



PIT THERMAL ENERGY STORAGE EXPERIENCES FROM TOFTLUND

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HEATSTORE KNOWLEDGE SHARING - DRONNINGLUND
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AGENDA

- Case Toftlund
 - Key facts
 - Main experiences
 - Update on the performance

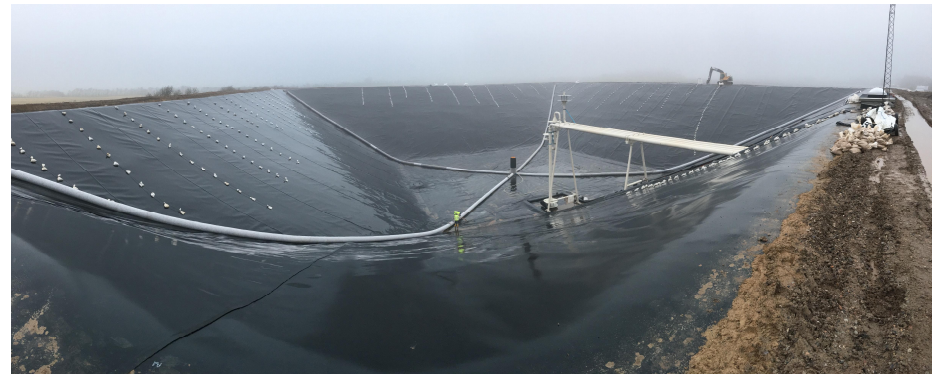
TOFTLUND PTES - KEY FACTS

Fact	
Operation start	June 2017
Size	85.000 m ³
CAPEX	21 mill. DKK (~247 DKK/m ³)
Charging capacity	18 MW
Discharging capacity	8 MW
Heat source	Primarily solar thermal 27.000 m ² and heat from a 3 MW absorption heat pump operated with heat from a gas fired boiler or an electrical boiler. Absorption heat pump cools down the storage in the winter period. Indirectly heat from CHP (7,2 MW _{heat}).
Lid construction	1,5 mm HDPE liner as top liner Insulation – 600 mm Leca (Expanded clay) 2,5 mm HDPE liner as floating cover



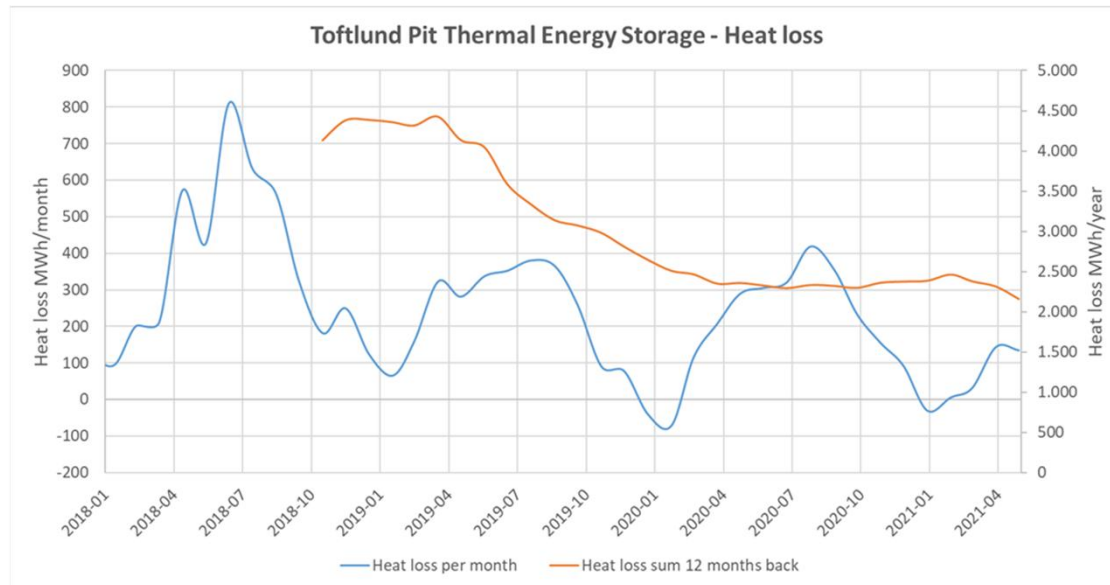
TOFTLUND - MAIN EXPERIENCES

- Lid construction still works as intended,
 - Approx. 2/3 of the insulation was flooded in the commissioning phase, due to a extreme rain. In the following phase it has shown possible to completely dry-out the insulation and the insulation properties is restored without replacement of the insulation material.
 - Minor leakage from the floating cover (2-3 m³/day). Water is reinjected via a central pump system. Leakage level is not critical for the time being but seams slightly increasing.
- Rain water handling system works satisfactorily in accordance to the operator.
 - Some puddles needs to be drained manually, but in general the system works automatically.



TOFTLUND - UPDATE ON THE PERFORMANCE

DATA FROM TOFTLUND (85.000 M3 STORAGE/27.000 M2 SOLAR/CHP/EL BOILER/GAS BOILER)



Total realized heat loss

- 4.377 MWh in 2018 – wet insulation – rainwater entered the lid construction during the commissioning phase.
- 2.808 MWh in 2019 – active drying of the insulation until April/May.
- 2.374 MWh 2020 – corresponding to the design.

Calculated heat loss

Approx. 2.650 MWh/year – calculated based on the operating profile for 2019.

The heat loss has the last year stabilized at the current level of around 2.350 MWh, when seen 12 month back. Conclusion: The storage is performing in accordance with the design.

QUESTIONS?

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THANK YOU!

