



PIT THERMAL ENERGY STORAGE UPDATE FROM TOFTLUND 85.000 M3



HEATSTORE – Høje Taastrup
Oct. 28th, 2020

AGENDA

- **Introduction**
 - **Key facts**
 - **Main experiences**
 - **Update on the performance**

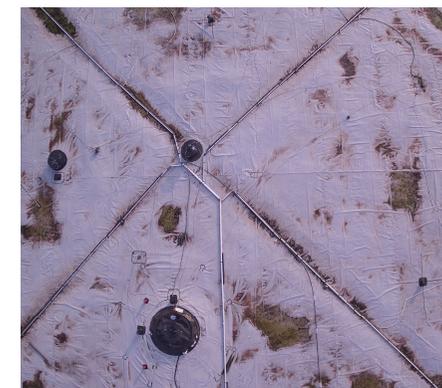
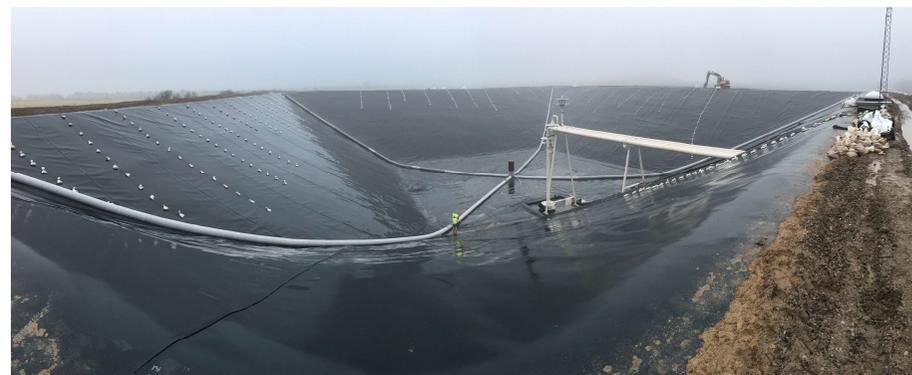
KEY FACTS

Fact	
Put in operation	June 2017
Size	85.000 m ³
Charging capacity	18 MW
Discharging capacity	8 MW
Heat source	Primarily solar thermal 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



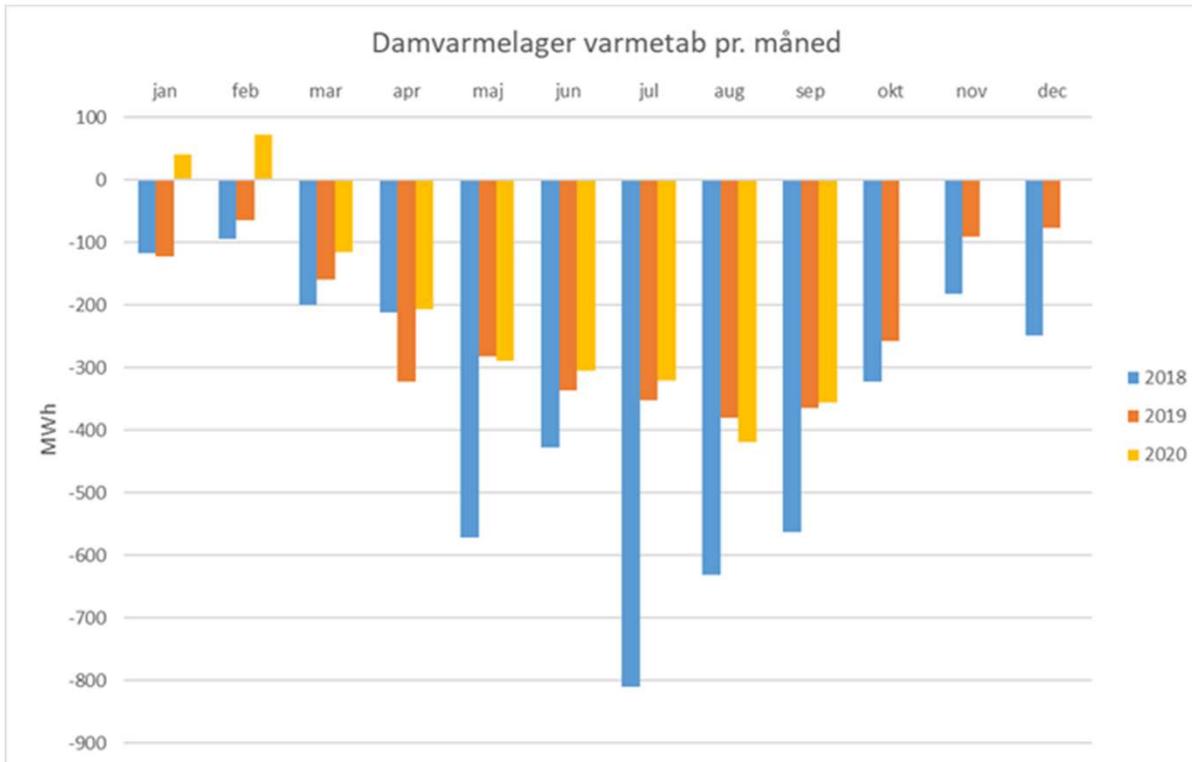
MAIN EXPERIENCES

- **Permanent floating liner** should not be installed before water filling – a sacrificing liner should be used instead – Weight pipes should be avoided.
- **Lid construction** works as intended,
 - Approx. 2/3 of the insulation was flooded in the commissioning phase, due to a heavy shower storm. 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.**
 - For the next project with a lid construction with Leca, the lid should be installed with ventilators, for a more controlled ventilation of the insulation. Primarily to handle the water vapour diffusion from the storage.
- **Drainage system** works satisfactorily in accordance to the operator.
 - Some puddles needs to be drained manually, but in general the system works automatically.



UPDATE ON THE PERFORMANCE

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



Total realized heat loss

- 4.400 MWh in 2018 – wet insulation – rainwater entered the lid construction during the commissioning phase.
- 2.800 MWh in 2019 – active drying of the insulation until April/May.
- 2.321 MWh latest 12 month. – corresponding to the design.

Calculated heat loss

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

UPDATE ON THE PERFORMANCE

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

Period	01-02-2018 to 31-01-2020 (2 years)	Last 12 mth. (01/10/2019- 30/09/2020)
Energy to the storage	17.141 MWh	8.501 MWh
Energy out of the storage	9.874 MWh	6.098 MWh
Heat losses	7.027 MWh	2.321 MWh
Efficiency	58 %	72 %

The heat loss has the last 4-5 month stabilized at the current level of 2.300 MWh, when seen 12 month back.

Conclusion: The storage is now performing in accordance to the design.

QUESTIONS?

THANK YOU!