

Strategic Materials for a Low-Carbon Future: From Scarcity to Availability
2-3 November 2017 – Session Summary

Breakout 1f: Fertilisers, yields and resource depletion: Phosphates and the need for productive agriculture in Europe

Phosphorus will be the key to the increase in yields needed to maintain food requirements. Yet phosphorus from rock is not a renewable resource, recovered sources are hard to make cost effective, and over-use of phosphorus from any source risks being washed away and causing pollution. How might legislation on climate change or other environmental legislation affect phosphate use and supply? What policies are likely to foster resource efficiency and recovery? What European policies are required for the management of a strategic resource in Europe? And what are the best sources of 'biofertilizers', for instance phosphorus from sludge?

Ludwig Hermann, President, European Sustainable Phosphorus Platform; Technology Manager, Outotech

Kazuyo Matsubae, Associate Professor, Graduate School of Engineering, Tohoku University

moderated by Julie Hill, Chair of WRAP UK

Summary [200-400 words]

Phosphate elements and rock may be listed by the European Commission as critical materials supporting human life, but this breakout established that scarcity is not at the core of the issue with phosphates. Phosphates are available all around us; their criticality is a function of their economics and environmental consequences of extraction and use:

- Phosphorus is mined primarily as phosphate rock, as this is the lowest cost source. High-quality phosphate rock is finite and some of the world's largest remaining reserves, e.g. in Morocco, are already depleting. Phosphate rock carries radioactive materials, which can contaminate the food chain, risking human health and causing nutrient pollution in the oceans.
- Apart from existing extractable phosphate rock reserves, there are very few other mineable deposits. A price peak in the 2000s pushed companies into exploring and discovering new high-quality phosphate rock deposits which today are being depleted, rather than investing in innovative ways to tap low-quality or unconventional circular phosphorus sources.

- Most crucially, we are not yet tapping into the potential for industrial and non industrial waste streams to provide phosphorus. The steelmaking industry produces high volumes of phosphorus-rich slag, which could - in the case of China - source 7% of phosphorus needed to produce plant-based food. We could harvest phosphorus from manure by finding ways to concentrate the product and transport it to agricultural farmlands consuming phosphorus as fertilisers. Phosphorus from wastewater streams in towns and cities also remains an untapped resource, mostly for political reasons. To extract phosphorus from wastewater in Europe, for example, local governments would need to charge an additional 3-4 Euros per citizen, and they have so far been reluctant to reflect this cost to their constituents.

Speakers concluded that there are existing technological solutions to extract phosphorus that would help decrease our dependency on contaminated sources. Their adoption at scale would depend on positive political, regulatory and market drivers. And, as Ludwig Hermann noted, we also need a mindset shift towards accepting “that our society will bear a certain cost for phosphorus recycling”.