

Popular science summary of the PhD thesis

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Title of the PhD thesis	<u>Investigations of pit thermal energy storages in district heating systems</u>
PhD school/Department	<u>Civil and Mechanical Engineering</u>

Science summary

In recent years, there has been a growing interest in utilizing large-scale heat storage in combination with district heating systems. This thesis investigated water pit thermal energy storage (PTES) as a cheap and efficient heat storage technology for district heating. The main focus was the performance assessment of PTES and their techno-economic impact. The effect of PTES geometries on performance was investigated, and energy and exergy indicators were suggested for comparing PTES performance with different operations (seasonal or short-term). On a country scale, it was found that PTES can increase the flexibility of the overall energy system, thus increasing the utilization of renewables while reducing curtailment. Additionally, PTES can benefit the economy of a single district heating system by reducing the cost of heat as they can shift production from times when the electricity prices are high to periods with low electricity prices. Overall, this study elucidated the need to increase the number of PTES to reach cost-optimal carbon neutrality by 2050.

Please email the summary to the PhD secretary at the department