BWEENGWA

Location
Southern Province,
Zambia

PROJECT SUMMARY

A REPP-supported project to build a ~10MW geothermal plant in Zambia are progressing and positive results have been achieved from the exploration activities. A pilot power and cascaded direct thermal energy for agri-processes plant is now planned and is anticipated to be operational in Q1 2023.

Although geothermal power generation in Africa is currently focused on the Great Rift Valley in Kenya and Ethiopia, exploration suggests that the Kafue Trough in Zambia's Southern Province, is also suitable for the technology. The difference is that, unlike Great Rift Valley projects where the heat source is magmatic, the heat source in Zambia is within crustal fault zones where deep circulating fluids are heated by the geothermal gradient and held in place by a cap rock. This type of geologic setting has been successfully exploited for power generation in Nevada, USA, and Anatolia, Turkey.

Developer Kalahari GeoEnergy Ltd had privately financed the drilling of 18 exploratory wells (thermal gradient holes and slim wells). Five of these have intersected a near-surface aquifer with temperatures of more than 100 degrees Celsius. This shallow aquifer is fed from a deeper ~150 degrees Celsius resource.

REPP's USD 3.2m funding has been used to drill and test three additional slim wells and the deepening of further two. This has enabled the collation of additional data for reservoir modelling, and enabled the development of a feasibility study that was completed in March 2022. The intention is to install a prototype power unit of up to 250kWe at one of the new wells with other industrial applications, although the ultimate objective is to develop a 10MW power plant. The first commercial plant is likely to be operational in 2025.

In 2021, 32 people were employed through the project, of which 3 were women, 11 skilled and 17 local. As of June 2022, 17 people had been employed in operational jobs, of which 4 were women, 4 skilled and 12 local.

Adding geothermal to Zambia's energy mix would allow for a renewable source of baseload capacity, and have a potentially transformative impact on the region by facilitating the expansion of geothermal energy generation both nationally and regionally.

* Note: REPP is providing finance for drilling and part of the costs of establishing a prototype unit. KPIs refer to the plant once commercially operational.

Country policy alignment

Project supports Zambia's conditional NDC target to reduce GHG by 47% by 2030 (including through increased generation of renewable energy) and contributes USD 3.2m towards the estimated USD 35bn cost of implementing the conditional mitigation measures (NDC 2016; 2020). Also supports the aim of diversifying the energy mix, including through increased geothermal exploration, outlined as a priority in the National Energy Policy (2019).

AT A GLANCE

Technology:
Geothermal

Project type:
Exploratory (drilling)

Offtaker:
TBC

KPIs

GHG emissions avoided:
58,180 tCO_2e per year

MW Planned capacity:
10MW*

FUNDING STRUCTURE

Signed: 24 April 2020

Type: Convertible loan

REPP funding: USD 3.2m

SDGs

7 AFFORDABLE AND CLEAN ENERGY
8 DECENT WORK AND ECONOMIC GROWTH
11 SUSTAINABLE CITIES AND COMMUNITIES
13 CLIMATE ACTION
17 PARTNERSHIPS FOR THE GOALS

"The convertible loan facility from REPP funded the drilling and testing of four additional slim wells that enabled us to undertake a feasibility study that has determined the technical and commercial viability of generating geothermal power in the order of 6.5MW on the shallow part of the Bweengwa River geothermal system. It also funded a small post-feasibility drilling programme that measured temperatures in excess of those used in the study; this gives credence to the assertion that Bweengwa hosts a greater power capacity than considered in the study and will be further investigated."

Peter Vivian-Neal, CEO, Kalahari GeoEnergy Ltd