

Advancing the EU Climate and Energy Policy Agenda  
in the context of the Hungarian Presidency of the  
Council of the EU policy conference

25th June 2024

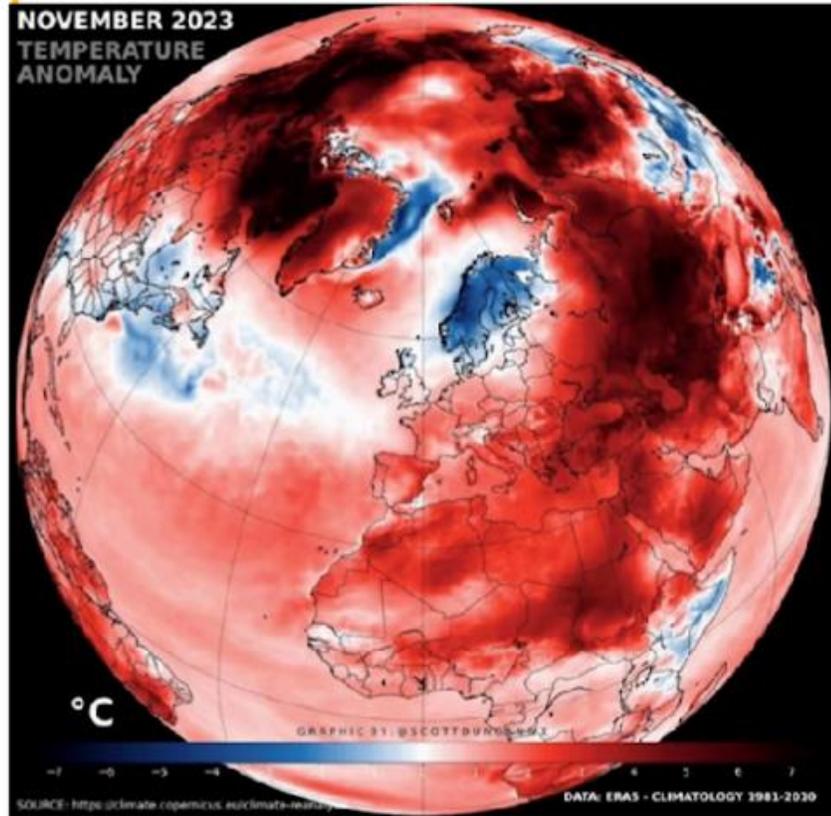


# The international and European mitigation and adaptation framework

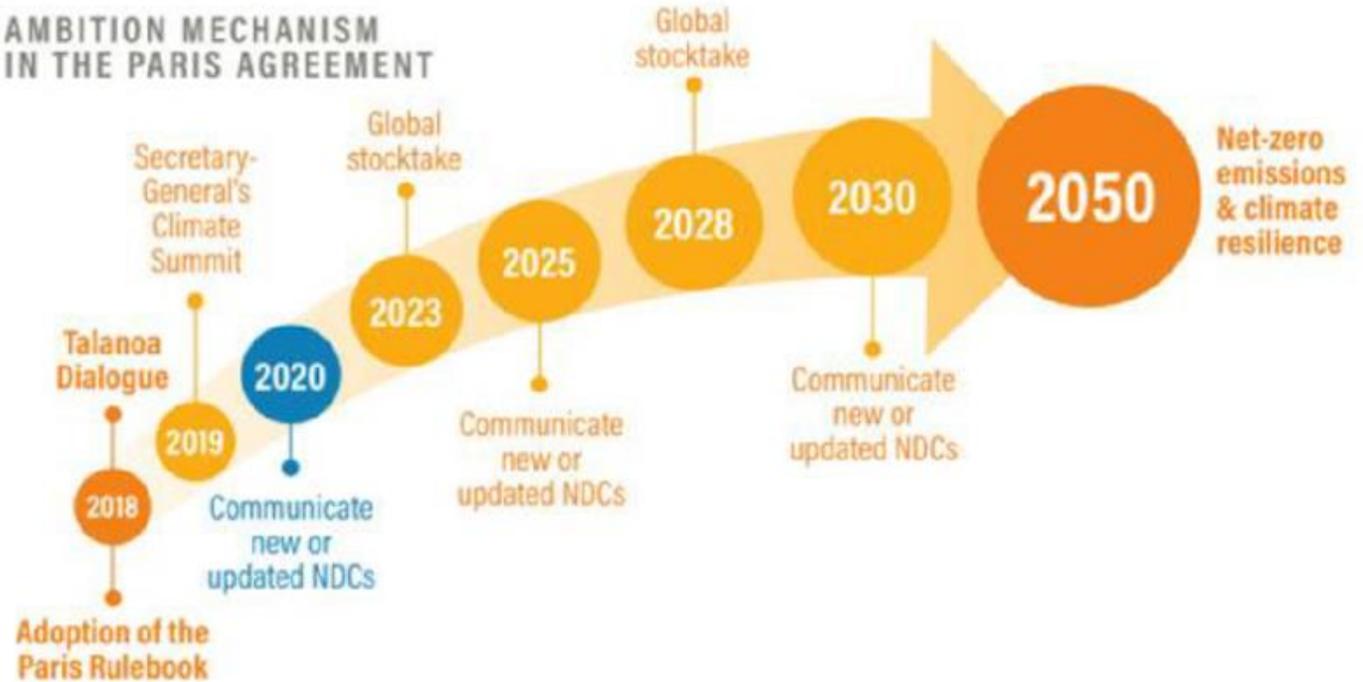
Dr. Barbara Botos

Ambassador-at-large for Climate, Ministry of Energy

# COP 28 – Can the Paris Agreement respond to the science?



## AMBITION MECHANISM IN THE PARIS AGREEMENT



- 2023 warmest year on record – **1.48°C!**
- Six record breaking months
- November had, for the first time ever, 2 days with a global avg temperature 2°C above pre-industrial levels

Images: Copernicus and UNFCCC

# COP28(CMA5/CMP18)



# Key issues and challenges for COP28

- The narrative of **historical responsibility** and of **broken promises and erosion of trust**, the expectations of future “**equity**”, the **burden of debt**, the **declining influence of science** as a basis for decision-making
- Additional **frictions** arising from the alleged **protectionism** and **self-interest** of developed country “net zero” trade and industrial policies, including unilateral trade measures
- The increasingly shared “**lived experience**” and perceived injustice of the **impacts of dangerous climate change**
- **Companies, markets and innovation systems are increasingly investing resources** in net zero technologies, and **consumers, shareholders and voters are increasingly demanding** products, services and information that support the net zero transitions
- The risks of ambition being dissipated by **government and corporate “greenwashing”** (including through the mis-use of carbon markets)
- International institutions, **from MDBs, to the IMF, to the WTO** are recognizing that their continued relevance depends on demonstrating they are contributing to the implementation of the Paris Agreement
- UAE as host:
  - The importance of the host country and the region to decarbonizing the oil and gas sector
  - The mixture of conspicuous consumption, economic diversification and technological



# “Negotiated outcomes” of COP 28/CMA5 in Dubai



## Key outcomes:

- The first **Global Stocktake** – capturing new benchmarks for ambition - **the UAE Consensus**
- Operationalization of the **new funding arrangements** and a fund to respond to **Loss and Damage**

## Other outcomes:

- A Framework for the **Global Goal on Adaptation**
- Annual Decision of the **Mitigation Work Programme** on pre-2030 Ambition, including a Ministerial Roundtable
- Decision on the **Work Programme on Just Transition** (and first annual Ministerial)
- Progress on the **NCQG** (New Collective Quantified Goal) and **Article 2.1 (c)**

**No outcome: Article 6.2 and 6.4 !**

**Procedural conclusions/Rule 16 in many topics, e.g. agriculture, transparency, ACE**

**WE UNITED. ACTED.  
DELIVERED.**

## FOREWORD

When the United Arab Emirates took on the Presidency of the 28th Conference of Parties (COP28) last year, it was evident that it would host a different COP from previous editions, one that would significantly shift the conversation around climate change.

Not only did COP28 mark the first Global Stocktake, but put inclusion firmly at the core. We aimed to ingrain a new sense of optimism and hope, and to forge an unprecedented consensus through negotiations on the main pillars of the Paris Agreement. Our goal was to deliver on old promises and raise new ambitions on adaptation, mitigation and means of implementation.

COP28 was more than a meeting of minds. It was a gathering of diverse voices, coming together to achieve what once seemed impossible, to set the world on a clear path to keep 1.5°C within reach, to protect those impacted by climate change and to leave no one behind.

The COP28 Action Agenda, centered on fast-tracking a just and orderly energy transition, fixing climate finance, focusing on people, nature, lives and livelihoods, and fostering inclusivity, provided a new path to make a difference.



# United Nations Climate Change



# COP28

## DUBAI 2023



COP28 held in November 2023 in Dubai delivered historic results across the board with the **UAE Consensus**. COP28 was a milestone and proved that countries across the world continue to see imminent need and find significant value in multilateral solutions to the growing global climate change challenge. At a moment of immense geopolitical and socioeconomic challenges with overlapping crises, the international community stood united in Dubai to prevent backsliding and rallied around high ambition climate actions when coming to agreement on the UAE Consensus and other key outcomes.

At COP28 Parties agreed on important commitments and pathways towards achieving the objectives of the UNFCCC and the Paris Agreement. At the opening plenary, Parties delivered a historic kickstart to the conference by agreeing to **operationalize new loss and damage funding arrangements and a fund**. At the same time, a broad range of countries announced pledges to the loss and damage fund of more than 650 million dollars.



# COP 28 marks the beginning of the end of fossil fuels!!!



Parties also adopted a decision on the outcome of the **first Global Stocktake**, which includes an assessment of the progress towards the goals of the Paris Agreement. The outcome of the Global Stocktake also includes decisions on a number of forward-looking global efforts aiming at closing the ambition and implementation gaps by 2030 and beyond, to keep 1.5 degrees within reach. These global actions include a call for **tripling renewable energy capacity globally and doubling the global average annual rate of energy efficiency improvements by 2030, accelerating the reduction of non-CO2 gases, transitioning away from fossil fuels in energy systems, halting and reversing deforestation by 2030 and recognizing the need for peaking of global emissions by 2025** noting sustainable development and **poverty eradication** needs and priorities, in order to limit the temperature rise to 1.5 degrees. The Global Stocktake delivered decisions on the necessary steps within the Paris Agreement ambition cycle, to take forward the implementation of the UAE Consensus in the delivery of the next round of NDCs in a post 2030 perspective.

THE HUMAN FACE OF CLIMATE CHANGE



COP28  
UAE



# UNITED FOR NATURE





Under the UAE Consensus at COP28 Parties also adopted the **UAE Just Transition Work Programme**, which aims to promote a just and equitable green transition for all countries. Furthermore, on adaptation, a key outcome from COP28 is the adoption of the **UAE Framework for Global Climate Resilience**, which provides guidance on how to enhance adaptation action by setting up thematic and dimensional targets with a view to achieving the global goal on adaptation, with a view to significantly strengthen global resilience and reduced vulnerability by 2030.

In less than 10 months, Parties will reconvene at **COP29 in the Baku, Azerbaijan**, to continue the work towards implementing the UAE Consensus and deliver the pathway towards the next round of NDCs. The expectations are high to deliver a robust decision on the **New Collective Quantified Goal on Climate Finance (NCQG)**, which is a milestone for the global climate finance architecture and its ability to effectively respond to the needs that implementing a Paris-aligned transformation encompasses.







At its core, the Troika will aim to raise and reframe ambition for the development process of the next round of NDCs, which can coherently address all pillars of climate action under the 1.5°C umbrella and be underpinned by strengthened targets and implementation frameworks. With this, the Troika will focus on:

- 1) Supporting Parties' nationally-determined ambition and priorities through the implementation of the UAE Consensus
- 2) Catalyzing the mobilization and provision of technical and financial resources to further stimulate ambition in NDCs
- 3) Utilizing existing mechanisms, processes and stakeholders, within and outside the UN system, to channel means of implementation and resources, finance, and the international climate finance architecture in support of greater ambition that contributes to sustainable development

# US surprised about Cop troika 'vision' on finance, NDCs

Market: Emissions | 03/21/24

The US said today that some of the wording in the "vision" set out by the Cop presidencies Troika — comprising the UN Cop 28, 29 and 30 climate summit hosts the UAE, Azerbaijan and Brazil — could be "highly prejudicial" to ongoing negotiations on a new global finance goal for developing countries.

US deputy special envoy for climate Sue Biniaz, taking part in the Copenhagen Climate Ministerial today, said she was "quite surprised" with some aspects of the letter, setting out the "vision", sent by the group of three presidencies to all parties to the UN Framework Convention on Climate Change (UNFCCC).

[The troika](#) was created earlier this year and has been welcomed by countries in the Cop process to push forward crucial issues such as setting more ambitious Nationally Determined Contributions



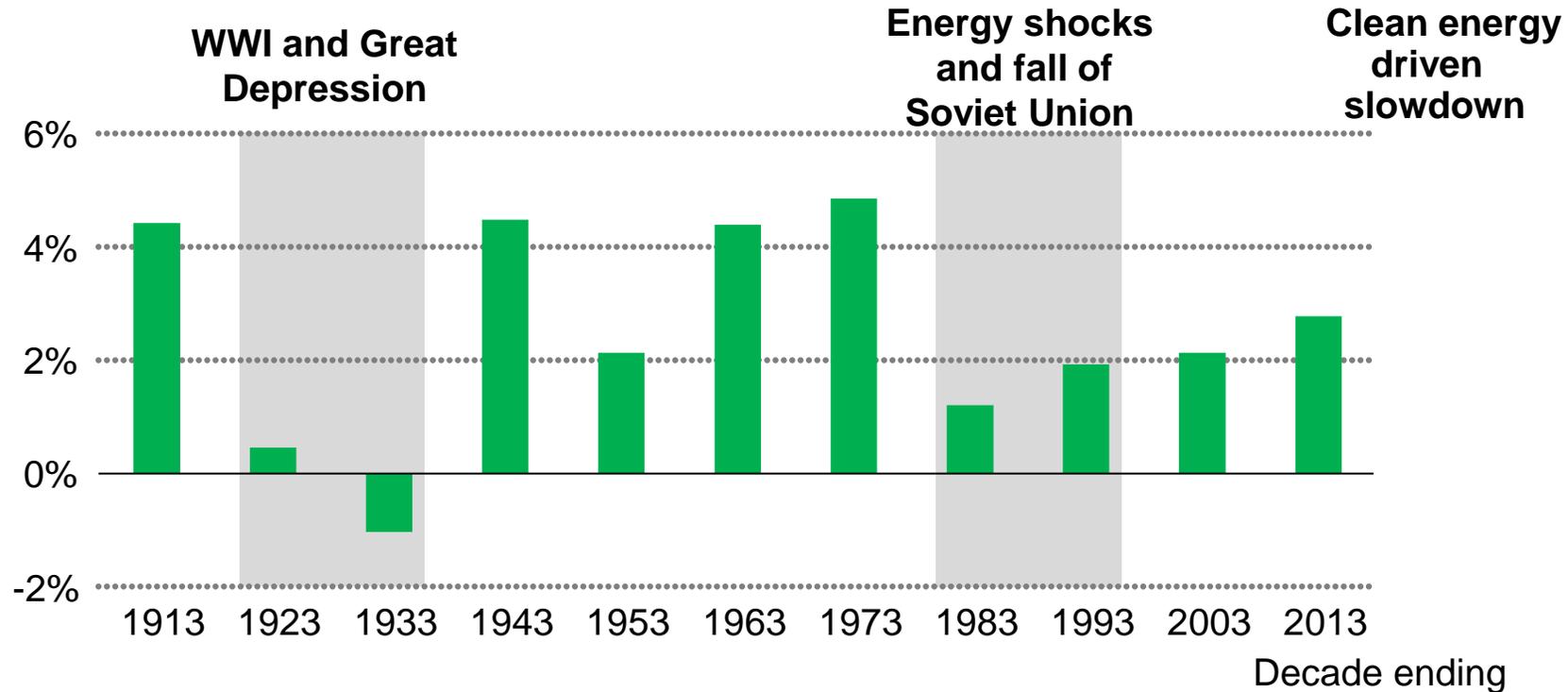
## **IEA: Advancing mitigation ambition and implementation under the UAE Consensus**

Emissions growth is slowest since the Great Depression. Clean energy expansion slowed global emissions growth to the lowest rate ever in an expanding global economy. In 2023 emissions in advanced economies are back to the 1973 level, with an economy three times larger. Clean energy transitions are accelerating. Clean energy is growing fast, avoiding emissions and demand for fossil fuels. Without clean energy, the emissions increase since 2019 would have been three times bigger.

Emerging and developing economies face an elevated cost of capital. The cost of capital for solar PV and storage projects in emerging and developing economies can be more than double the value in advanced economies, making it much more challenging to get projects off the ground.

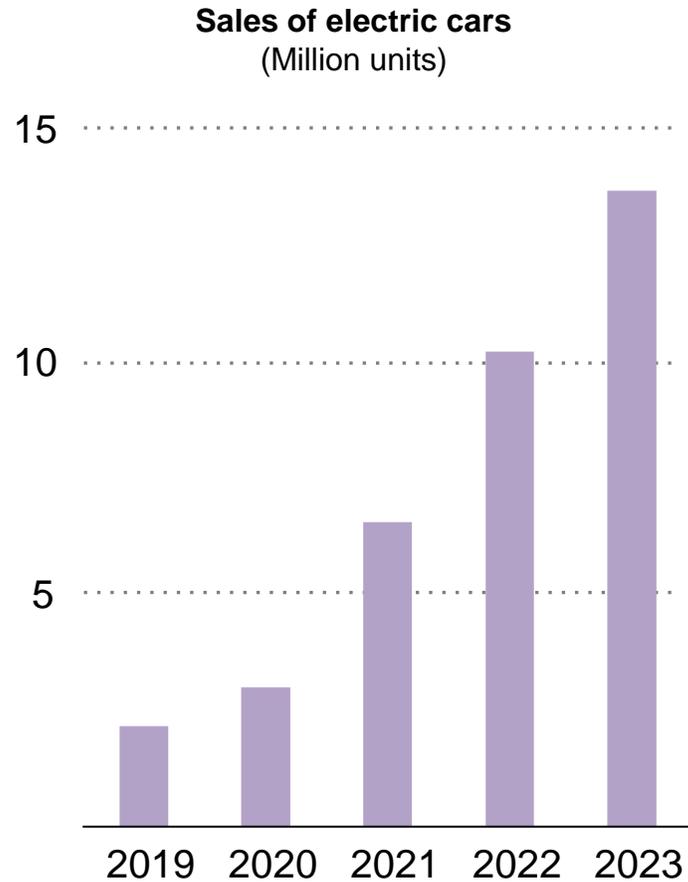
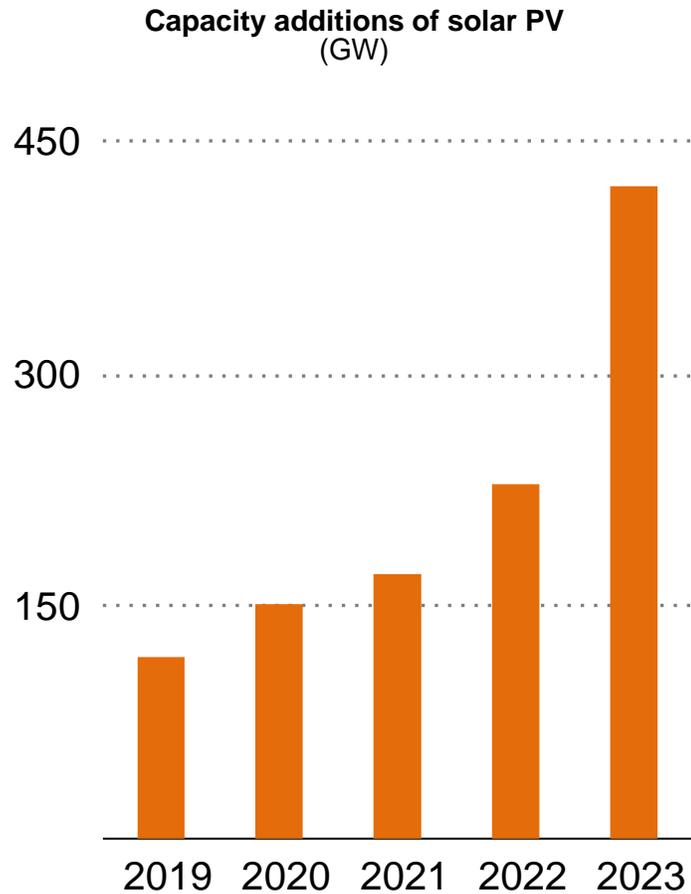
# Emissions growth is slowest since the Great Depression

Annual rate of global energy related CO<sub>2</sub> emissions by decade, 1903-2023



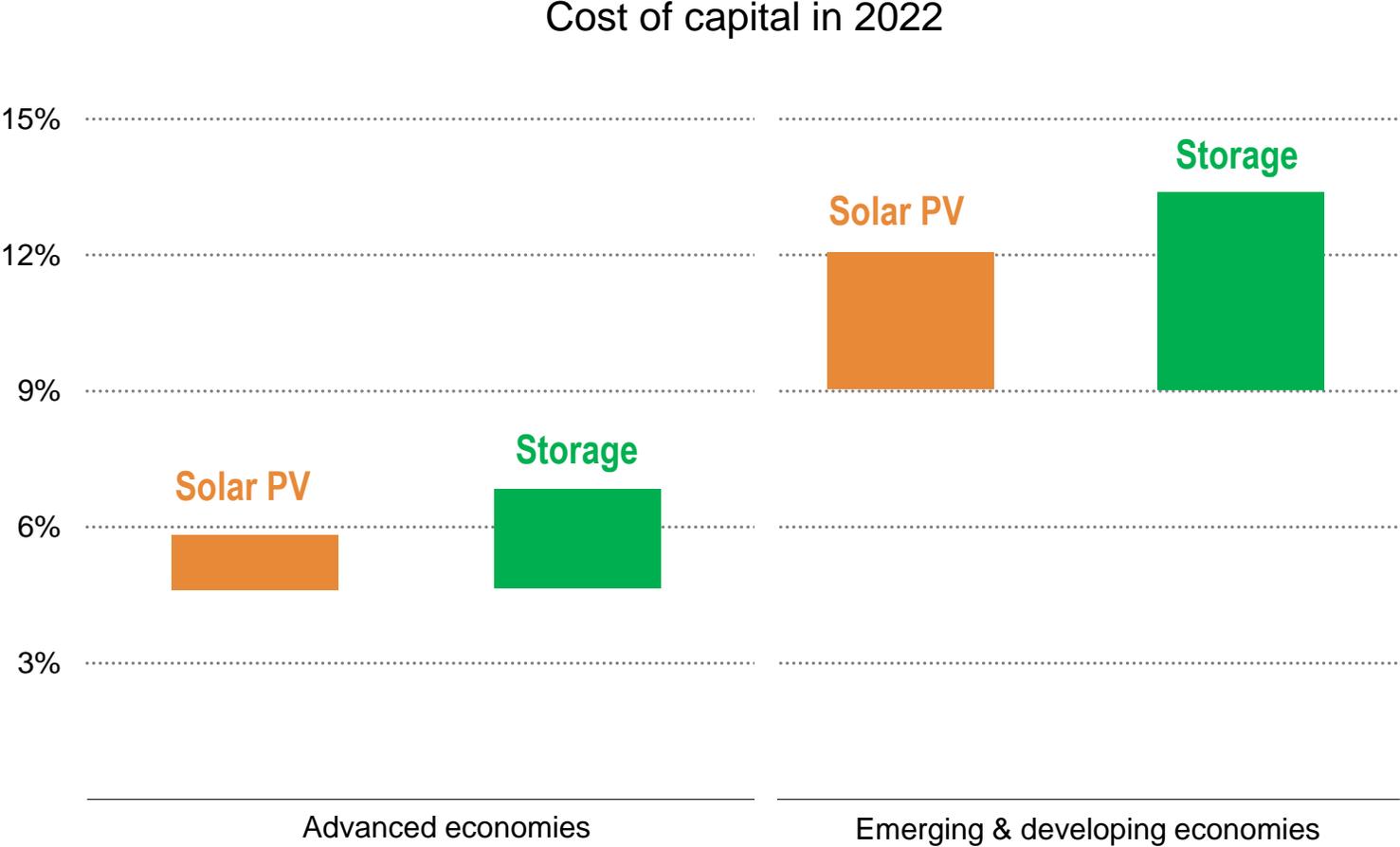
**Clean energy expansion slowed global emissions growth to the lowest rate ever in an expanding global economy; in 2023 emissions in advanced economies are back to the 1973 level, with an economy three times larger**

# Clean energy transitions are accelerating



**Clean energy is growing fast, avoiding emissions and demand for fossil fuels;**

# Emerging & developing economies face an elevated cost of capital



**The cost of capital for solar PV and storage projects in emerging and developing economies can be more than double the value in advanced economies, making it much more challenging to get projects off the ground**

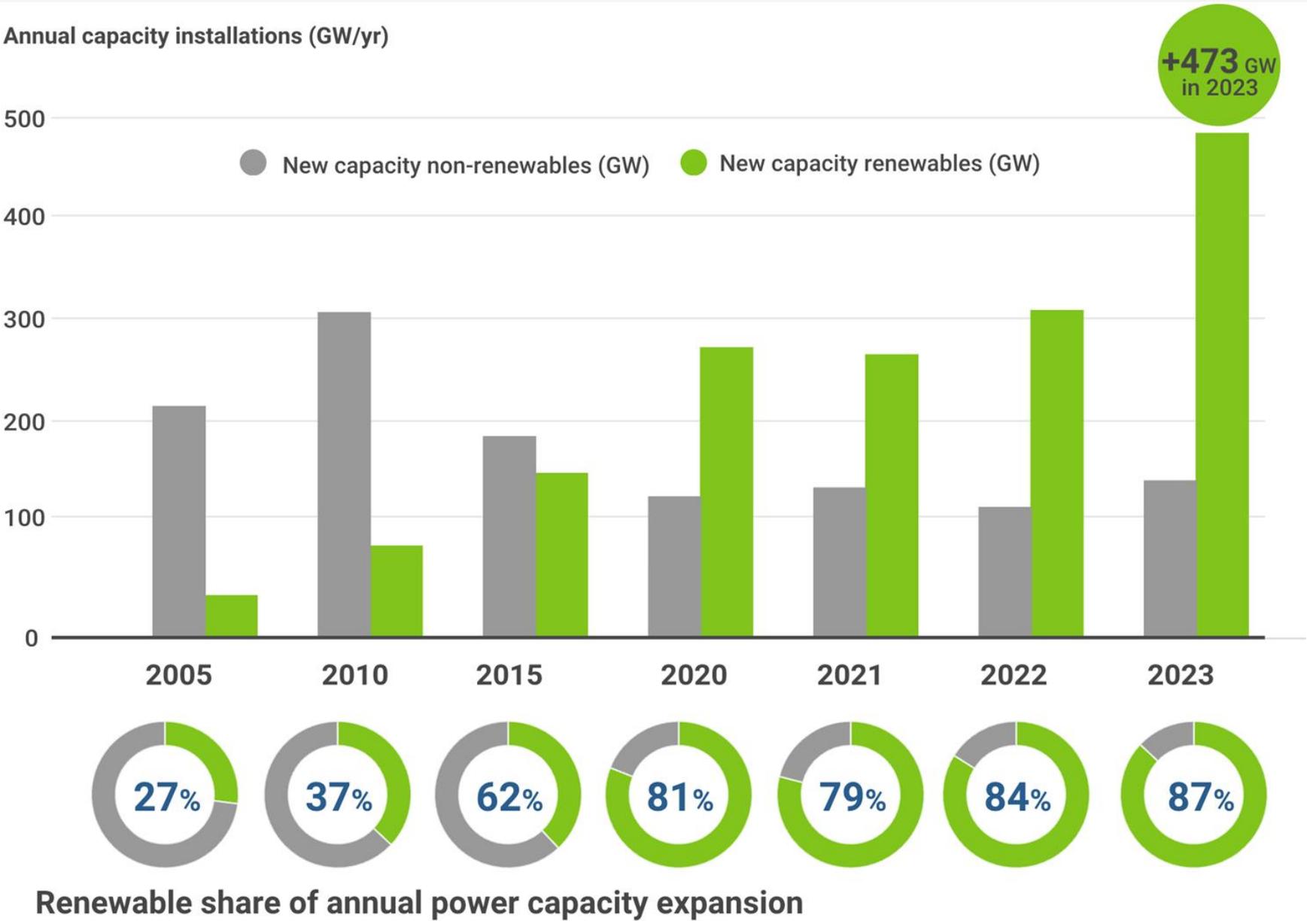
## IRENA: tracking COP28 outcomes

New phase: reality of commitment of COP28.

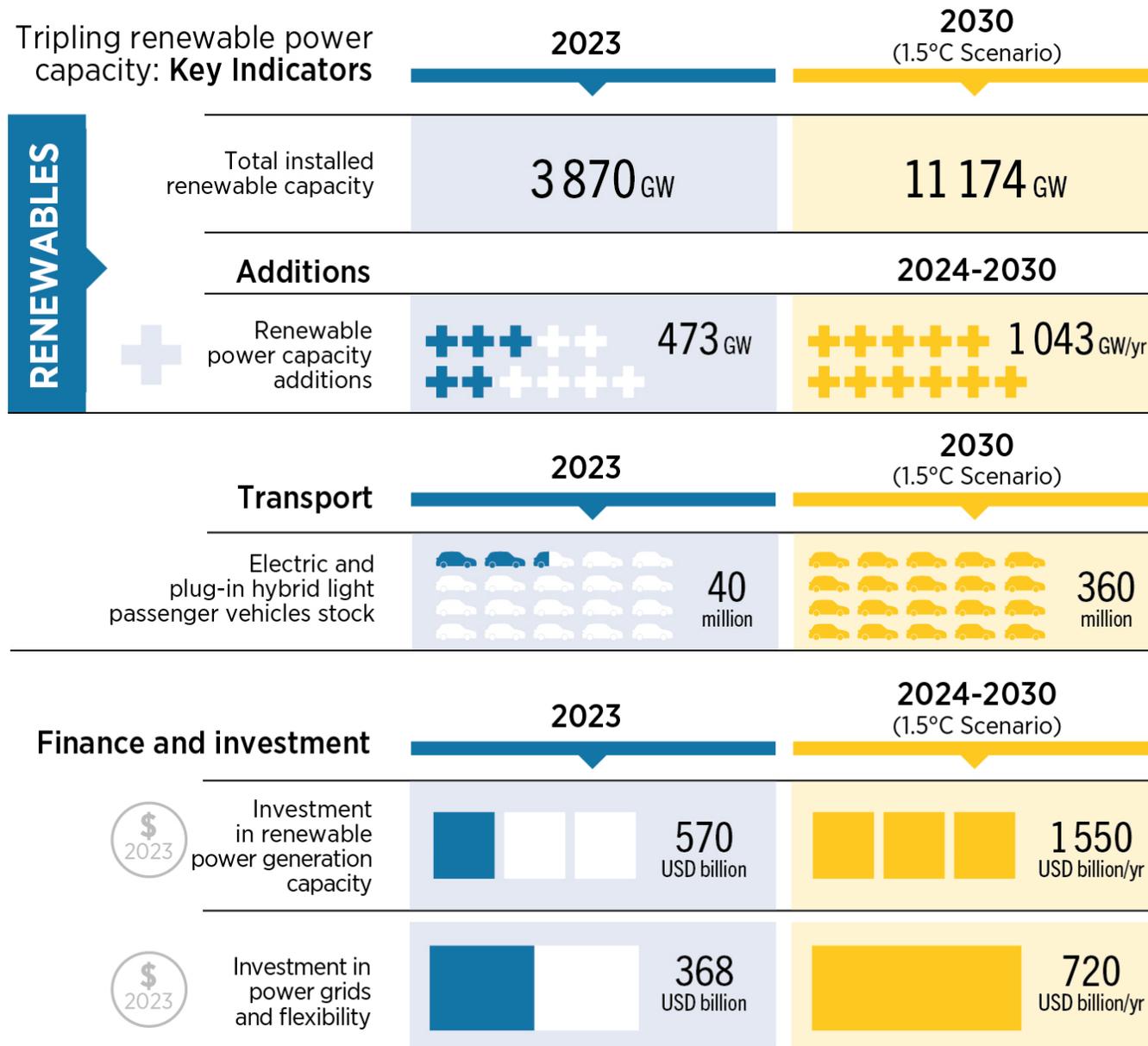
2023 set a new benchmark in renewable power deployment: +473 GW in 2023. Despite some progress, the tripling renewable power capacity is still off track. China, EU and the US contribute most to the progress.

Systematic changes are needed to overcome structural barriers impeding progress. We need to modernise and expanding infrastructures. We need grids with the speed needed. We need to phase out and phase down the demand for fossile fuels.

# 2023 set a new benchmark in renewable power deployment



# Despite some progress, the tripling renewable power capacity by 2030 is still off track



# COP28 outcomes: Transitioning away from fossil fuels

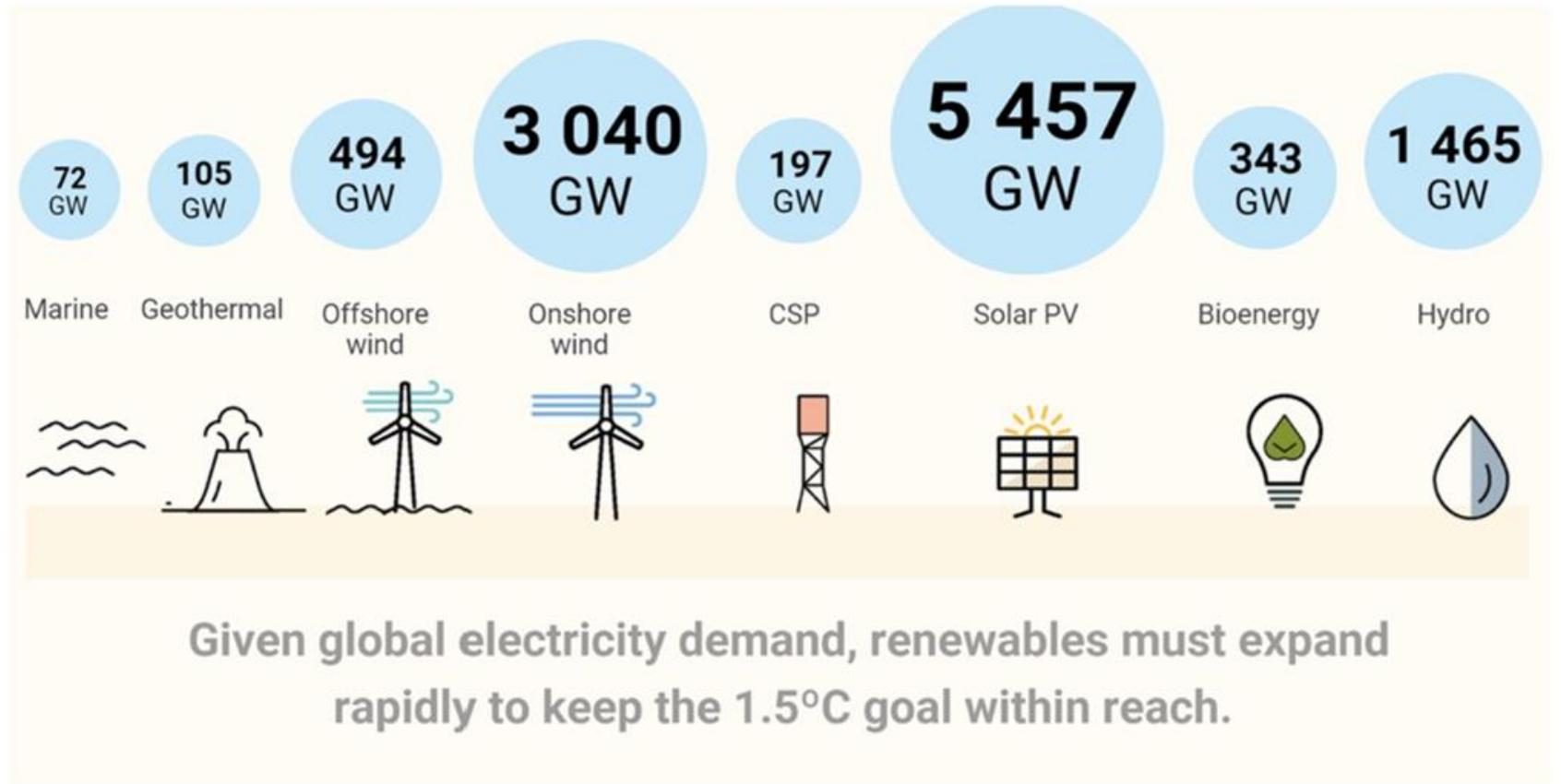
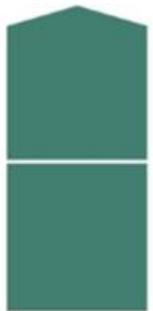
TRIPLING  
RENEWABLE POWER

x3

> 11 000 GW

DOUBLING  
ENERGY EFFICIENCY

x2



# Systemic changes needed to overcome structural barriers impeding progress



A World Energy Transitions Outlook brief

# TRACKING COP28 OUTCOMES

TRIPLING RENEWABLE POWER  
CAPACITY BY 2030



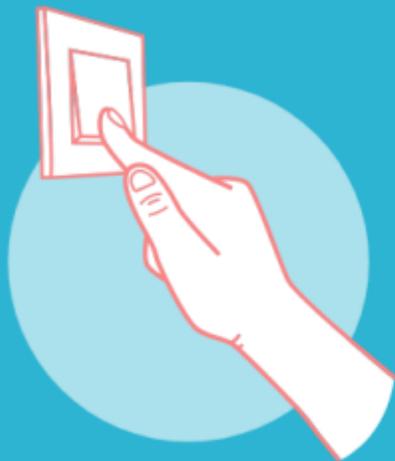
**SCAN  
TO GET THE BRIEF**



# EU wholesale electricity market: 2023 in numbers

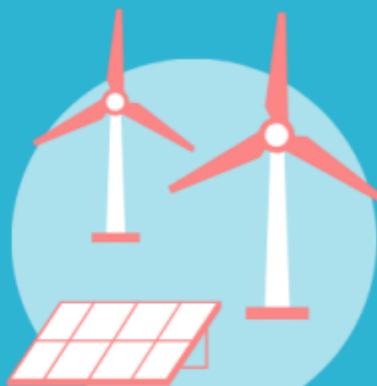
**-3.4%**

Decrease in  
electricity demand  
in 2023



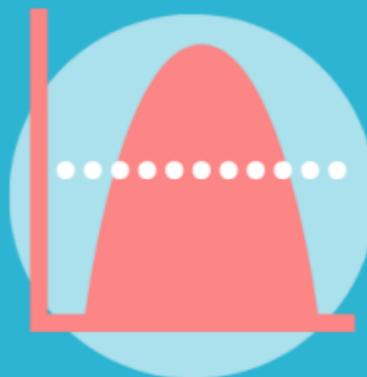
**+84 TWh**

Additional wind and  
solar generation



**93 €/MWh**

Average EU Day-  
Ahead price



**12-fold**

Increase in  
occurrences of  
negative prices



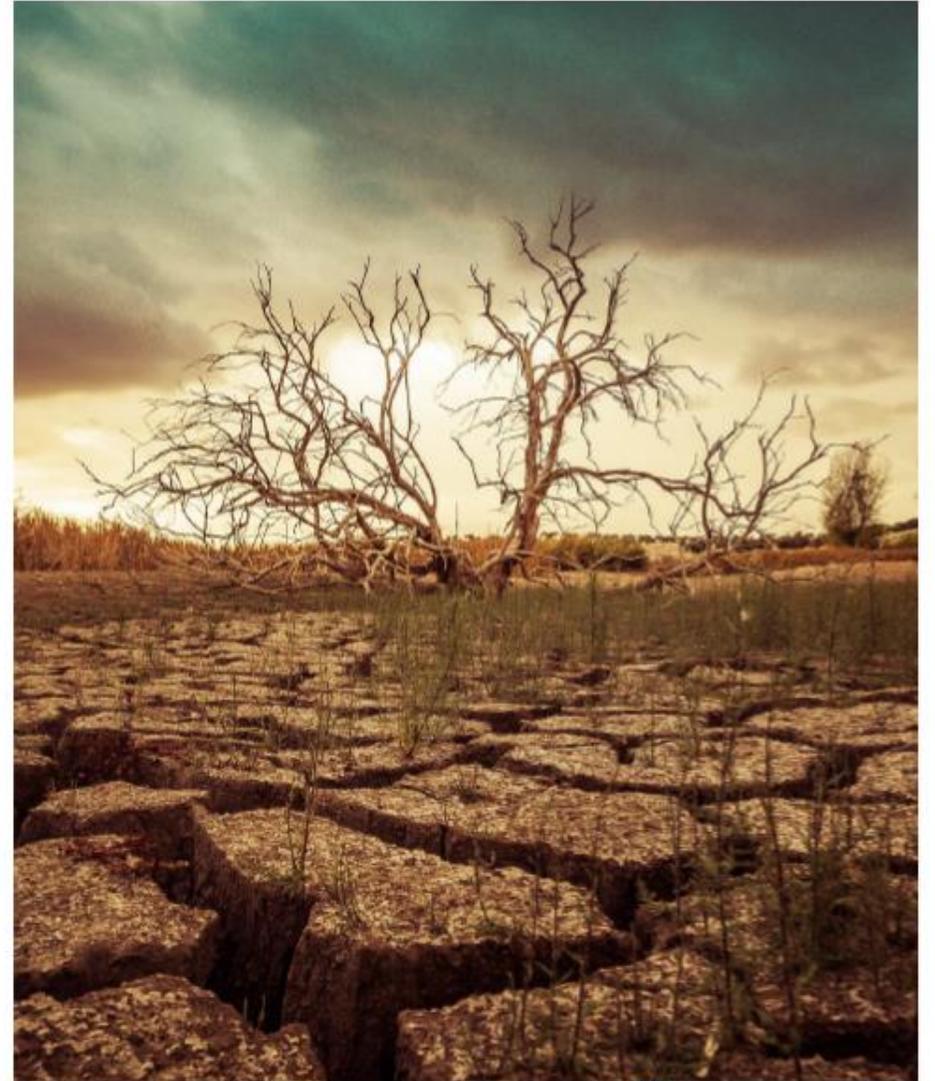
# Context: European Climate Risk Assessment (EUCRA)

## Europe is not prepared

Europe is the fastest warming continent in the world.

Climate risks are growing rapidly as we have exceeded 1.5 degrees global warming

Climate risks are threatening energy and food security, ecosystems, infrastructure, financial stability, and people's health.



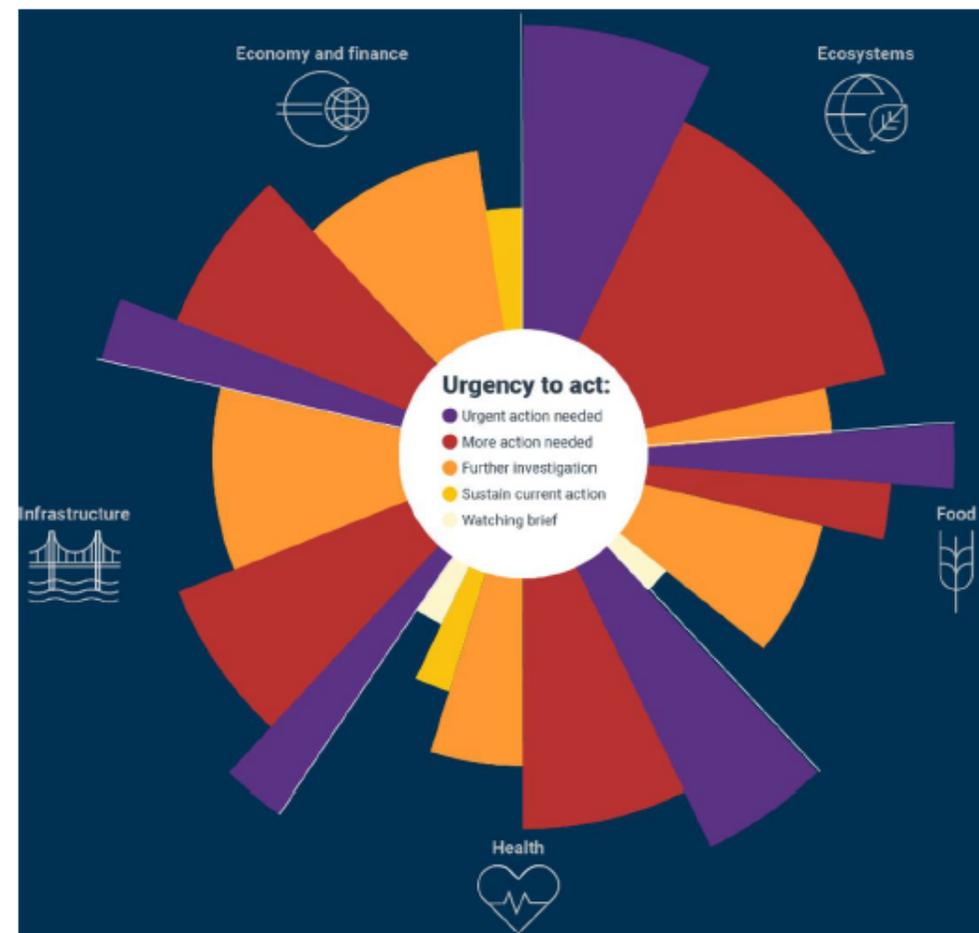
European  
Environment  
Agency

# Context – European Climate Risk Assessment (EUCRA) report

A scientific EEA report, published 11/03/2024, with a strong focus on cascading and compounding risks. The new go-to reference point for climate risks in Europe.

## Key takeaways

- Climate risk drivers are accelerating: worse heatwaves, more downpours, floods and droughts, higher sea temperatures.
- Several risks are already critical level, almost all would become critical or catastrophic during the century.
- EU policy preparedness is lagging the speed of change in the climate risks.



EUCRA identifies 36 key risks for Europe, grouped in five clusters.

<https://www.eea.europa.eu/publications/european-climate-risk-assessment>

Economy and finance



Ecosystems



**Urgency to act:**

- Urgent action needed
- More action needed
- Further investigation
- Sustain current action
- Watching brief

Food



Health



# Urgency to act now

More than half (21 out of the 36) key climate risks for Europe need more action now, with 8 of them being particularly urgent.



European  
Environment  
Agency

# Challenges in all five assessed clusters

## Ecosystems

- Coastal ecosystems
- Marine ecosystems
- Biodiversity/carbon sinks due to wildfires (¹)
- Biodiversity/carbon sinks due to wildfires
- Species distribution shifts
- Ecosystems/society due to invasive species
- Soil health
- Aquatic and wetland ecosystems
- Biodiversity/carbon sinks due to droughts and insect outbreaks
- Cascading impacts from forest disturbances

## Infrastructure

- Pluvial and fluvial flooding
- Coastal flooding
- Damage to infrastructure and buildings
- Energy disruption due to heat and drought (¹)
- Energy disruption due to heat and drought
- Energy disruption due to flooding
- Marine transport
- Land-based transport

## Food

- Crop production (¹)
- Crop production
- Fisheries and aquaculture
- Food security due to higher food prices
- Food security due to climate impacts outside Europe
- Livestock production

## Economy and finance

- European solidarity mechanism
- Public finances
- Property and insurance markets
- Population/economy due to water scarcity (¹)
- Population/economy due to water scarcity
- Pharmaceutical supply chains
- Supply chains for raw materials and components
- Financial markets
- Winter tourism

## Health

- Heat stress - general population
- Population/built environment due to wildfires (¹)
- Population/built environment due to wildfires
- Well-being due to non-adapted buildings
- Heat stress - outdoor workers (¹)
- Pathogens in coastal waters
- Health systems and infrastructure
- Infectious diseases
- Heat stress - outdoor workers

The most urgent risks are in health and ecosystems clusters

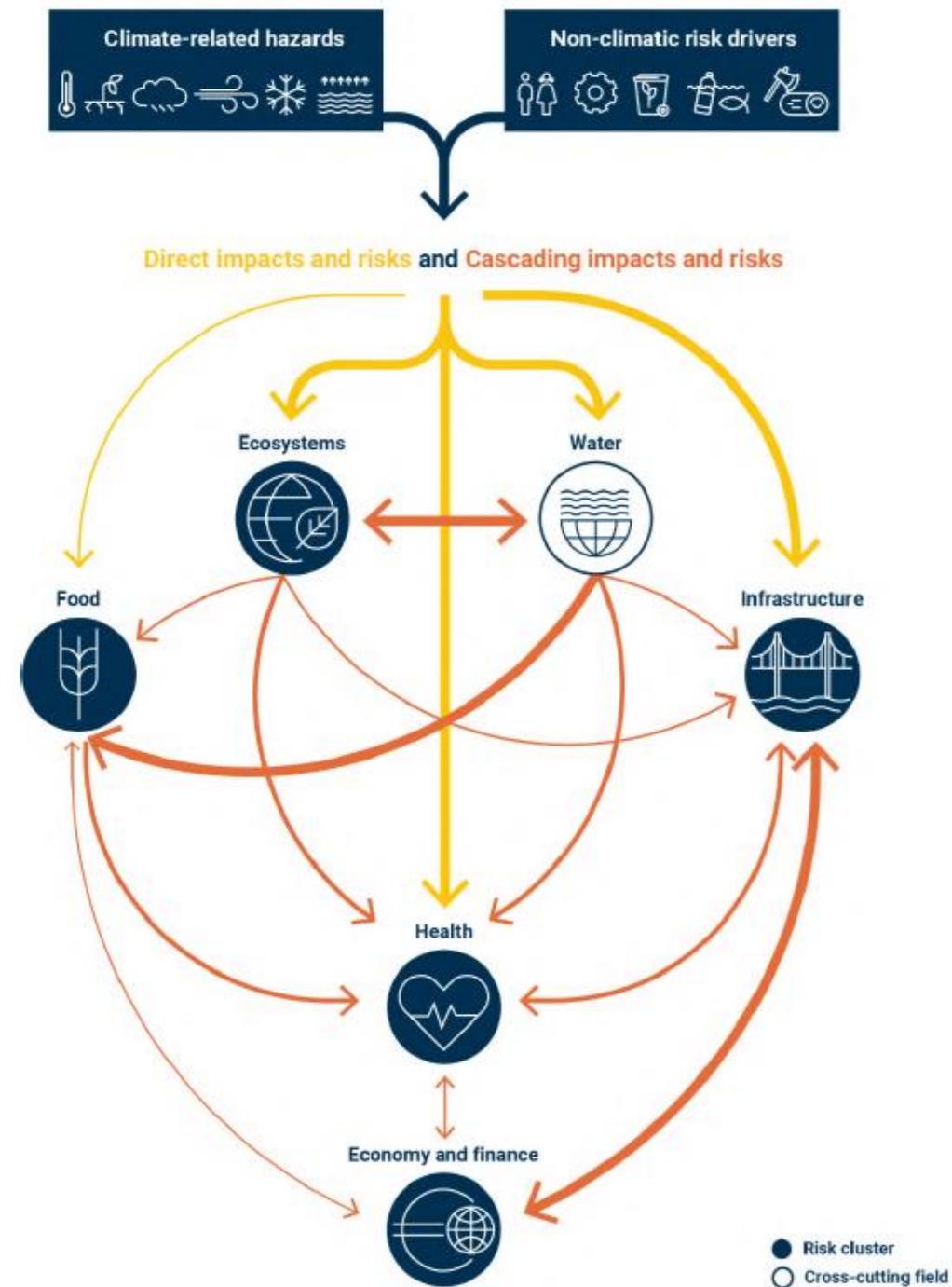
Note: (¹) Hotspot region: Southern Europe



European  
Environment  
Agency

# Climate risks cascade from one system to another

- Climate change is a risk multiplier that can exacerbate existing risks and crises.
- Cascading climate risks can lead to system-wide challenges affecting whole societies, with vulnerable social groups particularly affected.
- For example, climate change driven mega-droughts can lead to water and food insecurity, spread of diseases, disruptions of critical infrastructure, and threats to financial markets and stability.



# Communication on managing climate risks

# Communication “Managing climate risks – protecting people and prosperity”

## Main parameters of the Communication:

- Demonstrates EU readiness to respond to the evolving reality
- Geographic focus within the EU
- Risk ownership a central concept - identifying responsibility for managing risks, notably between EU and MS level
- Calibrated to the end of mandate, mostly about good decision-making processes and tools.

1. **Introduction:** explains why urgent action is needed and how it builds on existing processes

2. **Analysis/climate science:** Provides a condensed selection of the evidence and the uncertainties.

3. **Solutions space (provides key horizontal actions)**

3.1. Improved governance

3.2. Tools for empowering risk owners

3.3. Harnessing structural policies

3.4. Right preconditions for financing climate resilience

4. **Key actions in in main impact clusters**

4.1. Natural ecosystems

4.2. Water

4.3. Health

4.4. Food

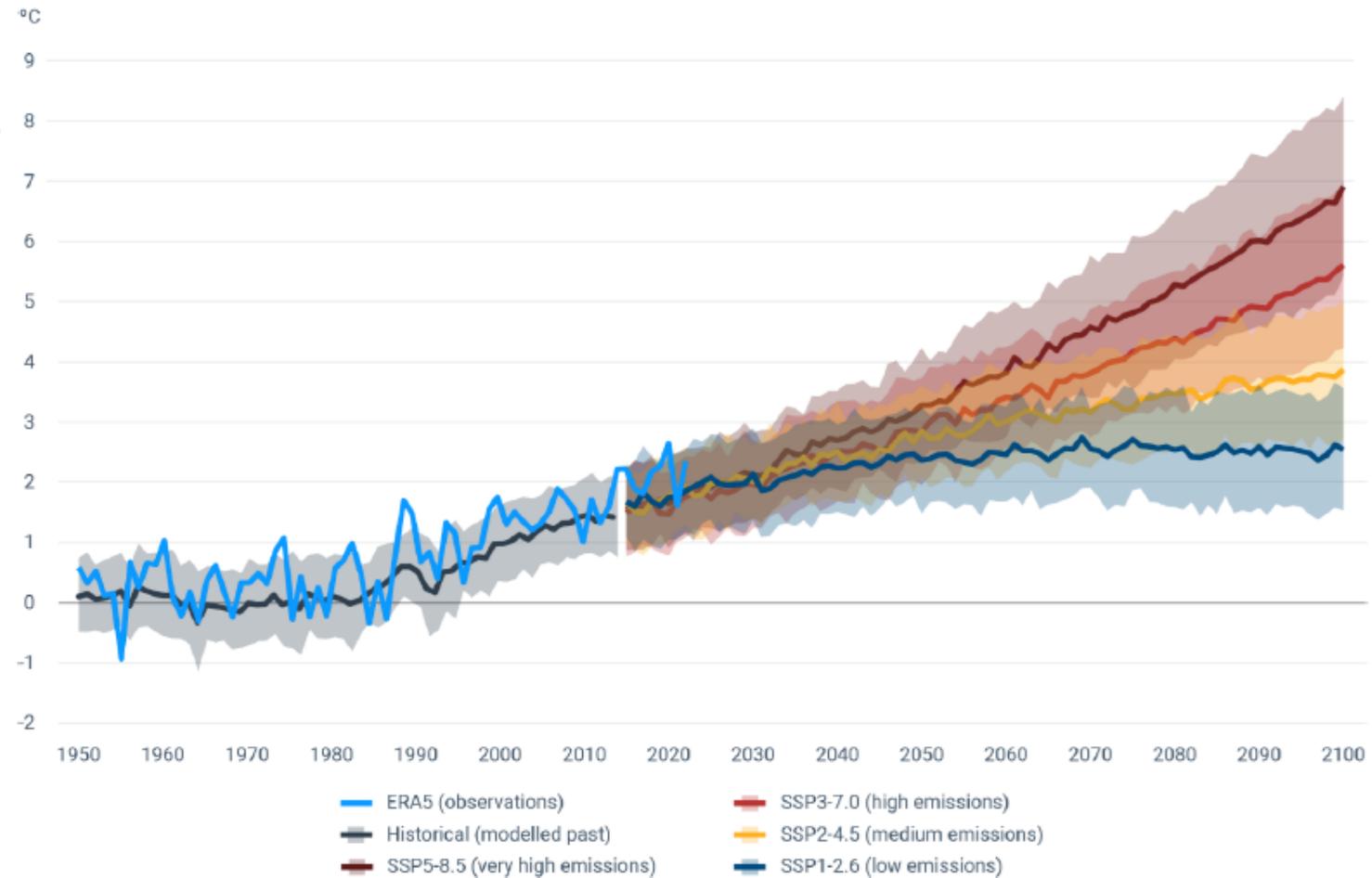
4.5. Infrastructure

4.6. Economy

5. **Next steps**

# Chapter 1: Introduction

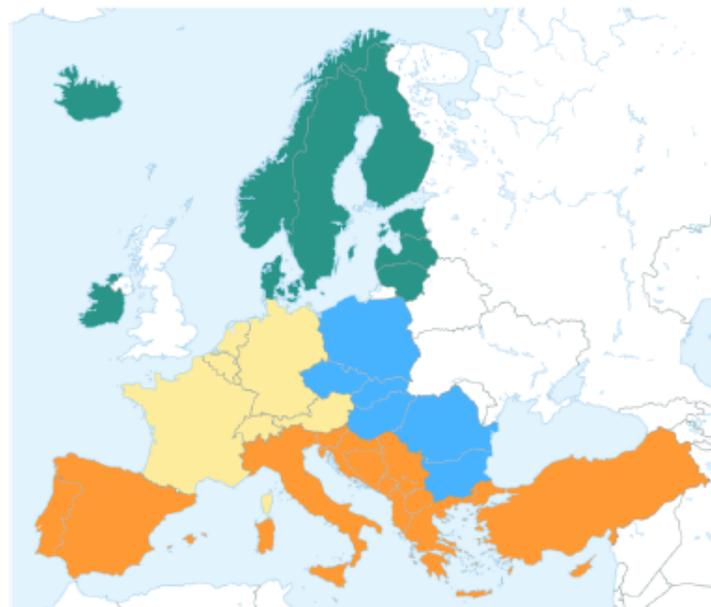
- Climate impacts will increase; mitigation & adaptation as part of the response package to the same problem.
- There is public demand for more action of resilience
- Not starting from scratch, but current action not sufficient
- Policy-makers have agency – risks can be managed



# Chapter 2: Diagnostics

## Hazards are increasing

Land regions	Northern Europe		Western Europe		Central-Eastern Europe		Southern Europe		European regional seas	Past	Future
	Past	Future	Past	Future	Past	Future	Past	Future			
	Low	High	Low	High	Low	High	Low	High			
Mean temperature	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗
Heat wave days	☐(*)	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗
Total precipitation	↗	↗	↗	↘	↘	↘	↘	↘	↘	↘	↘
Heavy precipitation	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗
Drought	↗	↘	↘	↗	↗	↗	↗	↗	↗	↗	↗
									↗	↗	



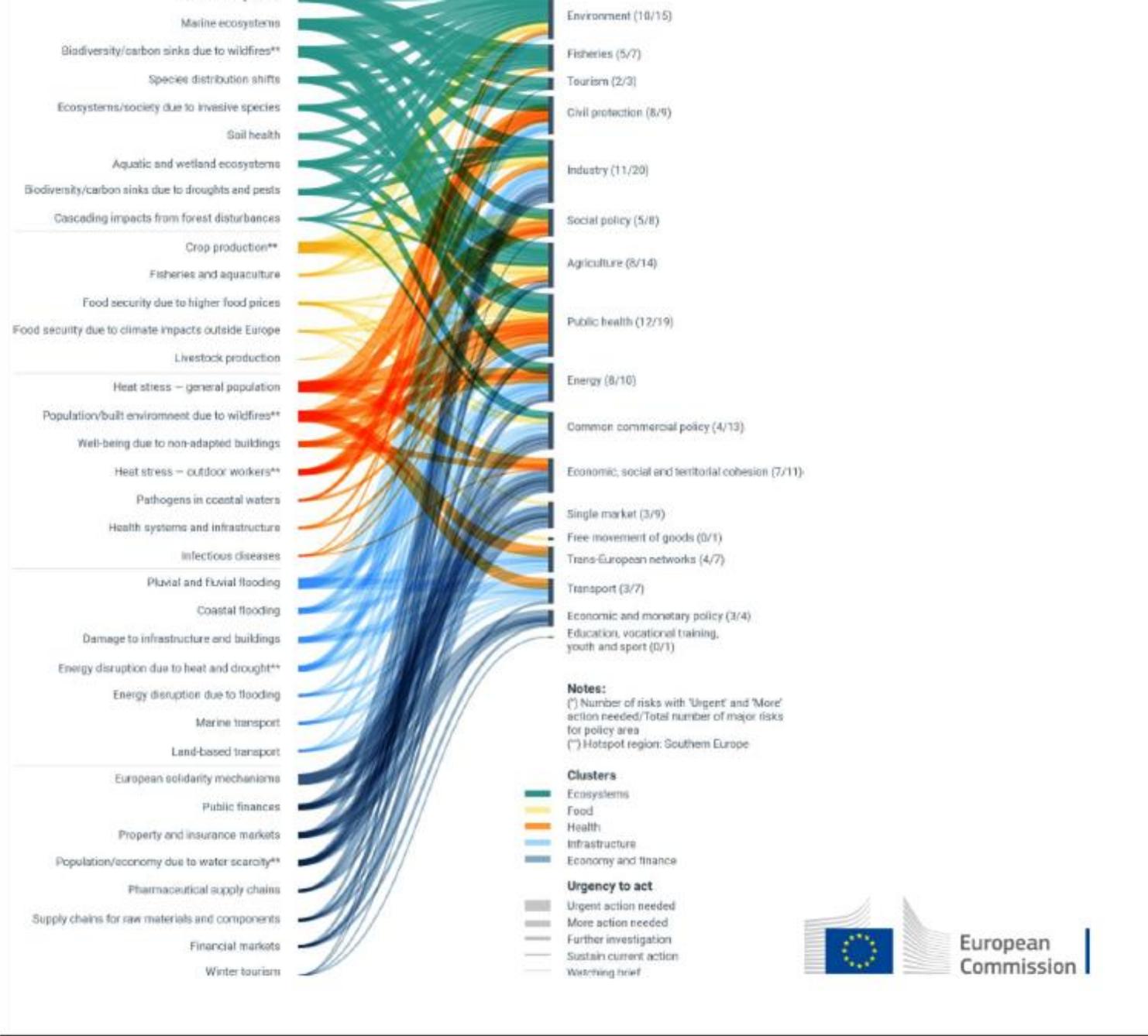
### Legend

- ↗ Increase
- ↗ Increase (limited agreement between models, datasets or indices)
- ↘ Decrease
- ↘ Decrease (limited agreement between models, datasets or indices)
- ↗ Low confidence in direction of change
- ☐ No change

### Note

(\*) Other heatwave indices show an increase for the past

- Heatwaves are getting worse.
- Rain patterns are changing, with downpours and dry spells increasing in magnitude.
- Accelerating sea levels are threatening coastal cities and communities.
- Low-lying regions in southern Europe are hotspots for multiple climate risks drivers



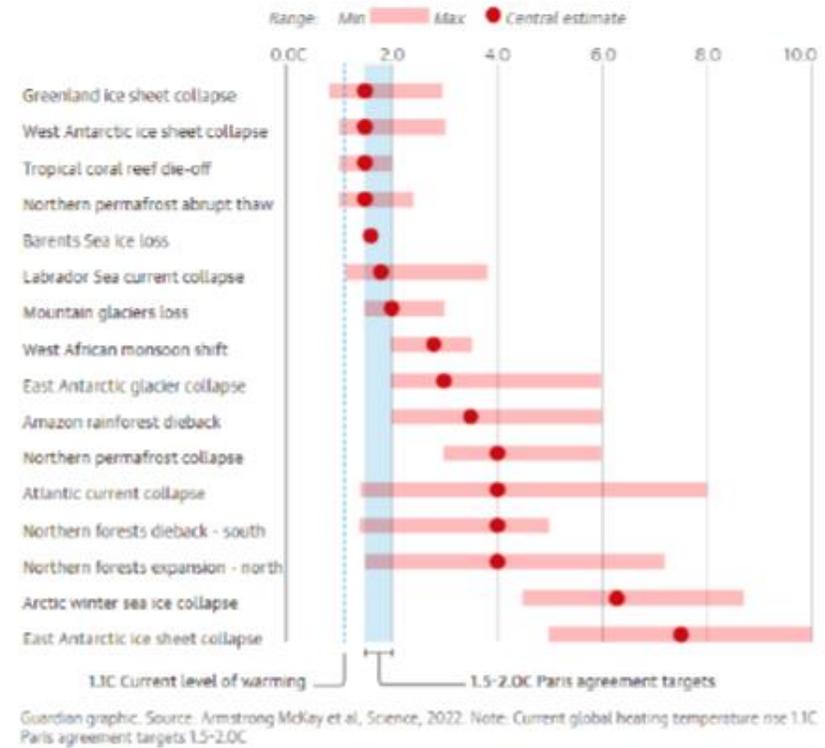
# Chapter 2: uncertainties

## Big "known unknowns"

- The climate scenarios are a useful indication of the likely outcomes (with confidence intervals), depending on GHG emissions. BUT,
- They don't account for "tail risks", the compounding and cascading impacts.
- For policy decision, these are important. The science on climate tipping points underlines the need for preparing.
- Uncertainty is not a valid excuse for inaction.

### The risk of climate tipping points is rising rapidly as the world heats up

Estimated range of global heating needed to pass tipping point temperature



# Chapter 3: Horizontal actions

Governance

Tools

Structural  
policies

Financial  
resilience

# Chapter 4: Actions in impact clusters

## 4.1. Natural ecosystems

- Implementation of legislation and better accounting of the value of natural systems
- Forest disturbances and carbon sinks
- Maritime ecosystems
- Climate-resilient landscapes

## 4.2. Water

- Safeguarding freshwater supplies
- Comprehensive stocktake of water issues

## 4.3. Health

- Occupational safety and health (linked to heat)
- European Climate and Health Observatory
- Monitoring on cross-border health threats
- Mobilisation of medical personnel and patient transfer
- Critical medical countermeasures

## 4.4. Food

- Food safety and affordability
- Future-proofing agriculture
- Fisheries policy

## 4.5. Infrastructure and built environment

- Infrastructure and building standards
- Transport infrastructure
- Energy infrastructure

## 4.6. Economy

- Resilience of firms, notably SMEs and supply chains
- Fiscal sustainability
- Financial markets stability

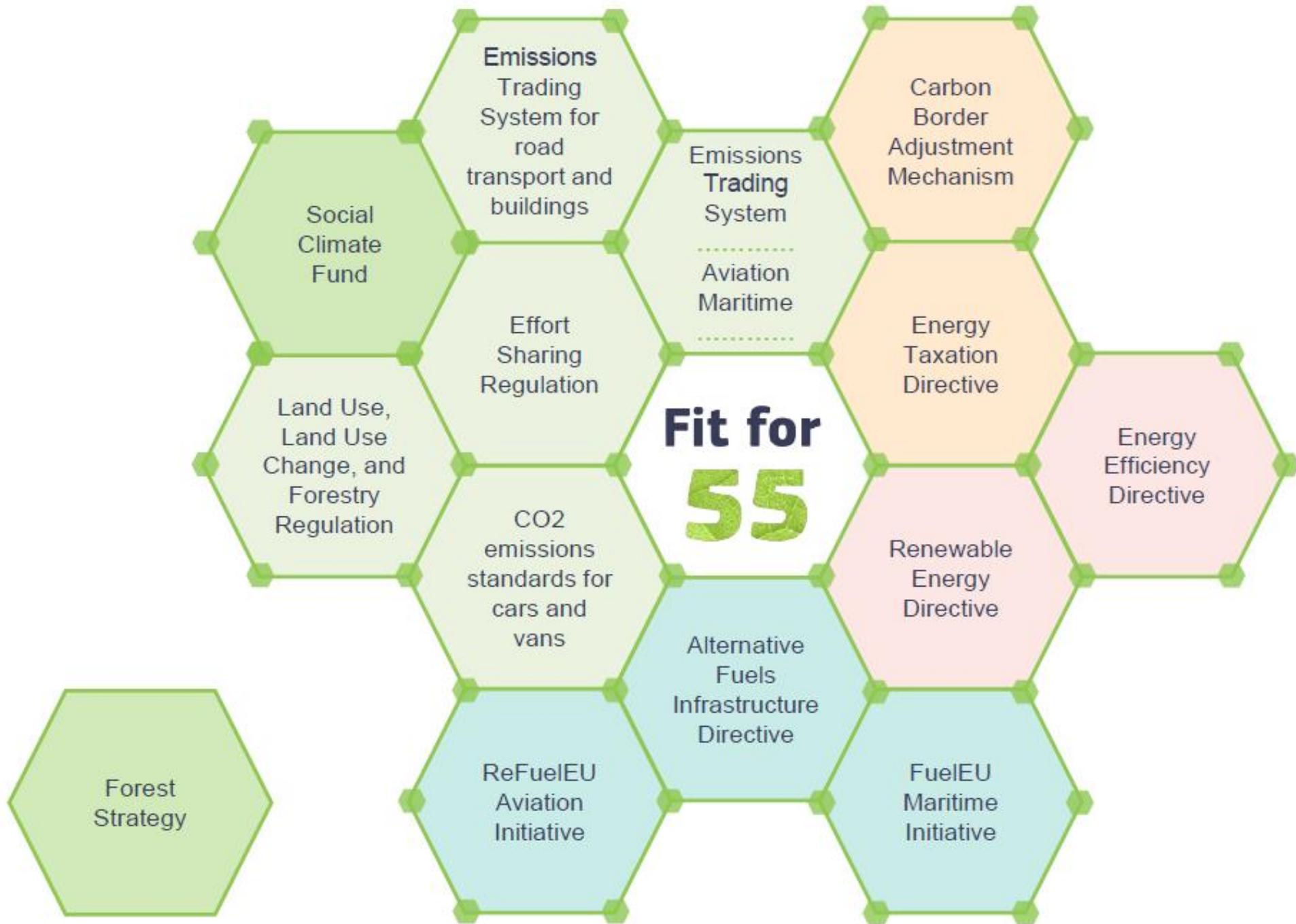
# Chapter 5: Next steps

## International dimension

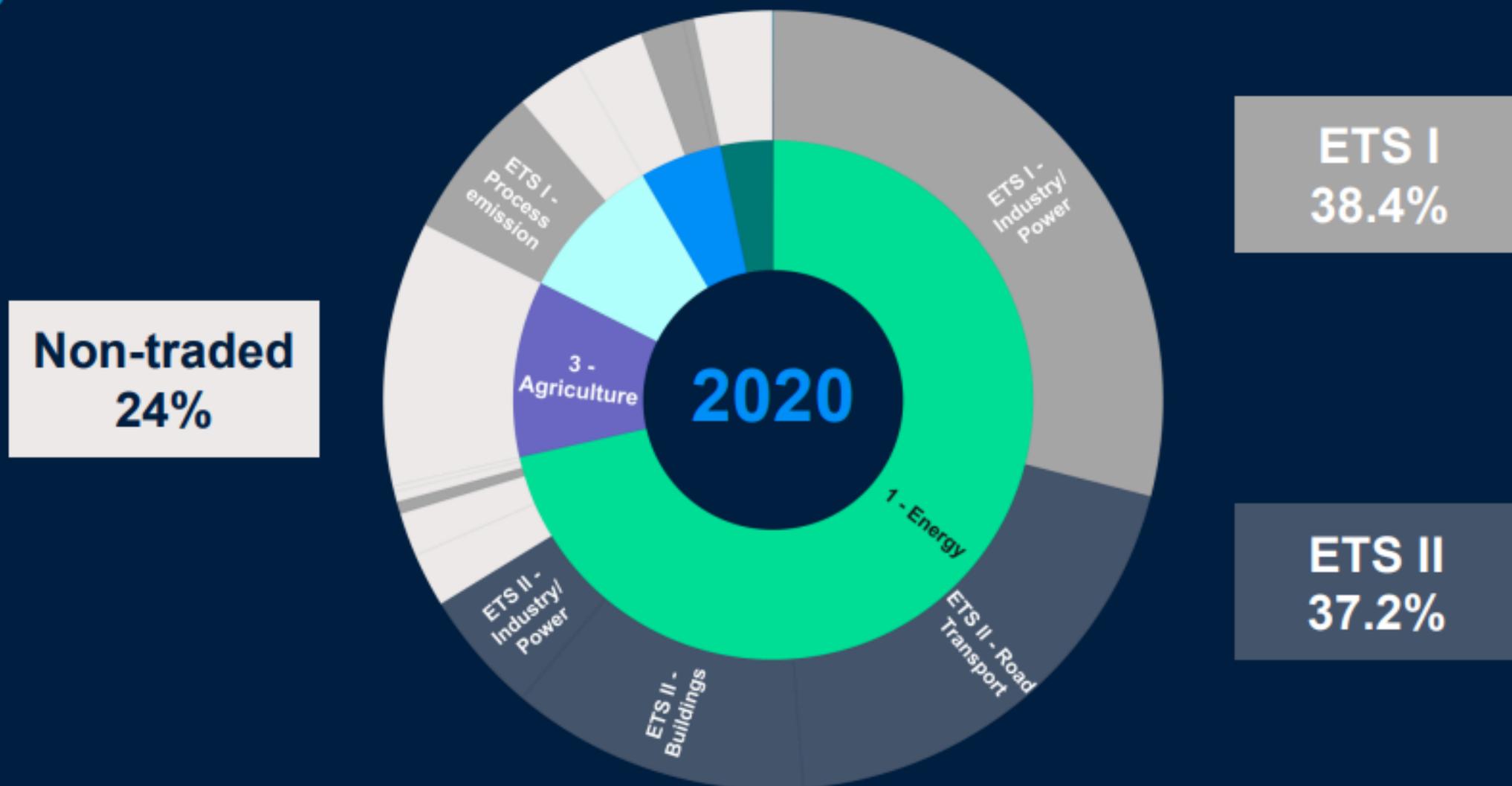
- EU will exchange with international partners for mutual learning in various fora.
- Possible international event in 2025 about managing climate risks.

## Political framing

Not an endpoint: building resilience requires concerted action and Commission will continue to work with all to take this forward.



# Fit for 55 puts 76% of EU's gross emissions under a cap



# Outlook 2030-2040



## Considering the legal context

EU commitments under the European Climate Law, the Paris Agreement and other relevant legal acts

## Understanding the limits to emissions

Global carbon budget, in the context of other greenhouse gas emissions

Different perspectives regarding EU's fair share of emissions

**Value judgements** guided by EU values and communicated transparently

## Quantifying pathways to climate neutrality

Up-to-date scenario evidence

Combining perspectives from different models and approaches

## Assessing the implications of different pathways

Side effects and co-benefits

Resilience

Feasibility



## Climate policy outlook: 2030-2040-2050

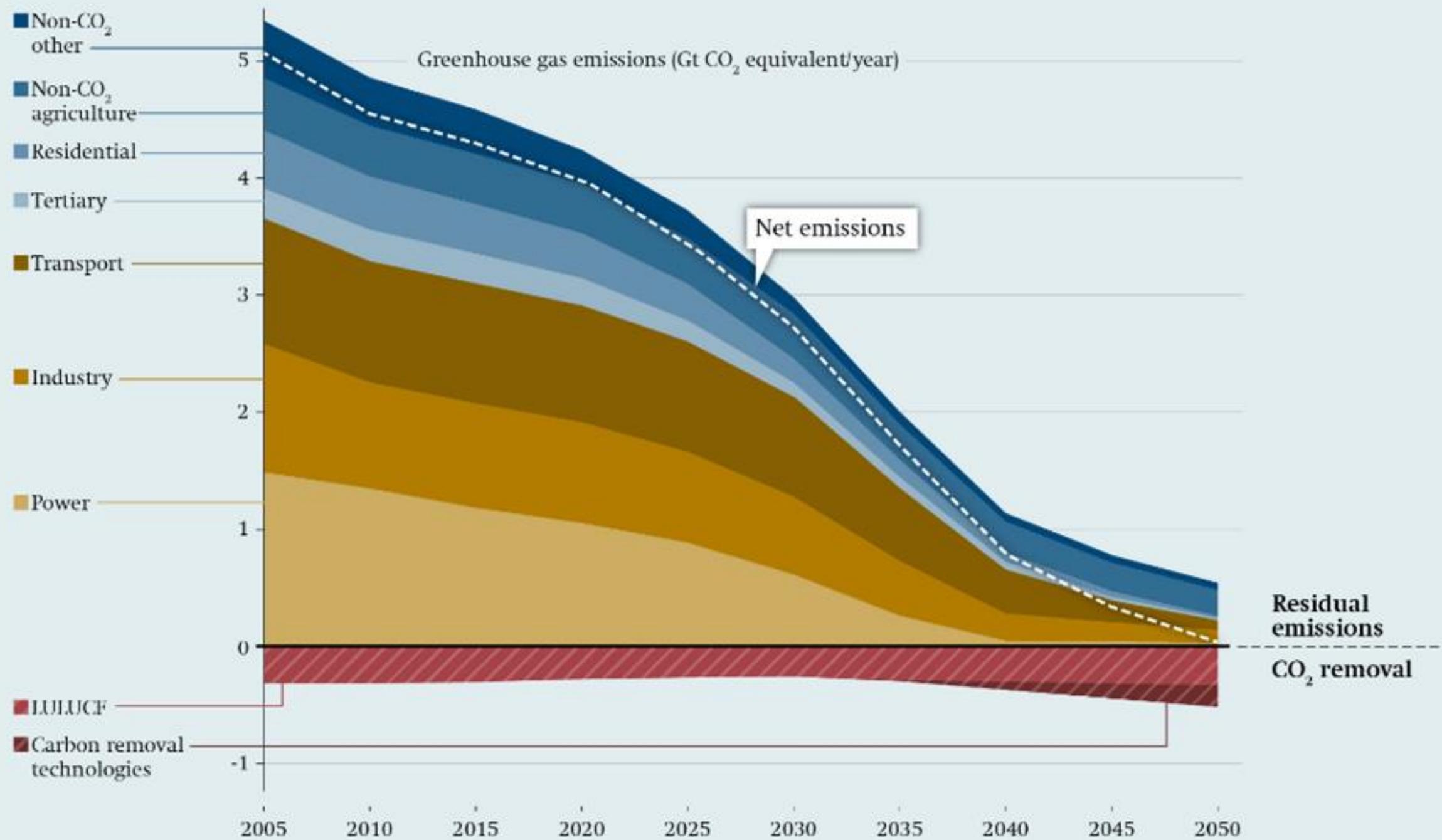
- In order to achieve the 2050 climate neutrality objective defined in the European Climate Act, an EU-wide climate policy target to be met by 2040 must be set (Article 4, paragraph 3 of the European Climate Act). To this end, no later than six months after the first global assessment (GST) referred to in Article 14 of the Paris Agreement, the Commission shall submit a legislative proposal based on a detailed impact assessment to amend this Regulation in order to include the **EU climate policy target to be met by 2040**.
- The Paris Agreement states that parties shall submit their Nationally Determined Contributions (NDCs) referred to in Article 4 of the Agreement to the Secretariat at least 9-12 months before the 2025 Climate Summit (COP30), i.e. Q1 2025.
- After the 2030 Fit for 55%! package of measures, we all have to prepare for the publication of a new package of measures aimed at achieving the intermediate EU target value of 2040.

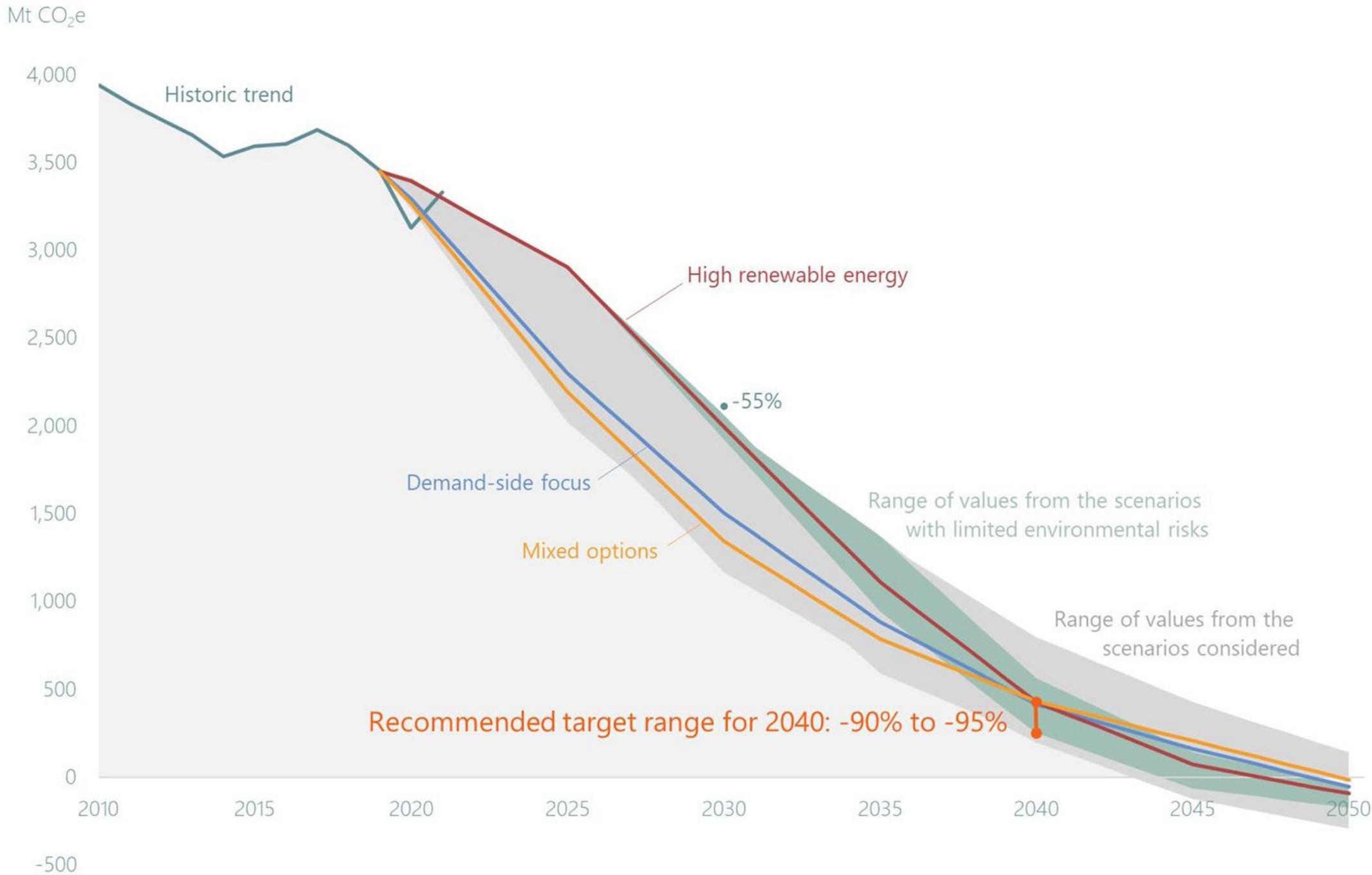
# Long-term target with potential for short-term EUA price impact



## 2040 Climate Target

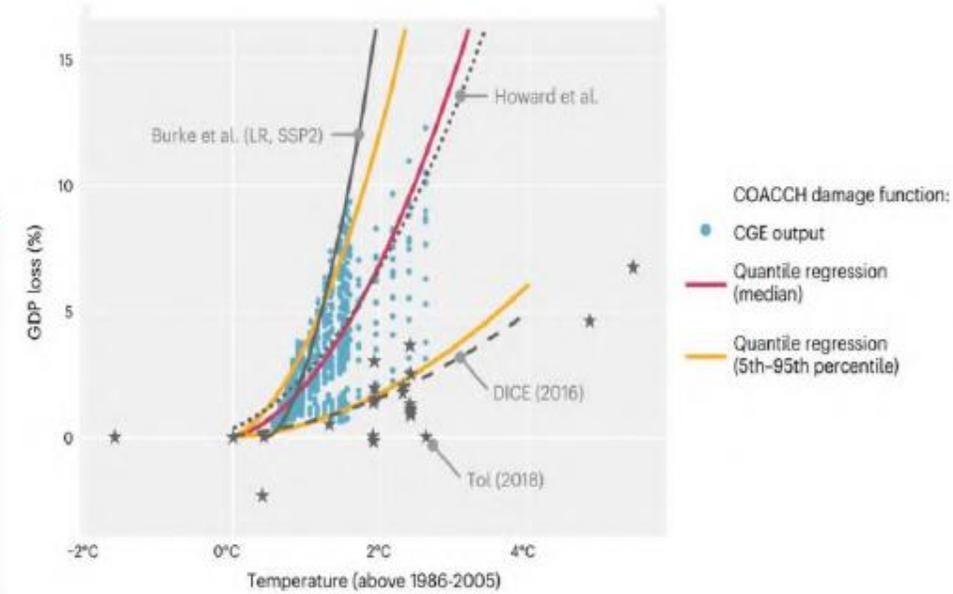
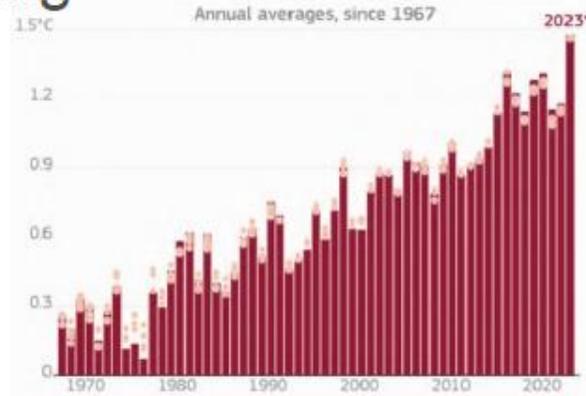






# The need for global climate action

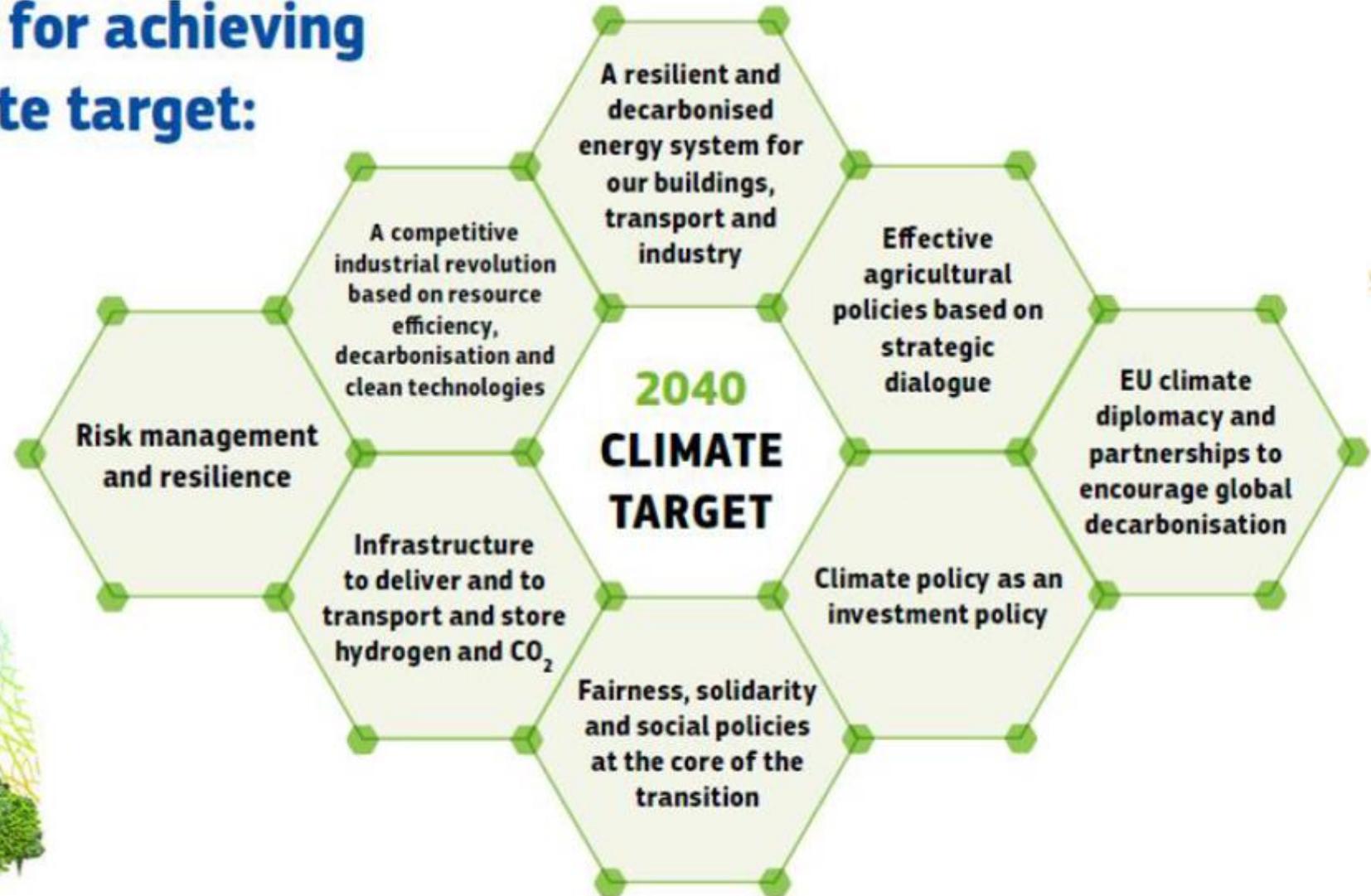
- Climate change is intensifying



- Need to cut greenhouse gas emissions sharply and rapidly & prepare for impacts of climate change
- The COP28 & Global Stocktake: parties set the minimum expectations for action; the world is moving towards the path taken by the EU

# 8 Building blocks for achieving the 2040 target

## Building blocks for achieving the 2040 climate target:



# Target levels considered- net GHG reductions in 2040

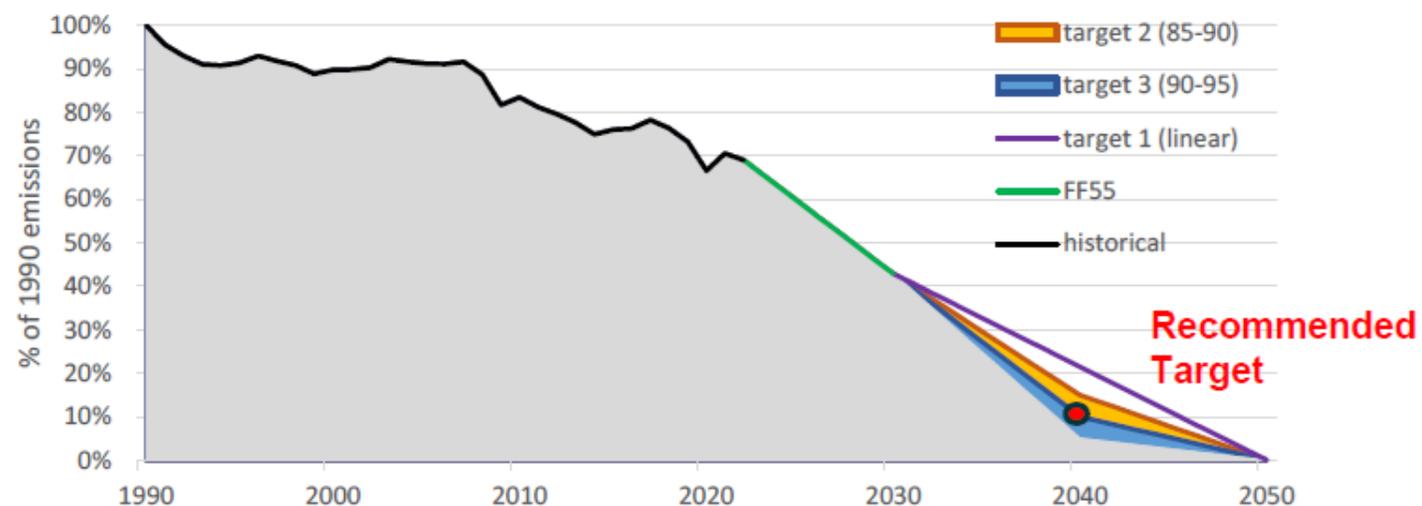
- Target Option 1: up to 80% (linear trajectory 2030-50)
- Target Option 2: at least 85% and up to 90%
- Target Option 3: at least 90% and up to 95%

## GHG budget and annual reduction of GHG emissions of each target option

Target	GHG budget 2030-2050 (Gt CO <sub>2</sub> -eq)	Yearly reductions (% vs 1990 levels)				
		1991-2010	2011-2030	2021-2030	2031-2040	2041-2050
Target level below 75%	More than 23	-0.9%	-2.0%	-2.8%	-1.8%	-2.5%
Target Option 1 (linear, 78%)	21				-2.2%	-2.2%
Target Option 2 (at least 85%)	Up to 18				-2.8%	-1.5%
Target Option 3 (at least 90%)	Up to 16				-3.3%	-1.0%

IA Main document (Part 1/5), Table 3

## Profile of the net GHG emissions over 1990-2050



IA Main document (Part 1/5), Figure 4

# Core policy scenarios

## ● S1 scenario

- Up to 2040, relies essentially on the Fit-for-55 **energy system trends**, lies on the “linear” reduction path between 2030 and 2050.
- No further mitigation of non-CO2 emissions beyond their default evolution within the current policy framework.
- Beyond 2040, all sectors contribute to the 2050 climate neutrality objective, and all technologies need to be deployed.

## ● S2 scenario

- **combines** the energy system trends reflected in S1 with a further deployment of carbon capture and e-fuels.
- also includes further reductions of GHG emissions in the land sector (including non-CO2 emissions in the agriculture sector and carbon removals in the LULUCF-sector).

## ● S3 scenario

- relies on a fully developed **carbon management industry** by 2040
- further reductions in agriculture compared to S2

# LIFE variant

- LIFE assesses the impact of a shift in consumption patterns to more sustainable alternatives leading to a more efficient use of natural resources, more specifically:
  - A more sustainable food system and associated land use
  - A more circular economy
  - More sustainable mobility patterns
- Is not attached to a specific target option and is not used to compare the different target options. It only serves to illustrate how these demand-side driven actions can complement the supply-side technology deployment analysed in the core scenarios.
- In practice, in the analysis, the LIFE variant is set so that it aims at reaching the same overall reductions of net GHG emissions as S3.

# Scenario building blocks by 2040

IA Main document (Part 1/5), Table 4

	S1	S2	S3	LIFE
<b>Rationale</b>	Continuity of existing decarbonisation trends up to 2040: improvement of energy efficiency, electrification of energy demand, deployment of renewables in the power system	Similar as S1, but S2 also includes a wider diffusion of novel technologies by 2040 (carbon capture, e-fuels)	Similar as S2, but S3 assumes a faster and wider uptake of novel technologies over 2031-2040 (carbon capture, e-fuels)	Assumes more sustainable lifestyles and a move towards a more circular and shared economy. It translates into a different evolution of demand patterns for energy use in buildings, transport, in relation with materials management towards or in the food system
<b>Industry</b>	Electrification of energy consumption, some development of e-fuels by 2040		More e-fuels by 2040 than in S2	Enhanced circularity entails comparatively lower needs for primary production of materials, and so lower needs for carbon capture
	Very limited carbon capture in industrial processes	Deployment of carbon capture	Further deployment of carbon capture	
<b>Buildings</b>	Further electrification through sustained deployment of heat pumps			Lower thermostat settings for heating and cooling temperature deliver additional energy savings
	Low average annual renovation rate in 2031-2040 and high in 2041-2050	Similar average renovation rate in 2031-2040 and 2041-2050	High average annual renovation rate in 2031-2040 and low in 2041-2050	
<b>Transport</b>	EU Sustainable & Smart Mobility Strategy and Action Plan: milestones achieved (particularly with regard to rail, inland waterways and short-sea shipping)			
<b>Road transport</b>	CO2 standards for cars and vans: -100% vs 2021 from 2035 onwards	CO2 standards for cars and vans as in S1 + Higher car occupancy & some shift from car to active modes (walking, cycling) and public transport, driven by a shift towards shared and collaborative mobility services and multimodal travel		As in S3 plus stronger shift towards shared and collaborative mobility services and multimodal travel, including sustainable urban transport; 'smart' charging
	CO2 standards for HDVs: -90% vs 2019 from 2040 (-100% for buses), more efficient operation of freight vehicles and delivery of goods by optimising multi-modal delivery solutions, higher use of intermodal freight transport		CO2 standards for HDVs: -100% vs 2019 from 2040, more efficient operation of freight vehicles and delivery of goods by optimising multi-modal delivery solutions, higher use of intermodal freight transport	
<b>Maritime transport</b>	FuelEU Maritime GHG intensity targets: -31% in 2040 and -80% in 2050 (vs 2020)			
	Lower end of the IMO GHG reduction target range (-70% in 2040 vs 2008)	Mid-point of the IMO target range (-75% in 2040 vs 2008)	Higher end of the IMO target range (-80% in 2040 vs 2008)	
<b>Aviation</b>	ReFuelEU Aviation SAF mandates (34% in 2040 and 70% in 2050; including a sub-mandate for synthetic aviation fuels and H2: 10% in 2040 and 35% in 2050)	Slightly more ambitious fuel mandates than in S1 (SAF: 36% in 2040 and 72.5% in 2050; synthetic aviation fuels and H2: 12% in 2040 and 37.5% in 2050), incentives for the deployment of zero-emissions aircraft	Slightly more ambitious fuel mandates than in S2 (SAF: 38% in 2040 and 75% in 2050; synthetic aviation fuels: 14% in 2040 and 40% in 2050), incentives for the deployment of zero-emissions aircraft	As in S3 plus fewer business trips and long trips compared to scenarios, modal shift to rail (particularly for short trips)

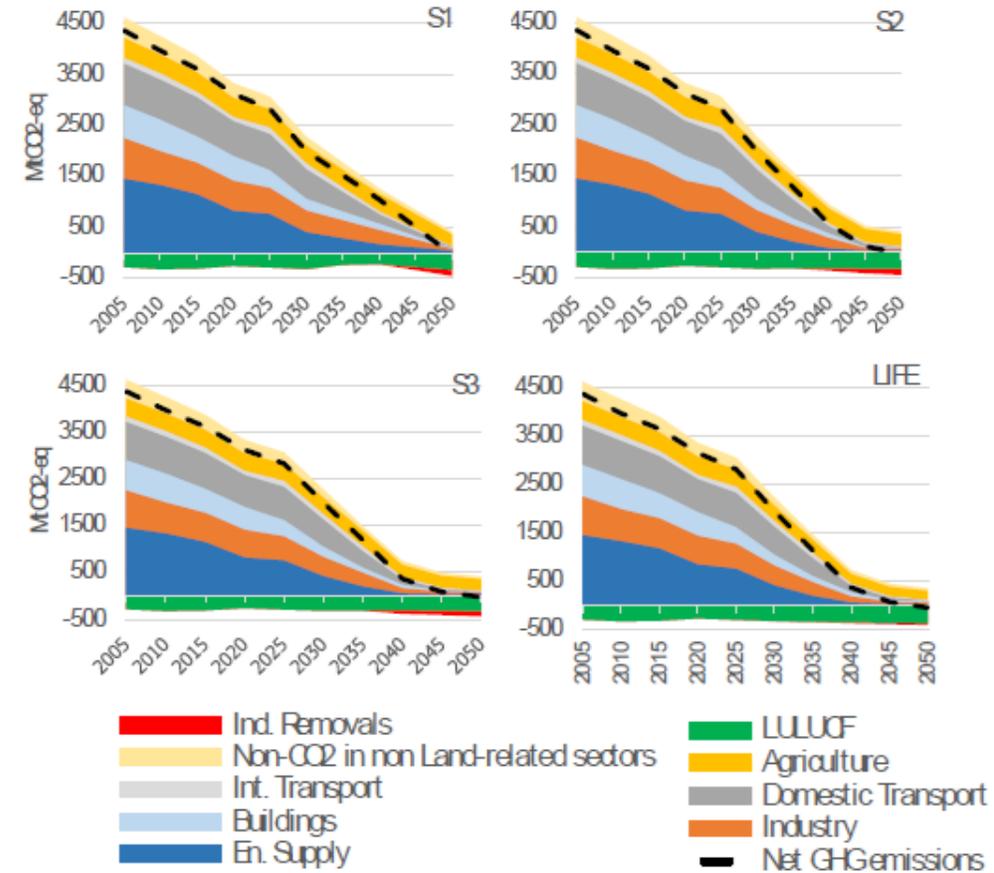
# Scenario building blocks by 2040

IA Main document (Part 1/5), Table 4

	S1	S2	S3	LIFE
<b>Power system</b>	Limited remaining CO2 emissions in 2040, share of renewables in total electricity production increases compared to 2030	Close to decarbonised in 2040, larger deployment of renewables	Fully decarbonised in 2040, the system operates mostly with renewables	
	The deployment of renewables is facilitated by system optimisation (interconnections, storage and demand-side response). Nuclear according to MS policies until March 2023; plays a comparable role in all scenarios.			
<b>Bioenergy</b>	Moderate increase by 2040 compared to current, stabilises over 2041-2050	Larger increase by 2040 compared to current, and slightly declines after 2040		
<b>H2 &amp; e-fuels</b>	Some increase in 2040 above 2030 levels	Stronger increase than in S1, notably in the transport sector	Stronger increase than in S2 in all sectors	
<b>Carbon capture</b>	Limited uptake in 2031-2040 and large deployment in 2041-2050	Deployment in 2031-2040, in particular in industrial processes, maintained in 2041-2050	Further deployment in 2031-2040 to cover remaining energy and industrial process emissions	
<b>Carbon removals</b>	Very limited uptake of BECCS by 2040	Some deployment of BECCS and DACCS by 2040	Higher deployment by 2040 of both BECCS and DACCS	
<b>Circularity</b>				Circular economy trends limiting raw materials needs
<b>Food system</b>	Continuation of current trends based on the Agricultural Outlook 2022			
	Very limited GHG reductions in agriculture	GHG in agriculture decrease further thanks to larger deployment of technological options	GHG in agriculture decrease further thanks to full deployment of technological options	Change towards more sustainable food diets, reduction of food waste objectives leading to additional reduction of agriculture GHG
<b>LULUCF</b>	Policy intensity to cover mitigation costs equivalent to meeting the 2030 target			
	Small increase of forest land and decrease in grassland	Higher land-use change with bigger increase of forest land, additional wetland and cropland while stronger decrease of grassland		More available land for carbon farming and high-diversity elements such as set aside and fallow land with natural vegetation through land-use change in grassland and cropland
<b>Non-land-related non-CO2 GHG emissions</b>	Non-land-related non-CO2 emissions slowly decline, combining current policy framework and transformation of the energy system	Non-land-related non-CO2 emissions decline further thanks to additional mitigation		

# Economy-wide GHG emission pathways

- Until 2030, all scenarios follow the same pathway
- In 2050, all scenarios reach climate neutrality
- During the 2030-2050 period, the scenarios show different trajectories



IA Annex 8 (Part 3/5), Figure 5

# The EU's energy system is central

- Electrification of the economy remains key to decarbonization
- The power sector is the first to decarbonize (by 2040)
- Renewable energy will become the backbone of the energy system
- However, all low carbon energy solutions are necessary (including, nuclear, energy efficiency, storage, CCS, CCU, carbon removals, etc.)



**Thank you for your kind attention**