GEOLOGICAL SURVEY OF ESTONIA

Project „The technical and economic viability of large-scale geoenergy applications in Northern Estonia and building the first geoenergy pilot plants (GEOENEST)“

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About

- The project “The technical and economic viability of large-scale geoenergy applications in northern Estonia and building the first geoenergy pilot plants (GEOENEST)” is implemented from the state budget using the measure “Pilot projects designed to implement the climate policy objectives”. The total cost of activities is up to 3 800 000 euros.

- The main goal of the project is to show that different geothermal energy applications can be economically viable in the geological conditions of Estonia and that geothermal energy can be used as an integral part of achieving the goals of the green transformation in Estonia.

Team

Steering Group

- Rein Vaks – Ministry of Economic Affairs and Communications, Head of Energy Markets – Head of Steering Group

- Sirli Sipp Kulli - Director of Geological Survey of Estonia
- Ene Jürjens - Ministry of Economic Affairs and Communications, Director of Mineral Resources Department
- Timo Tatar - Ministry of Economic Affairs and Communications, Deputy Secretary General for Energy and Mineral Resources
- Margus Raha - Ministry of Economic Affairs and Communications, Analyst of Mineral Resources Department

Management Group

- Aivar Auväärt – Project Manager

- Heikki Bauert
- Prof Alvar Soesoo
- Prof Pekka A. Nurmi

Eesti Geoloogiateenistus

Workpackages

Project duration 09.2021-06.2024

- Geoenergy background studies at the selected test areas (WP2)
- Selection of drilling sites, Borehole-drilling, Borehole studies (WP3)
- Deployment potential of mine- and seawater thermal energy applications 09.2022 (WP4)
- Feasibility studies, technical design & commissioning of pilot geoenergy plants (WP5)
- Legislation, permitting issues, environmental impact and geoenergy wells database (WP6)
- Geoenergy promotion, public awareness, social licencing, R&D Strategy and Action Plan (WP7)

Activities I

- General petrography and geochemistry (particularly U, Th and K) on Precambrian rocks in the existing drill cores of targeted areas
- Thermal conductivity and density measurements of drill core samples and *in-situ* measurements of Cambrian clays
- Re-analysis of existing geological and geophysical data
- Modelling of subsurface temperature in sedimentary rocks and Proterozoic crystalline basement of the selected sites
- Modelling of groundwater flow and heat transfer in Cambrian– Ediacaran siliciclastic sequence of the selected sites
- Study of potential abandoned mine water usage in North-East of Estonia
- Study of potential seawater usage areas in Tallinn and Viimsi peninsula, and elsewhere in Estonia

Activities II

- Collection of information on geothermal energy regulations in European countries and creation of an overview on environmentally-friendly geothermal energy solutions / best practices
- Mapping the environmental effects of geothermal operations and potential risks related to harnessing renewable geothermal energy in Estonia
- Creating an overview of domestic legislation which has implications for geothermal energy usage in Estonia. The overview should highlight the current obstacles and environmental concerns as well as propose recommendations to amend the legislation (including permitting) for sustainable use of geothermal energy in Estonia
- Creating and maintain an open-access database of geoenergy wells in Estonia which provides all relevant information on geoenergy wells and on installed geothermal energy systems
- Raising public consciousness and geoenergy promotion

The major goals of the project

- Demonstrate that geoenergy is a technically and economically feasible, low emission energy solution for heating, cooling, and energy storage applications in various hybrid energy systems in Estonia
- Build the first geoenergy pilot plants to demonstrate the feasibility of geoenergy
- Initiate building of large-scale geoenergy applications in Estonia

Important Tasks:

- Test various geoenergy applications in locations of business interests using test boreholes, optimisation and scoping studies
- Show the proof of concept of geoenergy using real-world applications
- Promote geoenergy for private and public decision-makers and developers

Impact:

- Large-scale geoenergy applications will grow in Estonia

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Wise decisions are based on best knowledge

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