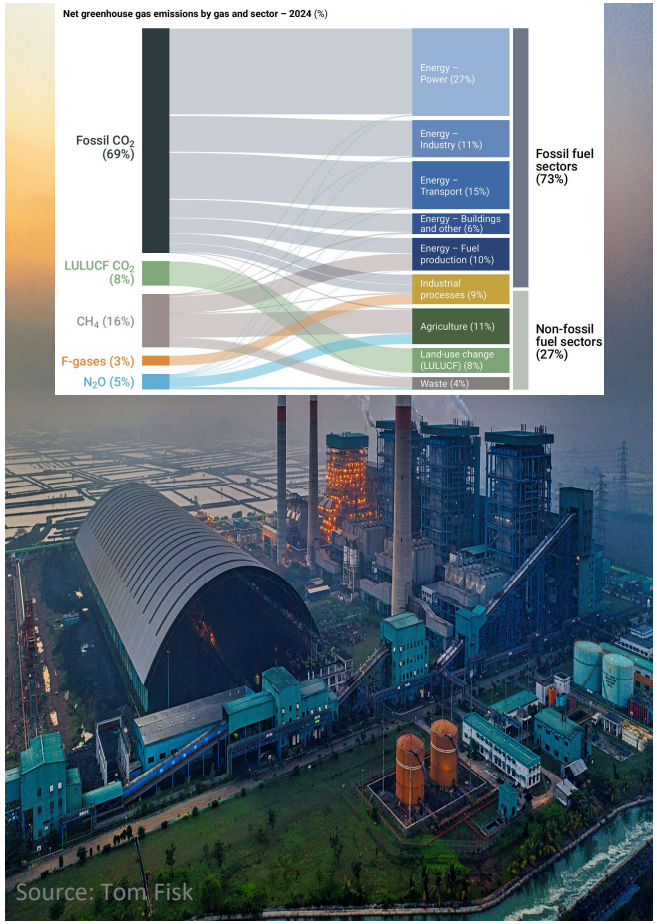
Global ETS Status (2026)

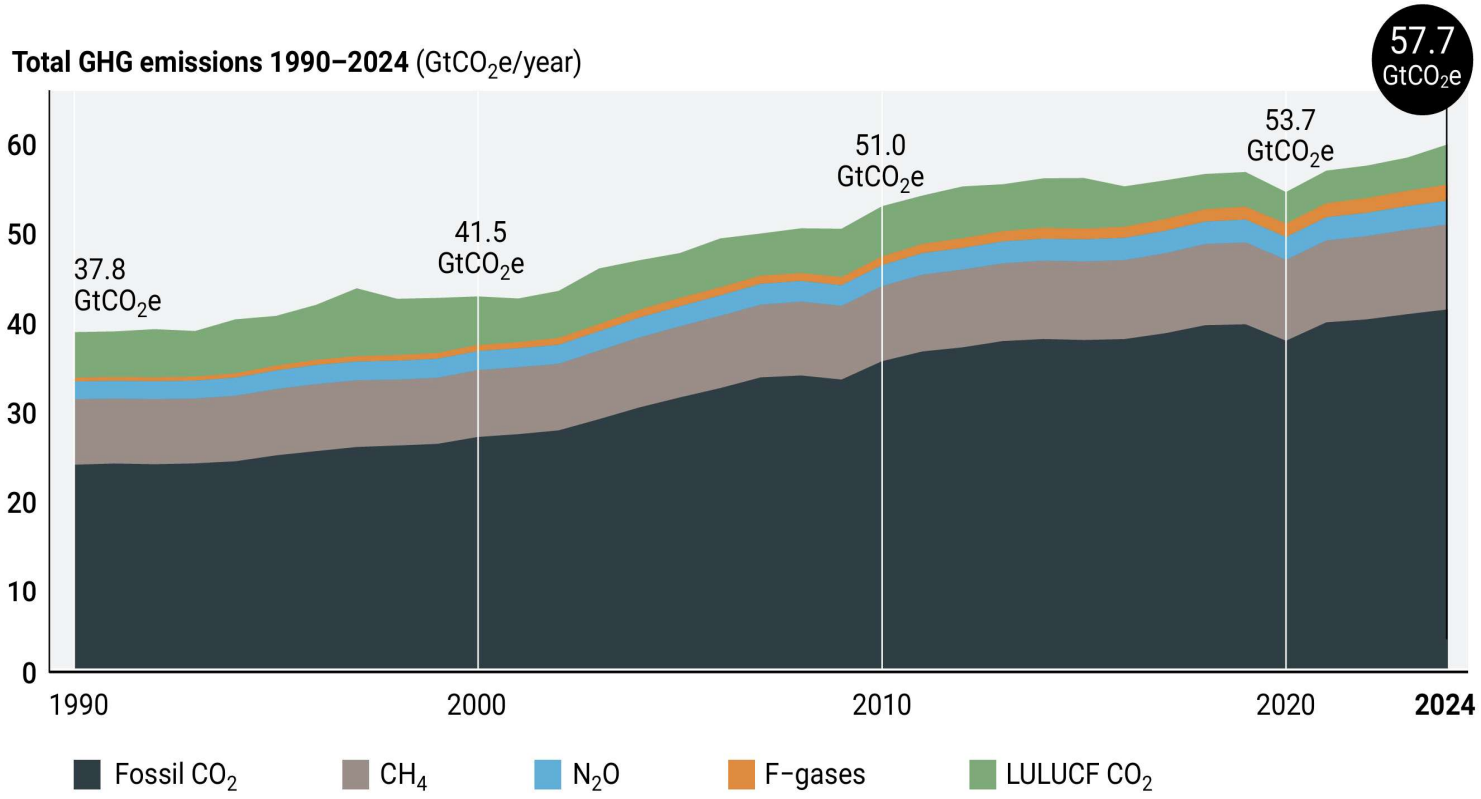
41 ETSs in operation	**23%** Global GHG covered
63% Global GDP covered	**$80B** ETS revenues 2025

Global Mechanisms for Achieving Carbon Neutrality

We have little time left to act to secure a sustainable future

- Despite enhanced NDCs, global emissions still hit a new record...
  Global GHG Emissions Hit a New Record in 2024…57.7 $GtCO_2e$, Up 2.3% from 2023.
- Emissions Are Accelerating, Not Slowing Down.



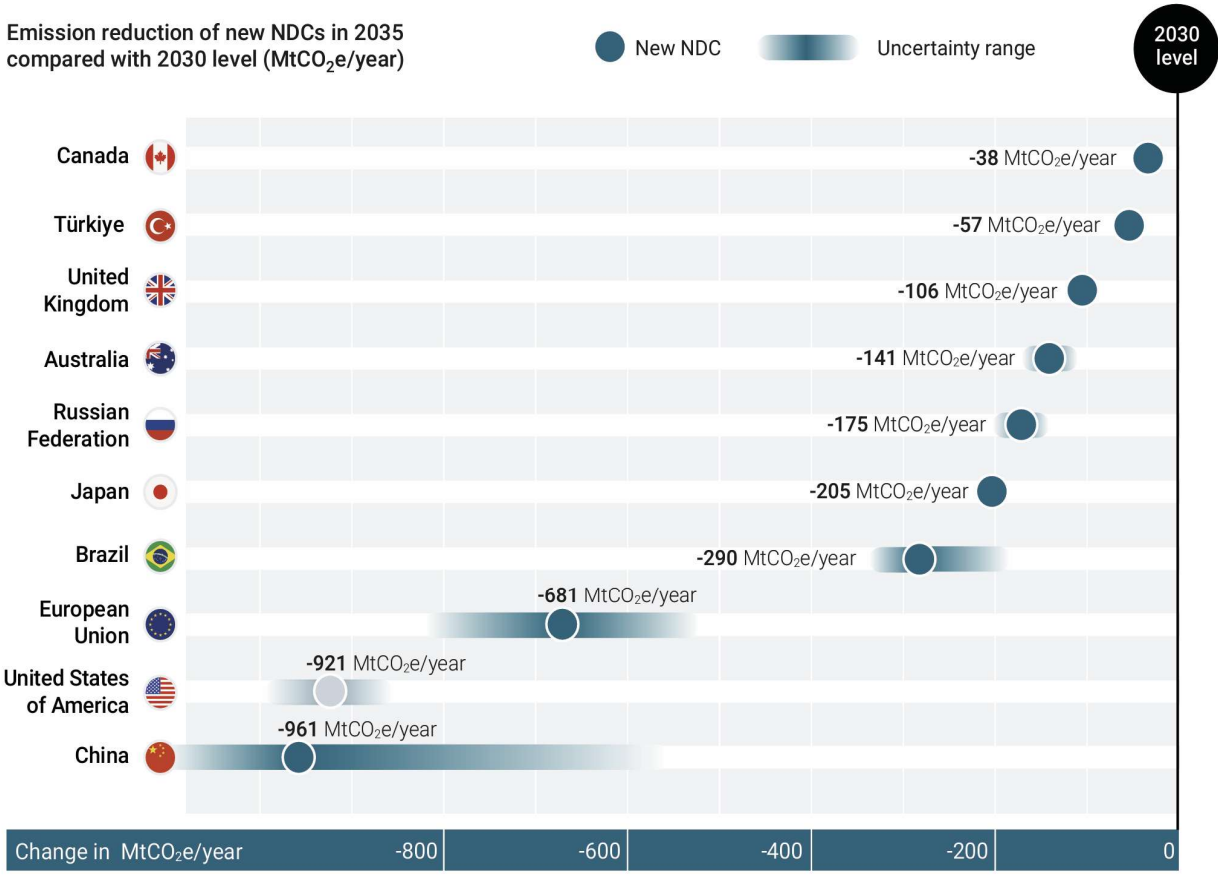


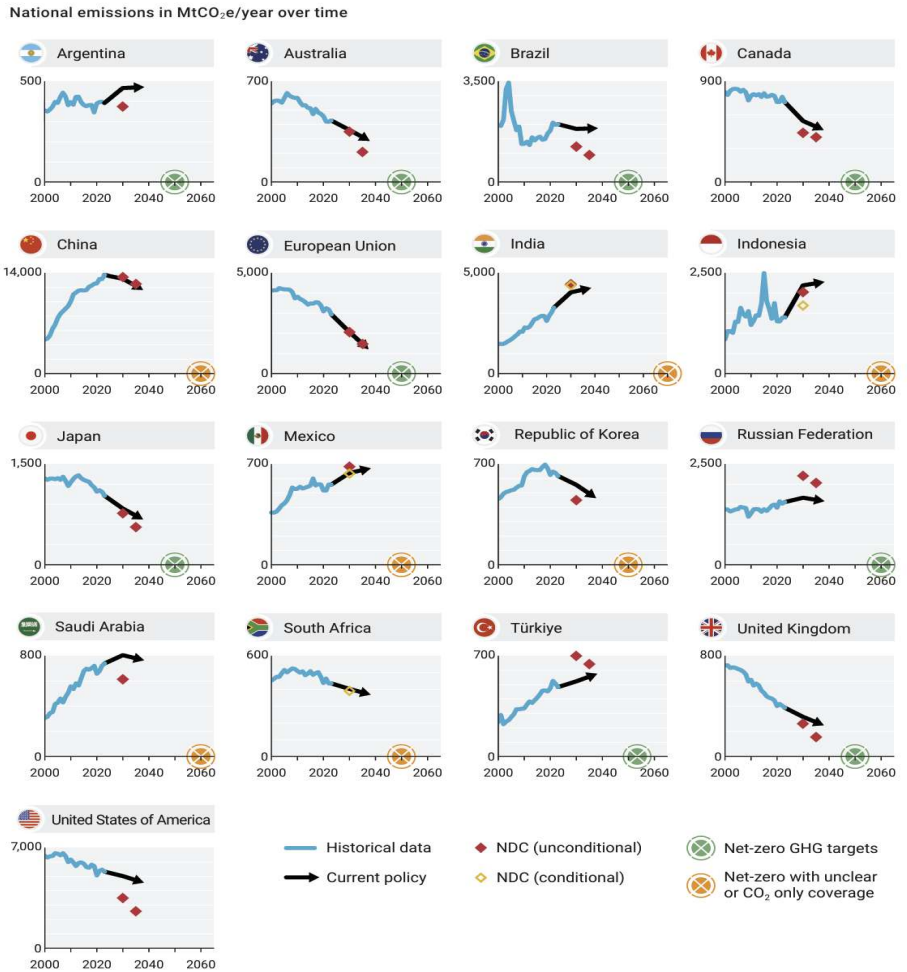
Source: UNEP

Global Mechanisms for Achieving Carbon Neutrality

We have little time left to act to secure a sustainable future

- Many countries have yet to reach their emissions peak, and real reductions will require deeper energy and industrial transformation.

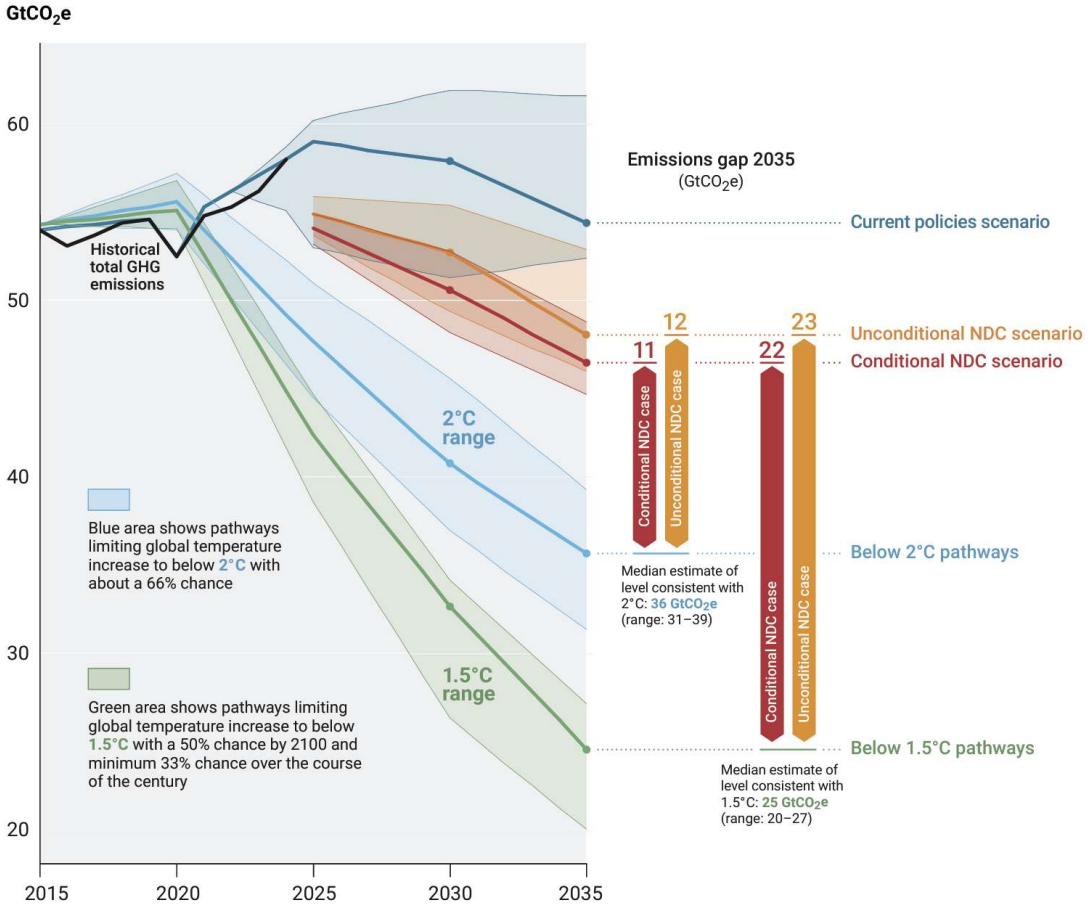


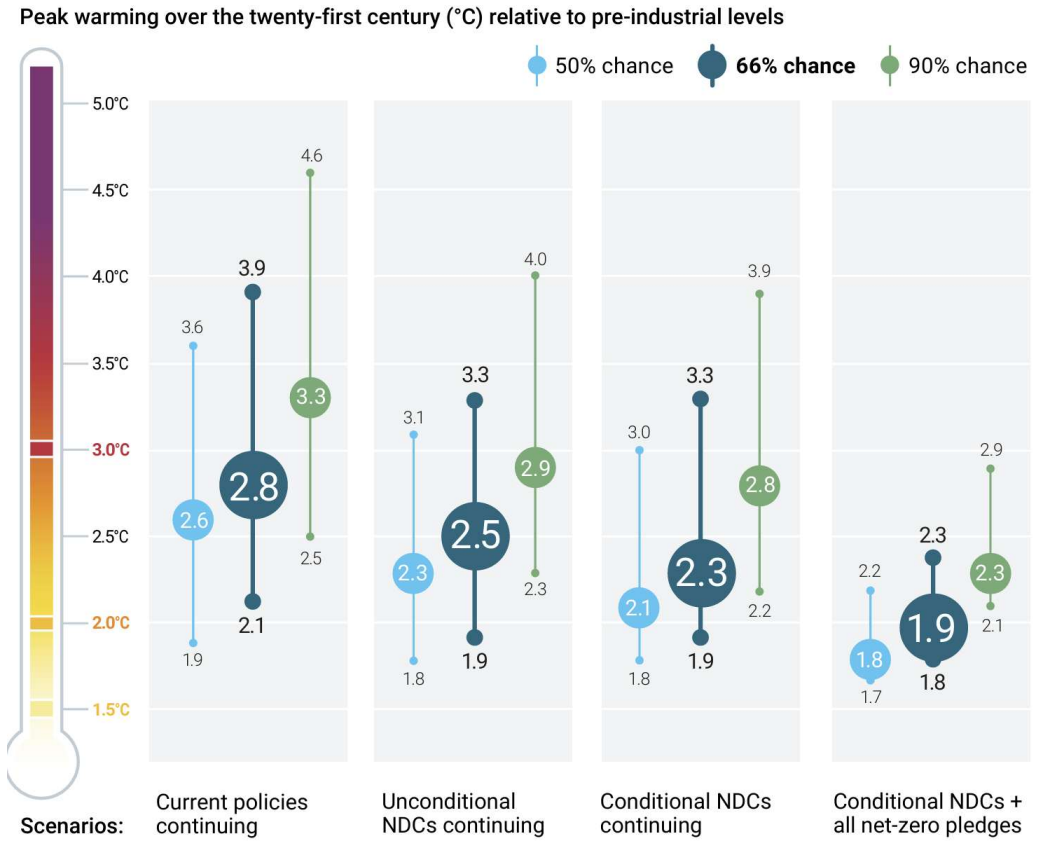


Global Mechanisms for Achieving Carbon Neutrality

We have little time left to act to secure a sustainable future

- New NDCs Narrow the Gap, but 2035 Emissions Remain Far Above 1.5°C and 2°C Pathways. The World Is Still Not Moving Fast Enough.





Korea's Carbon Neutrality Framework

- The Carbon Neutrality Committee was launched in May 2021, followed by preparing a scenario in June, announcing the '2050 Carbon Neutral Draft' in August, and confirming multiple plans to set the final net emissions to '0' in October.

Ministry of Environment

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Press Release

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South Korea to move towards the goal of carbon neutrality by 2050

Date: 2022-03-25 **View:** 15,514
File : (ENG) 220325-탄소중립기본법.pdf (199.6 KB)

▷ The government legislated a national vision to achieve carbon neutrality by 2050 and reduce greenhouse gas emissions.
▷ South Korea's caron neutrality law comes into force on March 25.

March 25, Sejong, Korea - The Ministry of Environment and the 2050 Carbon Neutrality and Green Growth Commission announced that the Enforcement Decree of the Framework Act on Carbon Neutrality and Green Growth for the Climate Change (the "Carbon Neutrality Act") would become effective as of March 25, 2022. before that, the Enforcement Decree was passed at the Cabinet meeting on March 22. The Framework Act on Carbon Neutrality and Green Growth stipulate legal procedures and policy measures to achieve carbon neutrality by 2050. The Act was legislated and promulgated on September 24, 2021. For six months, subordinate statutes were established, and a legal system was completed based on discussions among the relevant ministries, with the 2050 Carbon Neutrality and Green Growth Commission at the lead.

With Korea becoming the 14th country to legislate the vision to achieve carbon neutrality by 2050, the Act stipulates that South Korea's Nationally Determined Contribution (NDC) stands at an emissions reduction goal of 40 percent from 2018 levels by 2030. In addition, the law served as an opportunity to shift from the past system, which was centered on the central government and experts, to new governance with participation from all social sectors, including the central and local governments, industries, future generations, and laborers. The law also made institutional frameworks such as climate change impact assessments and climate-responsive budgeting to promote carbon neutrality as mainstream in national finance and across state plans. The law stated the principle of a just transition to safeguard regions and social classes that may suffer from the negative impacts in achieving carbon neutrality.

Korea's Carbon Neutrality Framework

- Korea Government Restructuring (Oct 2025) Establishment of the Ministry of Climate, Energy & Environment(MCEE) .
- MCEE consolidates climate, energy, and environment policies under one ministry by adding a new 2nd Vice Minister for Climate & Energy with five new offices transferred from MOTIE.

Korea's most significant climate/environmental governance reorganization in 31 years — integrates climate, energy, and environment under one ministry.

조직도: 행정안전부, 이투뉴스

Korea's Carbon Neutrality Framework

- The 2030 NDC implementation roadmap specifies annual reduction targets and reflects the timing of future technology adoption.

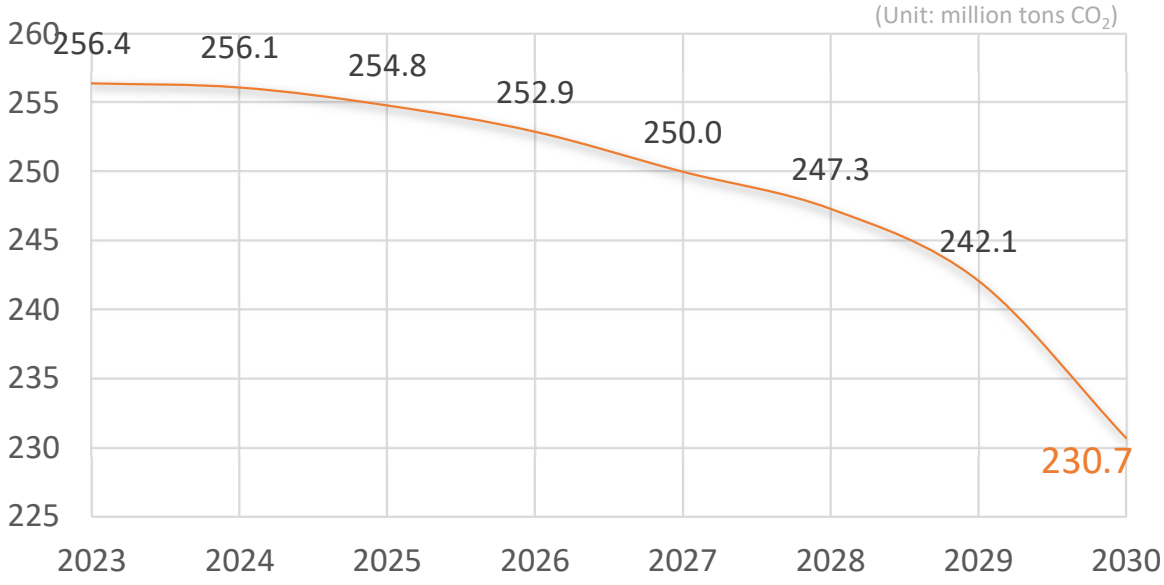
National GHG Targets : 40% reduction from 2018 level(2030 NDC), Net Zero(2050 Carbon Neutral)

Power	Industry	Buildings	Transport	Other*
−45.9%	−11.4%	−32.8%	−37.8%	−48.7 $MtCO_2eq$

** Other = CCUS (−11.2) + International Reduction (−37.5) · vs. 2018 baseline*

Industry Sector GHG Target

Sector	2018 (Baseline)	2023	2024	2025	2026	2027	2028	2029	2030
Total	686.3	633.9	625.1	617.6	602.9	585.0	560.6	529.5	436.6**
Power Generation	269.6	223.2	218.4	215.8	211.8	203.6	189.9	173.7	145.9
Industry	260.5	256.4	256.1	254.8	252.9	250.0	247.3	242.1	230.7
Buildings	52.1	47.6	47.0	46.0	44.5	42.5	40.2	37.5	35.0
Transportation	98.1	93.7	88.7	84.1	79.6	74.8	70.3	66.1	61.0
Agriculture & Livestock	24.7	22.9	22.4	21.9	21.2	20.4	19.7	18.8	18.0
Waste	17.1	15.1	14.7	14.1	13.3	12.5	11.4	10.3	9.1
Hydrogen	(-)	3.4	3.6	4.8	5.5	6.2	6.9	7.6	8.4
Sinks, etc.	6.6	5.6	5.1	5.0	4.9	4.8	4.5	4.2	3.9
Carbon Sinks	-41.3	-33.5	-31.3	-28.9	-30.4	-29.1	-28.3	-27.6	-26.7
CCUS	(-)	-	-	-	-0.4	-0.7	-1.3	-3.2	-11.2

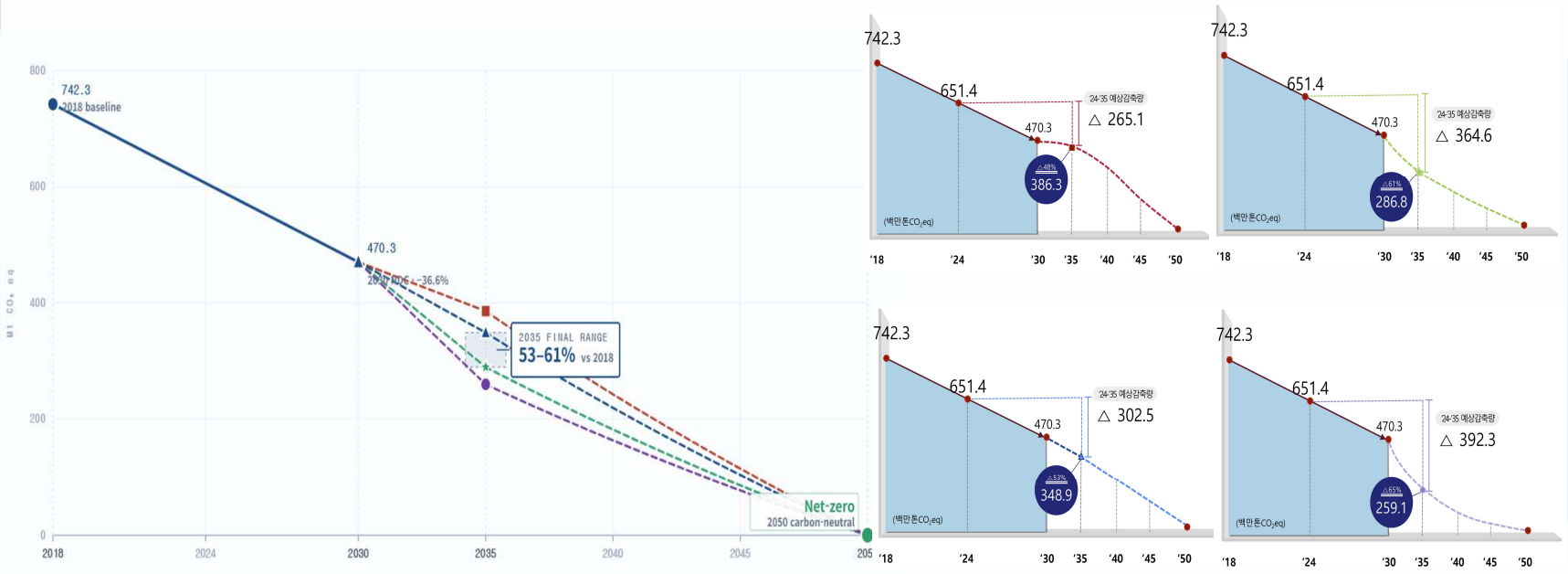


CHEMICAL FIBER · CHALLENGE FOR FURTHER REDUCTION & NET ZERO

The industry sector reduction (−11.4%) is the smallest among all sectors due to Korea's manufacturing-centric economic structure. Chemical fibers and other energy-intensive industries face structural challenges in achieving deeper cuts and Net Zero by 2050.

Korea's Carbon Neutrality Framework

Korea's Long-term GHG Reduction Pathway · 2018 → 2030 → 2035 → 2050



- **2018 baseline**
  742.3 Mt CO_2eq · reference year
- **2030 interim · −36.6%**
  470.3 Mt CO_2eq · existing NDC anchor
- **2035 target · 53–61%**
  ≈ 290–349 Mt CO_2eq · the final range
- **2050 net-zero**
  Carbon-neutral target · net emissions = 0

Four pathways & the final 2035 range

FINAL NDC SUBMISSION · 2035

53–61%

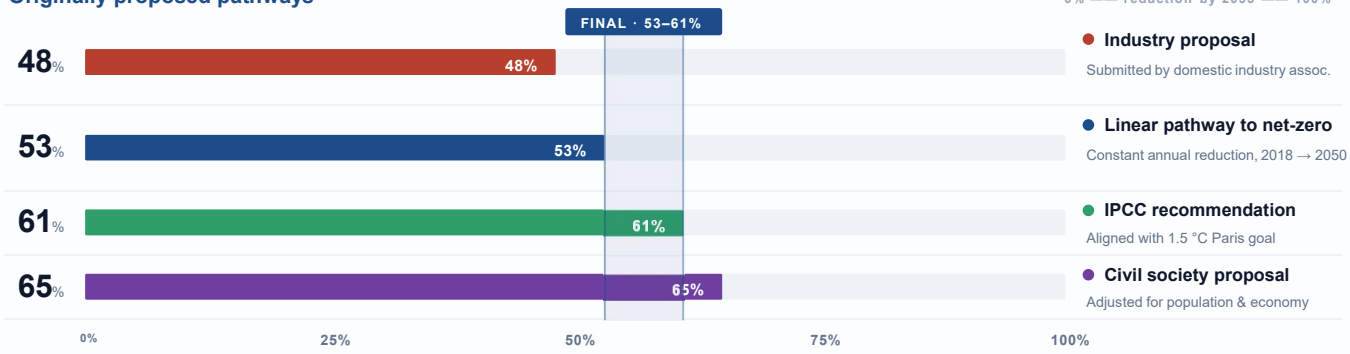
reduction from 2018 levels by 2035

Brackets two of four originally proposed pathways — the linear glide-path to net-zero by 2050 and the Paris-aligned IPCC recommendation.

PARIS GOAL · LIMIT WARMING TO 1.5 °C

Originally proposed pathways

REDUCTIONS VS. 2018 BASELINE



Korea's Carbon Neutrality Framework

- Korea's NDC: 40% Reduction by 2030 ➡ 53–61% by 2035.

NDC Evolution

Jun 2015 — First 2030 NDC
37% below BAU

Dec 2016 — GHG Reduction Roadmap
Sectoral plan

Jul 2018 — Roadmap Revised
Refined targets

Dec 2019 — **BAU → Absolute Target**
24.4% below 2017

Oct 2021 — **Enhanced NDC**
40% below 2018 (current)

Apr 2023 — Updated Roadmap
Sectoral re-allocation

Dec 2025 — **2035 NDC Submitted ✓**
53–61% below 2018

2030 Sectoral Reduction Targets

Final 2030 NDC (Apr 2023) · vs. 2018 baseline

Unit: million tonsCO_2eq

Sector	2018 Emissions	2030 Target	Reduction
Power	269.6	145.9	−45.9%
Industry	260.5	230.7	−11.4%
Buildings	52.1	35.0	−32.8%
Transport	98.1	61.0	−37.8%
Agriculture	24.7	18.0	−27.1%
Waste	17.1	9.1	−46.8%
TOTAL	**727.6**	**436.6**	**−40.0%**

** Korea's 2030 NDC uses gross emissions (727.6);*
2035 NDC uses updated net emissions (742.3). Both are official MoE figures.

2035 NDC

53–61%

below 2018 levels

✓ **Submitted to UNFCCC on 26 Dec 2025**

✓ Range-based target (53% baseline / 61% upper bound) — first time Korea adopts a range, aligned with EU, Australia, Brazil, Canada

✓ Coal phase-out by 2040 announced at COP30 (Powering Past Coal Alliance member)

⚠ ***Industry challenge:*** *Manufacturing-centric structure requires significant transition costs. K-GX (Korea Green Transformation) plan to be released H1 2026.*

Sources: Ministry of Environment · UNFCCC NDC Registry · Presidential Commission on Carbon Neutrality (5th plenary, 10 Nov 2025)

Korea's Carbon Neutrality Framework

Climate Litigation Ruling — Article 8(1) of the Carbon Neutrality Framework Act.

헌법재판소 2024. 8. 29 자 2020헌마389, 2021헌마1264, 2022헌마854, 2023헌마846(병합) 결정 [헌법불합치,기각,각하] [헌공 제335호]

요약정보
- 판시사항
- 결
- 심
- 참
- 참

전문
- 당
- 주
- 이유
  1. 사건개요
  2. 심판대상
  4. 참가신청의 적법 여부
  5. 구 녹색성장법 제42조 제
  6. 이 사건 재정계획에 대한
  7. 탄소중립기본법 제8조 제
  8. 결론
- 재판관

☑ 기후소송

KEY FINDING - Constitutional non-conformity (Asia's first climate-litigation ruling by a constitutional court)
.....However, Article 8(1) sets no quantitative standards of any form for the period 2031–2049.
Even considering the broader legal framework — including Article 8(4)'s 5-year review of GHG targets — the law cannot effectively secure the gradual and sustained reductions required to reach the 2050 carbon-neutrality target, and instead transfers excessive burden onto the future. A structure that depends solely on the government's situational judgment — which may be short-term — cannot ensure consistency or adequacy in climate-mitigation policy.

헌 법 재 판 소

결 정

사 건 2020헌마389 저탄소 녹색성장 기본법 제42조 제1항 제1호 위헌확인
2021헌마1264(병합) 기후위기 대응을 위한 탄소중립·녹색성장 기본법 제8조 제1항 위헌확인
2022헌마854(병합) 기후위기 대응을 위한 탄소중립·녹색성장 기본법 시행령 제3조 제1항 위헌확인
2023헌마846(병합) 제1차 국가 탄소중립 녹색성장 기본계획 위헌확인

청 구 인 [별지 1] 명단과 같음
공동심판참가인 [별지 1] 명단과 같음
선 고 일 2024. 8. 29.

주 문

1. 기후위기 대응을 위한 탄소중립·녹색성장 기본법(2021. 9. 24. 법률 제18469호로 제정된 것) 제8조 제1항은 헌법에 합치되지 아니한다. 위 법률조항은 2026. 2. 28.을 시한으로 개정될 때까지 계속 적용된다.
2. 기후위기 대응을 위한 탄소중립·녹색성장 기본법 시행령(2022. 3. 25. 대통령

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연도별 감축목표의 이행현황 점검이나 배출권거래제 등 배출량 목표 달성을 보장하기 위한 수단들과 관련하여, 매년 정량적 감축목표가 달성되지 않은 경우 추후의 감축목표에 미달성 부분을 추가하는 규율이 법률에 명시되어 [illegible] 기획될 수도 있는 정부의 상황 인식에만 의존하는 구조로는 온실가스 감축정책의 적극성 및 일관성을 담보하기 어렵다.

따라서 탄소중립기본법 제8조 제1항은 2031년부터 2049년까지의 감축목표에 대한 규율에 관하여 기후위기라는 위험상황에 상응하는 보호조치로서 필요한 최소한의 성격을 갖추지 못하였으므로 과소보호금지원칙을 위반하였다.

한편, 탄소중립기본법 제8조 제1항에서 2030년까지의 감축목표에 대하여 2030년을 목표연도로 한 2018년 대비 감축비율의 하한만 법률에서 정하였을 뿐, 구체적인 감축비율의 수치는 대통령령에 위임하고 감축의 경로는 정부가 설정하는 부문별 및 연도별 감축목표에 따르도록 한 것은 법률유보원칙을 위반한 것으로 볼 수 없다. 그러나 중장기적인 온실가스 감축목표와 감축경로를 계획할 때에는 매우 높은 수준의 사회적 합의가 필요하다는 점, 미래세대는 민주적 정치과정에 참여하는 것이 제약되어 있다는 점과 관련하여 입법자에게 더욱 구체적인 입법의무와 책임이 있음을 고려할 때, 2031년부터 2049년까지의 감축목표에 관하여 대강의 정량적 수준도 규정하지 않고 이에 관해 정부가 5년마다 정하도록 한 것은 의회유보원칙을 포함하는 법률유보원칙을 위반한 것이다.

결국 탄소중립기본법 제8조 제1항은 과소보호금지원칙 및 법률유보원칙에 반하여 기본권 보호의무를 위반하였으므로 청구인들의 환경권을 침해한다.

Korea's Carbon Neutrality Framework

Korea's Emissions Trading System (K-ETS)

~80% of national GHG

A key tool for reducing greenhouse gas emissions in Korea, managing nearly 80% of national emissions.

2015 (launch) **5.66M tons** ~20× 2024 **111.24M tons**

Trading volume grew ~20-fold from 5.66M tons (2015) to 111.24M tons by 2024.

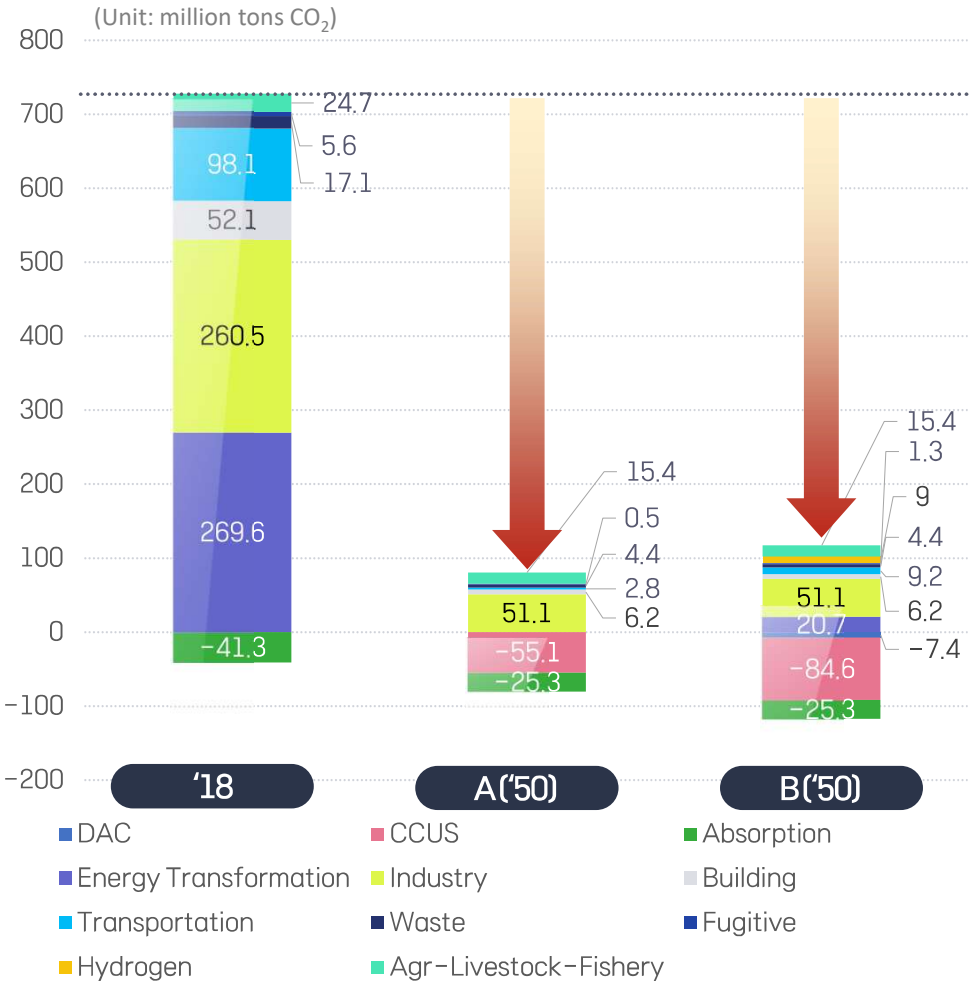
13	131	Spinning and Yarn Manufacturing	Free
	132	Textile weaving and manufacturing of textile products	
	133	Braided fabric manufacturing	
	134	Dyeing, cleaning and finishing of textile products	Paid
	139	Manufacturing of other textile products	Paid
14	141	Sewing clothing manufacturing	
	142	Fur products manufacturing	
	143	Braided garment manufacturing	
	144	clothing accessories manufacturing	
20	205	Chemical fiber manufacturing	Free
	201	Basic chemical manufacturing	Free
	202	Manufacture of synthetic rubber and plastic materials	Free

Korea's Carbon Neutrality Framework

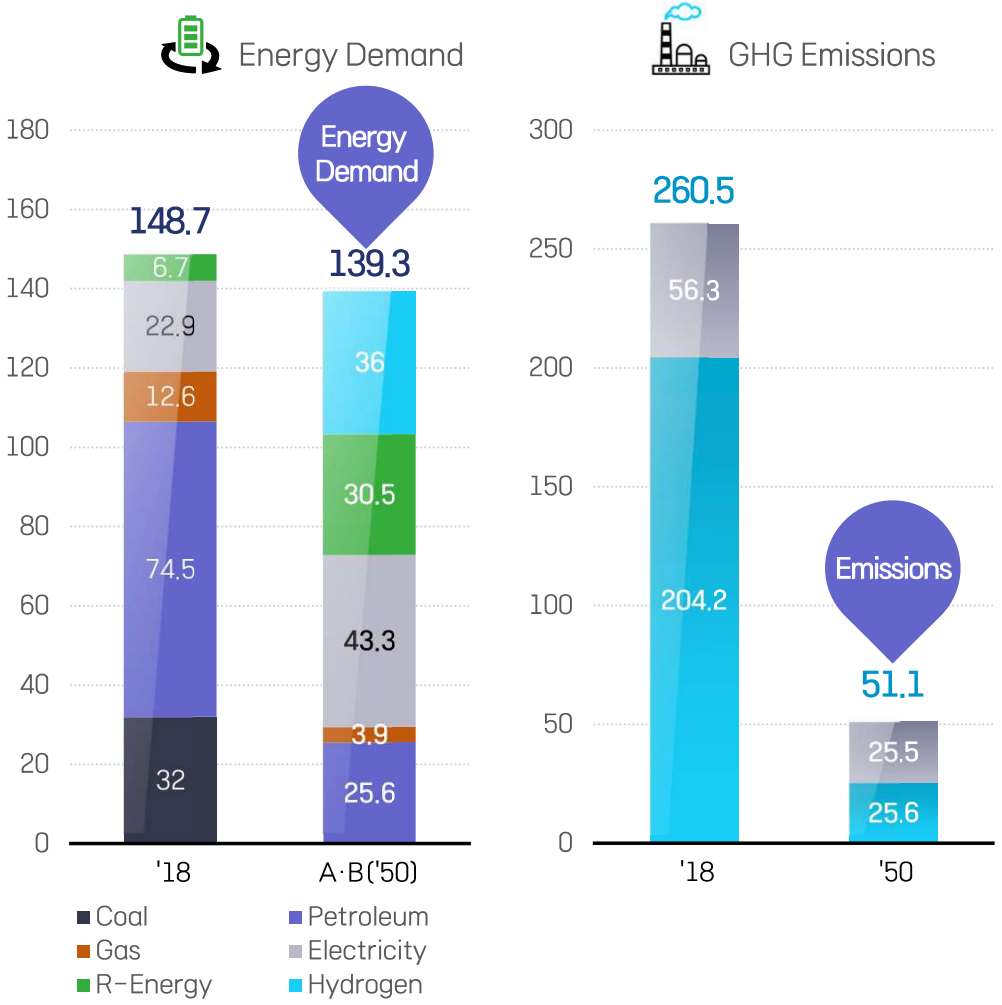
KAU Domestic Average Price & Trading Volume Trend

Korea's Carbon Neutrality Framework

Emissions and Targets by Sector



Emissions and Targets of Industrial Sector



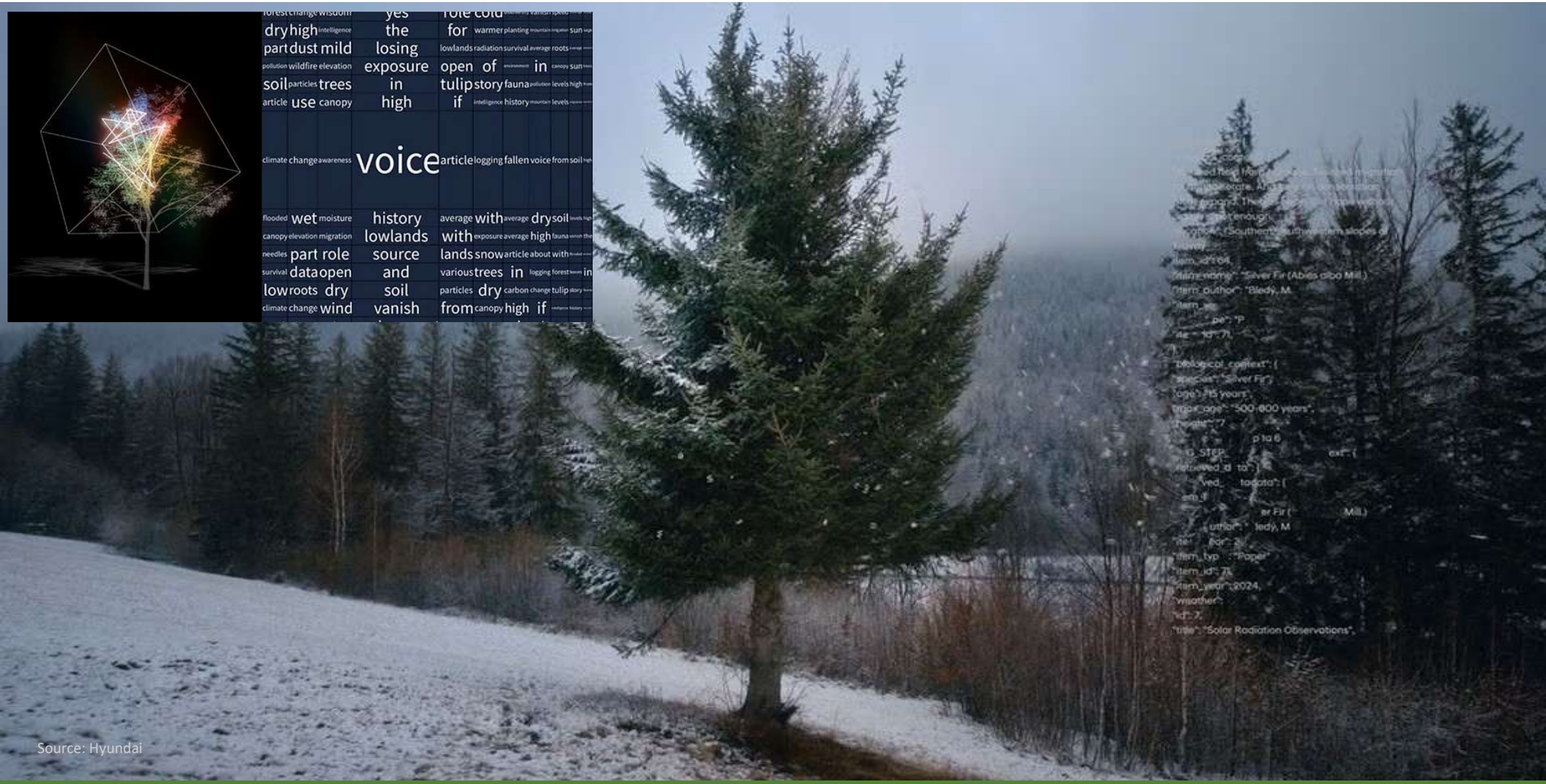
Technological Innovation and Cooperation for Sustainable Growth

Through **Innovative Technologies** and **Inter-industry Collaboration**, we are creating a path toward a sustainable future and a circular economy.

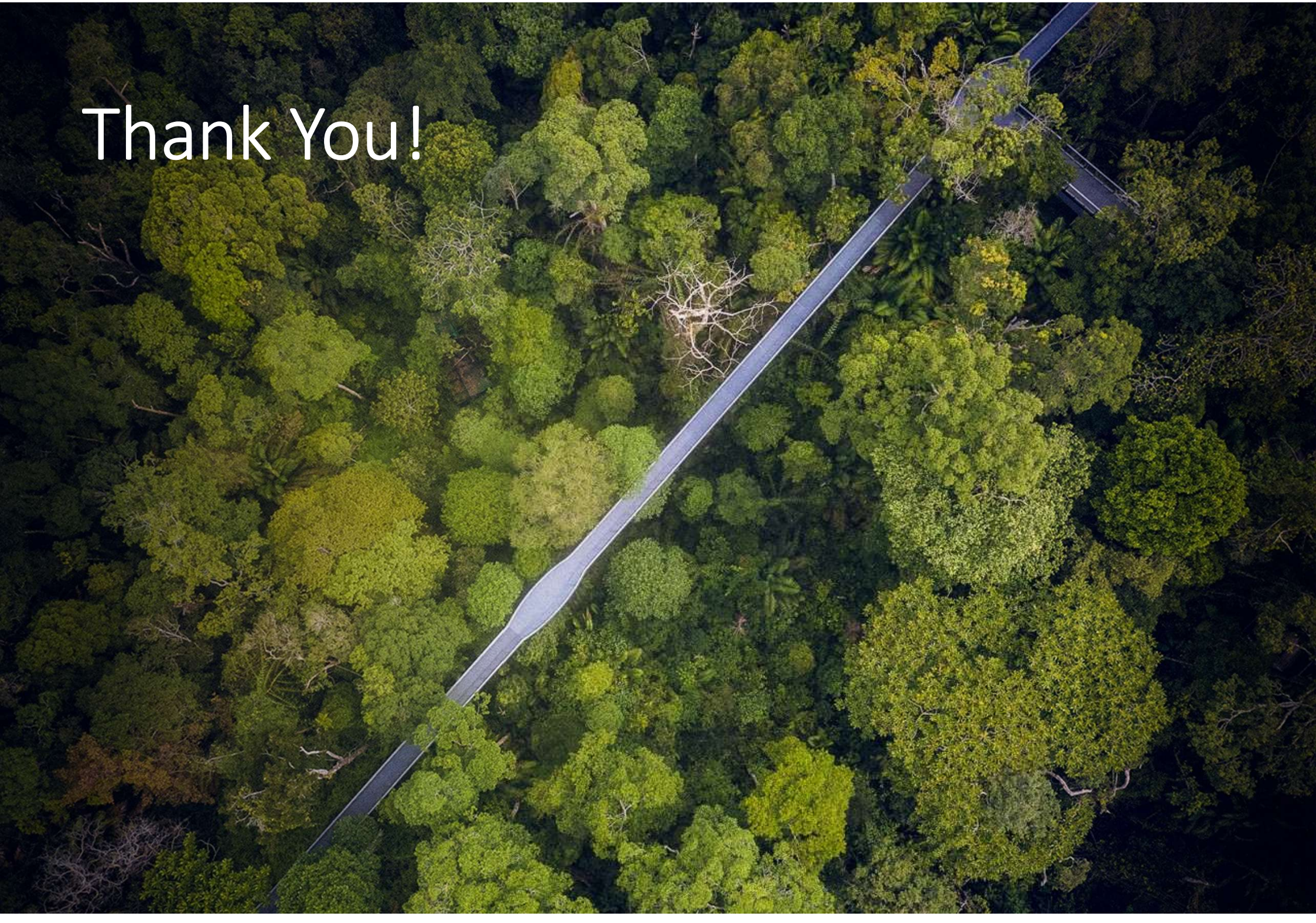
*To effectively respond to carbon regulations, it is essential to establish an **'Industry Supply Chain Carbon Partnership'** that enables efficient sharing of carbon emission data and joint reduction of carbon emissions across interconnected companies within the supply chain.*

Technological Innovation and Cooperation for Sustainable Growth

- The campaign “Tree Correspondents,” which won three awards at the 2025 Cannes Lions International Festival of Creativity, reminds us of the essential value of climate action by giving trees a voice.



Source: Hyundai


Thank You!