

The logo for PYRROCO₂ features the word "PYRRO" in a light green, sans-serif font, followed by a stylized "CO₂" in a dark grey font. The "O" in "PYRRO" is replaced by a cluster of blue dots of varying sizes, suggesting a molecular or technological theme.

PYRROCO₂

TOOLBOX

European Funding opportunities

AXELERA



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101037009.

European Regulations CCU – Information from the CCU seminar performed in France in September 2023



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EU definitions around sustainable fuels

Renewable fuels of non biological origin (RFNBOs)

- EU definition: 'liquid or gaseous fuels, the energy content of which is derived from renewable sources other than biomass'
- Also known as: CCU fuels, e-fuels, synthetic fuels, Power-to-X
- They must use renewable energy but use different carbon sources
- Meets -70% GHG threshold
- Examples: e-methane, e-methanol, e-kerosene, renewable hydrogen

Low carbon fuels

- Energy content derived from low carbon H₂
- Non-renewable sources: nuclear H₂, but also everything that is not 100% renewable. But **unclear** for blue H₂
- Meets -70% GHG threshold
- Future delegated act(s) by December 2024

Recycled carbon fuels

- Produced from liquid/solid waste non-renewable origin which cannot be recovered
- Produced from waste exhaust gas as an unavoidable/unintentional consequence in industrial installations
- Meets -70% GHG threshold
- Example: using CO from steelmaking exhaust gases to make a fuel

Source: CO2 value Europe

Biomass fuels (biofuels)

- EU definition: '*gaseous and solid fuels produced from biomass*'
- Definition includes biogas, bioliquids, biofuels
- They must use biomass and respect REDII criteria
- 4 types of biofuels with different rules and eligible uses:
 - 1) *Food & feed crops*
 - 2) *Advanced biofuels (Annex IX A)*
 - 3) *Used cooking oil/animal fats (Annex IX B)*
 - 4) *Other residues/feedstock*



Progress in Fit-for-55 implementation

Policy instrument	Trilogues' status	Official publication	Date when it's official law
EU Emissions Trading System (EU ETS) revision			As of Jan 2024
ETS Aviation			As of 31 December 2023 (deadline for transposition)
Carbon Border Adjustment Mechanism (CBAM)			Progressive: October 2023, January 2025, January 2026
Renewable Energy Directive revision (REDIII)		Expected in October/November 2023	Member States will have 18 months to transpose the Directive after its publication
ReFuelEU Aviation		Expected in October/November 2023	Most provisions as of 1 Jan 2024 Articles 4, 5, 6 as of 1 Jan 2025
FuelEU Maritime		Expected in September 2023	Rules to apply as of Jan 2025
Energy Taxation Directive revision	Not started 	Not started 	Unclear

Point sur l'évolution de la réglementation européenne concernant le CCU, Source: CO2 Value Europe



CCU at the heart of Fit-for-55 Package as adopted

Policy instrument	Impact on CCU
EU Emissions Trading System (EU ETS) revision	<ul style="list-style-type: none"> ✓ CO₂ which is chemically and permanently bound in a product under normal use (e.g. CO₂ mineralisation) is excluded from the obligation to surrender allowances ✓ Avoid double-counting of emissions released by the use of RFNBOs
Carbon Border Adjustment Mechanism (CBAM)	<ul style="list-style-type: none"> ✓ Carbon tax (equivalent to ETS price) for raw materials/energy carriers made outside Europe
ETS Aviation	<ul style="list-style-type: none"> ✓ Complete phase-out of free ETS allowances by 2027 ✓ Dedicated funds for innovation (€450M) and sustainable fuels (€1.8B) ✓ 95% of costs differential for synthetic aviation fuels to be covered
Renewable Energy Directive revision (REDIII)	<ul style="list-style-type: none"> ✓ Combined target advanced biofuels+RFNBOs: minimum 5.5% of energy in transport by 2030 ✓ Sub target for RFNBOs: minimum 1% of energy in transport by 2030 ✓ 42% of the use of hydrogen in the industry to be RFNBOs by 2030, 60% by 2035
ReFuelEU Aviation	<ul style="list-style-type: none"> ➤ SAFs quotas: min 6%, 34%, 70% by 2030/2040/2050 ➤ Synthetic aviation fuels quotas (RFNBOs): min 1.2%, 5%, 35% by 2030/2035/2050
FuelEU Maritime	<ul style="list-style-type: none"> ✓ Binding GHG reduction targets for ships: 2%, 6%, 31%, 80% in 2025, 2030, 2040, 2050 ✓ 2% RFNBOs quota in 2034 if RFNBOs account for less than 1% in fuel mix in 2031
Energy Taxation Directive STILL UNDER DISCUSSION	<ul style="list-style-type: none"> ✓ Minimum taxation rate of zero for 10 years for RFNBOs for specific types of air and waterborne navigation

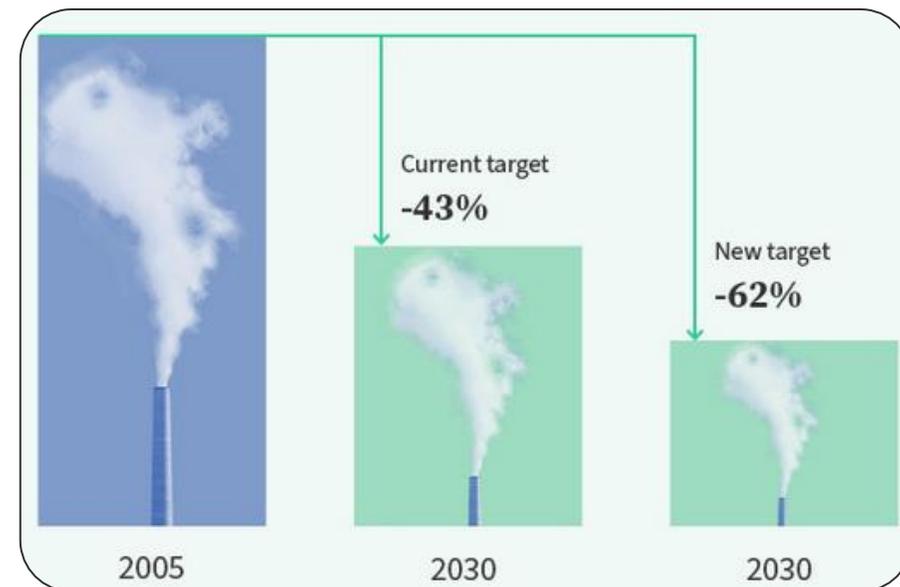
Point sur l'évolution de la réglementation européenne concernant le CCU, Source: CO2 value Europe



EU adopts ETS revision and new carbon border tax

The ETS revision

- **CCS and permanently bound CCU are fully exempted** from surrender requirements in the EU ETS
- End of **double counting** of carbon emissions for CCU fuels and CCU chemicals production
- Number of **free allowances will be reduced**, and the number of **total ETS allowances as well**. Consequence: the price of CO₂ will rise (currently 90€/ton on ETS market)



The Carbon Border Adjustment Mechanism

- **CBAM**: carbon tax for products made outside Europe aiming to make sure there is no carbon leakage
- **Principle**: producers outside Europe will need to pay the difference between the carbon price in a given country and the EU ETS carbon price
- **Scope**: raw materials like iron and steel, cement, aluminium, fertilisers, electricity, hydrogen, certain indirect emissions
- **Timeline**: will be phased-in as ETS free allowances are phased out between 2026-2034. Then reassessed to potentially include downstream products (e.g. plastics & chemicals)

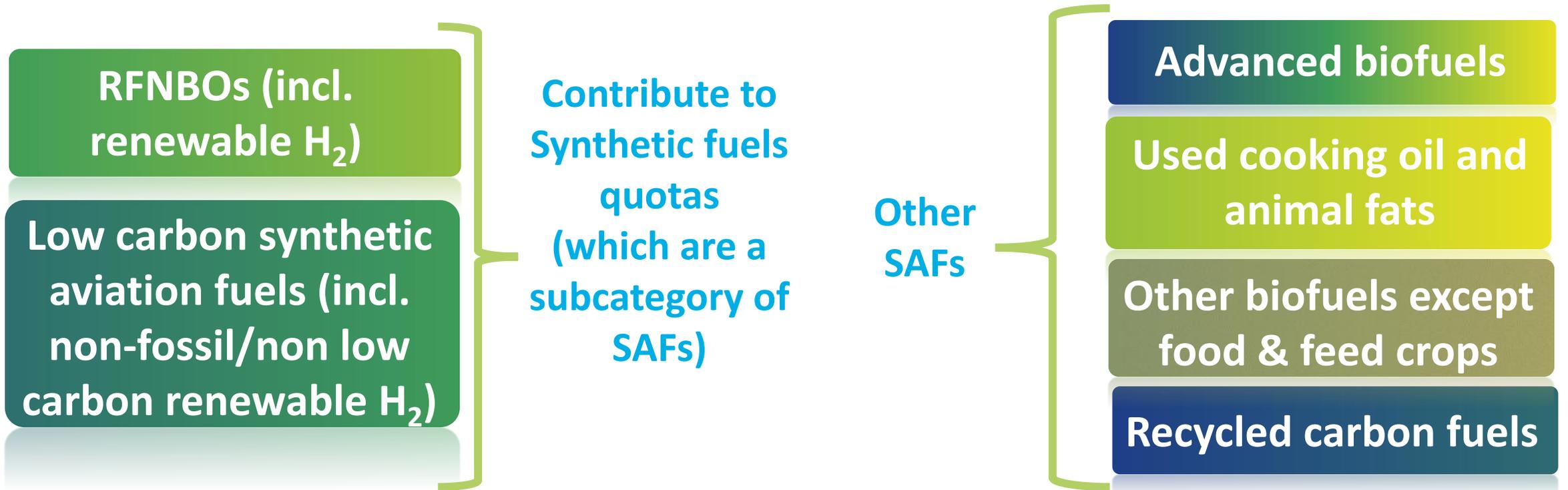
Source : CO2 Value Europe



ReFuelEU Aviation: definitions

Two categories in the Sustainable Aviation Fuels (SAF):

- SynAF = synthetic aviation fuels
- Other SAFs = everything that do not fall in SynAF definition



Source: CO2 Value Europe



Race for defossilising EU shipping & aviation is on

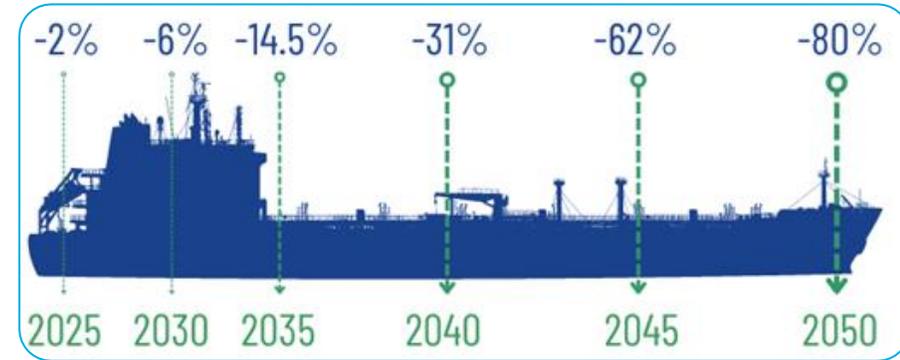
FuelEU Maritime

- Gradually increase the use of sustainable fuels and technologies
- GHG reduction targets in the energy they use
- 2% RFNBOs mandatory target ins 2034 if by 2031 RFNBO amount to less than 1% in fuel mix

ReFuelEU Aviation

- Mandates minimum quotas for sustainable fuels: RFNBOs, RCFs, advanced biofuels and even low carbon fuels
- Mandates specific subquotas for RFNBOs
- Sets penalties for fuels suppliers (which eventually will impact aircraft operators) if they fail to comply

GHG reduction targets



	2025	2030	2032	2035	2040	2045	2050
SAF	2%	6%		20%	34%	42%	70%
SynAF		2030-2032: 1.2%/y 2030-2032: 0,7%/y	2032-2033: 1.2%/y 2034: 2%/y	5%	10%	15%	35%

Source: CO2 Value Europe



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New EU rules for renewable hydrogen & CCU fuels: fit for purpose?



- On 10 July 2023, the new rules for the production of RNFBOs became EU law
- REDII delegated act on additionality
 - Definition of additionality: ensure the renewable hydrogen comes from new renewable energy installations and do not divert existing clean power from other decarbonisation efforts
 - This includes only what is considered as 100% renewable and hence given a zero carbon intensity
 - EU rules would provide flexibility until 2028, but stricter rules after that
- REDII delegated act on GHG methodology to calculate GHG savings from RNFBOs and RCFs to reach 70% GHG reduction threshold. The rules distinguish between carbon sources to which are considered “avoided”:
 - Eligible without an end date: DAC CO₂, biogenic CO₂ that respects REDII criteria, RNFBOs/RCFs’ CO₂, geological CO₂
 - ETS industrial CO₂ from power production (e.g. gas-fired powerplant): eligible until 2036
 - ETS industrial CO₂ from industrial production (e.g. emissions from cement): eligible until 2041
- Draft REDII delegated act on coprocessing: defines how to distinguish between fossil/biogenic CO₂ in refineries, will set precedent for future mass balance approach in other installations

During the Summer 2023, the EU Commission published a Q&A addressing technical questions on how the new rules will play out. The document is available online [here](#)

Source: CO₂ Value Europe



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Additional and updated information about the regulations can be find on the links below:

Fit for 55 –

<https://www.consilium.europa.eu/en/policies/green-deal/fit-for-55-the-eu-plan-for-a-green-transition/>

Position Paper: CCU regulation landscape–

https://co2value.eu/wp-content/uploads/2022/02/Position-paper_CVE_CCU-in-EU-Policy-Landscape_February-2022_FINAL.pdf

European Commission - https://ec.europa.eu/commission/presscorner/detail/en/IP_23_4754



The logo for PYRCO₂ features the word "PYRCO" in a green, sans-serif font, followed by a stylized blue and green molecular structure icon, and "CO₂" in a grey, sans-serif font. The background of the slide is a close-up photograph of a complex stainless steel industrial or laboratory apparatus with various pipes, valves, and gauges.

PYRCO₂

Thank you!



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