Biofertilisers in Europe – current and future policy developments

Projektet "Nya affärsmodeller för att öka värdet av rötrester och recirkulera näringsämnen"

12/11/2025

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Representing the full European value chain

+350

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Biogases covered 7% of EU gas demand in 2023

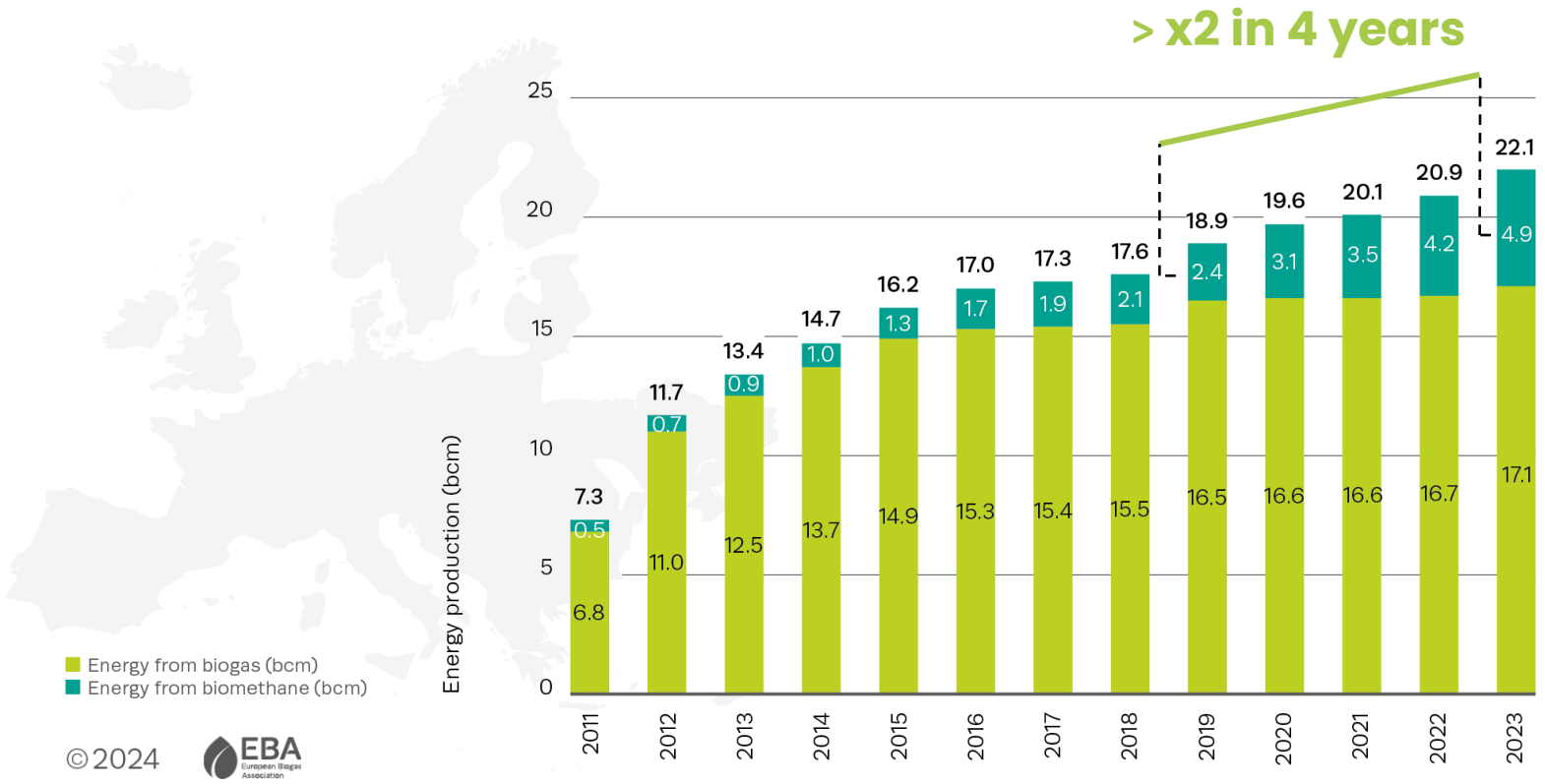
Combined biomethane and biogas production in Europe

22 bcm of combined biogas and biomethane production are produced today in Europe

= Gas consumption of Belgium, Denmark and Ireland combined

= 7% EU gas consumption in 2023

Combined biomethane and biogas production in Europe (bcm)



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Digestate: an alternative to synthetic fertilisers

31 Mt (DM)
digestate produced
Europe, **2022**

Digestate can already displace:

15%
Nitrogen-based fertilisers
(N demand in EU-27: 11.1 Mt/year)

11%
Phosphorus fertilisers
(P demand in EU-27: 2.8 Mt/year)

6%
Potassium fertilisers
(K demand in EU-27: 3.1 Mt/year)

GHG reduction potential when displacing synthetic N-fertilizers with digestate

10 Mt
of CO_2 equivalent
in 2022

Natural gas is the main feedstock and energy source to produce **synthetic fertilisers**

The replacement of 15% of **synthetic nitrogen fertilisers** with digestate could save today around **2 bcm of natural gas**

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Digestate is an enabler of carbon sequestration

9,3 Mt of Total Organic Carbon, **2022**

More **stable organic carbon**, particularly **recalcitrant to biodegradation**

- Potential for **carbon sequestration**
- Leads to **humus** and **structure formation** in the soil and increases its **fertility, functionality, microbial activity, aeration, and water storage capacity**

Carbon sequestration potential of digestate

	% of remaining TOC after 1,5 year
Solid fraction of digestate	86%
Digestate 1	73%
Digestate 2	56%
Cattle manure	58%
Maize straw	43%

Reuland, G.; Sleutel, S.; Li, H.; Dekker, H.; Sigurnjak, I.; Meers, E. Quantifying CO_2 Emissions and Carbon Sequestration from Digestate-Amended Soil Using Natural ^{13}C Abundance as a Tracer. Agronomy 2023, 13, 2501.

➔ The application of (solid fraction) digestate on soil is both a **sustainable soil management** and a **carbon farming practice**

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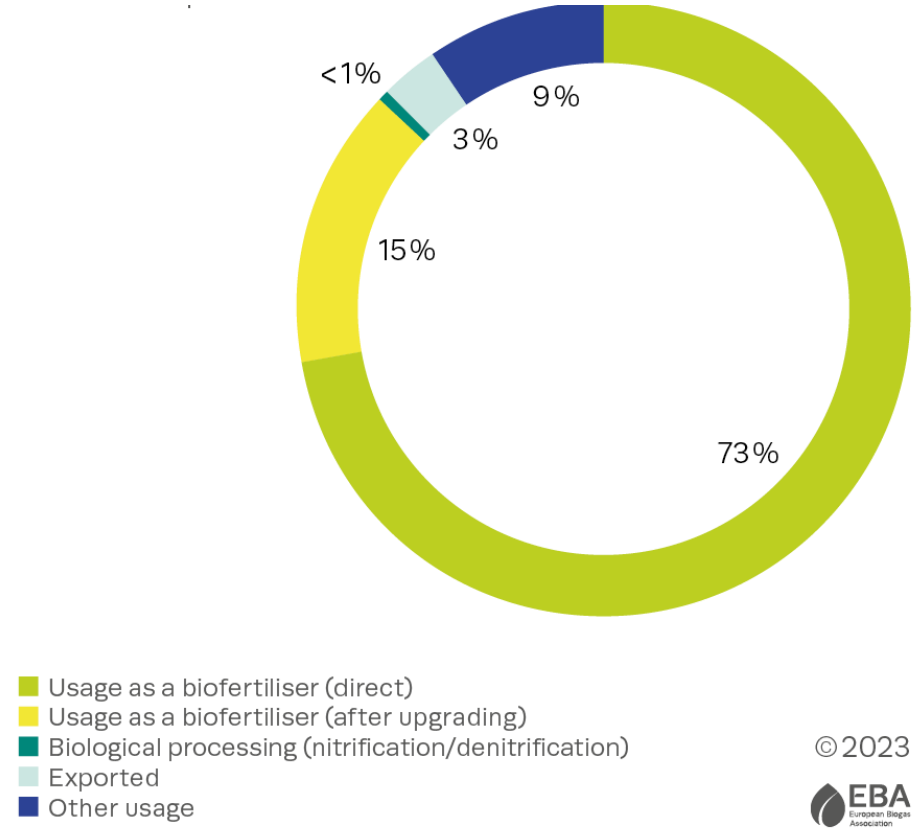
European digestate production

Most common end-use:
directly applied biofertiliser

Mostly non-separated digestate
Austria, Denmark, Germany, Poland, Slovakia, Sweden, and Ukraine

Mostly liquid digestate
Serbia, Croatia, Slovenia, UK, Switzerland and Belgium

Digestate end-uses in Europe



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Digestate valorisation routes

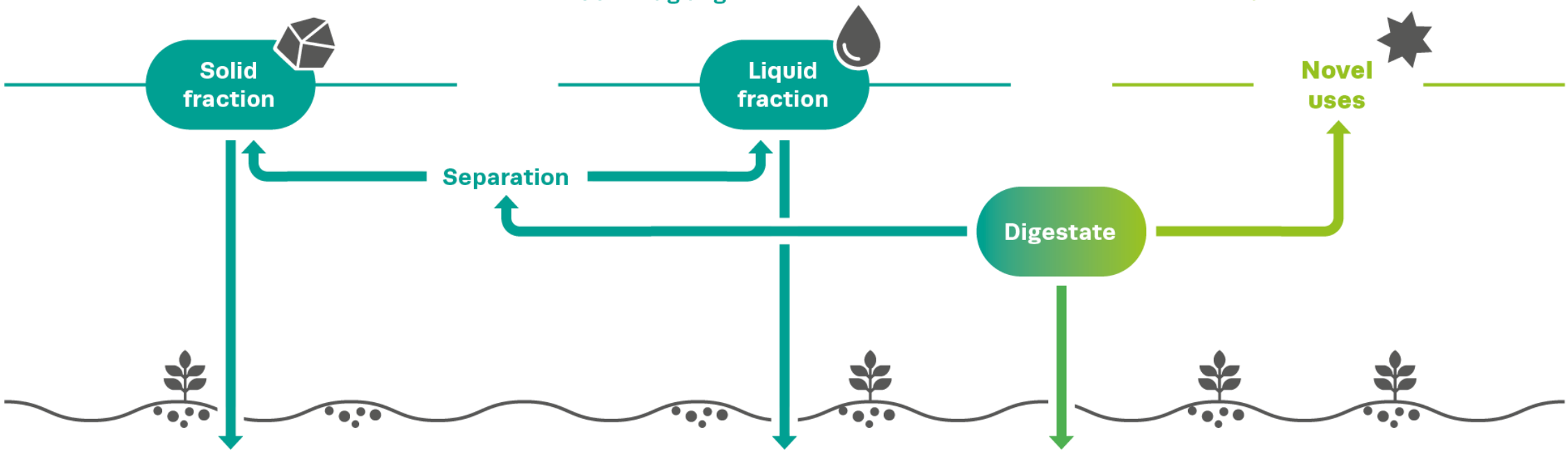
Nutrient recovery
char, hydrochar, biofuels

- Pyrolisis
- Gasification
- Hydrothermal carbonization

- Membrane filtration
- Reverse osmosis
- Evaporation
- Ammonia stripping and scrubbing
- Struvite precipitation
- Microalgae growth

Range of different
value added products

- Insects cultivation
- Pretreatment agent
- Substrate for microbial fuel cells
- Medium for hydroponics
- Production of volatile fatty acids (VFAs)
- Bio stimulants



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Digestate assessment

Two complementary pathways

Raw digestate

- Most common pathway (73% of applied directly)
- Local, circular, low-tech solution
- Provides combined fertiliser and soil improver benefits, aligned with EU goals (climate neutrality, strategic autonomy, soil regeneration)
- Perceived as waste by end-users → low or no market value
- In some countries, digestate management limits biogas development
- Particular challenges in Nitrate Vulnerable Zones (NVZs)
- Requires emission mitigation (N leaching, ammonia) via best agronomic practices

Post-processed digestate

- Currently limited deployment, but growing interest
- Enables cross-border trade, especially valuable in NVZs
- Processing is costly; viable business models still emerging
- Lack of planning → processing carried out by biogas producers, startups, bio-refineries, or conventional fertiliser companies?; reluctance in synthetic fertiliser industry to integrate recycled nutrients
- Organic/recycled fertilisers struggle to compete with synthetics; few incentives to replace them
- No recognition of benefits of organic soil improvers (soil health, water retention, carbon seq)

How to unlock the uptake of digestate?

1. A shift from a manure input limit to a nutrient surplus threshold in the Nitrates Directive

2. Practical and proportionate requirements for digestate-derived products in the EU Fertilising Products Regulation

3. A bio-based content requirement for fertilisers under the Ecodesign for Sustainable Products Regulation

EBA position paper 'Biogases systems as circular bioeconomy hubs'

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1. Nitrates Directive

!

Limit of 170 kg N/ha/y for manure-based digestate in NVZs, forcing farmers to supplement with synthetic fertilisers to meet crop needs

NITRATES DIRECTIVE EVALUATION ➔ REVISION?

RENURE

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Nitrates Directive evaluation

LONG-TERM: ongoing evaluation of the Directive (report expected end 2025)
➔ *towards a potential revision?*

➡ **Digestate** = lower risk of nitrate leaching than raw manure; equal to or lower risk of nitrate leaching than synthetic fertilisers with **best application practices**.

➡ Need to break away from the fixed input limit towards a more effective method to address nitrate leaching while enabling the substitution of synthetic fertilisers with digestate.

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RENURE (‘recovered nutrients from manure’)

EUROPEAN COMMISSION

Brussels, XXX
[…](2024) XXX draft

COMMISSION DIRECTIVE (EU) …/…

of XXX

amending Council Directive 91/676/EEC as regards the use of certain fertilising materials from livestock manure

EN EN

SHORT-TERM: European Commission’s proposal on RENURE, amending the Nitrates Directive, adopted in Nitrates Committee on 19/09 and currently under a 3-month scrutiny by the European Parliament and Council.

\+ **RENURE fertilisers** allowed above 170 kg N/ha/year

\−
- Only 3 product types: ammonium salts | mineral concentrate | struvite
- Consistent quality (enforced by MS strict quality standards): mineral N:TN ratio ≥ 90% *or* TOC:TN ratio ≤ 3
- Mandatory documentation: N and P_2O_5 content if >1% DM, max ±25% deviation
- +80 kg N cap
- Contaminants (Cu/Zn) & pathogen limits
- No livestock increase in N-excess areas
- Reinforced application & storage rules

EBA Feedback on RENURE

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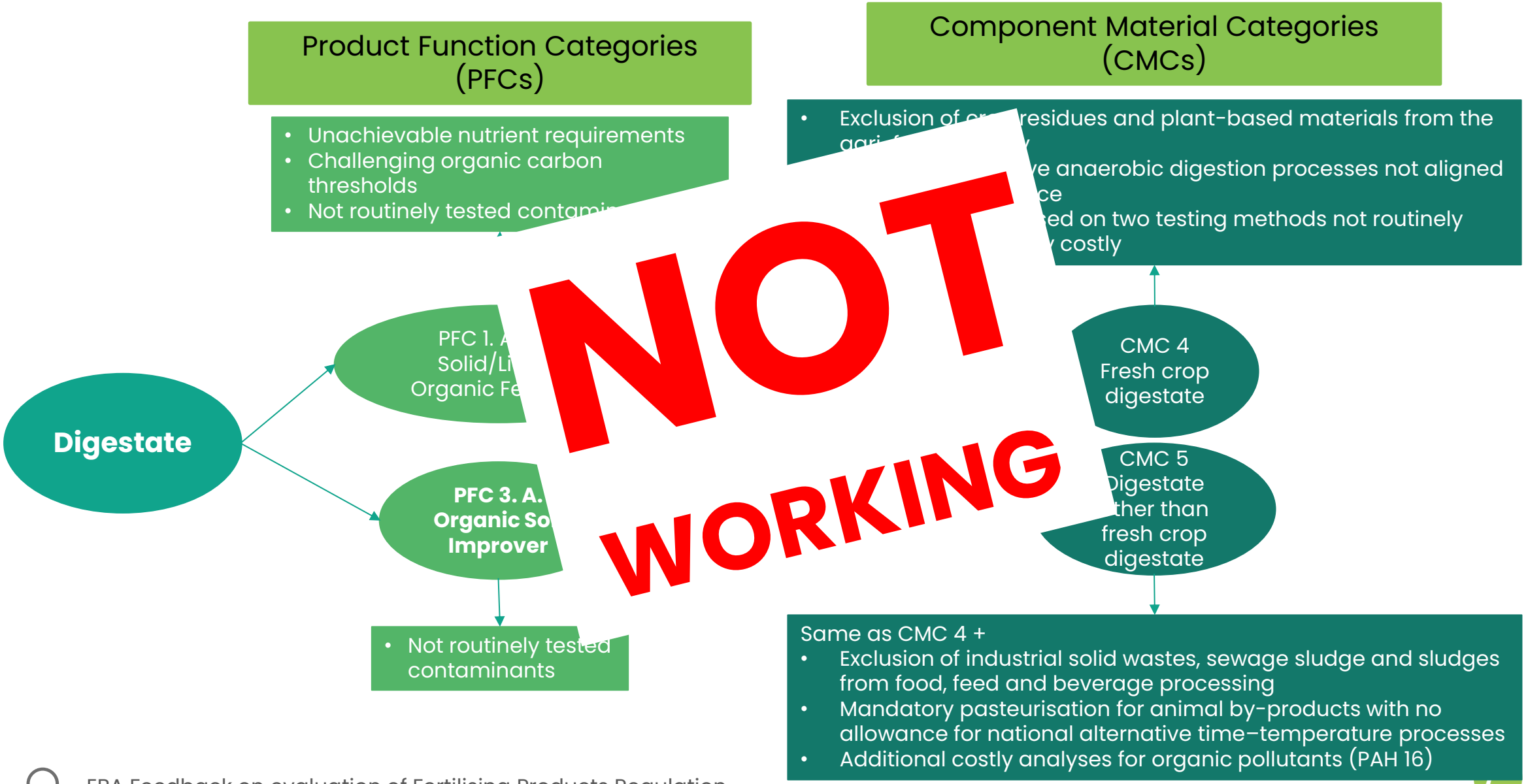
2. Fertilising Products Regulation



EBA Feedback on evaluation of Fertilising Products Regulation

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3. Ecodesign for Sustainable Products Regulation

Challenge

The largest fertiliser producers today are not transitioning to the production of organic-based fertilisers, including the incorporation of digestate into their products.

Regulatory incentive

Establishing a minimum percentage of fertilisers containing blended recycled nutrients or of bio-based fertilisers to be sold/used at the EU level.

Fertilisers must be included in DG GROW study on bio-based and other non-fossil content requirements for products

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