Testbädd Ellinge

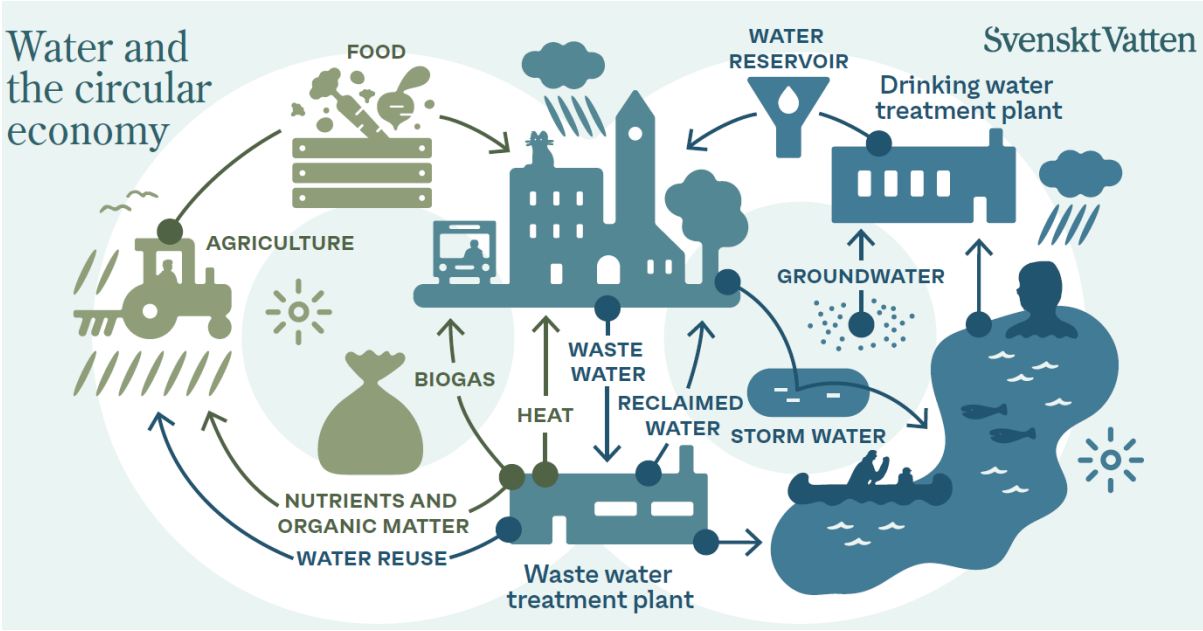
Current research on sludge biochar

David Gustavsson

Pyrolysis of sludge to obtain biochar (Boost Nordic Biogas)
22-11-2023

The situation

- Plant nutrients in wastewater should be safely recycled to food production.
- >90% of the P ends up in the sewage sludge.
- In Sweden only 50% of the sewage sludge is spread onto farmlands.
- WWTPs should be energy and climate neutral.



Drying + pyrolysis => sludge biochar

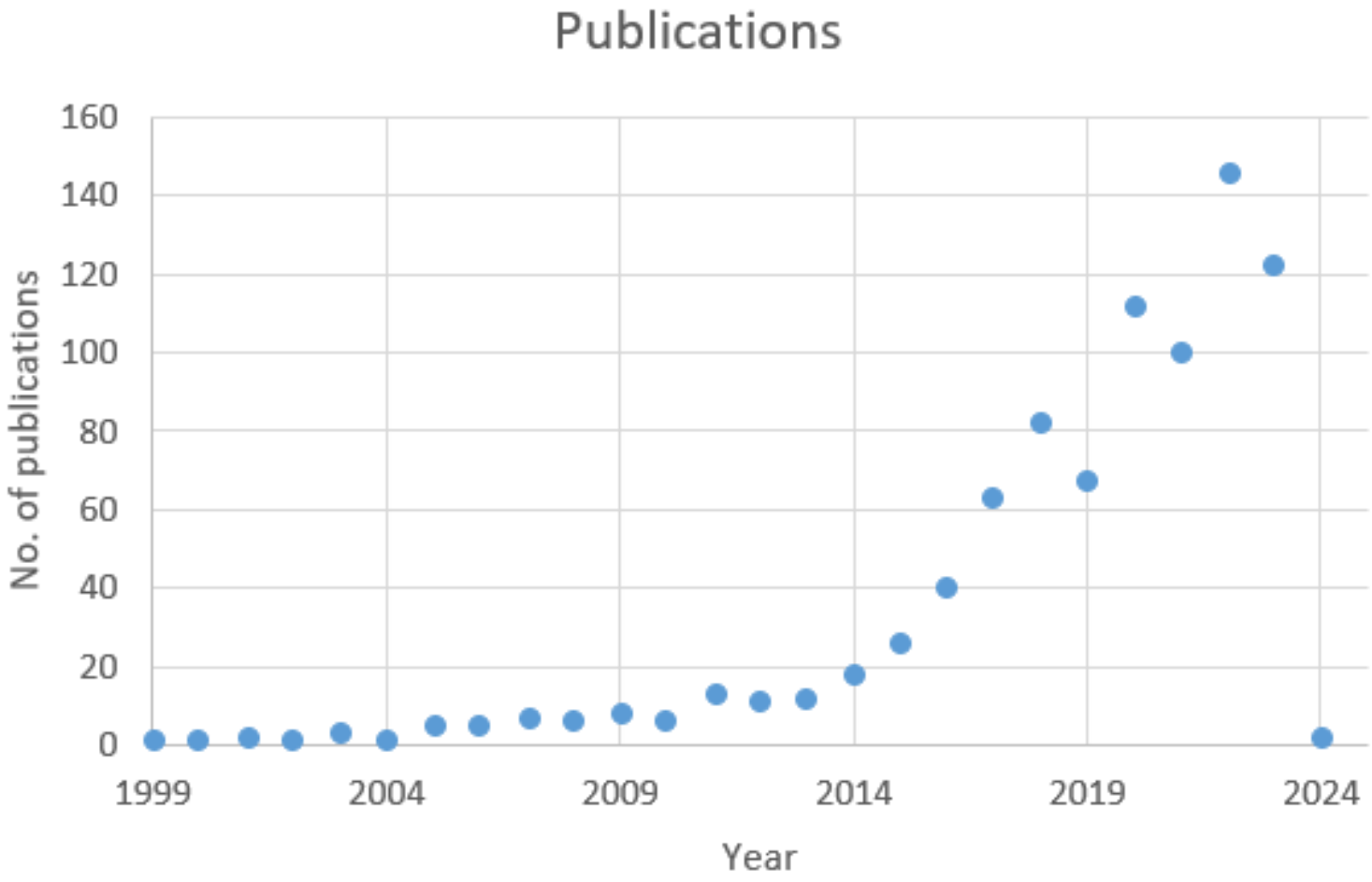
Opportunities

- Energy-effective volume reduction
- Degradation/removal of organic micropollutants (e.g. PFAS) and heavy metals (As, Hg and Cd)
- Phosphorus recovery
- Carbon sink
- Soil improvement
- City-scale implementation

Challenges

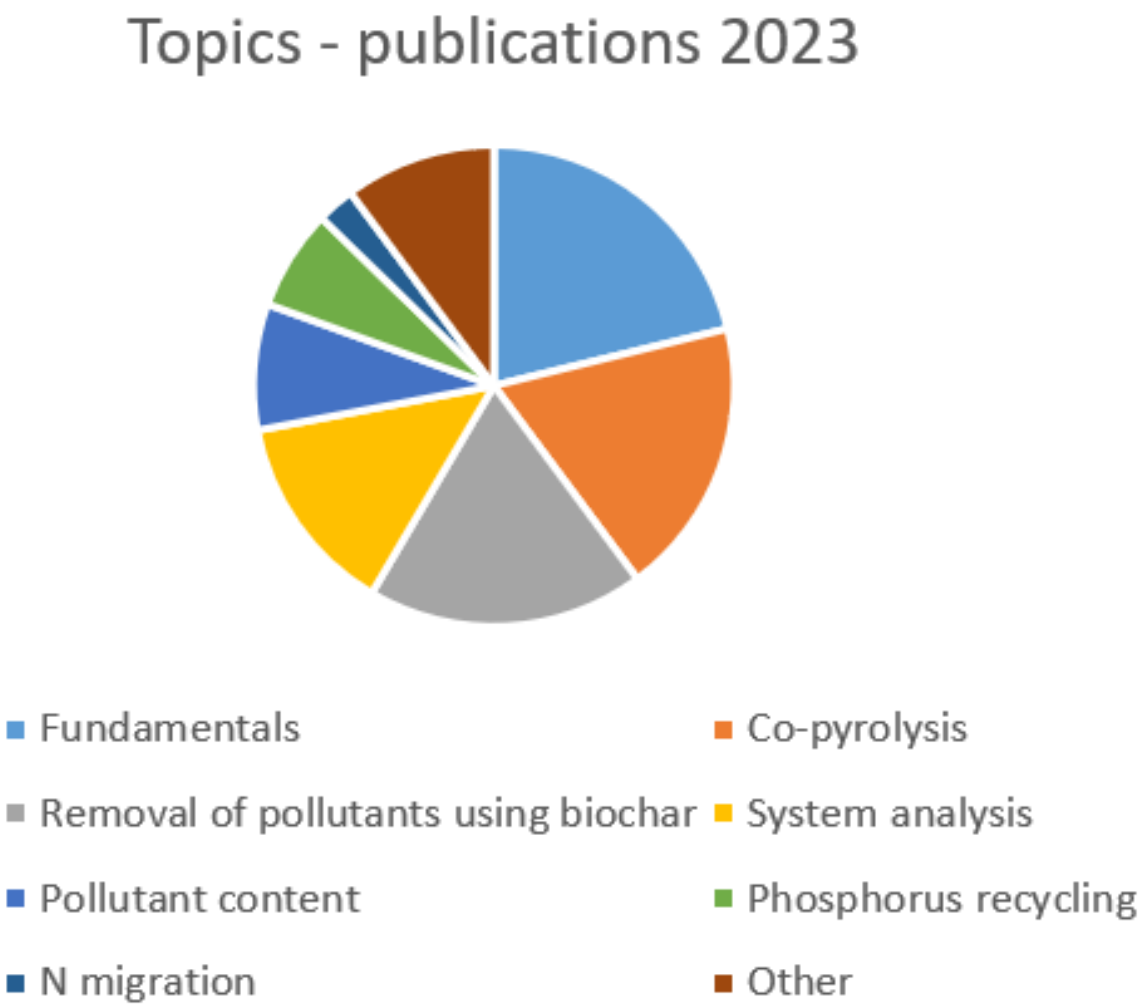
- Sludge biochar characteristics variability
- Phosphorus availability
- Studying soil effects
- Maximising energy efficiency and carbon sink
- Nitrogen recovery
- Business case(-s)

Scientific publications – sludge pyrolysis



pyrolysis AND (municipal OR domestic) AND (sludge OR biosolid*) AND (sewage OR wastewater OR waste water OR waste-water)

Topics


Topics - publications 2023
Fundamentals
Co-pyrolysis
Removal of pollutants using biochar
System analysis
Pollutant content
Phosphorus recycling
N migration
Other

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WWTP

- Wastewater characteristics
- Configuration
- Sludge type
- Sludge treatment
- *Co-substrates*

Dewatered sludge

Pilot

- Operational conditions
- Mass balances
- Energy balance
- Resource requirements
- Operational experiences

Sludge biochar

Biochar

- Characteristics
- Applications
- System analysis
- Business cases

Knowledge dissemination

- Homepage
- Stakeholder meetings
- Study visits
- Scientific publications
- Sludge biochar conference

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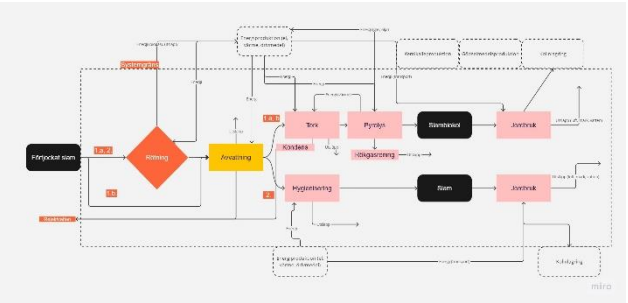
WWTP

Dewatered sludge

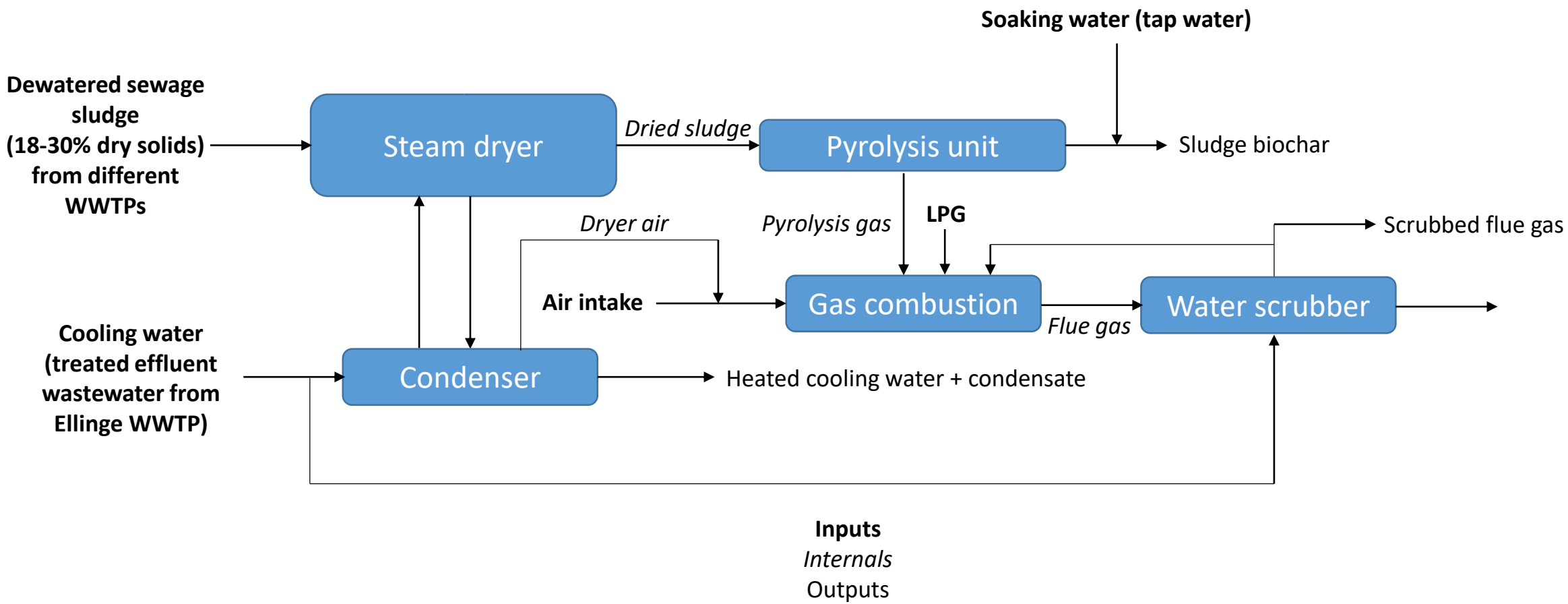
Pilot

Sludge biochar

Biochar



Schematic overview of the pilot plant at Ellinge WWTP



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https://www.swedenwaterresearch.se/en/projekt/testbed-ellinge/