

# A phosphorus hierarchy as a guidance within waste & resource management

*Input by The Nordic Phosphorus Network (June 20, 2018 - revised August 1, 2018)*

The waste hierarchy is a well-established and in general successful concept within European waste legislation, but it has proven less operational in prioritising the recovery of biodegradable wastes for agricultural purposes. In addition, the waste hierarchy does not give priority to critical raw materials over other waste constituents despite EU's List of critical raw materials highlights the importance of prioritising certain materials. Phosphate rock is on this critical list and even tops the list as being the least substitutable of the listed materials (98 % of its uses cannot be substituted).

It appears timely to outline a guide to help placing treatment/utilization options of phosphorus-containing wastes in the hierarchy and prioritising the phosphorus content – wastes such as:

- Manures (incl. fish) – the most abundant and account for the largest amounts of phosphorus;
- Municipal waste water (sewage sludge) – with high phosphorus contents, arises at few locations and in significant amounts, and under public control;
- Meat and bone meal – with very high phosphorus content and arises in very few locations;
- Other production and industrial wastes – can have high phosphorus concentrations and mostly to be found at relative few locations;
- Food waste (bio-waste) – with intermediate phosphorus content, possible synergies within energy systems and a key role in public awareness and waste handling.

A hierarchy depends on different drivers and synergies for a positive impact. Setting of clear targets for phosphorus recycling is certainly a strong driver. The hierarchy and recycling targets will need a supportive framework in strategies, legislation and administration – ways of financing should be addressed too. Finally, success in implementing the hierarchy might depend on remembering the possible synergies and spin-offs including optimising collection, treatment, energy and quality aspects and gaining benefits in costs, jobs, export, awareness and branding. It should also be remembered that a) by combining more technologies and modes of utilisation, overall phosphorus recovery may be increased, i.e. moving a waste further up in the hierarchy, and b) in terms of present marketing and economical value, other constituents in the waste might be more important today than phosphorus.

## **A suggestion to a phosphorus waste hierarchy**

1. Waste utilised in agriculture.
2. Minimum 80 % of phosphorus in waste ash / waste char recovered, or waste ash / waste char utilised in agriculture, or waste utilised in landscaping.
3. Minimum 40 % of phosphorus in waste recovered, and / or waste stored for later phosphorus recovery.
4. Waste utilised in construction materials.
5. Landfilling.

*The quality of the recycled or recovered waste (or -residues) must comply with relevant legislation and - where relevant - fulfil technical specifications or certification schemes. Observe environmental limitations and plant-growth recommendations during utilisation. When to be stored for later recovery, any mixing of the waste (or ash/char) must not deteriorate the qualitative, technical or economical potential of later phosphorus recovery.*

Nordic Waste Group (NAG) under Nordic Council of Ministers supported the establishment of a Nordic Phosphorus Network by a DKK 50.000 grant in 2017.

A Nordic Phosphorus Network - with representation from national authorities responsible for waste legislation, national waste associations and national water- and wastewater associations in the Nordic countries - met in Malmø in October 2016 after the first Nordic Phosphorus Conference, Copenhagen in August 2017, in Oslo in April 2018 and has a proposed meeting in Stockholm in March 2019.

This paper has been developed after the Oslo meeting and is forwarded to NAG<sup>1</sup> as an input into the continued discussion on how to ensure recycling of phosphorus from wastes in the Nordic countries.

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<sup>1</sup> The remit of the NAG is to promote the transition to a circular economy and a green society in which the use of resources is decoupled from economic growth by means of greater resource efficiency, and the prevention and recycling of waste (cf. [www.norden.org](http://www.norden.org)).