



## Environmental impact analysis of chemicals and energy consumption in wastewater treatment plants: case study of Oslo, Norway.

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Abstract: Wastewater treatment plants, while performing the important function of treating wastewater to meet the prescribed discharge standards, consume energy and a variety of chemicals. This paper analyses the consumption of energy and chemicals by wastewater treatment plants in Oslo over eight years, and their potential environmental impacts. Global warming and acidification were the dominant impacts for chemicals and energy, respectively. Avoided impacts due to usable by-products - sludge, ammonium nitrate and biogas - play a key role in shrinking the environmental footprint of the wastewater plants. The scope for decreasing this footprint by streamlining energy and chemicals consumption is limited, however, considering that over 70% of the impact is accounted for by the eutrophication potential (thanks to the nitrogen and phosphorus which is discharged to the sink) of the treated effluent wastewater.

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