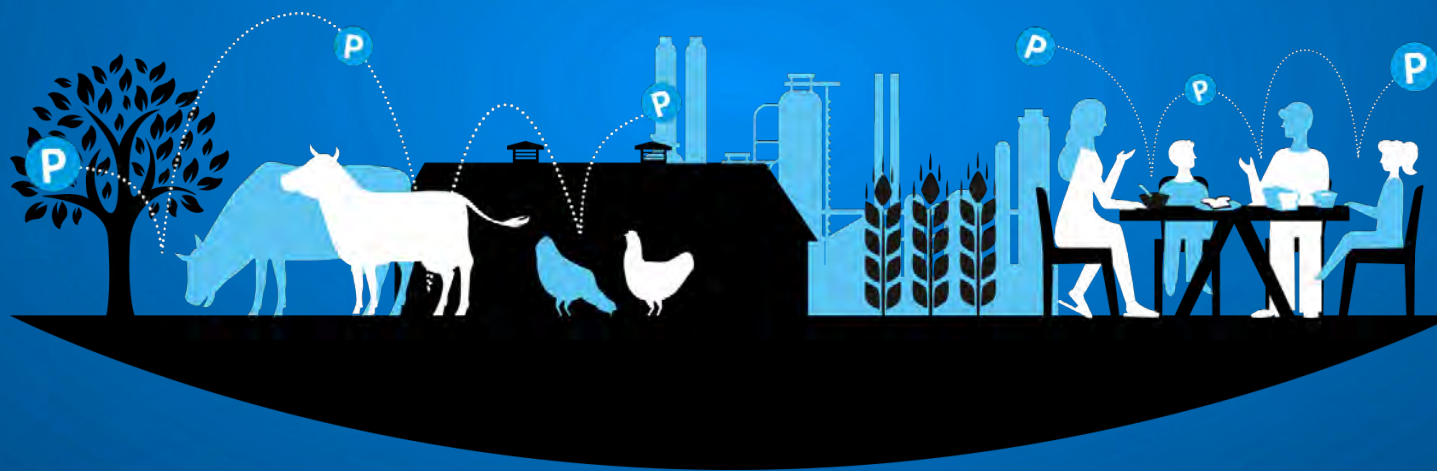




European Sustainable Phosphorus Platform



Opportunities for phosphorus recycling in Europe, today and tomorrow

Christopher Thornton, European Sustainable Phosphorus Platform

info@phosphorusplatform.eu

European Sustainable Phosphorus Platform (ESPP)



ESPP in action

- *Decision by consensus*
- *Mediation rather than advocacy*
 - enable dialogue between stakeholders
 - develop shared policy proposals
 - communicate with regulators
- *Communication tools:*
 - web site www.phosphorusplatform.eu
 -  [LinkedIn](#)  [Twitter](#)
 - eNews, Scope Newsletter,
62 000 + emailing list (11 – 14% identified opening rate)



ESPP eNews n°58 September 2021
page 2

EU consultation on “Taxonomy”

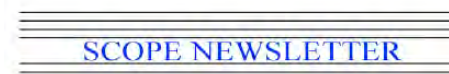
P-recovery in EU list of top-100 green activities ... but clarifications needed

The EU Taxonomy will classify which economic activities, and when, are considered environmentally sustainable, so eligible for EU Green Deal investment. It may become a **key tool** for private investors, markets, other public policies. Phosphorus recovery from sewage is one of the 100 activities listed (at the same level as e.g. livestock production, crop production, hotels and accommodation ...) but N-recovery or P-recovery from other streams is not cited.

Consultation [open](#) to 24th September 2021, 18h00 deadline (not midnight).

The unified EU-wide classification system (“EU Taxonomy”) will establish an operational list of economic activities, with technical screening criteria (TSC), determining in which cases each economic activity makes a ‘substantial contribution’ to an environmental objective. The Taxonomy Regulation ([2020/852](#)) defines six eligible environmental objectives: Climate change mitigation, Climate change adaptation, Water and marine resources, Circular economy, Pollution prevention and control, Biodiversity and ecosystems.

The EU has now published a report (over 1 000 pages including the annex) proposing criteria for classifying when a wide range of different industries and activities can thus be considered environmentally friendly, covering (amongst many others) agriculture (both livestock and crop production), sewage treatment, waste management ... The report and its annex propose TSC (Technical Screening Criteria for “substantial contribution” to sustainability) and criteria for DNSH (Do No Significant Harm, under Pollution Prevention and Control).



SCOPE Newsletter special issue: Climate Change, Nutrients and Catchment Management

This is the second [SCOPE Newsletter](#) special issue addressing the **links between phosphorus, nutrients and climate change**, in cooperation between the *Sustainable Phosphorus Alliance*, North America, and the *European Sustainable Phosphorus Platform*.

The first issue covered aquatic **methane emissions** (*SCOPE Newsletter* n°135, July 2020).

As is usual for the SCOPE Newsletter, this issue is based on targeted ‘layman’s’ summaries of relevant information from selected recent scientific papers, from which we have tried to draw overall conclusions.

Currently in preparation are further special issues on:

- interactions between **climate change, nutrients and soil carbon**
- **climate change impacts of nutrient recycling and stewardship technologies**

ESPP wishes to thank for their support and input: *Amin Soltangheisi (Lancaster University)*, *Matt Scholz (Sustainable Phosphorus Alliance)* and *Sara Johansson*, all the authors of papers summarised who sent their corrections and comments, and ESPP’s **members** whose support makes this possible.

Nutrient platforms - partners of ESPP

- Netherlands 2010 <http://www.nutrientplatform.org/>
- Germany 2015 www.deutsche-phosphor-plattform.de
- Baltic: ESPP works with Baltic Sea Action Group www.bsag.fi
- North America Sustainable Phosphorus Alliance (SPA) 2017 (launched as NAPPS in 2015) <https://phosphorusalliance.org/>
- Japan PIDO 2011 (Phosphorus Industry Development Organization of Japan) www.pido.or.jp
- Global Partnership for Nutrient Management (UNEP) <http://www.unep.org/gpa/what-we-do/global-partnership-nutrient-management>
- nutrient platform projects: Ireland, Italy, Sweden, ...

*Sept 2021: US SPA
announces US\$ 25 million
« STEPS » phosphorus
research centre*



**Sustainable
Phosphorus
Alliance**



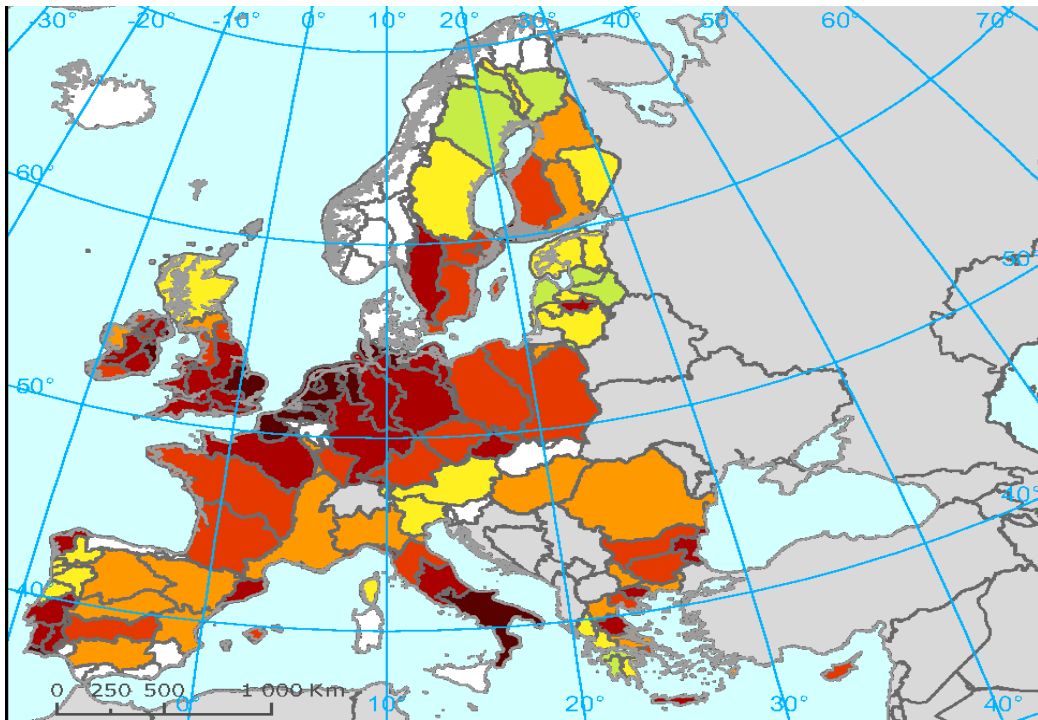
Why recycle nutrients?



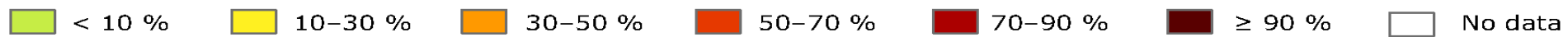
'Sea snot' spreads across Turkish sea



Eutrophication



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



Source EEA 2017: <https://www.eea.europa.eu/data-and-maps>



Eutrophication

< 40% of EU surface waters in “good” ecological status (as defined by the Water Framework Directive 2000/60)

main problems include nutrient losses, especially from agriculture

European Environment Agency, 2018 www.eea.europa.eu/publications/eea-signals-2018-water-is-life/at_download/file

Aquatic methane emissions represent c. 20% of fossil fuel impacts

Downing et al. 2021 <https://doi.org/10.1038/s41467-021-22836-3>

EU Green Deal ¹

→ Farm-to-Fork Strategy ²
and Biodiversity Strategy ³

Both fix 2030 target for nutrients:

- reduce nutrient losses by at least -50%
while ensuring no deterioration on soil fertility
- resulting in a reduction in fertiliser use by at least -20%

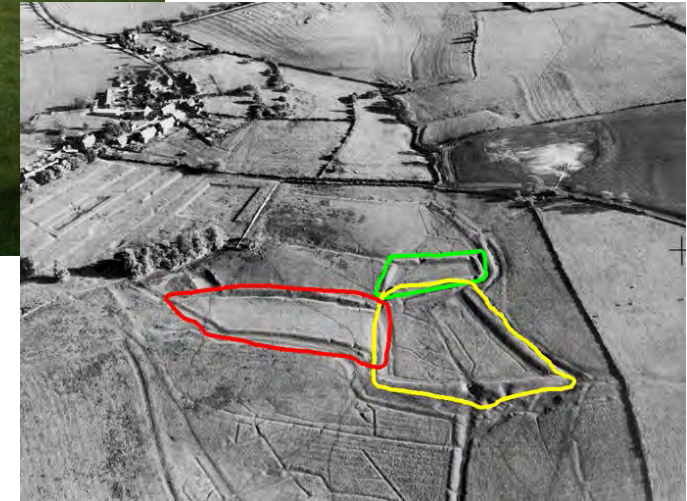
1 = COM(2019)640 https://ec.europa.eu/info/files/communication-european-green-deal_en

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



Phosphorus recycling: a long tradition



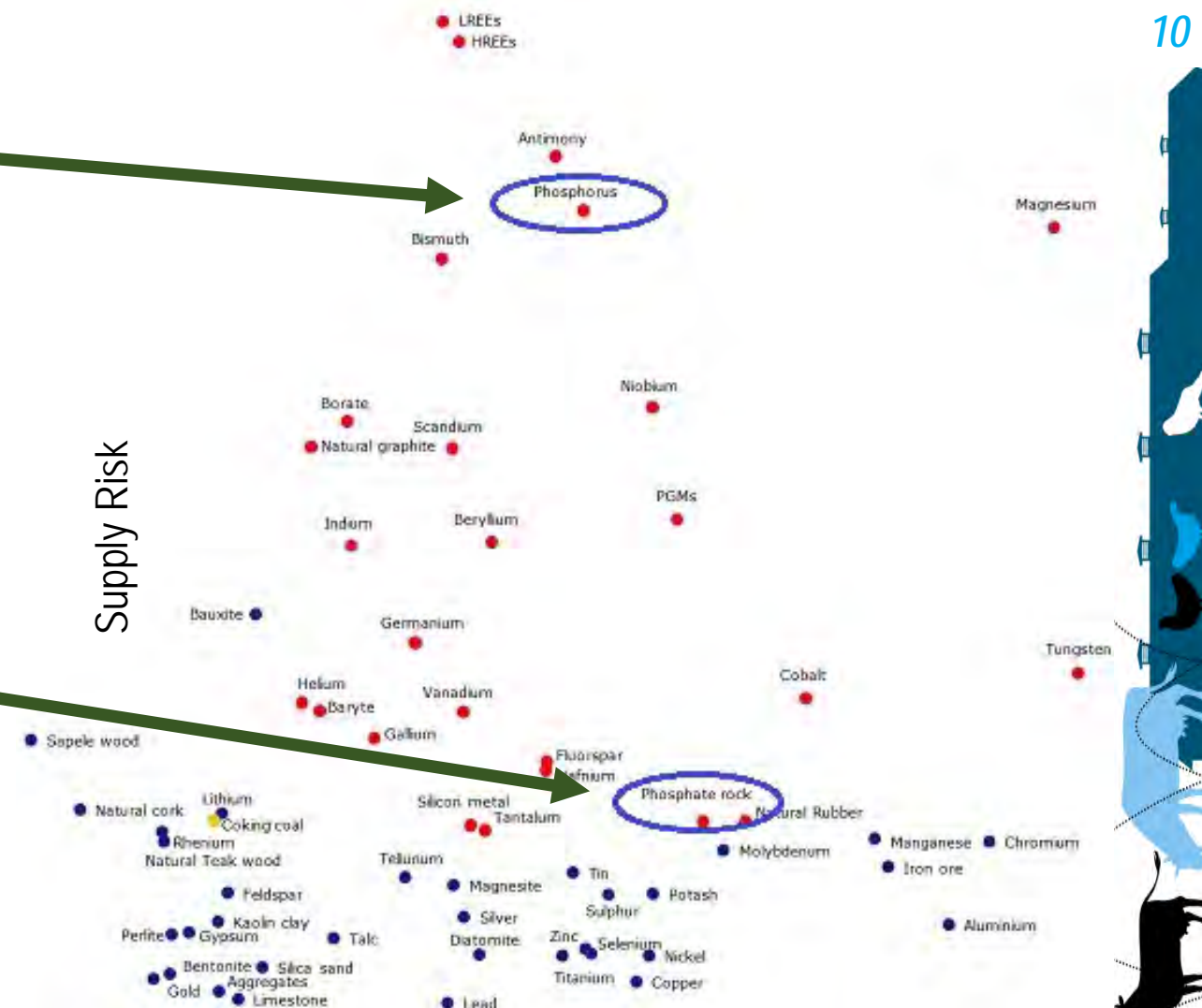
*You can't grow
phosphorus from air,
as you can nitrogen*



EU Critical Raw Materials (CRM)



- **White Phosphorus (P_4)**
since 2017
confirmed 2020
 - essential for a wide range of industries: electronics, fire safety, batteries, water, pharmaceuticals ...
- **Phosphate rock**
on the EU Critical Raw Materials List since 2014
confirmed 2020
 - non-substitutable
 - non-renewable
 - geopolitical resource concentration
 - EU 90% dependent on imports



10

https://ec.europa.eu/growth/sectors/raw-materials/specific-interest/critical_en

2/9/2020 <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020DC0474>

Criticality and uses of P_4 / P_4 derivatives www.phosphorusplatform.eu/Scope136

Economic Importance
Phos4You, 22 September 2021

And yet

*Without mineral phosphate fertilisers
we could feed maybe **1/5th**
of the current world population*

*Adapted from Dawson et al., Food Policy 2011:
<http://dx.doi.org/10.1016/j.foodpol.2010.11.012>*

*Without Haber-Bosch
(mineral nitrogen fertilisers)
we could feed **only half**
of the current world population*

- Fertilizers Europe / Wageningen University
- SMIL 2004 <https://mitpress.mit.edu/books/enriching-earth> and discussion here <https://ourworldindata.org/how-many-people-does-synthetic-fertilizer-feed>
- Erisman 2008 <http://dx.doi.org/10.1038/ngeo325>

<https://phosphorusalliance.org>



Potential and routes for phosphorus recycling



Phosphorus recycling potential in EU-27

<i>[kton P/year - 2005]</i>	Total	Recycled	Potential
Sewage sludge	297	115	182
Biodegradable solid waste	130	38	92
Meat & bone meal	128	6	122
Total	427-555	153-160	274-396
Manure = 1 800			
Mineral phosphorus fertiliser use = 1 450 ktP/y			

Based on: Van Dijk, Lesschen & Oenema "Phosphorus flows and balances of the European Union Member States." Sci Tot Env 2016
<https://doi.org/10.1016/j.scitotenv.2015.08.048>



What do people say ?

- **European Commission** ¹
STRUBIAS recycled products
could replace 25-40%
of EU mineral phosphate fertilisers
- **European Commission** ²
Phosphorus recycling could replace 30%
of EU mineral phosphate fertilisers
- **Netherlands Government**
Circular Economy Strategy: replace 50%
of imported raw materials by recycling
by 2030, including phosphorus

1 = JRC STRUBIAS draft « Market » report 20/12/2017

2 = IP/18/6161 http://europa.eu/rapid/press-release_IP-18-6161_en.htm

3 = Environ. Sci. Technol. 2017, 51, 10765–10776

<https://doi.org/10.1021/acs.est.7b02147>

4 = BSAG / SITRA video "Soil solutions" <https://t.co/8nj4wFqllv>

5 = Gaia 2011 <https://doi.org/10.14512/gaia.20.2.8>

6 = Science of the Total Environment 2016

<https://doi.org/10.1016/j.scitotenv.2015.08.047>

- **Trimmer et al., 2017** ³
global nutrient reuse from new sanitation could replace:
→ 9 – 16% of N fertilisers → 5 – 15% of P fertilisers
→ 10 – 16% of K fertilisers
- **Baltic Sea Action Group** ⁴
Finland: recycling organics and sewage sludge could
replace 80% of mineral fertilisers
- **Lamprecht, 2011** ⁵
Switzerland: meat and bone meal ash (abattoir by-
products) could replace 1/3 to 1/2 of P fertilisers
- **Metson et al.** ⁶
US: <40% of potentially recyclable P could replace
100% of P fertiliser needs for corn

**NEW STUDY FINDS RECYCLED PHOSPHORUS
COULD FERTILIZE 100 PERCENT OF U.S. CORN**



P-sources

- *Livestock manures*
- *Wastewater treatment*
- *Abattoirs / Animal By-Products /
Meat and Bone Meal Ash (MBA)*
- *Food, beverage and dairy processing*
- *Food wastes*
- *Industry*

- *[Bio-fuels production ?]*



P reuse & recycling routes

➤ *Agricultural use of treated sewage biosolids:*

- After composting and/or anaerobic digestion
- recycling of N, C
- c. 50% of EU sewage sludges

Pressures:

- spatial distribution
- contaminants

In particular:

- PFAS
- pharmaceuticals
- microplastics
- social perception

EU announces PFAS "ban"
SWD(2020)249

www.phosphorusplatform.eu/eNews049



➤ **Agricultural use of digestates**

After processing

- solid/liquid separation
- drying – pelletising
- phosphorus precipitation
- membrane separation
- nitrogen stripping / ammonia salt recovery
- ...

It is still unclear how the EU Fertilising Products Regulation (2019/1009) applies to digestate processing

Photos: www.systemic.eu (left to right: digestate field tests, RePeat, Groot Zevert Vergisting)



➤ *Agricultural use of digestates*

COOPERL / Brittany farmers' cooperatives

- 400 000 t/y manure processed to organic fertiliser product
- Adapted to specific crops and exported to other regions of France
- Supported by EU Investment Plan

<http://www.cooperl.com/en/environmental-solutions>

www.phosphorusplatform.eu/scope122



Géotexia, Brittany

- 33 pig farmers
- methanisation of 70 000 t/y manure & agri by-products
- 14 000 MWh electricity = 4 600 households
- Processing of digestate: drying, osmosis, evapo-concentration
- French fertiliser homologation obtained for digestate 2013

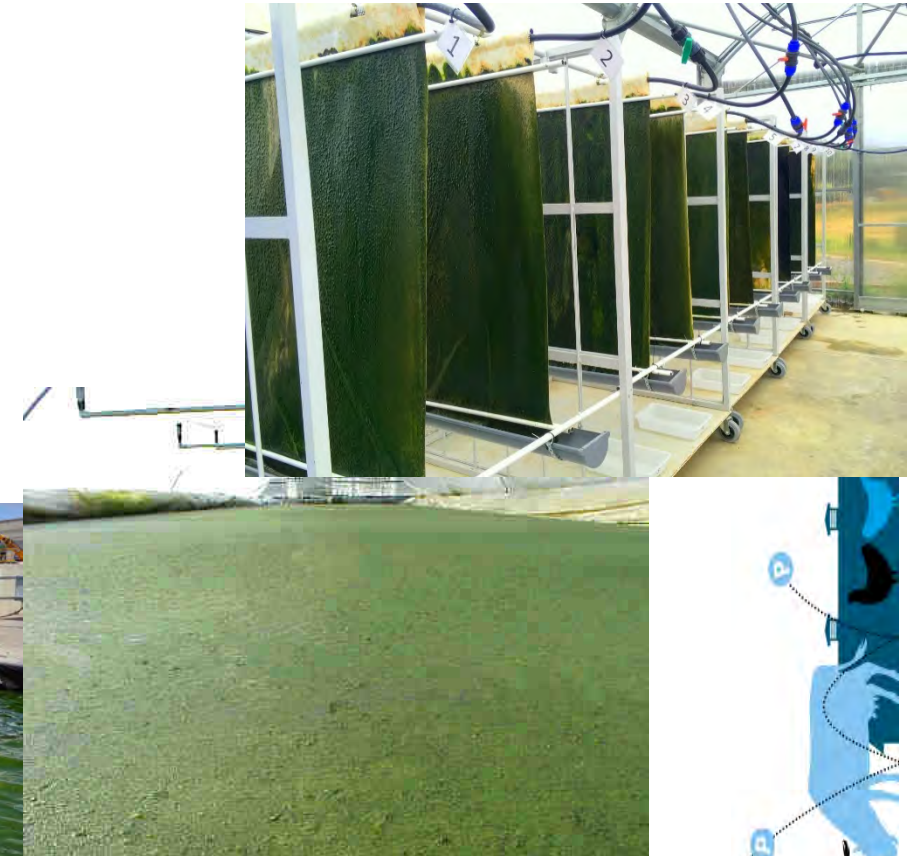
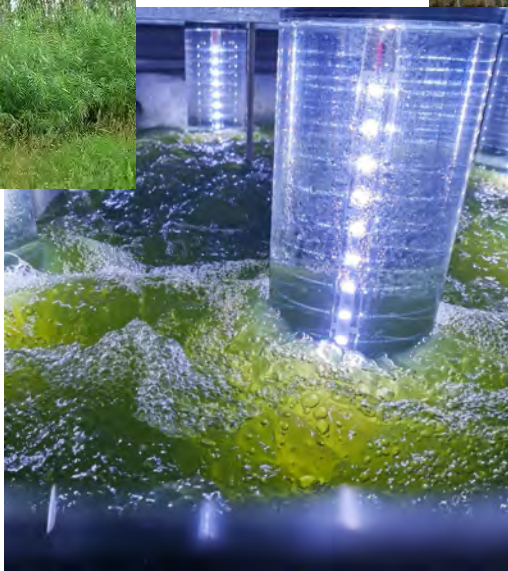
<https://geotexia.wordpress.com/le-digestat/>

P reuse & recycling routes

➤ *Use of wastewaters to feed biomass*

- *algae, duckweed*
 - > *animal feed, fertilisers, chemicals, biofuels **
- *energy crop production*

* See ESPP SCOPE Newsletter n° 140 www.phosphorusplatform.eu/Scope140



Photos left to right: Resilience.org – I-PHYC – Urbabiofin / Uni. Valladolid –
duckweed Paul Skillicorn - LIFE TLBiofer / Biomasa Peninsular



P reuse & recycling routes

➤ *Adsorption to produce a fertiliser / soil amendment*

- *Organic materials: posidonia, straw, ...*
- *(Calcinated) shellfish or crab* shells*
- *Biochar*
- *Minerals** (natural, artificial)*

* Bottom photo: Phos4You https://www.nweurope.eu/media/12161/phos4you_p-rich_biomass_en_nov2020.pdf

** see www.phosphorusplatform.eu/Scope138



P reuse & recycling routes

➤ **Precipitation processes**

- anaerobic sludge digestate in biological P-removal wastewater treatment plants
 - side-streams or concentrated streams
- E.g. struvite, calcium phosphate (brushite)*

Phosphogreen – Suez

<https://www.suezwaterhandbook.com/degremont-R-technologies/sludge-treatment/recovery/recycle-phosphorus-from-effluent-to-produce-a-valuable-fertilizer-Phosphogreen>



Struvia – Veolia

<https://www.veoliawatertechnologies.com/fr/te>



NuReSys <http://www.nuresys.be/>



CrystalGreen – Ostara

www.ostara.com



Struvite (magnesium ammonium phosphate)

- Good quality struvite has demonstrated high fertilising efficiency
- c. 80 full-scale struvite recovery plants operating worldwide*
 - $\frac{3}{4}$ in sewage works, but also food processing, manure digesters ...
- Driven and paid-back by operational improvements/savings:
 - Avoids scaling in digesters and pipes
 - Improves dewaterability of sludge
- P recovery rate:
8-15% of WWTP inflow,
up to 40% recovery with sludge pre-treatment
- World's biggest plant to date:
Ostara at Chicago sewage works: 9 000 t/y struvite
- Currently only applicable to enhanced bio-P removal:
c. 10% of EU WWTPs

* List of operating struvite installations worldwide: Inventory of phosphorus "recovery and /or recycling" facilities, C. Kabbe, 2021 <https://www.phosphorusplatform.eu/activities/p-recovery-technology-inventory>



<http://www.aljazeera.com/programmes/earthrise/2014/12/recycling-phosphorus-2014121693225616272.html>

P reuse & recycling routes

➤ Ion exchange

- From e.g. municipal wastewater after secondary treatment
- Orthophosphate ions are (selectively) adsorbed to a bed of resin, then released in regeneration, resulting in an orthophosphate solution, from which P-salts can be precipitated
- Challenges:
 - selectivity: resin adsorption sites occupied by competing ions (sulphates)
 - cost of regeneration (consumption of e.g. NaOH)
 - durability of resin over time with real wastewater (other ions, organics)
 - purity of recovered orthophosphate solution

Example Fit4Reuse (Cranfield UK, University of Bologna et al.)

- Layne^{RT} commercial hybrid anion exchanger (HAIX) resin (quaternary ammonium + nano iron phosphate)
- 2 ½ years operation 10 m³/day pilot, real wastewater plant effluent in UK
- NaOH regenerates iron sites -> P release ; NaCl regenerates resin matrix -> other anions
- Acid not needed for resin restoration
- P removed down to 0,1 – 1 mgP/l (95% soluble P removal)
- Challenges above largely resolved – need for further demonstration sites



23



SMART-Plant

Phos4You, 22 September 2021



P reuse & recycling routes

➤ *Fertiliser industry:* *Input of ash to existing processes*

- Input of P-rich ash (secondary material) to replace P-rock in existing industry process or specific plant:
 - sewage sludge incineration ash
 - animal by-products ash (Meat and Bone Meal MBM)
- Input of ash at rock acid attack or acidulation stage:
 - improves plant availability of P in ash
- Heavy metals, iron: → levels in final product conform to limits
- ICL have already tested at industrial scale (several hundred tonnes) and are implementing in Amsterdam (Netherlands) and Ludwigshafen (Germany). Fertiberia and Borealis have run trials. Glatt (specific plant using phosphoric acid): tested 30 kg/h pilot, 30 000 t ash/y plant under commissioning, Haldensleben, (Germany)



Photo: silos for secondary materials (ashes) input to ICL's phosphate fertiliser factory, Amsterdam, inaugurated March 2019 <http://icl-group-sustainability.com/reports/producing-fertilizers-with-recycled-phosphate/>

P reuse & recycling routes

➤ P-recovery from Ash

after sewage sludge mono-incineration, or from Meat and Bone Meal Ash

Ash is dissolved in acid to generate phosphoric acid. Heavy metals and iron (from sewage sludge) are (partly) removed by solvent extraction and/or ion exchange and/or selective precipitation.

- > 85% P-recovery rate
- High value “commodity” products: technical grade phosphoric acid, DCP, mineral fertilisers
- Some processes recover Fe/Al salts for P-removal in sewage works and/or silicates for use in cement production
- Financially sound, industry owned technology suppliers:
[EasyMining](#) (Ragn-Sells), [Prayon](#) (ex EcoPhos),
[Phos4Life](#) (Kanton Zurich ZAR), [Tetraphos](#) (Remondis)
several 30 to 60 000 t/y-ash plants planned or under construction in Germany, Sweden, Switzerland
- Other technologies under development: [Susphos](#), [Parforce](#)



EasyMining Ash2Phos <http://easymining.se/>



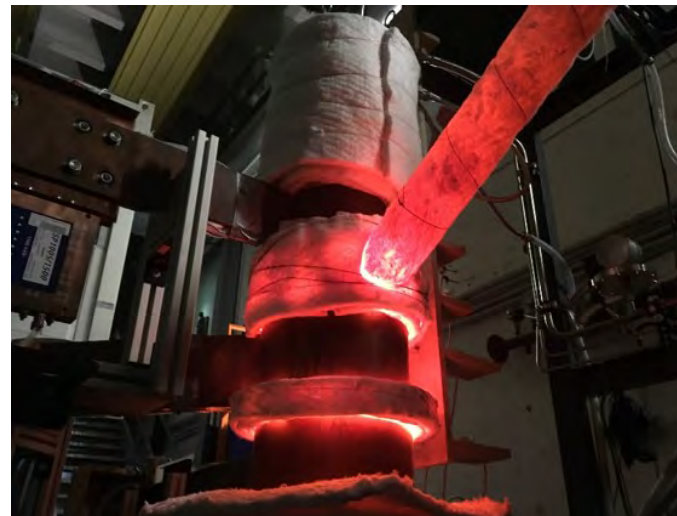
Phos4Life / Tecnicas Reunidas / ZAR
www.tecnicasreunidas.es

P reuse & recycling routes

➤ Other processes

- **AshDec (Outotec)** : see photo right - P-recovery from ash and contaminant separation using a sodium carrier at 850-900° C
- **Pyrophos (CTU)** - from dried sewage sludge by thermal pyrolysis/oxidation and heavy metal removal using K-salts
- **Thermal P4 recovery from ashes**: see photo left e.g **RecoPhos** / **FlashPhos** / **Italmatch** *
- **EuPhore**: modified sewage sludge incineration + chloride addition to remove part of the heavy metals
- **Pyrolysis / biochar**
- **P extraction from sludge**:
low temperature P-recovery using CO₂ (Extraphos Prayon, ex Budenheim) or solvent (RSR Green Sentinel) ...
- **Iron phosphate / vivianite recovery** (ViViMAG WETSUS <https://www.wetsus.nl/vivimag>)
- **Nano-filtration / membranes**
- **other**

* See www.phosphorusplatform.eu/Scope136
and www.phosphorusplatform.eu/eNews057



More information:

ESPP – DPP – NNP “catalogue” of technical P-recovery technologies



27

- ten processes operating full-scale today
- c. 20 other processes in pilot or R&D phase

P-recycling catalogue available and updated here

<http://www.phosphorusplatform.eu/p-recovery-technology-inventory>

Information on:

- input materials, output products
- fate of Fe/Al, heavy metals
- summary of process steps
- current operating status
(full-scale or pilot operation at how many sites, capacity and duration of operation)
- websites and contacts of technology suppliers

ESPP – DPP – NNP phosphorus recovery technology catalogue

NOTE: this document aims to provide an indicative overview, not technical information to support decision making. It is accurate to the best of our knowledge, but further information and updates should be sought from the indicated contacts. Inclusion in this document does not constitute any endorsement of technology(ies) by the nutrient platforms, nor validation of intellectual property nor commercial claims.

Sewage P-recovery: full scale plants operating or under permitting/construction			
Fertiliser industry – E.g. ICL	1	Struvite enhanced: acid (MSE-mobile)	6
Ecophos	2	Sludge lysis	6
Ash2Phos (EasyMining)	2	Pyreg (pyrolysis)	7
TetraPhos (Remondis)	3	Sewage P-recovery: (TRL 6+)	7
EuPhore	3	Phos4Life	7
TerraNova (HTC)	4	RAVITA (Helsinki HSY)	8
Kubota	4	Extraphos (Budenheim)	8
PHOS4Green (Glatt)	5	VivimAG (WETSUS)	9
Metawater alkaline ash leaching	5	AshDec (Outotec)	9
Struvite enhanced: biological	6	Kemira iron/aluminium phosphate	9
		ePhos (Fraunhofer IGB)	10
		Nutrient recovery from manure, TR6+	10
		Hitachi Zosen	10
		Agro America (VP Hobe)	10
		GENIAAL (Nijhuis)	11
		BioEcoSim (Suez)	11
		N2-Applied	12
		Technologies at R&D scale	12
		CarboREM	12
		RecoPhos thermal (Italmatch)	12
		P-roc	13
		Parforce	13
		RSR process	14
		Susphos	15

Process & contact	Input materials	Output products	Process description	Operating status	Photos
-------------------	-----------------	-----------------	---------------------	------------------	--------

Catalogue update underway

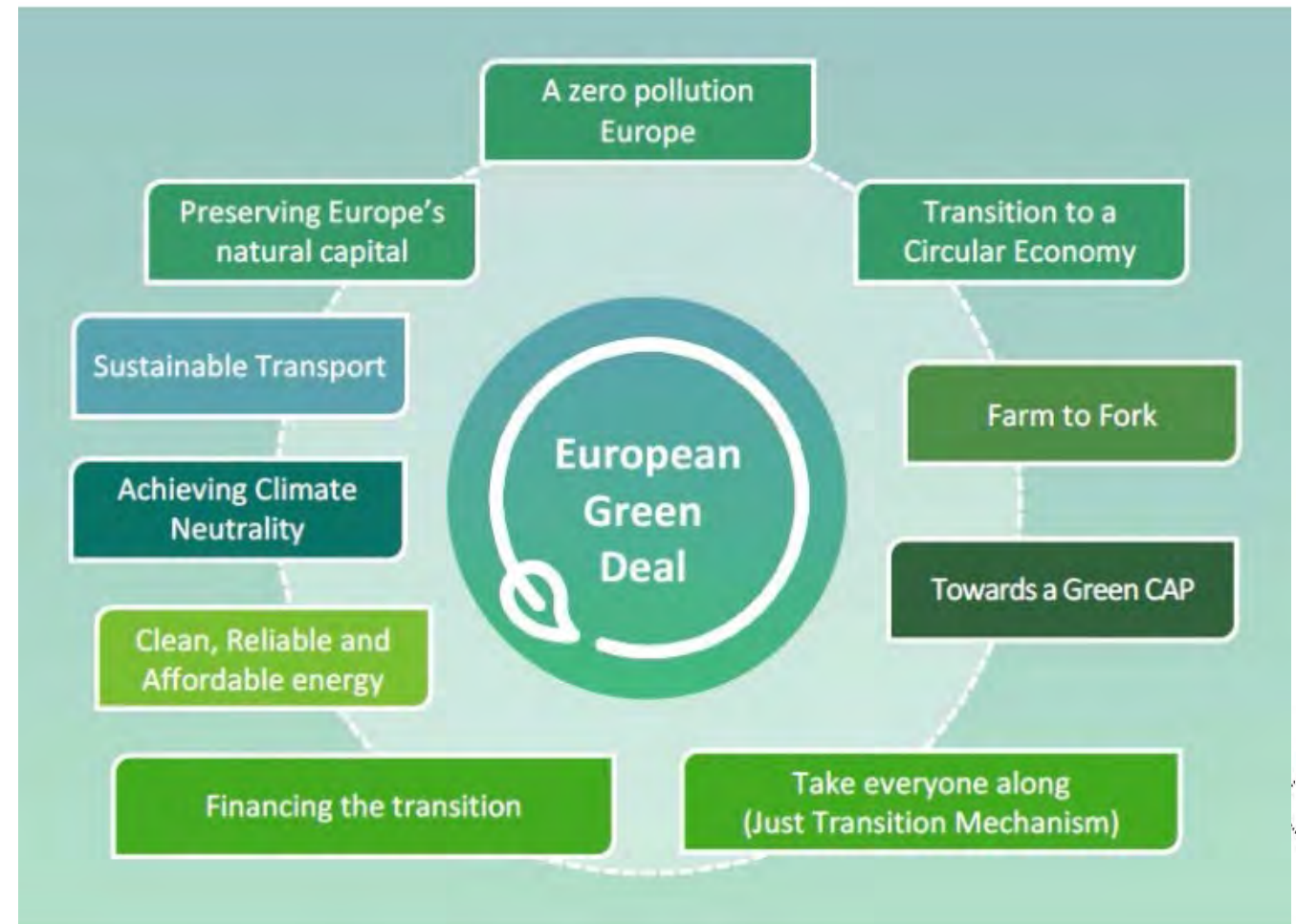
- send information on processes to info@phosphorusplatform.eu

Technology Fair at [ESPC4](#), Vienna 20-22 June 2022

Phos4You, 22 September 2021



Policy developments in Europe



EU policies on phosphorus recycling



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



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>

**EU Green Deal: 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>



EU Fertilising Products Regulation 2019/1009 (“FPR”)

- Enters into implementation June 2022
- **Covers all “fertilising products”**: fertilisers (mineral & organic), plant materials, food industry by-products, composts, digestates, soil amendments, growing media, bio-stimulants, liming materials, etc.
- **First EU product legislation to confer “End-of-Waste” status**
- Opens EU market for recycled fertilisers and for recycling technologies
- **FPR compliance not obligatory : national fertilisers can still be sold**
 - future markets will have both CE-mark and national fertilisers
- Underway (2021, “STRUBIAS”): inclusion of :
 - precipitated phosphate salts (inc. struvites)
 - ash-based materials
 - biochars & pyrolysis materials
- **Challenges: by-products (underway), interpretation ([FAQ](#)), inclusion of further secondary materials (e.g. recovered ammonium salts, waste-grown algae, recovered K salts ..), Notified Bodies, ...**

DIN



EU Fertilising Products Regulation: links

EU Fertilising Products Regulation 2019/1009

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

“STRUBIAS” criteria

- [*Precipitated phosphate salts and derivatives*](#)
- [*Thermal oxidation materials and derivatives*](#)
- [*Pyrolysis and gasification materials*](#)



EUROPEAN COMMISSION

European Commission > DocsRoom > Document detail

Proposal for a Regulation on the making available on the market of CE marked fertilising products and amending Regulations (EC) No 1069/2009 and (EC) No 1107/2009

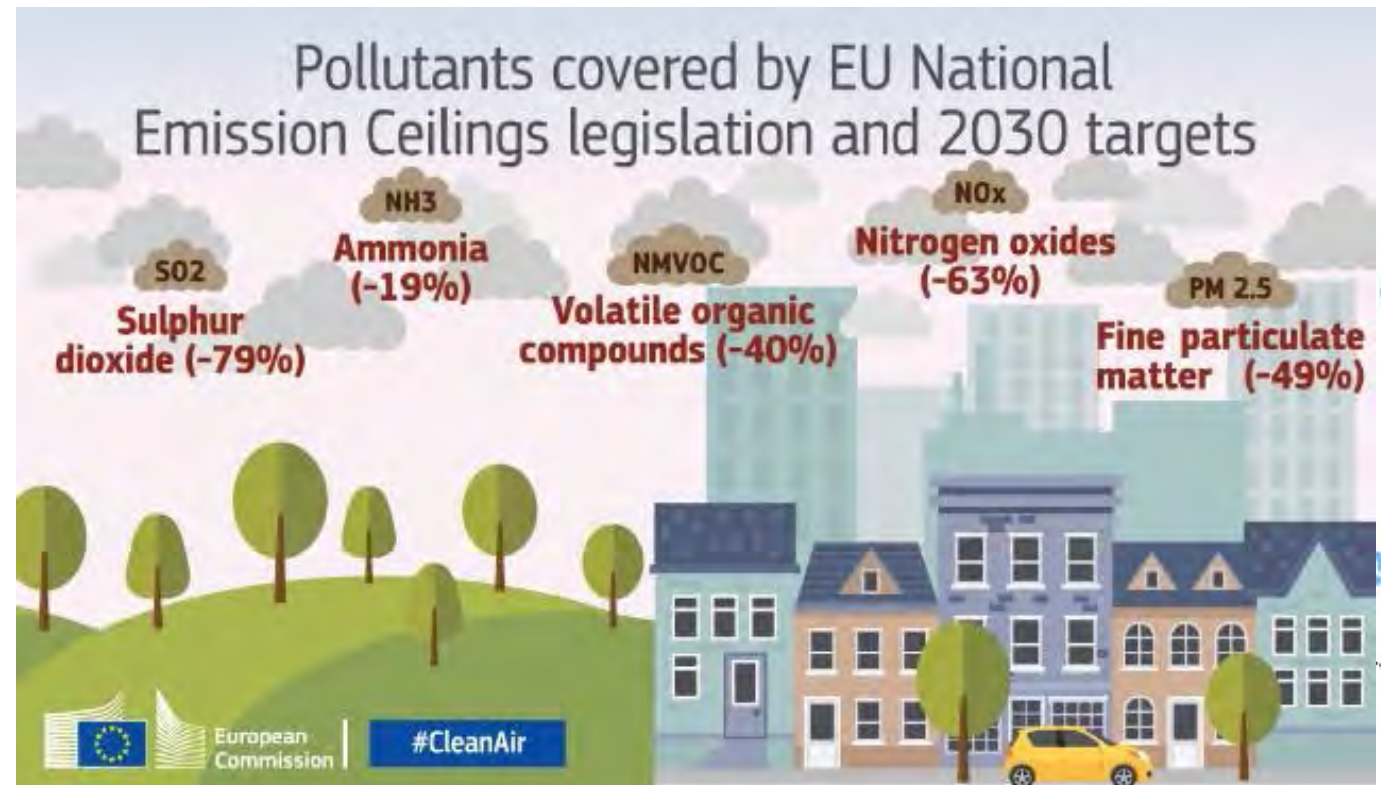
Document date: 17/03/2016 - Created by GROW.A.5.DIR - Publication date: 17/03/2016



National Emissions Ceilings Directive (NECD)

- Implements the Gothenburg Protocol –
UNECE Long-Range Transboundary Air Pollution Convention (LRTAP)
- 2016 NECD revision:
 - **19% ammonia emissions reduction by 2030**

<http://ec.europa.eu/environment/air/pollutants/ceilings.htm>



EU "Taxonomy"

- EU Taxonomy Regulation ([2020/852](#)) will define which economic activities, and under which conditions, can benefit from Green Deal investment funding
- Future criteria for private investors, public purchasing, other policies?
- EU "Platform on Sustainable Finance" [report \(8/2021\)](#) proposes (\$12,2) "*P-recovery from waste water*" as one of c. 100 listed activities
- *Proposal only covers P-recovery (but not other nutrients), only from sewage*
- *Proposals on agriculture address Nitrogen Use Efficiency (but not P)*



33

P-recovery from sewage proposed in EU "top 100" eco-industries

Public consultation open to 24/9/21 18h00

https://ec.europa.eu/info/publications/210803-sustainable-finance-platform-technical-screening-criteria-taxonomy-report_en



EU taxonomy for sustainable activities

What the EU is doing to create an EU-wide classification system for sustainable activities

National policies for P- recycling

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 becomes 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

**Principales nouveautés dans l'ordonnance
sur le traitement des déchets**

Summary of German and Swiss P-recovery legislations: ESPP Scope Newsletter [n° 129](#)

National policies for P- recycling



Baltic : HELCOM = 8 EU Member States, plus Russia and the EU

- “Recommendation” = obligation - March 2017
 - maximise phosphorus and other useful substance recycling
 - regular State reporting on measures taken to implement this
- Ministerial Declaration March 2018: - define Nutrient Recycling Strategy by 2020
(expected October 2021)



Sweden

Government Enquiry Report, January 2020, proposes:

- obligation of 60% P-recycling from uwwtps > 20 000 p.e.
- Including biosolids use on crops, with demanding quality requirements (to be defined: on hold, 2021)

<https://www.regeringen.se/48e7cd/contentassets/3d68880d2e6942f3a1dcc158e46beb7/hallbar-slamhantering-sou-20203>



Government Offices of Sweden

EU policy opportunities 2021 and tomorrow



Green Deal:

- Farm-to-Fork & Biodiversity Strategy : nutrient loss reduction target -50% by 2030 ([SCOPE Newsletter n°139](#))
- EU Chemicals Strategy and PFAS / Zero Pollution Action Plan / Circular Economy Action Plan
- EU Taxonomy for Sustainable Activities
- **impact on Common Agriculture Policy ?**

EU Fertilising Products Regulation (FPR)

Water policy: revisions underway: Water Framework / Marine Strategy Framework / Urban Waste Water Treatment / Sludge Directives

- tighter P-removal requirements ? ([SCOPE Newsletter n°133](#))
- sludge contaminants
- **possible objectives for nutrient recycling ?**

Horizon Europe

Recycled nutrients in Organic Farming

End-of-Waste

Critical Raw Materials and P4 ([SCOPE Newsletter n°136](#))

Nitrates Directive (Renure / SafeManure)

Ecolabels

Recovered chemicals from sewage or manure in animal feeds

Industrial Emissions Directive and BAT

Algae Initiative ([SCOPE Newsletter n°140](#))

...



VIENNA
20 - 22 June
2022

The logo graphic for ESPC4 features the letters 'E', 'S', 'P', 'C', and '4' in a bold, white, sans-serif font. The 'P' is the central element, with four white circles connected to it by thin white lines, forming a cross-like shape. The circles are positioned at the top-left, top-right, bottom-left, and bottom-right relative to the 'P'.

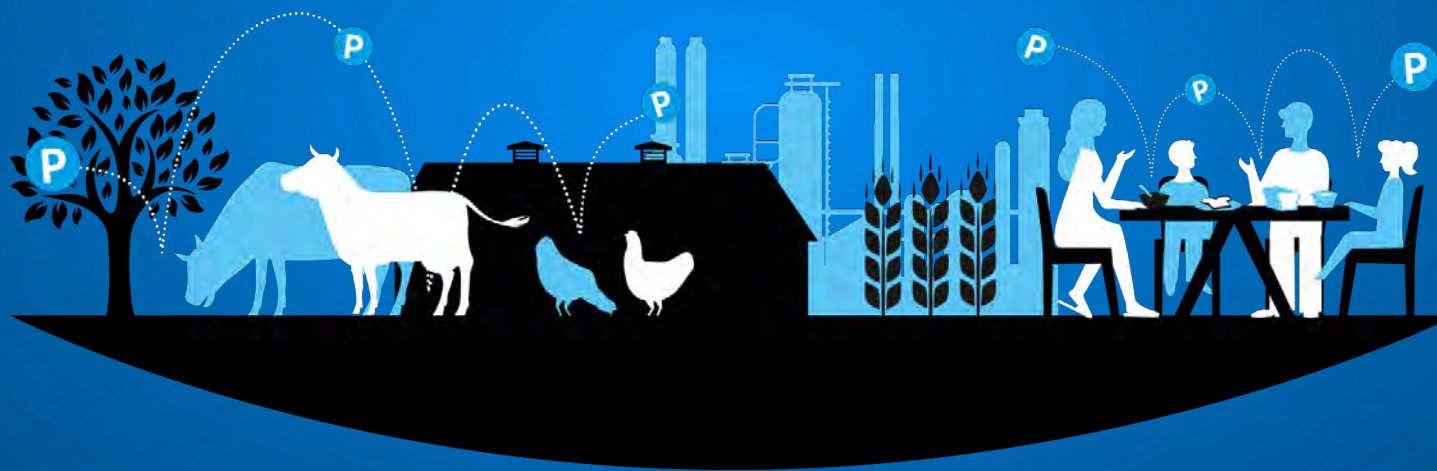
ESPC4

**European
Sustainable
Phosphorus
Conference**

4th European Sustainable Phosphorus Conference
5th PERM Phosphorus in Europe Research Meeting
Nutrient Recovery Technology Fair
<https://phosphorusplatform.eu/espc4>



European Sustainable Phosphorus Platform



Opportunities for phosphorus recycling in Europe, today and tomorrow

Christopher Thornton, European Sustainable Phosphorus Platform

info@phosphorusplatform.eu