

special issue
ESPC2 – 2nd European Sustainable Phosphorus Conference



The Conference confirmed the **growing awareness of phosphorus sustainability**, since the first Conference (ESPC1, 2013) and the launch of the European Sustainable Phosphorus Platform (ESPP).

Taking P to the next level

As President of the European Sustainable Phosphorus Platform, I am proud to have been involved in the success of the Second European Sustainable Phosphorus Conference (ESPC2), Berlin, 5-6 March 2015.

The scope of phosphorus stewardship engagement has widened, covering food security, agriculture, phosphorus efficiency – reuse – recycling, eutrophication rehabilitation, food - phosphorus footprint - diet, social aspects (e.g. skill training for **circular economy jobs**), innovation and new business opportunities ...

Firstly, I wish to thank the Conference sponsors, the European Commission, the German Federal Government and the Netherlands Government who made it possible, and particularly the German Phosphorus Platform and Kompetenz Zentrum Wasser Berlin for making it happen.

The strong sense of shared commitment and engagement, at ESPC2, from hands-on business operators to policy makers, was highly positive and ambitious. **Concluding the Conference, I admitted a dream.** Of a future where farmers' productivity using just the right amount of phosphorus in fertilisers, produces food without degrading lakes, rivers or seas. Where diets with a low phosphorus footprint are optimal for health but equally for global food security. Where Europe has supply security for phosphorus both for farmers and for the chemical industry. Where phosphorus can be sustainably used for important society needs such as catalysts or sustainable fire safety. Where recycling and a circular nutrient economy create local jobs and added value.



ESPC2 brought together more than 300 companies, governments, European institutions, NGOs, scientists. **Connections and trust were built** at ESPC2 and through a number of connected workshops and events.

ESPC2 Berlin has, I believe, brought this dream a little closer and I invite you to join us in the European Sustainable Phosphorus Platform to take further practical steps together.

Arnoud Passenier, ESPP President,
Netherlands Ministry for Infrastructure and the Environment

The partners of the European Sustainable Phosphorus Platform





2nd European Sustainable Phosphorus Conference Berlin 5-6 March 2015

Over two days, ESPC2 brought together 300 experts and decision makers in the field of phosphorus management. Companies and stakeholders presented **success stories in phosphorus management** and commitments were made to address barriers to phosphorus recycling. In parallel:

- a **workshop on innovation deployment**, co-organised by the European Commission, P-REX and ESPP, brought together 28 projects on P-recovery
- an ESPP companies' working group proposed EU **criteria for recovered struvite** as a fertiliser
- stands presented solutions by **Kubota, Hitachi, Outotech, Refertil, Rostock P Campus, Flanders and Netherlands Nutrient Platforms, BioRefine, NuReSys** (see presentations in **conference programme online**)
- HVC, SNB and Ecophos **announced** a **60 000 tonnes/year P recycling contract**
- The **German Phosphorus Platform** (DPP) elected a Board of industry, R&D and regulators
- The **Everglades Foundation**, Florida, presented a **US\$ 10 million prize** for a cost effective P-removal and recovery innovative technology
- ARREAU progressed **"best practice" case-studies** for nutrient recovery, to support standards
- P-REX presented its practice-based **policy brief on P-recycling** from municipal wastewater
- SCANDIC hotel/DPP ensured **"demitarian"** catering throughout for a reduced food P-footprint
- The EU Commission (GROW) announced **calls for full-scale P-recycling plants** (EIB/ Investment Plan funding call) and for **model pilot regions**
- **12 policy action proposals** were defined and are now published by ESPP

This SCOPE Newsletter details these proposals, summarises discussions, success stories and proposals for action from the ESPC2 conference, in the P-Recovery Deployment workshop and in the parallel events. Additionally, **you can find online** the 60 posters presented at the conference and the full summaries of ESPC2's 6 parallel sessions and 18 working groups: **www.phosphorusplatform.eu/espc2/**



The 2nd European Sustainable Phosphorus Conference (ESPC2) was supported by:



Federal Ministry for the
Environment, Nature Conservation,
Building and Nuclear Safety



Government of the Netherlands



European
Commission



ESPP policy action proposals from ESPC2

Stakeholders wishing to contribute to defining and implementing these proposals can join the European Sustainable Phosphorus Platform www.phosphorusplatform.eu and/or national nutrient platforms (where established: Netherlands, Flanders, Germany, or underway: UK, France, Norway, Baltic ...).

Phosphorus (P) is a non-renewable resource, non-substitutable for agriculture and food production and directly linked to global food security, as well as being important in a range of other industrial and technical uses.

The world's mineral phosphate reserves are finite, so that although there is debate about their extent and extractability and about their geographical concentration, the need for phosphorus stewardship will endure, generating new jobs and business opportunities.

At the same time, P losses pose major environmental issues. Phosphorus is the principal contributor to surface water quality failure (eutrophication) in much of Europe, whilst Europe's population eats around twice as much P as is required for health and globally the P footprint of human diets continues to increase.

These issues have synergies with other challenges, including sustainable biosolids management, nitrogen and micro-nutrients, soil organic carbon, soil erosion, water treatment, food waste, contaminants and food safety, global food security.

Improving the efficiency of P processing and use, in industry, agriculture, livestock production, food processing and diet, and developing P reuse or recovery-recycling can save money, contribute to reducing nutrient pollution, and create jobs in the circular economy.

1. Make phosphorus a flagship for stewardship, reuse and recycling in the new EU Commission's **Circular Economy proposals** in 2015, to develop innovation and sustainable local jobs
2. **Carry through the revision of the EU Fertiliser Regulation** to take in recycled phosphates, composts, digestates, etc., with clear definitions and criteria for each product category (agronomic functions, quality, safety, labelling ...)
3. Facilitate **phosphorus recycling from animal by-products**, subject to stringent safety criteria (adaptation of the Animal By Products Directive and inclusion in revised EU Fertiliser Regulation)

4. Exonerate recycled P & N products from **Nitrates Directive limits for manure in a "processed form"**, if they are non-organic with agronomic properties comparable to mineral fertilisers (see SCOPE 100)
5. Develop policies, in particular **education and consumer information**, to encourage **diets with lower P footprints**
6. Reduce phosphorus losses in **food waste** by reducing food wastage and reusing or recycling nutrients from non-avoidable food waste (e.g. separate collection, (co-) composting or digestion)
7. Implement in appropriate European institutions (EEA, Eurostat, JRC ...) reporting coherent **data monitoring of phosphorus and nitrogen mass-flows, concentrations and sinks**, at regional and national levels
8. Define **national/regional objectives and action plans for phosphorus efficiency, reuse and/or recycling**. In particular, **fix targets for phosphorus reuse and recycling from sewage / sewage biosolids**
9. Assess both phosphorus-in-general (P) and other specific forms of phosphorus as **EU Critical Raw Materials**, in addition to phosphate rock
10. Establish **coherent policies across Europe to reduce phosphorus losses from agriculture**, based on soil P status and crop needs, including precision nutrient management, buffers along watercourses, soil erosion mitigation ...
11. Define, through an inclusive stakeholder consultation methodology, an **EU Research, Innovation and Integration Agenda** for phosphorus sustainability, covering research, demonstration, implementation, information, skills and training. This should input to Horizon 2020 and the EIPs on Raw Materials, Water and Sustainable Agriculture.
12. **Harmonise EU regulatory frameworks and policies** to facilitate P stewardship: in addition to those above: e.g. water, sewage and biosolids, soil, bio-resources, consumer and health, international, rural development ...

2nd European Sustainable Phosphorus Conference - Berlin 5-6 March 2015

ESPC2 Conference summary



Federal Ministry for the
Environment, Nature Conservation,
Building and Nuclear Safety



Government of the Netherlands

More than 300 leading experts and decision makers in the field of phosphorus management met at the Second European Sustainable Phosphorus Conference (ESPC2) in Berlin to exchange knowledge and experiences and to take action: **taking P to the next level.**

60 posters were presented (online on ESPP website), stands, 18 thematic working groups, 6 parallel sessions and a number of parallel action meetings and announcements.

ESPC2 followed on from the first European Sustainable Phosphorus Conference, Brussels, March 2013 *. In ESPC2, the accent moved from awareness building to action, with presentation of **success stories** in phosphorus management by innovative companies and stakeholders. Representatives of the European Commission present were inspired by frontrunner industries, committed to continue to integrate phosphorus stewardship into European policies.

* see SCOPE Newsletter n°92 www.phosphorusplatform.eu under Downloads and under Conference – ESPC1

Through ESPC2 and the parallel meetings, **ESPP has prepared 12 policy action proposals** (see above), to take the conference discussions forward into practical implementation in Europe. The European Platform will be developing specific action programmes on these proposals in coming months, and pursuing dialogue with regulators and stakeholders to take them forward.



ESPC2 was opened by Arnoud Passenier, European Sustainable Phosphorus Platform (ESPP), and Stephan Gäth, German Phosphorus Platform (DPP), who thanked the conference sponsors:

European Commission, German Federal Ministry for the Environment and the Government of the Netherlands.

Stephan Gäth underlined that phosphorus is a non-renewable and finite natural resource, essential for life, so that even if the planet has resources for several hundred years, we must act now.

Arnoud Passenier pointed to the ecological, economic and geopolitical importance of phosphorus stewardship. Networking, innovation and stakeholder trust and cooperation are the keys to effective action. This conference, and the European and national phosphorus platforms, can take this forward.

Florian Pronold, Parliamentary State Secretary to the Federal Minister for the Environment, noted that phosphate rock supply worldwide is increasingly from politically unstable regions, so Europe needs to develop P-recycling. Germany is taking this forward within Prog.Ress, the German Resource Efficiency programme, launched in 2012:

<http://www.bmub.bund.de/themen/wirtschaft-produkte-ressourcen/ressourceneffizienz/progress-das-deutsche-ressourceneffizienzprogramm/>



Martin Kneisel, Baden-Württemberg Ministry for Environment, Climate Protection and Energy, explained that the Land currently incinerates over 90% of sewage biosolids. He announced the **objective to build 4-5 full scale phosphorus recovery plants by 2020**. Two pilots are currently being tested: struvite recovery (Offenburg wwtp, 8000 pe) and P-ROC calcium phosphate precipitation (Boxberg pig manure, see https://www.ifg.kit.edu/english/738_1000.php).



The German working group of the Lands' Environmental Ministries intends to propose a **German federal phosphorus recovery strategy** to the Environmental Ministers in November 2015. A seminar in Stuttgart on 24-25 June will be combined with site visits to the Baden-Württemberg P-recovery pilot plants (see Agenda in this Newsletter).

Pia Bucella, European Commission DG Environment, presented policy actions already engaged since the first ESPC conference in 2013 and proposals to move forward. The EU Consultative Communication on phosphorus sustainability 2013-2014 (see conclusions in SCOPE Newsletter 107) confirmed that stakeholders agree the need to take action, particularly because of phosphorus supply security concerns and because of environmental costs (e.g. algal blooms on French beaches impacting tourism).



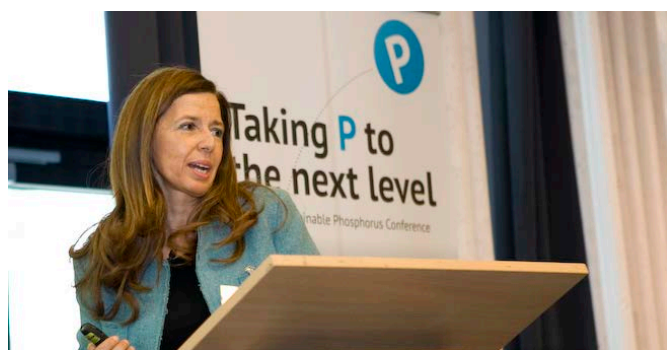
European Commission policy priorities

Pia Bucella identified as key **areas for action**:

- Including **phosphorus as a priority action in the Commission's new "Circular Economy" policy** proposals to be developed in 2015
- Developing **incentives for phosphorus recovery**
- Addressing the phosphorus footprint in **food waste**: the EU has 30% food losses
- Collective commitment with farmers to husband **soil quality** and reduce erosion (2015 is International Soil Year www.fao.org/soils-2015)
- Integrating phosphorus stewardship into the implementation of existing EU legislation including the **Nitrates Directive** and **Water Framework Directive**
- Public **awareness raising** and communications

Luisa Prista, European Commission DG Research & Innovation, underlined that **the "Circular Economy" implies economic and societal change**. A systemic approach is needed so that research and innovation can lead to market uptake. She identifies as **needs for developing a circular economy for phosphorus**:

- R&D beyond technology, e.g. into **social aspects** of phosphorus stewardship and P-recycling uptake
- **Stakeholder platforms** to facilitate dialogue
- **Enabling policy frameworks**, including addressing regulatory obstacles
- **Demonstration plants** to present and promote the novel solutions.



Funding tools: the EU has already invested over 21 million Euros in R&D projects into nutrient recycling, in addition to LIFE+ and InterReg funding. Horizon 2020 offers opportunities for further developments through EIPs (agriculture, raw materials, water), public private partnerships (e.g. SPIRE www.spire2030.eu), Societal Challenges 2, 3, 5 and 6 (project funding), SME Instrument, and through the InnovFin initiative.



Dialogue and facilitation

David Sears, European Economic & Social Committee, underlined the importance of **stakeholder dialogue to implement phosphorus stewardship**, through structures such as the European phosphorus platform ESPP and the Horizon 2020 strategic dialogue groups (EIPs). Governments should facilitate, and only regulate if other routes fail.



Society needs to change its approach to waste, treating it as a resource and not a problem. For this, the **European Commission’s “Circular Economy” proposals will be important in 2015**. He identifies as priorities for phosphorus in the circular economy:

- Refining **information about phosphorus flows and resources** for potential recovery
- **Life Cycle Analysis** to provide scientific data to support policies, e.g. on losses, energy use, environmental impacts
- **Quality standards and BAT** (Best Available Technology) data, to ensure a level playing field for recycled phosphates
- Development of **local solutions** implicating communities and farmers

Success stories

Rosanna Kleemann, Thames Water and University of Surrey, presented phosphorus recovery as struvite at the company’s Slough sewage treatment works using the **Ostara www.ostara.com** process. As well as producing a high-quality fertiliser (Crystal Green®) worth UK£ 37 000 /year, the process improves the biological



nutrient removal process (ensuring discharge consents) saves the company £ 100 000 in P-removal dosing chemicals, £ 75 000 reduced sewage sludge transport, £ 31 000 operating savings (nuisance deposits) and has achieved major media interest (see e.g. <http://www.aljazeera.com/programmes/earthrise/2014/12/recycling-phosphorus-2014121693225616272.html>). See SCOPE Newsletter 99.

Alexander Schitkowsky, Berlin Wasser, presented phosphorus recycling as struvite at the company’s Wassmansdorf works (process developed onsite, patent now marketed by CNP www.cnp-tec.de). The recovered struvite is sold locally to farmers as **Berliner Pflanze**. The company has established a carbon footprint showing benefits through reduced energy in sewage sludge drying and by reduced flocculation polymer consumption. See SCOPE Newsletter 101.



Carl Dewaele presented **NuReSys** experience in phosphorus recovery, with five installations operating today, 3 in French fries production, 1 in a dairy, 1 in pharmaceuticals and 3 in municipal waste water. The Apeldoorn plant will treat 73m³/h and produce 900 tonnes of struvite/year. **Cost benefits** include avoiding chemical precipitant costs, nitrogen removal and sales of the struvite product, giving payback in less than three years. The struvite is e.g. mixed with standard mineral fertilizers to provide a **combined slow and fast release start-up fertilizer for maize**.



See www.nuresys.be and videos at <https://www.youtube.com/watch?v=t0KK-olGirs>
<https://www.youtube.com/watch?v=u2oP2u2QBYg>

Philippe Becquet, DSM, presented the success of phytase as an animal feed ingredient, improving P uptake, so reducing feed phosphate additive use rates and reducing P concentrations in manures by up to 30%. Phytase has today achieved a 60-80% uptake rate in livestock farms. **DSM's phytase is a strong success story of R&D implementation**, is produced from renewable bio-sourced materials by fermentation. See SCOPE Newsletters 78 and 108.



Celia Bertholds, explained how the Käppala sewage treatment works is recycling 260 tonnes of phosphorus / year by **agricultural use of sewage biosolids**. Upstream actions with industry and households have enabled significant reductions of contaminant levels for e.g. cadmium, nonphynols. Käppala has examined degradation of harmful organic substances when sludge is composted with manure: results show a significant reduction of organophosphates and detergent chemical (LAS) contaminants.



The **REVAQ certification scheme** and complete traceability ensure farmer confidence. Agricultural use of biosolids is the most efficient route for nutrient recycling from sewage, but other solutions must be developed in parallel because of concerns with diffuse contaminants, such as pharmaceuticals and organic chemicals.



Xiangyang Chen, Tianshui Sweetest Apples Company, China, presented successful use of EcoSan toilets from Sweden to save water, implement sanitation in rural areas, and recycling nutrients through use of collected urine to fertiliser fruit production. After ten years of difficulties with societal acceptance, logistics and uptake, the company is today supplying urine as fertiliser to more than 30 orchard owners, whose **income has increased 30% with improved apple quality** as well as saving chemical fertiliser costs.

Violtje Lebuf, VCM (Flemish Coordination Centre for Manure Processing), explained that some **790 000 tonnes (fresh matter) of pig, poultry, cattle manure and digestate is today processed** (estimated c. 470 000 t dry matter) in Flanders and exported to Northern France. This corresponds to about 17 000 tonnes of P. The manure undergoes liquid/solid separation, drying, composting, nitrogen removal or ammonia recovery and post treatment (e.g. addition of other nutrients, granulation) to produce an organic fertiliser product, adapted for use on arable crops, so recycling both phosphorus and organic carbon. Flanders also exports granulated poultry manure to Asia and the Middle East. In total some 24 000 tonnes of phosphorus (P) are exported and recycled annually.



Povilaitis, below Juhan Sārgava, personal collection.

Sébastien Homo, Cooperl, Brittany, France, explained that Brittany's farmers process today over 400 000 tonnes of manure per year (processed weight, 50 – 90% dry matter), **producing organic fertiliser specifically adapted for different crop needs** and transported to other regions of France. This includes 150 000 tonnes of dry poultry manure, 150 000 tonnes of composted poultry litter and 100 000 tonnes of pig manure (30% of Brittany's pig manure), from a total of 1 100 farms. In total, Brittany's livestock manure contains around 200 000 tonnes of nitrogen (N) and 120 000 tonnes of phosphorus (P).



Ottilia Thoreson, presented the WWF's Baltic Sea Farmer of the Year Award. See SCOPE Newsletter 104 and www.panda.org/baltic_farmer WWF believes that **farmers are a key to the solution to the major eutrophication problems of the Baltic** (28% is classified as dead zones covering an area two times the size of Denmark). Showcasing individual farmer's agri-environmental measures is essential to demonstrate and disseminate for others to follow and replicate. WWF is also now launching a Baltic agri-environment cooperation platform.

http://www.balticcompass.org/PDF/Events/GABBS2014/Warnback_A%20platform%20for%20Agri-Environmental%20Cooperation_GABBS2014.pdf

Photo in right hand columns: top © WWF Lithuania / Egidijus





Cooperl also presented the **TRAC scraping system for in-stable solid/liquid separation of pig manure**, which reduces nitrogen climate gas emissions, improves animal and worker welfare (reduced NH₄) and facilitates manure treatment for nutrient recycling. 40 such installations are already operational in Brittany. In order to prevent possible contamination of manures, Cooperl already has one million “antibiotics free” pigs.

International cooperation

Monika Stankiewicz explained that HELCOM (Baltic Sea Marine Environment Protection Commission) takes nutrient management forward by a combination of political action, science and stakeholder dialogue. Nutrient reduction targets are negotiated with stakeholders so that targets are shared. **Phosphorus marine loading reductions are more challenging than for nitrogen**: although annual inputs have been reduced by some 5 000 tonnes P since a reference period (1997-2003), over 10 500 tonnes of P still need to be cut to reach the Maximum Allowable Input of 22 000 tP/y. Phosphorus reuse and recycling contributes to objectives and facilitates stakeholder commitment.



In discussion, the importance of soil erosion in phosphorus losses was underlined, but this is difficult to monitor, and participants pointed to the need for financial tools to support farm P-loss mitigation.

Mathias Bergman, presented BSAG (Baltic Sea Action Group) which functions as a stakeholder platform, strongly action orientated through member commitments. BSAG is taking forward the **transition to a Circular Economy for nutrients** by developing industrial processes and



working on societal attitudes and lifestyles. He proposed that BSAG could act as a nutrient platform for the Baltic region, as part of the ESPP network of national/regional platforms, and **proposed that the next European Sustainable Phosphorus Conference, ESPP3, take place in the Baltic region**, which is symbolic of phosphorus management in Europe.

Helen Rowe, explained that the North America Partnership for Phosphorus Sustainability (NAPPS) will have its first meeting on 19th May <https://sustainablep.asu.edu/events>. The US EPA, US Dept. of Agriculture and the Ontario Ministry of the Environment, and Agriculture and Agri-Food Canada are participating in discussions, alongside industry, research institutes and NGOs. NAPPS will facilitate innovation and develop dialogue on action strategies to **integrate P-efficiency and P-recycling in North America**.

Closing the Phosphorus cycle for a sustainable food system



Fertilizer



Farm



Food

Will Brownlie, CEH, presented the experience of the International Nitrogen Initiative and the International Nitrogen Management System www.inms.international in producing **scientific evidence and agreed understanding to support global policy**. This led for example to the UNEP policy framework proposals ‘Our Nutrient Planet’ 2013 (see SCOPE Newsletter 96) including the proposed goal of 20% improvement in nitrogen use efficiency (NUE) by 2020. Similar work is needed for phosphorus, to develop global P management policy, to complement locally specific actions. Research, with stakeholder involvement, is needed into phosphorus flows and models, environmental impacts, possible solutions and societal actors roles, in order to support defining agreed indicators, targets, potential benefits of achieving these targets, and monitoring. This is being taken forward by Global Partnership for Nutrient Management (see SCOPE Newsletter 107 and 108), with involvement of ESPP’s President Arnoud Passenier.



Demitarian food and phosphorus footprint

The importance of **changing diet to reduce the phosphorus footprint** was discussed. Will Brownlie underlined that one steak has a phosphorus footprint equivalent to around 750 potatoes, that is nearly a year's vegetarian food.

The **SCANDIC Hotel** provided **“Demitarian” catering** for the conference, on request of ESPP members. The “Demitarian” concept was introduced by the Barsac Declaration on environmental sustainability and demitarian diet. (<http://www.nine-esf.org/barsac-declaration>). Simply put, this translates to a 50% reduction in meat consumption, so considerably reducing phosphorus and nitrogen footprint, as well as reducing carbon emissions, water use, etc.



US\$ 10 million challenge

Melodie Naja, Everglades Foundation, Florida, presented the Phosphorus Grand Challenge to be launched in 2016 and to be awarded to cost effective **technologies removing and recycling phosphorus from eutrophied surface waters**. The US\$ 10 million challenge, designed by a scientific expert committee and InnoCentive, aims to demonstrate technologies full scale by 2022, with a number of stepping-stone prizes



and sub-prizes. The \$ 10 million for P-removal technologies, will start with prizes for lab scale tests and then bigger funding for pilot tests and full-scale demonstration. The additional sub-prizes are:

- 170 000 \$ for developing high added-value recovered phosphorus products
- 15 000 \$ for phosphorus footprint calculation methodology
- 60 000 \$ for farmers Best Management Practices to reduce phosphorus runoff
- 60 000 \$ for innovation and business plans

The target is to test the technologies under cold and warm weather conditions to reduce surface water phosphorus concentrations from around 300 ppb to 10 ppb. The competition is worldwide and **proposals from outside the USA are welcome**.

See SCOPE Newsletters 105 and 107 and <http://www.evergladesfoundation.org/grandchallenge/>



EU calls for P-recovery plants and pilot regions

The European Commission (DG Growth) announced two actions to support the phosphorus circular economy:

- A **call for full-scale phosphorus recycling installations**, based on business plans, with possible European Commission Investment Plan / European Investment Bank (EIB) loan funding
- A call for **six model regions for bio-refinery / nutrient circular economy** implementation, to benefit from Commission support and promotion

Panel debate: developing policies

The final conference plenary panel participants underlined the need to adapt existing legislation and implement Circular Economy policies to move phosphorus stewardship forward.

- **Eric Liégeois**, European Commission DG Growth: technologies for phosphorus recycling are operational but that legislation is not in place to accompany this. The new EU **Circular Economy policy 2015** and the revision of the **EU Fertiliser Regulations** will both be important.



- **Sofie Bouteligier**, Flanders Nutrient Platform: need for knowledge sharing, training and development of the **new skills** necessary for the circular economy. ESPP will be taking forward a working group on this with OCDE-LEED.
- **Max Schulman**, Finnish farmers association MTK and COPA-COGECA: **full scale testing and demonstration** of phosphorus recycling is needed, with scientific monitoring, to provide support for policy decisions and to convince farmers and consumers
- **David Sears**, European Economic & Social Committee, invited stakeholders to work with the EESC, which can **make proposals to the European Commission**
- **Otilia Thoreson**, WWF: action must be taken to **reduce the consumption phosphorus footprint**, and to integrate phosphorus management into the Common Agricultural Policy.
- **Mika Saariaho**, Outotec: phosphorus recovery and recycling technologies exist and companies such as Outotec are ready to implement these. However, **policy support is needed** to make this economically viable and so release the **job creation potential of the circular P economy**.
- **Greet de Gueldre**, Aquafin: **application of good quality sewage biosolids in agriculture is the most efficient way to recycling nutrients**. If not possible, then regional policies should ensure integrated and safe management of sewage, organic wastes and manure.
- **Jacob Hansen**, Fertilisers Europe: EU policy must ensure that recovered fertiliser products offer reliable **plant-available nutrients**. Another challenge for making recycling happen is to **facilitate logistics**. The future of recycling probably lies in the development of many spatially disseminated small-scale production sites.

In discussion, the need to **improve phosphorus use efficiency** was emphasised: improving crop use of soil phosphorus surpluses, plant breeding to improve crop soil P uptake. Participants underlined the importance of **soil organic carbon** in improving plant availability of phosphorus. Composts and other organic fertilisers contribute here.



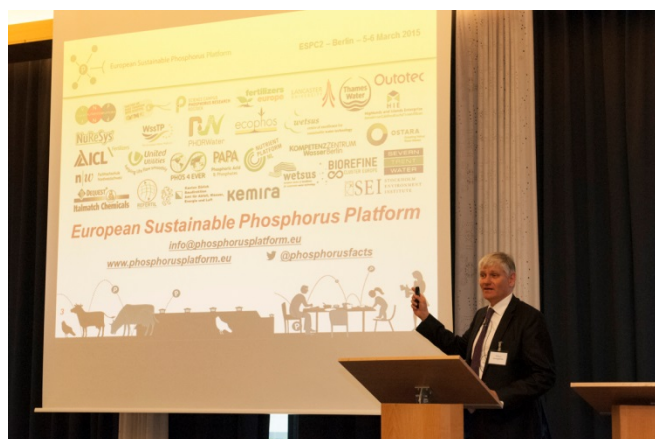
Participants repeated the need to reduce phosphorus waste in society. **Systemic changes** and closing the loop solutions are needed. Awareness raising and communication are important.

Discussions concluded clearly the **need for policy support for phosphorus stewardship and P-recycling**. Without a European policy framework, companies will not have confidence to invest and recycling economics will not enable job creation. Policy opportunities identified include:

- **EU CAP funding** of outreach via farmers' organisations to reduce P losses whilst maintaining food production and quality
- Integration of phosphorus into **Rural Development Fund** programmes
- Harmonisation and **standards** to support policy
- Public information, **training curricula**
- **Food waste** policy
- **Regulation should prevent P being lost** to sinks where recovery or reuse is not feasible
- Inclusion of phosphate rock on the **EU Critical**

Raw Materials list in 2014 should lead to policy actions

- Phosphorus reuse and recycling targets in the **Waste Framework Directive**
- Integration of recovered nutrient products into the **EU Fertiliser Regulation**
- As a priority, the new **EU Circular Economy policy** to be proposed in 2015



Arnoud Passenier, ESPP President and Netherlands Ministry for Environment and Infrastructure, concluded the conference, with three key messages from the panel and participants' discussions:

- Tomorrow's keyword is **sufficiency**: based on efficient phosphorus use and phosphorus recycling
- **Innovation** will change waste into a resource in a **Circular Economy**, creating jobs in Europe and opportunities for export of technologies and competence
- Companies, stakeholders, governments, the European Commission services, present at the conference, are a **strong network**, motivated, committed and ready to take phosphorus to the next level.

ESPC2 parallel sessions:

Regions implementing sustainable P policies

Anders Nättorp, FHNW Switzerland: **Switzerland published draft legislation obliging phosphorus recovery from sewage sludge and meat and bone meal end 2014** (see SCOPE Newsletter 108). Stakeholder feedback is now being considered and the

definite decree is planned for autumn 2015. Also a revision of national fertiliser legislation to accommodate recycled mineral fertiliser raw materials is planned. Kanton Zurich is pioneering the process. A mono-incineration plant for the sludge of the whole canton will come into operation this year and the Kanton is expecting to decide which technology will be used for P-recovery from ash (900t P) also in 2015 (see also SCOPE Newsletter 108).

Linda Bagge, Denmark EPA, explained **Denmark's national phosphorus objectives**. The country has c. 45 000 tonne P per year in manures, 5 000 tP in sewage sludge and 5 000 tP in food wastes and animal by-products such as meat and bonemeal. National objectives, fixed by the Government Resource Strategy 2013* require 80% recycling of sewage phosphorus by 2018, either by mono-incineration and production of fertiliser from the ash or by **agricultural application of sewage biosolids**. Today c. 60-70% of Denmark's sewage biosolids are used in agriculture. Objectives also require 60% valorisation of **organic waste from the service sector** (separate collection, biogas production), compared to only 17% today.

Actions currently being developed by Denmark include: R&D into P-recovery from sewage sludge ash, evaluation of technologies, development of Guidance on P-recycling, Lighthouse Billund BioRefinery full-scale biogas and nutrient recovery plant www.billundbiorefinery.dk and a proposed Denmark Phosphorus Platform. This platform would have as objectives: prioritise EPA actions, facilitate collaborative phosphorus value chains, international collaboration.

* "Denmark without waste"

http://eng.mim.dk/media/mim/67848/Ressourcestrategi_UK_web.pdf

Diane Duncan, Highlands and Islands Enterprise and **Janine Young**, Scotland Environment Protection Agency, presented Scotland's "Hydro-Nation" policy. In Scotland 10% of surface waters are not achieving quality objectives because of phosphorus, with important issues from **diffuse household P losses**. Phosphorus losses are often linked to EU 'Priority Substances' (toxic pollutants). Scotland also wishes to address diffuse pollution through P levels in animal feeds. Scotland's SBRI (Small Business Research Initiative) has launched an **800 000 UK£ funding challenge for public-private innovative solutions to recover phosphorus**, nutrients and chemicals from water for beneficial use. <http://www.hie.co.uk/about-hie/news-and-media/archive/innovation-competition-launched-to-protect-scotland-s-water-environment.html#sthash.TyTniyLc.dpbs>



Reducing P losses from agriculture

Beata Jurga Institute of Soil Science and Plant Cultivation, Poland, presented the P-Index approach to estimate diffuse phosphorus emissions in Poland. **Kuno Kasak**, University of Tartu (Estonia) presented a catchment modelling approach to define cost-efficient actions to reduce phosphorus losses. **Peter Leinweber**, ScienceCampus Phosphorus Research Rostock, presented examples for the use of recovered materials as fertilisers: food industry wastes, bonechar, and biogas digestate. **Inga Krämer**, ScienceCampus Phosphorus Research Rostock, rapporteur, concluded that stakeholder cooperation can **take science to practice**, including modelling to support policy and management practice tools, with a need for field scale testing and demonstration.

Innovation for phosphorus sustainability

Will Brownlie, CEH Scotland, **Rob de Ruijter**, EcoPhos, **Frank de Ruijter**, The Sustainability Consortium, and **Rainer Schnee**, Budenheim, rapporteur. The importance of dietary phosphorus footprint must be addressed by involving industry in science-based actions, integrated into an overall sustainability approach. Stakeholder networking is essential.



Agricultural phosphorus efficiency

Kurt Möller, University of Hohenheim, rapporteur. **Allan Buckwell**, RISE Foundation, explained that “Sustainable Intensification” and reduced wastage are essential to ensure adequate food production with reducing land availability and so **global food security** (see SCOPE Newsletter 107). **Debbie Mc Connell**, ECIP European Cattle Innovation Partnership, explained how the dairy sector is looking to reduce environmental impacts by increasing efficiency, so

contributing to growth and jobs (see SCOPE Newsletter 109). **Javier Brañas Lasala**, Fertiberia, underlined the need to **improve crop use of fertilisers**, looking at soil microorganisms, organic carbon and the need for improved agricultural advice to farmers.

Global phosphorus governance

Kimo van Dijk, Wageningen University, Netherlands, summarised this session. **Felix Ekardt**, Rostock Phosphorus Campus, explained that phosphorus sustainability requires **transition management and cultural change**: behaviour is as important as science. **Arno Rosemarin**, Stockholm Environment Institute, considers that data on phosphate rock reserves is inadequate and non-transparent and suggested that a “Global Phosphorus Security Roadmap” should be initiated. **Anna Kuokkanen**, LUKE Natural Resources Institute Vantaa, underlined that the phosphorus cycle currently greatly exceeds **planetary boundaries**, posing the need to transform both diet and agri-food production systems. Participants disagreed on the need for an international treaty or agreement, but agreed on the need to discuss governance issues at the global level whilst at the same time already engaging action at the local level

Skills development

Sofie Bouteligier, OVAM, **Dirk Halet**, VLAQWA, and **Nathalie Cliquot**, OECD LEED (Local Economic and Employment Development) programme developed this session. **The phosphorus circular economy will create jobs but will also modify the type of staff companies are hiring and the training companies need to provide**. The session identified:

- Specific needs: **Design skills** (e.g. designing products in such a way that people behave in a circular way), **ICT skills** (e.g. in the field of precise fertilisation: 4th Industrial revolution), **hands-on experience** with pilot projects, better **waste management** practices .
- Generic needs: transdisciplinary, communication skills; training for cooperation and working together; new multidisciplinary and social application knowledge with a role for NGOs who have expertise in these areas; specific training and outreach for farmers;

A **full report of this session** is available on the ESPC2 conference website. This work will be taken forward by ESPP – OECD over coming months:

www.phosphorusplatform.eu/esp2/



Discussion tables

- Awareness raising
- Legal and economic policy options to foster sustainable nutrient management in Europe
- Bridging the gap between recovery and recycling
- Perspectives for biological nutrient removal in municipal wastewater and synergy with P recovery
- Nutrient recycling in composts and digestates
- Sustainable manure management
- Recovering nutrients in biorefineries and biofuels production
- Nutrient and energy recovery from chicken manures, animal residues
- Nutrient recycling in organic farming
- Phosphorus efficiency, what does it mean
- Plant availability of recovered P products
- Research integration and implementation agenda for P sustainability
- Financial instruments to foster sustainable nutrient management
- MFAs, MSAs, nutrient flow analyses – data, action hotspots, criticality
- LCA methodology aspects
- Phosphorus resources, supply and demand

Summaries of certain table discussions will be available at:

www.phosphorusplatform.eu/espc2/



Simulation business game: P fiscal reform

The Swedish Sustainable Economy Foundation ([TSSEF.SE](http://tssef.se)) its presented **business-game simulation of divided-bearing pollutant fee mechanisms**. This simulates a government charged with reducing emissions of phosphorus against food producers and property owners who try to maintain profits whilst following regulations. At ESPC2, five teams were food, producers, property actors and the government. Most teams managed to get back to profitability, some reaching new heights. A full summary of the TSSEF.SE simulation game at ESPC2 outcomes can be found at <http://tssef.se/simulation-shows-how-environmental-fiscal-reform-works-at-european-phosphorus-conference/>

Parallel events

Phosphorus video

Marissa de Boer, SUSPHOS, and **Helen Rowe**, North America Partnership for Phosphorus Sustainability, brought together participants to work on a series of videos to promote different aspects of phosphorus sustainability (see SCOPE Newsletter 110).

To participate in this project marissa.de.boer@vu.nl



Struvite fertiliser criteria

A technical working group organised by ESPP brought together 7 of the approximately 10 companies / water utilities **producing recovered struvite from wastewater today in Europe** (legal entities).

The meeting discussed implementation of **art. 2(7)d of REACH** (European chemical regulation), which exempts recovered substances from registration obligations, under certain conditions. The EU Commission (DG GROW) has engaged action to ensure a coherent interpretation of this article for recovered struvite by the different EU member states.

Issues around End-of-Waste / product / by-product status were also discussed.

The group also progressed content of a **joint proposal for “EU fertiliser criteria for recovered struvite”**, following consultation of all identified struvite recovery process operators and technology suppliers. The proposals are now being finalised in dialogue with competent experts, will be taken to ESPP members and partner stakeholders for validation, and then submitted to the European Commission as a proposal for input to the EU Fertiliser Regulation revision and/or JRC struvite End-of-Waste criteria.

To contribute to this process: info@phosphorusplatform.eu

German Phosphorus Platform DPP



The German Phosphorus Platform (DPP) had its first meeting of members and **elected the Board** for the Platform, which is now newly legally established as a not-for-profit association (e.V.).



The DPP Board is:

- **Stefan Gäth**, Justus-Liebig University Giessen
- **Michael Spitznagel**, Bavarian State Ministry of the Environment and Consumer Protection
- **Christian Kabbe**, Berlin Centre of Competence for Water
- **Kees Langeveld**, ICL Fertilisers
- **Rudolf Bogner**, CNP-Technology Water and Biosolids GmbH
- **Burkard Hagspiel**, City of Nuremberg
- **Peter Leinweber**, Leibniz ScienceCampus Phosphorus Research Rostock



DPP will now take forward a number of actions, to fulfil its aim to achieve a sustainable phosphorus management in Germany. Some of these actions are:

- support networking of phosphorus related stakeholders from agriculture, engineering, science, policy and municipalities,

- create interdisciplinary understanding, develop guidelines and recommendations on best practices for policy makers,
- provide data on mass flows and qualities of phosphorus in Germany

First action of DPP is the development of a national work plan for P management in Germany, based on an inquiry of its members.

Furthermore the general awareness of phosphorus disposal has to be risen in Germany to gain more members and bring the developed technologies for P recovery into the market.

The secretariat is now managed by Daniel Frank info@deutsche-phosphor-plattform.de

ARREAU best practice cases for P-recovery

Draft Best Practice fact sheets on nutrient recovery from wastewaters were discussed at a meeting of the **ARREAU Resource Recovery working group**. ARREAU is a Horizon2020 EIP Water Action Group.

These fact sheets will cover both technologies operational today full-scale and promising processes today at the pilot scale and probability of full-scale implementation in the near future. The objective is to **contribute to standards and BAT definition**.

The working list below is not yet finalised:

- Agricultural valorisation of treated biosolids
- Struvite recovery from municipal and industrial wastewater
- Processing biosolids to produce organic fertilisers
- Processes recovering phosphoric acid/MCP/DCP from sewage sludge ash

If you are in charge of a best practice in full-scale, success-story on P-recovery or business cases we missed, and you want us to promote them as best practice on P-recovery in the EIP Water Action Group and on European Level, please contact us:

fabian.kraus@kompetenz-wasser.de

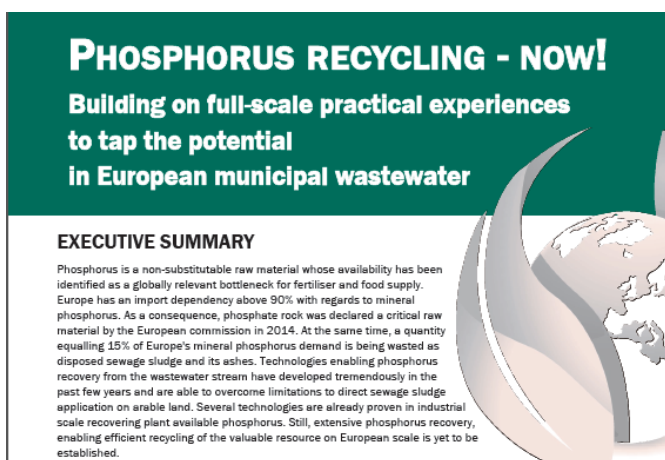
ARREA = Accelerating Resource Recovery from Water Cycle, EU EIP Action Group <http://www.eip-water.eu/eip-water-keeps-growing-and-welcomes-16-new-action-groups>



P-REX policy brief

At ESPC2, **FHNW Switzerland** launched the P-REX policy brief “**P-recycling Now! Building on full-scale practical experiences to tap the potential in European municipal wastewater**”

In 9 pages (plus 6 pages case studies annex), this document summarizes arguments for widespread implementation of technical phosphorus recycling from municipal wastewater, potential business models, and the policy support necessary, as seen by the P-REX project 15 partners. The document puts the following policy message:



Several **technologies for P-recovery are already ready for implementation**. Technical P-recovery can complement agricultural valorization of sewage biosolids and address obstacles caused by sludge quality and logistics. Wide-spread implementation requires the following:

- 1. Realistic and reliable European phosphorus recovery targets**, especially from wastewater. It should be combined with a European overall road map and defining Best Available Technologies for phosphorus recovery and recycling.
- 2. Obligation for national or regional action plans for phosphorus recovery**, in line with the European goals, implementing technical recovery of phosphorus and/or agricultural valorisation of high quality sludge.
- 3. Clear guidelines stopping contradictory national interpretation of the current European legislation around recycling of phosphorus** from waste, especially into fertilisers. Better integration of secondary raw materials and introduction of quality standards including end-of-waste criteria to the European Fertilisers Regulation .

4. National mechanisms for fair distribution of the cost of phosphorus recovery (e.g. fertilizer mixing quota, recovery obligations). Financing of demonstration projects, since references are obligatory for market penetration of innovative technologies and products.

P-REX website: <http://p-rex.eu/>

P-REX policy brief, March 2015: http://p-rex.eu/uploads/media/P-REX_Policy_Brief_final.pdf

SNB – HVC – EcoPhos P-recovery contract

At ESPC2, SNB (Slibverwerking Noord-Brabant), HVC Groep and EcoPhos announced signature of a **contract to use c. 60 000 tonnes/year of sewage sludge incineration ash from the Netherlands as a raw material for phosphorus recycling**.



The ash will be treated at **EcoPhos’ new plant under construction in Dunkerque**, France, producing DCP (Di Calcium Phosphate) using a wet chemical process, for use in fertilisers or animal feed.

SNB and HVC currently incinerate around one half of the Netherland’s municipal sewage sludge (c. 1.5 million tonnes/year), Because the companies use “mono-incineration” (sewage sludge incinerated separately, not mixed with municipal solid waste or other waste), the ash contains high phosphorus levels (up to 7% P). **The project will recycle over 4 000 tonnes/year of phosphorus.**

<http://www.snb.nl/nieuws/grote-stap-gezet-in-de-recycling-van-schaarse-grondstof-fosfaat/1931>

P-recycling workshop : R&D to deployment



The workshop organised by the European Commission (DG Research & Innovation, **Tomas Turecki**, photo above), P-REX and ESPP on 4th March (at BAM, Berlin) brought together 80 participants and 28 nutrient recycling projects (see list below).

Initiatives present included R&D and demonstration projects funded by the EU (FP7, LIFE+, InterReg) as well as national funded projects and industry initiatives.

The workshop noted that some processes are **already at the commercial production scale**, e.g. processing manure to organic fertiliser, calcium silicate filter media for diffuse farm P-removal, struvite recovery, EcoPhos P-recovery from manure and sludge ash.

A number of promising new approaches were also presented, including the **RecoPhos (thermal)** process (see SCOPE Newsletter 104 and also the next edition for a summary of the recent pilot demonstration of the technology), TL BIOFER using **microalgae** to convert sewage to fertiliser ...

Participants underlined **the need for policy support for phosphorus recycling and coherent interpretation of pertinent EU and national legislation** as preconditions for widespread implementation.

The economic value of recovered phosphates as fertiliser does not cover recycling costs. In some cases, **implementation is driven by cost savings** (e.g. reduced waste disposal costs and P-removal chemical purchase) or operational improvements in water treatment (better sludge dewatering, improved biological nutrient removal performance, avoidance of

nuisance deposits ...). Another way forward is to **high added-value recovered phosphorus products** such as pure phosphoric acid or white phosphorus P₄.

Workshop R&D recommendations

The workshop identified the following R&D needs:

- **Phosphorus flow studies** (mass flows, characteristics), to identify points for P-recovery implementation
- **Social science** (attitudes, acceptance, choices) to accompany P-recycling implementation
- **Actions covering the whole value-chain**, from P-recovery to market of recycled P products
- Detection & risk assessment of **organic contaminants in sewage sludge** and recovered nutrient products
- **Full-scale demonstration** projects
- R&D to support **standards, BAT, product criteria, best practices**
- Coherency and interpretation of EU and national **legislation**
- **Regional approaches** and adapting to specific local situations or niche markets
- **Clustering** of projects and networking to enhance impact on policy, improve synergy and mutual learning and facilitate market uptake

A full workshop report will be published shortly by the European Commission and summarised in a future SCOPE Newsletter.

A list of **projects and initiatives on phosphorus recovery and nutrient recycling** is given below. The projects present at the workshop are indicated below.

NOTE: this does NOT include companies or utilities already operating nutrient recovery or selling technology commercially, because these are already inventoried elsewhere (P-REX eMarket and ESPP website members' pages at www.phosphorusplatform.eu, NAPPS P-recycling operator inventory)

This list will be maintained and updated on the ESPP website www.phosphorusplatform.eu

If your project is not listed, please contact ESPP



List of nutrient recovery projects and initiatives

An updated version of this list can be found online at www.phosphorusplatform.org under Platform > Links and Resources. The list below is based on the information available and projects at the date of 4th March 2015

Nutrient recycling research projects (technology, demonstration, implementation assessment)			
<i>Name</i>	<i>Description</i>	<i>Funding</i>	<i>Website</i>
Best Resources from Water	Learning from Best Practices on Resource Recovery from Water	TKI (NL)	http://bestresourcesfromwater.org/
A_Propeau	Includes P filtering from artificially drained agricultural fields	IWT, Belgium	
AquaEnviro UK	Sustainable fertiliser from renewable energy byproducts	UK NERC	www.aquaenviro.co.uk/limited/newsarticle/Leading-the-field-in-sustainable-fertiliser-research
BioEcoSIM			www.bioecosim.eu
Biorefine cluster		InterReg	www.biorefine.eu/cluster/projects
DeBugger	Demonstration of efficient Biomass Use for Generation of Green Energy and Recovery of Nutrients	EIT KIC InnoEnergy	http://www.kic-innoenergy.com/case-study/debugger/
End-o-sludg	Marketable sludge derivatives	FP7	www.end-o-sludg.eu
FERTIPLUS			www.fertiplus.eu
Circular economy for plant nutrients		German BMBF	
ImproveP			https://improve-p.uni-hohenheim.de
INEMAD			http://www.inemad.eu
LIFE PHORWater	Struvite recovery from wastewater	LIFE+	www.phorwater.eu
ManureEcoMine			www.labmet.ugent.be/content/manureecomine
LIFE NECOVERY	WWTP of the future: Nutrients and energy recovery from wastewater	LIFE+	www.life-necovery.eu
NewFert	Nutrient recovery from biobased Waste for Fertilizer production	H2020	Just starting
Northern Ireland EPA project			
Nutricycle			www.dlvinnovision.be/dlvinnovision/en/mip-icon-2011-nutricycle
RISE Foundation	Nutrient recovery and recycling in European agriculture– a review		www.risefoundation.eu
NUTS	Transition towards Sustainable Nutrient Economy in Finland		www.nutrient.fi/en
OCAP	Optimisation of carbon, nitrogen and phosphorus cycles in the city (Paris)		
PhosFarm			www.igb.fraunhofer.de/en/press-media/press-releases/2013/phosfarm-agricultural-phosphorus-recovery.html



Nutrient recycling research projects (technology, demonstration, implementation assessment)

Nutrient Clearing House	Centralized upgrading plant for the recovery of mineral nutrients and critical metals	MIP	http://www.i-cleantechvlaanderen.be/nl/nch
PRecover	Recovering phosphorus from sewage sludge to fertilizer	Finland Min. Agri	
PProduct	Potential of sewage sludge phosphorus in plant production	Finland Min. Agri	
P-REX		FP7	http://p-rer.eu/
PROMISE Finland	Phosphorus Recycling of Mixed Substances	BONUS EEIG	http://www.bonusportal.org/projects/innovation_projects/promise
R3Water	Resource efficiency, reuse and recovery in urban wastewater treatment	FP7	http://r3water.eu/
RecoPhos (thermal)	Thermal production of P4 based on InduCarb furnace	FP7	www.recophos.org
RecoPhos Germany	Chemical treatment of ash with phosphoric acid to produce a phosphate fertiliser		www.recophos.de
REFERTIL	Competitive manufacturing of ABC Animal Bone bioChar		www.refertil.info
ReuseWaste			www.reusewaste.eu
Sustainable Airport Cities	Pilot for recycling of P from wastewater of airport/planes	TKI (NL)	http://www.kwrwater.nl/tki/sustainable-airport-cities/
Routes	Enhanced sewage sludge stabilization for its agricultural easy recovery	FP7	www.eu-routes.org
SuWaNu	Sustainable Water Treatment and Nutrient Reuse Options		http://suwanu.eu/
TL-BIOFER		LIFE+	http://www.life-tlbiofer.eu/
VALODIM	Optimal Valorization of Digestate, NPK recovery (NOTE: follows Phosph'OR)	French BPI	www.bpifrance.fr/content/download/131337/2292074/file/20140221%20Valodim%20-%20PSPC.pdf
ValueFromUrine	Demonstration of a bio-electrochemical system for recovery of nutrients from urine.	FP7	www.valuefromurine.eu
Wetsus Phosphate Recovery theme	Phosphate recovery from iron phosphate and iron based phosphate adsorbents	Kemira, ICL, STOWA	www.wetsus.nl/phosphate-recovery
AV CleanPhos			
IF2O - COOPERL			
OmzetĀ Amersfoort	Wastewater resource factory	LIFE+	http://www.omzempuntamersfoort.nl
AVA CleanTech	Hydrothermal carbonization (HTC) for sewage sludge treatment.	Swiss Federal Office for the Environment (FOEN)	www.ava-co2.com
Tetraphos®	Phosphoric acid dissolution of ash then purification	Remondis Aqua	http://www.remondis-aktuell.com/en/remondis-aktuell/032014/water/phoenix-from-the-ashes/
POWER	Renewable P-fertilizer from livestock effluent to prevent water eutrophication	CARIPO Foundation	http://users.unimi.it/ricicla/



Nutrient recycling research projects (technology, demonstration, implementation assessment)

KRN-Mephrec	Transforming sewage sludge to energy, fertiliser and iron in a single step	BMBF	http://www.nuernberg.de/internet/krn-mephrec/
Budenheim process	Low temperature CO ₂ P extraction from sewage sludge to produce phosphoric acid	Private company	
Tianshui Shui Sweetest Apples Ltd	Growing apples with urine	SOHO China Foundation	www.toilechina.com.cn
Waste to Product (W2P)	Valorization of industrial wastes brines containing N,P,Ca,Mg as chemicals/fertichemicals	Spanish RD (Mineco)	
ZAWENT	Integrating water, energy and nutrient recovery in the cities of the future	MIP	http://www.i-cleantechvlaanderen.be/nl/zawent

Related networks and platforms

IWA Resource Recovery Cluster	IWA Specialist Group for Resource Recovery	Network	http://www.iwa-network.org/cluster/resource-recovery-from-water-cluster
Netherlands Nutrient Platform	Dutch sustainable nutrient network	Membership network	http://www.nutrientplatform.org
Vlaams Nutriëntenplatform	Flemish sustainable nutrient network		http://www.vlakwa.be/initiatieven/nutriëntenplatform/
German Phosphorus-Platform (DPP)		Membership Network	www.deutsche-phosphor-plattform.de
WssTP (European Water Platform)			http://wsstp.eu/
ScienceCampus Rostock Phosphorus Research			www.wissenschaftscampus-rostock.de/
ESPP	European Sustainable Phosphorus Platform	Membership network	www.phosphorusplatform.eu
ARBOR	Nutrient recovery from digestate	InterReg	http://www.vcm-mestverwerking.be/publicationfiles/VC M001 Rapport_04_LR.pdf
ARREAU Resource Recovery WG	EIP Water Action Group	Membership network	http://www.eip-water.eu/ARREAU
Baltic Sea Action Group	Membership	Network	www.bsag.fi
NAPPS	North America Partnership for Phosphorus Sustainability	Membership network	https://sustainablep.asu.edu/
PhoSciNet (ended 2011)	European Phosphorus Sciences Network	COST	www.phoscinet.org
SusPhos	Sustainable industrial phosphorus chemistry		www.susphos.eu
European Compost Network (Task Group 'Biobased products')	Quality assurance for recycled organic waste products – sludge compost	Membership Network	www.compostnetwork.info
Phosphorus Sustainability Research Coordination Network	Five year research network on themes of P efficiency and P recovery and the synthesis if the two.	US NSF	www.sustainableP.asu.edu

Agenda

Argus FMB East Europe Fertiliser conference

2015 Argus FMB East Europe Fertilizer 2015 will take place on **17-19 June in Prague**. The annual event brings together the major fertilizer and raw material producers from within the CIS with their major global trading partners. Expert analysis will be provided by our speakers and panellists, framing eastern Europe issues in the context of our global industry. You will hear the latest updates on phosphate fertilizer consumption in Eastern Europe, looking at Russian export strategies, product movement and forecasts for increased consumption. Whether you are interested in fertilizer production in Russia, developments in domestic nitrogen market trends, trends in natural gas prices or the latest duty changes this is the event to attend in 2015.

Register today: <http://argusmedia.com/Events/Argus-Events/Europe/Fert-East-Euro/Home>

Upcoming events

- ❖ 31 Mar - 3 Apr, Seattle, International Conference on Livestock and Poultry Environmental Quality – **Waste to Worth** <http://water.okstate.edu/news-events/conferences/waste-to-worth-2015>
- ❖ 12-17 April 2015, Vienna, Austria, **European Geosciences Union: P soil biochemistry, P across boundaries, P-recovery** www.egu2015.eu
- ❖ 16-17 April, Rennes, France, **BioRefine meeting on organic fertilisers, composts and digestates** <http://www.aile.asso.fr/index.php/rencontres-franco-belges-entre-regions-productrices-de-fertilisants-issus-delevage>
- ❖ 17-18 April, Axel, Netherlands, **ManureEcoMine** pilot plant visit and presentation www.manureecomine.eu
- ❖ 29th April, London 9h30 - 16h30, Royal Society of Chemistry: **UK Nutrient Platform** meeting of stakeholders http://www.phosphorusplatform.eu/images/UK_Nutrient_Platform_29-4-2015_save-the-date.pdf
- ❖ 1 May – 31 Oct. **Expo2015** Feeding the planet, energy for life, Milano <http://en.expo2015.org/>
- ❖ 3-7 May 2015, Barcelona, SETAC Livestock Environmental Assessment and Performance (LEAP) Partnership session, **challenges for global modelling of N & P in agriculture supply chains** http://barcelona.setac.eu/home/?contentid=767&pr_id=766
- ❖ 18-20 May 2015, Marrakesh, Morocco: **SYMPHOS** www.symphos.com
- ❖ 18-21 May, Gdansk, Poland, **IWA Nutrient Removal and Recovery Conferences** <http://www.iwahq.org/2jw/events/iwa-events/2015/nrr2015.html>

- ❖ 18-22 May 2015, Washington DC, **Phosphorus Research Coordination Network (P-RCN)** <https://sustainablep.asu.edu/>
- ❖ 19 May, Washington DC, **NAPPs stakeholder event**. Programme at <https://sustainablep.asu.edu/events>
- ❖ 3-5 June 2015, York, England, Gdansk, Poland, **RBB-11 11th International Conference on Renewable Resources & Biorefineries** <http://www.rrbconference.com/>
- ❖ 15-16 June, Skellefteå, Sweden, **LIFE+ conference Resource Recovery and Water Protection** <http://www.outotec.com/en/About-us/Calendar-of-events/Life-Conference-Resource-recovery-and-water-protection/>
- ❖ 17-19 June, Prague: **ARGUS FMB East Europe Fertiliser Conference** <http://www.argusmedia.com/Events/Past-Argus-Events/Europe/2014/Fert-East-Euro/Home>
- ❖ 24-25 June, Stuttgart, Germany, **P-recovery P-ROC pilot plant visit & conference** (in German) http://www.prueck-dwa-bw.de/programm_und_vortraege/
- ❖ 24 June, Brussels, ECN (European Compost Network) policy workshop: compost & digestate in the Circular Economy www.compostnetwork.info
- ❖ 19-22 August, Tampere, Finland: **Global Dry Toilet Conference** www.huussi.net/en
- ❖ 30 Aug – 2 Sept, Ghent, Belgium, Bridging towards the chemical industry 1st **IWA Resource Recovery Conference** <http://www.iwarr2015.org/>
- ❖ 17-18 September 2015 Toledo, Castilla-La Mancha Gastronomy School, Spain **REFERTIL International Conference** <http://www.refertil.info>
- ❖ 1-2 October, Vienna University of Technology, “**Mining the Technosphere: Potentials and Challenges, Drivers and Barriers**” helmut.rechberger@tuwien.ac.at
- ❖ 11-14 October 2015, Ithaca, New York, USA, 2nd International Conference on **Global Food Security** www.globalfoodsecurityconference.com
- ❖ 18-19 November, Minneapolis, **SERA-17** promoting innovative solutions to minimize phosphorus losses from agriculture <http://www.cvent.com/events/2015-sera-17-meeting/event-summary-4eb969f0be224a25821b4372c54c34a5.aspx>
- ❖ 2-4 Dec 2015, Ghent, Belgium, **ManuResource II** (manure valorisation) <http://www.manuresource2015.org/>
- ❖ 12-16 Sept 2016 Rostock, Germany, 8th **International Phosphorus Workshop (IPW8)**, Phosphorus 2020 – Challenge for synthesis agriculture & ecosystems <http://www.wissenschaftscampus-rostock.de/>

18th to 20th of May 2015, Marrakesh

SYMPHOS : International Symposium on Innovation and Technology in the Phosphate Industry. Organised by the OCP Group, this technological and scientific event focuses on innovation, technology and current trends in processes to upgrade phosphates and derivatives, as well as research and development prospects in the phosphate sector.



Following the success of the two previous events held in 2011 and 2013, Symphos 2015 will be the place to be for major international players in the phosphates and phosphate derivatives industry. A wide range of scientific subjects, phosphate innovations and the use of advanced technology for sustainable agriculture will be discussed during Symphos 2015. Renowned international experts will take part of this event to contribute to, and to benefit from its various programmes. It is also an opportunity for these experts to share the results of their researches, and of their different projects. There will be also debate sessions organised by a high-level international and technical committee.

Symphos will be also open to biotechnology, fertilizers of tomorrow and to "slow & - controlled releases". As well as a forum to share ideas and to discuss sustainable development topics including water & energy management, industry-related challenges, and the development of innovative processes and sustainable agriculture.

Sustainable agriculture

Through the organisation of this event for the third time, OCP, the world leader of the phosphate industry, reaffirms its commitment to the promotion of technical and industrial innovation for sustainable agriculture.

The International Symposium on Innovation and Technology in the Phosphate Industry (SYMPHOS) is a once every 2 years event and a global benchmark dedicated to key players in the phosphates and phosphate derivatives industry. This technological and scientific event is a platform for sharing ideas on innovation, technology, current trends in terms of processes for upgrading phosphates and derivatives, research, and development prospects for the phosphate sector. Initiated in 2011 and repeated in 2013, SYMPHOS has been attended by over 1,900 industrial stakeholders, manufacturers, equipment suppliers and researchers from 43 countries, who come together to share their experiences, discover the latest innovations and discuss their thoughts on the future of the phosphate industry. Held every two years, this committee works to enrich and diversify the event's scientific and technical content in connection with the phosphate industry.

OCP: world leader

The OCP Group is a global leader in the phosphates and derivatives market, including fertilisers, and has been a major player on the international market since 1920. The Group has exclusive access to Morocco's phosphate reserves, the largest reserves in the world according to the USGS. The Group is also a "leading low-cost" producer of phosphate and has become a key player throughout the entire phosphate value chain. The Group employs nearly 23,000 staff and achieved a turnover of US\$5.5 billion in 2013. <http://www.ocpgroup.ma/>

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www.symphos.com*