

# Scaling up carbon dioxide removals

Recommendations for navigating opportunities and risks in the EU

Dr. Vera Eory

**European Scientific Advisory Board on Climate Change**

Bio-CO<sub>2</sub> Use and Removal 2025, Helsinki

6<sup>th</sup> May 2025

1. **The Advisory Board**
2. The need for a rapid and sustainable scale up of carbon dioxide removals
3. Recommendations for the EU climate policy framework

# The Advisory Board is composed of 15 scientific experts



**Ottmar Edenhofer**  
(Chair)

Technische Universität in Berlin



**Jette Bredahl Jacobsen**  
(Vice-Chair)

University of Copenhagen



**Laura Diaz Anadon**  
(Vice-Chair)

University of Cambridge



**Maarten Van Aalst**  
University of Twente



**Constantinos Cartalis**  
National and Kapodistrian  
University of Athens



**Suraje Dessai**

University of Leeds



**Vera Eory**

Scotland's Rural College



**Edgar Hertwich**

Norwegian University of Science  
and Technology in Trondheim



**Lena Kitzing**

Technical University of Denmark



**Elena Lopez-Gunn**

ICATALIST



**Lars J. Nilsson**

Lund University



**Keywan Riahi**

International Institute for Applied  
Systems Analysis



**Joeri Rogelj**

Grantham Institute of the  
Imperial College London



**Nicolaas Schrijver**

Leiden University



**Jean-François Soussana**

French National Research  
Institute for Agriculture, Food...



# Previous advice covers EU 2040 target, EU climate policy gaps, energy systems and carbon removals



## Scaling up carbon dioxide removals

Recommendations for navigating opportunities and risks in the EU

21 February 2025

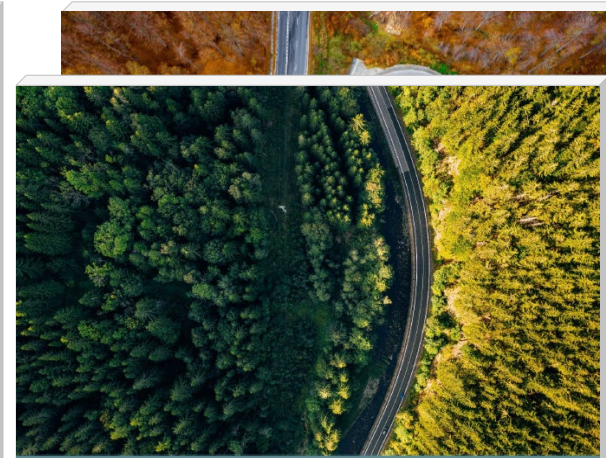


## Towards EU climate neutrality

Progress, policy gaps and opportunities

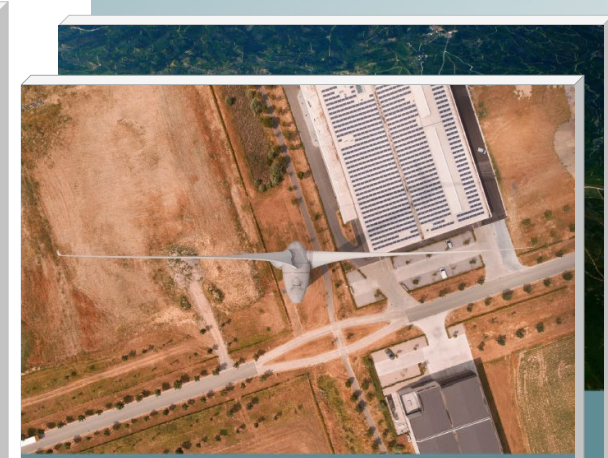
Assessment Report 2024

18 January 2024



## Scientific advice for the determination of an EU-wide 2040 climate target and a greenhouse gas budget for 2030–2050

15 June 2023



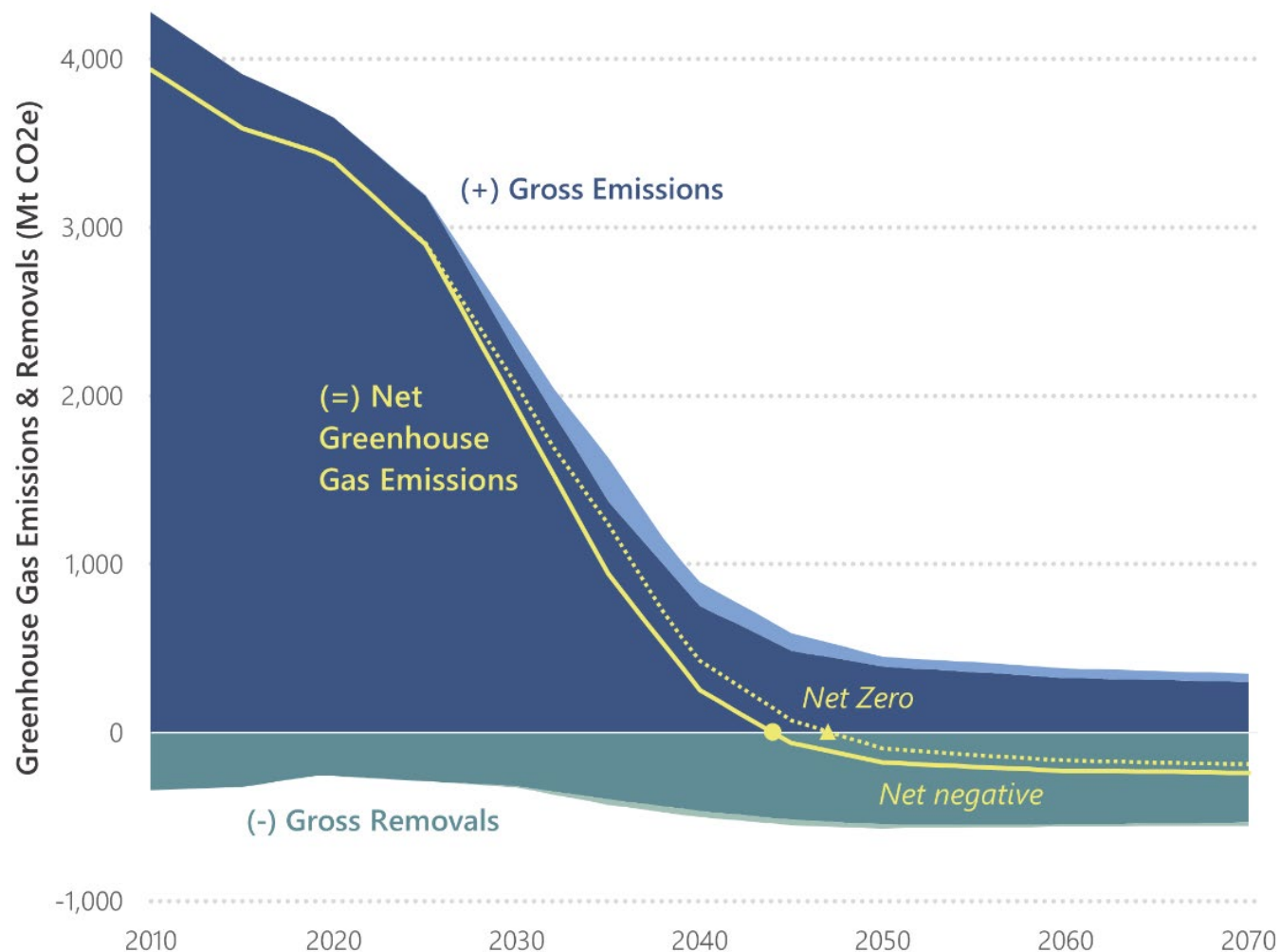
## Towards a climate-neutral and climate-resilient EU energy infrastructure

Advice on scenario guidelines for trans-European networks for energy

16 November 2022

1. The Advisory Board
2. The need for a rapid and sustainable scale up of carbon dioxide removals
3. Recommendations for the EU climate policy framework

# EU scenarios show the need to rapidly reduce emissions and scale up removals to achieve climate targets

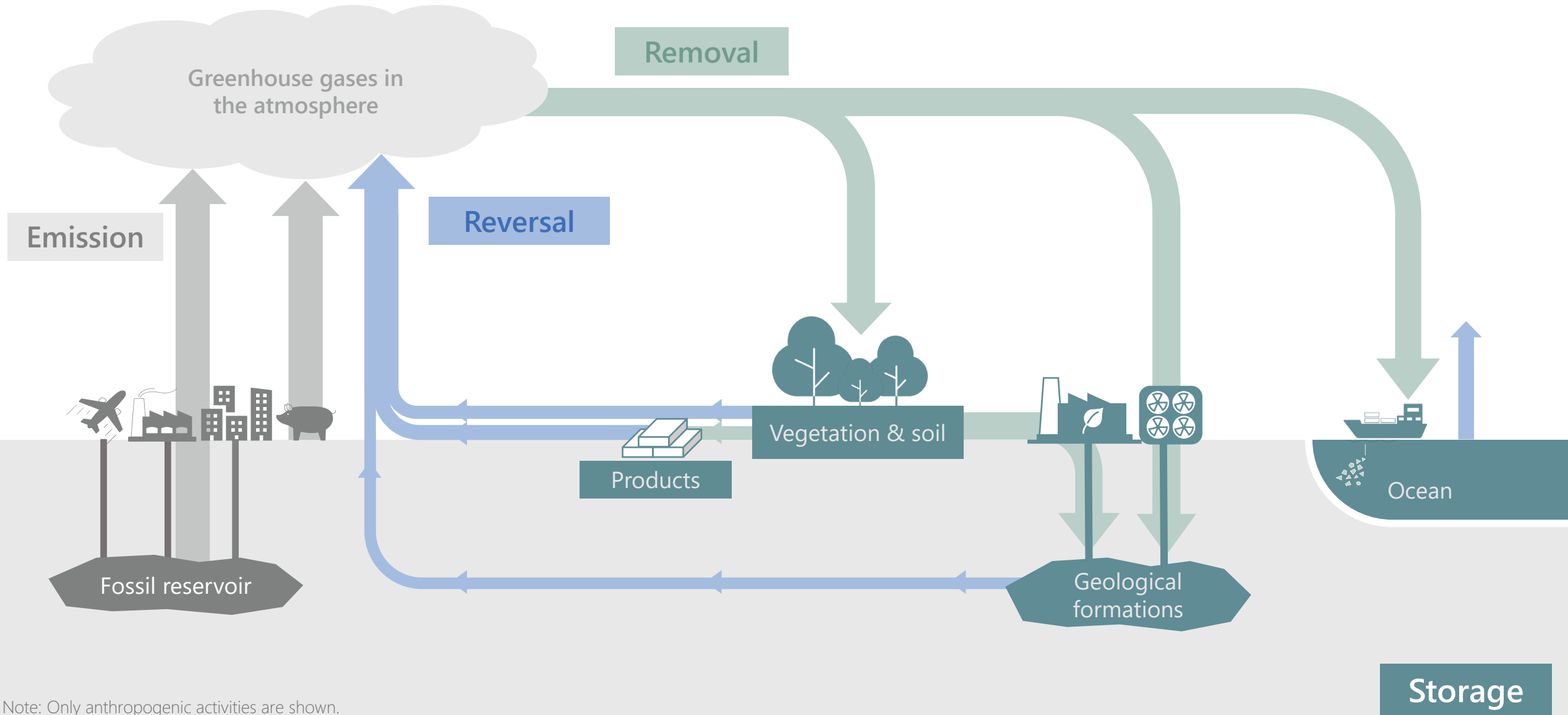


- Advisory Board and Commission scenarios both indicate removals up to **400-500 MtCO<sub>2</sub>e in 2040**
- Of which approx. **50-150 MtCO<sub>2</sub>e from permanent methods** (DACCS and BECCS)
- But **future mitigation alternatives and removal potentials are dynamic**, depending on technological progress, environmental risks, and scale-up constraints

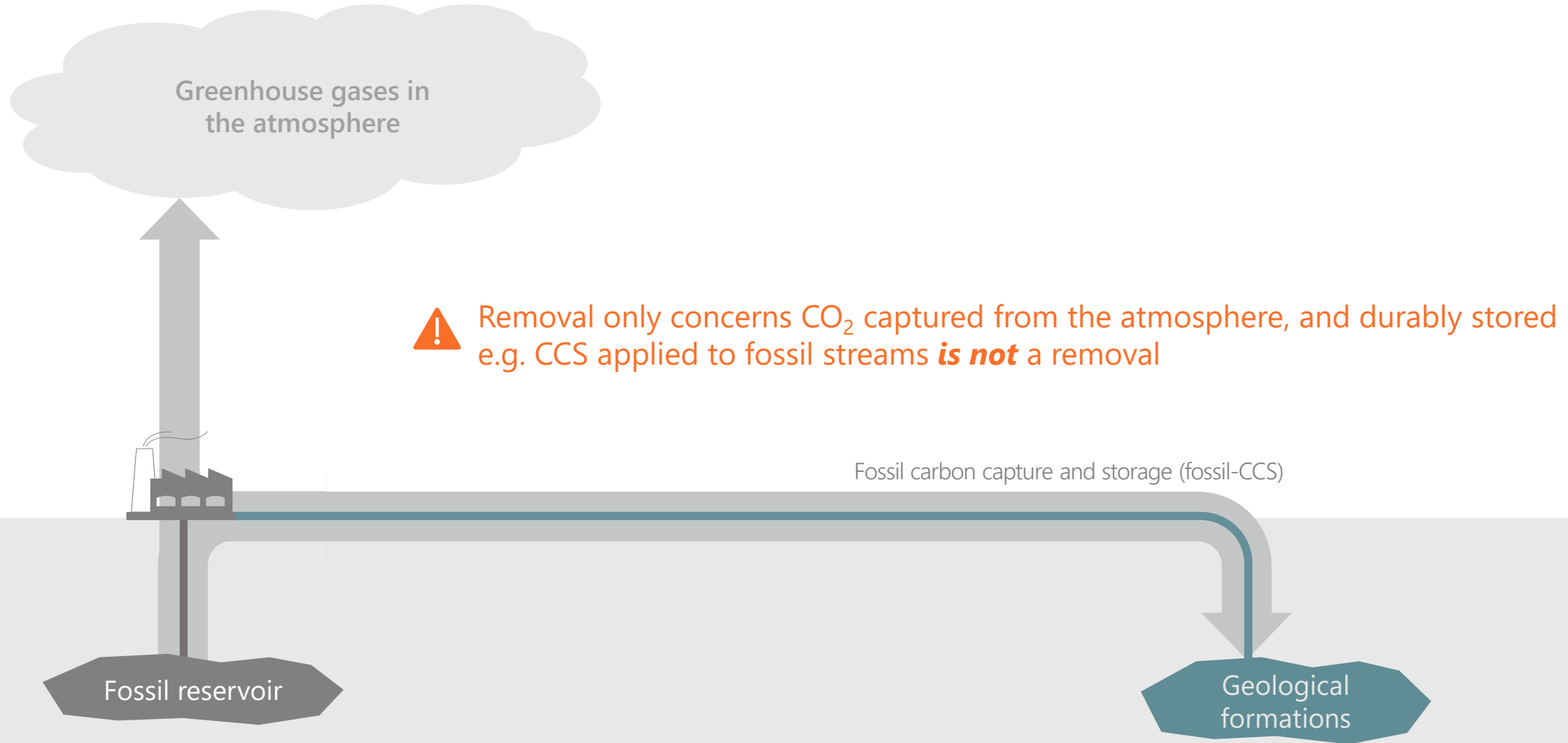
Scenarios compliant with 90% to 95% net GHG reduction in 2040. Shaded areas represent the range between scenarios.

Source: Advisory Board

# Managing the greenhouse gas budget requires reducing emissions, increasing removals and managing reversals



# Fossil carbon capture and storage (fossil-CCS) is not a removal, but an emission reduction

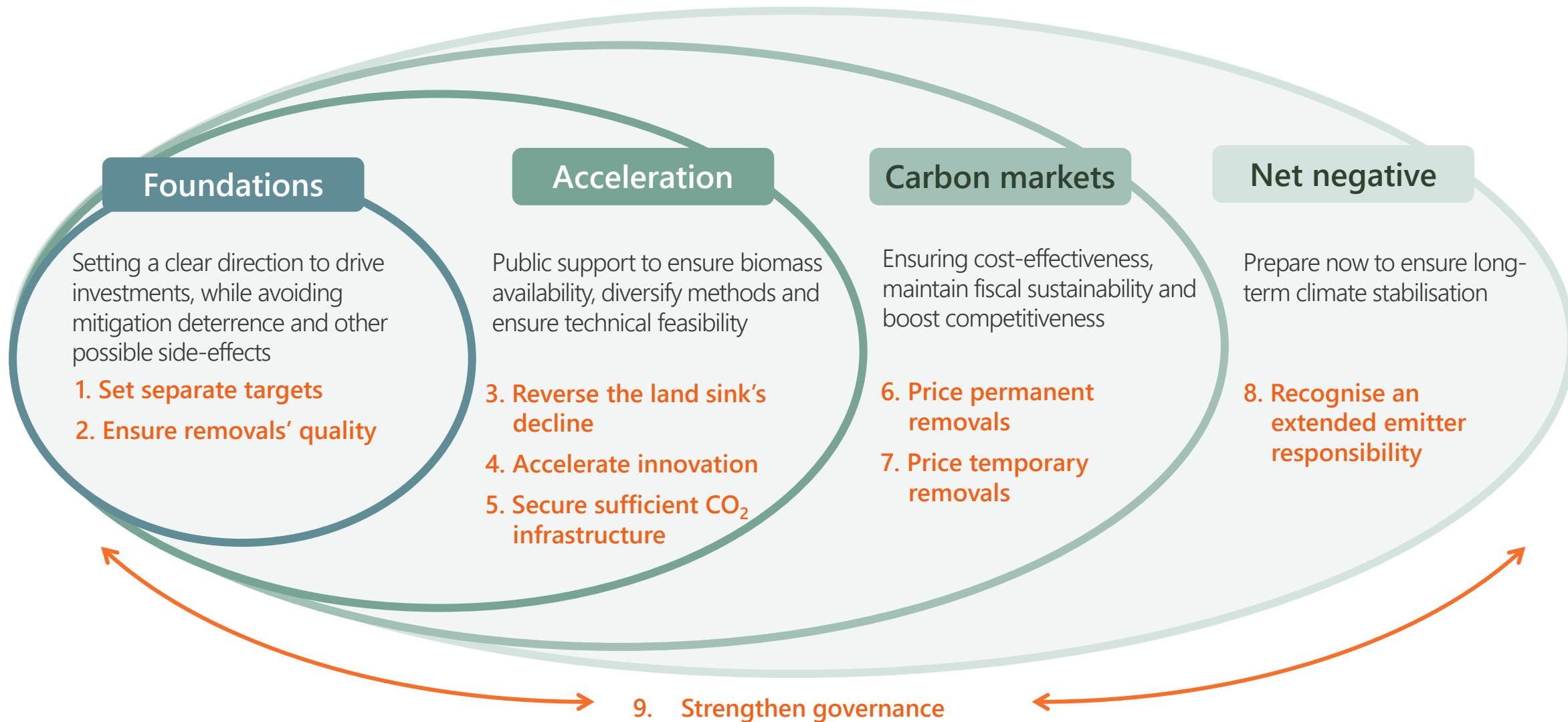


Storage

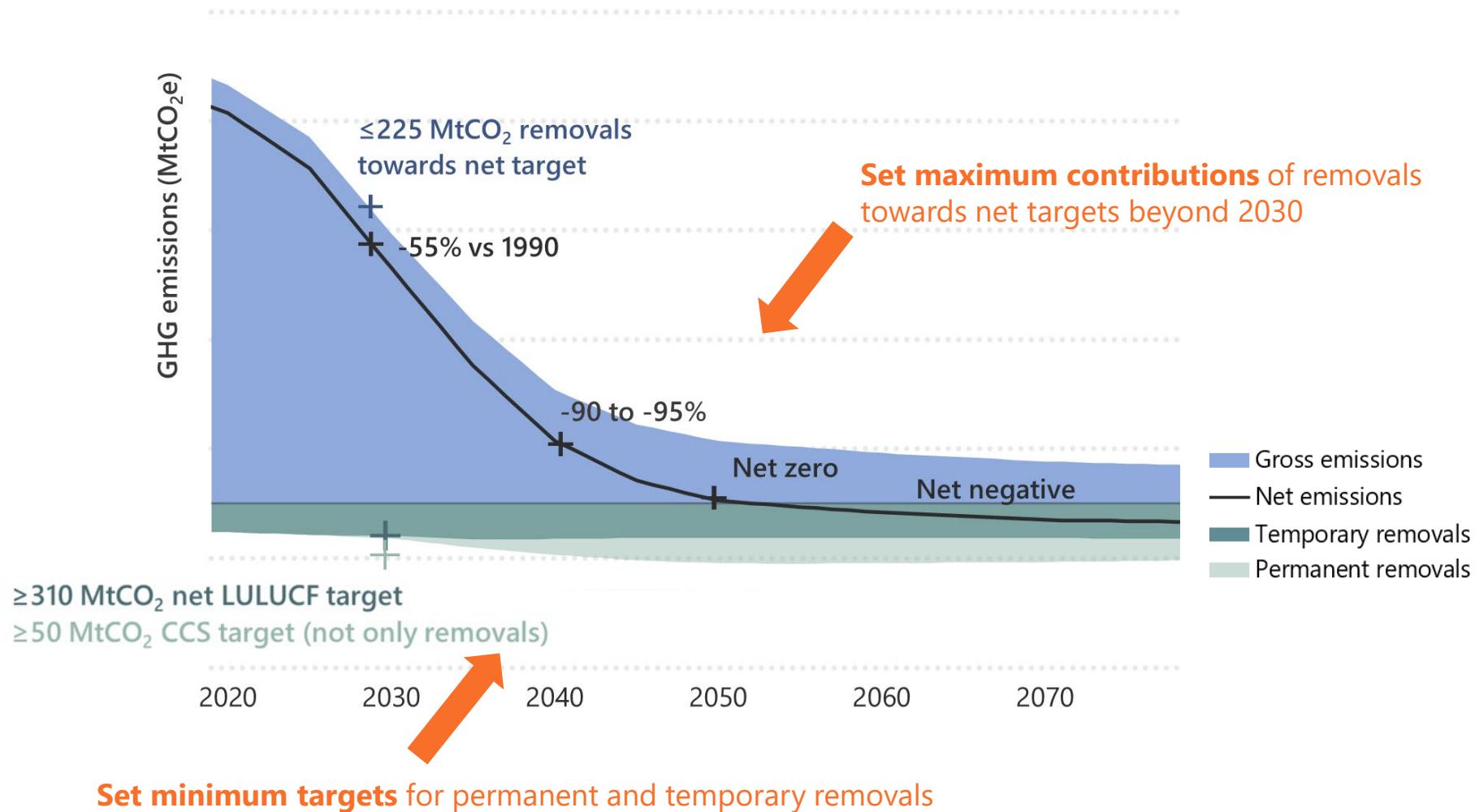


1. The Advisory Board
2. The need for a rapid and sustainable scale up of carbon dioxide removals
3. Recommendations for the EU climate policy framework

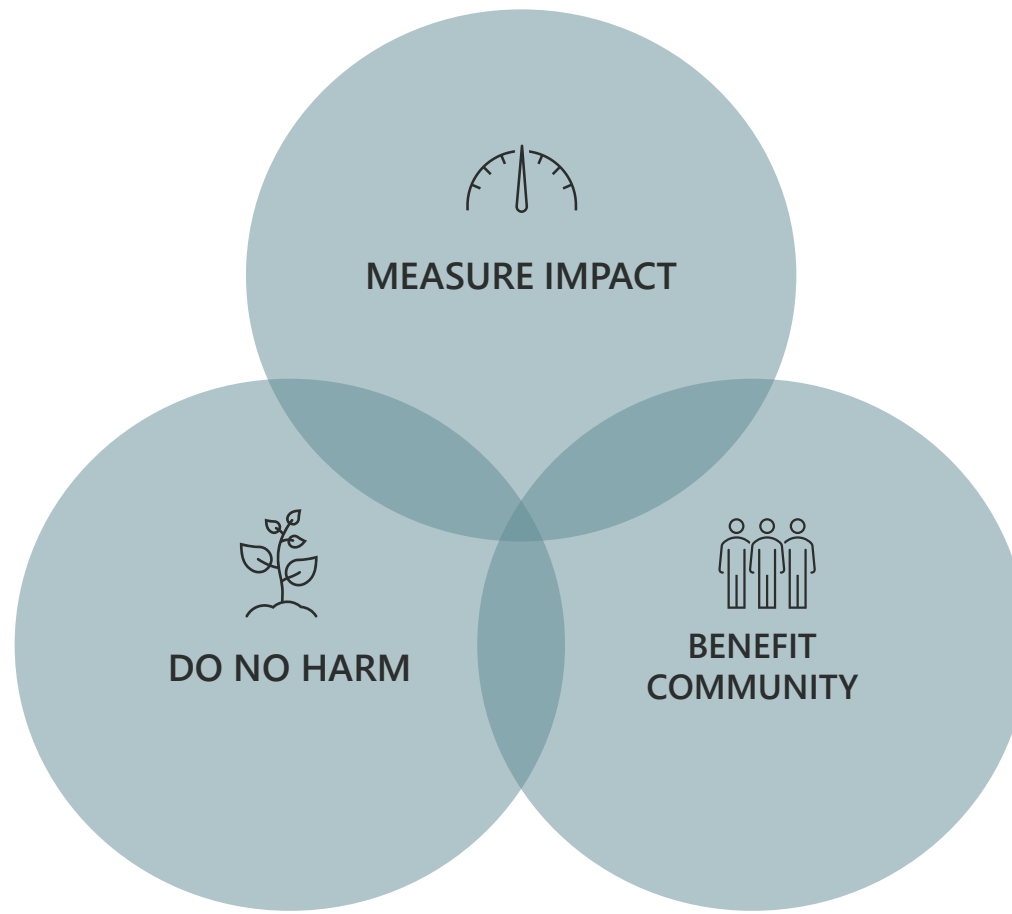
# Recommendations for the EU removal policy architecture



# Recommendation 1. Set separate legally-binding targets for gross emissions reductions, permanent removals and temporary removals



## Recommendation 2. Ensure the quality of removals through robust monitoring, reporting and verification

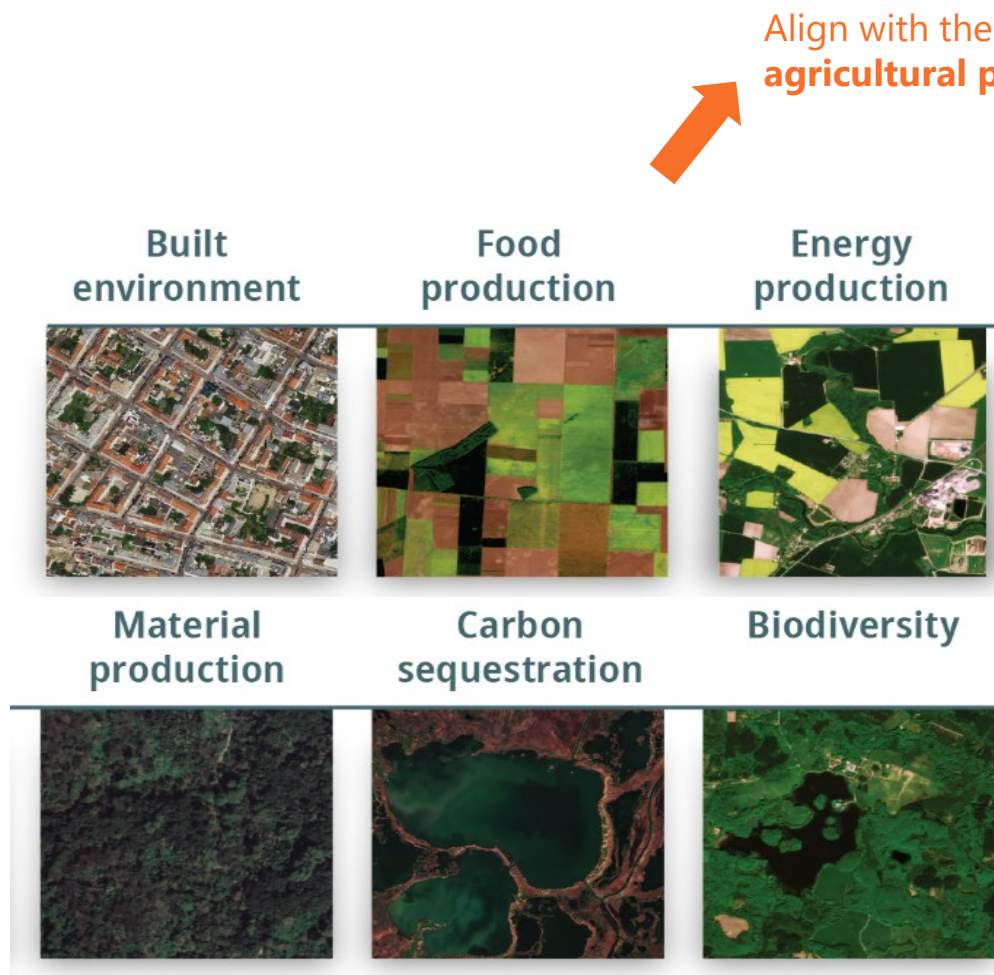


Embed measurable binding sustainability safeguards and enhance data accuracy in:

- **Certification regulation**
- **Governance regulation**
- **Forest monitoring law**
- **Soil monitoring and resilience law**

# Recommendation 3. Reverse the decline of the land sink by integrating land-related policies into a coherent framework

Reinforce the coherence of **land-related policies** and mainstream **climate adaptation**

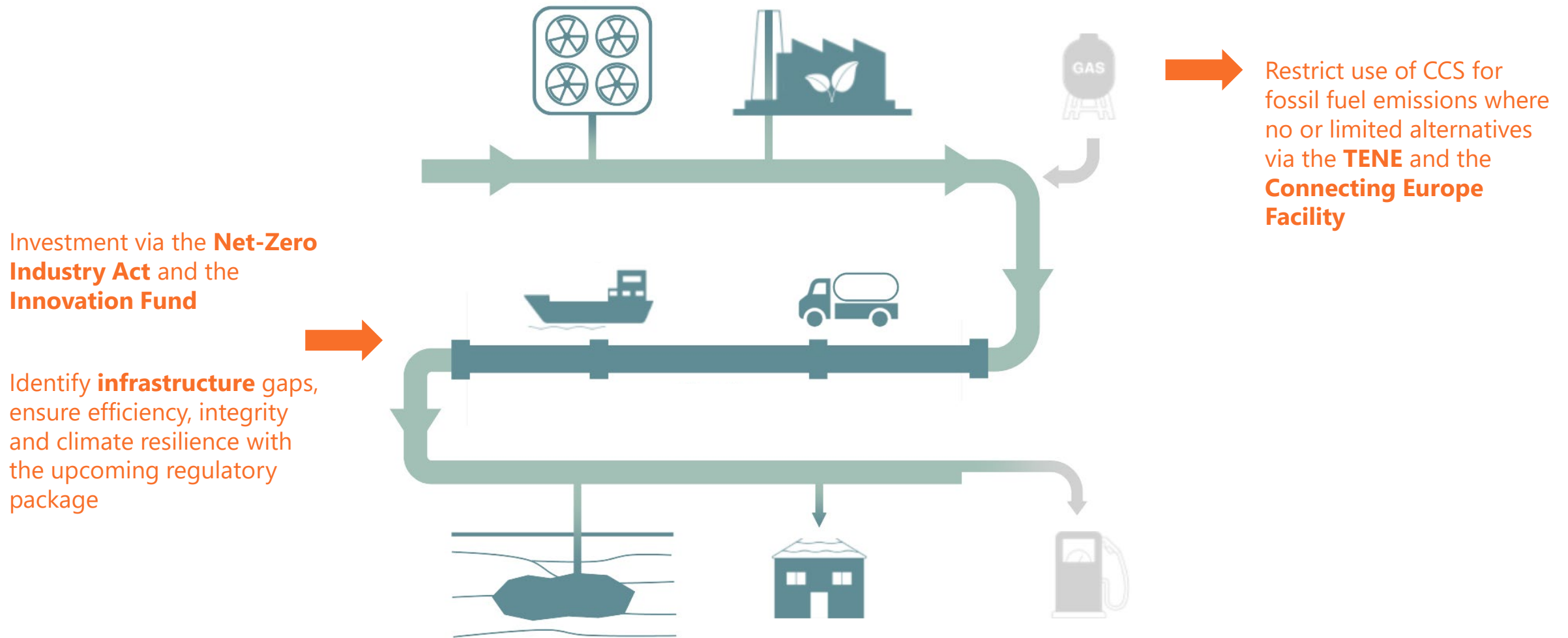


Align with the **common agricultural policy** with net zero

Ensure sustainable bioenergy feedstocks via the enforcement of the **Renewable Energy Directive, FuelEU, REFuelEU**

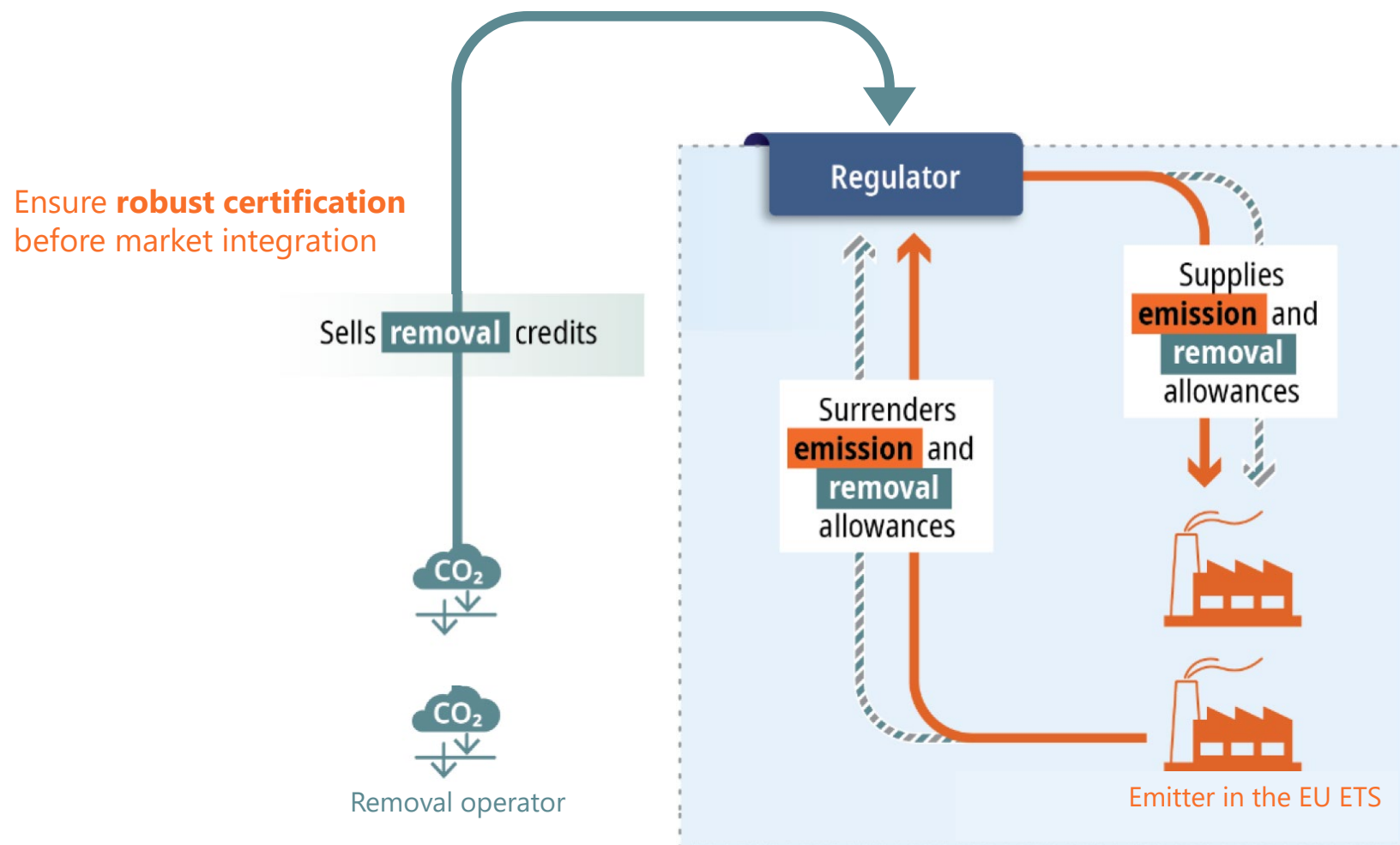
Prioritise synergies with ecosystem restoration through implementation of the **Nature Restoration Law**

## Recommendation 5. Secure sufficient CO<sub>2</sub> infrastructure through coordination, investment, strategic planning, equitable access and climate resilience



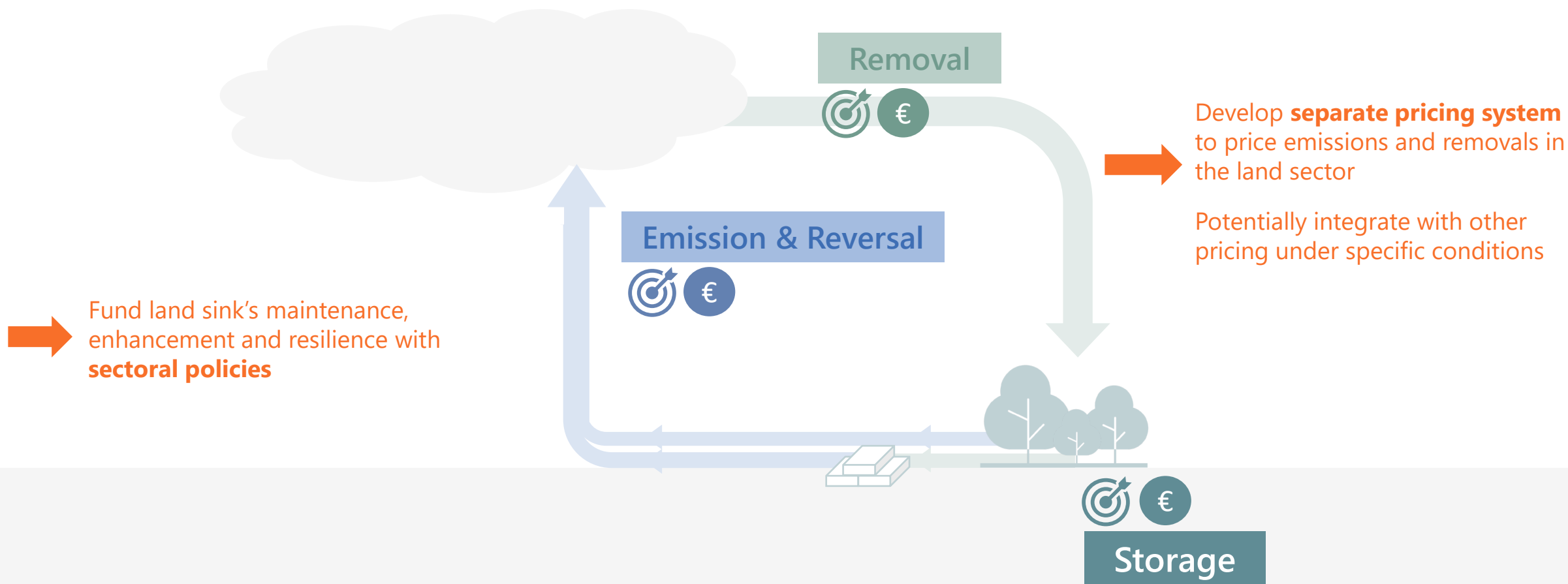


## Recommendation 6. Price permanent removals through a progressive integration into the EU ETS under strict conditions

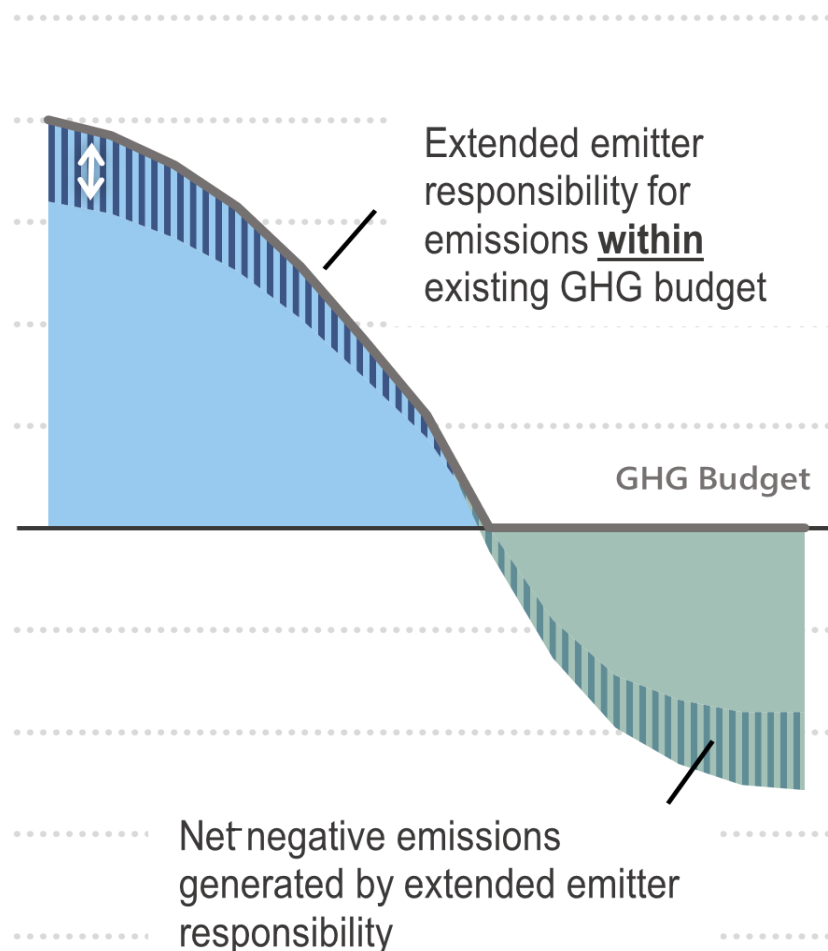


- Progressively integrate permanent removals in the **EU ETS**, subject to **sustainability safeguards on biomass feedstocks**
- Establish an **institutional framework** to manage the cap, purchase removals and manage supply and demand

## Recommendation 7. Price emissions and temporary removals in the land sector through new instruments, ensuring coherence with the broader policy framework



## Recommendation 8. Recognise an extended emitter responsibility where emitters contribute to removing the greenhouse gases they emit



➔ Assess options to operationalise the **extended emitter responsibility**, considering different approaches (e.g. timing of payments and removals)

➔ Avoid increase of cumulative GHG in the short term, and increase ambition over time

# Conclusion: The Advisory Board calls for a rapid and sustainable scale-up of carbon dioxide removals in the EU

- **Separate targets** for gross emissions, permanent and temporary removals, supported by **robust monitoring**
- Increased public support to urgently reverse the decline of the **land sink**, accelerate **innovation** and **infrastructure** deployment
- **Gradual integration of permanent removals** in the **EU ETS** and **new pricing** instruments to reward removals in the **land sector**
- Creating new instruments to operationalise the **extended emitter responsibility** and achieve **net-negative emissions**



[secretariat.advisoryboard@esabcc.europa.eu](mailto:secretariat.advisoryboard@esabcc.europa.eu)



[climate-advisory-board.europa.eu](https://climate-advisory-board.europa.eu)



@European Scientific Advisory Board on Climate Change



@esabcc\_eu



@esabcc.bsky.social