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BILS with SAP insulation

SOUR project call 1-2021

BILS – Bubble in the lake storage

Large sensible storages submerged in lakes could provide heat for the cold season. Why lakes? Conventional PIT Storages use a lot of land space that is not available in Switzerland.
In this project we investigate the option to locate such storages as flexible bubbles in lake (BILS).

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We follow an open research approach: All we know is published on our webpage. Your valuable input is welcome.

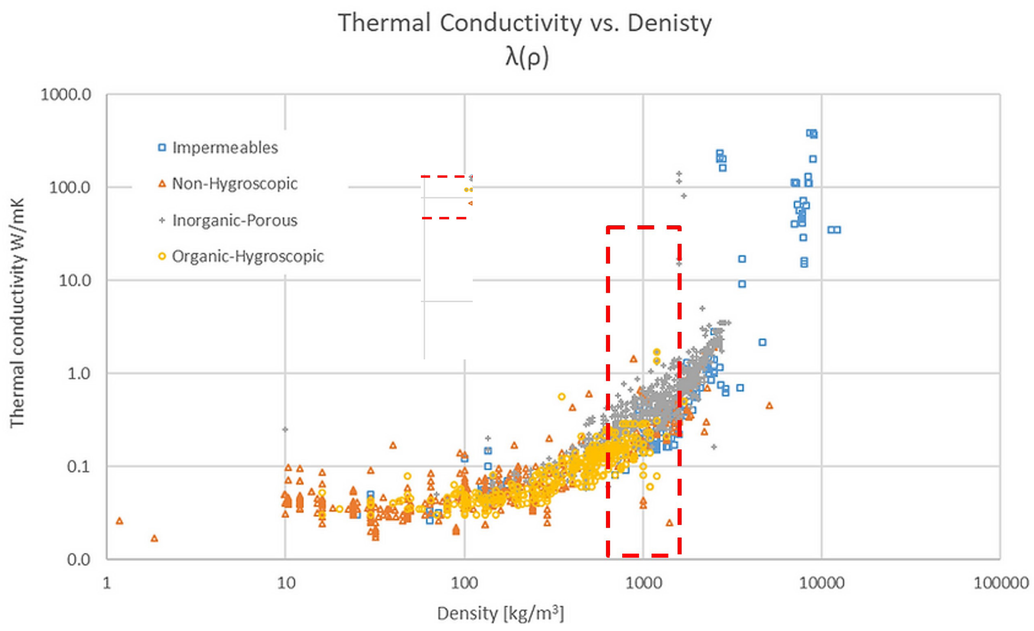
www.bils.tech

Insulation challenge

Due to the flexible concept and the specific environment, there are many limitations for insulation materials. The figure below shows an overview of the thermal conductivity of many known materials. To avoid buoyancy problems, it is important to use only materials with a density similar to that of the surrounding water. Furthermore, the insulation materials must be flexible, pressure insensitive, environmental safe and cheap of course. Indeed, no material other than water seems to have the potential to be used as an insulation material for BILS.

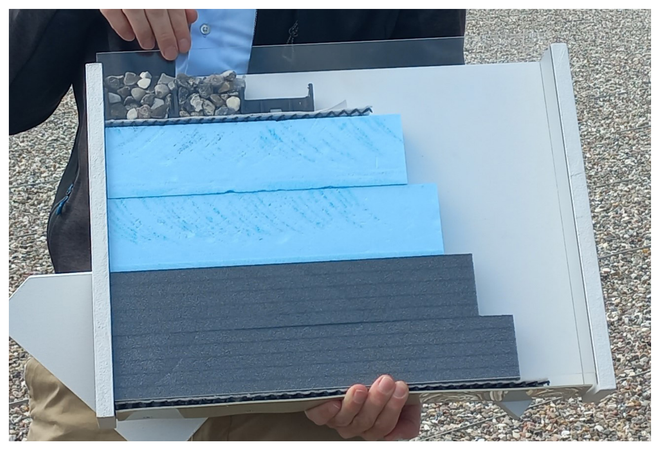
Insulation solution

For water (λ = 0.6-0.7 W/mK) to be suitable as an insulating material, it must be i) very thick and ii) immobilised. For a large storage tank, an insulation thickness of 2-3 metres or even more is appropriate. To reduce the movement of the water, so called super absorbent polymers (SAP) will be used.



This class of material, which can absorb up to 1000 times its own weight in water, is used in various applications and technologies. In this way, the water retains its properties but is still flexible and immobilised.


Pit Storage in Høje Tåstrup (DK)


Conventional pit top insulation


Super Absorbent Polymer SAP

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Project partner

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