

## ORMEL- Optimal utilization of ground water for heating and cooling in Melhus and Elverum

S. GJENGEDAL<sup>1\*</sup>, R. K. RAMSTAD<sup>1,2</sup> AND B. BRATTLI<sup>1</sup>

<sup>1</sup>*Norges Teknisk-Naturvitenskapelige Universitet, Institutt for geologi og bergteknikk, NO-7491, Trondheim, NORWAY  
(\*sondre.gjengedal@ntnu.no)*

<sup>2</sup>*Asplan Viak AS, 7490 Trondheim, NORWAY*

Ground source heat is a renewable energy source that has a potential for more use in Norway. In the ORMEL-project the municipalities of Melhus and Elverum are evaluating their potential for ground water extraction for heating and cooling purposes. The aim of this evaluation is to identify the heat extraction potential by mapping the aquifers beneath the city centers. Local heating and cooling demand in buildings and industry will also be mapped, as well as gathering operational data from existing production plants. Based on the totality of this investigation, the use of ground source heat can then be optimized.

The ground source heat is extracted from the ground by pumping ground water through a heat pump. As the ground water is used directly as a heat transfer medium, the flow properties of the aquifers have to be mapped extensively. The aquifers will be mapped in detail with both geophysical and traditional methods. The project started in 2015 and this year 2D- resistivity, ground penetrating radar (GPR), establishment of test wells, well capacity tests, water analysis and sediment analysis will be carried out. Analysis of operational data from existing plants will also be started this year.

The sites have some wells operating with varying degree of efficiency and success. Often the well design is not modified to fit the local geological conditions. Typical problems tend to be clogging of the heat exchanger and infiltration wells. This seems to be caused by both precipitation of iron oxides and sand production from the production well. Results from the ongoing investigation will be presented.