European Sustainable Phosphorus Platform

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Green & Circular Economy
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Technologies & Policies: the way to phosphorus recovery

GRUPPO HERA

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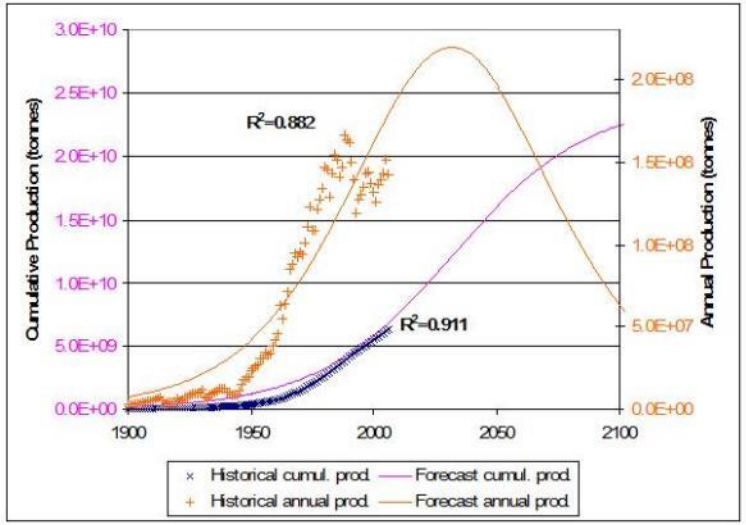
A precious and limited resource

Phosphorus is a precious resource. It is essential for the production of synthetic fertilizers and, consequently, for the global food production.

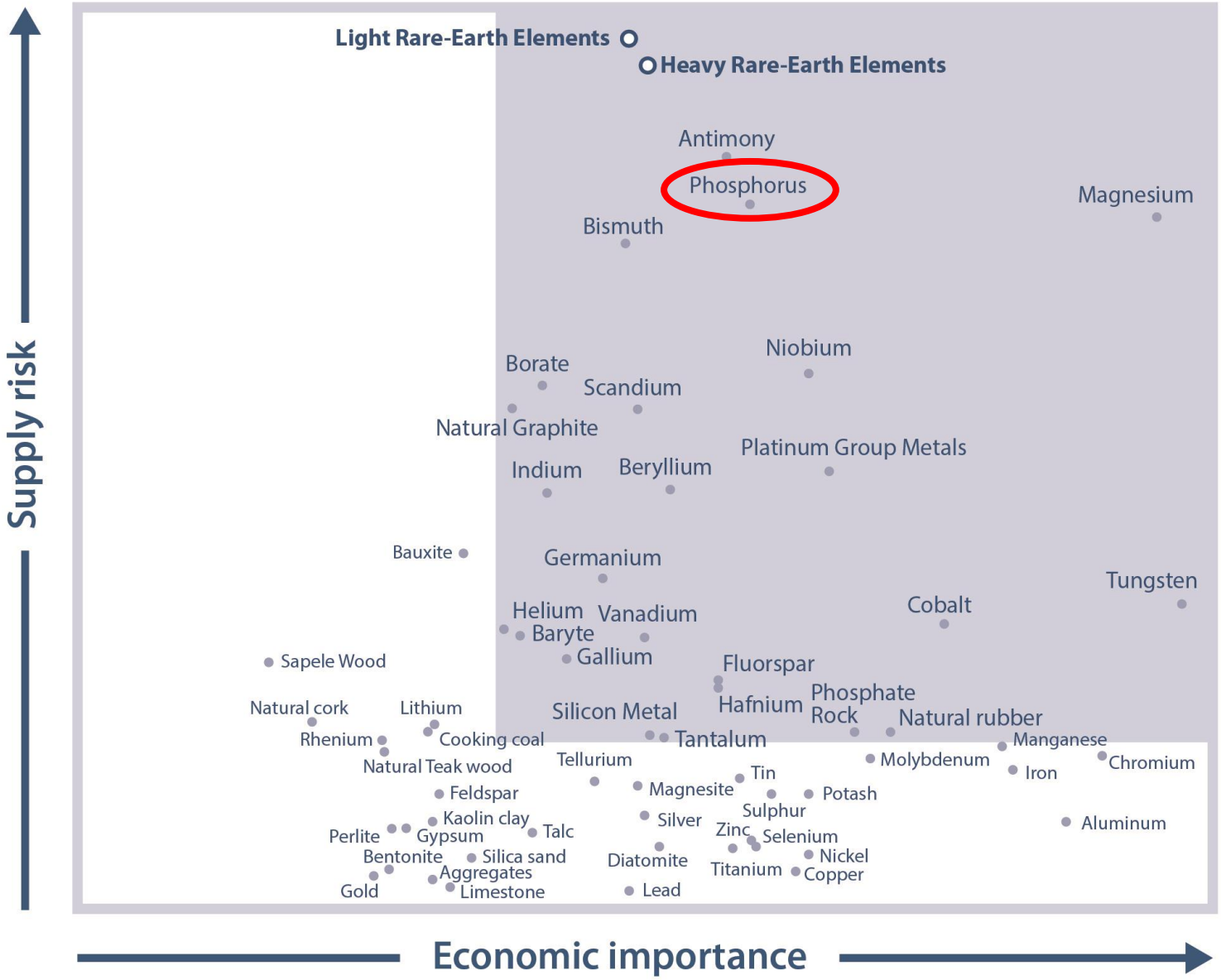
Wikipedia

Phosphorus is a limited resource: its availability will decrease in the next decades, the peak of production is estimated within this century. Furthermore, its presence in nature is concentrated in a few areas of the globe, outside EU.



Ward J., (2008). *Peak phosphorus: quoted reserves vs. production history*. Energy Bull

P is a critical raw material



The limited availability of phosphate rocks as well as Europe's high import dependency led EU to add phosphorus to the list of **Critical Raw Materials** (CRM) in 2014.

CRM List EC 2017

Why we should recover phosphorus from wastewater

Tabella 1 – Quantitativi di fosforo perso per settore di consumo estrapolati dal bilancio europeo del fosforo proposto da van Dijk et al. (2016)

Settore di consumo	% P perso (van Dijk et al., 2016)	Quantitativo di P perso (Mt/anno)	
		2005	2016[a]
Fanghi di depurazione	34,6	0,51	1,21
Effluente impianti di depurazione	5,7	0,08	0,20
Impianti di depurazione decentralizzati	5,5	0,08	0,19
Acque reflue non collettate	4,9	0,07	0,17
Acque reflue municipali non trattate	2,5	0,04	0,09
Acque reflue decentralizzate non trattate	1,6	0,02	0,06
Scarti alimentari (industriali e urbani)	26,8	0,39	0,94
Scarti di cartiera, non adatti all'agricoltura e lignei, altre attività industriali, ruscellamento	6,0	0,09	0,21
Scarti di cibo per animali, deiezioni animali, decessi animali e umani	12,4	0,18	0,43
P totale perso		1,46	3,50
P totale in ingresso		2,39	6,37
% P perso nel ciclo antropico		61%	55%

[a] *Per il 2016 i calcoli sono stati effettuati considerando le percentuali di P perso riportate da van Dijk et al. (2016), e considerando una frazione media complessiva di P perso nel ciclo antropico pari al 55%, minore rispetto a quella del 2005 in quanto si ipotizza un sostanziale miglioramento della gestione del P nei processi produttivi (es: il minor uso di P per i detergenti).*

Canziani R, Di Cosmo R, *Stato dell'arte e potenzialità delle tecnologie di recupero del fosforo dai fanghi di depurazione*, Ingegneria dell'Ambiente Vol. 5 n. 3/2018, pag. 151

- About 40% of the phosphorus lost in the anthropic cycle flows into the wastewater and sludge.
  The phosphorus discharged by WWTPs is about 24% of the total quantity purchased in Europe.

- In the last few decades several technologies have been developed to recover significant quantities of phosphorus from these flows with interesting cost/benefit ratios.

The main problem

"The minimum cost of recovery [...] is 2-3 €/kg of recovered P compared to about 1-1.5 €/kg of P coming from classic mineral sources. Therefore, today a recovered P market can not be achieved without incentive actions acting on price, quality requirements and, finally, on the acceptance by transformers/users.

In other words, it is not enough that adequate technologies have been developed to recover the phosphorus from the sludge, but it is necessary to make it appealing to the producers of fertilizers in terms of price and quality." (*)

(*) Canziani R, Di Cosmo R, *Stato dell'arte e potenzialità delle tecnologie di recupero del fosforo dai fanghi di depurazione*, Ingegneria dell'Ambiente Vol. 5 n. 3/2018, pag. 167

So, it is necessary to build a regulatory framework and direct the market policies to incentivize the recovery and use of secondary phosphorus in place of the one coming from mineral source.

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A possibility

Inclusion of the revision of the Fertiliser Regulation in the EU Circular Economy Package: using phosphorus recovered from wastewater treatment as a component of fertiliser products.

The Eureau suggestion

"Regulation on blending would be a strong incentive for the use of recovered phosphorus. Just as requirements for blending natural gas with biogas already exist, there should also be requirements of blending recovered phosphorous with mined fertilisers.

Additionally, as in most cases the recovery of phosphorus is not yet economically viable, funding should be considered to support the development and use of the most promising solutions." (*)

EurEau

(*) EurEau, *Water and the EU's Circular Economy - Briefing note*, 13 September 2018

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Thanks for your attention

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