



How to take a further step toward net zero carbon at your WWTP?

29.07.2021

Speakers



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ABOUT US



- ELIQUO is a portfolio company of SKion Water GmbH
- Experts in plant engineering and innovative water and wastewater technologies and solutions for municipalities
- Our goal: to protect water as valuable resource and thus make an important contribution to protect nature



Clean water has a price, also for the environment



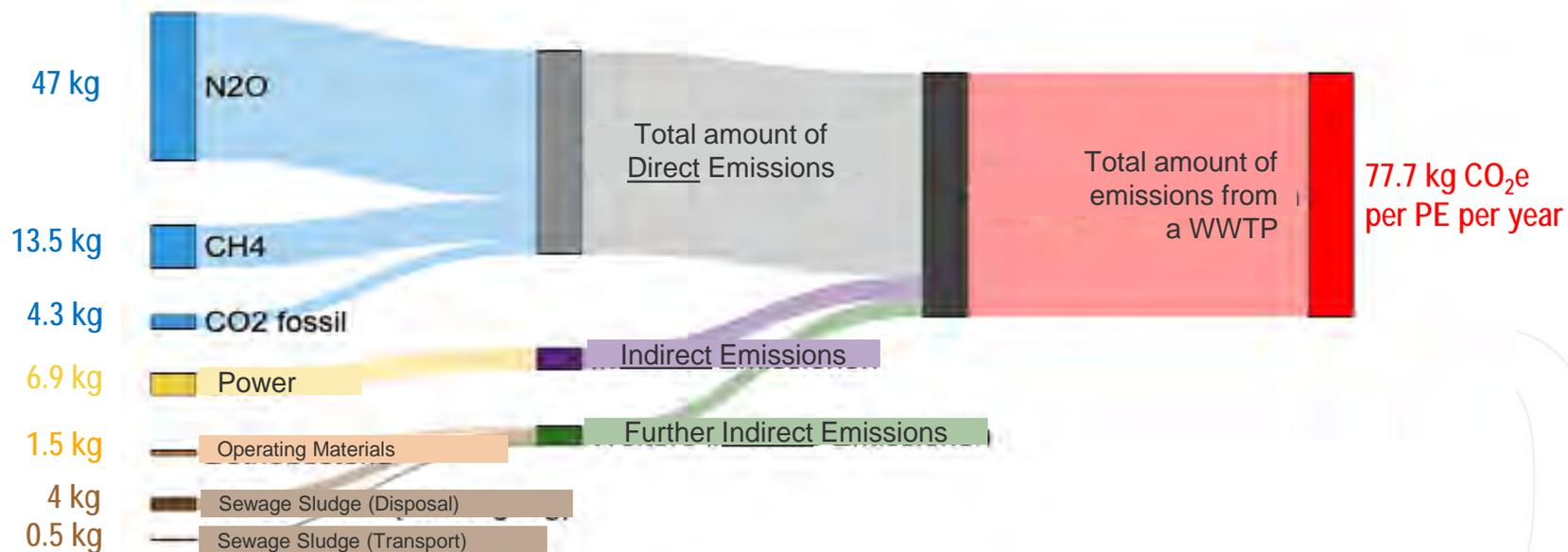
Survey:

Which factors at WWTPs are essential for reducing the carbon footprint?

- Electric Power
- Heat
- Transports
- Operating Media/Chemicals
- Direct greenhouse gas emissions



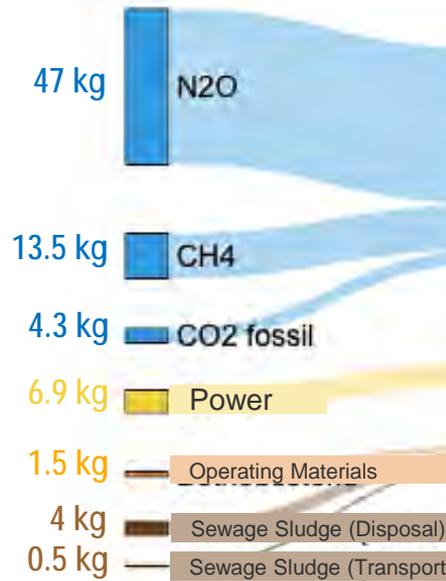
Direct emissions – major share on WWTP's carbon footprint



Sankey diagram created by Iris Beuter, Master thesis student at Umwelttechnik BW based on the following studies:

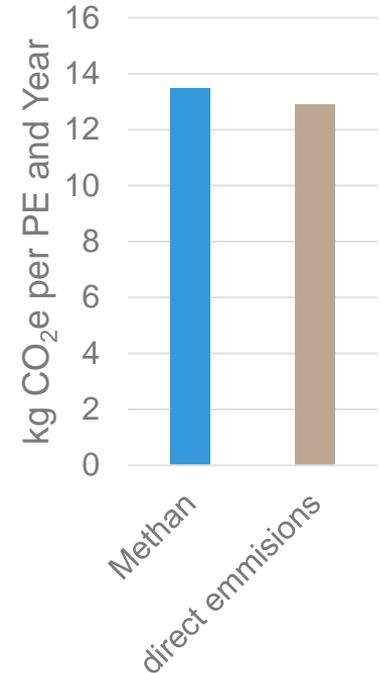
- Daelman, M. R. J. (2013) Methane and nitrous oxide emissions from municipal wastewater treatment - results from a long-term study (DOI: 10.2166/wst.2013.109)
- Law, Y. (2013) Fossil organic carbon and its fate in treatment plants (<http://dx.doi.org/10.1016/j.watres.2013.06.002>)
- Kosse, P. (2016) Climate change and greenhouse gas emissions within the context of urban waste water management

Methane emissions play a significant role



13.5 kg CO₂e per PE per year from direct methane emissions

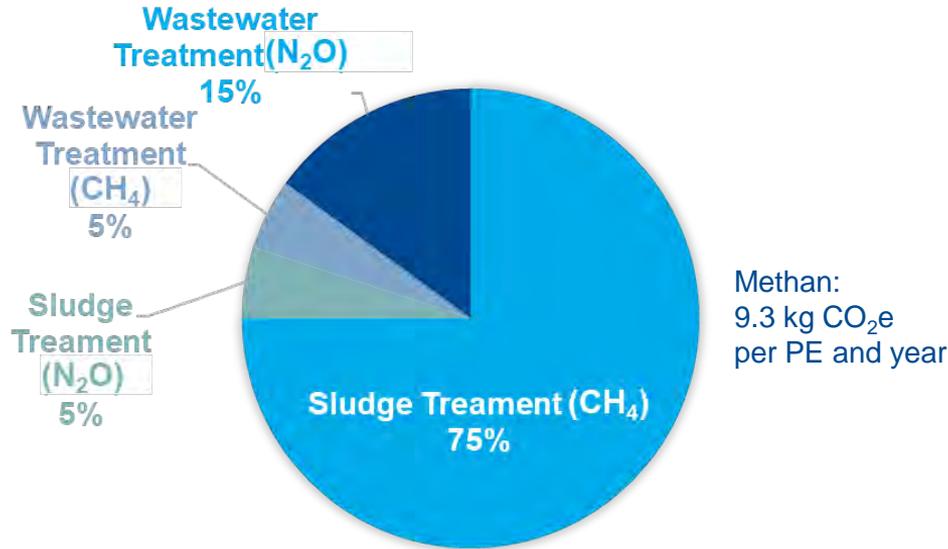
12.9 kg CO₂e per PE per year from total indirect emissions



→ The **share of methane emissions is higher** than the **total indirect emissions** of a wastewater treatment plant.

75% of the GHG emissions originate from CH₄ in sludge treatment

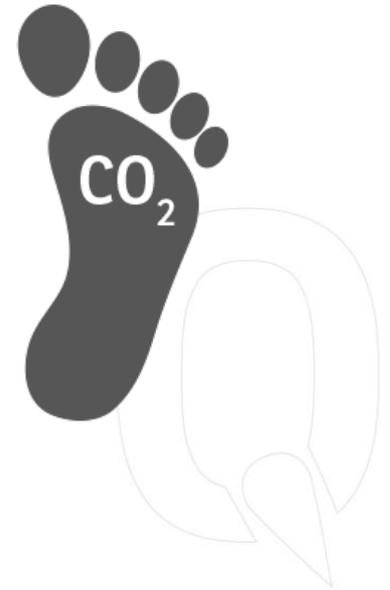
Mean percentage distribution of CO₂-equivalent emissions from wastewater and sludge treatment (Gärtner 2017)



- results from a study conducted at **10 different WWTPS**
- Both studies show comparable results concerning methane emissions
- Consistent on all studies: → direct methane emissions play a major role and are easy to avoid

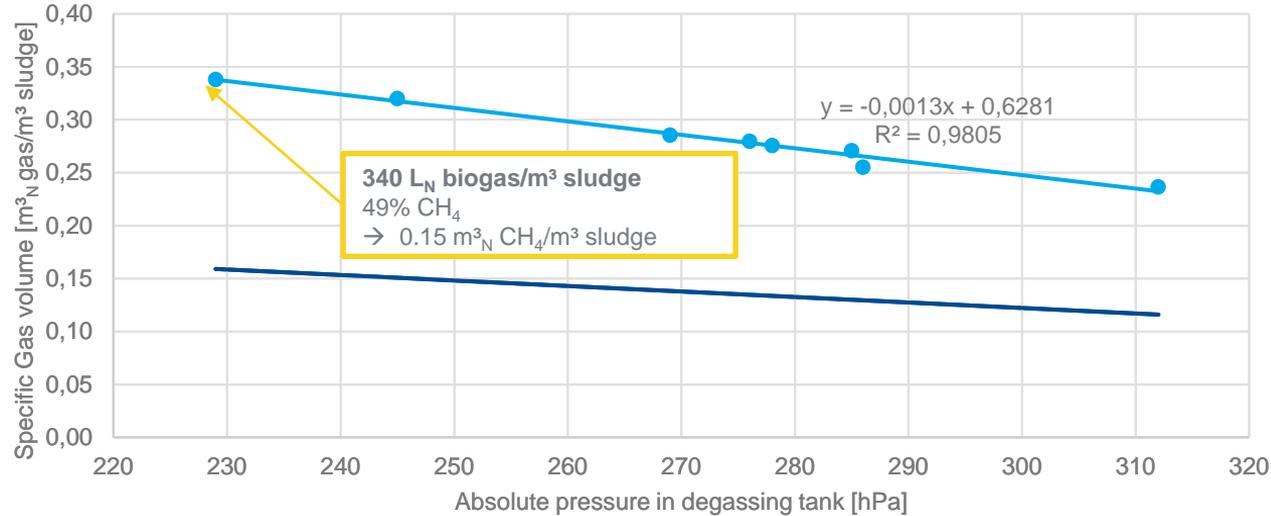
Avoiding methane emissions is key for a CO₂ neutral WWTP

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Theory vs. Practice

WWTP Lingen – Specific gas volume captured by degassing



The gas volume captured by degassing is twice as high as expected in theory!

- Total (dissolved gas + gas bubbles)
- Dissolved gas (calc. acc. Henry's law)

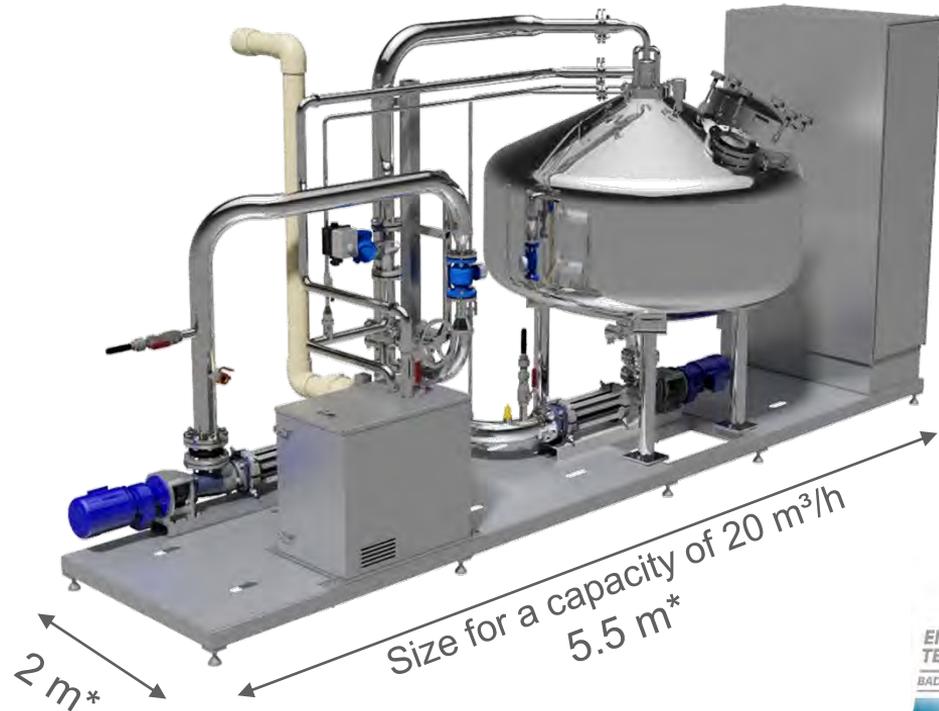




What is EloVac[®]-P



- Compact Plug & Play-Unit
- System for vacuum degassing of digested sludge
- Energy-positive
- Reduces greenhouse gas emissions
- Optional: integrated controlled phosphate precipitation
- Improves dewaterability of digested sludge
- Patent pending

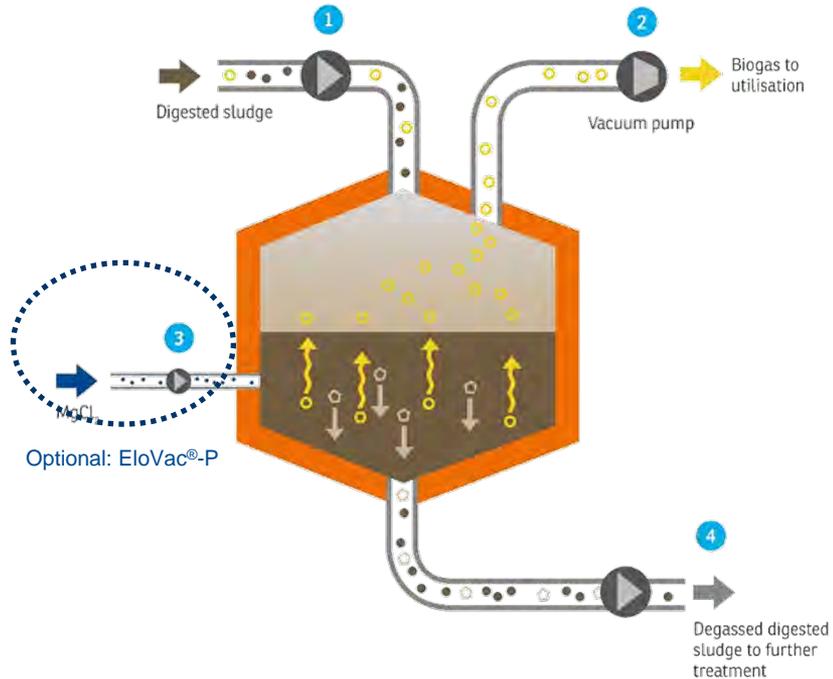


EloVac[®]: vacuum degassing

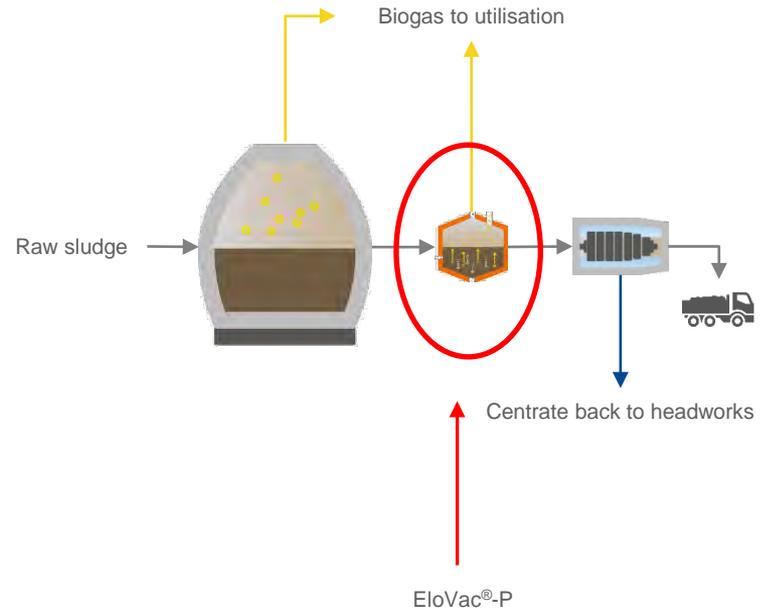
10 EloVac[®]-P: vacuum degassing with integrated phosphate precipitation



How does EloVac[®]-P work?



Implementation



Why Phosphate Precipitation?



Benefits **in addition** to the **improvement of the carbon footprint** by vacuum benefits with phosphate precipitation:



Reduction of Phosphate return load by up to 95%



Improvement of dewaterability by up to 5%-points



Lower polymer consumption



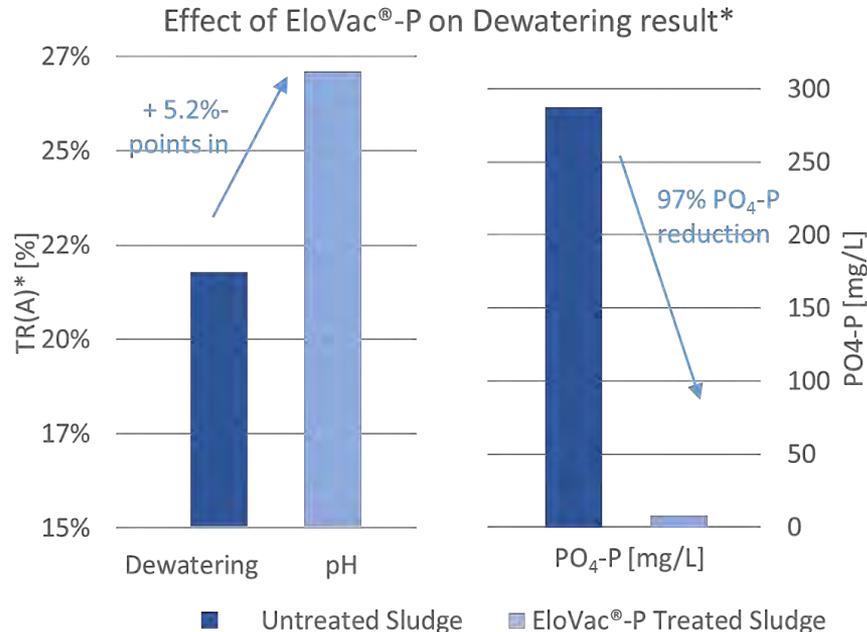
Avoid struvite scaling issues

ROI of < 3 years depending on disposal and polymer costs



Why Phosphate Precipitation?

TR(A) measurements* for the evaluation of the EloVac[®]-P plant in Lingen, GER



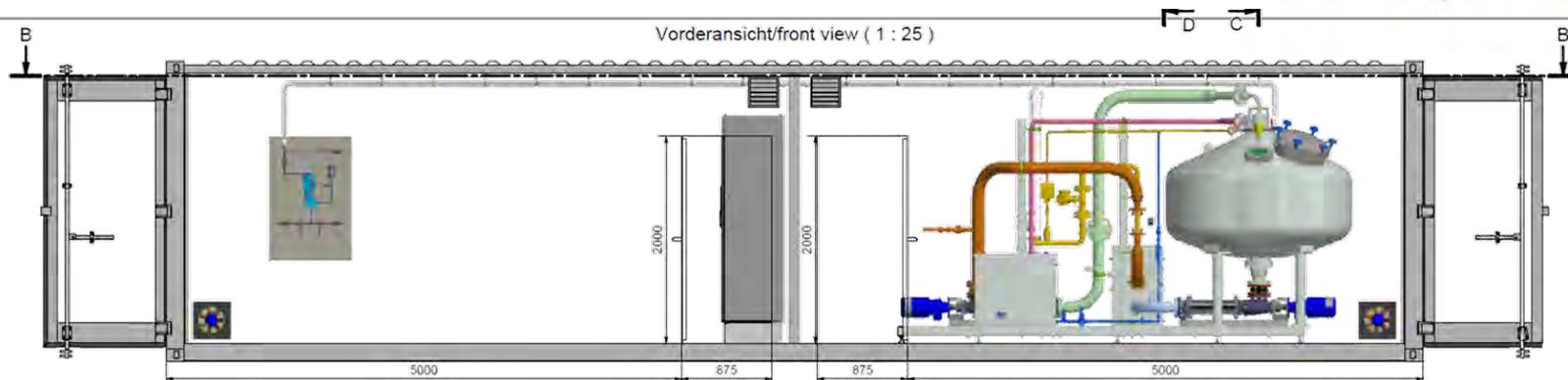
For example, we offer laboratory tests to investigate the effect of EloVac[®]-P on a specific sludge.



*) = TR(A) - www.KBKopp.de

Demo plant for Europe

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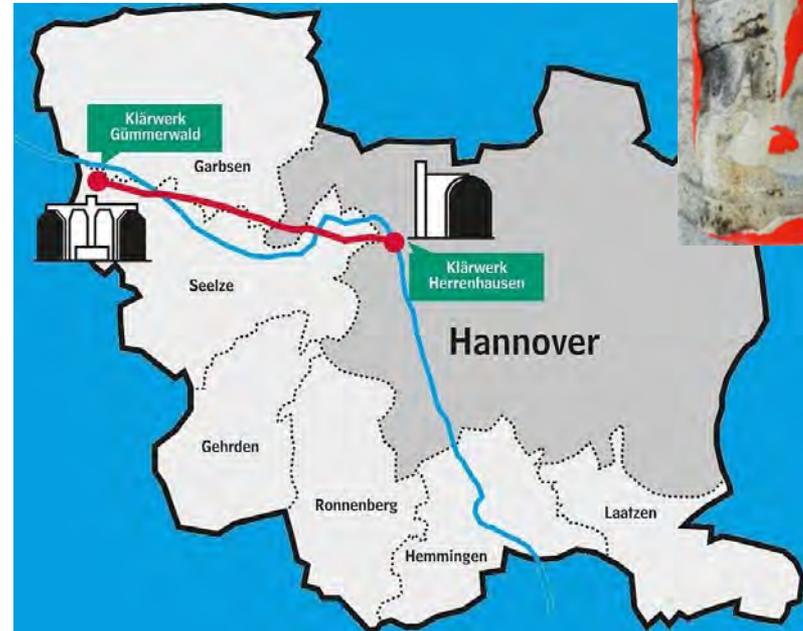


- Capacity 15 m³/h digested sludge (full scale treatment for midsized WWTPs)
- Available since 10/2020
- So far experiences at 4 different WWTPs and 3 further employments by end of 2021

Results of full scale demo test

Background of the project

- Pigs (see picture on the right) are regularly used to clean the connecting pipeline (14 km length) between sewage treatment plants.
- Deposits in the pressure line cause the pig to move unevenly (by sticking and loosening) and cause abrasion on the surface of the pigs.
- Goal: mitigate scaling → reduce abrasion on pigs



EloVac[®]-P in Hannover



29.06.2020
26/20



15.11.2020
47/30

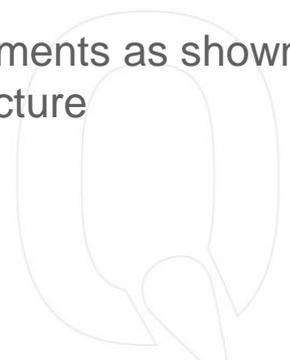


13.12.2020
51/30



17.01.2021
56/30

- 4 months of continuous operation
- Improved volume, difference of the pig before and after use
- improvements as shown in the picture



Source: KBKopp

EloVac[®] – successful technology



HIAS, Ottestad, Norway
Capacity max. 290 m³/d
commissioning 2020



Provo, USA
Capacity max. 500 m³/d digested sludge
commissioning 2021



Lingen, Germany

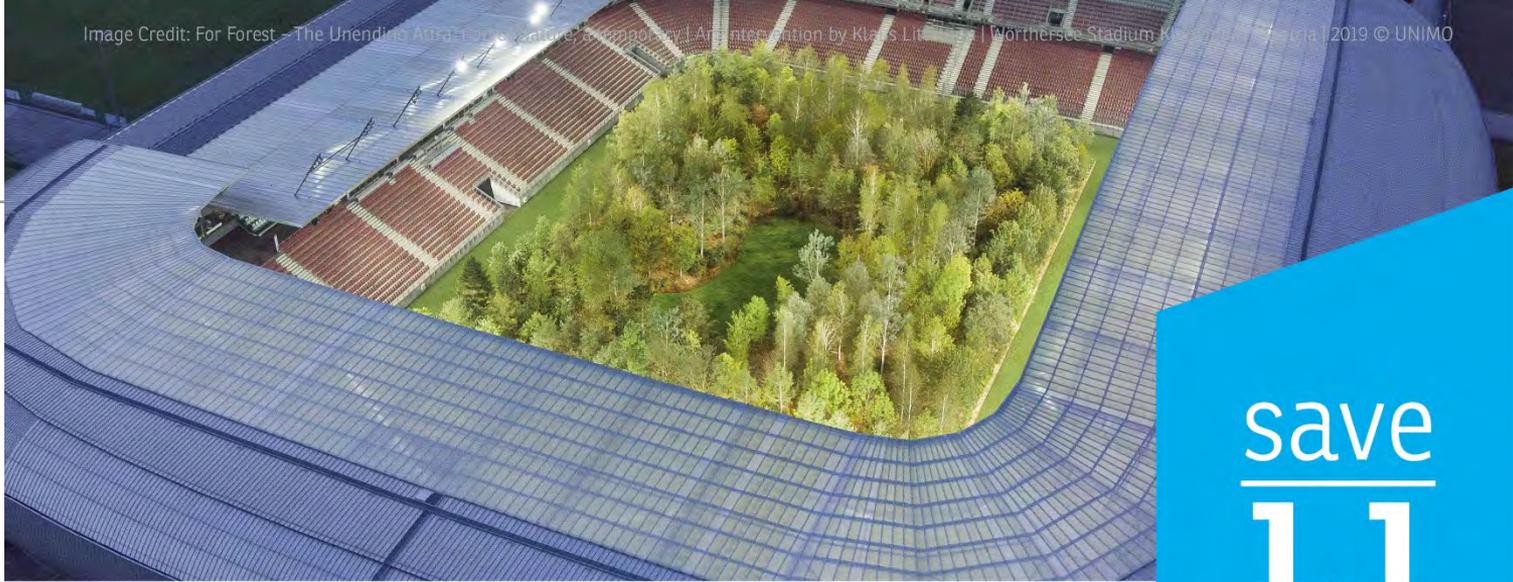
Saves 150 t CO₂e per year
160 m³/d digested sludge

2016: EloVac[®]
2019: EloVac[®]-P



Further Projects

- 📍 Summer 2021: Northern Germany
- 📍 Autumn 2021: South Korea
- 📍 End of 2021: Denmark and USA
- 📍 2022: South Germany



Plant 110 million
trees in 20,000
football stadiums

or

install EloVac® at
all AD plants
in Europe.

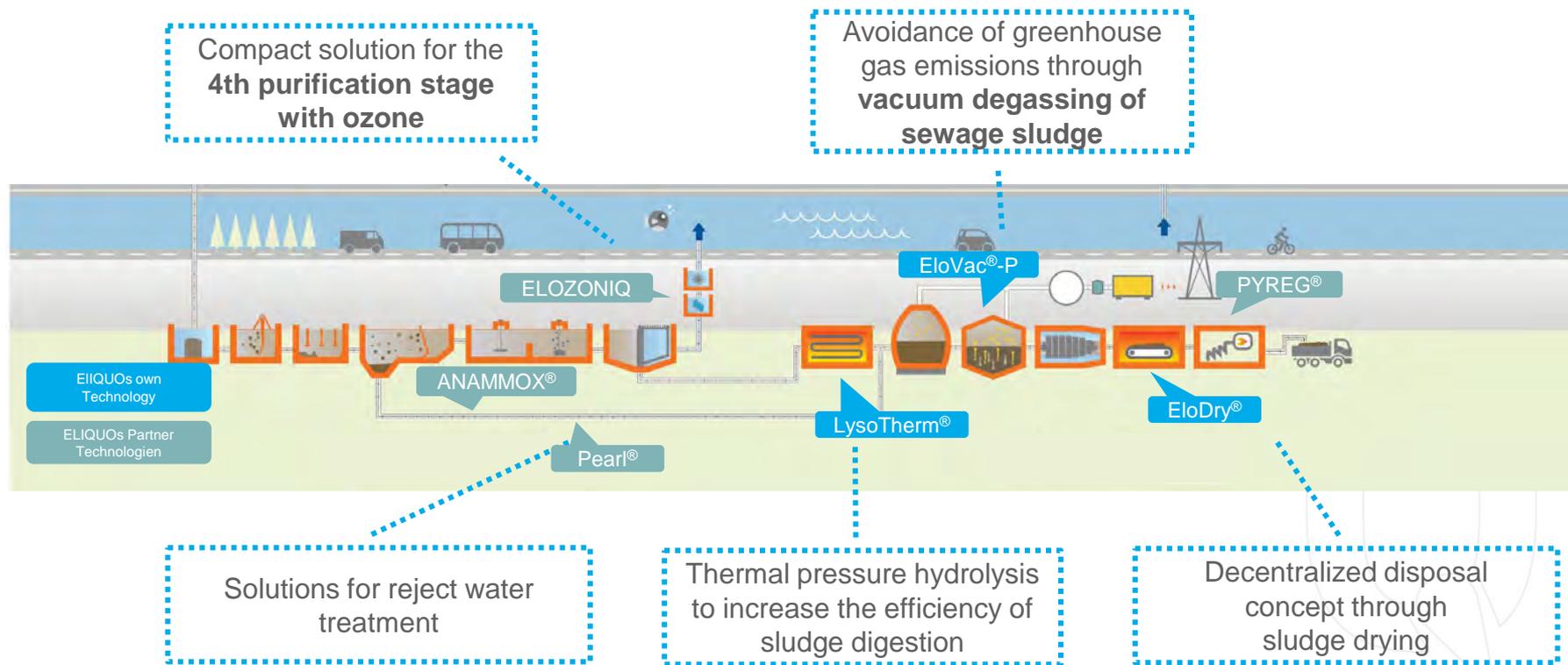
=

save
1.1
million t
CO₂

Your Questions?!



Interested to learn more? Examples for further online seminars



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