# Strategy and Concept-Approach for the Recovery of Phosphorus at One of the Largest Sewage Sludge Producers in Germany

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## 1. Current Situation at EGLV

The Emschergenossenschaft (EG) and Lipperverband (LV) together, are one of the largest sewage sludge producer in Germany operating 59 wastewater treatment plants (WWTPs).

Currently:
- 77% of EGLV sludge is thermally disposed of in the associated Bottrop and Lünen incineration facilities.
- 20% is disposed of through external contracts, for instance at cement works or coal power plants (co-incineration).
- 2-3% is used in agriculture, due to new regulations will have no relevance in the future.

In Germany P-recovery from sewage sludge is mandatory from 2029.

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## 2. Sewage Sludge Strategy

<table>
<thead>
<tr>
<th>Fertilizer Ordinance</th>
<th>Sludge Ordinance</th>
<th>Market Situation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development of a strategic approach</td>
<td>Target Criteria:</td>
<td>- Disposal Security</td>
</tr>
<tr>
<td></td>
<td>- Economic Viability</td>
<td>- Environmental Sustainability</td>
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<td></td>
<td>- Future ability</td>
<td>- Development of a strategic approach</td>
</tr>
</tbody>
</table>

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## 3. R&D as a Tool

Under the leadership of LV, the INTERREG VB Northwest Europe “Phos4You” demonstrated innovative technologies towards recovering phosphorus from wastewater. The essential project working objectives are:

- Demonstrate P-recovery technologies from wastewater, sewage sludge, and sewage sludge ash under real conditions.
- Show case of new fertilizer products using P-recovered from waste water.
- Develop model-like approaches for phosphorus recycling in rural and urban regions.

A regional scenario is currently considered in a complementary project: Five waterboards in North Rhine-Westfalia (NRW) develop a concept for regional sludge-ash-management and phosphorus recycling.

The essential aspects, for develop P-recovery are:
- site selection (area availability, approval capability, infrastructure)
- process selection (method, product, byproduct, residue)
- organizational structure (especially if several parties are involved)

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## 4. Scenario Choice

- Based on the sewage sludge strategy, as well as possible routes of P-recovery (Figure 2), a first approach for different scenarios (Figure 3) was drawn up.
- The sludge scenarios take into account the initial sludge quantities from 2021 to 2029. Sludge quantities could be changed after results of a strategy check in 2025.
- First approaches of the scenarios will be further analyzed, fleshed out, and evaluated according to the already listed criteria (cf. chapter 2).

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## 5. Strategic Procedure and Approach

In 2023, the german sludge producers need to submit a mandatory concept and in 2029 they should adopt P-recovery completely.

The timeline is ambitious, and for this reason, EGLV has worked intensively on the way for P-recycling.

This includes following steps:
- Definition of framework and options (cf. Figure 4)
- Observation of market and process development
- Plant design up to the point of viability
- Analysis of variants for strategic options
- Risk assessment and sensitivity analyses
- Establishing of decision roadmap

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## References


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**Phos4You - We deliver phosphorus “made in Europe”**

www.nweurope.eu/phos4you