

Energy systems based on closed loop boreholes - development of tools and best practices

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Shallow geothermal energy is a renewable energy source, where the low enthalpy heat in the shallow subsurface can be exploited using borehole heat exchangers in a combination with heat pumps. Despite the energy saving and CO₂ emission reduction potential of the technology, the utilisation of shallow geothermal energy in Denmark is relatively limited compared to e.g. the other Nordic countries (Røgen et al. 2015). A recently completed Danish development and demonstration project has compiled knowledge, tools and best practices for closed loop boreholes combined with detailed mapping of thermal properties of shallow Danish sediments as well as 3D modelling of heat and groundwater flow. Furthermore a WEB application to estimate thermal conductivities in new project areas from existing borehole data has been develop (Ditlefsen et al. 2014). Results and recommendations from the project will be presented and discussed.

References:

- Ditlefsen, C., Sørensen, I., Slott, M. & Hansen, M. 2014: Estimation of thermal conductivity from existing soil descriptions. Geological Survey of Denmark and Greenland, Bulletin 31, 55-58.
- Røgen B, Ditlefsen, C, Vangilde-Pedersen, T, Nielsen L. H. and Mahler, A 2015: Geothermal Energy Use, 2015: Country Update for Denmark. Proceedings World Geothermal Congress 2015. Melbourne, Australia, 19-25 April 2015