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Nutrient recovery and recycling in water management

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Boosting the economy with water - and keeping it
clean, World Water Week

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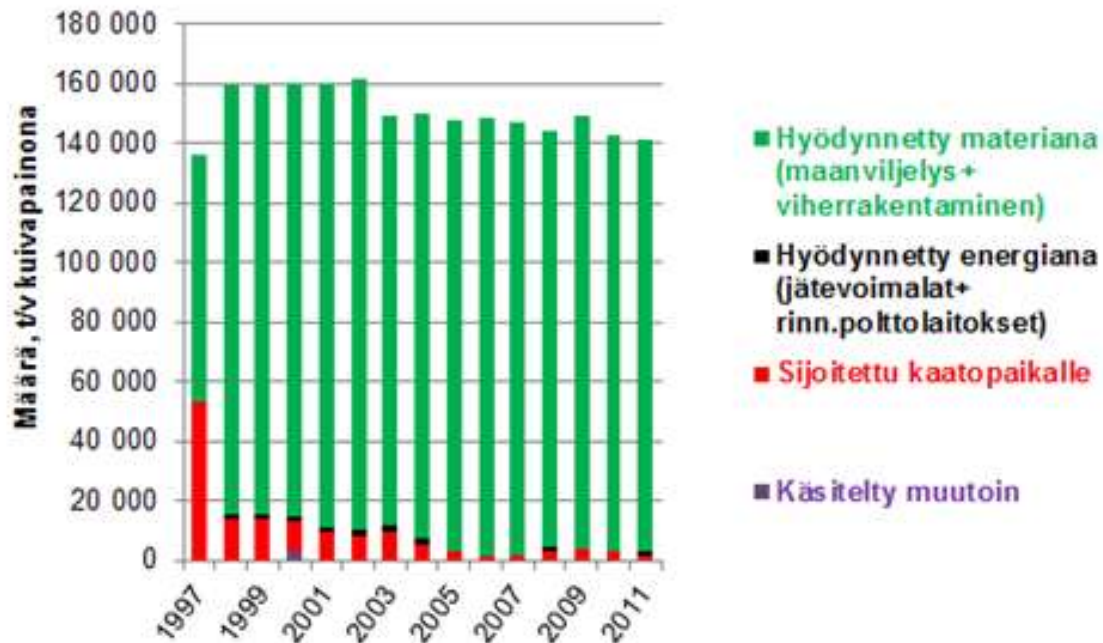
Nutrient recovery and recycling in water management – Finnish cases

- Sewage sludge in Finland, amount, treatment, use and disposal
- Special cases
 - Responsibilities in sludge management and treatment service contracts
 - Phosphorous recovery and reuse
 - Risks in using sewage sludge products in agriculture

Sewage sludge usage in Finland

Yhdyskuntien jätevesilietteiden hyödyntäminen ja käsittely vuosina 1997-2011

(Lähde: SYKE ja Tilastokeskus; Kuva: SYKE)



Tons per year in dry solids

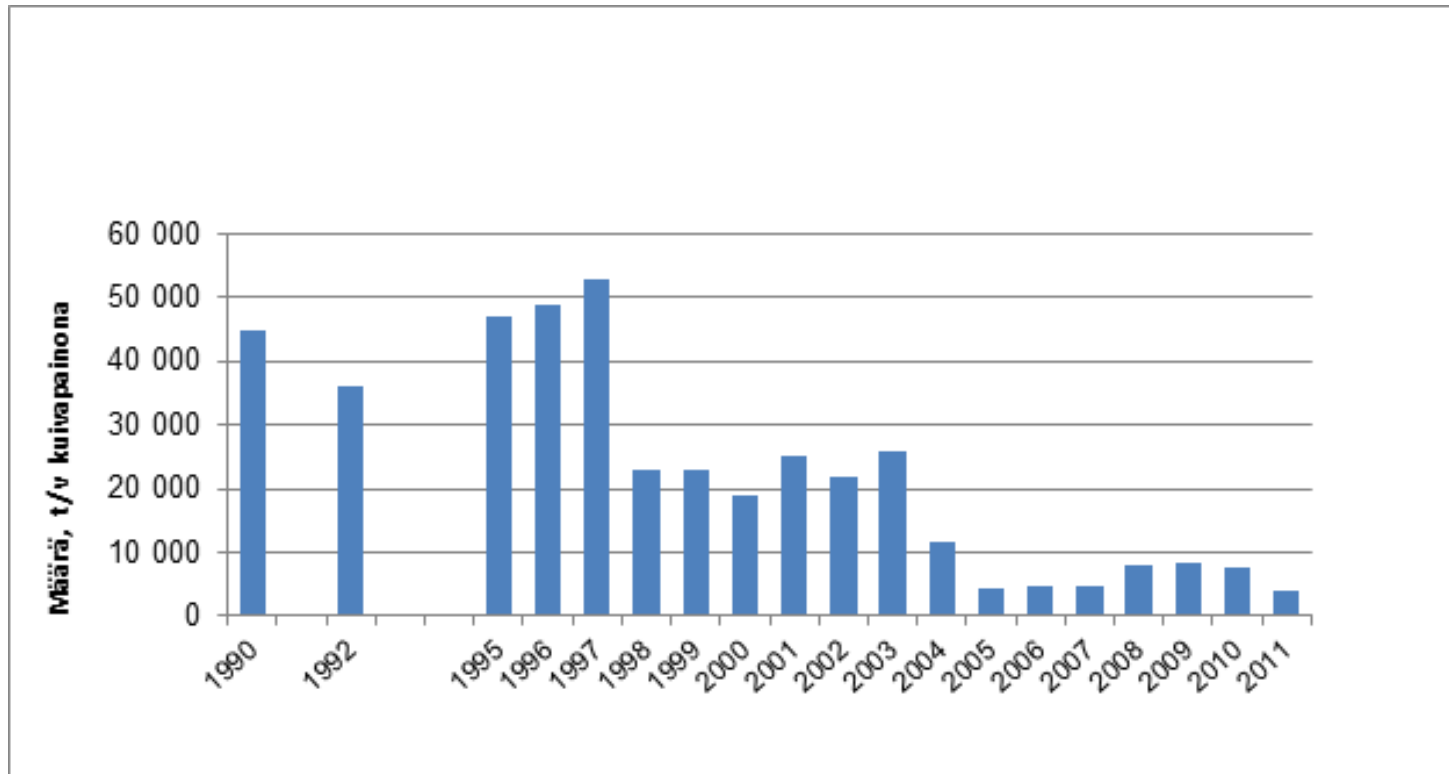
Green - Agriculture + landscaping

Black - Used in energy production

Red - Disposed in a landfill

Blue - Other

Sewage sludge usage in agriculture in Finland

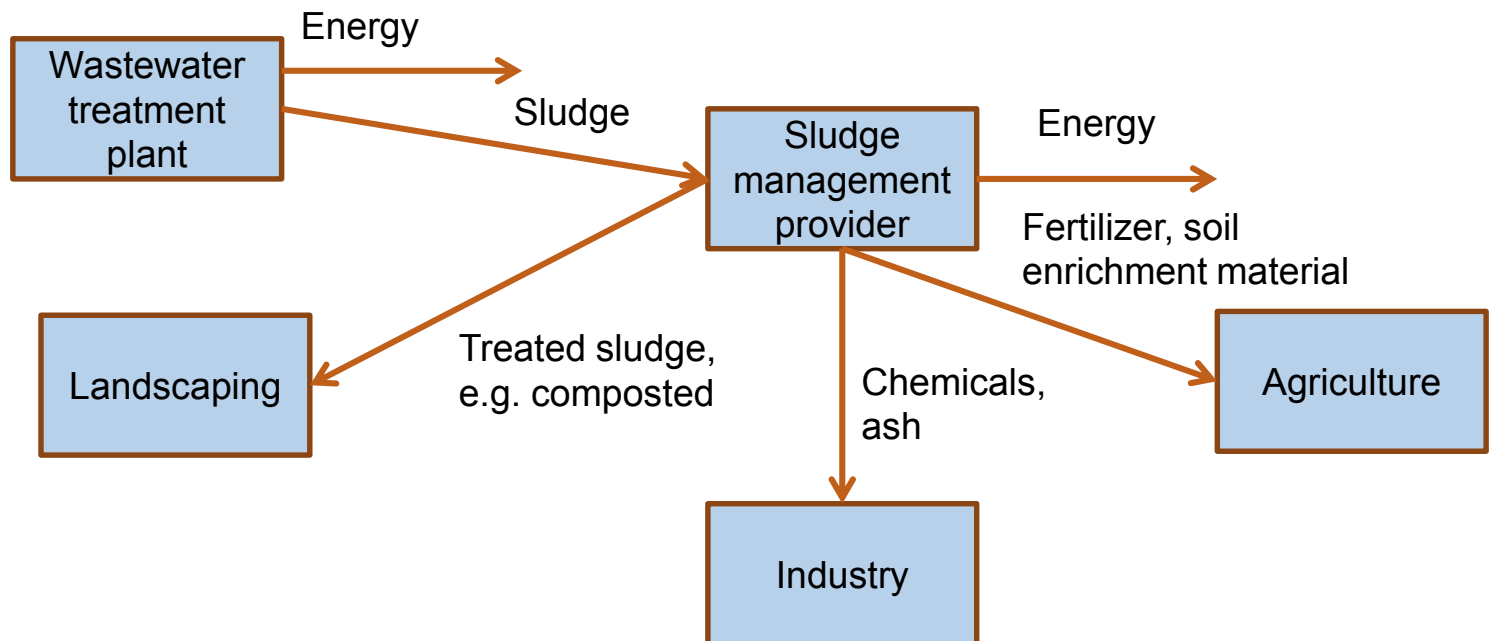


Tons per year in dry solids

Responsibilities and arrangement in sewage sludge management in Finland

According to legislation, water utilities are responsible to take care of their own sewage sludge.

Water utility can treat sludge on site or, as the practice usually is, outsource sludge treatment to service providers. Typical scheme is presented below:



Operations model for service procurement of sewage sludge treatment – case Uusimaa

Target: Cost efficient sludge management taking energy efficiency and nutrient recycling into account

- **Regional view**
 - Regional changes and possibilities
 - Important view considering regional cooperation
- **Selection of procurement model**
 - Alone or together with other utilities?
- **Selection of procurement process**
 - What kind of process, open tender or negotiation process?

Needs assessment and selection of procurement process

Needs assessment and market survey:

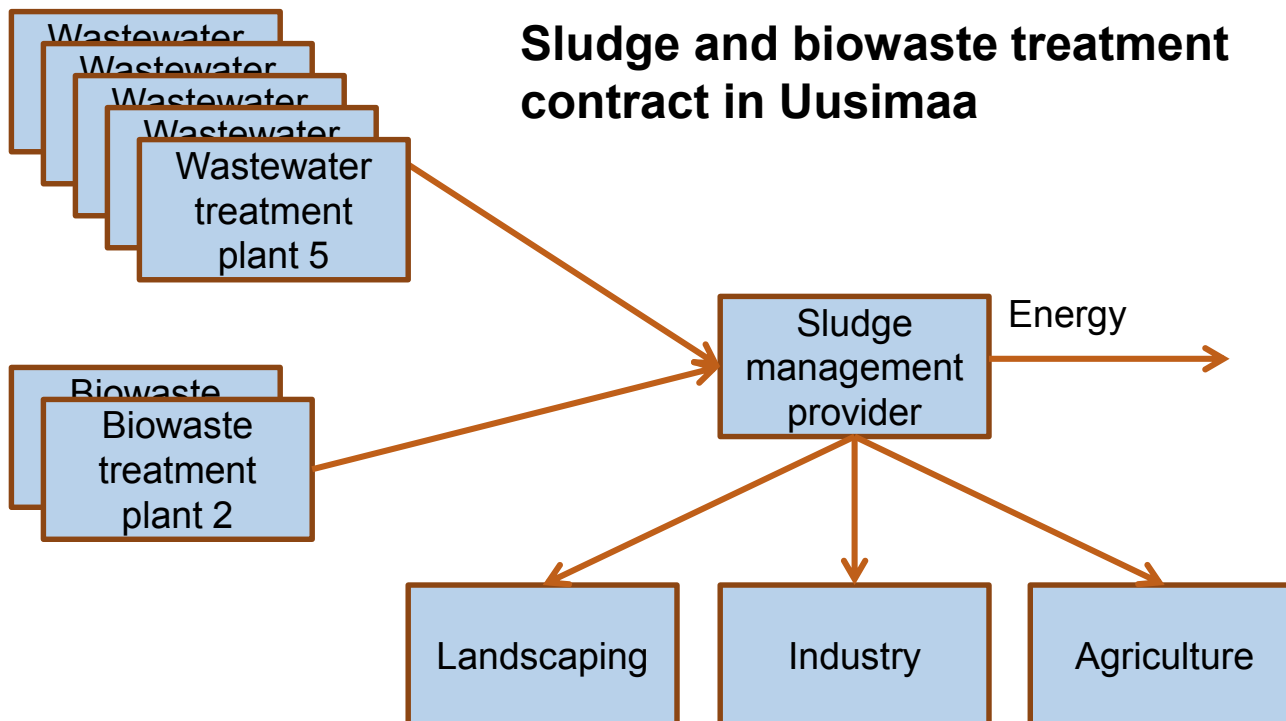
- Possible other utilities as partners?
- Possibilities and solutions in market?
- Quantity and quality, logistics
- Feasibility study
- Contracts about cost sharing

Needed answers:

- **ALONE OR TOGETHER?**
- **WHAT WILL BE PURCHASED: EQUIPMENT OR SERVICE?**
- **WHAT KIND OF PROCUREMENT PROCESS SUITS BEST?**

How can nutrient recovery and reuse be considered in procurement process?


- Description of treatment process and disposal will be asked
- **In a negotiation process** some performance indicators are checked:
 - Indicators of energy balance
 - Comparison of nutrient recovery and reuse



Potential of sewage sludge phosphorus in plant production and impacts on environment and food chain (PProduct)

- Luke, SYKE, Evira
- Study on long term fertilizing effect of sludge bound phosphorus
- Concentrations of selected hazardous substances and pharmaceutical residues in sludge and their possible accumulation to food chain (oats)
- Study on a novel method, pyrolysis, for future handling of sewage sludge
- Environmental risk assessment and exposure risk assessment on municipal sludge use

RUSSOA (Risks of using sewage sludge on agriculture or on landscaping purposes)

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- Risks related on the usage of municipal sludge
 - Occurrence of pharmaceuticals and certain POPs in sludge
 - Ecotoxicological effects on soil fauna of digested and composted sludge
 - Accumulation of harmful substances from sludge on soil fauna
 - Introduction of harmful substances to the environment where municipal sludge is used

Thank you for your attention!

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