**Sludge Management in Germany**

with focus on the legal framework

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**Structure**

1. Introduction of Emschergenossenschaft/Lippeverband
2. Sludge utilisation in Germany
3. Last Draft of the German Sludge Ordinance
4. Consequences for WWTP-Operators
5. Summary and Outlook
### Sludge utilisation in Germany

**Mg DS (Thousands)**


- Landfill: 2,205, 2,195, 2,030, 2,049, 2,056, 2,054, 1,954, 1,887, 1,950, 1,846, 1,795
- Agriculture: 3,000, 2,995, 2,980, 2,975, 2,970, 2,965, 2,960, 2,955, 2,950, 2,945
- Landscaping: 1,000, 995, 990, 985, 980, 975, 970, 965, 960, 955
- Incineration: 500, 495, 490, 485, 480, 475, 470, 465, 460, 455
- Other: 500, 495, 490, 485, 480, 475, 470, 465, 460, 455

### Our catchment area

- Streams
- Drainage pumping station
- Treatment plant
- Pumping station

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Coalition agreement of the federal government of Germany November 2013:

„We will stop the direct use of sewage sludge as a fertiliser on land and promote the recycling of Phosphorus and other nutrients“

Last Draft of the German Sludge Ordinance

- Published in August 2015
- New: Requirements for P-Recycling
- Background
  - up to 60 % of mineral P-demand of agriculture in Germany can be covered (theoretically) from wastewater and sludge
  - Federal government and federal states actually are in favour of Phosphorus recycling and want to face out the utilisation of sewage sludge in agriculture (political will)
- **Ban of sludge use in agriculture** after a transition period (about 10 years)

- **P-Recycling obligatory** if the sludge has a P-content of more than 2% (all municipal sludges have more!)

  - after the transition period (from 2026 on) all municipal sludges in Germany have to go to incineration (exceptions are under discussion for small WWTP's up to 1,000 PE)

**For P-Recycling there are different possibilities**

- **Mono-incineration** (will be possible without P-recovery from sludge on the WWTP) if the ash
  - is used directly as a P-fertiliser
  - is directly used in a method for P-recovery from ash
  - is stored separately (in mono dump sites) for a later utilisation (long time storage, max. till the year 2035)

- **P-recovery from the sludge at the WWTP**
  - to reach a P-content < 2% in the sludge
  - to reduce the P-content of the sludge for at minimum 50% (for all sludges with a very high content of P)
  - different techniques are available (later more)
Co-incineration will be possible only for sludges with a P-content < 2% (extract P at the WWTP - How? → later)

> for all sludges in coal-fired power plants, if the ash-content of the coal is less than 2.5% and the ash is used directly as a fertiliser or longtime stored (same requirements as for ashes from mono-incineration)

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Consequences for WWTP-Operators

What are the possibilities for sludge disposal in future?

- **Co-incineration**
  - if the sludge has a low P-content that can be reduced to less than 2% (at the WWTP, different methods are possible)
    - cement industry, coal-power plants and waste-incineration plants are possible, capacity for sludge must be increased (today about 0.5 Mio. Mg DS)
  - coal-fired power plants with low ash-content in the coal (only a few power plants are imaginable)

Consequences for WWTP-Operators

Methods for P-recovery

- **Mono-incineration**
  - No available capacity!
    - Germany has about 0.5 Mio. Mg DS, but full!
  - Building new plants?
    - Decision process, planning, financing, approval procedure, building, take into operation
    - not possible in the transition period of 10 years
Summary and outlook

- The federal government of Germany will
  - stop the use of sewage sludge in agriculture
  - ensure that the WWTP-operators recycle Phosphorus

- Therefore a new draft of the German sludge ordinance is worked out and published

- The consequences for the WWTP-operators are serious and not completely foreseeable

Summary and outlook

- Estimations of the DWA (German Association for water, wastewater and waste) come to the result, that additional costs of 2 Billion € Invest and 400 Mio. € per year have to be covered

- The response of the DWA calls for:
  - continuing the use of high quality sludges in agriculture
  - unlimited storage of ashes from mono-incineration
  - limit values and efficiency of P-recovery should be graduated in time
  - promotion of full scale demonstration projects
  - avoid cost increase for the general public

Thank you for your attention!