

GEB NEWSLETTER

Issue 6: June 2024

About GEB:

The GEB Project is supported by the Erasmus + Programme Key Action 2, Capacity Building in Higher Education, CBHE, to help reduce the lack of skilled engineers in geothermal engineering in Egypt, to unlock the potential of this clean and sustainable energy resource.

GEB Activities January 2024 to June 2024:

The project final auditing has been accomplished on 27 of April, 2024 by hosting Prof. Jannis Epting “Head Applied and Environmental Geology” at University of Basel, Switzerland, in order to evaluate the project from the technical wise.



GEB Project partners attending the technical auditing in the presence of Prof. Jannis Epting

On 20th and 21th of May, GEB final consortium meeting has been held at Valladolid University at which all the project outcomes has been discussed in addition to setting the plan for the last few months of the project. The EG partners attended a technical training at the University of Valencia, Spain on 23rd and 24th of May, 2024, where they visited buildings using geothermal energy, such as the Paterna clinic, Valencia, Spain.



GEB final consortium meeting, Valladolid, Spain.

University of Valencia training.

On 23rd and 24th of May 2024, the EG partners attended 2 days of technical training at the University of Valencia including attending lectures and technical visits to buildings operated by geothermal energy such as the Paterna clinic which is air-conditioned using a hybrid system between geothermal units and air units.



GEB partners at Paterna clinic, Valencia, Spain

The installation of the first pilot plant at Faculty of Engineering – Cairo University.

The geothermal pilot plant at Faculty of Engineering, Cairo University construction stages included drilling for the first Borehole Heat Exchanger (BHE) on the 3rd of April, 2024. The drilling process involved welding and testing polyethylene pipes, with the third BHE taking three days due to different types and core samples. The BHEs are connected to a Ground Source Heat Pump (GSHP) for cooling, heating, and providing domestic hot water. A monitoring system uses temperature sensors, flowmeters, energy meters, pressure gauges, and data loggers to record technical data and calculate performance coefficients.

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Geothermal pilot plant Construction stages.

Stage 1: Borehole heat Exchanger Installation

On the 3rd of April 2024, drilling started for the first Borehole Heat Exchanger (BHE) which ended within 2 days in the presence of the Italian staff from the University of Bologna: Professor Francesco Tinti and Mr. Fausto Peddis. The location of each borehole was selected based on the GPR survey carried out in 2022 before drilling the exploratory borehole to avoid the buried infrastructure pipelines.

Before starting the drilling stage, Polyethylene pipes were welded and tested to ensure no leakage. Filling material (Grout) was injected around the pipelines

After that, each BHE took 2 working days except the 3rd one which took 3 days due to the different BHE type (Double U pipe) and the collected core samples. On the other hand, for the first 2 BHEs, samples were collected as rock cuttings during the rotary drilling process while the type of BHE was a single U pipeline.



“Drilling stages of the first pilot plant at Faculty of Engineering – Cairo University”

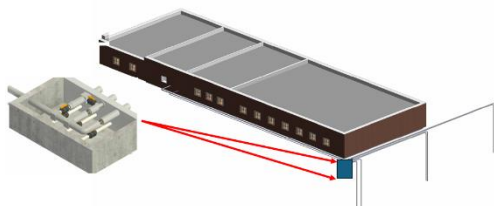
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Stage 2: Trenching and central collector

All three borehole Heat Exchangers (BHEs) are connected to reach the Ground Source Heat Pump (GSHP) by digging a horizontal trench 1 m deep. All lines are combined through a central collector so that one inlet and one outlet pipe will be connected to the GSHP.



“Horizontal Trench for the three BHEs”



“General view for the BHES and the central collector”

Stage 3: GSHP installation

The GSHP is placed into a small room to protect it against rain, dust, and heat. The distribution system (Fan coils) is connected to the heat pump and buffer tanks to get over the peak hour usage. Two fan coils are used to distribute the cool/heat into the 48 m² room.



Eco Forest heat pump received at Faculty of Engineering – Cairo University



GSHP room behind Rock Engineering Lab

Stage 4: Control and Monitoring system

Temperature sensors, flowmeter, energy meter, pressure gauges, and data logger are applied in the monitoring system to record all technical data and calculate the coefficient of performance. Also, different manholes are found for the system’s visual inspection and for installing the sensors.



“Manhole constructed at BHE1”

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Advertising GEB

The project members have been keen on advertising the project to attract potential students, and to attract partners from the industry that are willing to adopt this technology and apply it commercially. This has been through the regular posts on the Facebook page (<https://www.facebook.com/gebproject>) that aim to increase people's knowledge and interest in Geothermal Energy and its potential as a clean and sustainable source of energy. Additionally, the participating institutions have mentioned the

project and its potential on their respective websites, links to these websites can be found on the project website (<https://www.geb-project.info/pages/Partners>). The tools being developed for the project, such as the pilot plant and the lab-scale model, will also be a powerful tool in showing the potential stakeholders the power of Geothermal Energy.

Disclaimer

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