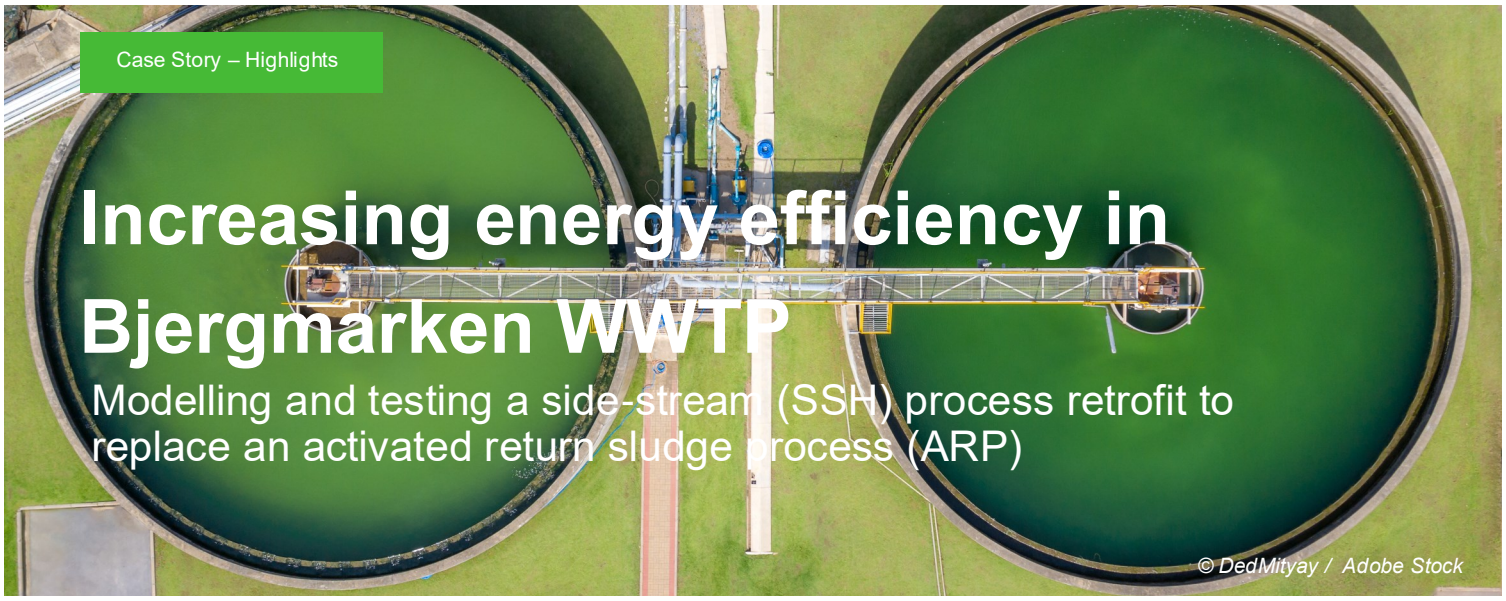
Case Story – Highlights



Increasing energy efficiency in Bjergmarken WWTP

Modelling and testing a side-stream (SSH) process retrofit to replace an activated return sludge process (ARP)

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Reduced energy consumption < 22%

Long-term stability of plant performance

Limited impact on treatment efficiency

Challenge

Reducing aeration energy consumption

The utility company, FORS A/S, was seeking new strategies to improve energy efficiency in their Bjergmarken wastewater treatment plant (WWTP). The WWTP used an activated return sludge process (ARP) to increase sludge retention and treatment capacity.

However, the WWTP's processed high concentrations of solids (> 10 kgSS/m3), which required extensive aeration energy to maintain sufficient dissolved oxygen levels.

Multiple options were virtually tested to retrofit this process. The retrofit evaluation criteria required the new process to maintain a high-level of treatment performance under typical and extreme conditions.

Solution

Modelling WWTP operations to identify retrofit options

Using WEST, our wastewater systems modelling software, we developed a detailed plant model. We calibrated the model using the WWTP's historical data, then simulated and evaluated various retrofit options.

Assessments showed a side-stream hydrolysis (SSH) process could reduce aeration energy consumption by more than 20%. Better still, the retrofit would have limited or no impact on treatment efficiency, effluent quality or require any additional chemical dosing.

We also tested the retrofit using data from WWTP's historically highest loading period during one of Europe's largest music festivals. Roskilde Festival usually produces a 50% N load and +70% P load. The model showed SSH was reliable.

Longitudinal data was collected before and after FORS A/S converted the ARP to SSH, which confirmed the model's predictions.

"We had good cooperation with DHI, and it was easy to understand and implement the suggested solution. DHI has been a great support after implementation, allowing us to substantially improve the efficiency of Bjergmarken WWTP.'

Lars Lund Schjødt
Team Leader—Wastewater Treatment
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