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LUNCH TALK

Overview of EU policies accelerating CCU

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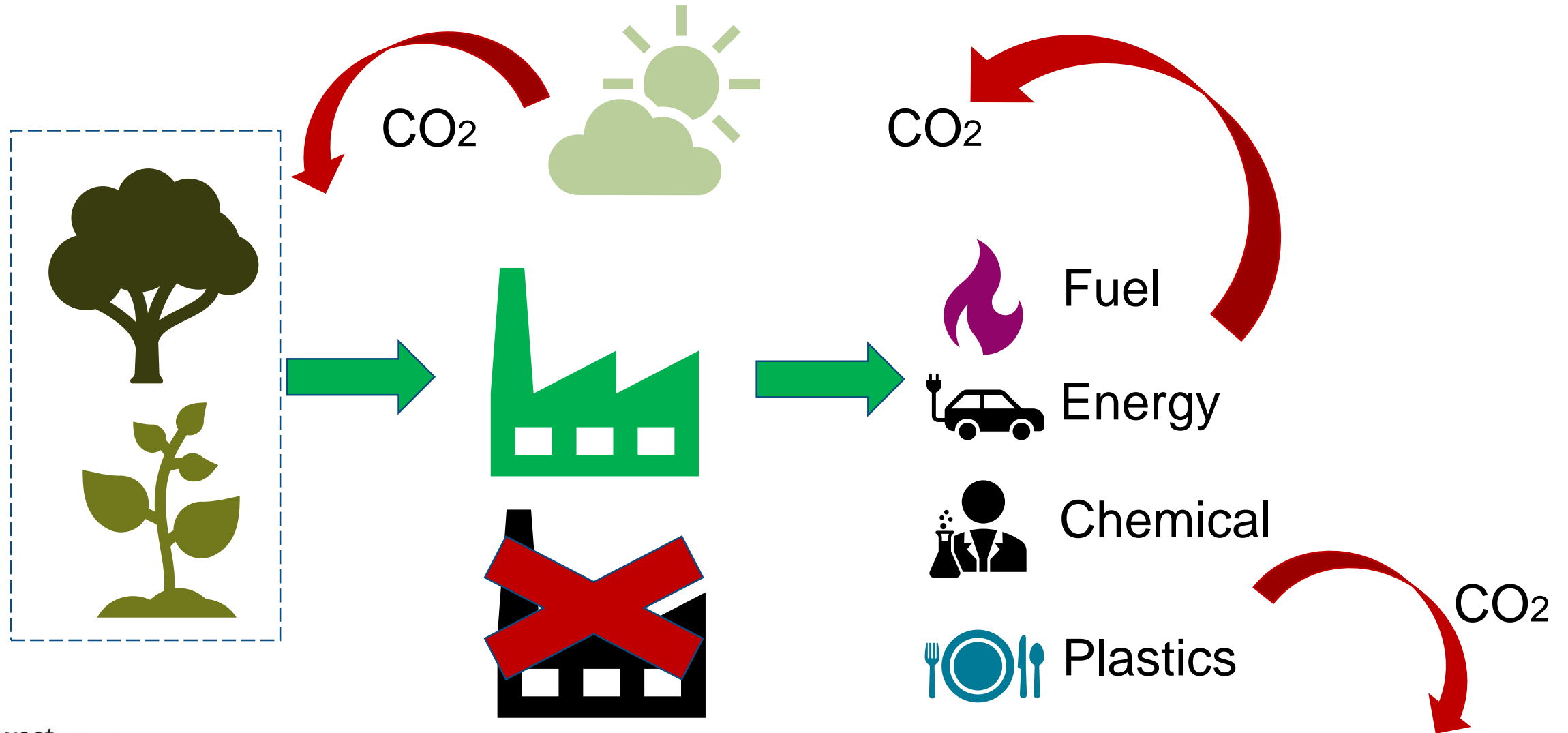


Aim

Provide an overview of:

- Current and future EU policies aiming at accelerating the deployment of carbon capture and utilisation (CCU)
- Among CCU technologies, the focus is on products made from CO₂
- A bit of deep dive regarding the CO₂ itself.

Conceptually, the carbon capture process is like biomass growth for bio-based products



CCU policy context

- Policies concerning renewable fuels and chemicals (e.g. bio-based)
- Policies concerning the ingredients i.e. CO₂ and hydrogen feedstocks incl. the needed infrastructure
- Policies concerning carbon capture and storage (CCS) and carbon removal (more generally)

Current and upcoming EU CCU policy context

Current:

Updated up to

EU2050 vision for a transition to a climate-neutral economy by 2050



Upcoming:

Under update to align with **the EU green deal**

2019

2005	EU Emissions Trading System (ETS)
2007	European Strategic Energy Technology Plan (SET Plan)*
2009	EU CCS directive
2011	EU roadmap to a low-carbon economy by 2050
2015	EU fuel quality directive
2017	SET Plan*- CCU-CCS Implementation Working Group
2018	EU Effort Sharing Regulation
2018	Renewable Energy Directive Recast (RED II)
2018	EU2050 vision for a transition to a climate-neutral economy by 2050
2019	EU regulation CO2 emission performance standards for new passenger cars and for new light commercial vehicles (RECAST)
2019	EU Clean Energy Package

2020	Trans-European networks-energy regulation
2020	2030 Climate target plan (Stepping up Europe's 2030 climate ambition)
2020	Energy System Integration strategy
2020	Update of SET CCU-CCS Implementation Working Group plan
2021	The EU Climate law (framework for achieving climate neutrality)
2021	Fit for 55 package
2021	Proposal on carbon border adjustment mechanism
2021	Sustainable taxonomy
2021	Chemical strategy
2022	REPower EU

*Not directly linked with EC (only several EU countries but also Turkey, Norway and UK)

EU vision for a transition to a climate-neutral economy by 2050

A set of documents released in 2018 presenting the EC analysis of EU long-term climate policy options.

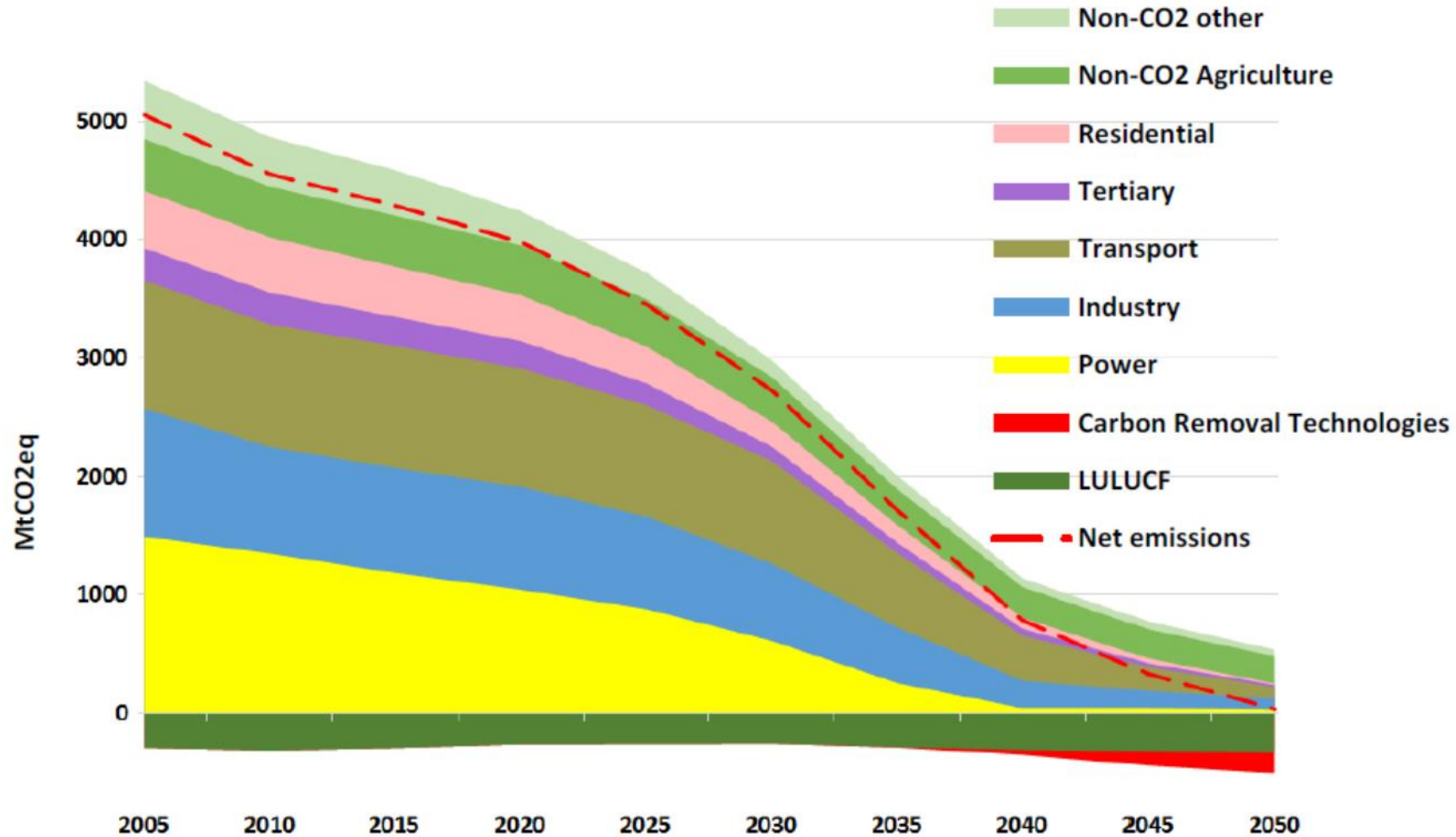
2030: -45% GHGs compared to 1990 with **40% legally binding target** and **32 % share renewable energy target**.

2040: no milestone

2050: 8 scenarios to go over 60% by 2050, considered an “easily” achievable target.

Among these 8 scenarios, only two allow to lead to net zero (>90% reduction). These two scenarios imply either drastically change lifestyles or very heavy Investment in carbon capture (1.5 TECH scenario)

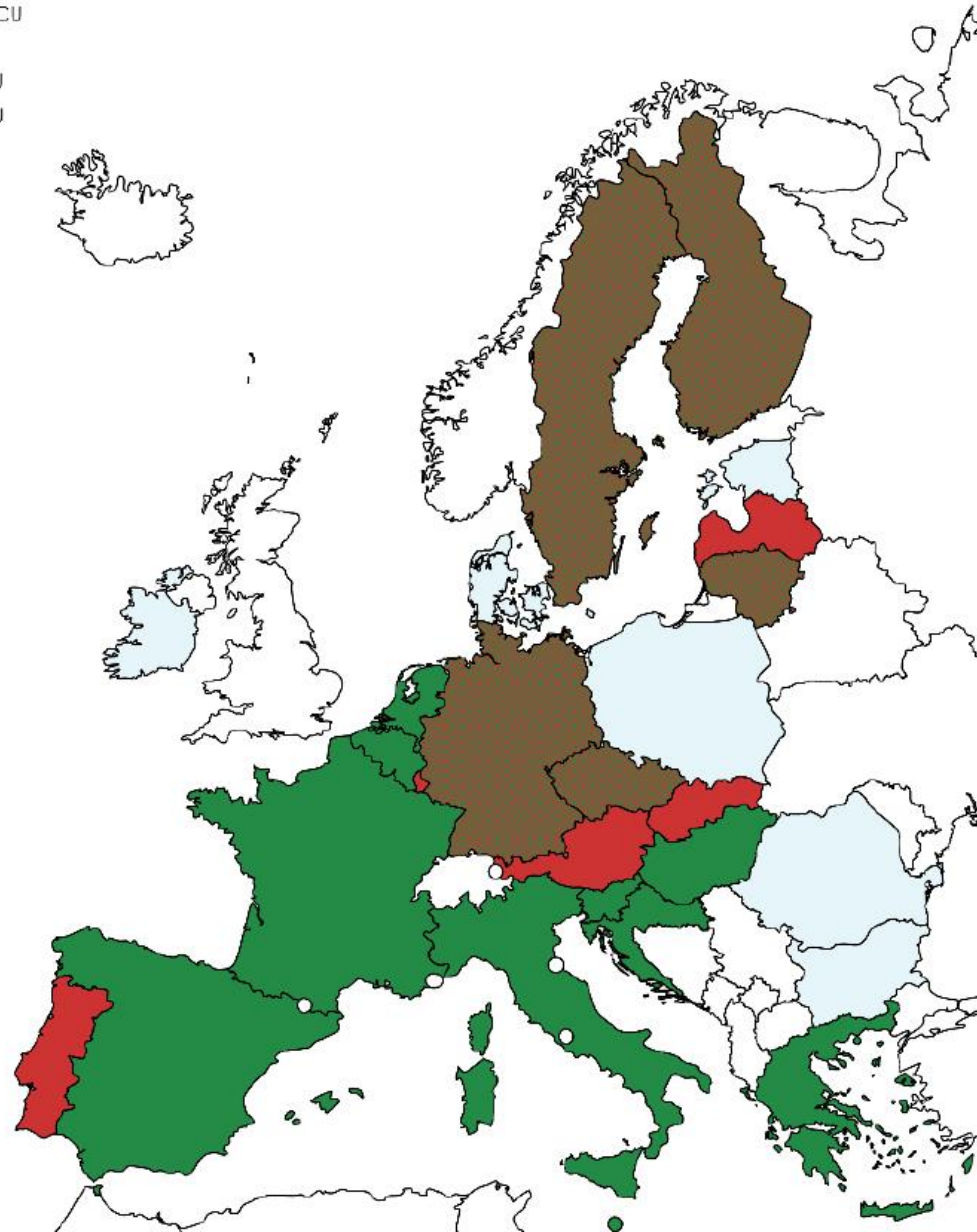
Evolution of GHG emissions towards 2050 in the 1.5 TECH scenario



A Clean Planet for all: A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy – COM(2018) 773, Brussels, 28.11.2018

CCU/CCS in EU member states' long term decarbonisation strategies

- Not planning for CCS/CCU
- Planning for CCS/CCU
- Ambivalent to CCS/CCU
- No mention of CCS/CCU



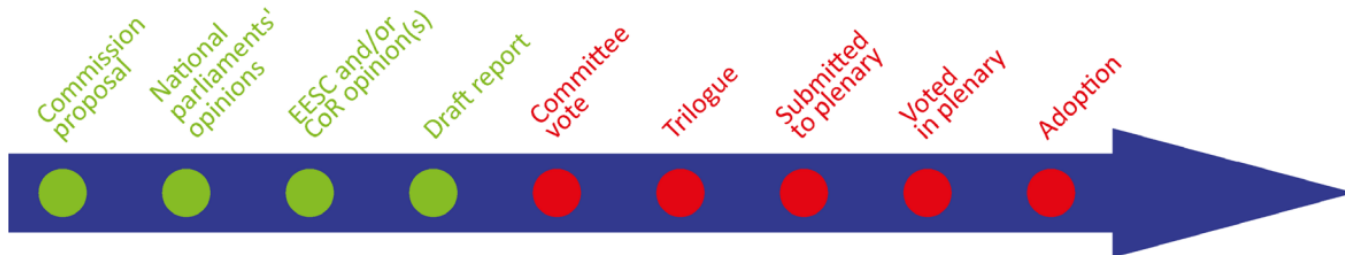
Walke et al. 2022 Carbon Dioxide Removal options in the national Long-Term Strategies of EU Member States

The EU green deal (Dec 2019)

Main change compared to the EU 2050 vision:

- The EU aims to be climate-neutral by 2050!
- There is a more ambitious target of at least **55% GHG reduction** compared to 1990 levels **by 2030** (before it was 40%).
- This means a **38-40% renewable energy target** instead of 32% to be achieved by 2030.

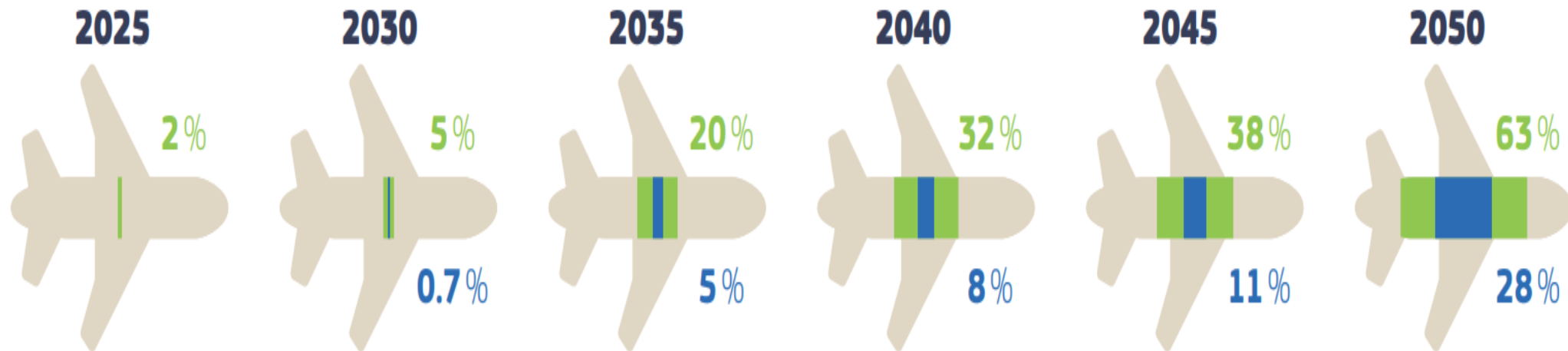
Lots of new strategies and legislative proposals to update current EC directives and EU regulations in most sectors.



RED II revision: The REFuel EU Aviation proposal

Introduce an increase in the minimum share of **SAF** for 2030 from 5% to 6% of fuel mix and **yearly targets for renewable fuels (SAFs and e-fuels)**

■ Sustainable aviation fuels ■ Specific sub-mandate on e-fuels



Renewable fuels policies

there are also member states with much higher targets
e.g. Sweden has target of 30% blending SAF by 2030

RED II revision: The FuelEU Maritime proposal

It aims to limit the GHG emissions intensity of fuels used in shipping.



Renewable fuels policies

Given the wide range of potential technologies in the maritime sector, the proposal does not have targets for specific technologies. Therefore, it focuses on fuel demand and not type.

Alternative marine fuels considered: liquid biofuels, e-liquids, bio-LNG, e-gas, hydrogen and hydrogen-derived fuels (including methane, and ammonia) etc.

Applies to all vessels of any flag above 5,000 gross ton travelling to, from or at berth in ports in the EU

Proposal for amending the regulation on CO₂ emission of new passenger cars and new light commercial vehicles

- More ambitious CO₂ emission targets for new cars and vans from 2030 onward
- Net zero vehicles from 2035.

Renewable fuels policies



Approved by the EU parliament last week

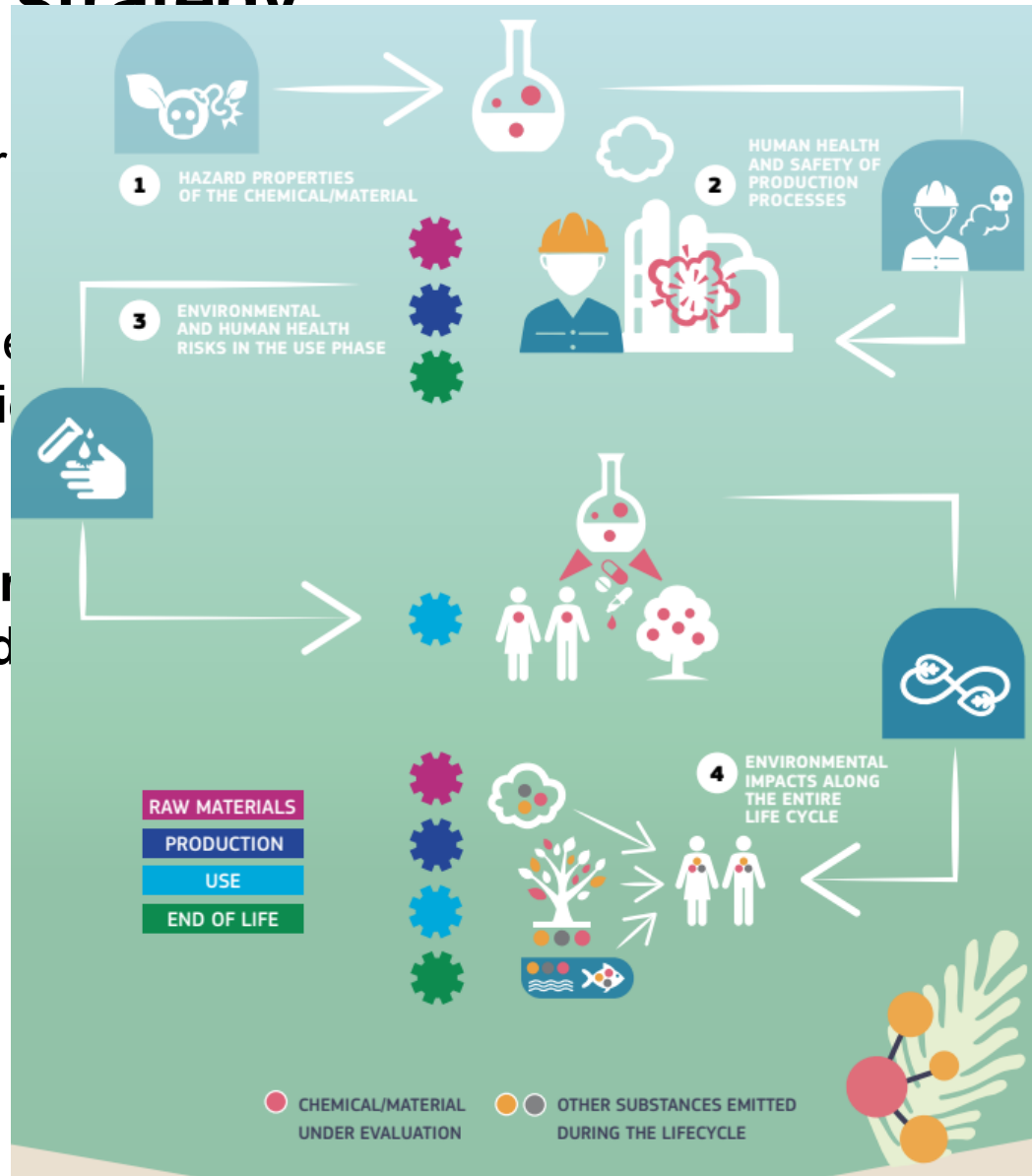
EU chemical strategy

1. Ban the most hazardous chemicals
2. Establish a simple classification and labelling system for hazards of chemicals
3. Boost investment in research and innovation to develop safe and sustainable by design chemicals and materials

not if their use is essential.

for assessing the risks and

s that are safe and



Renewable chemicals policies

When a CO₂-based fuel/chemical is considered sustainable?

Ingredients policies

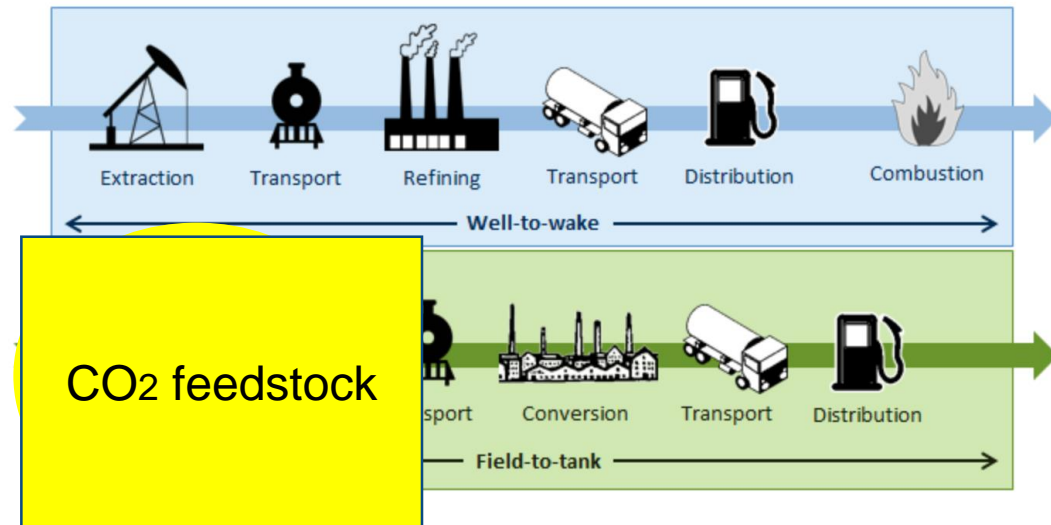
Renewable chemicals policies

GHG savings = Fossil fuel comparator – Eb

- Fossil fuel comparator is 94 gCO₂eq/MJ for liquid fuels and 80 gCO₂eq/MJ for gaseous fuels.
- Eb is the calculated life cycle GHG emission per MJ of alternative fuel produced.

Biofuel	Typical GHG savings (%)
Wheat ethanol	32
Rape seed biodiesel	45
Sugar beet ethanol	61
Palm oil biodiesel	62
Sugar cane ethanol	71
UCO biodiesel	88
Biogas from dry manure	86

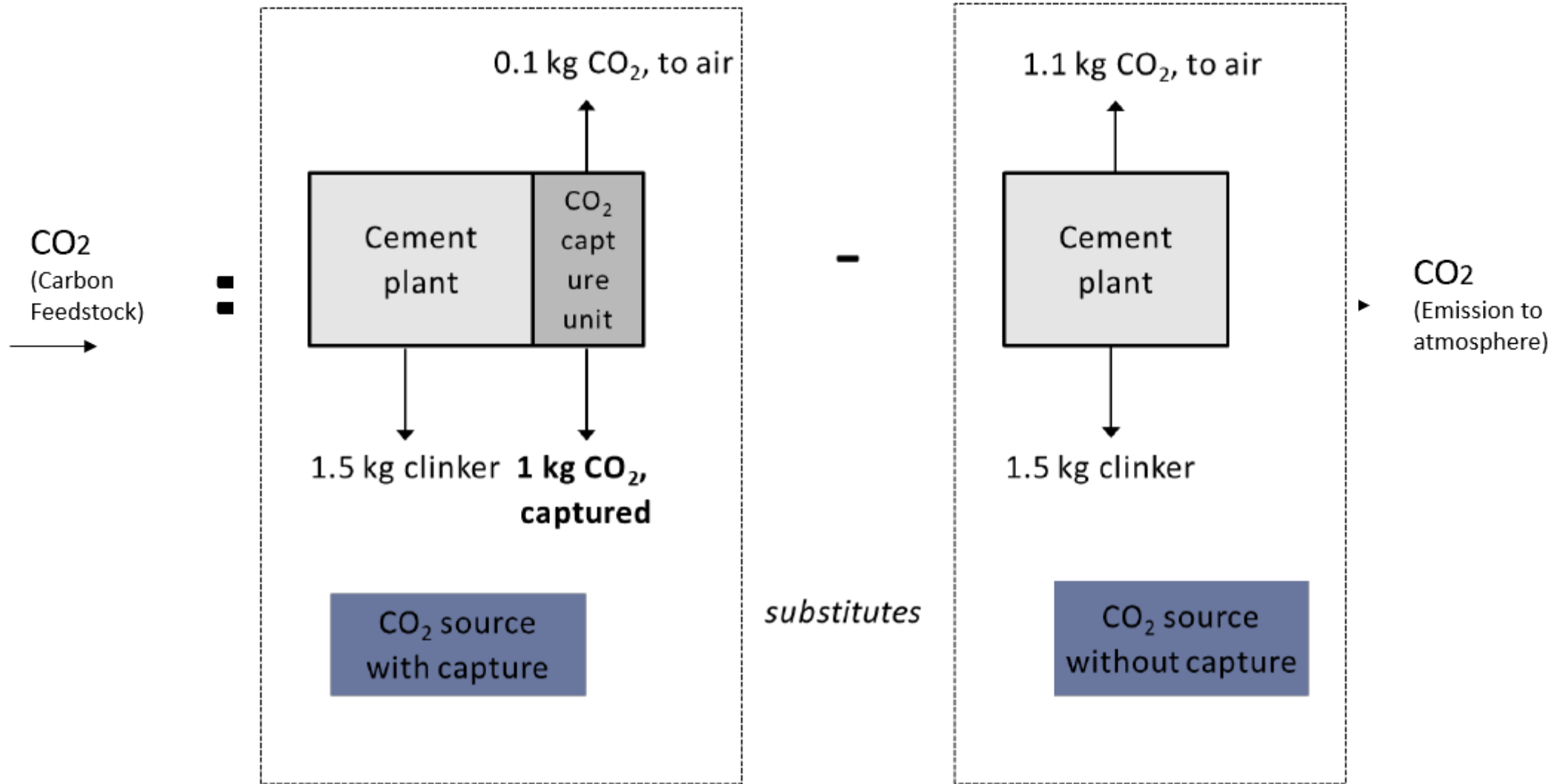
>65% or 70% (depending on fuel type), otherwise ciao ciao incentives



>70% for CCU fuels

The carbon footprint of the feedstock CO₂

Ingredients policies



<https://www.psi.ch/de/media/72878/download?attachment>

Calculation according to RED II (recycled carbon) and major International guidelines for TEA and LCA of CCU

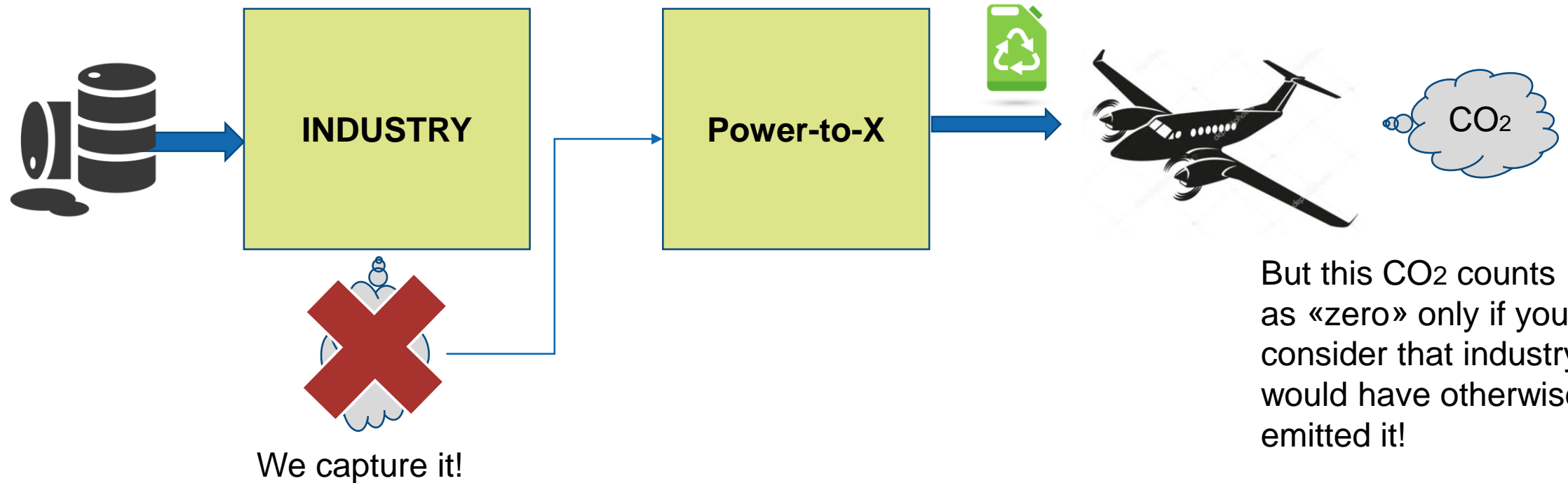
Therefore, this method:

- Makes no direct distinction between **biogenic and fossil CO₂ sources**.
 - **Assuming the same energy source**, a CO₂ source with high CO₂ concentration and easier to be separated will result in a lower carbon footprint (i.e. it requires less energy for the separation).
- > **barrier for DAC and favoured capture from point sources where CO₂ has a lower concentration.**

The rationale of the recommended method works well for mitigating climate change in the short term but might conflict with the long-term climate neutrality goal after a certain **year X**.

when is year X? it is a matter of policy sequencing

Ingredients policies



But this CO₂ counts as «zero» only if you consider that industry would have otherwise emitted it!

From a certain year X, this rationale starts to conflict with carbon neutrality goal since I still have emitted CO₂ of fossil origin.

So, from year X, I need another CO₂ source and CO₂ from industry needs to be permanently stored somewhere to achieve carbon neutrality.

EU delegated regulation C(2023)1086 final

(adopted by EU on Feb 10th)

*“Captured emissions from the combustion of non-sustainable fuels for the production of electricity should be considered avoided emissions up to **2035**, as most should be abated by that date, while emissions from other uses of non-sustainable fuels should be considered avoided emissions up to **2040**, as these emissions will remain longer.”*

<https://data.consilium.europa.eu/doc/document/ST-6341-2023-INIT/en/pdf>

https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12713-Renewable-energy-method-for-assessing-greenhouse-gas-emission-savings-for-certain-fuels_en

<https://www.fuelseurope.eu/publications/publications/joint-statement-on-the-redii-delegated-act-art-28-5-the-importance-of-industrial-ccu-for-reaching-climate-neutrality>

The other ingredient (H₂). EU Delegated regulation on methodology for RNFBOs (adopted by EC on Feb 13th)

- These fuels can only be produced using **hydrogen from “additional” renewable electricity** generated at the same time and in the same area as their own production.
- Set **specific criteria** for hydrogen producers to prove that the electricity they are using is renewable, both in case their *production installation is directly connected to a renewable-power installation* and if the *electricity is taken from the grid*.

https://ec.europa.eu/commission/presscorner/detail/en/qanda_23_595

https://energy.ec.europa.eu/delegated-regulation-union-methodology-rnfbos_en

e.g. when given bidding zone reaches a share of 90% renewable electricity or the emissions intensity of the electricity is lower than a certain threshold

The EU Hydrogen and Gas market decarbonisation package

Low carbon hydrogen, biogas, biomethane, as well as low carbon synthetic methane will represent about 2/3 of the gaseous fuels in 2050, with fossil gas with CCS/U representing the remainder.

-> This will require:

1) **a gas grid rethinking.**

2) mechanism to ensure transparent and objective **tariffs and facilitate utilisation of the hydrogen network.** TARGET: from 1 January 2031.

When hydrogen network operators or relevant authorities will have to publish complete information on tariff derivation, methodology and structure



EC adopted proposal for first EU-wide voluntary framework to certify high-quality carbon removals reliably

*Four **Q.U.A.L.I.T.Y** criteria:*

Nov. 22.

Quantification: *Carbon removal activities need to be measured accurately and deliver unambiguous benefits for the climate;*

Additionality: *Carbon removal activities need to go beyond existing practices and what is required by law;*

Long-term storage: *Certificates are linked to the duration of carbon storage so as to ensure permanent storage;*

Sustainability: *Carbon removal activities must preserve or contribute to sustainability objectives such as climate change adaptation, circular economy, conservation of water and marine resources, and biodiversity*

For questions and comments, get in touch with us!

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