

# The European Sustainable Phosphorus Platform and the Urban Circular Bioeconomy Policy



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# European Sustainable Phosphorus Platform ESPP

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European Sustainable  
Phosphorus Platform

Innovation	Health and safety
<b>BIG P Conference, Old Trafford, Manchester</b> Challenges of tightening phosphorus discharge limits for big and small sewage works: technologies, economic costs, environmental costs, biosolids.	<b>Ecotoxicity of fertilisers &amp; potassium monophosphate</b> Potassium, nitrogen and phosphate fertilisers and relevant mineral salts were tested for ecotoxicity on aquatic snails and fish.
<b>SYMPHOS: Phosphorus industry &amp; phosphorus use innovation</b> Summary of the 4th International Symposium on Innovation and Technology in the Phosphate Industry.	<b>New book on phosphorus food science</b> 17 chapters current knowledge on P metabolism, P in food, P and health and nutrient interactions.
<b>US Phosphorus RCN</b> US P-RCN (Research Coordination Network) final meeting shows many publications and some outstanding questions.	<b>Ecotoxicity of recycled phosphate products</b> Contaminants analysed and ecotoxicity tested for 3 struvites, 5 thermal recovered phosphates, and leachates, suggesting low risk to the environment from use in agriculture.
<b>North America Phosphorus Forum</b> The Sustainable Phosphorus Alliance (North America) second stakeholder Forum, Washington DC, looked at phosphorus management today and tomorrow.	<b>Circular economy and recycling</b> France conference on phosphorus recycling in agriculture
<b>Newtrient's manure management technology catalogue</b> US dairy company Newtrient launches online selection tool for manure nutrient recycling technologies and suppliers.	<b>Resource efficiency in practice: improving farm nutrient management</b> EU funded, 8 regions project to identify optimal nutrient
<b>Recycled fertilisers</b> UK assessment of targeted phosphorus	



Participate  
Collaborate  
Innovate

European Sustainable Phosphorus Platform  
Sustainable management of Phosphorus is crucial for agriculture, food, industry, water and the environment. ESPP brings together companies and stakeholders to address the Phosphorus Challenge and its opportunities.

Struvite sales success in UK

SUBSCRIBE to eNews  
Newsletter

IN THE SPOTLIGHT

Everglades Foundation George Barley Water Prize - Stage 2 US\$ 80 000 prize

Now open for submissions - deadline to request materials = 15<sup>th</sup> July 2017

Stage 2 of the Everglades Foundation George Barley Water Prize is **currently open for applications** for teams capable of testing their solution for two consecutive weeks processing c. 24 litres/hour (see exact specifications in application materials). Applicants will submit daily inflow and outflow samples from their technology. A total of \$80,000 will be awarded in November of this year to the top 3 teams in Stage 2. You can apply to stage 2 whether or not you applied to stage 1. **The deadline to request Stage 2 application materials is 15<sup>th</sup> July 2017 and the deadline to submit applications is 31 August 2017.** Beyond Stage 2, the Pilot Stage, the third stage of the George Barley Water Prize, will qualify 10 teams to compete at a Pilot location in Canada in early 2018, with awards totalling \$800,000. Finally, the Grand Prize will see the top 4 teams compete in Florida for the ultimate \$10 million award. Information [www.barleyprize.com](http://www.barleyprize.com)

TWITTER

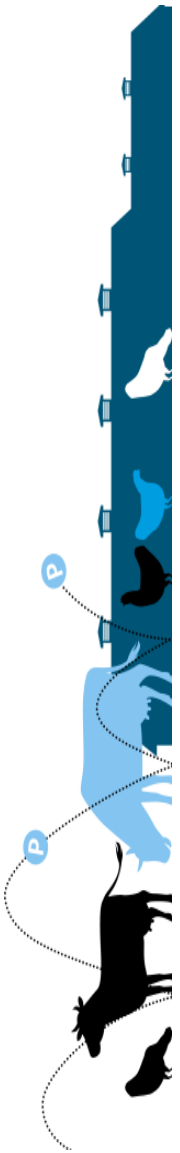
@phosphorusfacts

7 Nov. Nutrient sustainability for food industry, led by ESPP at Sustainable Food and Beverage Conference, Coventry UK @wbcsl @eaAgriFood

RT @vroumeas: #Wine is leading in the food industry to reduce their environmental impacts with immediate quality gains #AECL7 #circularcon...

NEWS

ESPP eNews no. 12 - June 2017  
June 15, 2017  
Newsletter about nutrient stewardship - European Sustainable





# ESPP facts and figures

**Legally established, not-for-profit association**

**→ *important for transparency, clarity of decision making, representation***

- statutes are public <https://www.phosphorusplatform.eu/platform/about-espp>

- EU Transparency Register no. 260483415852-40

<http://ec.europa.eu/transparencyregister/>

**100% membership funded**

**→ *key to credibility, independence***

**48 paying members to date: industries, SMEs, R&D institutes or projects, city- / regional- / national governments**

**→ *balance between different interests and industries***

**→ *in touch with reality (payment = commitment)***



# How ESPP operates

*Decision by consensus*

*Mediation rather than advocacy*

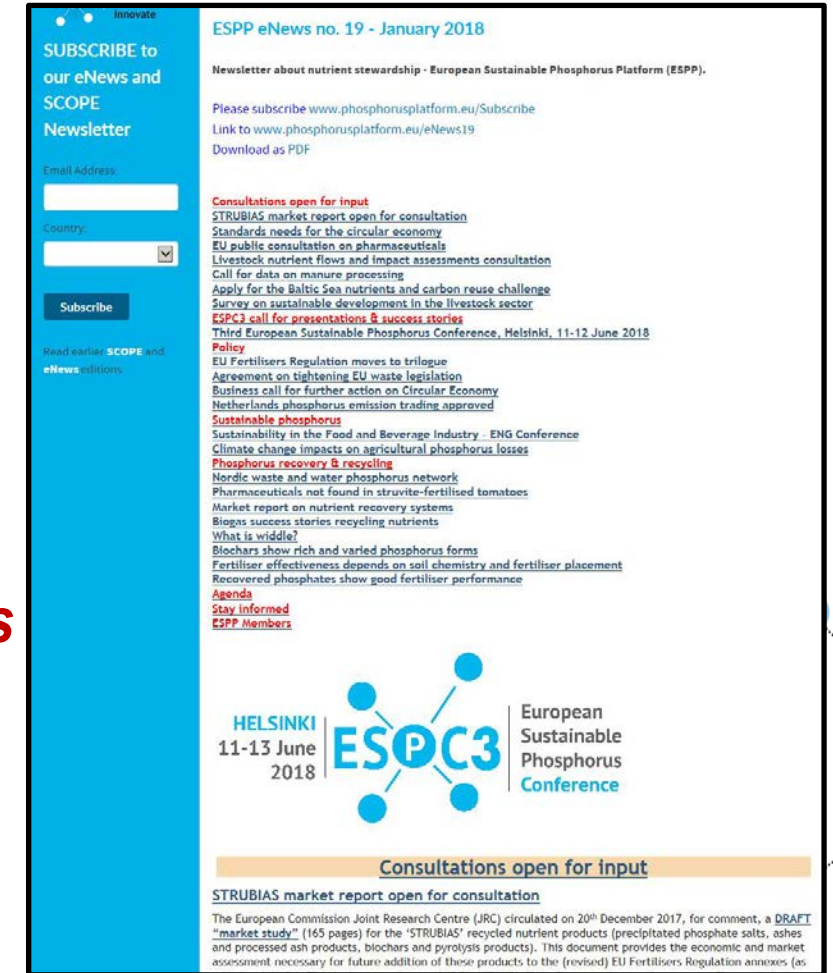
- enable dialogue between stakeholders
- develop shared proposals for policy
- communicate with regulators

*ESPP communication tools → available for other networks*

- **ESPP website** [www.phosphorusplatform.eu](http://www.phosphorusplatform.eu)
- **SCOPE Newsletter**
  - science and innovation
- **Twitter**  [@phosphorusfacts](https://twitter.com/phosphorusfacts)
- **eNews – monthly, policy, practice**
  - 60 000 email listing worldwide
- - events, Members Pages, news, R&D projects, success stories, regulatory issues



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# ***Why Circular Economy Policies are needed***



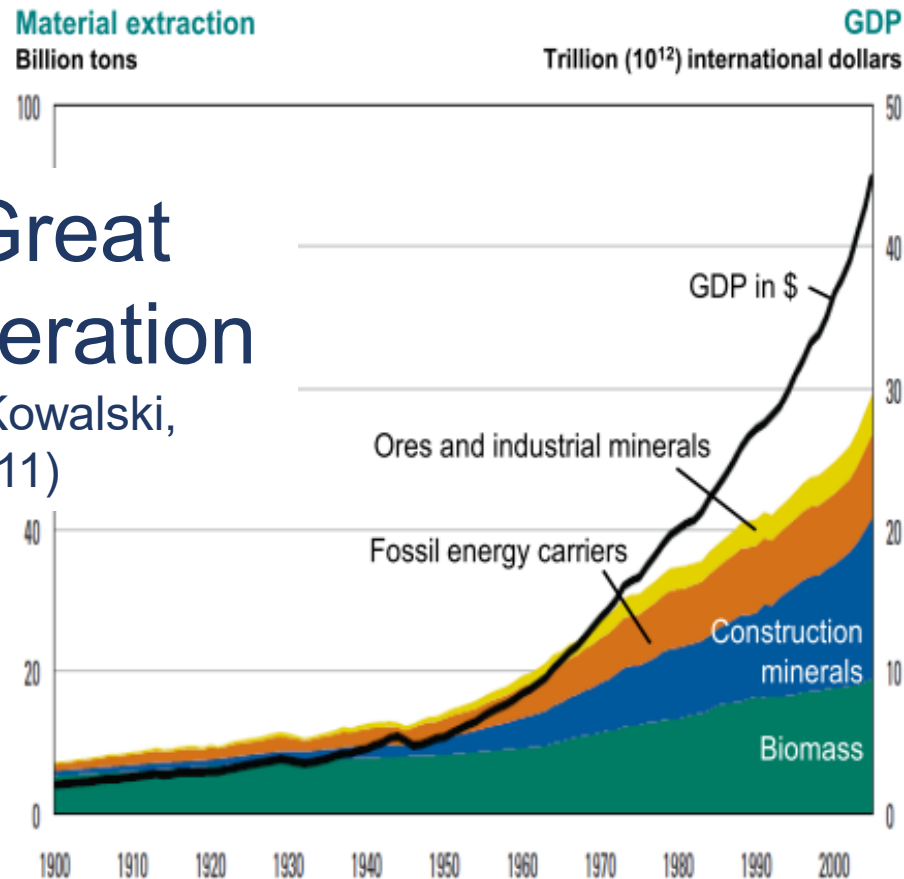
# We extract more resources than Earth can supply

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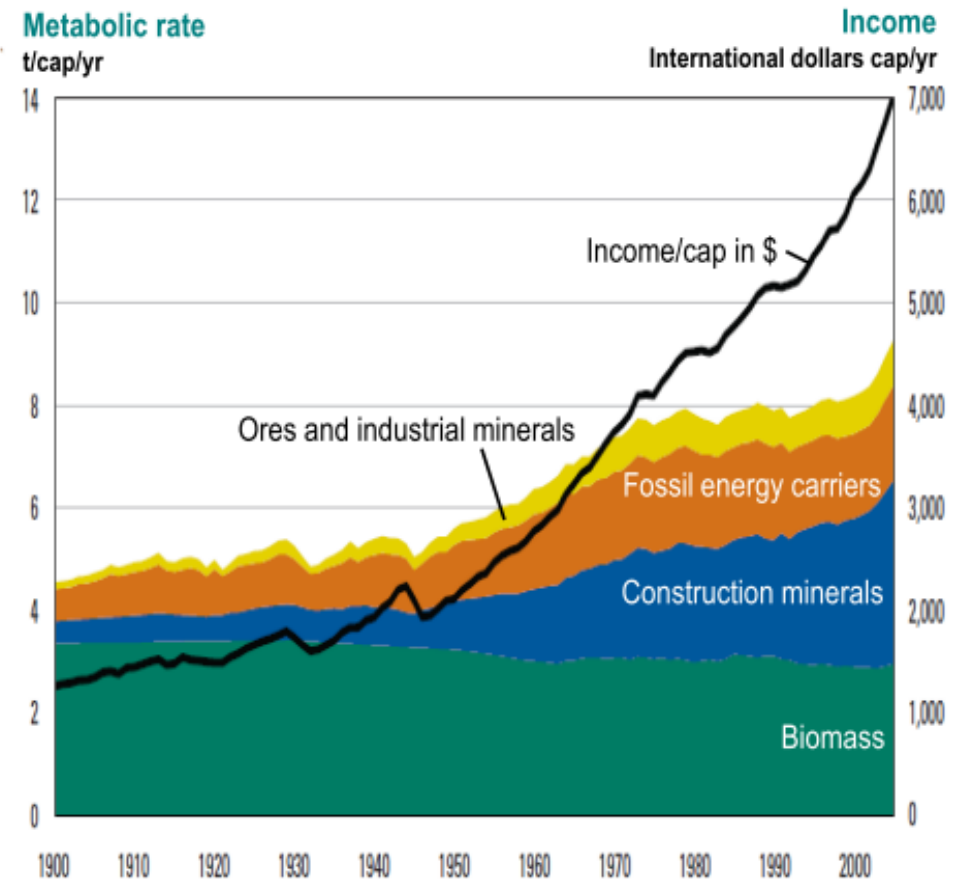
## The Great Acceleration

(Fischer-Kowalski, UNEP, 2011)

Global material extraction  
1900-2005

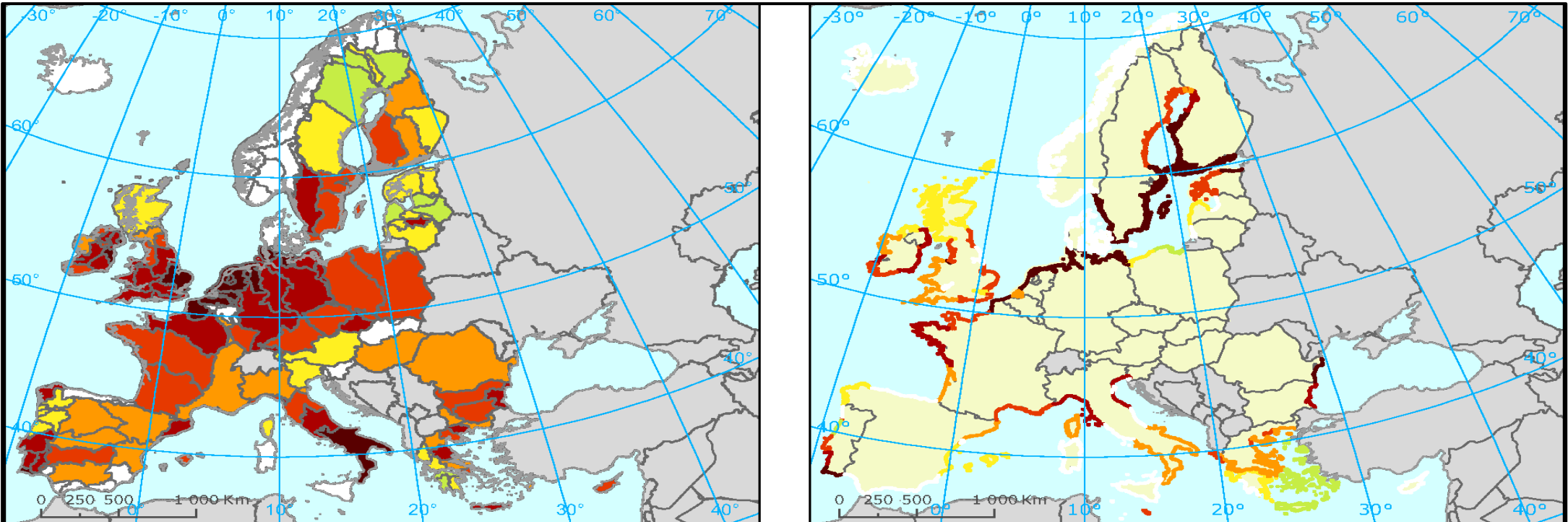


Global metabolic rates  
1900-2005

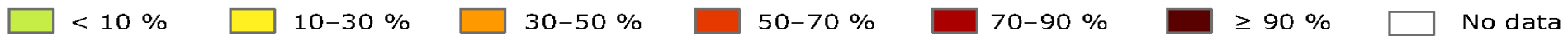


# We deteriorate water quality and aquatic life

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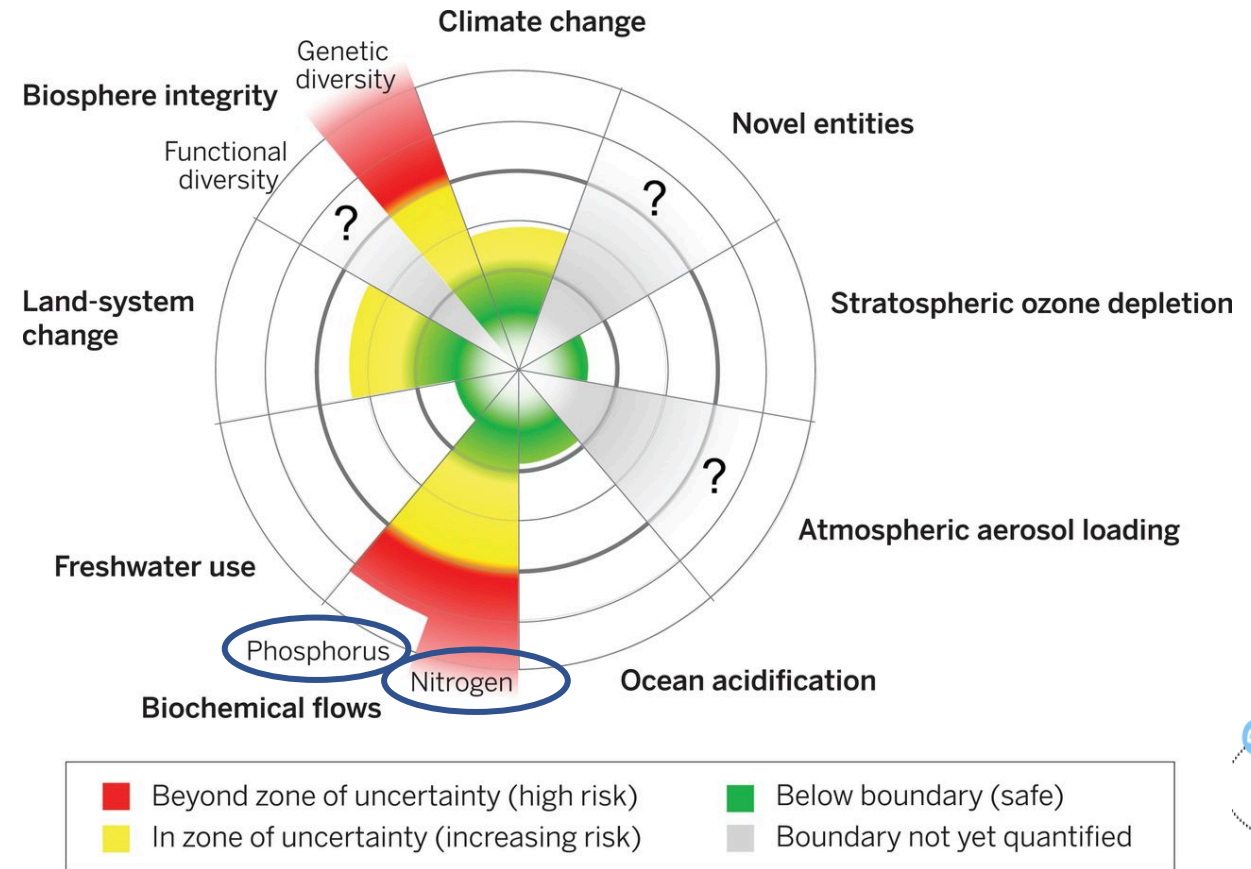
**Percent of classified water bodies affected by point and/or diffuse pressures**



# We consume & pollute more than biosphere can tolerate

## Planetary Boundaries (Steffen et al., 2015)

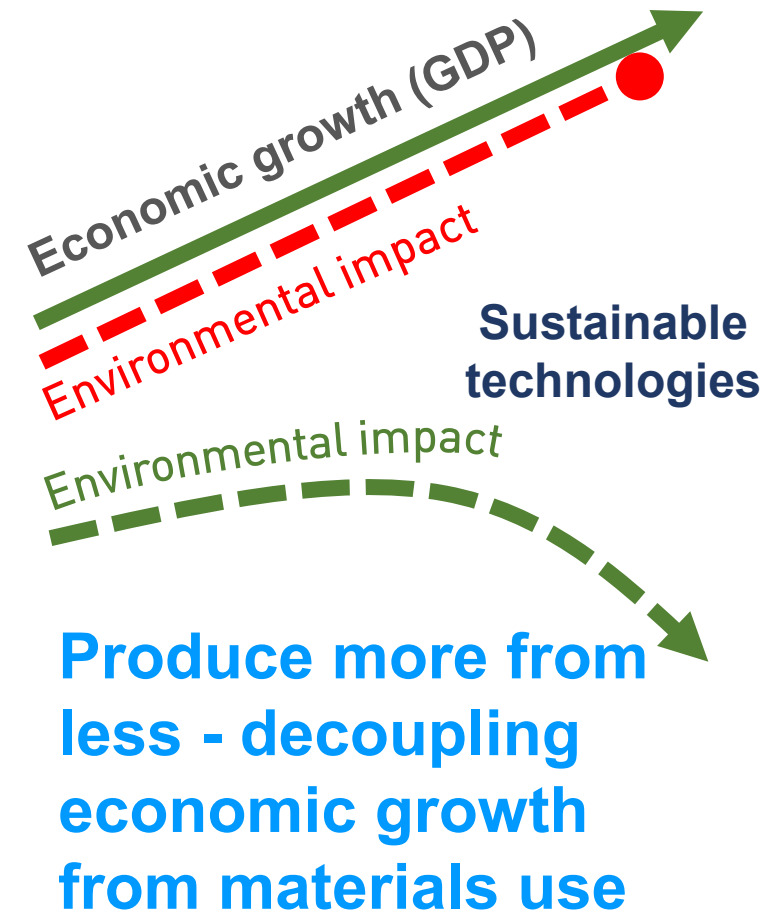
- Transgressing one or more planetary boundaries may be catastrophic
- Abrupt global environmental change can no longer be excluded.
- **Wasteful operations reduce profits**



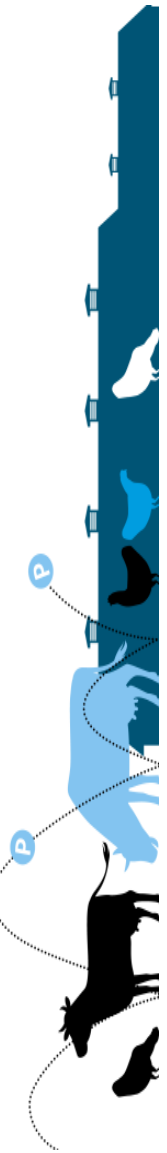


# Solutions

- Policies (prices) to account for externalities associated with environmental and climate impacts (greenhouse gas emissions)
- Policies to avoid waste and close material loops
- Agricultural and urban practices to avoid nutrient losses
- Nutrient recovery and recycling (NRR)
- **Transition from a material-based to a service-based economy**



# *Circular EU policies*



# EU policies in regard to a Circular Economy



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## 2014 EU Consultative Communication on Sustainable Use of Phosphorus

Proposals include: Increasing knowledge and research,  
P-recycling, risk of soil contamination  
by mineral or recycled fertilisers

[www.phosphorusplatform.eu/scope107](http://www.phosphorusplatform.eu/scope107)

## 2015: EU Circular Economy Package

## 2020: EU Circular Economy Action Plan

11/3/2020 <https://ec.europa.eu/environment/circular-economy/>

## 2019: EU Fertilising Products Regulation 2019/1009

<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ:L:2019:170:TOC>

ESPP: Joint Statement on the EU Fertilisers Regulation proposal, between EU federations in the mineral fertilisers, organic fertilisers, soil improvers, digestate, animal by-products, limiting materials and wastewater industries, 20th November 2017 [www.phosphorusplatform.eu/regulatory](http://www.phosphorusplatform.eu/regulatory)



## 12

- # DIN

**Underway 2021, STRUBIAS and industrial by-products, inclusion of:**  
precipitated phosphate salts (inc. struvites), ash-based materials, biochars,  
**ammonia salts, etc.** <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ:L:2019:170:TOC>



# EU wastewater policy trends

## *Increasing environmental pressure*

- *European Commission (JRC) study says nutrient thresholds are often too high <sup>1</sup>*
- *Climate change will accentuate nutrient runoff and eutrophication <sup>2</sup>*

## *Water Framework Directive evaluation 2019*

- *Effective and fit for purpose. Benefits exceed costs.*
- *Improve implementation.*
- *Improve funding.*
- *Action needed on chemicals, inc. updating list of Priority Substances.*

### **Water Framework Directive report** 26/2/2019

[https://ec.europa.eu/info/sites/info/files/com\\_report\\_wfd\\_fd\\_2019\\_en\\_1.pdf](https://ec.europa.eu/info/sites/info/files/com_report_wfd_fd_2019_en_1.pdf)

- 38% of surface waters in good chemical status
- 40% in good ecological status/potential
- “only a limited number have improved” since 2009-2015

(1) “Estimating river nutrient concentrations consistent with good ecological condition: More stringent nutrient thresholds needed Ecological Indicators”, S. Poikane et al., 2021 <https://doi.org/10.1016/j.ecolind.2020.107017>

(2) See ESPP [SCOPE Newsletter n° 137](#)

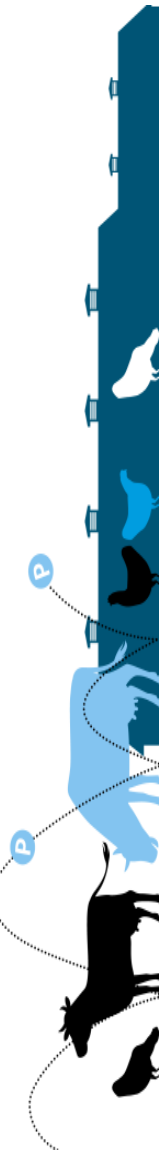
# EU wastewater policy trends

## **Urban Waste Water Treatment Directive evaluation 2019**

- *Effective and fit for purpose.*
- *Ensure compliance.*
- *Action needed on: **small agglomerations, individual systems, stormwaters.***
- *Pharmaceuticals, microplastics.*
- *Energy use and resource recycling.*

## **Sewage Sludge Directive**

- Evaluation currently underway.
- *Objective remains to promote safe reuse.*
- ***Proposal to address nutrient and resource recycling.** Possible proposals on phosphorus recycling.*



# EU Green Deal <sup>1</sup>

- **Farm-to-Fork Strategy** <sup>2</sup>
- **Biodiversity Strategy** <sup>3</sup>
- **Chemicals Strategy** <sup>4</sup>
- **Zero Pollution Action Plan** <sup>5</sup>
- **Circular Economy Action Plan** <sup>6</sup>

**Green Deal states possible  
“legal requirements to boost the market  
for secondary raw materials, with  
mandatory recycled content”**



1 = COM(2019)640 [https://ec.europa.eu/info/files/communication-european-green-deal\\_en](https://ec.europa.eu/info/files/communication-european-green-deal_en)

2 = COM(2020)381, 20th May 2020 <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1590404602495&uri=CELEX%3A52020DC0381>

3 = COM(2020) 380 final, 20th May 2020 [https://ec.europa.eu/environment/nature/biodiversity/strategy/index\\_en.htm](https://ec.europa.eu/environment/nature/biodiversity/strategy/index_en.htm)

4 = COM(2020)667, 14/10/2020 <https://ec.europa.eu/environment/pdf/chemicals/2020/10/Strategy.pdf>

5 = <https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12588-EU-Action-Plan-Towards-a-Zero-Pollution-Ambition-for-air-water-and-soil/public-consultation>

6 = 11/3/2020 <https://ec.europa.eu/environment/circular-economy/>

# Nutrients in EU food and agriculture policies

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- **Organic Farming Regulation 2018/848: art. 5(c)** <sup>1</sup>  
 - **possible added-value market for some recycled nutrient products?**
- **Common Agricultural Policy** <sup>2</sup>  
**Proposed FaST tool for Nutrients “Farm Sustainability Tool for Nutrients”** <sup>3</sup>  
 = complete farm nutrient budget - **Council proposes to render “advisory” only** <sup>4</sup>  
**Conditionality requirements: control of nutrient losses: buffer strips, soil management ...**  
**Health and food safety: EU - EFSA safe limit (ADI) for phosphorus in diet (2019)** <sup>5</sup>
- **DG ENVI study on contaminants in mineral and organic fertilisers, underway** <sup>6</sup>  
 - **possible REACH “restrictions”**
- **Marine policy / guidelines for aquaculture, update underway** <sup>7</sup>

1 = art. 5(c) “the recycling of wastes and by-products of plant and animal origin as input in plant and livestock production”

2 = [https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/future-cap\\_en](https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/future-cap_en)

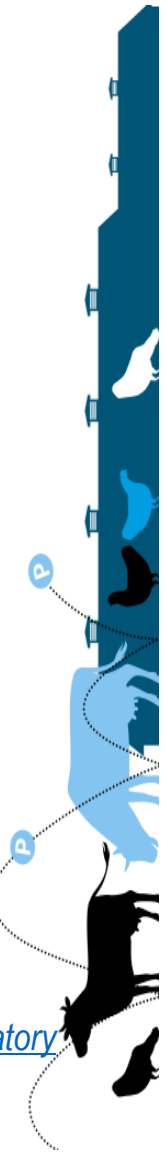
3 = Commission proposal: [https://ec.europa.eu/jrc/sites/jrcsh/files/03-fast\\_final.pdf](https://ec.europa.eu/jrc/sites/jrcsh/files/03-fast_final.pdf)

4 = 21/10/2020 <https://data.consilium.europa.eu/doc/document/ST-12148-2020-INIT/en/pdf>

5 = 12/6/2019 <https://www.efsa.europa.eu/en/press/news/190612>

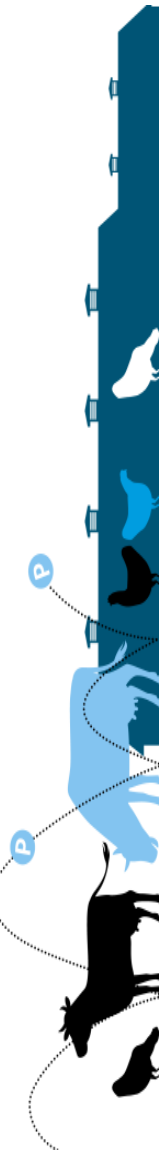
6 = follow-up study to the criticized AMEC report on composts and digestates, which was criticised by ESPP and stakeholders, see [www.phosphorusplatform.eu/regulatory](http://www.phosphorusplatform.eu/regulatory)

7 = <https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12261-Strategic-Guidelines-for-EU-aquaculture-update>





# *Challenges, Barriers and Recommendations*



# From wastewater to resource

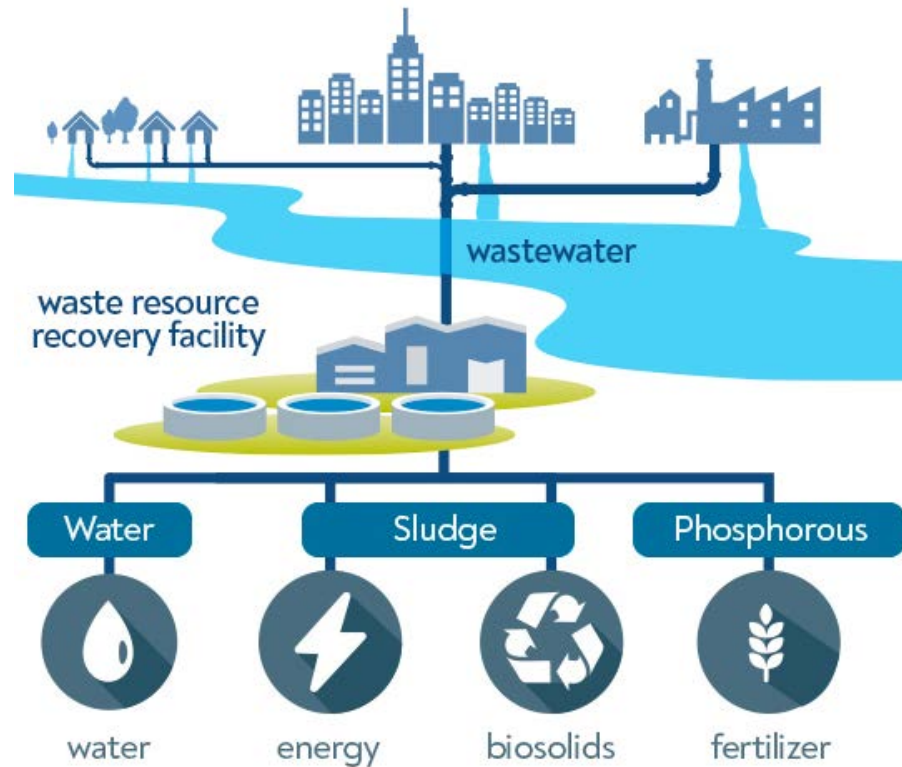
## 80% unused

- Thermal energy
- Chemical energy
- Nutrients
- Water

## Polluting

- Groundwater
- Rivers & Lakes
- Oceans

A threat to human health and biodiversity



## Potential for

- Heating
- Cooling
- Power
- Bio-methane
- Chemical building blocks

## Earnings

- ✓ Revenues for WWT
- ✓ Carbon Credits

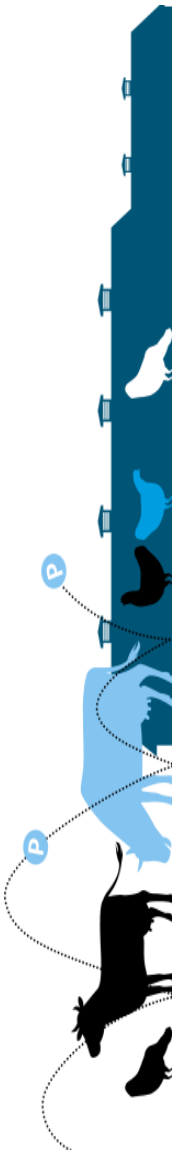


# From strategy to reality

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## Circularity: urban recovery – rural recycling and use

- Most of nutrients, bio-pesticides, proteins (insects), etc. recovered in urban environments will be recycled to rural use – on cropland, as feed for animals
- Recovery and recycling efficacy needs improvement – clear targets, efficient (separate) collection systems, motivation of citizens
- EU strategies need to be covered by regulation, incentives, penalisation – compliancy must be rewarded – non-compliance must be penalised
- Rewards could be linked to EU net-zero emission strategy – saving greenhouse gas emissions by recovery (e.g. nutrient recovery), if replacing synthetic products, should receive an EU ETS (EU Emission Trading System) credit for added value in terms of CO<sub>2</sub> emission savings.



# End-of-Waste for materials recovered from or grown in wastewater (Algae)

**2020 Circular Economy Action Plan:**  
**EU to identify priority streams for definition of EU**  
**“End-of-Waste” Criteria -> underway**

**Initiative: Joint letter requesting that materials recovered from wastewater be included in these priority streams:**

**Algae grown in wastewater; fibres, polymers, fatty acids, proteins, gums; N, S, K, P compounds from gas treatment, membranes, ion exchange ...; fats, grease, oils; grit and sand**

**NOTE: Letter does not concern use in fertilising products, for which EU End-of-Waste status is provided by the EU Fertilising Products Regulation. Does not concern treated wastewater, covered by the Water Reuse Regulation 2020/47**



	BIOREFINE CLUSTER EUROPE Contact: Erik Meers <a href="mailto:Erik.Meers@UGent.be">Erik.Meers@UGent.be</a>
	European Biogas Association <a href="http://www.europeanbiogas.eu">www.europeanbiogas.eu</a> Contact: Marco Giacomazzi <a href="mailto:giacomazzi@europeanbiogas.eu">giacomazzi@europeanbiogas.eu</a>
	Aqua Publica Europa - European Association of Public Water Operators <a href="http://www.aquapublica.eu">www.aquapublica.eu</a> Contact: Milo Fiasconaro <a href="mailto:milo.fiasconaro@aquapublica.eu">milo.fiasconaro@aquapublica.eu</a>
	Gruppo CAP (Milan public water operator) <a href="http://www.gruppocap.it">www.gruppocap.it</a> Contact: Andrea Lanuzza <a href="mailto:andrea.lanuzza@gruppocap.it">andrea.lanuzza@gruppocap.it</a>
	Unie van Waterschappen (Dutch Water Authorities) <a href="http://www.uvw.nl">www.uvw.nl</a> Contact: Dieter Staat <a href="mailto:staat@vwwin-uvw.be">staat@vwwin-uvw.be</a>
	Water Alliance, Netherlands <a href="http://www.wateralliance.nl">www.wateralliance.nl</a> Contact: Mr. Hein Molenkamp <a href="mailto:h.molenkamp@wateralliance.nl">h.molenkamp@wateralliance.nl</a>

**Over 110 industry federations, companies, EU projects and other organisations have signed to date**

**Joint letter here: [www.phosphorusplatform.eu/regulatory](http://www.phosphorusplatform.eu/regulatory) - To sign: [info@phosphorusplatform.eu](mailto:info@phosphorusplatform.eu)**





# Carbon credits for saved emissions for all actors – sewage plants, waste management

- Recycled N can save up to 4 t CO<sub>2eq</sub>/t N compared to Haber-Bosch N (current EUA futures € 50-55/t CO<sub>2eq</sub>).<sup>1) 2)</sup>
- Bio-methane can save up to 2 kg CO<sub>2eq</sub>/m<sup>3</sup> CH<sub>4</sub> compared to natural gas
- Level playing field for all actors needed – municipal and private utilities / waste management companies

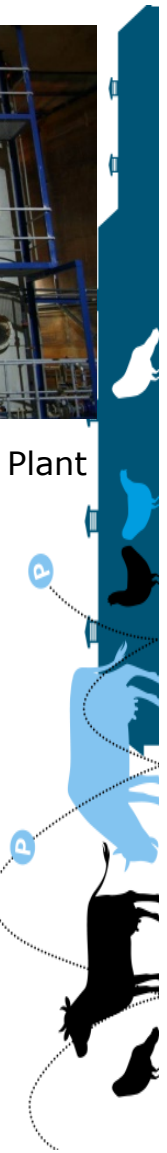


Yara/VEAS Oslo Demonstration Plant

<sup>1)</sup> <https://ember-climate.org/data/carbon-price-viewer/>

<sup>2)</sup> [https://www.fertilizerseurope.com/wp-content/uploads/2020/01/The-carbon-footprint-of-fertilizer-production\\_Regional-reference-values.pdf](https://www.fertilizerseurope.com/wp-content/uploads/2020/01/The-carbon-footprint-of-fertilizer-production_Regional-reference-values.pdf)

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



# Why not making Circular Economy obligatory

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## Germany

- AbfKlärV 2017 (sewage sludge regulation):  
**phosphorus recycling becomes obligatory**  
- within 12/15 years for all WWTPs > 100 000 P.E. / 50 000 P.E.  
if sewage sludge P > 2% of dry matter



National | Verordnungen | AbfKlärV  
Verordnung zur Neuordnung der Klärschlammverwertung  
Klärschlammverordnung

## Switzerland

- 2016 VVEA (waste act), Art 15, makes  
**phosphorus recovery obligatory** by 2026  
from sewage sludge incineration ash\* and meat and bone meal ash

\* Switzerland banned land use of sewage biosolids in 2006



Schweizerische Eidgenossenschaft  
Confédération suisse  
Confederazione Svizzera  
Confederaziun svizra

*P-recycling requirements under discussion: Baltic, Sweden, Austria, ...*

*Possible recycling requirement in EU Sewage Sludge Directive (under revision)\**

<https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12328-Evaluation-of-the-Sewage-Sludge-Directive-86-278-EEC-/public-consultation>

