L’iniziativa europea sui crediti di carbonio

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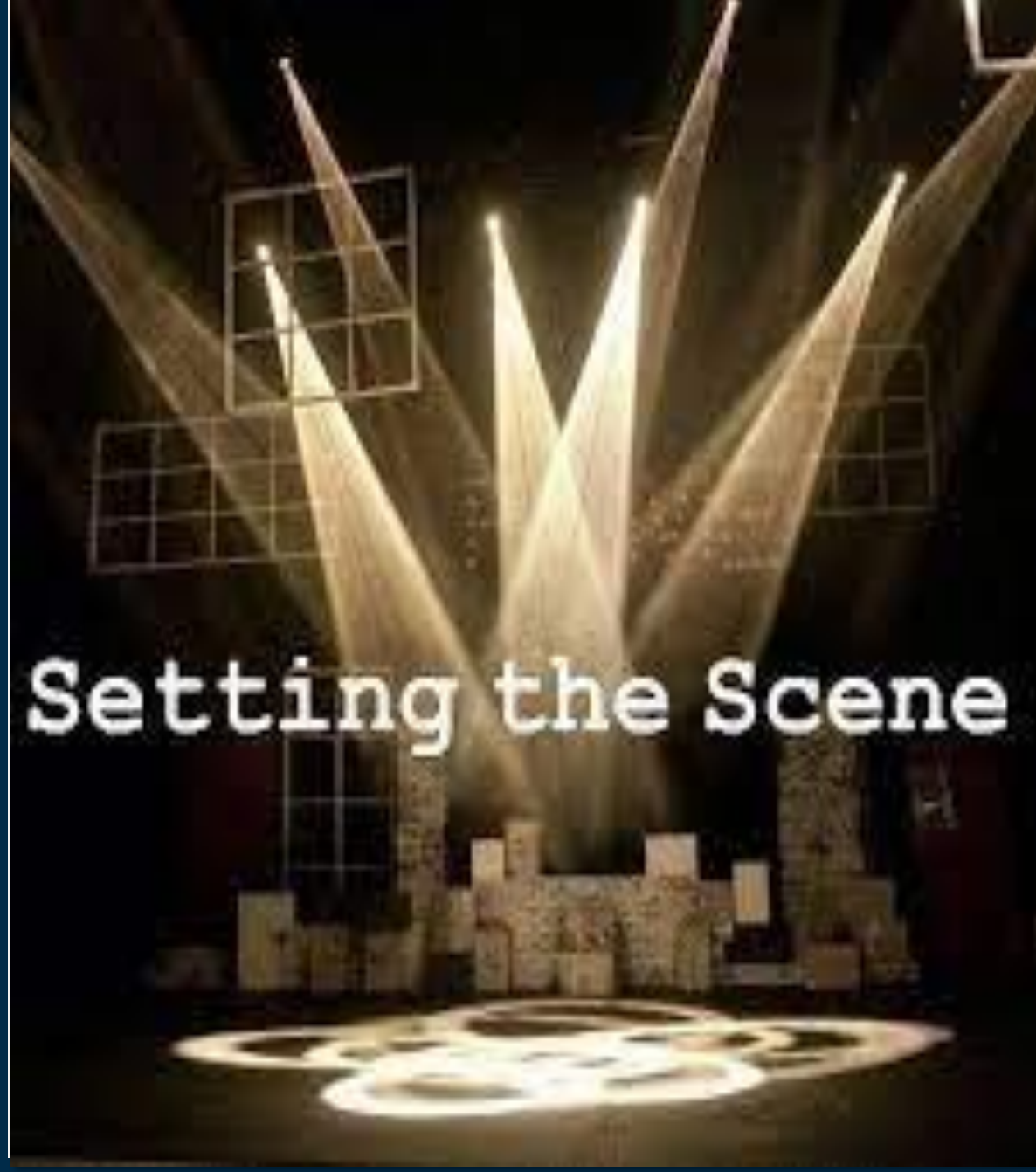
Politecnico di Torino

RE·CORD

F4F Fit4Foresight FUEL

Outlook

- Soil Carbon Accumulation
- REDII-IR and SCA/Biochar
- CRCF and SCA/Biochar
- Biochar: a long-lived C form
- Decarbonisation of processes: in-sector vs inter-sector



Carbon Policies in the EU and farming

Soil Carbon Accumulation and Policies
Biofuels vs Carbon Removals

Two main streamlines to Carbon accounting

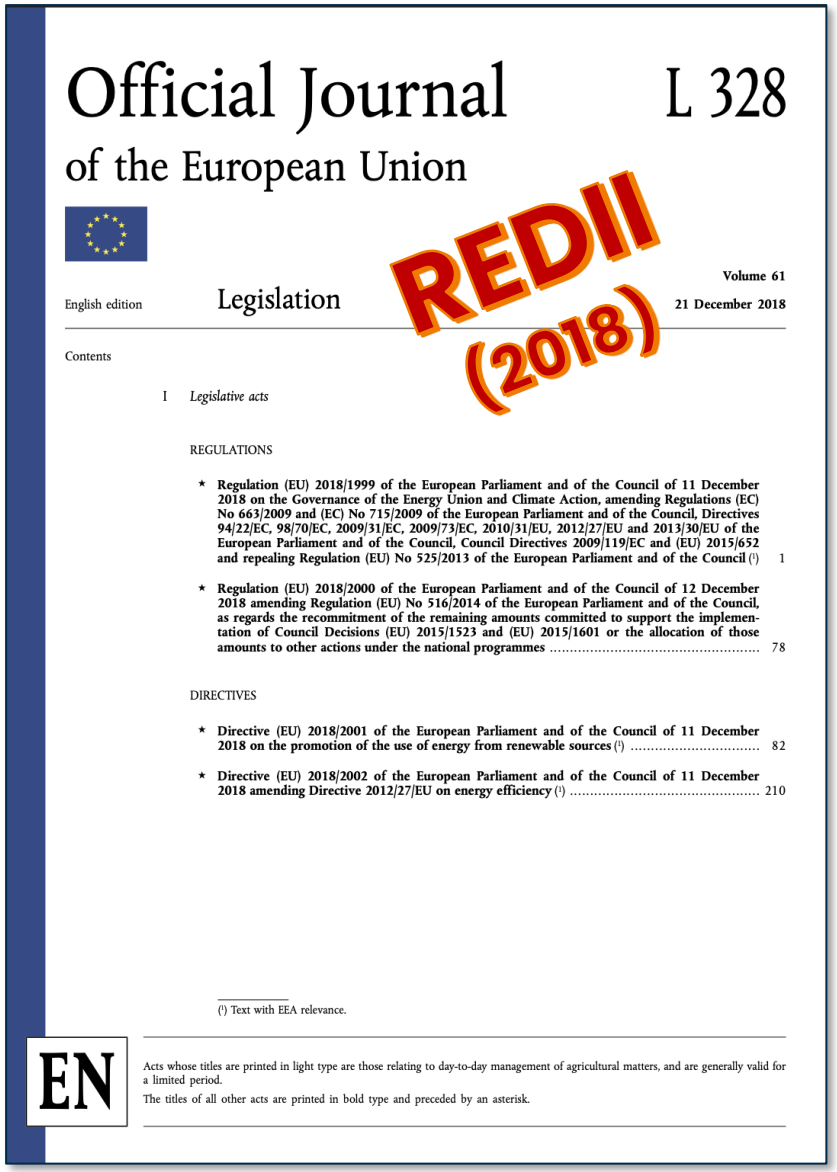
- **REDII – IR** (and **REDIII**): relevant for Sustainable Biofuels. In place.
- **CRCF**: Carbon offsetting, under development by DG Clima initiative. Relevant to voluntary and mandated (revised ETS, 2026) Carbon markets.

Soil Carbon Accumulation and Sustainable Biofuels

SCA (SOC) & Biofuels

REDII (2018)

Implementing Regulation (2022)



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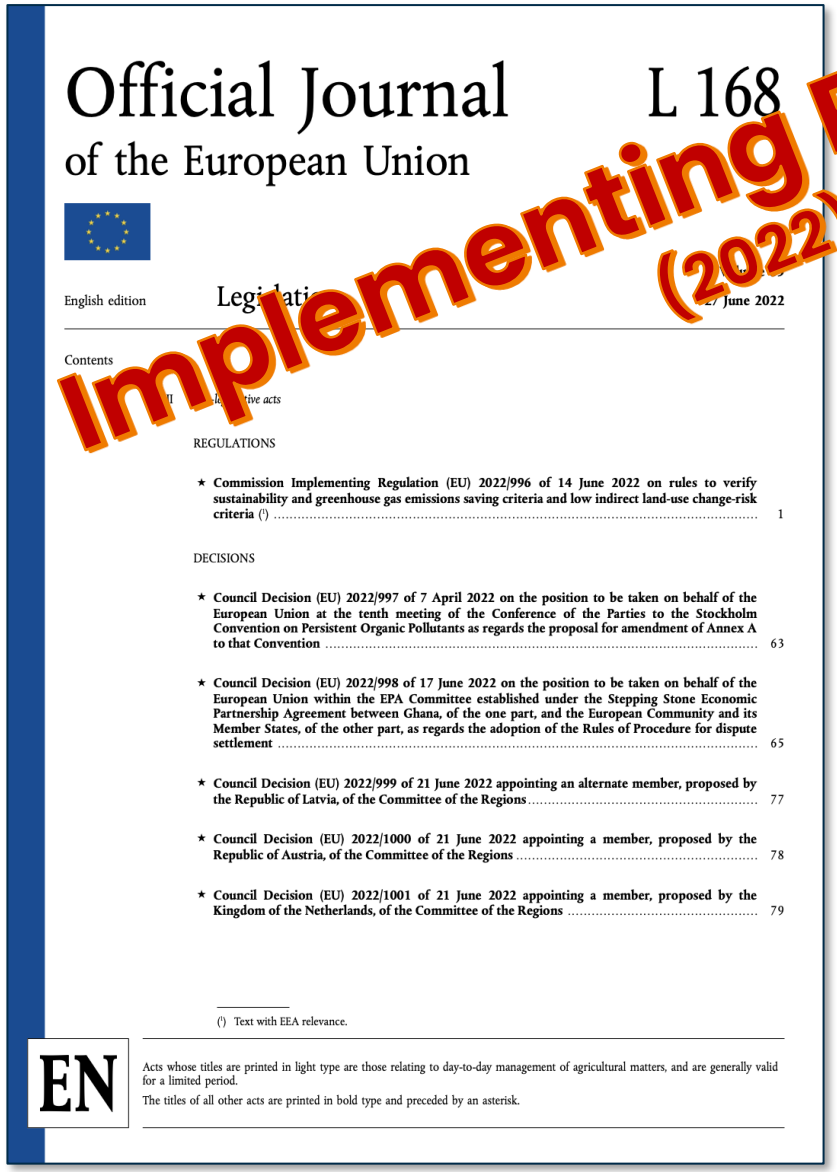

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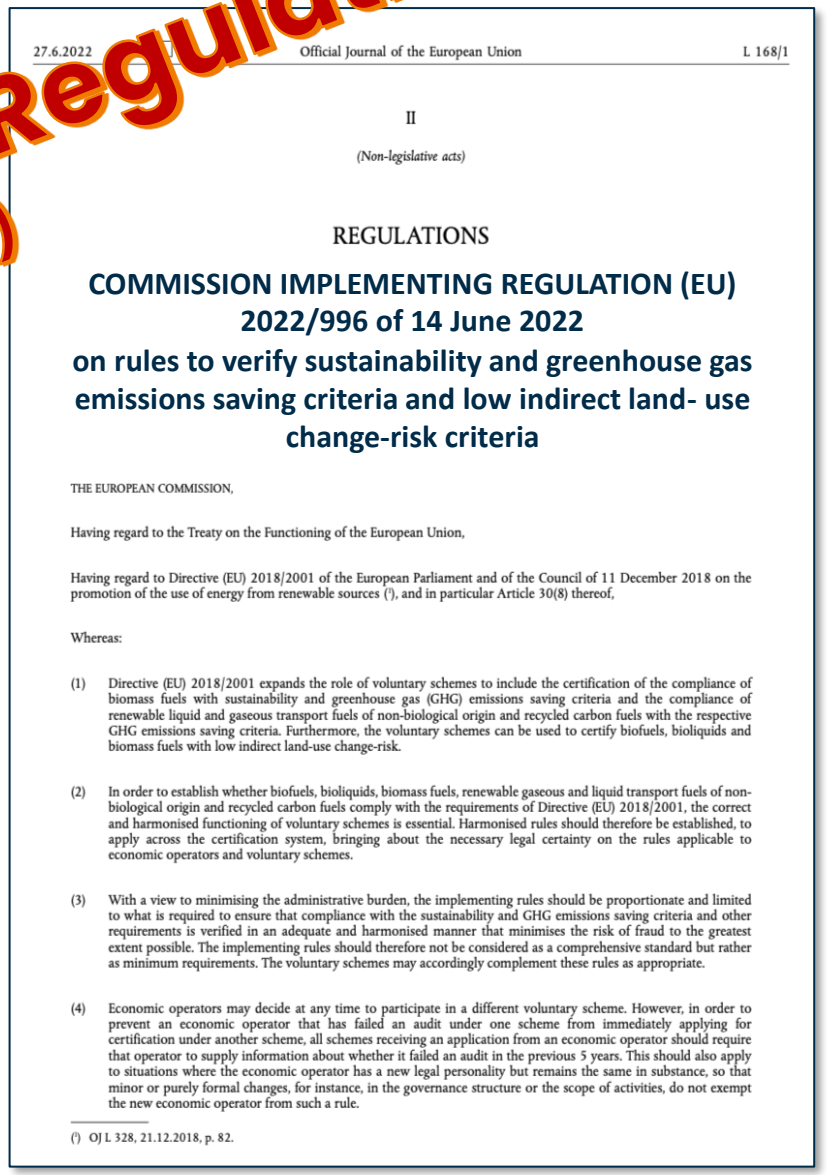


II

(Non-legislative acts)

REGULATIONS

COMMISSION IMPLEMENTING REGULATION (EU) 2022/996 of 14 June 2022

on rules to verify sustainability and greenhouse gas emissions saving criteria and low indirect land- use change-risk criteria

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources (1), and in particular Article 30(8) thereof,

Whereas:

(1) Directive (EU) 2018/2001 expands the role of voluntary schemes to include the certification of the compliance of biomass fuels with sustainability and greenhouse gas (GHG) emissions saving criteria and the compliance of renewable liquid and gaseous transport fuels of non-biological origin and recycled carbon fuels with the respective GHG emissions saving criteria. Furthermore, the voluntary schemes can be used to certify biofuels, bioliquids and biomass fuels with low indirect land-use change-risk.

(2) In order to establish whether biofuels, bioliquids, biomass fuels, renewable gaseous and liquid transport fuels of non-biological origin and recycled carbon fuels comply with the requirements of Directive (EU) 2018/2001, the correct and harmonised functioning of voluntary schemes is essential. Harmonised rules should therefore be established, to apply across the certification system, bringing about the necessary legal certainty on the rules applicable to economic operators and voluntary schemes.

(3) With a view to minimising the administrative burden, the implementing rules should be proportionate and limited to what is required to ensure that compliance with the sustainability and GHG emissions saving criteria and other requirements is verified in an adequate and harmonised manner that minimises the risk of fraud to the greatest extent possible. The implementing rules should therefore not be considered as a comprehensive standard but rather as minimum requirements. The voluntary schemes may accordingly complement these rules as appropriate.

(4) Economic operators may decide at any time to participate in a different voluntary scheme. However, in order to prevent an economic operator that has failed an audit under one scheme from immediately applying for certification under another scheme, all schemes receiving an application from an economic operator should require that operator to supply information about whether it failed an audit in the previous 5 years. This should also apply to situations where the economic operator has a new legal personality but remains the same in substance, so that minor or purely formal changes, for instance, in the governance structure or the scope of activities, do not exempt the new economic operator from such a rule.

(1) OJ L 328, 21.12.2018, p. 82.

Carbon and Sust.Fuels: REDII

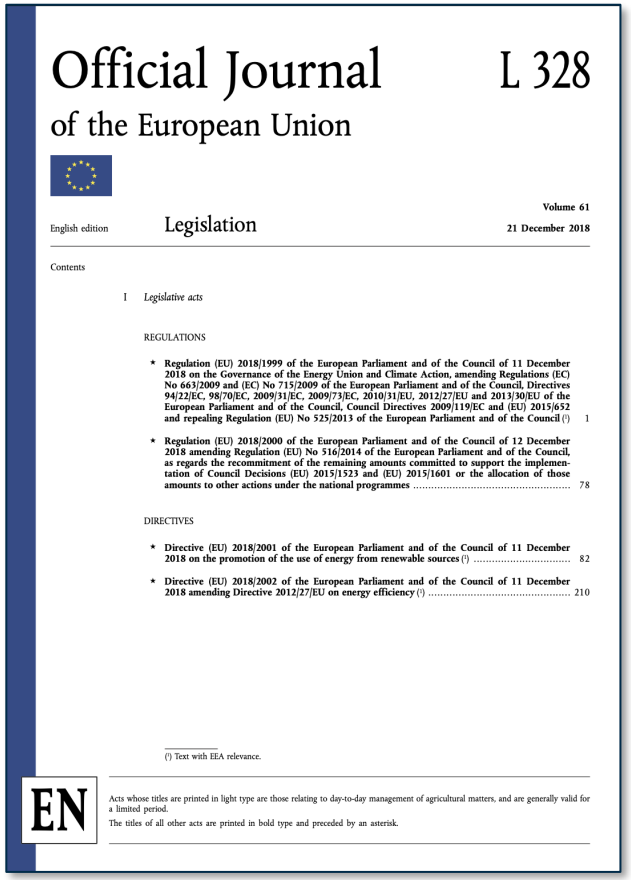
(a) greenhouse gas emissions from the production and use of biofuels shall be calculated as:

$$E = e_{ec} + e_l + e_p + e_{td} + e_u - e_{sca} - e_{ccs} - e_{ccr},$$

where

E	=	total emissions from the use of the fuel;
e_{ec}	=	emissions from the extraction or cultivation of raw materials;
e_l	=	annualised emissions from carbon stock changes caused by land-use change;
e_p	=	emissions from processing;
e_{td}	=	emissions from transport and distribution;
e_u	=	emissions from the fuel in use;
e_{sca}	=	emission savings from soil carbon accumulation via improved agricultural management;
e_{ccs}	=	emission savings from CO_2 capture and geological storage; and
e_{ccr}	=	emission savings from CO_2 capture and replacement.

$$e_{sca} = (CS_A - CS_R) \times 3{,}664 \times 10^6 \times \frac{1}{n} \times \frac{1}{P} \text{-} e_f$$



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I *Legislative acts*

REGULATIONS

* **Regulation (EU) 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action, amending Regulations (EC) No 663/2009 and (EC) No 715/2009 of the European Parliament and of the Council, Directives 94/22/EC, 98/70/EC, 2009/31/EC, 2009/73/EC, 2010/31/EU, 2012/27/EU and 2013/30/EU of the European Parliament and of the Council, Council Directives 2009/119/EC and (EU) 2015/652 and repealing Regulation (EU) No 525/2013 of the European Parliament and of the Council** (1) 1

* **Regulation (EU) 2018/2000 of the European Parliament and of the Council of 12 December 2018 amending Regulation (EU) No 516/2014 of the European Parliament and of the Council, as regards the recommitment of the remaining amounts commited to support the implementation of Council Decisions (EU) 2015/1523 and (EU) 2015/1601 or the allocation of those amounts to other actions under the national programmes** 78

DIRECTIVES

* **Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources** (1) 82

* **Directive (EU) 2018/2002 of the European Parliament and of the Council of 11 December 2018 amending Directive 2012/27/EU on energy efficiency** (1) 210

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EU on Carbon and Sust.Fuels: REDII – IR

Examples of essential soil management practices to promote soil carbon sequestration (given the absence of residues) and promote soil quality

Requirement	Soil quality parameter
At least a 3-crop rotation, including legumes or green manure in the cropping system, taking into account the agronomic crop succession requirements specific to each crops grown and climatic conditions. A multi-species cover crop between cash crops counts as one.	Promoting soil fertility, soil carbon, limiting soil erosion, soil biodiversity and promoting pathogen control
Sowing of cover/catch/intermediary crops using a locally appropriate species mixture with at least one legume. Crop management practices should ensure minimum soil cover to avoid bare soil in periods that are most sensitive.	Promoting soil fertility, soil carbon retention, avoiding soil erosion, soil biodiversity
Prevent soil compaction (frequency and timing of field operations should be planned to avoid traffic on wet soil; tillage operation should be avoided or greatly reduced on wet soils; controlled traffic planning can be used).	Retention of soil structure, avoiding soil erosion, retaining soil biodiversity
No burning of arable stubble except where the authority has granted an exemption for plant health reasons.	Soil carbon retention, resource efficiency
On acidic soils where liming is applied, where soils are degraded and where acidification impacts crop productivity.	Improved soil structure, soil biodiversity, soil carbon
Reduce tillage/no tillage – Erosion control – addition of organic amendments (biochar, compost, manure, crop residues) – use of cover crops, rewetting Revegetation: planting (species change, protection with straw mulch) – landscape features – agroforestry	Increase soil organic carbon

45 / 25 (biochar/other) gCO2e/MJ threshold

Based on measurements of C stock
MODELS allowed only if validated

27.6.2022 EN Official Journal of the European Union L 168/1

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(Non-legislative acts)

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(1) OJ L 328, 21.12.2018, p. 82.

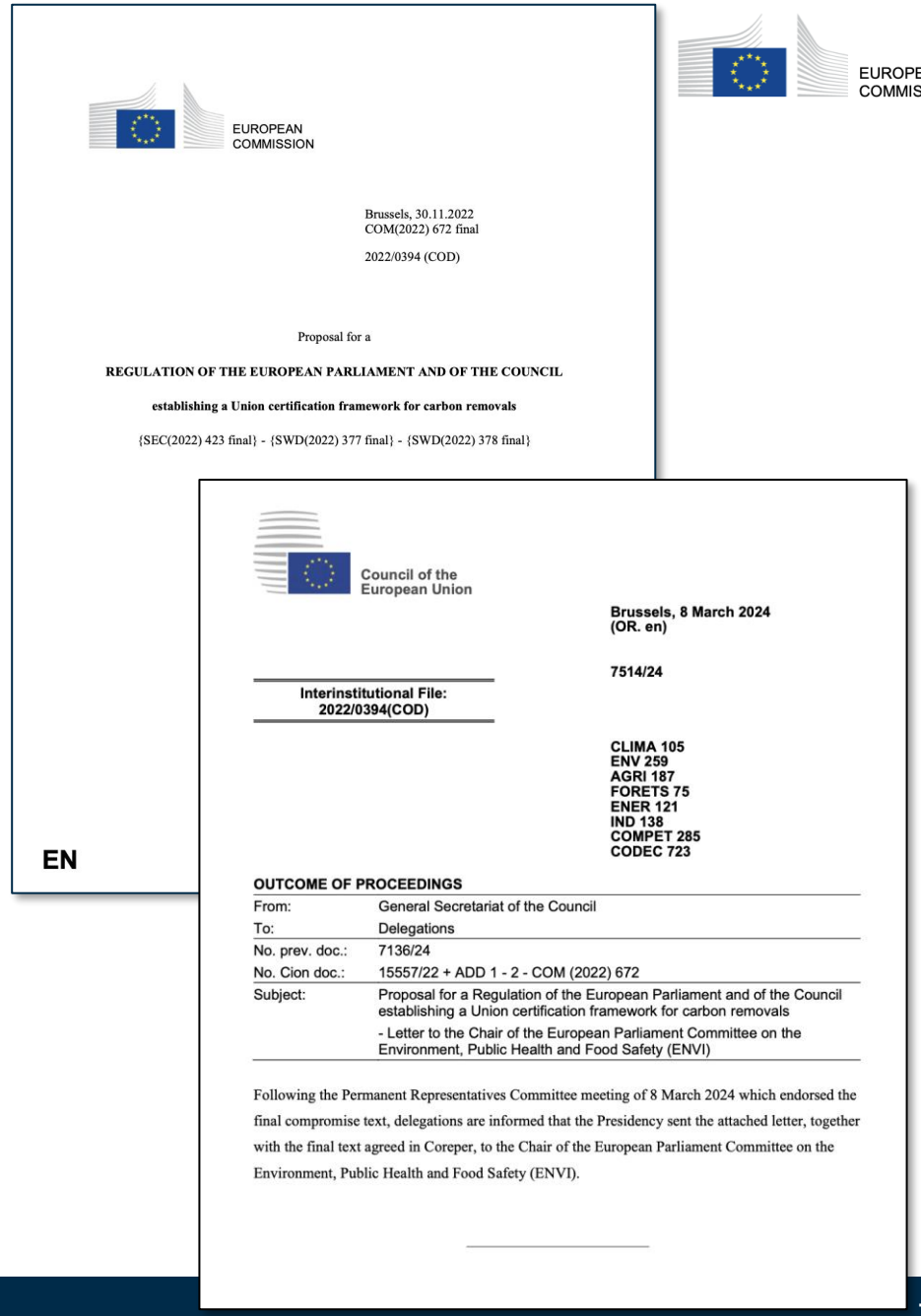
CRCF: Soil Carbon Accumulation and CDR

EC COM 2022 on Carbon

Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL establishing a Union certification framework for carbon removals.

EC 30.11.2022, COM(2022) 672 final

Provisional Agreement on March 2024



EUROPEAN COMMISSION

Brussels, 30.11.2022
COM(2022) 672 final

2022/0394 (COD)

Proposal for a

REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

establishing a Union certification framework for carbon removals

{SEC(2022) 423 final} - {SWD(2022) 377 final} - {SWD(2022) 378 final}

EN

Council of the European Union

Brussels, 8 March 2024
(OR. en)

7514/24

Interinstitutional File:
2022/0394(COD)

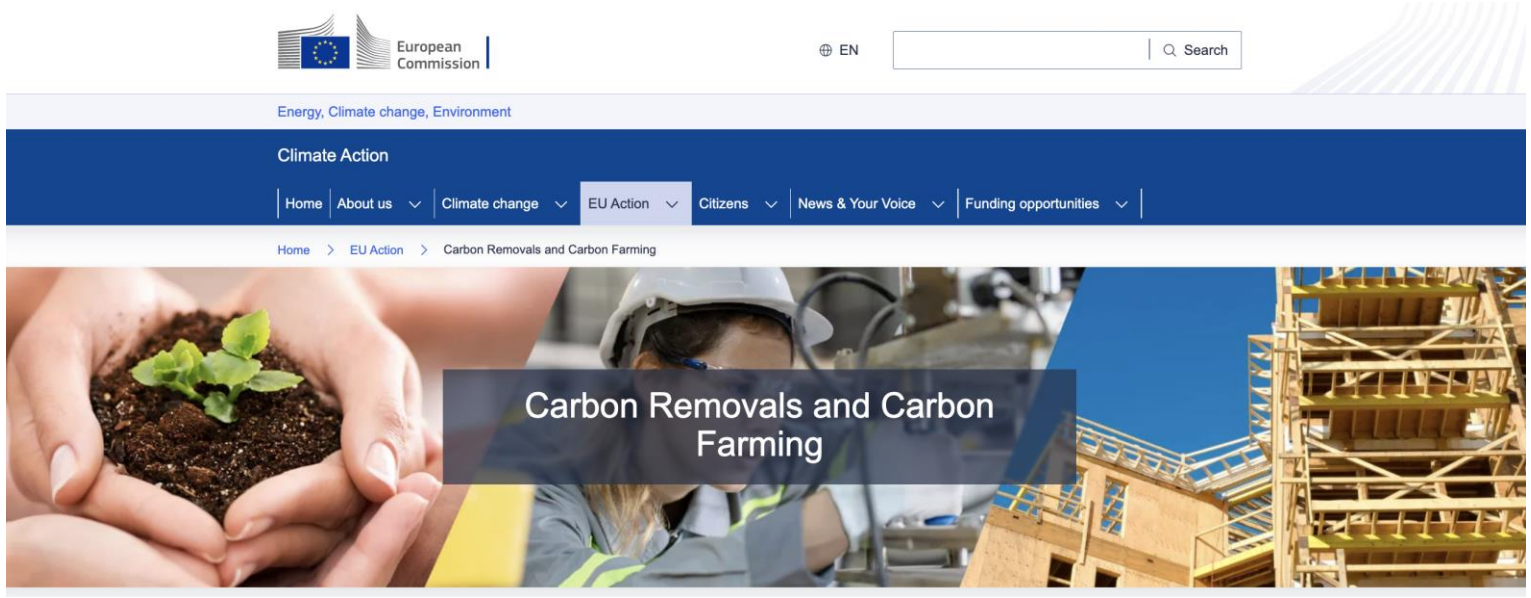
CLIMA 105
ENV 259
AGRI 187
FORETS 75
ENER 121
IND 138
COMPET 285
CODEC 723

OUTCOME OF PROCEEDINGS

From:	General Secretariat of the Council
To:	Delegations
No. prev. doc.:	7136/24
No. Cion doc.:	15557/22 + ADD 1 - 2 - COM (2022) 672
Subject:	Proposal for a Regulation of the European Parliament and of the Council establishing a Union certification framework for carbon removals - Letter to the Chair of the European Parliament Committee on the Environment, Public Health and Food Safety (ENVI)

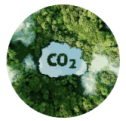
Following the Permanent Representatives Committee meeting of 8 March 2024 which endorsed the final compromise text, delegations are informed that the Presidency sent the attached letter, together with the final text agreed in Coreper, to the Chair of the European Parliament Committee on the Environment, Public Health and Food Safety (ENVI).

Carbon Removals & Carbon Farming



- Permanent carbon removals
- Carbon farming and soil emission reductions
- Carbon storage in long-lasting products

Carbon Removals and Carbon Farming in a nutshell



Carbon removals

Innovative approaches to capturing CO_2, directly from the atmosphere and from biogenic emission sources, before storing it in reservoirs such as geological formations, forests, soil or products for the long term.

Carbon farming

Climate-friendly practices implemented by farmers and foresters to enhance carbon sequestration and storage in forests and soils, as well as reduce greenhouse gas emissions from soils.

EU Carbon Removals and Carbon Farming Certification (CRCF) Regulation

On 10 April 2024, the European Parliament adopted the provisional agreement on the Carbon Removals and Carbon Farming (CRCF) Regulation, which created the first EU-wide voluntary framework for certifying carbon removals, carbon farming and carbon storage in products across Europe. By establishing EU quality criteria and laying down monitoring and reporting processes, the CRCF Regulation will facilitate investment in innovative carbon removal technologies, as well as sustainable carbon farming solutions, while addressing greenwashing.

Explore the sections below to learn more about the specific activities covered by the CRCF Regulation.

EU Expert Group on carbon removals

The Expert Group on carbon removals advises the Commission on the development of tailored EU certification methodologies. With around 70 members from different backgrounds, including national authorities, businesses, NGOs, and research institutions, it ensures broad representation of stakeholders. The Expert Group meets biannually in person and remotely, following Commission guidelines.

Role of CRCF Regulation in voluntary and regulated carbon markets

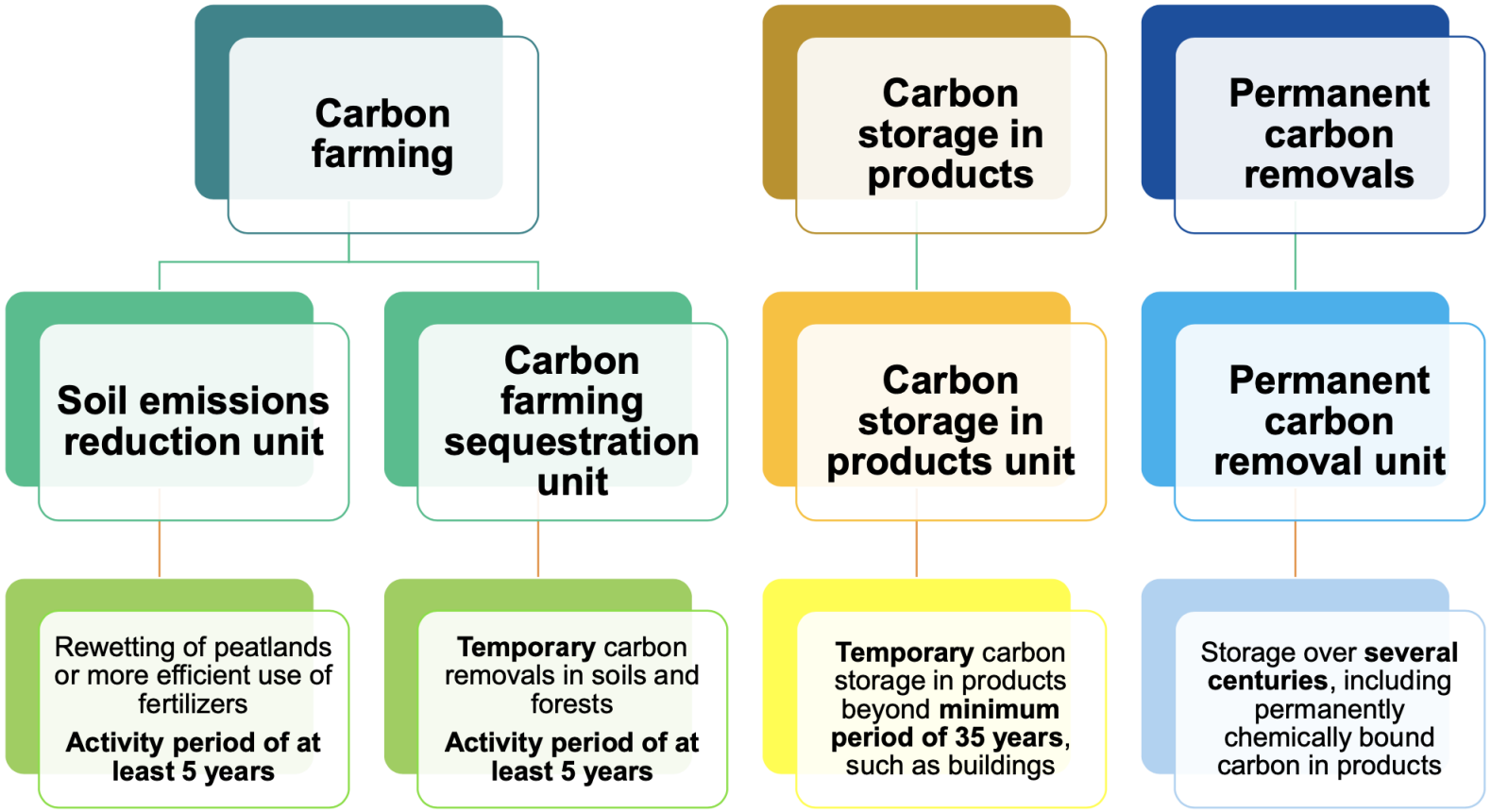
Corporate claims and sustainable finance

- **Corporate Sustainability Reporting Directive**
  - Sustainable Reporting Standards on Climate for non-financial reporting
- **Green Claims**
  - Commission proposal from March 2023 in co-decision

Post-2030 EU climate policy

- **EU ETS review in 2026**
  - Commission to assess the inclusion of permanent removals in EU ETS
- **Review of LULUCF and Effort-Sharing Regulation in 2026**

CRCF – Scope (Art 1-2)



CRCF–Liability and Monitoring rules (art 6)

		Validity of certified units
Permanent removals, including permanently chemically bound in products	Consistent with the rules and obligations pursuant to • **CCS Directive** • Article 12(3b) of the **EU ETS Directive**	**No expiry date**
Temporary removals from carbon farming and carbon storage in products	• To be set out in certification methodology, such as **insurance or buffers** • **Full liability for reversal** during monitoring period	**Expiry at the end of monitoring period**
Soil emissions reductions	• To be set out in certification methodology	**No expiry date**

Certification audit and regular re-certification audits during activity and monitoring periods

Certification audit (validation)

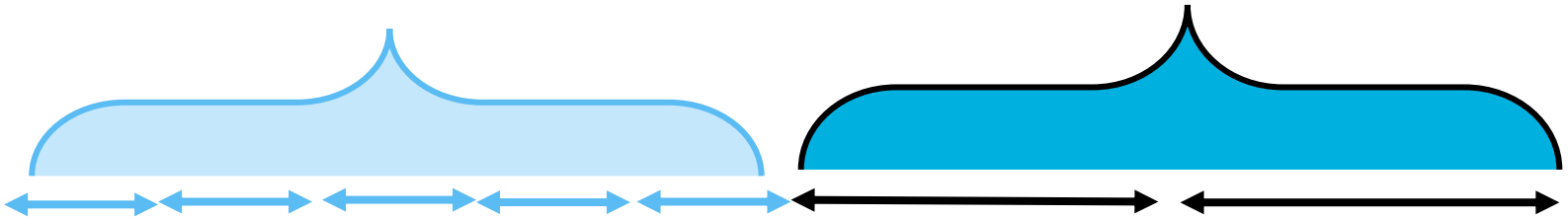
- Before start of activity period
- Issuance of Certificate of Compliance

Re-certification audits (verification)

- Update of Certificate of Compliance
- Issuance of certified units by registry

Monitoring audits (storage verification)

- Update of Certificate of Compliance



Activity period

Monitoring period

Biochar in CRCF

PROCESSES AND END-USES

- From **pyrolysis** or **gasification**
- In **soil** or **materials** (cement, concrete, asphalt..): no distinction in CRCF

PERMANENCE assessment: two methods

- Decay function **> 200 y**
- **Inertinite** assessment or **IPCC**
- Higher permanence as H/Corg reduces. H/Corg < 0.7 (**<0.4** recommended)

PRODUCT CHARACTERISTICS

- Feedstocks: limited to **wastes** and **residues** (proposed). Sustainability requirement as BioCCS
- EBC Guidelines for product specifications
- Standardised baseline 0 t_{CO2e}/yr

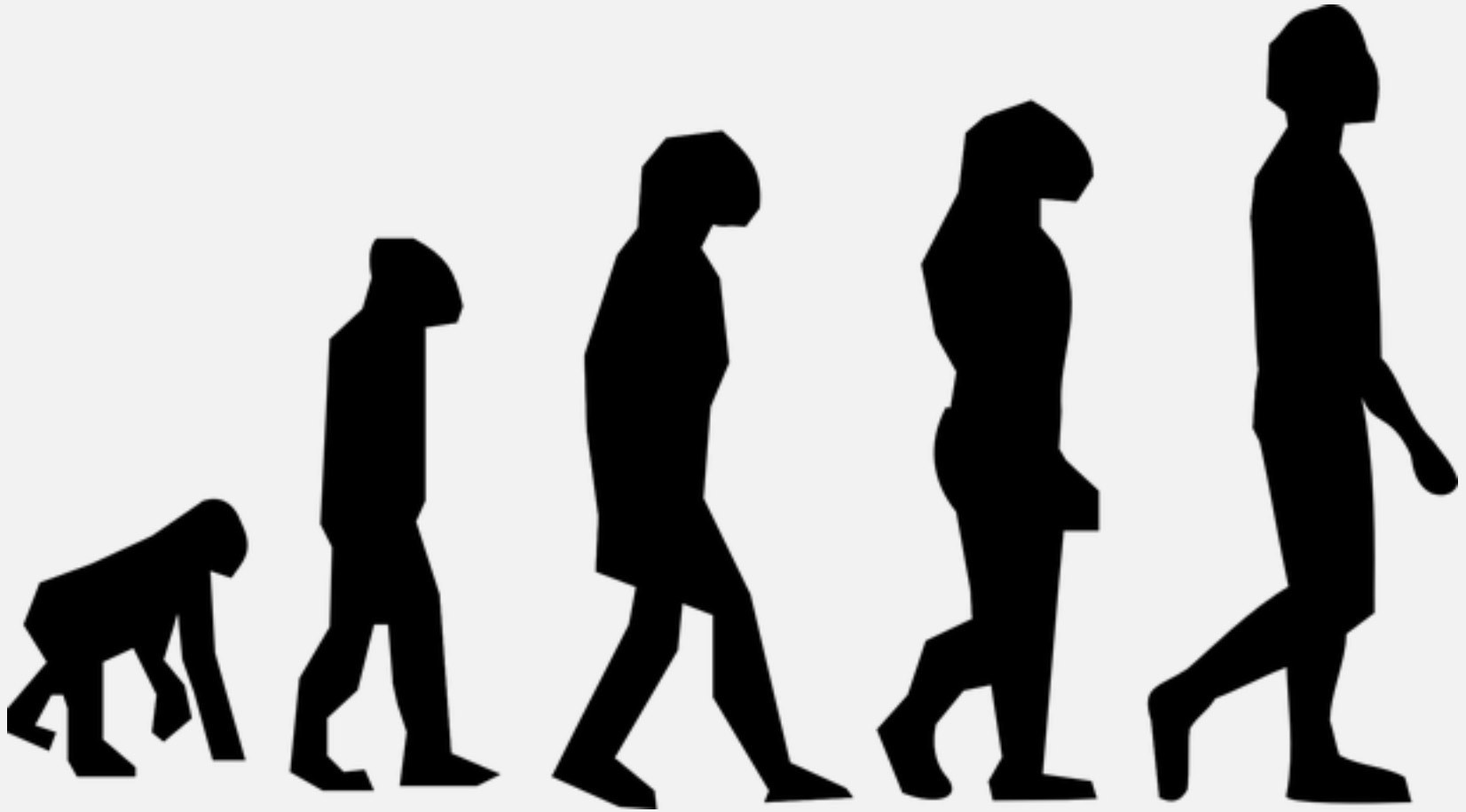
Other specifications

- Allocation of emissions between biochar and other co-products
- Processes with low biochar yield to treat it as residue: no emission allocated (gasification)
- CH4 emission from feedstock decomposition depending on adoption of storage practices

Other specifications

- Allocation of emissions between biochar and other co-products
- Processes with low biochar yield to treat it as residue: no emission allocated

Biochar Value Chain evolution



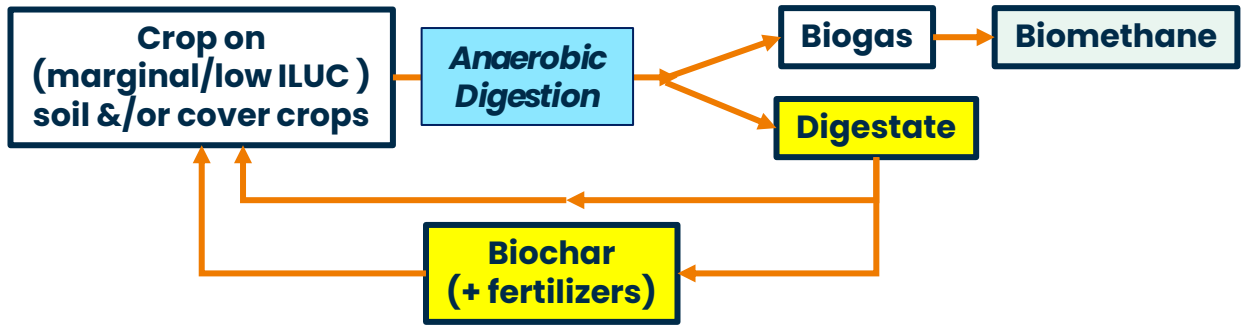
CARBON NEGATIVE: Offset (Compensate)

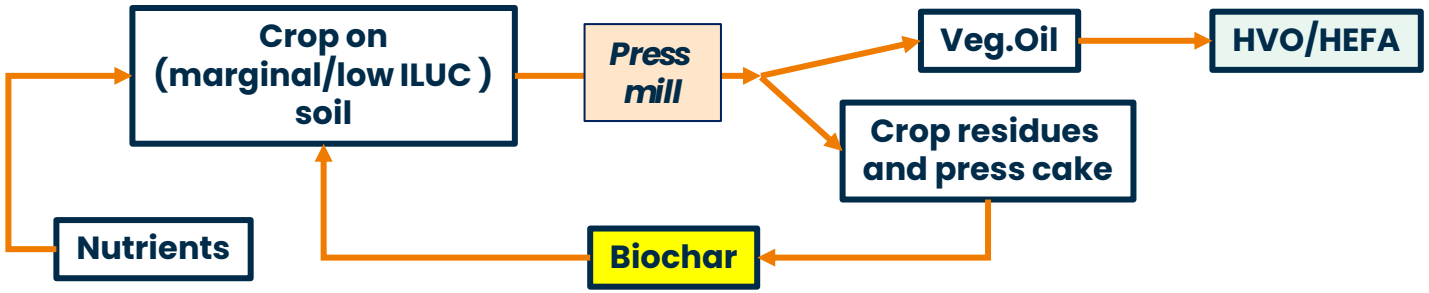
- ✓ **Low-ILUC** : Camelina&Barley in recovered land under marginalization (**BIO4A, BIKE**)
- ✓ **Offsetting CO2** at EU airport land, landside and/or airside + Circular Airports (**TULIPS**)
- ✓ **Nature-based offsetting** next to **SAF** production, or in combination with it (**BIO4A, BIKE**)

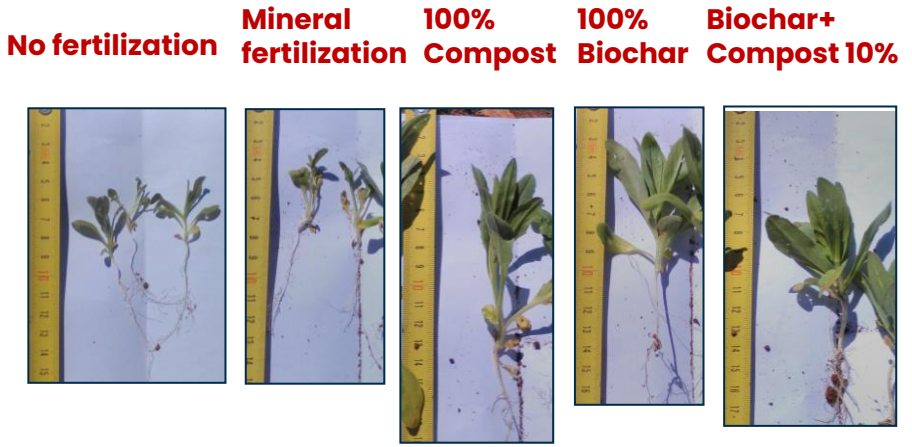
→ **Energy** can **support more sustainable agriculture** through **Biofuels Done Right models**

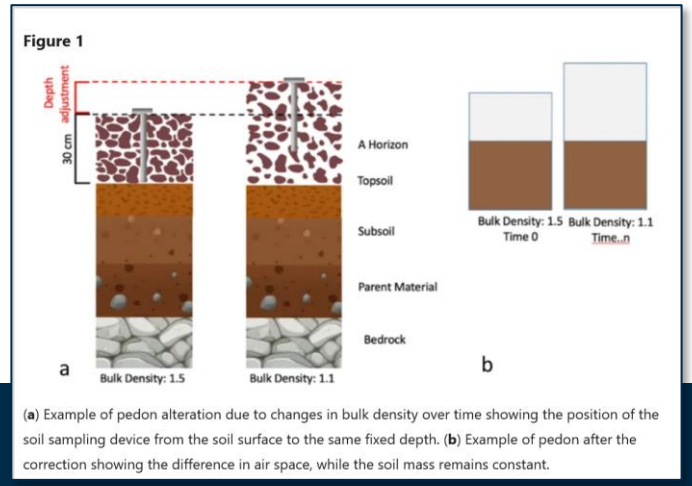
“Biofuels Done Right” can be Carbon Negative and support farming in EU

- **Carbon NEUTRAL vs Carbon NEGATIVE: renewable BIOfuels can be C-Negative**
- **Biogas Done Right and Digestate, or Pyrolysis of residues to Biochar are some examples**
- **Fully deploying REDII-IR (Esca factor → C in soil in GHG assessment)**









Bulk density very relevant in SOC accounting

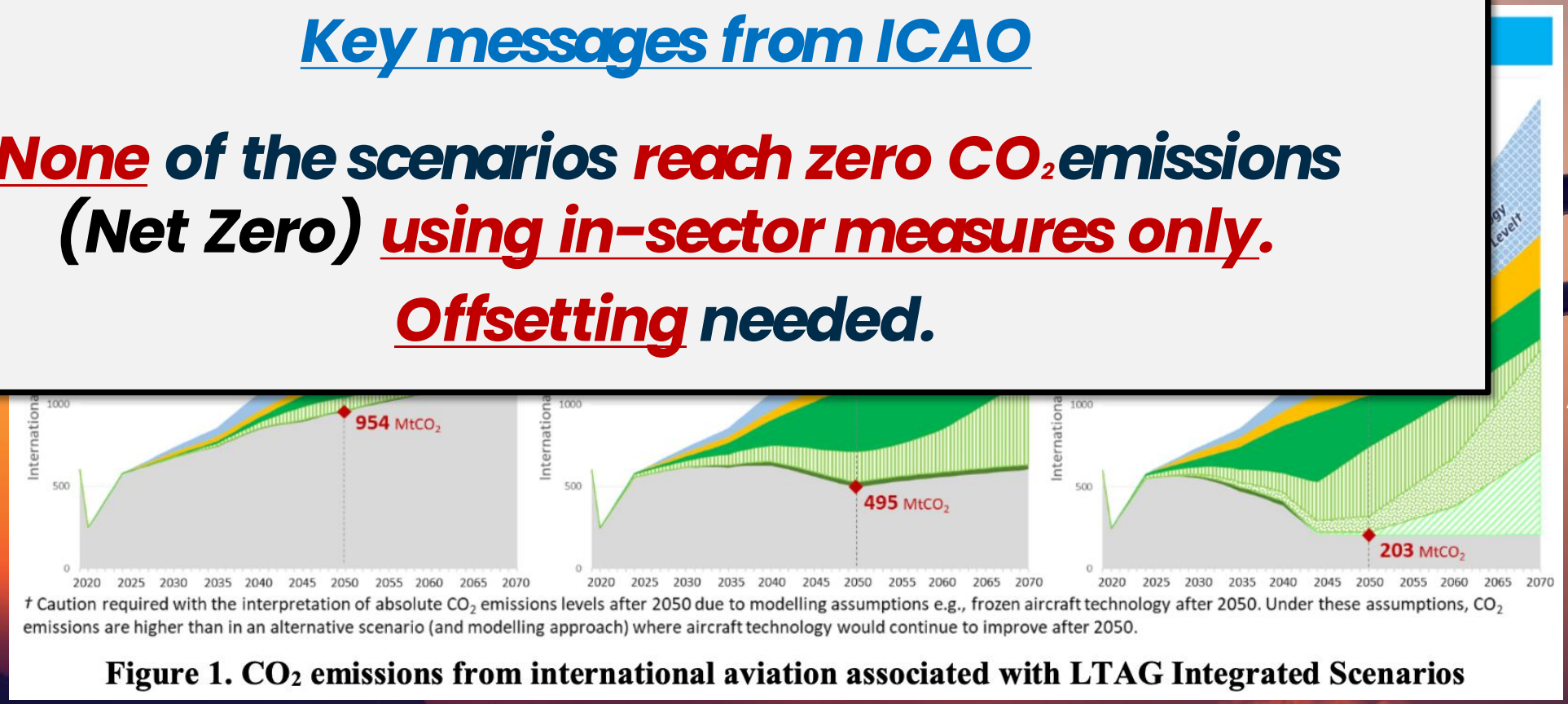
- **ICAO, 2017 → 142** Mt CAF at 2010 → 570-**860** Mt at 2050 (Intern. Aviation) + 400-600 % !!
- **100% CAF substitution (MAX scenario)** – **170 new biorefineries each year** from **2020 to 2050** (15-60 $B/y) –
- **MAX** would **reduce CO_2 emission by 63%**

LTAG Scenarios *(ICAO, March 2022)*

Key messages from ICAO

***None* of the scenarios *reach zero CO_2* emissions (Net Zero) *using in-sector measures only*.**

***Offsetting* needed.**



† Caution required with the interpretation of absolute CO_2 emissions levels after 2050 due to modelling assumptions e.g., frozen aircraft technology after 2050. Under these assumptions, CO_2 emissions are higher than in an alternative scenario (and modelling approach) where aircraft technology would continue to improve after 2050.

Figure 1. CO_2 emissions from international aviation associated with LTAG Integrated Scenarios

Aircraft Technology

Operations

Biomass SAF
Gaseous Waste SAF

Atmospheric CO2 SAF

Hydrogen

- ***Aircraft Techn*:** *Advanced tube and wing, unconventional airframe/propulsion concept aircraft, non-drop-in fuels such as battery electric etc*
- ***Operations*:** *improvements in the performance of flights across all phases*

EU-ETS Carbon Market

https://tradingeconomics.com/commodity/carbon


Thanks for your attention
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