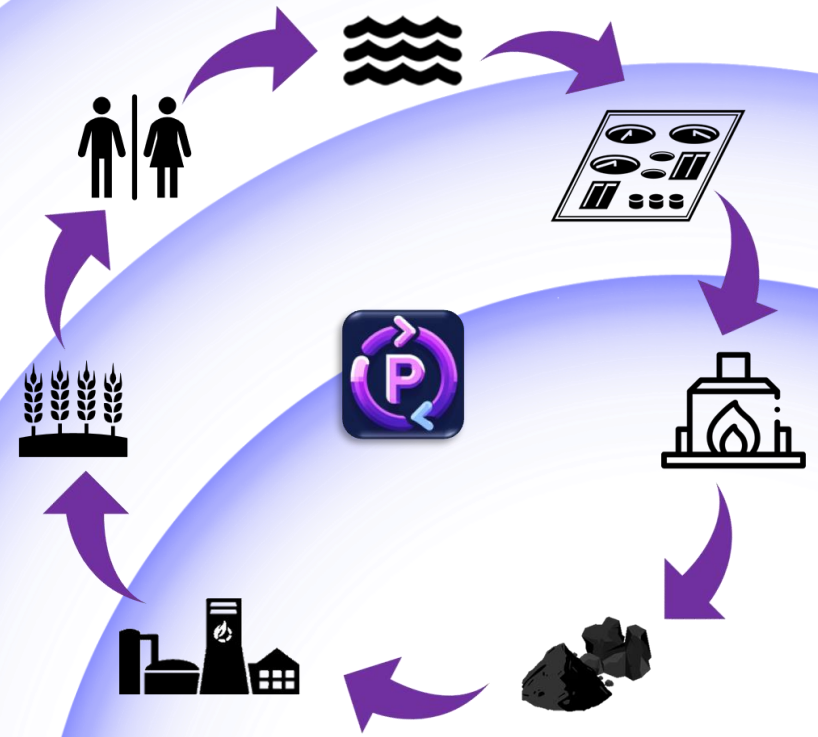


Closing the Loop: Aquafin's Journey and Vision in Phosphorus Recovery



aquafin

€?

**Yearly spend by Aquafin to
remove Phosphorus from
wastewater?**

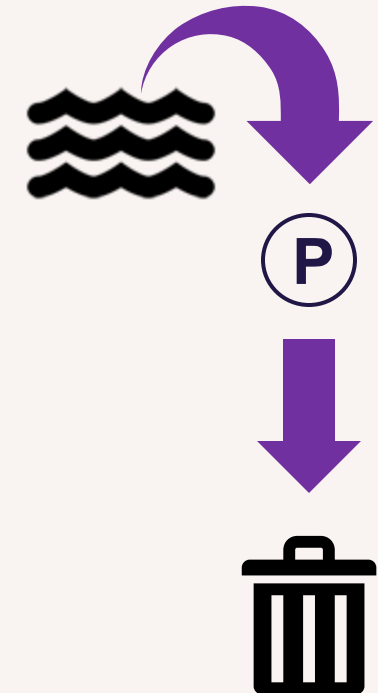
€6.274.803

**Yearly spend by Aquafin to
remove Phosphorus from
wastewater**

Only Chemicals !

€6.274.803

**Yearly spend by Aquafin to
remove Phosphorus from
wastewater**



What about Phosphorus?



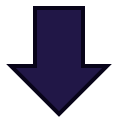
Europe
Commissie



Revision **Urban Wastewater Treatment Directive**
(UWWTD) 1 Januari 2025



Article 20



Requirement for minimum reuse and recovery
rates of phosphorus from sludge

Phosphorus = Crucial element in the food cycle

A finite resource! ->
fear of global
shortage

On the list of critical
raw materials for the
EU since 2014

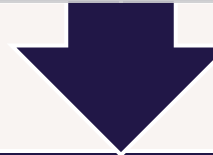
Geopolitics



Europe is strongly depended on P-import

90% of the P-requirement

EU wants to focus more on
domestically sourced raw
materials

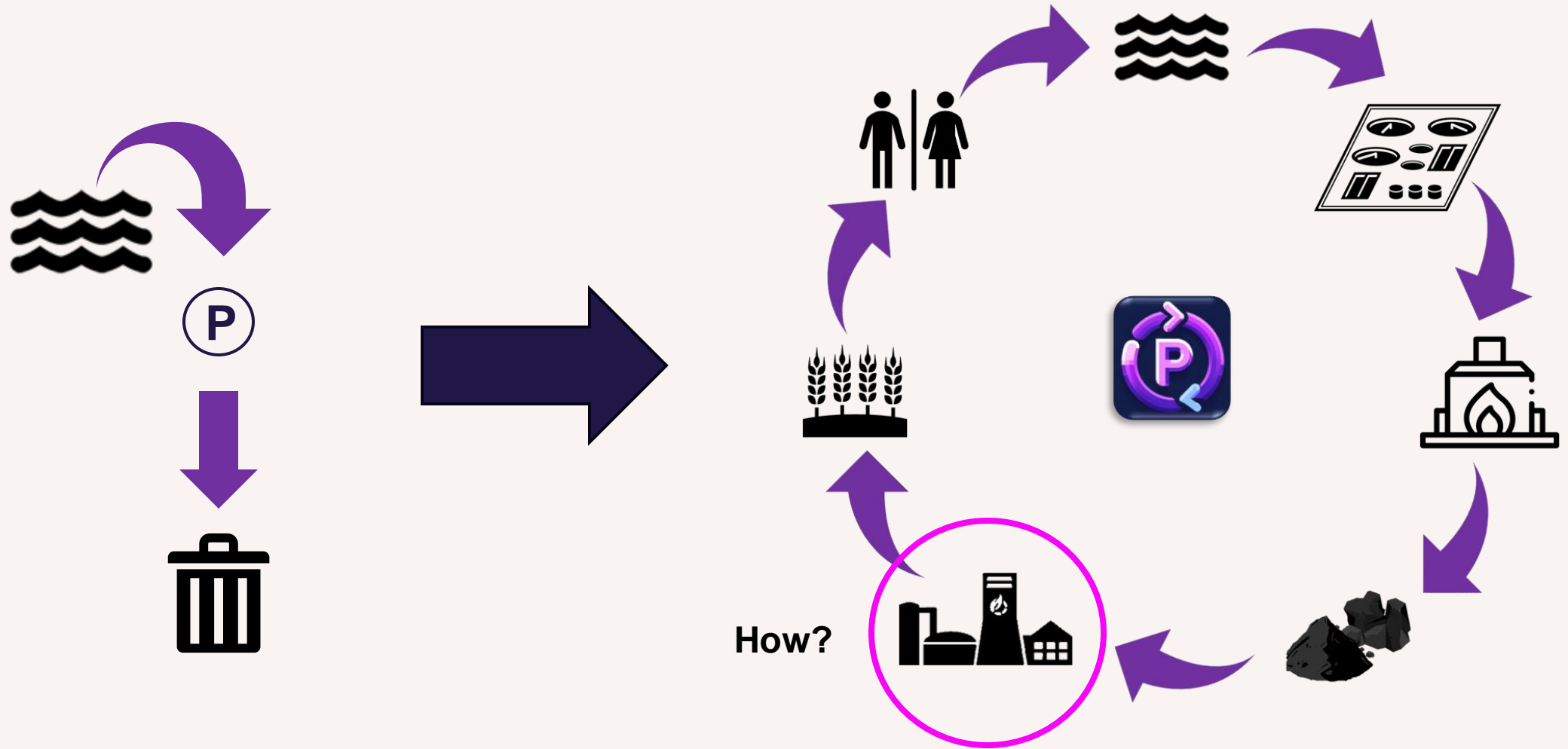


Wastewater

Biggest domestic source of P

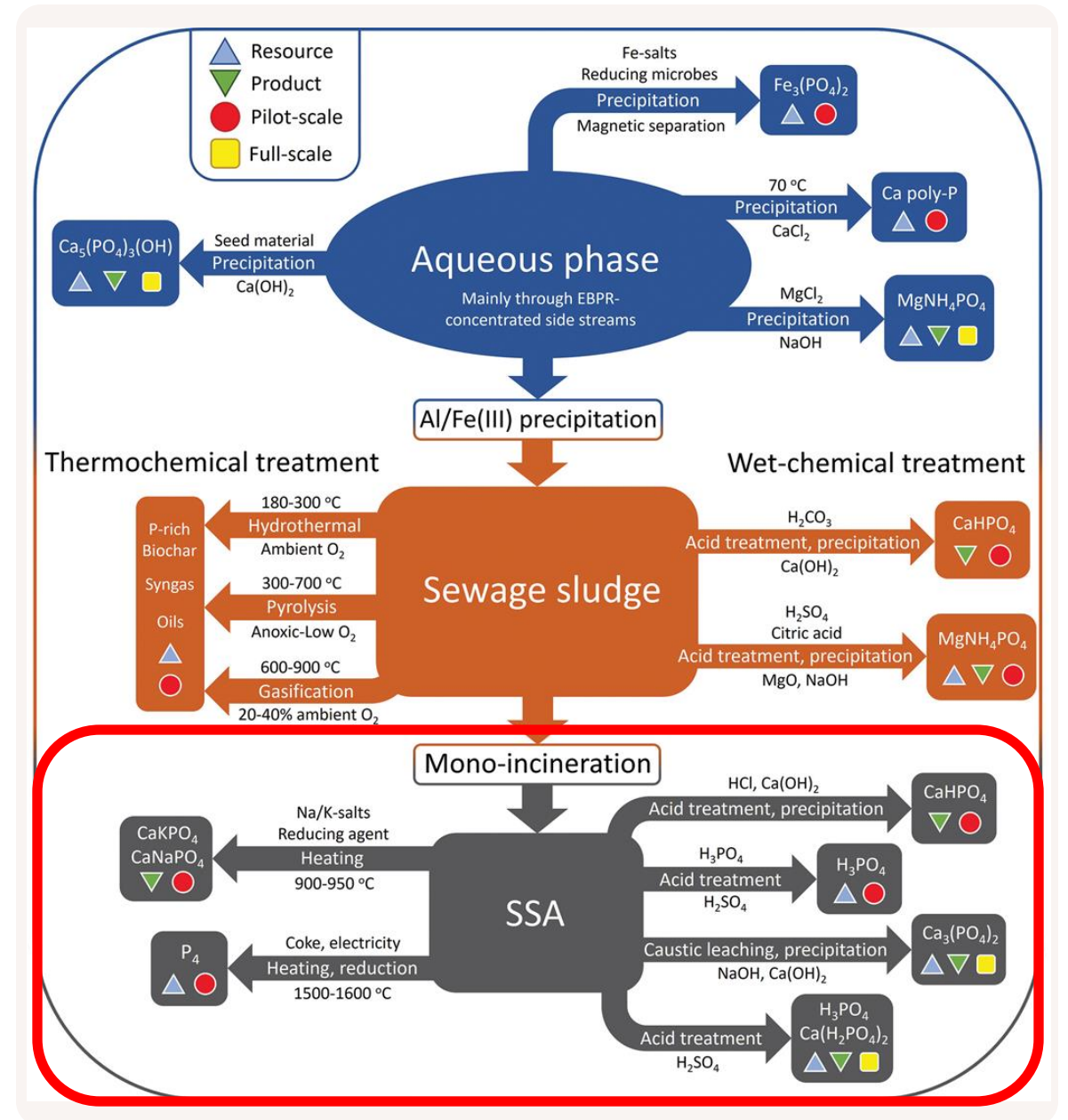
30% P-requirement

Closing the Loop:



Realisation of P-recovery at Aquafin

- Multiple possibilities
 - Depending on location/step in wastewater treatment process
- Vision Aquafin
 - Recovery from Sewage Sludge Ashes (SSA)
 - Locked in -> future sludge strategic



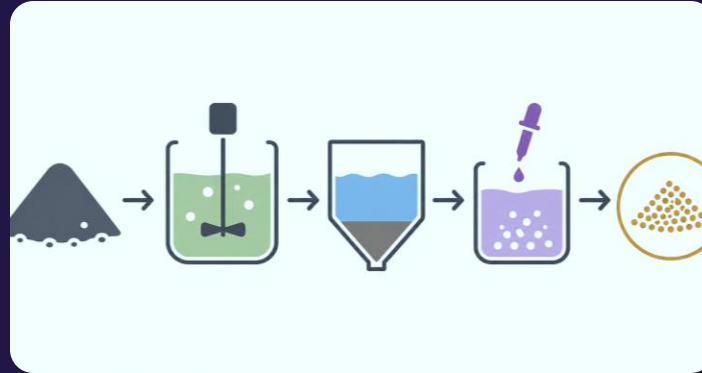
Options Aquafin: P-recovery from SSA



EUROCHEM

EuroChem

- Direct mixing of SSA in existing production process
- NPK



Acid leaching Technology

- Easymining, Remondis, Susphos, TTBS,....
- Phosphate products



Spodofos

- Metallurgical
- White Phosphorus

Options Aquafin: P-recovery from SSA



EUROCHEM

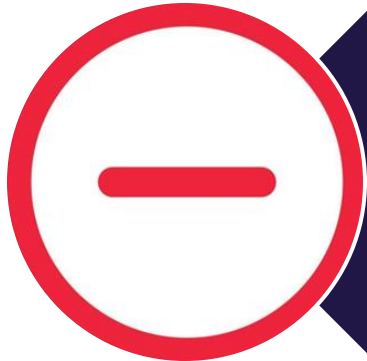
EuroChem

- Direct mixing of SSA in existing production process
- NPK



Pros:

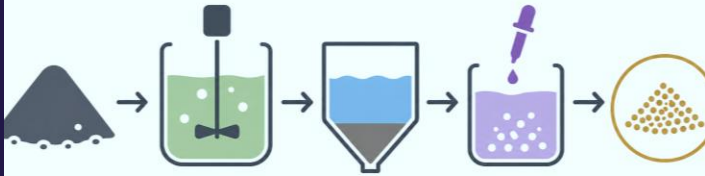
- No major investment
- No residual waste



Cons:

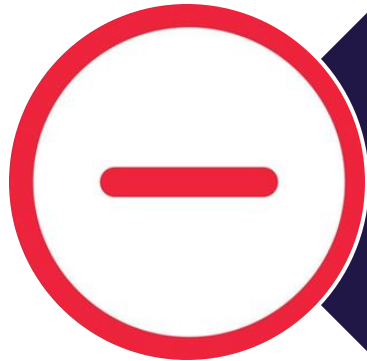
- No guarantee of success
- Heavy metals in the final product
- Reliability?
- EU-legislation

Options Aquafin: P-recovery from SSA



Pros

- Final product purity
- EU-legislation
- High(er) TRL
- Multiple Techniques developed



Cons

- High gate fee
- High investment cost
- TRL variable
- High chemical consumption

Acid leaching Technology

- Easymining, Remondis, Susphos, TTBS,.....
- Phosphate products

Options Aquafin: P-recovery from SSA



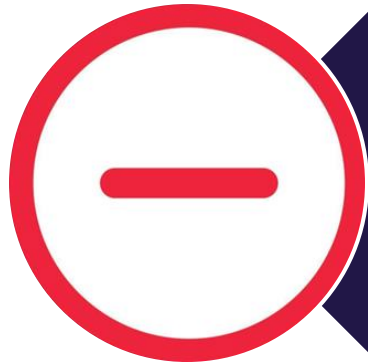
Spodofos

- Metallurgical
- White Phosphorus



Pros

- High value end-product
- Low Gate-fee
- Carbon negative
- Strong business case
- Small footprint & low capex



Cons

- Low TRL -> 5
- Dependence aluminium
- Only 1 patented technique
- Reputation White phosphorus

P-recovery at Aquafin

Are we there yet?

Not really..

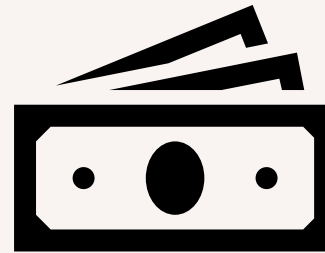
P-recovery at Aquafin

Are we there yet?

- **Biggest bottle necks for development P-recovery**



- **Origin stigma**
- **Contamination concerns**



- **Price competition**



- **Stimulants government**

Whats next?

What will the future on P-recovery hold for Aquafin?

