

Bømoen Plussbygd (Bømoen Plus Village)

A sustainable utilization of groundwater resources for drinking water, energy sources and energy storage

The project will lay the foundation for the development of a future "Plus" settlement that is largely self-sufficient with energy and water from local geological resources. What will be investigated is how groundwater from the same aquifer can be used in the municipal water supply and as a "battery" (energy storage) for heating or cooling of future constructions. The research project will create management tools for effective use and protection of the local geological resources.

Bømoen is a 2 km² flat area consisting of sand and gravel, situated 3 km from the city center of the municipality of Voss in Norway. The area has been used for military activity for 100 years and is largely undeveloped. Bømoen AS bought the area in 2013 with the purpose of developing businesses, industry, and residential homes.

Plus Village is a term that is used to show that this is a project that will mainly be self-sufficient in energy for heating and cooling. The groundwater maintains a relatively even temperature throughout the year. The temperature of the water in the aquifer is stored by solar energy. By pumping up the groundwater and passing it through a heat exchanger, one can extract energy that can be used for seasonal heating or cooling. By storing residual heated or cooled water in the groundwater one can use the ground as a "battery".

The project will facilitate a development / or "Plus Village" which under this Municipal Plan should be able to produce all the energy into heating and cooling of buildings using geothermal energy. Development of the area will require the use of some of the sand and gravel as building material. This use should not impact the quality or quantity of the groundwater. Management of resources and city planning will be a crucial part in sustainable development of Bømoen. A project like this will be an example of how to use short travelled geological resources as part of sustainable development in Bømoen, and areas with similar conditions.

Implementation of the project will be in the form of collaboration between the Research Council of Norway, Norwegian University of Science and Technology, the Geological Survey of Norway, Bømoen AS, Voss Herad, Voss Energi AS and COWI AS. The work will lead to a doctorate (Industrial PhD).