



TMGO

TULU MOYE GEOTHERMAL

NEWSLETTER

September 2020

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FIRST TIME THROUGH OUR 16 KM STRETCH
PIPELINE

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Chief Technical Officer
Sigurgeir Geirsson

MESSAGE FROM SIGURGEIR GEIRSSON

Happy new Ethiopian year and welcome to the September edition of TMGO's newsletter. The beginning of the new Ethiopian year gives us a change to both reflect on last year activities and look ahead to our next tasks in this ambitious journey to construct a geothermal power plant in Tulu Moye.

If I had to choose one word to describe last year, I would choose resilient. It is amazing to look back to beginning of March when spudding of exploration well GA-1 took place not knowing exactly what challenges were ahead of us. We understood that the first exploration well in a new area like Tulu Moye would be a challenge on its own, but no one could predict how the worldwide Covid-19 crises would affect the project. Planning for recommencing of the exploration drilling campaign back in July demonstrated the belief the team of TMGO and our partners, KenGen the drilling contractor and Mannvit-Verkis our Owner's Engineers, and stake holders had that we could effectively complete the task together. It also demonstrated how we as a team shared a common mental model of teamwork. All had their roles and responsibilities which helped in successfully remobilizing the drilling crew back to Tulu Moye and recommence drilling.

As if the Covid-19 was not challenging enough the exploration well GA-1 has given us the team additional

challenges. Challenges that in my mind demonstrate how interesting the geothermal field in Tulu Moye really is. TMGO's technical team, KenGen, Mannvit-Verkis, and TMGO's technical sponsors from Reykjavik Geothermal and International Science & Technical Advisory Committee have together as a team risen to the challenges of GA-1 with a common mental model of teamwork and have been able to improvise and develop new ideas and ways of handling the situation and we always believe that we can effectively complete the task of successfully drilling exploration well GA-1. These are the attributes of resilient team and with this resilience we have managed to get where we are during these strange Covid-19 times and with this resilience we will continue our journey as a team.

As we look ahead, there are new and exciting challenges for the team to take on. Our exploration drilling campaign will continue. With the experience and knowledge gain from drilling exploration well GA-1 we will modify and improve the design for our next exploration wells, increasing the rate of success in finding suitable geothermal steam for our power plant. In addition, next milestone in the EPC tender progress for the geothermal power plant and resource gathering system is near. When drilling of exploration well GA-1 completes TMGO will issue the Request for Proposal documents and start the next step of tendering progress, with the target of selecting the EPC contractor for the project. The Request for Proposal documents are a result of multinational collaboration where TMGO have been working together with our team of Owner's Engineers, Power Engineers and Delphos from US and Mannvit-Verkís from Iceland and TMGO's legal team from Trinity in UK. To work on Request for Proposal documents is in its own a great challenge but to do that during Covid-19 is a challenge this team has met with great resilience and overcome. I look forward to welcome Jacobs Engineering from New Zealand as TMGO's Lenders Technical Advisors to the team. They will be a great add-on to our diverse, experienced, and multinational team of experts.

I really look forward to tackling the challenges the new Ethiopian year brings on with the resilient team at TMGO and our partners and stake holders.

Melkam Addis Amet | Gleðilegt nýtt Eþíópískt ár

SITE UPDATE

GEOTECHNICAL SURVEY WORKS FOR THE POWER PLANT

Geotechnical surveying works and analysis have been completed for power station access road and the proposed power station location works in the month of September. The scope of work completed is plane survey by total station, centreline profile levelling survey, cross section survey and mapping works along with access road design to mobilize two rigs that will allow detailed foundation investigation for Tulu Moye Phase 1 Geothermal Power. The conducted survey of the Powerplant area and the ongoing detailed geotechnical investigation will provide valuable information for the prospected EPC contractors to prepare their proposal for the power plant.

IMPROVEMENT OF NARROW SECTION NEAR CAMP SITE

Widening works of the access road (km 12) have been on-going which will increase better access in the long run.



FLOOD MITIGATION AND ROAD MAINTENANCE WORKS

TMGO appointed a Grade 3 contractor, SAP Engineering, to do additional road maintenance beyond Pad GB in Tero Moye area (2km): work is completed and commissioned. The contractor maintained recently affected road to Anole. Additional flood mitigation tasks were also concluded at anole junction to channelize high volume of flood water to existing faults, thus decreasing the downstream impacts. The contractor was

also involved to maintain 800 m access to pioneer tank to allow water trucks deliver water to the water collection point and the access road to the water wells.

GROUND WATER WELLS

Water well 2 has been ready for pump installation and to be connected to the water supply system. Jos Hansen, KenGen's sub-contractor for the electro-mechanical aspect of the water supply system of TM project, has mobilized to site, and among their first task is the supply and installation of the submersible pump with 30kW motor (Franklin CS19/46) at well 2. Unfortunately, galvanized pipes used for installation got broken during installation leaving the pipes and the submersible pump stuck at a depth of 288m (borehole camera inspection conducted). Despite several efforts to push KenGen and their subcontractor for a prompt fix and solution, the sub-contractor was finally able to contract a fishing service providers who is on site working hard fishing out wires, electric cable, broken pipes and the 6 inch pump.



Water well 3 pump tests has been performed. The sub-contractors carried out borehole camera inspection for reporting and final handover (which is completed). The submersible pump has been delivered to site. To avoid a second mishandling of pump installation like well 2, robust and overrated grade installation pipes are being procured and sent to site (which will also be used for well 4 and 5)

Drilling for water well 4 has reached 465m, well development and pump test preparation are in preparation. This will be the last well under the management of Mikada Engineering.



SEISMIC MONITORING UNITS

TMGO with a selected team of experts from Addis Ababa University have started the installation process of the imported RS3D seismographs for recording seismic activity of all magnitudes, both vertically and laterally, incorporating three weak-motion geophone sensors. The mock installation was conducted in the Addis Ababa University premise (see below) and to be followed by the installation of 4 units in key locations in our project site. An additional 4 units will be installed second half of next month.



Water trucking option has been fully active in the past 2 months (delivery of up to 900 m³/day).

The intermediate water collection tank has been connected to KenGen's booster pump and supply line as indicated in the direct procurement section.



THE DRILLING CHALLENGES AND EXCITEMENTS

The challenges with drilling exploration well GA-1 continued with the over pressurized zone in exploration well GA-1 in September. Early September the water influx zone at 425 m down to 485 m depth had been properly sealed off and the team was ready to deal with the over pressurized zone again. The zone was found at 639 m depth. After trying to seal off the top of the over pressurized zone without success it was decided to re-evaluate the approach

After careful evaluation of the situation and planning it was decided to try to drill through the over pressurized zone to see how deep it goes and then try to seal the zone off after that. After drilling started again the bottom of the over pressurized zone was reached at around 653 m, drilling continued down to almost 660 m and then drilling was stopped and the crew attention turned back to deal with the over pressurized zone.

The height of the zone is around 14 m which can be quite a chal-

lenge. In collaboration with KenGen, TMGO's drilling supervisors and TMGO'S ISTAC members various options were explored. It was decided to try few different cementing procedures to try seal off the over pressurized zone. In addition, additional plans to continue drilling where planned out.

Late September the team was ready to try and seal off the over pressurized zone. First cementing plug jobs were not successful although one was promising. Currently the team is preparing for alternative solutions in cementing and preparing next steps.

Drilling of exploration well GA-1 has given the team some good challenges. In geothermal drilling that is considered a positive sign of promising geothermal resource. The team at site has been resilient in the situation the exploration well has given us and with co-operation and collaboration the drilling of well GA-1 will continue.



SITE UPDATE: COVID-19 PREVENTION

The arrival of the new KenGen crew members was warmly welcomed at Project site by the team. We always make sure covid-19 prevention protocols are properly followed while doing this. These activities begin right from the entrance of the camp: disinfecting vehicles and fumigating their rooms-they cannot be mixed

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with the existing team. Induction was also given by Sigurgeir Geirsson, CTO on TMGO Environmental and Social principles of TMGO and covid-19 camp protocols.

Facilitated for INNOVA health consultant team who came to take covid-19 samples at site, testing at the site was organized in collaboration with TMGO's Public health expert at site.



TMGO TEAM WARMLY WELCOMES ETHIOPIAN NEW YEARS



TMGO Team together with the drilling crew and support staff at camp, warmly welcomed the Ethiopian New years in style at TMGO project site. In support of the Ethiopian tradition, a bonfire and dinner ceremony were held. Also, sparks of fireworks at our project site made this New Year's Eve ceremony special for TMGO.

Carefully maintaining COVID-19 protocols, a lunch ceremony was held by TMGO team in Addis Ababa Offices on September 10th (Ethiopian New Year's Eve). In addition, as part of its 'TMGO Cares' strategy, New Year's post-card and TMGO face-masks were distributed as a Season's Greetings gesture for TMGO partners, customers and vendors.

TMGO family thanks you for your continued support and wishes you a prosperous and successful Ethiopian New Year ahead ~ 2013 ~



WE ARE THANKFUL



TMGO are pleased to announce the further support of United States International Development Finance Corporation [US DFC] for our project and investment. The Board of Directors of DFC approved a Grant of up to US\$1.550,000 to support early stage design of Phase 1 50MW Power Plant. This is in addition to the support DFC are already providing by playing a key role as part of our lender group for the project finances. The Grant will allow and support TMGO to commence detailed design work for the Power Plant at a much earlier stage than would otherwise been possible, thereby allowing us to accelerate our project program and delivery of the first 50MW of electricity to the Ethiopian power grid. TMGO CEO Darrell Boyd said “We are really pleased and very proud to receive this additional support from United States International Development Finance Corporation. It is a great example of international cooperation and a commitment to support investment into Ethiopia. It is also a demonstration that Ethiopia remains open for business and investment even in these difficult times of the COVID-19 Crises. The TMGO Team thanks DFC for their support and show of confidence.

TMGO ANTI- BRIBERY AND CORRUPTION POLICY (ABC) TRAINING

TMGO has given its staff Anti Bribery and Corruption Policy (ABCs) which has been designed to be used by anyone who could be exposed to bribery and/or corruption. It explains what bribery is and helps to increase understanding and manage situations where gifts and hospitality offered or accepted.

The procedures put in place to implement an organisation's bribery prevention policies should be designed to mitigate identified risks, as well as to prevent deliberate unethical conduct on the part of associated persons and an important aspect of those procedures is the communication of the organisation's policies and procedures to staff of all levels, and training in their application.

TMGO RECEIVES CERTIFICATE OF APPRECIATION

On September 17th, TMGO was honoured to receive a ‘Certificate of Appreciation’ from ‘Ethiopian Public Health Institute’ for its donation of tables worth \$5,000 USD. Overall, \$100,000 was raised by private sector investors and 1,000 Electronic Tablets with contact tracking and reporting software installed and mobile SIMs. TMGO believes that this support will serve EPHI long after Corona has gone, for all other health matters. TMGO will continue to support the Government & people of Ethiopia both at Federal and Regional level for sustainable changes.



NEWS FROM KENGEN (OUR DRILLING CONTRACTOR)

NATIVE STORY

By Business Daily Reporter



Kenya Electricity Generating Company PLC (KenGen) sustainability projects touching on Clean Development Mechanisms (CDM) have yielded

USD 3.6million (about Ksh 364m) for the organization since inception in December 2010 when Olkaria II expansion project was registered.

The above has been realized under the company's Clean Development Mechanism (CDM) program based on the United Nations Framework Convention on Climate Change (UNFCCC). The guidelines for implementing the scheme is based on the UNFCCC's Kyoto protocol that enables developing countries like Kenya to implement green projects that will contribute to emissions reduction. The emission reductions are verified and certified by a third-party auditor prior to issuance of a Certified Emissions Reduction Certificate (CERs) by the UNFCCC. The Clean Development Mechanism (CDM) was developed as part of the output of a global concern to contribute to climate change mitigation and to foster sustainable development for non-industrialized countries.

Climate change has become the biggest global environmental challenge and the International community acknowledged it as an important global issue in 1992, when it adopted the United Nations Framework Convention on Climate Change (UNFCCC, 1992) at the Rio de Janeiro Earth Summit and has subsequently been ratified by approximately 190 nations. The effects of climate change have been shown to contribute to decreased hydro-power generation and widespread increase in the risk of flooding in many human settlements due to increased heavy precipitation.

The amount of carbon trapped in the atmosphere as a result of use of fossil fuels leading to increased carbon dioxide levels in the environment has led to climate change with effects such as extreme weather conditions being felt across the world.

The company has a dedicated team to spearhead environmental sustainability and contribute to the reduction of the effects of climate change. So far, the organization has registered six CDM projects under the United Nations Framework Convention on Climate Change (UNFCCC). These projects which include (Geothermal) Olkaria II, Olkaria 1 AU 4 and 5, Olkaria VI, (Hydro) Tana, Kiambere and (Wind) Ngong contribute to off-setting on an annual basis 1.5 million tonnes of Carbon Dioxide (CO₂) equivalent annually. As a way of enhancing its portfolio of climate change mitigation projects, KenGen intends to incorporate additional geothermal, wind and solar projects which will reduce between 100,000 to 600,000 carbon emissions every year, in the process reducing the impact of climate change in the environment.

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MEET OUR TEAM



Idris Mohammed
Contractor Liaison Officer


Idris Mohammed has a degree in civil engineering with experience in project management and construction. He has administrative experience on road construction projects. As Contractor Liaison Officer of TM Geothermal Operations PLC, Idris is stationed at the Tulu Moye camp site and liaises with the community around the site, and coordinates and facilitates the work of the drilling contractors with the rest of our workers at the site.


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CDM projects have also resulted in environmental and social benefits to KenGen and communities living around the company's installations through implementation of community benefits projects identified jointly with the community covering education, water and sanitation.


To leverage on its renewable Energy, KenGen is currently piloting the implementation of Carbon Markets (Article 6) under the Paris Agreement that is currently being considered by the UNFCCC to replace the Kyoto Protocol. The company has been focusing on the production of green energy. Currently, 86% of the energy produced by the company is from clean energy sources namely wind, hydro and geothermal.




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