CONFEREECE REPORT

Kigali Convention Center (KCC)
29th October - 2th November 2018
Kigali, Rwanda
Seventh African Rift Geothermal Conference (ARGeo-C7)

Seizing the moment: Investing in Geothermal for Sustainable Development

29th October – 2th November 2018

The UN Environment’s ARGeo Project served as a platform for Regional Networking and Capacity building and for Spurring geothermal exploration and development in the East Africa Region
The Seventh African Rift Geothermal Conference (ARGeo-C7) and “Pre- and Post-Conference activities” were held on 29 October -4 November 2018 in Rwanda. The conference was hosted and organized by the Government of Rwanda, pursuant to the ARGeo’s Steering Committee’s decision at its eighth meeting in Addis Ababa in 2016.

This conference consisted of: (i) The Main Conference (31 October-2 November 2018); (ii) Four parallel Pre conference short courses (29-30 October 2018), (iii) Tenth ARGeo Steering Committee Meeting (29 October 2018), (iv) Seventh African Geothermal Centre of Excellence Steering Committee meeting (29 October 2018), (V) MFA- Iceland International development Agency Project Review Meeting (30 October 2018); (VI) Second Annual General Meeting of IGA- African Regional Branch (1 November 2018), (VII) Technical Advisory Team and AGCE working team meeting (2 November 2018) and (Viii) Post conference field trip to Gisenyi and Karisimbi geothermal prospects (3-4 November 2018).

The Ministry of Infrastructures, Energy Development Corporation Limited (EDCL) and Rwanda Energy Group (REG) Co-organized this conference with UN Environment. The theme of the Conference was “Seizing the Moment: Investing in Geothermal for Sustainable development”. This was the Seventh ARGeo conference held after those held in Ethiopia, Uganda, Djibouti, Kenya, Tanzania and Ethiopia in 2006, 2008, 2010, 2012, 2014 and 2016 respectively.

ARGeo-C7 was one of the UN Environment- ARGeo Project’s Biennial Geothermal Conferences being implemented under the “Regional networking, information systems, capacity building and awareness creation” component.

This conference is organized in the context of achieving the global and continental development policy and strategic processes, i.e. The Agenda 2030 Sustainable Development Goals and the AU Agenda 2063; The Africa We Want. The Agenda 2063 harmonizes the two development processes in its Common Africa Position (CAP) that reflects (among others) the implementation of SDG 7 whose objective is “to ensure access to affordable, reliable and sustainable modern energy for all”.

The Conference was sponsored by many International, regional and national organizations and agencies that include Government of Rwanda, Ministry of Foreign Affairs - Icelandic International Development Agency (MFA-ICEIDA), United States Agency for International Development- East Africa Geothermal Programme (USAID-EAGP), German Federal Institute of Geosciences and Natural Resources (BGR), International Geothermal Association (IGA), United Nations University-Geothermal Training Programme (UNU-GTP) and Africa development Bank. During this Conference, UN Environment’s ARGeo Project served as a platform for Regional Networking and Capacity building and spurring geothermal exploration and development in the East Africa Region.

The Seventh African Rift Geothermal Conference (ARGeo-C7) that celebrated its 12th anniversary welcomed more than 350 delegates who convened at the magnificent Kigali Convention Centre, Rwanda. These included: policy makers, technical experts, developers and financiers. Top on the agenda of the three-day biennial geothermal conference are discussions on how countries can seize the momentous opportunity to actualize the African geothermal dream. The participants were able to network, share experiences and knowledge, and laid down strategies on how to harness Africa’s abundant geothermal resource, now estimated at 20,000MWe.
1.1. Opening Session of the Conference

The opening ceremony was graced by the Rwanda Minister for Infrastructure Amb. Claver Gatete who was the chief guest, and the UN Environment Africa Office Regional Representative and Director, Dr. Juliette Biao Koudenoukpo. Other dignitaries included Mr. Rashid Abdalla of the African Union Commission, and Dr. Belay Ejigu, Executive Director of SDG for Africa.

Ambassador. Gatete welcomed delegates to Rwanda noting that the conference was a timely addition to the portfolio of conferences hosted in Rwanda. He said that Africa had a great opportunity that required urgency and focus. “Geothermal resources are a solution to the ever increasing energy demand in Africa, particularly owing to affordability and negligible impact on the environment. We need to develop these huge resources,” noted the Minister.

In her opening remarks, Dr. Biao noted that while the UN Environment will continue supporting geothermal development from high temperature resources, there will be a renewed focus on small-scale and modular generation power plants, and direct use applications from lower temperature geothermal resources. This opening session was also attended by Ambassadors from Iceland, New Zealand, EU, Uganda and Kenya.
Preceding the official opening was an insightful panel discussion about the “Global Geothermal outlook”. It was moderated by Mr. Morris Kayitare who guided the panelists through an incisive and in-depth discussion of key issues relating to geothermal development in Africa. The panel consisted of key players in the global geothermal scene including Ludvik Georgsson from Iceland, Andrew Palmateer from USA, Dr. Peter Omenda from Africa, Greg Ussher of New Zealand and Eiji Wakamatsu from Japan.

1.2. Official Opening of Exhibitions

More than 10 international, regional and local companies exhibited their products and services during the seventh ARGeo conference. The exhibition ran for three days from 31 October - 2 November 2018. The exhibition was opened by H.E. Ambassador Gatete Rwanda’s Minister for Infrastructure, Juliette Biao Koudenoukpo, Regional Director, UN Environment - Africa Office.
1.3. Decision Makers Round Table Discussions

Roundtable discussions among decision makers responsible for mines and energy, Ambassadors, concluded that geothermal energy plays a key role in the achievement of most of the Sustainable Development Goals. The decision makers discussed modalities of creating an enabling environment for geothermal development in the eastern Africa region. The Managing Director of EDCL, Mr. Felix Gakuba was a moderator of the session where as ARGeo Program Manager Meseret Zemedkun co-moderated the session on behalf of the Regional Director, UN Environment-Africa Office, Juliette Biao Koudenoukpo.

The round table discussions focused on four key areas:

- Promote science and knowledge based exploration, development and utilization of geothermal resources in the region,
- Build a critical mass of skilled experts for sustainable geothermal development through the African Geothermal center of Excellence that will be hosted by the Government of Kenya,
- Leverage political will at national strategic levels in terms of policy development and resource mobilization, and
- Enhance cooperation and synergies among eastern Africa countries and partners to accelerate geothermal development in the region.

There was consensus that the key success factors for accelerated development of geothermal resources in the region focused on science and knowledge-based decisions by policy makers; understanding unique characteristics of geothermal resources in the western and eastern branches of the EARS and apply appropriate strategies for each branch. The decision makers also noted that geothermal energy needs to be developed in an environmentally sustainable manner in responsive to Africa’s environmental and sustainable development policy as well as the strategic processes such as AU Agenda 2063 and the Common Africa Position (CAP) on Sustainable Development Goals (SDG 7).

In order to build a critical mass of skilled experts in the region there is a shift from project based to matured institutional support specifically through establishment of the Africa Geothermal Centre of Excellence. The center will be designed to have regional relevance, regional ownership while building on existing initiatives.

In general, the roundtable discussions encouraged cooperation and synergies among eastern Africa countries endowed with geothermal resources through international forums for knowledge sharing and experience exchange, pooling resources to maximize benefits, supporting the Africa Geothermal Centre Excellence and sharing geothermal data and information through the African Geothermal Inventory Database (AGID).
1.4. Plenary sessions and Parallel technical sessions

Five parallel technical sessions were held in the three days of the conference to accommodate the more than 140 technical papers submitted. The increase in number of papers compared to past ARGeo conferences is an indication of the increased interest in these biennial regional conferences.

These five parallel technical sessions run daily after the morning plenary sessions and covered: country updates meant to provide a summary of the status of geothermal development in each of the EARS country, exploration with a focus on geology, geophysics and geochemistry, Gender and Energy, direct use of geothermal resources, reservoir engineering, drilling, use of new technologies in geothermal development, environmental and social issues, as well as legal framework and strategy for geothermal development. The Plenary sessions also brought together various international and regional organizations to discuss on Financing of Geothermal Projects as well as Direct use applications for sustainable development.
The second day plenary session focused on the financing of Geothermal projects. A panel comprising Dr. Humphrey Ndwiga of African Development Bank, Rajiv Garg of Climate Technology Network (CTCN), Gunnar Gunnarsson, CEO Reykjavik Geothermal and Darrell Boyd of Meridiam addressed the subject. One point of agreement by the panel chaired by Engilbert Guðmundsson from Iceland was that countries need to explore different options since financing geothermal projects is not a one-size-fits-all undertaking.

To attract funding, governments need to put in place friendly policies and an enabling regulatory framework as a catalyst. However, panelists cautioned that policies and legal framework are not a panacea for overcoming all funding challenges. Other factors such as unresolved environmental and social issues and a small power market could impede robust involvement by financiers.

To mitigate market-related challenges, one panelist advised countries to collaborate to expand the power market, making their projects more attractive to financiers. Thankfully, countries in the eastern Africa region are working towards an integrated grid by 2020, which will exponentially expand the power pool.

A larger power pool will enhance the feasibility of geothermal projects and ensure speedier payback for investors and financiers. However, the various African countries need to harmonize their policies and legal frameworks for the integrated grid to function well. Still, using an incremental and stepped development of geothermal projects is another option that countries need to explore as they seek to overcome current financing challenges.
The third day plenary session focused on how to Domesticate direct use applications in response to the felt needs of communities.

The argument in the plenary was focused on “Africa needs direct use projects to respond to its unique needs”. This was the resounding punch line during the Direct Use plenary discussion on the third and final day of the 7th geothermal conference taking place in Kigali, Rwanda. The plenary session chaired by Dr. George Muia (GDC, Kenya) comprised Martha Mburu (GDC, Kenya), Luca Angelino, International Renewable Energy Agency (IRENA), Arni Ragnarsson, Iceland Geo-Survey and Caitlin Smith – US Power Africa.

Africa’s main need is food security and sustainable livelihoods. direct use session Geothermal direct projects should, therefore, explore agriculture-based projects to make the lives of communities living around geothermal prospects more comfortable, just as USA, Europe and China use geothermal for district heating during winter. And the good news is that the use of geothermal resources in agriculture is a time-tested venture. And there is a lot of hope. Kenya already has a demonstration project in its Menengai project with prototypes for milk pasteurization, greenhouse heating, and a laundromat using heat harvested from brine before re-injection. More than 2000 entities have expressed interest to establish geothermally-driven agricultural and industrial projects.

GDC-Kenya is seeking funding for a feasibility study after which a geothermal direct use park will be established within a 50Km radius from the project to allow entities to set up various projects. Still in Kenya, KenGen has a fully operational geothermally-heated spa that adds a variety of experiences to tourists visiting the Hells Gate National Park. For geothermal prospects with lower temperatures, it is possible to drill a shallow well up to around 1000m depth and use it for direct use agricultural and industrial.
1.5. Sideline meetings that took place during the conference

UN Environment signs an MOU with the Sustainable Development Goals Center for Africa (SDGCA)

On the sidelines of the 7th ARGeo conference, UN Environment and the Sustainable Development Goals Center for Africa (SDGCA) signed an MOU to collaborate in areas of mutual interest. Some of the key areas of cooperation include: enhancing environmental sustainability, maximizing the production of energy into other productive sectors such as water, agriculture, health and education, mainstreaming energy efficiency and sustainable energy systems, regional networking, knowledge and information systems sharing, awareness creation, policy development and harmonization. The MOU will also facilitate the tracking of progress made towards SDG 7 that targets the provision of “affordable and clean energy,” and other applicable SDGs.

CTCN Announced a Technical Assistance for Geothermal Direct Use Projects in ARGeo member countries

The UN Environment Climate Technology Center and Network (CTCN) announced a technical assistance for direct use applications of geothermal resources on 1 November 2018. Direct utilization of geothermal resources is one-way countries can meet their greenhouse gases reduction quotas since it will displace the use of biomass and fossil fuels. It is also great for fighting hunger and poverty by enhancing the livelihoods of communities living in geothermal-rich localities.

In a side-event held during the ARGeo-C7 conference CTCN gave details of the technical mechanism. CTCN is looking to providing technical assistance that will use climate-related technology for non-conventional direct use applications. Specifically, CTCN is keen to provide technical assistance on resource assessment, financing appropriate technology and assessment of markets for crop drying, chilling of agricultural produce and fish farming, among a host of other applications.

To qualify, CTCN has urged all countries to submit a request using the CTCN template because this is a multi-country process that requires at least four countries for it to kick off. Countries should submit fully completed applications through their National Designated Entities (NDFs). They should submit applications by 15th December 2018.
Africa Geothermal Branch of IGA holds second AGM

The African geothermal branch of IGA chaired by the President Dr. Peter Omenda held its second AGM during the 7th ARGeo conference on 1 November 2018. ARB membership is open to individuals and corporates. Members agreed to make membership contributions by end of November 2018. So far more than 30 members have already paid up. A road map for the next one year was also discussed and endorsed.
UN Environment and Ministry of Infrastructure through the Energy Development Corporation Limited (EDCL) in collaboration with various partners also successfully completed both pre- and post-conference activities

2.1. THE PRE-CONFERENCE ACTIVITIES:

(a) Four parallel Short Courses (29-30 October 2018)

(b) Tenth Meeting of the “ARGeo Steering Committee” (29 October 2018),

(c) Seventh Meeting of the AGCE Steering committee (29 October 2018)

2.1.1 Four Parallel Short Courses

A total of 113 geothermal scientists, engineers, planners and social scientists participated in four geothermal training courses from 12 East African countries and other parts of the world participated in the four parallel pre-conference short courses. The short courses offered were: (i) Short Course 1: Management and financing for Geothermal project development facilitated by United Nations University-Geothermal Training Programme (UNU-GTP) and sponsored by MFA-ICEIDA and UN Environment; (ii) Short Course 2: Low temperature geothermal systems and direct use application facilitated by United Nations University-Geothermal Training Programme (UNU-GTP) and sponsored by MFA-ICEIDA and UN Environment; (iii) Short course 3: Geothermal Reservoir engineering and modelling: facilitated by US Power Africa and EAGP, and sponsored by US Power Africa and UN Environment; (iv) Short Course 4: Geothermal Resource Decision Modules 1 and 2: Volcanic and Deep Circulation Models facilitated by US Power Africa and EAGP, and sponsored by US Power Africa and UN Environment.

This is the first time the pre-conference training program is offering four courses; an increase from the three courses offered previously. The additional specialized course focuses on geothermal volcanic and deep circulation modeling. The objective of the new course is to enable participants learn conceptual modelling techniques for sound exploration and resource development decisions. Detail report on the four short courses will be prepared and shared with the participants of the courses.
Representatives from UN Environment, African Union Commission, Ministry of Foreign Affairs-Iceland International development Agency (MFA-ICEIDA); US Power Africa and United nations University -Geothermal Training programme and Rwanda Energy development Corporation (EDCL) participated in the opening session of these four parallel short courses.

Speaking during the opening ceremony, Mr. Frank Turyatunga, UN Environment Deputy Regional Director noted that geothermal training is a great step towards achieving Sustainable Development Goals and the African Union Development Agenda 2063, dubbed “the Africa we want.” Participants are drawn from 12 Africa countries. Mr. Turyatunga was pleased, for the first time, the short courses are being offered under the auspices of the newly created Interim Project Coordination Unit of the Africa Geothermal Center of Excellence (IPCU-AGCE). The UN Environment ARGeo Programme is shifting its focus from project-based training to a more mature institutional support through the Africa Geothermal Centre of Excellence (AGCE).

In his official opening remarks, the Managing Director of the Energy Development Corporation Limited (EDCL) Eng. Felix Gakuba reiterated Rwanda’s commitment to build capacity for developing its vast and unique geothermal resources. “These short courses will really help our scientists understand how to harness Rwanda’s abundant medium temperature geothermal resources,” he said. Training is a key cog in turning the wheels of energy security in Africa. The vibrant ARGeo pre-conference training programme had over the last seven years become a curtain raiser for the biennial geothermal conferences. “This programme has really grown; for the first time, we have 4 parallel courses,” noted Dr. Meseret Zemedkun, the ARGeo-Project Manager based in the UN Environment. She added that there is a significant increase in numbers and interest.
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Participants of the pre-conference training programme have been urged to use the skills acquired to enhance job performance back home. The participants have been drawn from The Comoros, Djibouti, DRC, Ethiopia, Germany, Kenya, Malawi, Mozambique, Rwanda, Tanzania, Uganda, UK and Zambia. ARGeo short courses continue to facilitate knowledge and skill development for African workers in Geothermal Sciences and Technology. With the additional skills acquired, geothermal development in Africa continues to gain momentum.

Dr. Juliette Biao Koudenoukpo, the Regional Representative and Director UN Environment Africa Office officiated a colorful awards ceremony held to confer certificates to participants who completed the two-day training. “The UN Environment is optimistic that the knowledge you have acquired will enhance the performance of your jobs and contribute to the sustainable development of geothermal resources,” noted Dr. Biao. Owing to the great number of participants, a few representatives were issued with certificates of completion.

Dr. Juliette Biao Koudenoukpo, the Regional Director of UN Environment Africa Office awarding a certificate to a short course participant.
2.1.2. Tenth ARGeo Steering committee Meeting

Representatives from UN Environment (Africa Office and Division of Economy), ARGeo member countries, and partners (Africa Union Commission, MFA-ICEIDA, UNU-GTP) attended the meeting. The ARGeo steering committee has resolved to deepen its focus on medium temperature resources in the next five years, while at the same time sustaining the development of high temperature resources. The decision was made during this 10th ARGeo steering meeting held on Monday October 29, 2018 at the Kigali Convention Centre. The resolution comes as great news for all countries who have medium temperature resources that can be utilized for both electricity generation and direct use applications.

Most of the geothermal resources in the western branch of the East Africa Rift System record lower temperatures than those in the Eastern Branch. Already, several projects from Africa’s Western Rift Branch have submitted proposals for funding. The funds once approved, will be used for resource assessment and identification of suitable technology for harnessing low-temperature geothermal resources. The next steps for the ARGeo programme is to support country requests in resource assessment, define appropriate technology and assess the techno-economic feasibility of direct use application. Detail Steering committee report will be shared with the member of Steering committee.

2.1.3. Seventh AGCE steering committee meeting

The African Geothermal Center of Excellence (AGCE) held its seventh steering committee meeting on Monday October 29, 2018. The committee appreciated the progress made so far through the Interim Project Coordination Unit of AGCE. The meeting endorsed the use of e-learning to enhance and optimize geothermal training in Africa. The modality and mechanisms of implementation on e-learning was presented to the steering committee members.

A geothermal training plan for the coming five years was adopted alongside an annotated business plan for the establishment of a fully-fledged, Africa-owned and Africa-led institution. Currently an Interim Project Coordination Unit with representation from Eleven African countries of the East African Rift System is managing the Centre of Excellence. Detail Steering committee report will be shared with the member of Steering committee.
2.2. POST CONFERENCE ACTIVITIES

A field visit to the Kinigi, Gisenyi and Karisimbi geothermal prospects were organized on 3-4 November 2018. Selected delegates of the concluded Seventh African Rift Geothermal Conference (ARGeo-C7) spent two days post-conference sampling Rwanda’s countryside. The organizing committee treated delegates to a field tour in Rwanda, the land of a thousand hills. Rwanda’s countryside is so beautifully hilly that most delegates kept marveling at every new hill, dotted with houses, banana farms and a variety of vegetation. The tour that took delegates to the Northern Province of Rwanda with the first day ending at the Serena Hotel on the shores of Lake Kivu, just 1.3km from DRC border.

On the first day, delegates visited touristic places and the Karisimbi geothermal drilling site. Walking through the Musanze caves about three hours’ drive from Kigali was a great way to exercise following the 3-day intensive conference in Kigali. As a safety measure, each delegate got a complete safety kit with a helmet, gloves and a torch to light the pathways since the caves are dark. The 52 Musanze caves are volcanic lava tubes with 31 entrances formed from basaltic lavas of the Sabyinyo and Bisoke volcanoes. Inside the two kilometers long caves are bats that hang from the stunning rock formations. The Musanze caves are very significant to the local people since they were for many centuries used as hiding places during various wars. The government has converted them into touristic sites and plans are underway to involve the local community in managing them for revenue generation.

The tour of the Karisimbi drilling site was another wonderful challenge for the delegates. The Karisimbi Geothermal field, now not operational, has two wells drilled in 2013—the first well is more than 3000m deep and the second well terminated at 1367m. Following the drilling of the two wells, there was no conclusive geological sign of utilisable geothermal system. Nevertheless, the data gathered from the two wells is a worthy outcome for the investment made because it will inform the development of guidelines on how to develop geothermal resources in the Western Branch of the East African Rift System. In essence, Rwanda seems to have paid the price on behalf of other countries in the Western Branch.

In spite of the drilling outcomes, Rwanda, and indeed all countries in the Western Branch, need to consider investing on direct use projects that tap into the lower temperature geothermal resources. For instance, the Nyamyumba hot springs, which reach 73 degrees Celsius, are a natural touristic attraction with high tourism potential widely known in the region for their medicinal virtues. Locals and indeed visitors swim in the geothermally-heated water. Rwanda could, for instance, think how to exploit the Nyamyumba and Josi hot springs commercially. Just like the USA, China and several countries in Europe continue to use geothermal directly mainly to meet their space heating and recreational needs, African countries endowed with geothermal resources should explore agriculture-based projects as a way of fighting poverty and ensuring food security for rural communities.
On the second and last day of the tour, delegates visited Kivuwatt Project, a rare gem in Rwanda’s Western Province in Karongi District. Delegates learned that the Kivuwatt Project is the only gas/water extraction project in the world. Currently, a power plant commissioned in 2015, powered by the potentially deadly methane gas extracted from the sea, generates 26MW which is connected to the Rwanda national grid. The project plans to generate 100MW in its first phase. Kivuwatt mines the methane gas using Gas Extraction Facility located 13km offshore and tethered to the bottom of the 400m deep lake.
The Main Conference was closed by a representative of Ministry of Infrastructure. The ARGeo Programme Manager gave the “Closing” remarks on UN Environment’s behalf. At this closing session, the Kenyan representative declared that Kenya will host the next ARGeo-C8 in October-November 2020.

ARGeo-C7 spurred renewed interest in harnessing the huge geothermal potential within the East Africa Region. The success of this Conference is reflected by the big attendance (more than 350 delegates) of the main conference, the 140 successful presentations delivered at the Conference. The large number of participants in the four -conference short courses from 12 East African countries and strengthened the institutional and infrastructural capacities of the region is also indeed a success.

One of the outcomes of the Conference was the “Kigali Conference Statement” that focuses on Mainstreaming Direct Use application in Geothermal Power development” This statement was endorsed and approved buy all conference participants during the closing session of the conference (enclosed).
Speaking during the opening ceremony, Mr. Frank Turyatunga, UN Environment Deputy Regional Director noted that geothermal training is a great step towards achieving Sustainable Development Goals and the African Union Development Agenda 2063, dubbed “the Africa we want.” Participants are drawn from 12 Africa countries. Mr. Turyatunga was pleased, for the first time, the short courses are being offered under the auspices of the newly created Interim Project Coordination Unit of the Africa Geothermal Center of Excellence (IPCU-AGCE). The UN Environment ARGeo Programme is shifting its focus from project-based training to a more mature institutional support through the Africa Geothermal Centre of Excellence (AGCE).

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Seventh African Rift Geothermal Conference (AGeo-C7) Kigali, Rwanda 31 October- 2 November 2018

KIGALI Statement of the Conference

Mainstreaming Direct use in Geothermal Development in Africa
INTRODUCTION

The Seventh African Rift Geothermal Conference (ARGeo-C7) was held at the Kigali Convention Center on 31 October - 2 November 2018 with the theme “Seizing the moment: Investing in Geothermal for Sustainable Development”. This conference followed those held in Ethiopia, Uganda, Djibouti, Kenya, Tanzania, and Ethiopia in 2006, 2008, 2010, 2012, 2014 and 2016 respectively.

The conference was hosted by the Government of Rwanda and co-organized with the United Nations Environment (UN Environment) and other partners. The conference was endorsed by the International Geothermal Association (IGA).

Sponsors included the Ministry Foreign Affairs-Icelandic International Development Agency (MFA-ICEIDA), Nordic Development Fund (NDF), United Nations University-Geothermal Training Programme, US Power Africa, Federal Institute for Geosciences and Natural Resources (BGR), and the International Geothermal Association (IGA).

The conference was preceded by four short courses on (i) Managing and Financing Geothermal projects; (ii) Low to medium temperature geothermal systems for direct use application; (iii) Geothermal reservoir engineering and modelling; and (iv) Geothermal resource for Decision making modules: Volcanic and deep circulation.


CONFERENCE STATEMENT

The participants expressed their appreciation to the Government of Rwanda for hosting the conference and to the United Nations Environment (UN Environment) and partners for the excellent organization of the conference.

The participants:

Being aware of the substantial potential of geothermal energy resources on the African continent, estimated at more than 20,000 MWe, for power generation in the East African Rift System and huge resources for direct use application in the whole of the African continent;

Recognizing the Agenda 2030 on Sustainable Development Goals (SDG) and the continent’s environmental and sustainable development policy and strategic processes such as the AU Agenda 2063 where the common Africa Position (CAP) harmonizes the two agendas to reflect the implementation of SDG’s such as SDG 7 whose objective is to “ensure access to affordable, reliable, sustainable and modern energy for all;”

Recognizing that there is a significant economic growth in the region that entails a high energy demand and where geothermal resources could play a significant role as one of the alternative renewable energy sources;

Recognizing the modular nature of geothermal utilization and the potential to use it as both a baseload and peaking plant

Recognizing that there is a significant economic growth in the region that entails a high energy demand where geothermal plays a significant role as one of the alternative renewable energy resource

Recognizing the diverse nature of geothermal resources for power generation and direct use applications and importance of direct uses to contribute to the socioeconomic development of the continent

Realizing the different occurrences and characteristics of geothermal systems between the Western and Eastern branches of the EARS

Recognizing the need to have a better understanding and knowledge of the nature of geothermal systems in the western branch of the East African Rift System

Realizing the need to enhance skilled manpower that will contribute to sustainable geothermal resource development in the region

Recognizing further that there are major challenges affecting the acceleration of geothermal energy development that include sufficient upfront capital.

Recognizing the need to coordinate various regional geothermal support Programmes of ARGeo, AUC, ICEIDA, BGR, USAID-EAGP, EAGER-DFID, JICA, and others to avoid duplication of efforts and foster complementarities leading to cost savings and enhancement of the quality and effectiveness of these programmes
In order to leverage political commitment at national strategic level, the participants recommended that Governments of African Rift countries:

- Integrate/include geothermal energy in their long-term National Power Development Master Plan and leverage political will at the national strategic level in terms of policy development and resource mobilization.
- Ensure to develop the policies that depend on the resources identified because of the exploration of geothermal resources in the application of the right scientific and technical approach.
- Develop and harmonize energy policies (including geothermal) as per the identified resource. This is with a view to attract private sector participation and accelerate development of geothermal energy resource in the region in terms of power generation, direct use application and co-development.
- Mainstream direct use application projects with a focus on tangible benefits for local communities neighboring geothermal resources.
- Consider use of geothermal for both on-grid and off-grid applications.
- Allocate adequate national budgetary funds for exploration and development of the geothermal resource.
- Seek technical assistance for resource assessment, financing appropriate technology and assessment of markets for crop drying, chilling of agricultural products and fish farming, among a host of other applications.
- Support cooperation and collaboration by regional energy development projects through regional power pools (e.g. EAPP, SAPP) for power generation and direct use.

The participants at the conference, in addressing the challenges of developing geothermal energy in the region and mainstreaming direct-use in geothermal development, recommended to:

- Factor direct use applications in geothermal development where countries can meet their greenhouse gases reduction quotas as it will displace the use of biomass and fossil fuels. It is also great for fighting hunger and poverty by enhancing the livelihoods of communities living in geothermal-rich localities.
- Focus on knowledge-based exploration, development and utilization that leads to the best strategic approach to develop the resource in terms of power generation and direct use.
- Access appropriate risk mitigation funds through the support of donor and development agencies for surface exploration and drilling projects.
- Enhance cooperation and synergies among African countries and partners to accelerate geothermal development in the region.
- Access appropriate risk mitigation funds through the support of donor and development agencies for surface exploration and drilling projects.
- Seek innovative financing solutions that range from utilizing capital markets, pension funds, carbon and green funds.
- Promote south-south cooperation on geothermal research and development within the region.
- Embrace new technologies such as geothermal hybrid systems including geothermal-solar hybrid systems; geothermal – gas hybrid systems; engineered geothermal systems (EGS), and electricity generation from low-temperature resources.
- Embrace use of early generation through wellhead power plants as a way of accelerating geothermal development.
- Collaborate with ARGeo and other geothermal support programmes including the African Regional Branch (ARB) to raise awareness on the geothermal resource in African countries and use it as one of the major vehicles to enhance cooperation and synergies among African countries.
- Ensure a well-integrated regional geothermal exploration and development approach.
- Involve private developers to enhance and fast-track geothermal development in the region by bringing knowledge, finances and skills, and
- Collaborate through the existing geothermal support programmes in (i) promoting a regional network of geothermal energy agencies, (ii) enhancing a regional geothermal information system, (iii) building institutional and human capacity, and (iv) surface exploration with an aim to minimize resource risk.

Kigali, Rwanda
2 November 2018