



## Cover Delivery Report

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<https://systemicproject.eu/>

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# Policy Brief: Boosting mineral recovery in the EU and transition into a circular economy



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# Policy Brief: Boosting mineral recovery in the EU and transition into a circular economy

SYSTEMIC<sup>1</sup> a H2020 Research and Innovation Project demonstrating anaerobic digestion with full scale technical nutrient recovery and recycling welcomes the latest European initiatives, such as the EU Green Deal [1], the Farm-to-Fork Strategy [2], the Biodiversity Strategy [3], the Zero Pollution Action Plan [4], the New Circular Economy Action Plan [5], the soil and water related missions [6] [7], and the RENURE ("*REcovered Nitrogen from manURE*") criteria [8] for highly nutrient use efficient manure-derived fertilisers.

Strategies and criteria extend the scope of already adopted directives and regulations, first and foremost the new Fertilising Products Regulation (EU) 2019/1009 [9] (FPR), becoming effective on 16th July 2022. With all CMCs currently underway enacted (CMC 12, 13, 14 and 15), it will pave the way to pan-European use of digestate derived, tailor made and FPR compliant fertilisers as produced by SYSTEMIC project partners. The FPR covers most SYSTEMIC products of higher value, particularly ammonium sulphates and separated (dried) solid fractions, regardless of being made available on the market as fertilisers, soil improvers or growing media.

The new strategies and missions have the potential to boost the transition of European agriculture from a source of greenhouse gases and pollutants to a carbon sink and a long-term provider of safe nutrition and growing rural employment. However, strategies alone will not provide enough impetus to create the systems change required to meet the climate targets and sustainable development goals and to make the EU the leading circular sustainable economy in the world. Strategies need to be cast in law, preferably at the EU level:

- 1) The Farm-to-Fork Strategy aims – among others - at limiting nutrient losses by 50% by 2030, a bold target currently lacking regulatory support, even if the INMAP (Integrated Nutrient Management Action Plan, draft expected in 2022) and the - regrettably voluntary - FaST (Farm Sustainability Tool) [10] could become useful instruments to achieve the goal.
  - The new CAP [11] budget for Eco-Schemes - 25% of Pillar 1 payments in support of the INMAP and the FaST or similar tools may become key enablers of the Farm-to-Fork Strategy and must be adopted in all Member States. The European Commission and MEPs should closely monitor the Member States' proposals for compliance with the strategic goals.
  - Limitation of nutrient losses needs to be enforced and controlled by limiting the spreading allowance of manure- and waste-borne nutrients to quantities and qualities that crops can uptake, i.e., all fertilisers use in compliance with the 4R Nutrient Stewardship principles [12]. Policies must make sure that nutrient supply is in synchrony with plant nutrient uptake, that no single nutrient is in oversupply and therefore prone to losses and that nutrients are not spread where crops have no access.
  - Anaerobic digestion is a win-win system of supplying renewable energy and limiting nutrient losses [13] simultaneously. Widespread deployment needs an

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<sup>1</sup> SYSTEMIC – Circular Solutions for Biowaste, <https://systemicproject.eu/>

EU-wide level playing field regarding policy support like feed-in quotas, tariffs, eco-schemes and – possibly - CO<sub>2</sub>-based rewards.

- 2) The New Circular Economy Action Plan may perfectly complement the Farm-to-Fork Strategy if enforced by European legislation. Nutrient stewardship requires organic waste treatment, i.e., anaerobic digestion, nutrient separation, and concentration for compliance with circular principles. Yet, treatment and production of tailor made fertilisers is more expensive than spreading manure or composting organic waste.
  - The benefits of recycling nutrients to biobased, tailor-made fertilisers as defined by the RENURE criteria, particularly if products can frequently replace synthetic fertilisers and avoid corresponding greenhouse gas impacts (e.g., 3-4 kg CO<sub>2</sub>-eq/kg N) need to be monetarised in the form of rewards to be considered in the CAP or zero-emission policies. For instance by
    - A monetary incentive for the producer of bio-based fertilising products granted within the EU Emissions Trading System, equivalent to the ETS carbon market price (€~75/t CO<sub>2</sub>eq as of 25<sup>th</sup> November 2021)<sup>2</sup>. Alternatively, a politically fixed, over time incremental CO<sub>2</sub>eq-based Euro premium corresponding to the value of CO<sub>2</sub> emissions savings per ton of N in synthetic nitrogen fertiliser production for bio-based N fertilisers in compliance with RENURE criteria
    - A monetary incentive for the user (farmer) of bio-based fertilisers, granted within the EU Emissions Trading System for the replacement of untreated animal by-products by RENURE compliant products equivalent to 50% of the EU ETS carbon market price of CO<sub>2</sub>eq emissions per ton of N replaced
    - A monetary incentive by exempting synthetic N fertiliser producers from buying ETS allowances for each ton of bio-based N blended to its nitrogen-containing products
    - On top of recovered nutrient based incentives, owners and operators of biogas plants should be compensated for avoided greenhouse gas emissions (~2 kg CO<sub>2</sub>eq/m<sup>3</sup> biomethane)<sup>3</sup> by producing biomethane replacing natural gas or fuels, representing a monetary value of € 0.15/m<sup>3</sup> of biomethane.
  - The proposed approach in combination with a tax exemption for biomethane/bio-LNG/bio-CNG could replace current, controversial feed-in tariffs/premiums by a market (ETS) based, EU-wide applicable support scheme.
  - Decentralised recovery and recycling as demonstrated in SYSTEMIC is more labour and less materials intensive. In the EU, most taxes and social fees are wage-based while materials are largely exempt from tax. Tax policies must gradually be reversed in support of a Circular Economy.
- 3) The Zero Pollution Strategy requires reducing the input of contaminants, a requirement perfectly matched by technologies demonstrated in SYSTEMIC. Anaerobic digestion as such reduces certain organic pollutants, particularly if thermophilic operations or peripheral hygienisation systems are applied. Peripheral treatment of effluents enables easy and cost-effective elimination of many organic contaminants and, if required, an effective separation of inorganic pollutants. In addition, reuse of manure and organic waste as starting material for bio-based

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<sup>2</sup> <https://ember-climate.org/data/carbon-price-viewer/>

<sup>3</sup> IPCC guidelines 2006 (Fuel carbon factor) 56.1 kg CO<sub>2</sub>eq/GJ and GCV 35.17 MJ/m<sup>3</sup> = 2.00 kg CO<sub>2</sub>eq/kg

fertilisers avoids import of additional pollutants associated with certain phosphate rock deposits.

- The Zero Pollution Strategy should be transferred to a corresponding regulatory framework for effectively controlling and penalising pollution.

Proposed measures – incentives and limitations – are fully compliant with current EU climate, environmental and agricultural policies and would provide market based support schemes to make a circular nutrient economy in agriculture economically viable.

## Conclusion

The various new strategies presented by the European Commission in 2019/2020 provide an adequate backbone to the systems change needed towards achieving a sustainable agriculture providing healthy, affordable food for all, an economic basis for the rural population and a natural environment where city dwellers can relax.

Anaerobic digestion in combination with the production of bio-based, balanced, and controlled release fertilisers as demonstrated in SYSTEMIC provide a win-win scenario perfectly in compliance with the European strategies for zero emissions and a sustainable food production.

Yet, European legislation enforcing compliance with the goals and missions stipulated in the EU Green Deal and associated strategies is urgently needed.

- In pursuit of a level playing field, European legislation should prevail over national legislation and the European Commission is asked to propose binding targets and legislative acts to enforce stakeholders' farming practices in compliance with EU Green Deal Strategies.
- If European legislation is not viable, strong guidance of national policies is required to ensure a harmonised legal framework within the European Union. That includes an ambitious INMAP, use of the FaST or similar digital tools, and an effective support system for anaerobic digestion and production of bio-based, tailor-made fertilisers to be implemented in all Member States. A legal framework combining sticks (nutrient use limitations) and carrots (financial eco-scheme support) looks most promising.
- Beyond EU Green Deal and Farm-to-Fork Strategies, a system change is required making virgin raw materials and climate-damaging emissions more expensive and reducing the cost of wage-based labour. This may be achieved by shifting a relevant part of taxes and social expenses from labour to materials, a challenging but promising policy transition that needs further research and modelling.

**In essence and as an ambitious first step, the policies and goals of the EU Green Deal and related strategies should be legally enforced in all Member States.**

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Systemic large-scale eco-innovation to advance circular economy and mineral recovery from organic waste in Europe

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