# **FUTURE IMPACT**

During the four-year innovation action, the industrial FlashPhos process will be demonstrated in a pilot plant with up to 250 kg/h sewage sludge throughput. The construction of the first full-scale FlashPhos plant will start in 2025 and industrial-scale white phosphorus production will start together with an industrial consortium, expecting market introduction by 2028.

# **UNTIL 2040**



# PARTNERSHIP

The FlashPhos consortium is a multi-disciplinary European team composed of large industrial companies, SMEs, NGOs and academic institutions. Under the coordination of the University of Stuttgart, 17 renowned partners from five countries are working together to jointly develop an innovative process fostering circular economy.

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# FROM SEWAGE SLUDGE TO PRODUCTS FOR THE INDUSTRY

FLASH

PHOS

The complete thermochemical

recycling of sewage sludge



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## ABOUT

The European Union is largely dependent on imports of white phosphorus ( $P_4$ ), a critical raw material, e.g. for electronics, food and pharmaceutical industries.

To tackle this challenge, the fouryear EU-funded project FlashPhos, led by the University of Stuttgart, will recover at a large scale highquality white phosphorus and other raw materials using sewage sludge as input material. These raw materials have strategic applications for the European chemical, metal, and cement industry.





EU CONTRIBUTION € 11 897 102,28

# **17 PARTNERS 5 COUNTRIES**



#### CONCEPT

The award-winning FlashPhos process is a high temperature fast reacting (flash) entrained flow gasification of dried and ground sewage sludge and other phosphorus-rich waste streams such as meatand-bone meal.

The inorganic waste components are melted or evaporated and are then separated in a refiner reactor to produce recycled  $P_4$  as the main product. Other output materials of the process are a climate-friendly alternative cement raw material, an iron alloy and a heavy metal concentrate as valuable outputs for the metal industry.

The organic components are gasified at a high temperature and converted into heat and a gaseous fuel. This gas and excess heat can be used in cement plants to substitute fossil fuels.

Consequently, several valuable raw materials will be generated by the innovative and cost-efficient FlashPhos process without solid waste.

#### **OUR VISION**

FlashPhos is the first process in the world to sustainably produce white phosphorus for the chemical industry in a full circular economy model, surpassing the quality of white phosphorus on the market today.

### **FLASHPHOS PROCESS**

