State General for Soil Health

David Chiaramonti

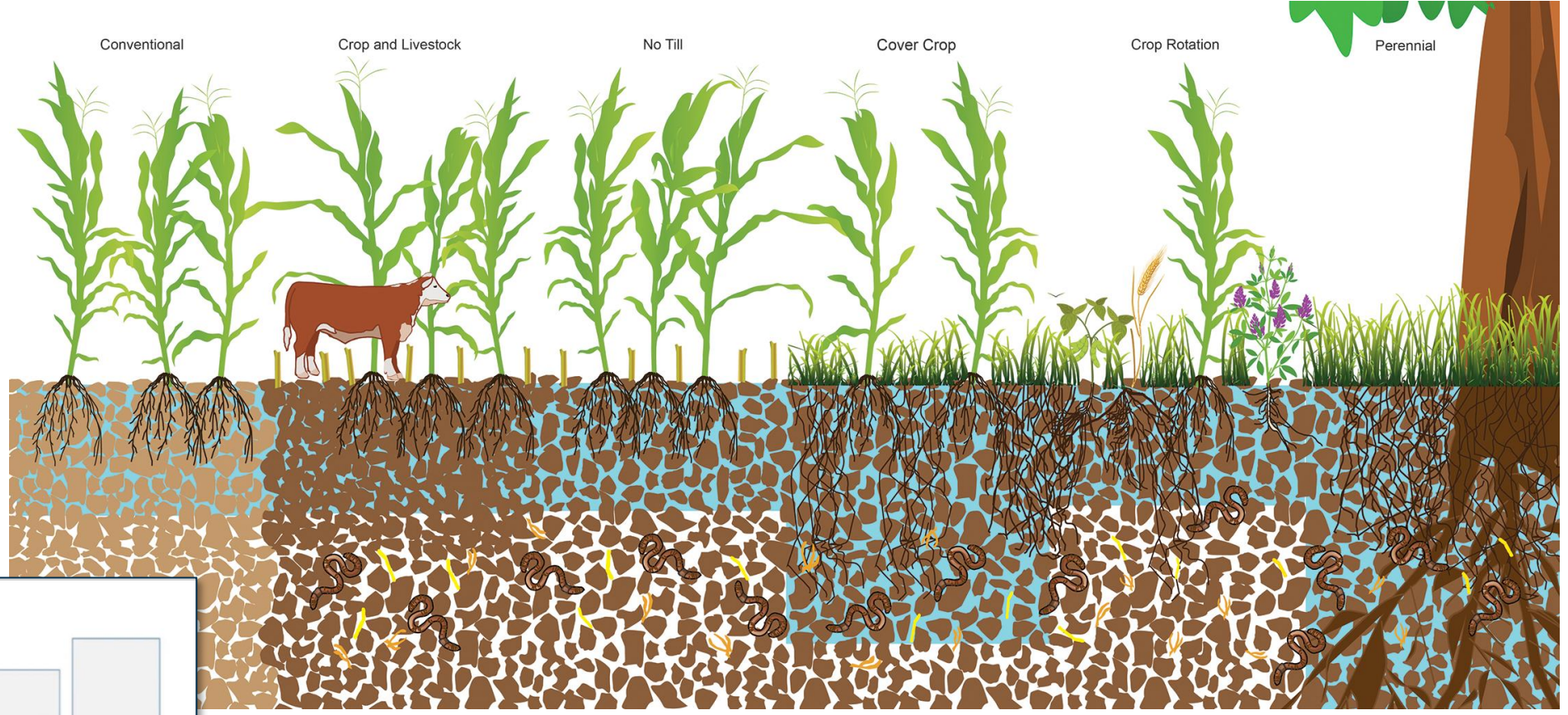
Politecnico di Torino

RE·CORD

…. where we left off ….

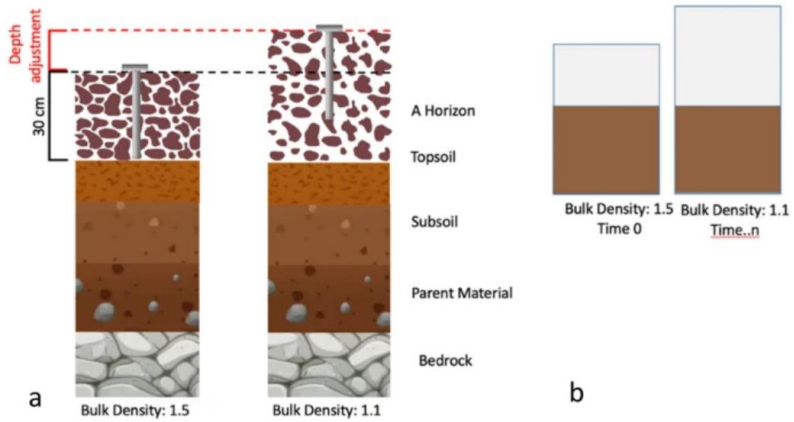
BIKE

Bringing organic C back to soil, and promoting **soil health** and **fertility** , are key elements for Sustainable Bioeconomy chains as BDR, Climate Positive fuels, Agroforestry, Agroecology, etc. fully aligned with EU Mission and policy on soil, contrast to desertification/erosion, promoting sustainable agriculture



Comparing infiltration rates in soils managed with conventional and alternative farming methods: A meta-analysis
Andrea D. BascheMarcia S. DeLonge

Figure 1



(**a**) Example of pedon alteration due to changes in bulk density over time showing the position of the soil sampling device from the soil surface to the same fixed depth. (**b**) Example of pedon after the correction showing the difference in air space, while the soil mass remains constant.

Bulk density very relevant for SOC accounting

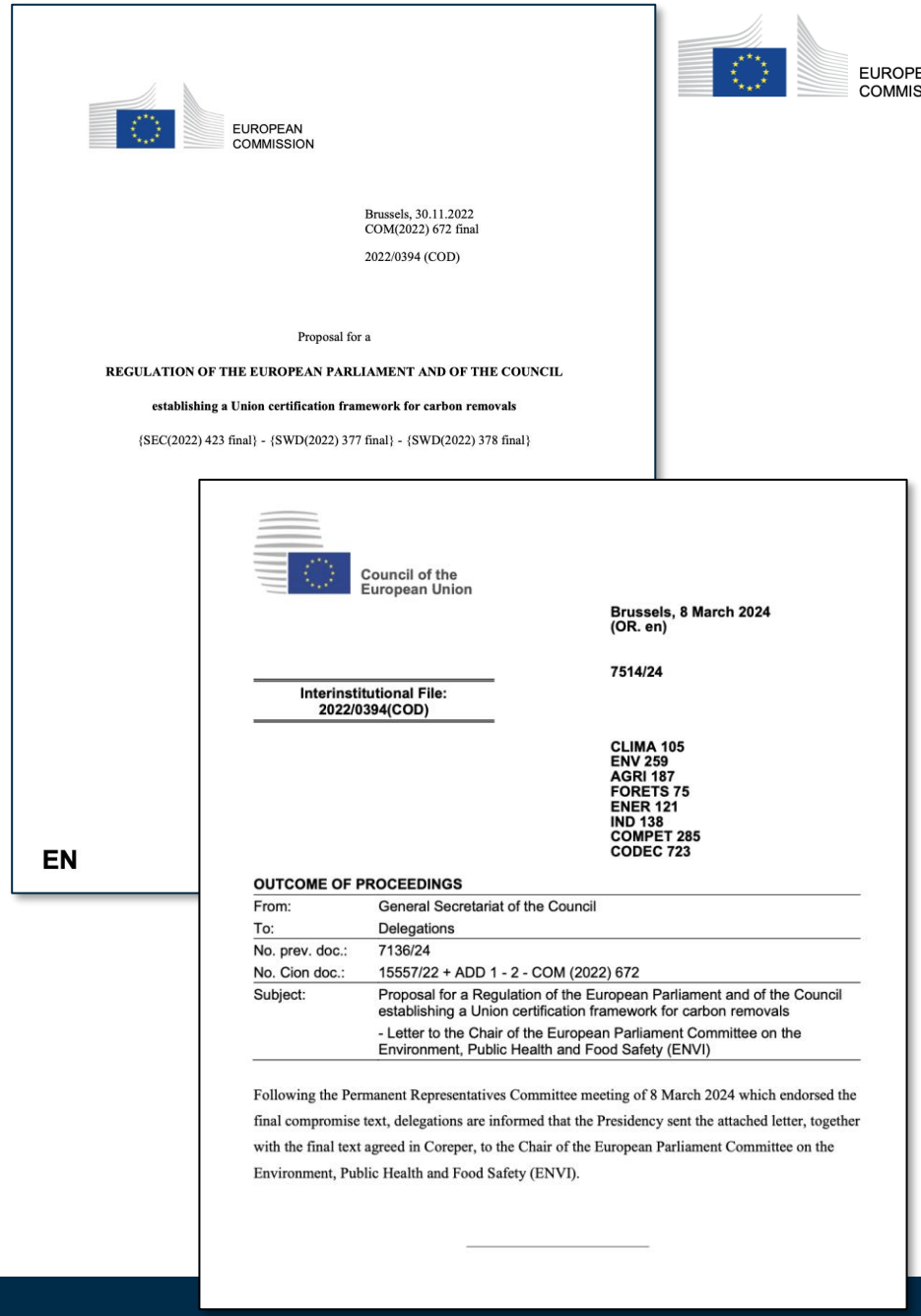
CRCF: Soil Carbon Accumulation and CDR

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)

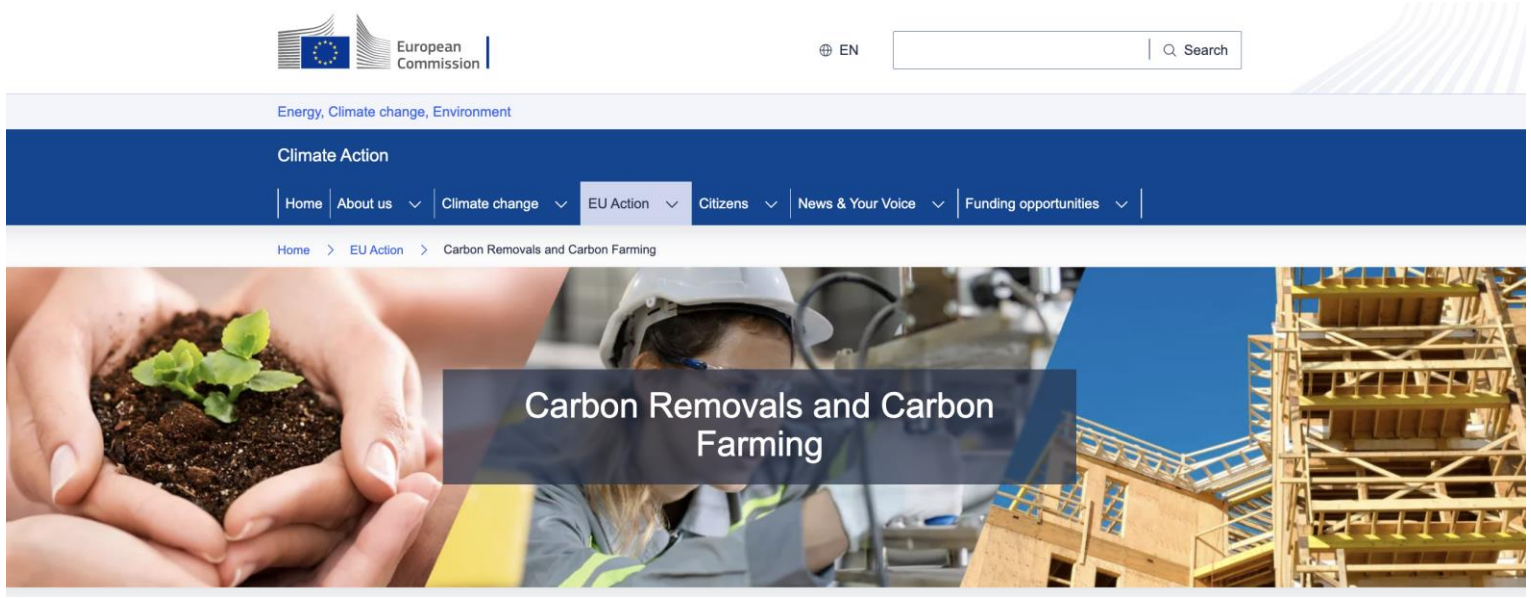
CLIMA 105
ENV 259
AGRI 187
FORETS 75
ENER 121
IND 138
COMPET 285
CODEC 723

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

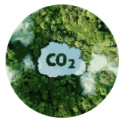


Permanent carbon removals

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

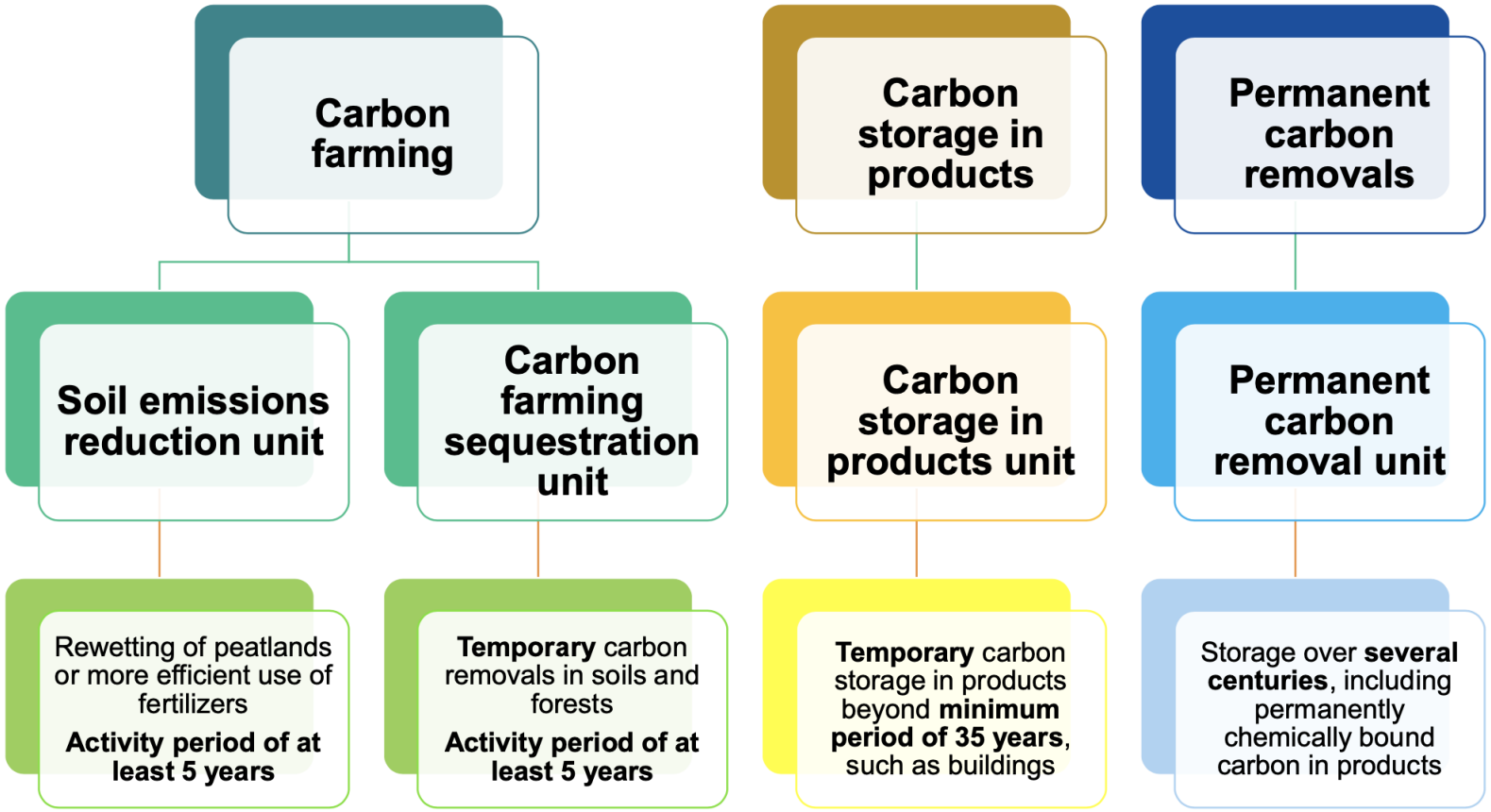
Corporate claims and sustainable finance

- **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)



The Biogas Done Right case

Biomethane comes with C, N, P… in the Biogas Done Right model.

It is already a Carbon – Negative model with manure (ANNEX VI RED)

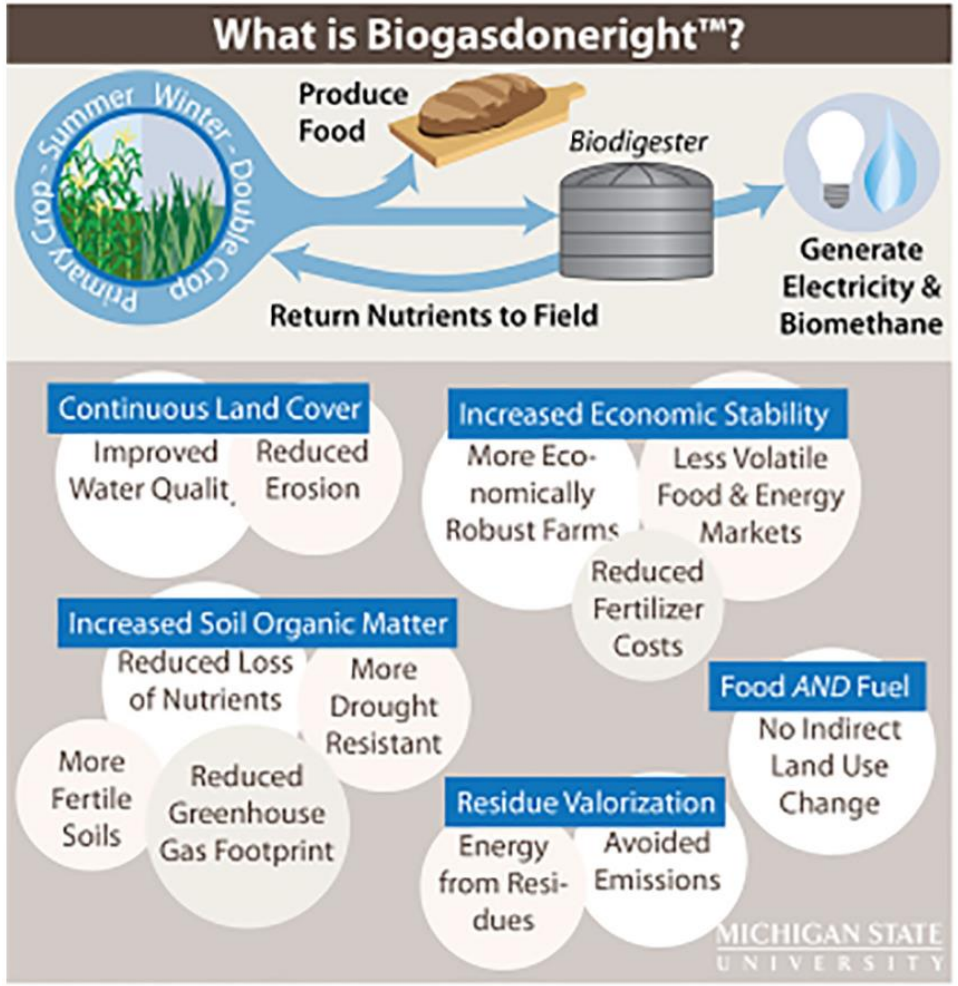
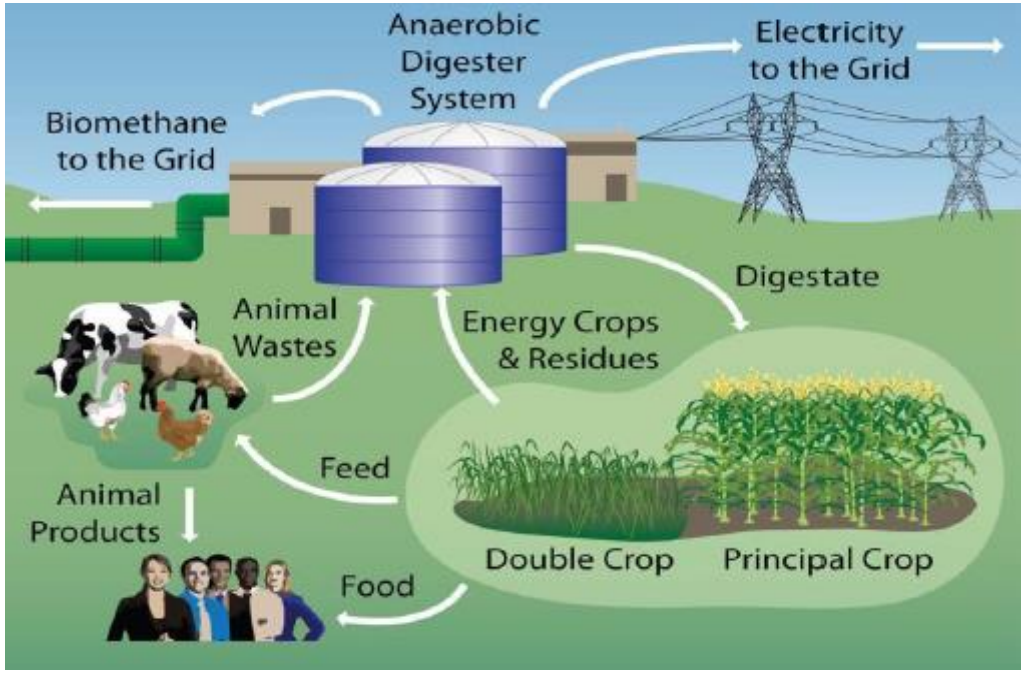
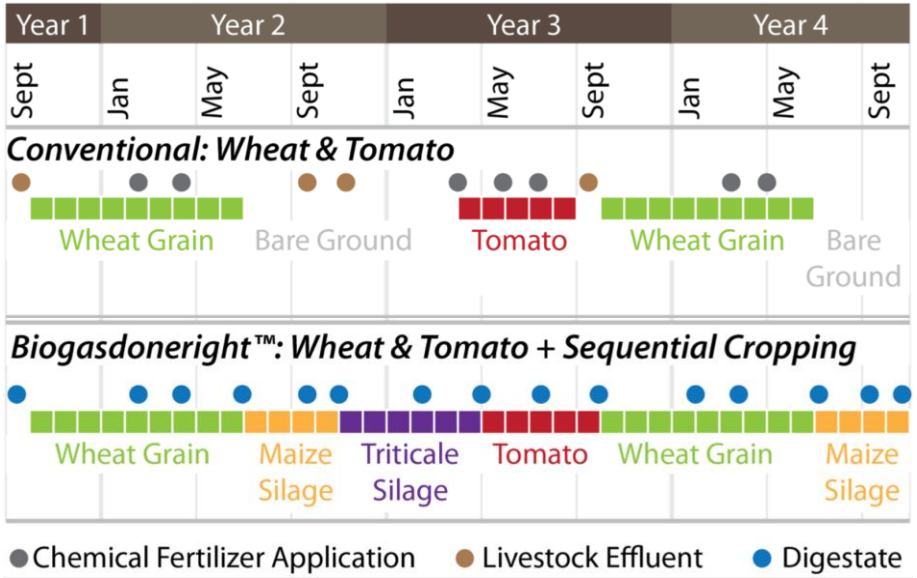


Figure 1. Basic processes and effects of the Biogasdoneright ™ system.



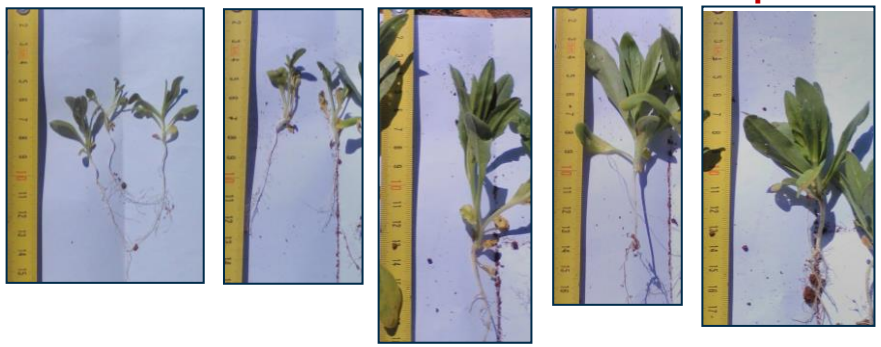


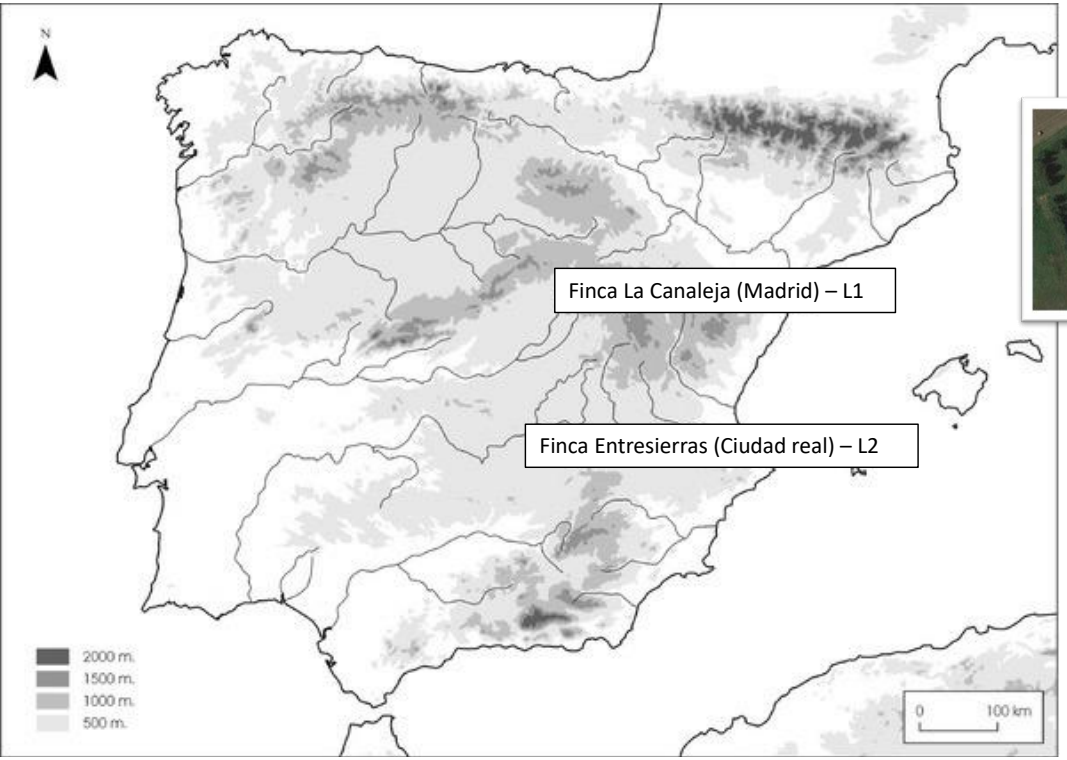
FOOD, FEED AND ENERGY (FUELS)

Reverse ILUC approach:
Barley & Camelina in recovered soil in Spain.

Food/feed otherwise not produced.

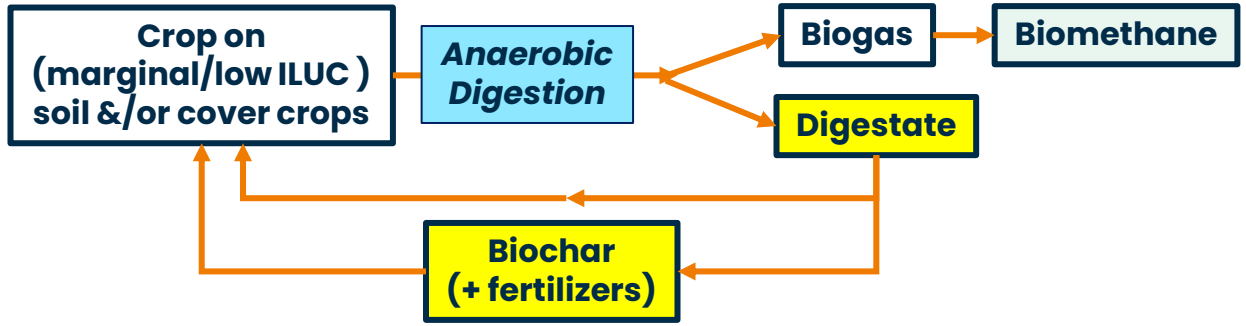
No fertilization | Mineral fertilization | 100% Compost | 100% Biochar | Co-composted Biochar+ Compost 10%

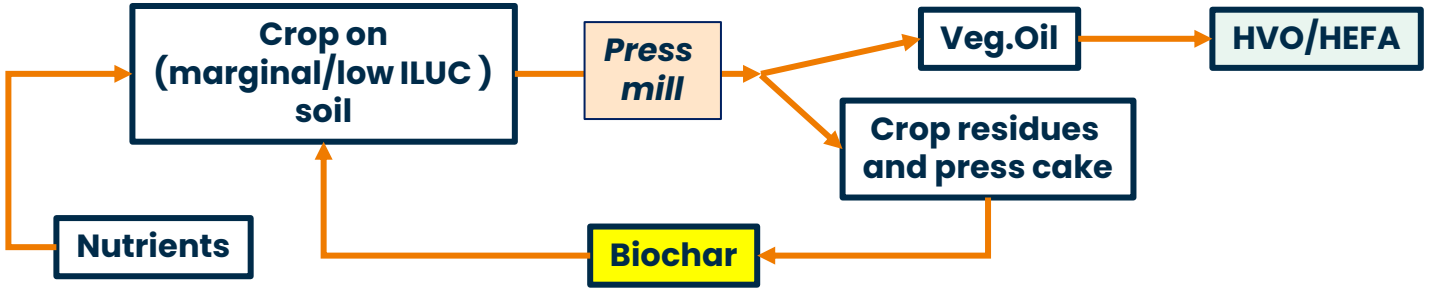




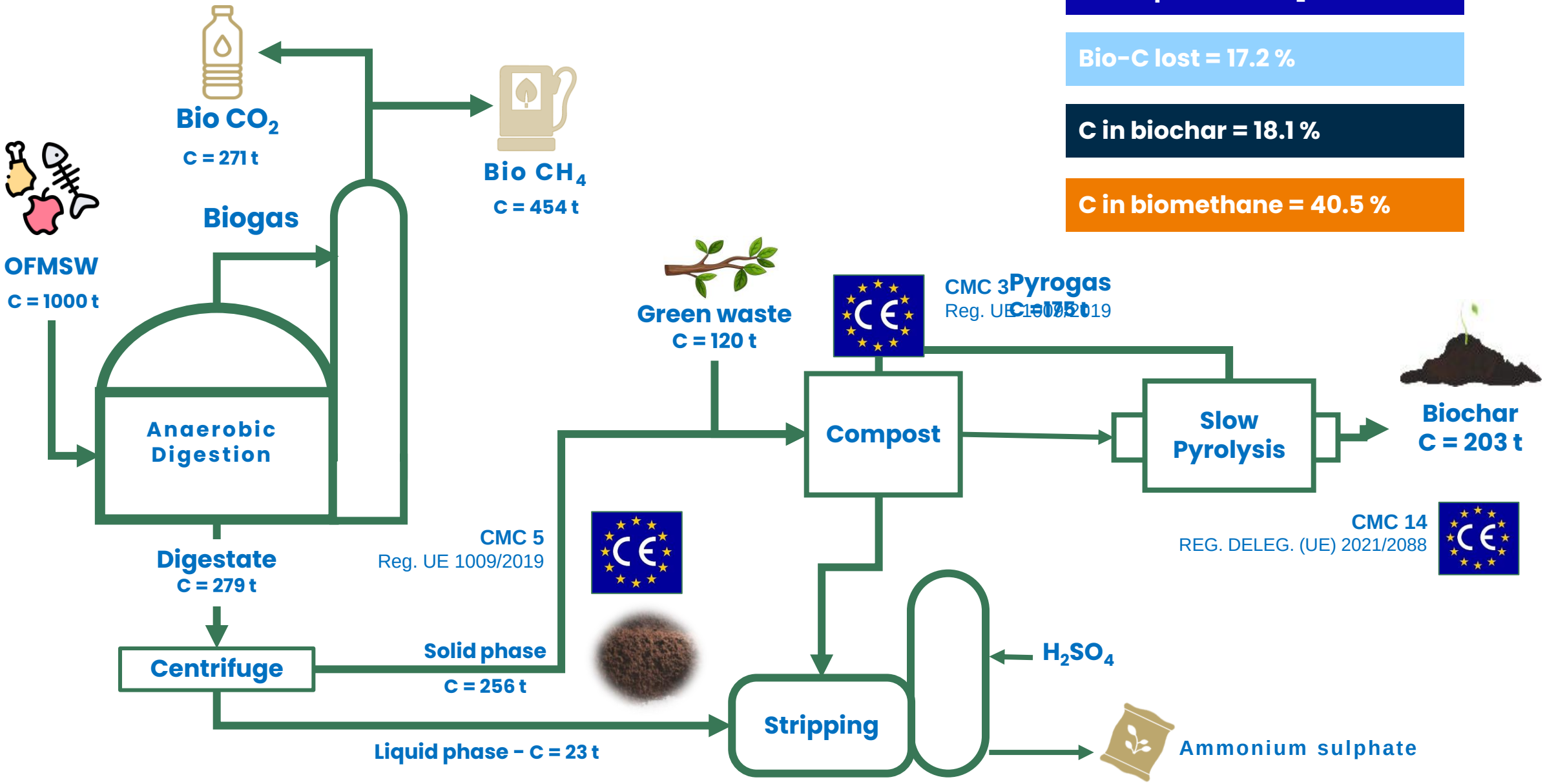
“Biofuels Done Right” can be Carbon Negative and support farming in EU

- **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)**





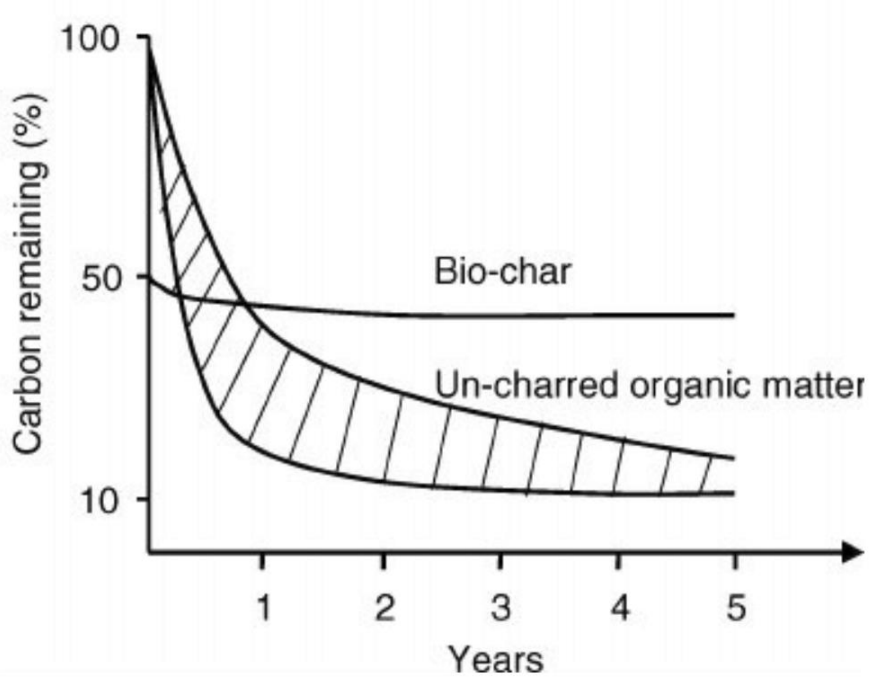
Integrated AD-pyrolysis plant

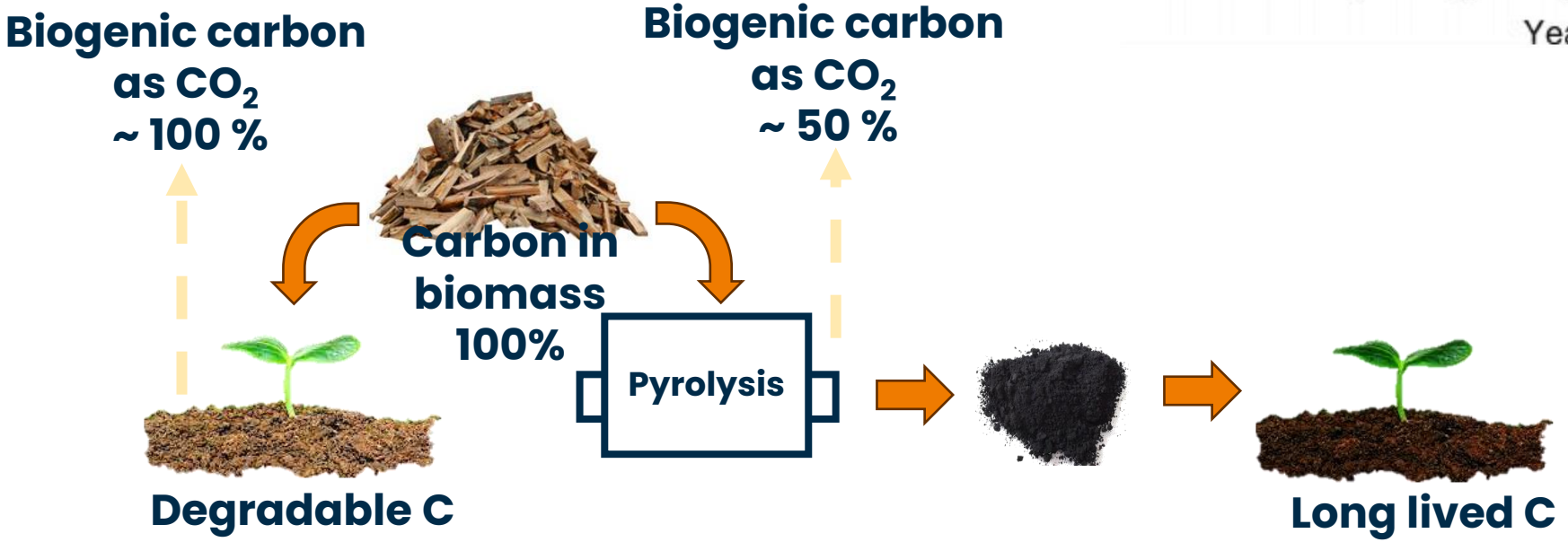


The Biochar carbon economy

1 ton of biochar

1.5 – 3.0 ton Bio-CO_2 removed from atmosphere





The case study of AER plant

Biowaste
40 000 t/y

Green waste
2 000 t/y

- **2 250 t/y Biomethane**
- **3 690 t/y CO_2**
- **1 680 t/y Biochar**
- **2 420 t/y Ammonium Sulphate**

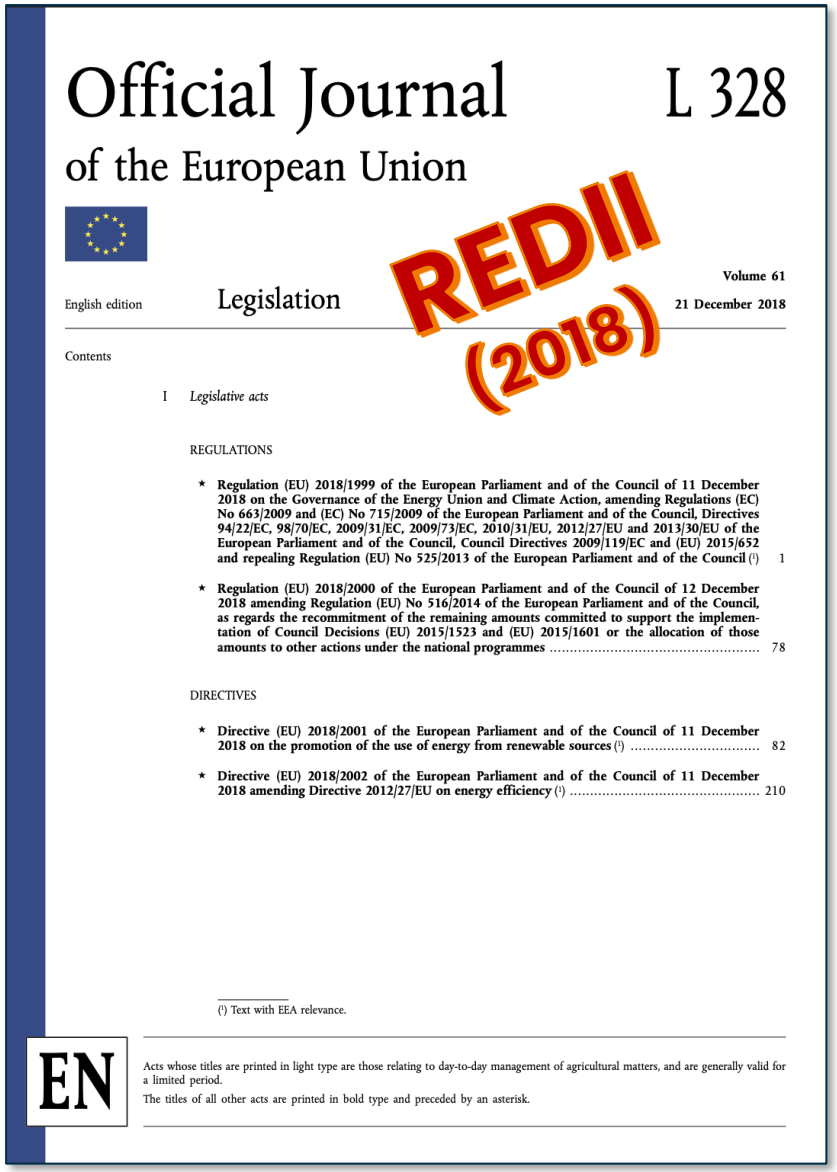
Verbale seduta 05.06.2024

La Conferenza dei servizi [...] approva il Progetto ai fini del rilascio della autorizzazione unica, ai sensi del decreto legislativo 387/2003 e della legge regionale 39/2005, comprensiva della autorizzazione integrata ambientale di cui al decreto legislative 152/2006

SCA (SOC) & Biofuels

REDII (2018)

Implementing Regulation (2022)



Official Journal of the European Union

L 328

English edition — Legislation — Volume 61 — 21 December 2018

Contents

(1) Text with EEA relevance.

EN

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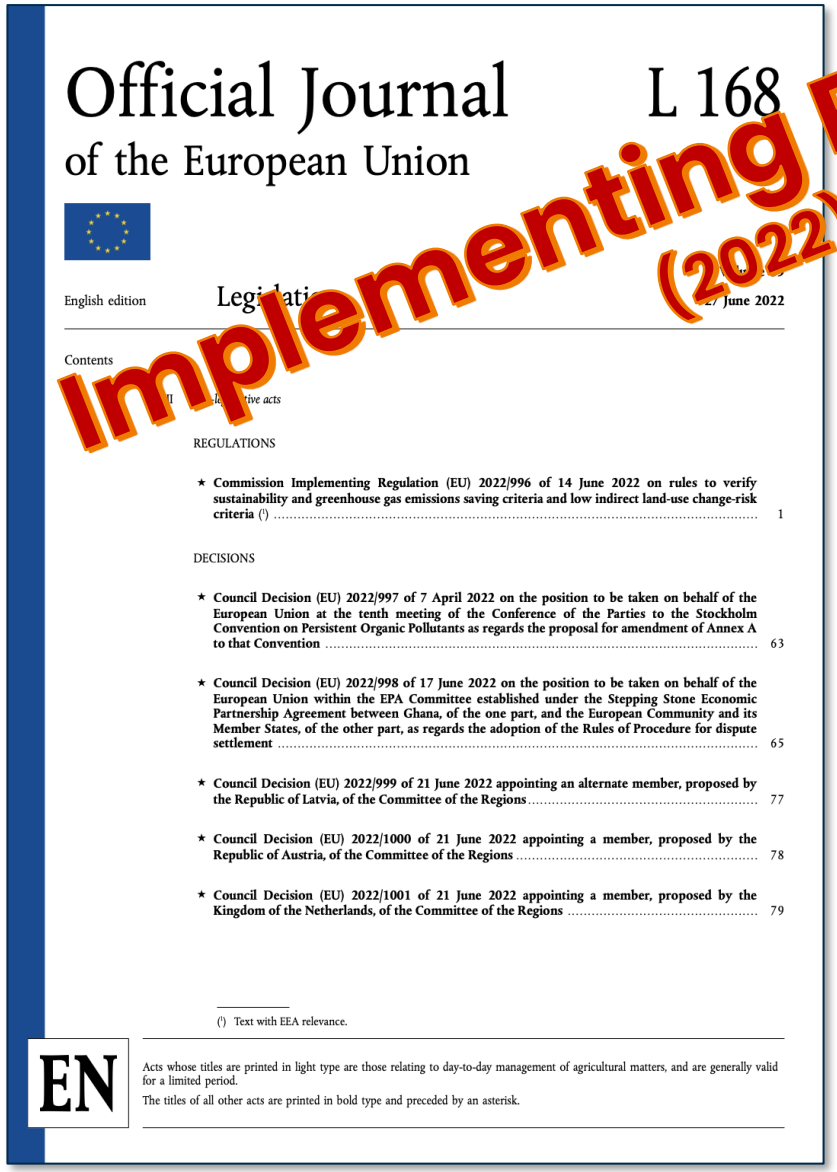

Official Journal of the European Union

L 168

English edition — Legislation — 27 June 2022

Contents

(1) Text with EEA relevance.

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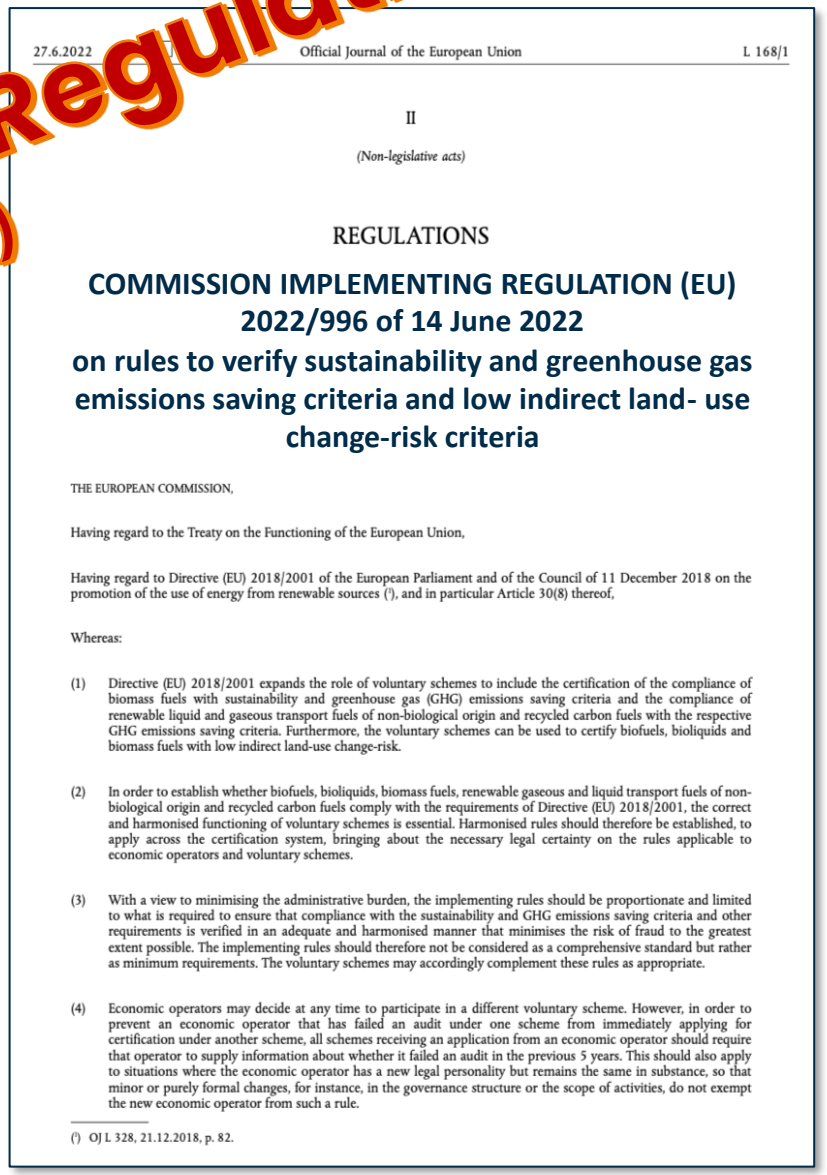

II

(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.

Biometano e Combustibili Sostenibili: REDII – IR

(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.

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

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

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

EU ETS

Council adopted 25/4/23

Which sectors are currently covered

The EU ETS covers approximately **10 000 companies**

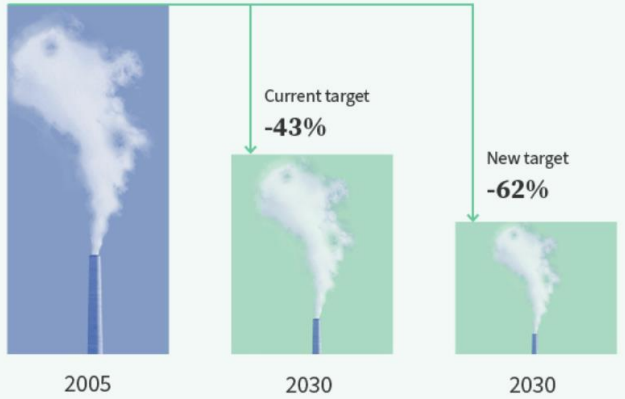
electricity and heat generation

energy-intensive industry sectors (e.g. oil refineries, steel industry, cement, glass and paper production)

commercial aviation (flights within the European Economic Area)

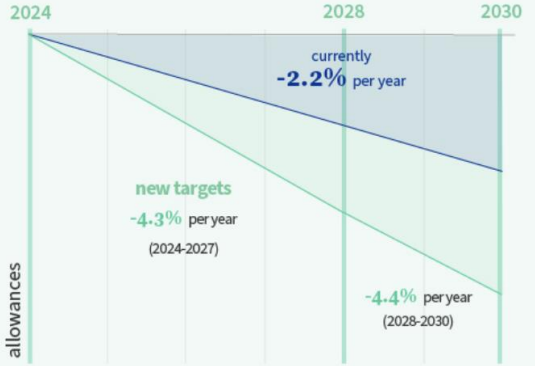
What will change with the reform?

more **ambitious** emissions reduction **goals**



faster reduction of the cap, fewer allowances on the market:

reduction of **117 million allowances** over two years



gradual **phasing out of free allowances** for certain sectors (in parallel with the introduction of the **carbon border adjustment mechanism** – a carbon pricing system applicable to energy-intensive products imported into the EU in order to avoid carbon leakage)

the ETS to cover **new sectors:**

→ extension to **maritime transport** (introduced gradually between 2024 and 2026)

→ a separate new ETS for **buildings, road transport and fuels** for additional sectors

Until EU ETA is revised, CDR in ETS is not possible

EU-ETS Carbon Market

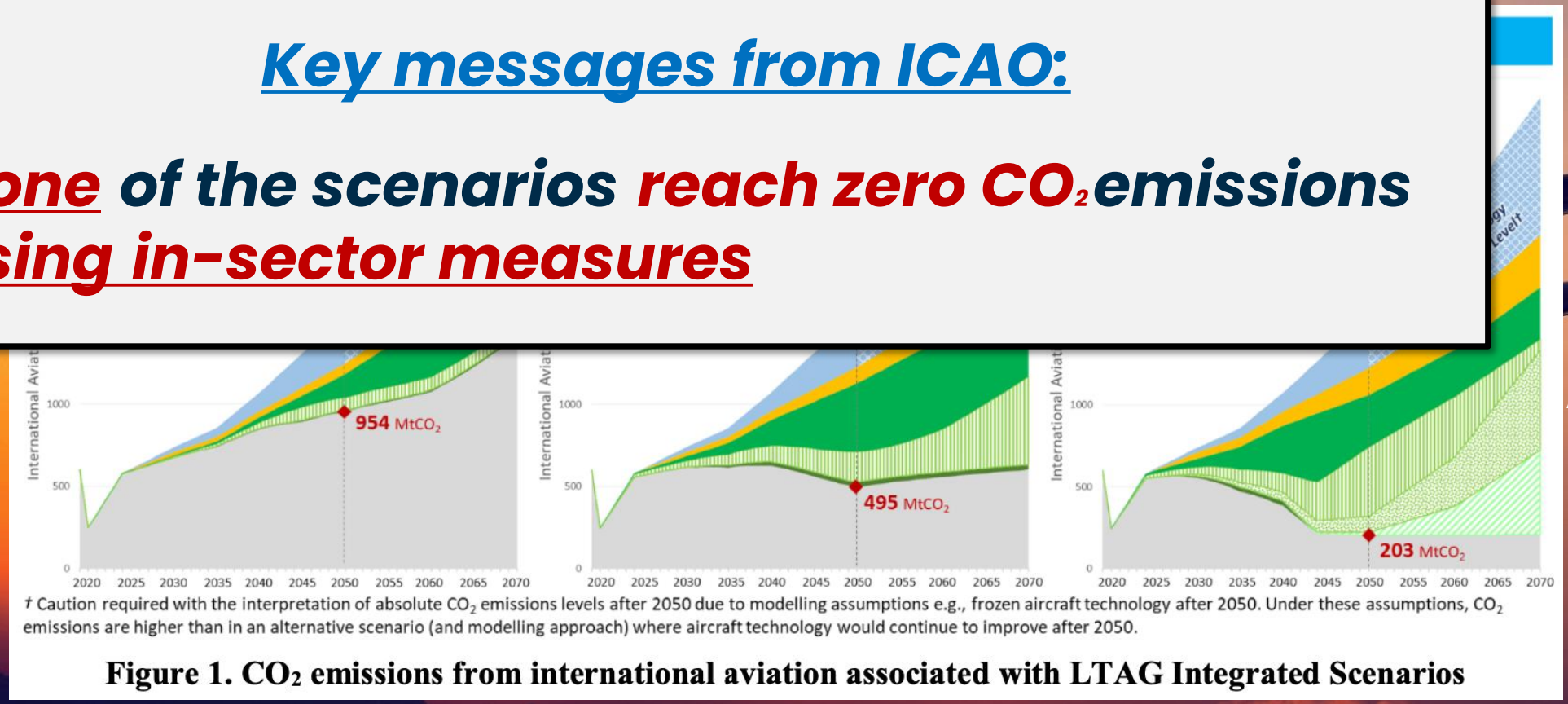
https://tradingeconomics.com/commodity/carbon

- ***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:

1. ***None*** ***of the scenarios reach zero CO_2 emissions***
2. ***using in-sector measures***



† 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 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*

Aircraft Technology

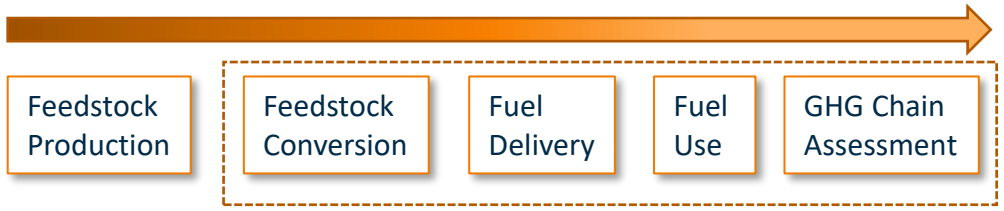
Operations

Biomass SAF
Gaseous Waste SAF

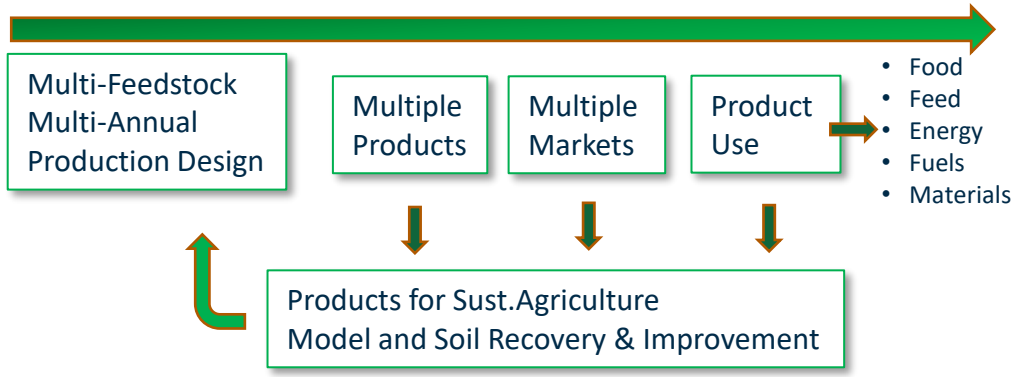
Atmospheric CO2 SAF

Hydrogen

Enabling more sustainable agriculture & Negative Carbon through Sustainable Biofuel chains



How to make this linear biofuel thinking sustainable (GHG) enough?



Which opportunities Bioenergy & Bioeconomy offer to sequester Carbon and make agriculture more sustainable (beyond GHGs, towards SDGs)?

From linear to circular, from energy-driven to C-negative sustainable agricultural models

Bioenergy / Bioeconomy enabling more Sustainable Agriculture AND Carbon removal


Thanks for your attention
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RE·CORD