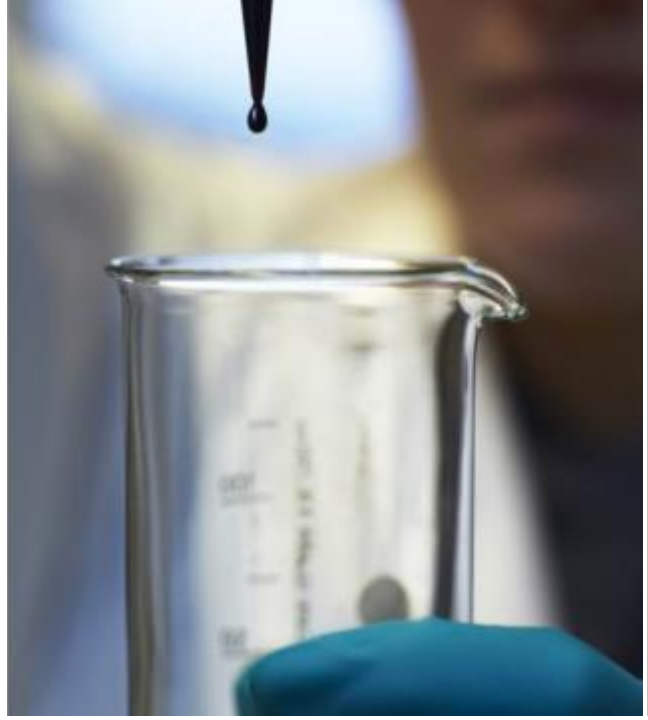
Overview of the status in Denmark, Netherlands, Finland, UK, Switzerland and Canada



Workshop Nutrient Recovery from Waste

Bo von Bahr

IEA-meeting 2019-05-07

RISE Research Institutes of Sweden

Samhällsbyggnad
Energy and circular economy

Overview of presentation

- The following countries:
  - Denmark
  - Netherlands
  - Finland
  - UK
  - Switzerland
  - Canada

… will be commented regarding nutrient recycling with focus on phosphorus from sewage sludge

Denmark

Aspect	Answer
Handling of sewage sludge today?	Appr. 75 % of sewage sludge goes to farmland. ”No-problems” attitude to sewage sludge Some incineration around Copenhagen, interested in P extraction from ash
Any P recycling?	Yes, struvite production at some WWTP
Recycling via biogas/digestate?	Yes, biogas production from manure and food waste, appr 4 TWh (Sweden has 2 TWh)
Source separated systems	Limited experience

General comment: Denmark is a very intense agricultural land with an excess of P since the import of feed is large.
Danmark has 13 millions pigs, Sweden has 1,4 millions

Netherlands

Aspect	Answer
Handling of sewage sludge today?	Spreading on land allowed but does not occur – no sewage sludge fulfil the criteria. Almost all sludge is burned
Any P recycling?	There is interest of P extraction from ash There are about 10 WWTP with P extraction
Recycling via biogas/digestate?	Yes, Netherlands has a lot of biogas plants
Source separated systems	Yes, Europes biggest system under construction!

General comment: Netherlands is also is a very intense agricultural like Denmark, with a surplus of phosphorus. Some companies refine organic (biological) fertilisers

Finland

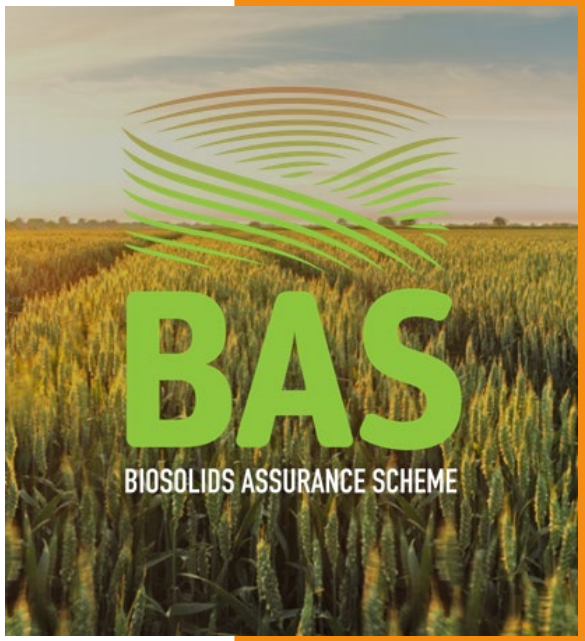
Aspect	Answer
Handling of sewage sludge today?	A majority is spread on farmland, no incineration
Any P recycling?	Finland want to be a frontrunner regarding nutrient recycling, started a program in 2017 A number of different projects regarding P recycling, e.g. RAVITA (reconstruction of WWTP)
Recycling via biogas/digestate?	Yes, Finland has some biogas plants
Source separated systems	Very limited

General comment: Finland has the only P-mine in EU, Siilinjärvi

Finland – Siilinjärvi Phosphorus mine

United Kingdom

Aspect	Answer
Handling of sewage sludge today?	Large share of the sewage sludge is spread on farmland. They have a system similar to swedish Revaq, called BAS Agricultural use is considered the *Best Practicable Environmental Option* (BPEO) by the UK Government
Any P recycling?	Not other than above
Recycling via biogas/digestate?	Yes a large number of plants, mainly in the agricultural sector
Source separated systems	Only at research level



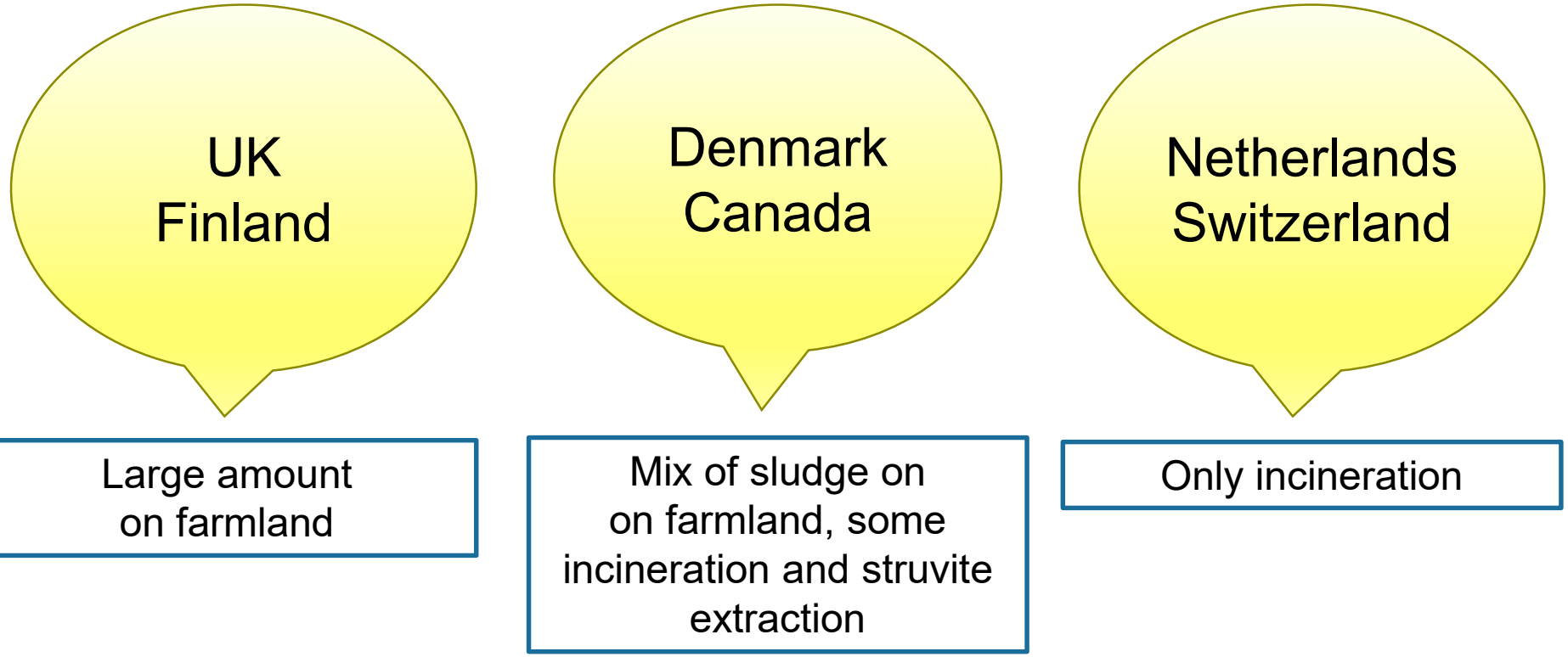
Switzerland

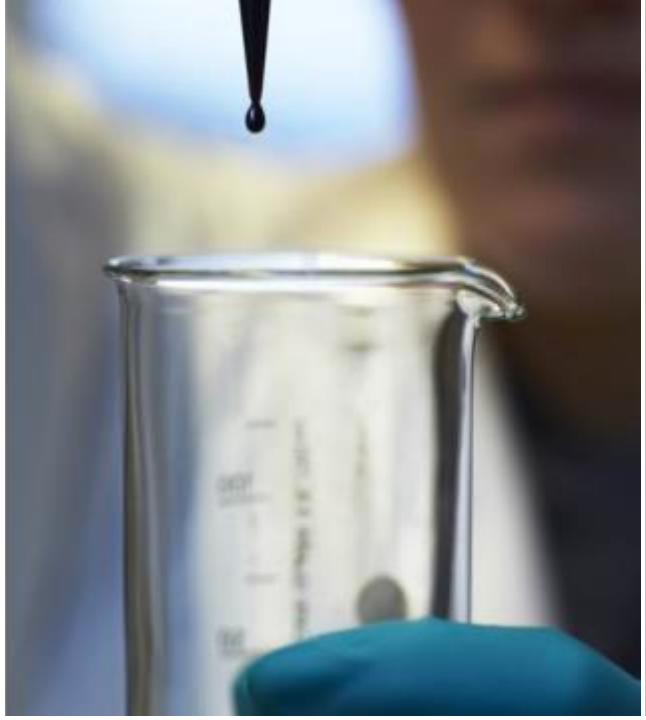
Aspect	Answer
Handling of sewage sludge today?	All sewage slude is incinerated in mono-, waste- or cement incineration plants. Distribution on farmland prohibited.
Any P recycling?	No, but there is an interest to extract P from the ash
Recycling via biogas/digestate?	Yes, a large number of biogas plants
Source separated systems	No, only on a reserach level

Canada

Aspect	Answer
Handling of sewage sludge today?	A large amount is spread on farmland, a quality control system is active, NASM (Non Agricultural Source material) which regulates the spreading Incineration is also common
Any P recycling?	Yes, mainly through struvite production (E.g. Ostara)
Recycling via biogas/digestate?	Yes, Canada has a large number of biogas plants
Source separated systems	Only on a research level

Characterization regarding sludge use:





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Energi och cirkulär ekonomi