
**Chris Thornton - European Sustainable Phosphorous Platform**

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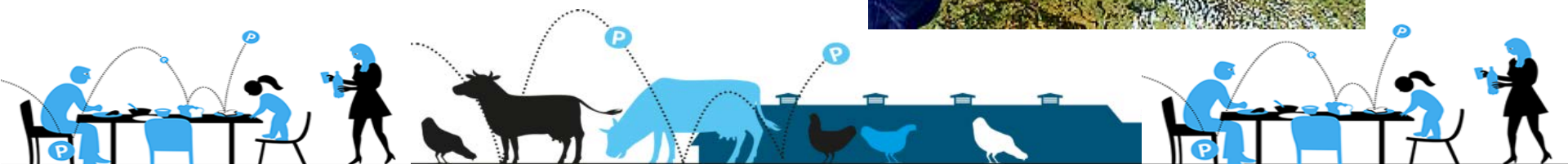
www.phosphorusplatform.eu @phosphorusfacts

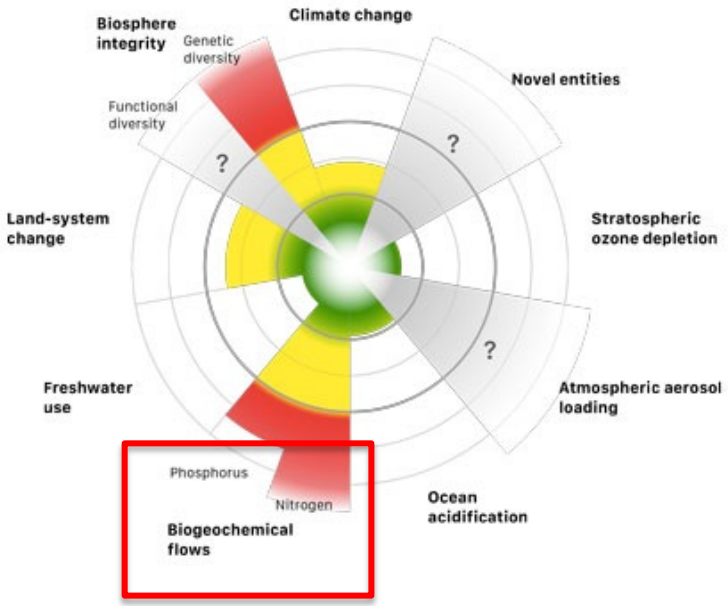
# *Pourquoi recycler le phosphore?*

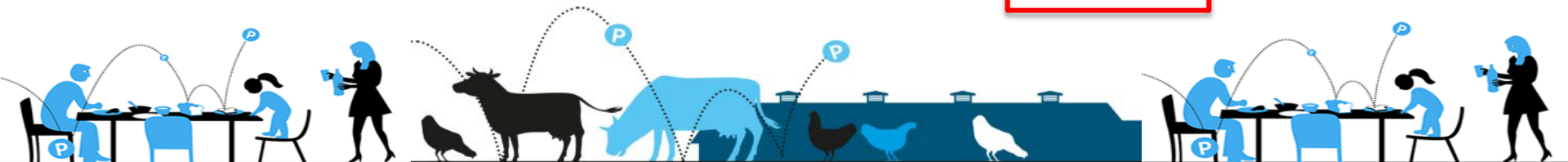


# Le phosphore (P)

*- eutrophisation:*
*principale cause (non morphologique) de non-atteinte des objectifs de qualité de la Directive Cadre Eau*

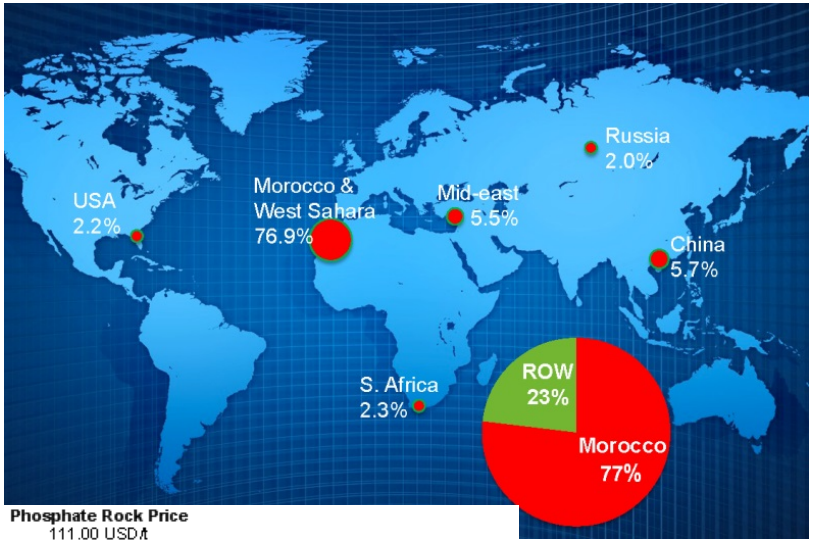
*- Planetary Boundaries*



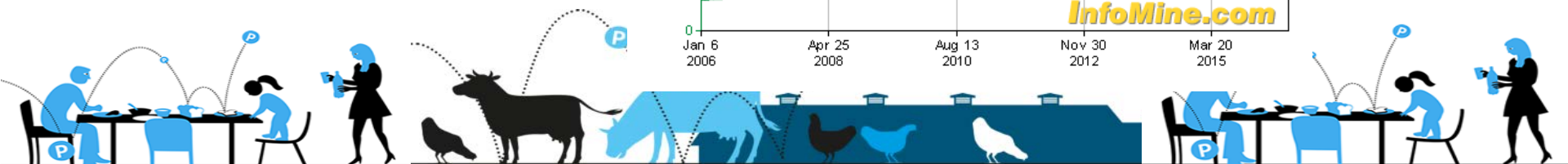



# L'Europe

- *Dépendance à 90% d'importations*
- *Concentration géopolitique des ressources*
- *Prix au marché mondial*
  *- variabilité*
  *- lié au prix des commodités agricoles*



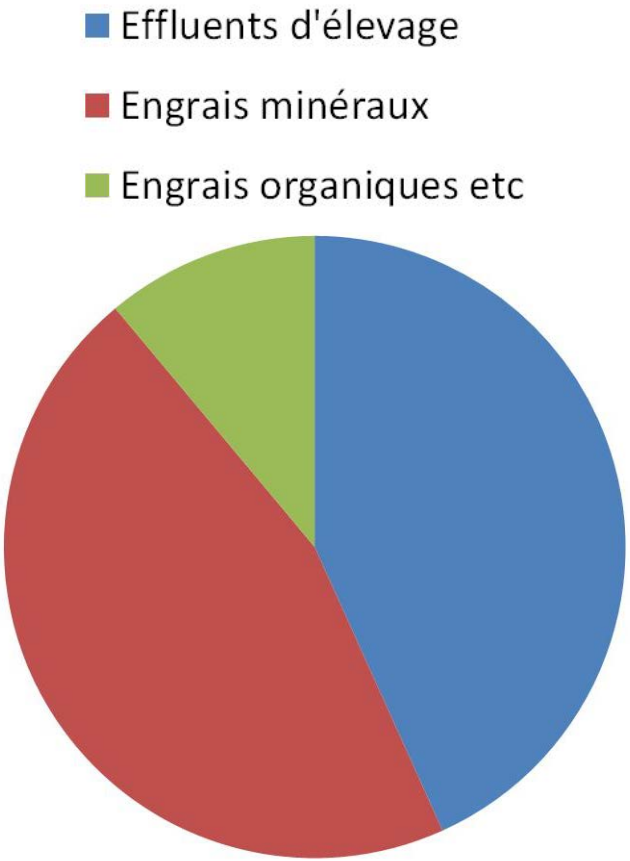




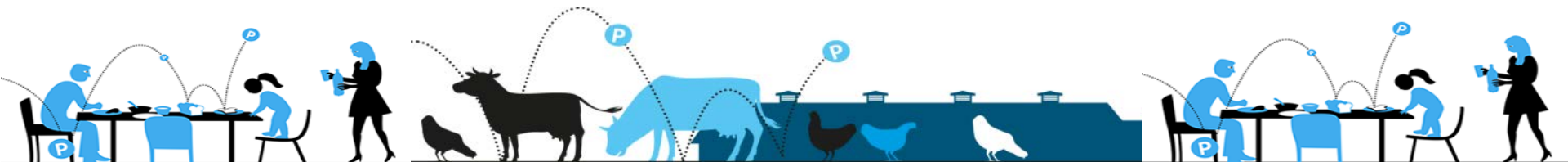
# Recyclage du P en France

- *Les lisiers = autant d'apport en P que les engrais minéraux [1]*
- *75% des boues d'épuration valorisés en agriculture [2]*
- *engrais minéraux phosphatés = 192Kt P = 400 millions d'€ [3]*

*Apports de phosphore, France 2015: fertilisants commercialisés et effluents d'élevage non commercialisés, total 400 000 tP*




1 = Observatoire de la fertilisation minérale et organique 2015 (ANPEA, UNIFA, AFCOME, AFAIA, COOP de France, CTPL, UP Chaux, UPJ)
http://www.anpea.com/livraisons-de-fertilisants/observatoire-de-la-fertilisation-minerale-et-organique.html
2 = "Answers to the Sewage Sludge Questionnaire", EurEau 4.10.2016
www.eureau.org (under Positions/Reports)
3 = en valorisant l'unité de P2O5 autour de 1€/kg



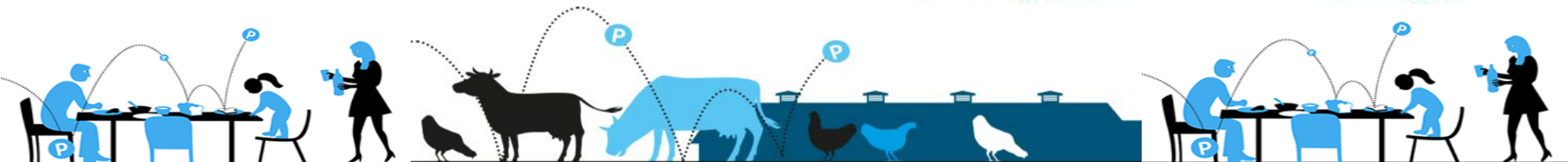
# Economie circulaire du phosphore

- *Resource non renouvelable, dépendance d'importations*
- *Eutrophisation*
- *Emissions d'ammoniac[1]*
- *Retour de carbone organique au sol[2]*
- *Méthanisation*
- *Gestion des boues et déchets alimentaires*
- *Concentration de la production animale*
- *Création d'emplois en zone rurale*
- *Economie agricole*

CIRCULAR ECONOMY

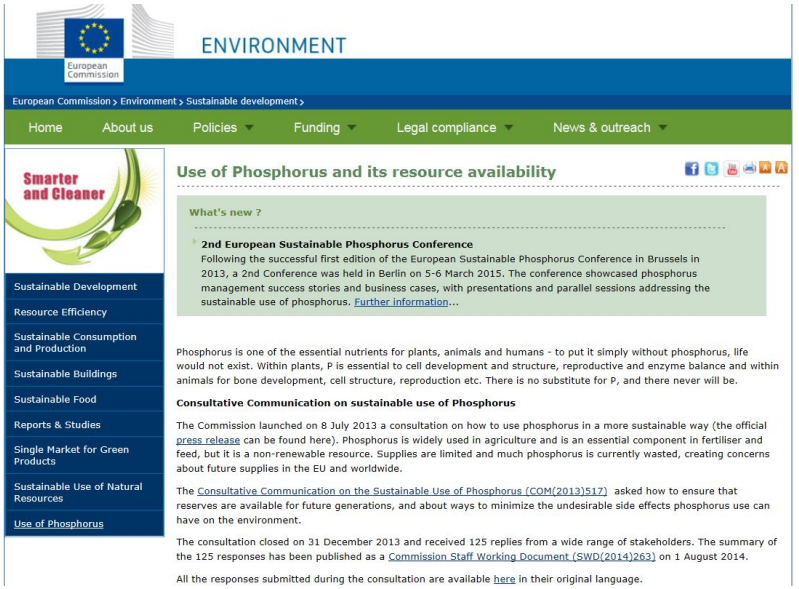
saving resources, creating jobs

**1 = National Emissions Ceilings Directive et UNECE Long Range Transboundary Air Pollution Convention for ammonia emissions**
**2 = engagement climat Paris 2016 = 4/1000°**

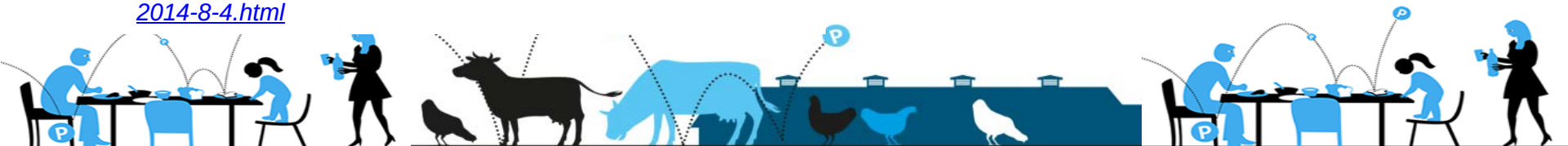


# *Les politiques européennes*


*http://ec.europa.eu/environment/archives/greenweek2014/05062014-8-4.html*




*http://ec.europa.eu/environment/natres/phosphorus.htm*



# Un historique de contentieux

- *1994 Urban Waste Water Treatment Directive (DERU)*
- *1994 Nitrates Directive*
- *2000 Water Framework Directive (DCE)*
- *2016 National Emissions Ceilings Directive - update*

InfoCuria - Jurisprudence de la Cour de justice

français (fr)

Accueil > Formulaire de recherche > Liste des résultats > Documents

Langue du document : français ECLI:EU:C:2016:887 Lancer l'impression

ARRÊT DE LA COUR (sixième chambre)

23 novembre 2016 (*)

« Manquement d'État – Directive 91/271/CEE – Traitement des eaux urbaines résiduaires – Article 4, paragraphes 1 et 3 – Traitement secondaire ou traitement équivalent »

Dans l'affaire C-314/15,

ayant pour objet un recours en manquement au titre de l'article 258 TFUE, introduit le 26 juin 2015,

**Commission européenne,** représentée par M^me^ O. Beynet et M. E. Manhaeve, en qualité d'agents, ayant élu domicile à Luxembourg,

partie requérante,

contre

**République française,** représentée par M^mes^ S. Ghiandoni et A. Daly ainsi que par M. D. Colas, en qualité d'agents,

EUROPEAN COMMISSION

Press Release Database

European Commission > Press releases database > Press Release details

**IP/04/39**

Brussels, 13 January 2004

**Water policy: Commission acts against eight Member States**

*The European Commission is taking legal action against Greece, France, the Netherlands, Belgium, Po*
*non-compliance with EU laws on water quality. The Commission has sent final written warnings to Gr*

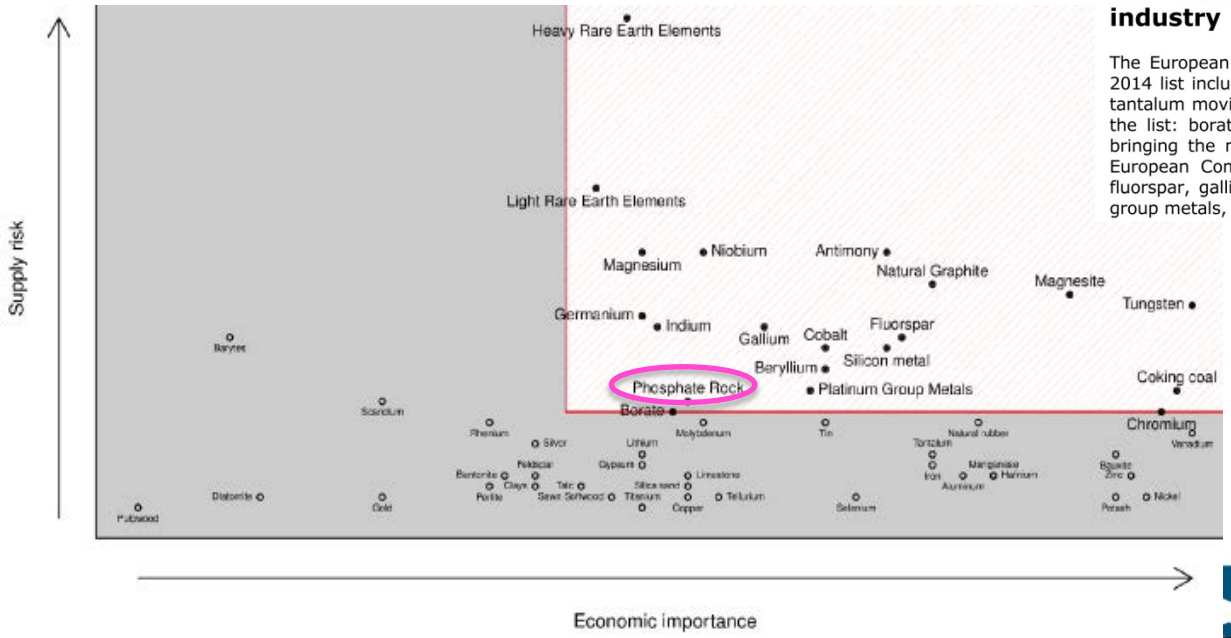
# Politiques européennes

- *2014 EU Consultative Communication on Sustainable Use of Phosphorus*
- *2014 Phosphate rock added to EU list of 20 Critical Raw Materials*

EUROPEAN COMMISSION

PRESS RELEASE

Brussels, 26 May 2014




**20 critical raw materials - major challenge for EU industry**

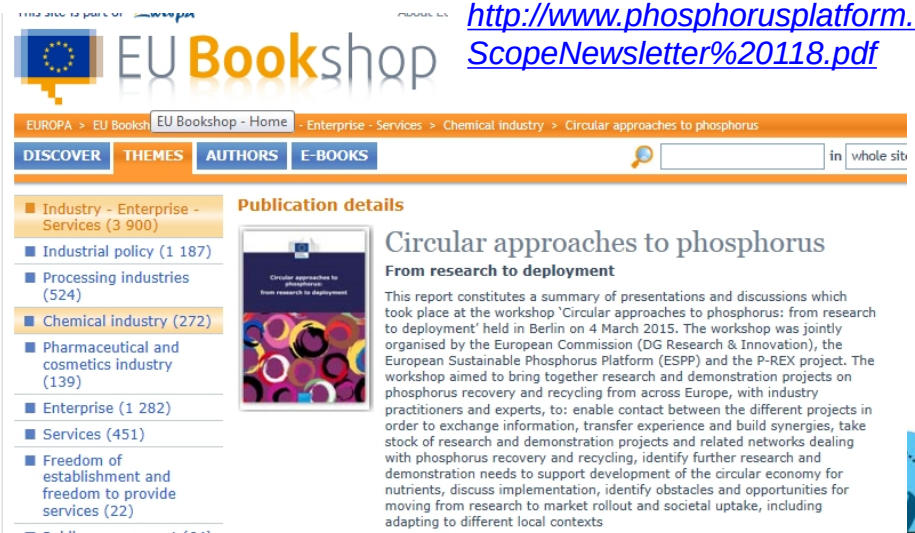
The European Commission presented today a revised list of Critical Raw Materials. The 2014 list includes 13 of the 14 materials identified in the previous list of 2011, with only tantalum moving out of the list (due to a lower supply risk). Six new materials appear on the list: borates, chromium, coking coal, magnesite, phosphate rock and silicon metal bringing the number up to 20 raw materials which are now considered critical by the European Commission. The other 14 raw materials are: antimony, beryllium, cobalt, fluorspar, gallium, germanium, indium, magnesium, natural graphite, niobium, platinum group metals, heavy rare earths, light rare earths and tungsten (MEMO/14/377).

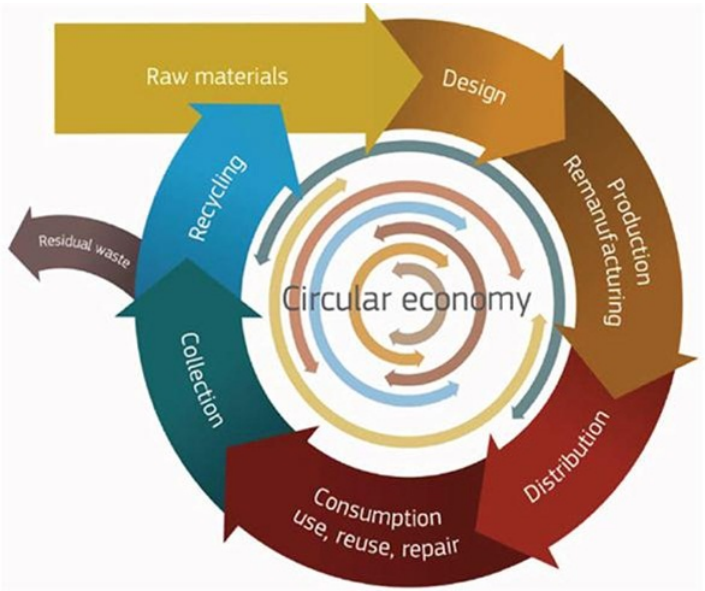
# 2015 EU Circular Economy Package

## *En réponse à la consultation publique consultation:*

- *30% des respondents considèrent les bio-nutrients comme des "materials the EU should target first" (Q5, Q3)*
- *En tout, 54% citent les bio-nutrients ou le phosphore (ensemble des questions)*

*Scope Newsletter n° 118*
*http://www.phosphorusplatform.eu/images/scope/ScopeNewsletter%20118.pdf*




# 2016 … EU Fertilisers Regulation

- *Actuellement au Parlement Européen & Conseil*
- *Tous les engrais (minéraux, organiques), amendements*
- *Fixera critères européens pour composts, digestats, sous-produits agro-alimentaires, Animal By Products*
- *Boues d'épuration **sont exclues***
- *STRUBIAS en cours (struvite, biochars, ash based products)*
- ***traçabilité non prévue***
- *de nombreux problèmes de rédaction restent à résoudre*

***Voir** www.phosphorusplatform.eu/regulatory*

http://ec.europa.eu/DocsRoom/documents/15949

# Politiques nationales

*- **Suisse 2016:** obligation de récupérer le P dans les boues d'épuration et l'équarrissage*

*- **Allemagne en cours (2017):** nouveau décret boues d'épuration (AbfKlärV) obligation de récupérer le P pour les STEP > 50 000 ie*

*- **2017 Helcom Recommendation on Sewage Sludge Handling 38/1:** 9 pays 'maximum recycling or recovery of phosphorus …' (y.c. valorisation agricole), reporting par les Etats du % de P recyclé*

HELCOM

**HELCOM Recommendation 38/1**

Adopted 1 March 2017
having regard to Article 20, Paragraph 1 b)
of the Helsinki Convention

**SEWAGE SLUDGE HANDLING**

*Scope Newsletter n° 118*
http://www.phosphorusplatform.eu/scope118

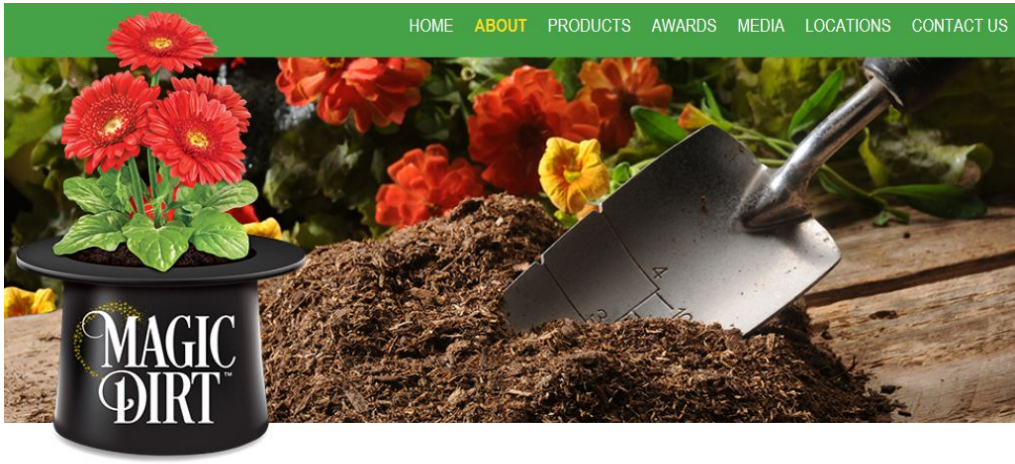
## Principales nouveautés dans l'ordonnance sur le traitement des déchets

L'ordonnance sur le traitement des déchets (OTD) est soumise à une révision totale. Voici en résumé les principales modifications :

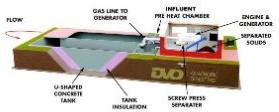
- Des exigences sont formulées pour la valorisation de certains déchets, laquelle n'était pas encore réglementée dans le droit fédéral. Il s'agit notamment des biodéchets (y compris règlementation relative aux possibles installations de traitement ) et des déchets riches en phosphore.
- Un plan d'élimination des déchets est exigé pour tout projet de construction. Le maître d'ouvrage est tenu de déterminer les déchets dangereux pour la santé et pour

# *Le recyclage du phosphore en action*

www.magic-dirt.com




## ANAEROBICALLY DIGESTED FIBER



The digested fiber in Magic Dirt™ is a byproduct made exclusively from DVO, Inc.'s patented anaerobic digestion (AD)

## WHAT'S TO LIKE

- Independent growth tests confirm Magic Dirt™ equal to or better than leading brands
- For use indoors, outdoors, in containers and mixed with gardens soils
- Can be used to grow flowering plants, vegetables and herbs without any added ingredients.
- Certified as Premium Potting Soil by

## INNOVATION CENTER FOR U.S. DAIRY

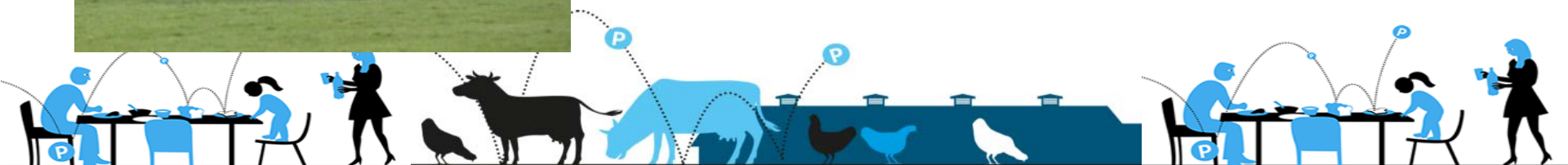
A recent study commissioned by the Innovation Center for U. S. Dairy, which was established by dairy producers, reports that the digested organic fiber that is used in MAGIC DIRT™ "provides an environmental advantage in comparison to peat moss for all indicators examined... (R)eplacing peat moss with dairy digester fiber in the US market could avoid the release of greenhouse gases equivalent to 5.8 million metric tons of CO2-eq."

# *Success story:*
# *SARIA UK – Kalfos*

KalFos®
we help you grow.

- P-fertiliser and soil conditioner from combustion of animal by-products (MBM)
- Authorised for arable and grazing land
- 12 000 tonnes/year

http://www.kalfos.co.uk/



# *Success story:*
# *Fibrophos UK*

- Bioenergy and fertiliser (ash) from chicken litter
- Since the 1990's
- Phosphorus, potassium, sulphur, trace elements
- 800 000 t/y chicken litter processed annually
- P shows both immediate and durable crop
  http://www.fibrophos.co.uk/phosphate-in-fibrophos-fertiliser/

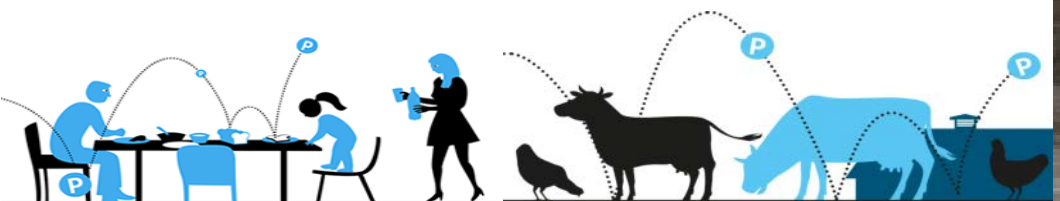

# *Success story:*

# *COOPERL / Brittany farmers' cooperatives*

- 400 000 t/y manure processed to organic fertiliser product
  - 150 000 t composted poultry litter
  - 150 000 t dried poultry manure
  - 100 000 t pig manure (1 100 farms)
- Adapted to specific crops and exported to other regions of France
- Positive farmer acceptance
- TRAC Emeraude stabling system

***Supported by EU Investment Plan***

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



# *Success story: Géotexia*

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

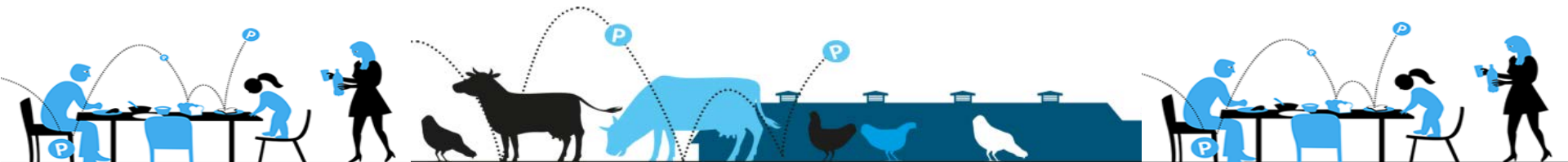
- Saint Gilles du Mené, Brittany
- 33 pig farmers
- Methanisation of 70 000 t(wet weight)/y
  - pig manure (c. 50% of input), sludges, chicken litter and other agri-food wastes
- 14 000 MWh electricity = 4 600 households
- digestate
  - solid-liquid separation (centrifuge, coagulation)
  - drying of solids to 80% DM
  - osmosis of liquids to < 10mg/l N, irrigation willow energy crop (58 000 $m^3$/y, 14 ha)
  - evapo-concentration to mineral concentrate (20% DM)
- French fertiliser homologation obtained for digestate 2013

https://www.anses.fr/sites/default/files/documents/FERTIXIANK_FSIM_2013-0856_Ans.pdf

http://technomaps.veoliawatertechnologies.com/struvia/fr/

# *Success story:*
# *Véolia Struvia*

- Struvite recovery
  for small-medium sewage works
  operating biological P removal
- Compact footprint, limited height (3,5m)
- Turbomix struvite reactor, lamella settler
  & bag draining of struvite prills
- Helsingor Denmark 2016
  - 70 000 p.e. sewage works
  - 60 m3/day treats 100% of works digestate after centrifuge
  - produces 36 t/y struvite



# *Success story:*
# *Suez Phosphogreen*

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

- Struvite recovery from sewage
- Biological P removal sewage works with anaerobic sludge digestion
  - 2013 Aby wwtp, Aarhus, 84 000 p.e.
  - 2015, Herning, Denmark, 150 000 p.e.
  - 2017, Marselisborg, Denmark 200 000p.e.
- Advantages
  - struvite sale: 250€ - 300€ /tonne
  - reduced P-removal chemical costs
  - avoidance of nuisance deposits
  - reduced sludge volumes
  - reduced energy consumption for biological N removal

# *Success story:*

## *Timac: struvite as maize starter fertiliser*

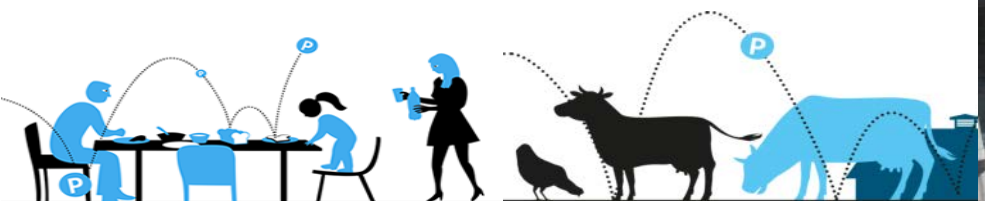
- NuReSys Recovered struvite from potato processing
- Non-burning, enabling "ultra localisation" next to roots
- Micro-granulation
- Ammonium addition for nutrient balance

# *Success story:*

# *ICL fertilisers Amsterdam & Ludwigshaven*

- Use of secondary materials in fertiliser production:
  - meat and bone meal ash
  - struvite
- Objective: 100% by 2025
- Pilot testing successful
- Industrial installations (storage, handling) planned

www.icl-group.com



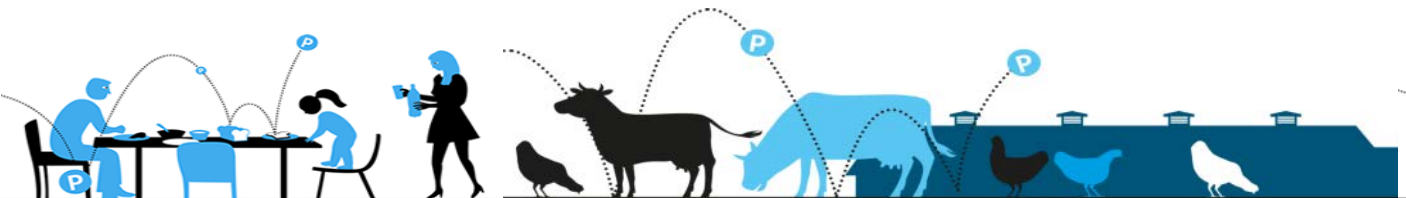
# *Success story: Recophos – ICL*



ICL
Where needs take us

- Electrothermal production of white phosphorus (P4) from sewage sludge / ashes
- High-value raw material for chemicals: fire safety, electronics, …
- Recophos FP7 pilot project
- Technology acquired by ICL March 2016

www.icl-group.com
http://www.prnewswire.com/news-releases/icl---next-step-towardssustainable-innovation-571973381.html



# *Success story:*

## *REVAQ sewage treatment Certification*

- > 50% Sweden's sewage goes to REVAQ Certified sewage works
- Sludge digestate quality, monitoring, information transparency criteria
- 3000 t/year phosphorus recycled to agriculture

http://www.iea-biogas.net/case-studies.html?file=files/daten-redaktion/download/case-studies/REVAQ_CAse_study_A4_1.pdf

# *Success story:*

# *Friesland Campina milk cooperative, NL*

- Biogas production and P-recovery from manure
- Bonus/malus in milk purchase prices
- Funding support for farmers' manure treatment investments

www.frieslandcampina.com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