



Bundesministerium  
für Bildung  
und Forschung



# **BMBF-Funding Measure Regionales Phosphor-Recycling (RePhoR)**

Division 727, Resources, Circular Economy; Geosciences  
Federal Ministry of Education and Research (BMBF)

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Project Management Agency Karlsruhe (PTKA)

Phos4You, 7<sup>th</sup> partner meeting  
Essen, 22<sup>nd</sup> of January, 2020

[www.bmbf.de](http://www.bmbf.de)

- **Importance and criticality of phosphorus**
  - Phosphorus (P) is an essential and non-substitutable nutrient
  - Germany is 100% dependent on imports  
(Phosphate imports in 2013: ca. 85.000 t, *BGR 2014*)
  
- **Political and legal relevance**
  - 2013: Coalition agreement of the federal government
  - 2014: EU put phosphorus on the List of critical Raw Materials
  - 2017: Amendment of the German Sewage Sludge Ordinance (AbfKlärV)
    - 2023: Obligation to submit a report
    - 2029 or 2032: Responsibility for large wastewater treatment plants to recover phosphorus

- **High-Tech Strategy** of the federal government
  - Creating sustainable circular economies
- BMBF-framework program: „Research for Sustainable Development - **FONA**”
  - Flagship Initiative „Green Economy“
  - Use resources intelligently and carefully
- German Resource Efficiency Programme (**ProgRess II**)
  - Enhancing resource-efficient closed cycle management – Improving phosphorus recycling



- **BMBF/BMUB-funding initiative:** „Circular Economy for Plant Nutrients, especially Phosphorus“ 2004 - 2011, funding: 4,1 Mio. €)
- Projects in different funding measures, for example:
  - **KMU-innovativ** (2012 – 2019)
  - **ERWAS** - Future-oriented Technologies and Concepts for an Energy-efficient and Resource-saving Water Management (2013 – 2017)
  - **r<sup>3</sup>** - Innovative technologies for resource efficiency - Strategic metals and minerals (2012 – 2014)





# Funding Measure „Regionales Phosphor-Recycling - RePhoR“

## ■ Goals

- Innovative economical solutions for regional P-recycling and utilization of sewage sludge
- Scientific results and practical experience from large-scale implementation of various P-recovery technologies
- Contribution for the implementation of the AbfKlärV
- Increased production and use of P-recyclates

## ■ 2 funding phases:

- Concept phase: Planning and preparation of regional concepts (6 months)
- Implementation phase: Realisation of the best concepts (60 months)

## ■ Implementation phase:

- Large-scale P-recovery
- High quality and recyclability of the P-recyclates
- Regional approach with short transport routes
- Transferability to other regions
- Collaborative projects with partners from business, science, administration and society
- Cross-disciplinary approach



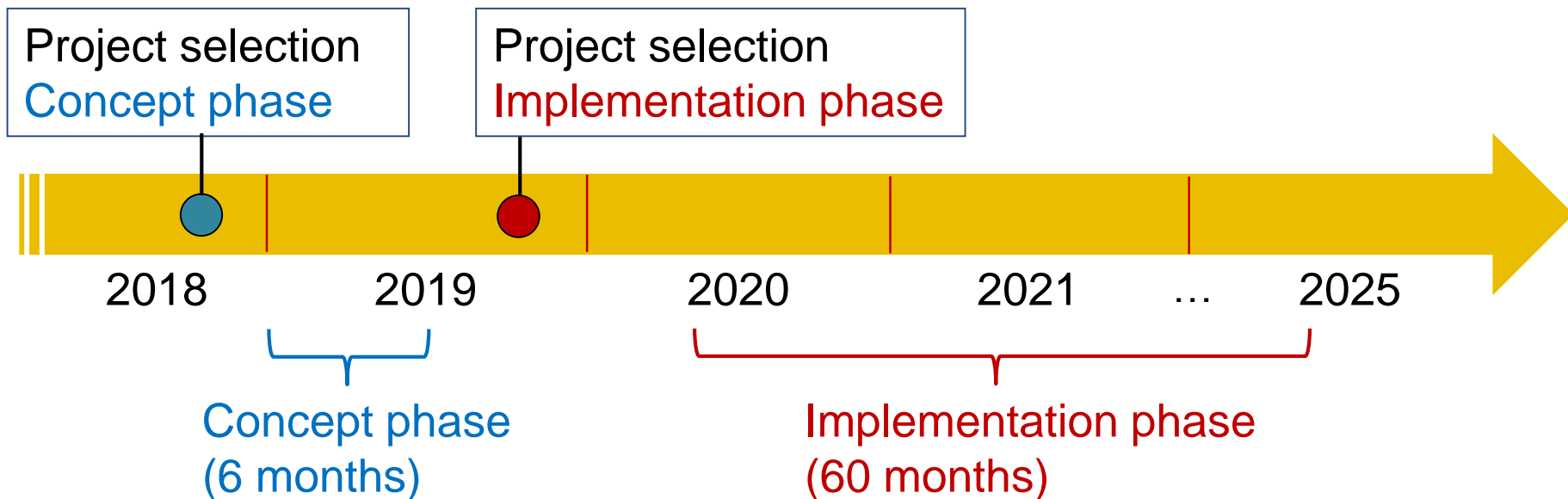
*Sewage plant (Pixabay/jarmoluk)*



*Phosphate fertilizer (BMZ 2013)*

# RePhoR - Funding Time Schedule

- **Call:** 09.03.2018
- **Concept phase:** 01.02. – 31.07.2019
- **Implementation phase:** 2020 – 2025



# RePhoR – Results of the Concept Phase I

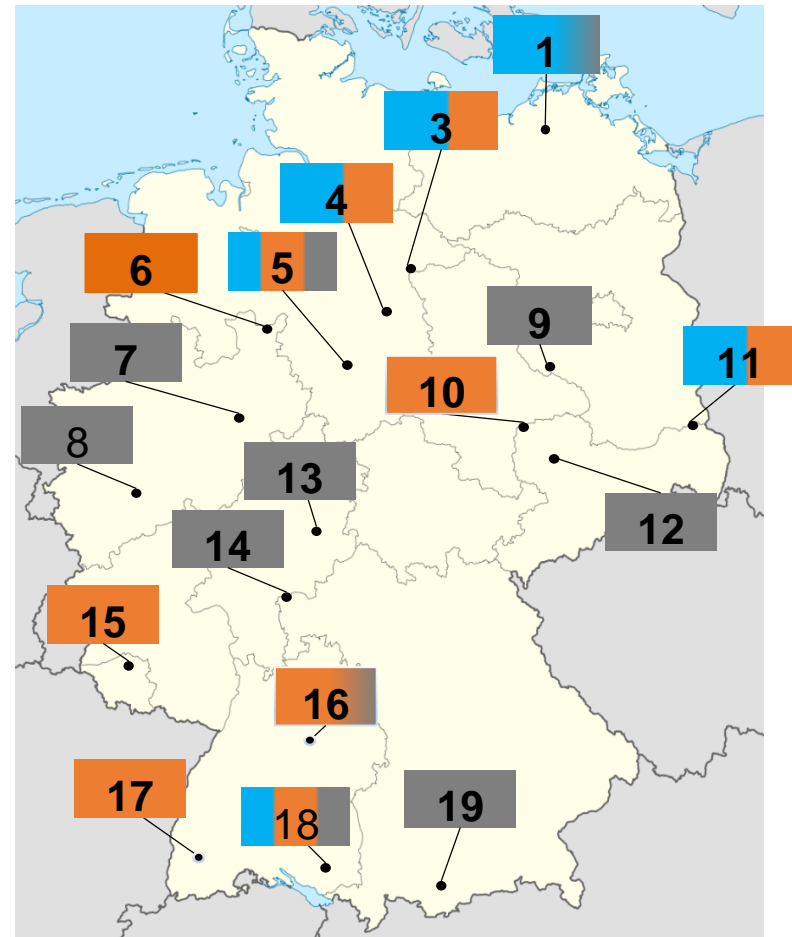
18 submitted concepts  
with 133 partners:

Large companies:	18
Small and medium enterprises (SME)	34
Universities:	23
Research institutions:	23
Others:	35

Aequous Phase

Sewage Sludge

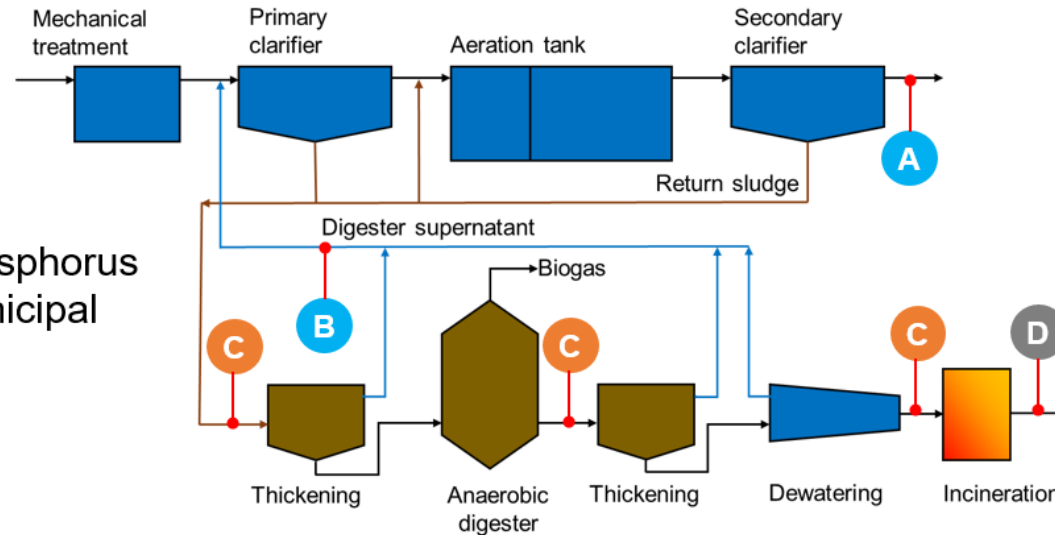
Sewage Sludge Ash





# RePhoR – Results of the Concept Phase II

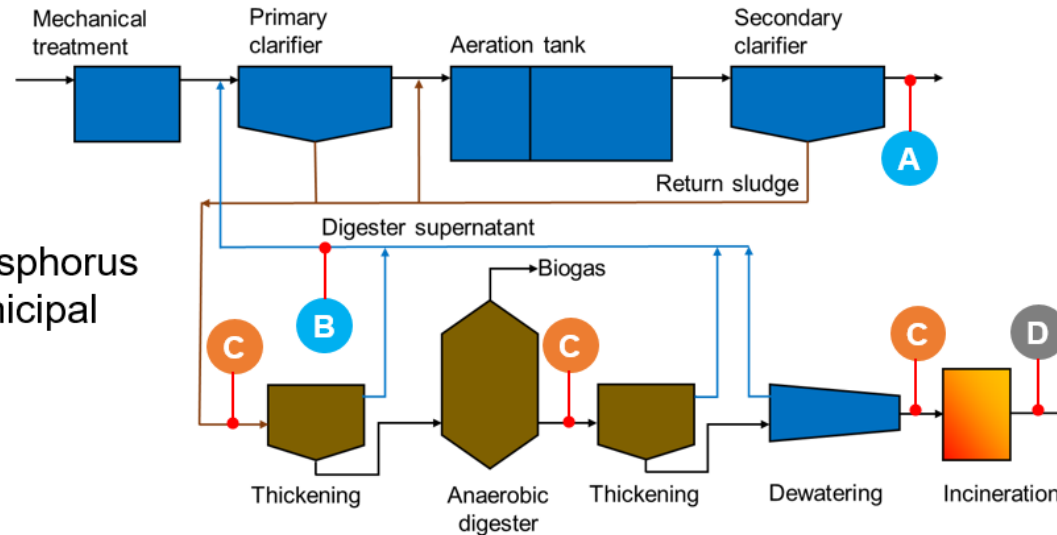
Processes for phosphorus  
recovery from municipal  
wastewater:



Aqueous Phase (digester supernatant)	B	MAP-precipitation MAP&ParForce	ParForce
Sewage Sludge	C	MAP-precipitation MAP&ParForce	Seaborne ParForce P-XTRACT EuPhoRe
Sewage Sludge Ash	D	Pontes Pabuli Phos4Green	Phos4Life ParForce Ash2Phos AshDec EuPhoRe

# RePhoR - Implementation Phase: Technologies

Processes for phosphorus recovery from municipal wastewater:



Aqueous Phase (digester supernatant)	B	MAP-precipitation MAP&ParForce	<del>ParForce</del>
Sewage Sludge	C	MAP-precipitation MAP&ParForce	Seaborne ParForce <del>P-XTRACT</del> <del>EuPhoRe</del>
Sewage Sludge Ash	D	Pontes Pabuli Phos4Green	Phos4Life ParForce <del>Ash2Phos</del> <del>EuPhoRe</del> AshDec

■ **Running time:** 12.2019 – 06.2025

## ■ **Goals**

- Synthesis of the project results and public relation
- Organisation of events of cross-project issues
- Networking with corresponding national and intern. activities
- Test procedures and product criteria for P-recyclates
- Analysis of the legal framework for the use of P-recyclates
- Comparable criteria for assessing the economic viability and the ecological balance of the implemented processes

## ■ **Contact persons**

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