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Heating by underground ice storage

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One of the key factors in energy transition is energy storage. As most of the energy in the Netherlands is used for heating, the focus of renewable energy sources is on capturing and using heat in an effective way. We have developed a system for underground heat storage that is based on ground freezing principles (also called ice storage). It is based on the fact that the phase change enthalpy of water from liquid to solid can be used for energy storage. During the freezing process of one kg of water, 333 kJ (0.093 kWh) is released. Hence, if a certain amount of groundwater can be frozen or heated up with a heat pump, energy can be stored and extracted. We discuss the experimental set-up to validate the storage principle and we compare the experimental results with numerical predictions.

References

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