8th AFRICAN RIFT GEOTHERMAL CONFERENCE (ARGEO - C8)

Seizing the Moment: Investing in Geothermal Resources for Sustainable Development

CONFERENCE PROGRAMME

2nd to 6th November 2020

United Nations Environment Programme - Nairobi, Kenya



Hosted virtualy and organized by the Government of Kenya in collaboration with UNEP, GAK, IGA - Africa Regional Branch, and other partners.

Endorsed by International Geothermal Association.

Table of Contents

Welcome Message 3

About the Conference 4

Organizing Committee 6

Profiles of the Sponsors 8

Panelists 12

Opening Ceremony 22

Programme 23

Conference Layout 31

Conference Highlights 33



Welcome Message



Juliette Biao Koudenoukpo
Regional Representative and Director for Africa Office.

The United Nations Environment (UNEP) is pleased to welcome you all to the Eighth African Geothermal Conference (ARGeo-C8), generously hosted this year by the Government of the Kenya.

This conference is one of the main initiatives of the UN Environment ARGeo programme to convene biennial international conferences to further regional cooperation in the exploration, development and utilization of geothermal resources. The first seven ARGeo conferences were held in the ARGeo member countries that include Ethiopia, Uganda, Djibouti, Kenya, and Tanzania, Ethiopia and Rwanda in 2006, 2008, 2010, 2012, 2014, 2016 and 2018 respectively.

ARGeo-C8 provides a platform for finding the paths to seize the inordinate opportunity for accelerating and scaling up renewable energies including geothermal in Eastern Africa countries. This is along with gains in energy efficiency and improved access to energy in support of various initiatives that geared towards the objective of Sustainable Development such as UN Sustainable Energy for ALL initiative launched in 2012 as well as the Agenda 2030 Sustainable Development Goals. Further the conference responds to the continent's environmental and sustainable development policy and strategic processes through alignment with a 10-year implementation plan of AU Agenda 2063 that enhances UN Environment programme's coherence and effectiveness at the regional and countries level.

Africa suffers from an acute and chronic energy shortage, notably lack of electricity. With little more than a 10% of the population connected to an electricity grid, with even lower rates in rural areas, this is seen as a key impediment to economic growth. As electricity use normally grows at twice the rate of economic growth, until significant saturation has been reached, an annual growth of electricity access of more than 10% is needed only to keep up with expected growth in most poor countries or not to directly hamper it. To reach goals of electrification present in most national development plans, an annual growth of closer to 20% over a sustained period is probably needed. Electricity prices in most African countries (except in those who subsidize) are well above world averages and constitute an important business and investment barrier.

While in the short term the bulk of energy needs are, and will be, met by fossil fuels and hydropower, geothermal energy is increasingly seen as part of the solution for energy in the countries of the Great African Rift Valley. Where this resource is of high quality it can provide reliable base energy at competitive prices, with relatively limited environmental impact.

Progress in the development of geothermal energy resources has been slow and uneven. Only one country, Kenya, is currently a significant producer of geothermal electricity; as high as 873 MWe. Governments face several difficulties in making long term bets on geothermal development: (i) the resource remains uncertain until well into the development process because costly exploration and drilling may end up unsuccessful; (ii) The project lead time (from exploration to development and utilization) is long – much longer than, say, investing in thermal electricity generation, and (iii) almost all the significant finance amounts needed are up-front whereas this is not so in alternatives such as thermal generation. Until recently, development partners were not overly keen on providing financing for geothermal development.

Only in the last 10-15 years has a momentum built up for harnessing geothermal energy in the region. This arose from recognition of the substantial endowment of geothermal resources in Africa and its potential to catalyse the economy and to meet social and environmental development aspirations.

UNEP, through the ARGeo project, has been a major player in generating this awareness, urging measures to catalyse investment and development challenges and supporting and disseminating resource identification and technical surveys. More specifically, the ARGeo Programme covering East African countries (Burundi, Comoros, Djibouti, Democratic Republic of Congo, Eritrea, Ethiopia, Kenya, Malawi, Mozambique, Rwanda, Tanzania Uganda, and Zambia) has achieved this mainly through its two major project components of Technical Assistance for surface exploration studies and Regional networking, information systems Capacity building, Policy advice.

The ARGeo-C8 is being held against the general backdrop of the challenges of the high upfront cost of geothermal development, inadequate skilled manpower for sustainable geothermal development, and the over-dependence on imported petroleum and petroleum products by most East African countries. Geothermal is 'indigenous', reliable and price wise lower in cost than imported oil or coal and a key ally in realizing a transition to a low carbon, resource efficient and inclusive Green Economy. Further, the ARGeo-C8 is an important step towards this vision of collective regional action and risk sharing; indeed it can propel moves towards the realization of a Regional Energy Policy and the East African Sustainable Energy Road map and Strategy.

Finally, I would like to extend my sincere appreciation to the Government of Kenya for hosting and co-organizing this important conference with UNEP in Virtual Mode in recognition of the limitations imposed by the pandemic. I would also like to thank our sponsors (among others): the Kenyan Electricity Generating Company (KenGen); Geothermal Development Company (GDC); Iceland Ministry of Foreign Affairs; UNESCO GRO--Geothermal Training Programme (GTP), US Based Geothermal Resource Group, New Zealand Africa Geothermal Facility (NZAGF) as well as other partners who have made this conference possible. UNEP also appreciates the Close collaboration with the African Regional Branch of International Geothermal Association (IGA-ARB) and Geothermal Association of Kenya (GAK) in organizing such a conference in the region.

About the Conference

The Eighth Africa Rift geothermal Conference (ARGeo-C8) is one of the UNEP African Rift Geothermal biennial Conferences being organized under its components on the "Regional networking, information systems, capacity building and awareness creation". This Conference will be held virtually from 2 November to 6 November 2020. The biennial ARGeo conferences are hosted and organized by ARGeo member countries on rotational basis. The first seven ARGeo conferences were held in Ethiopia (2006), Uganda (2008) Djibouti (2010), Kenya (2012), Tanzania (2014), Ethiopia (2016) and Rwanda (2018). The ARGeo steering committee at its sitting in Kigali, Rwanda in 2018 nominated Kenya to host the 8th ARGeo Conference in 2020.

In this context, the ARGeo C-8 will be hosted and organized by the Government of Kenya through the Ministry of Energy, in Collaboration with UNEP, Africa Union Commission, Kenyan Electricity Generating Company (KenGen), Geothermal Development Company (GDC), the Geothermal Association of Kenya (GAK), Africa Energy Branch of the International Geothermal Association (IGA-ARB), and other relevant partners.

Objective of the Conference

ARGeo C8 aims at promoting and supporting the geothermal development in the East Africa Region. The theme of ARGeo-C8 Virtual conference is: "Seizing the Moment: Investing in Geothermal Resources for Sustainable Development". This international conference will bring together policy makers, technical experts as well as developers and financiers of international and regional delegates. The conference will also provide a platform to explore solutions how to: (i) mitigate the risks associated with resource exploration, (ii) reduce lead times in developing geothermal projects, (iii) to leverage investment to stimulate the growth of industry, and (iv) to effectively develop, construct, and operate successful geothermal power plants.

Expected Participants

This virtual conference is expected to attract over 500 local, regional and international experts, policy makers developers and financiers from all over the world. Energy Ministers from East African Region and regional directors of investment and development banks are also expected to participate in the opening ceremony and first day of the High level Roundtable Ministerial Dialogue of the Conference in order to develop a strategy to accelerate development of geothermal resources in the region. Among others, establishment and legalization of the African Geothermal Conference (AGCE) where the Government of Kenya considered as a host of the Center will also be discussed in the high level discussion.

Conference Activities:

It is expected that the H.E. Ólafur Ragnar Grímson, Former President of Iceland and Global Geothermal Ambassador to officially open the Conference on 4 November 2020 and the Principal Secretary of Ministry of Energy to officially close the conference on 6 November 2020. Detail Conference programme of the conference will be circulated soon.

The activities during the conference include:

- 1 November 2020: 74th Virtual International Geothermal Association- Board of Directors Meeting
- 2-3 November 2020: Four parallel Pre-Conference geothermal Short Courses.
- UNEP ARGeo and AGCE Steering Committee Meetings, 3 November 2020
- 3 November 2020: Pre-Conference Forum on Investing in the Geothermal Sector in Kenya moderated by the Geothermal Association of Kenya
- 4 November 2020: Launch of African Women in Geothermal
- 4-6 November 2020: The Main Conference
- 5 November 2020: Annual General Meeting (IGA-African Regional Branch)

The Main programs of the Conference include:

(i) 4 November 2020: Opening Ceremony and High level (Ministerial) Round Table Discussion

(ii) 4-6 November 2020. Main conference: A total of 90 technical papers through five parallel technical sessions will be Virtually delivered. About 30 technical papers will be presented in the Virtual poster session.

(iii) Five Plenary Sessions: Focusing on: (i) Trends of Global Geothermal development and its contribution to Sustainable Development Agenda: (ii) Innovative Financing Scheme to drive geothermal industry in Africa (iii) Opportunities and challenges of private developers to drive the geothermal development in Africa;(iv) Mainstreaming Direct Use application to socio-economic development; (v) Role of Geothermal in Renewable Energy Mix and contribution to Socio-Economic Development in the Continent.

(iv) 4-6 November 2020: Virtual Poster Presentations and Exhibitions where all private developers, manufacturers of various geothermal equipment showcase their products and services.to be facilitated by IGA and Africa Regional Branch.

(v) 6 November 2020: Closing Ceremony and Resolutions of the conference

UNEP, under the auspices of the Interim project coordination unit of the African Geothermal Center of Excellence (IPCU-AGCE) will facilitate the following four Virtual parallel Pre-conference geothermal short course trainings on 2-3 November 2020. A total of about 100 trainees from thirteen African countries (Comoros, DRC, Djibouti, Eritrea, Ethiopia, Kenya, Malawi, Mozambique, Rwanda, Somalia, Tanzania, Uganda and Zambia) are expected to attend these trainings.

- Low to medium geothermal systems for Direct use application: Convened and supported by UNESCO GRO-Geothermal Training Programme, Iceland Ministry of Foreign Affairs and UNEP
- Geothermal Project Management and Financing: Convened and supported by New Zealand Africa Geothermal Facility and UNEP
- Reservoir Engineering and Well Testing: Convened and supported by US-Geothermal Resources Group and UNEP
- Geothermal Conceptual model of geothermal Systems: Convened and supported by SEEQUENT and UNEP

Expected Outcome:

- A regional Strategy and policy guideline to accelerate geothermal development both in power generation and direct use application resolved;
- Stimulated and spurred geothermal interest in private and public entities through bringing together Virtually more than 500 international and regional delegates that include policy makers, technical experts as well as developers and financiers.
- Knowledge and best practices in geothermal resource exploration, development and utilization in Africa shared through presentation and discussion of more than 120 technical papers
- Developed skill and Capacity for more than 100 home grown experts in geothermal science and technology through conducting of four parallel Short courses
- New geothermal technologies, equipment and soft wares showcased through exhibitions of products and services of various geothermal related companies in Africa and elsewhere in the world.
- Solutions to leverage investment to stimulate the growth of industry addressed.
- Awareness and Regional networking created; Partnership developed;



Credit: https://magicalkenya.com/

Organizing Committee



Chairperson
Chrispin Lupe
Ministry of Energy, Kenya



Main Coordinator
Meseret T. Zemedkun
UNEP, Regional Office for Africa



Secretary
Mike Karanja
Geothermal Association of Kenya (GAK)



Chair Tech. Commitee
Peter Omenda
Geothermal Consultant and IGA Board member



Chair Field Excursion Committee
Peketsa Mangi
KENGEN



Chair Fellowship and Resource Mobilization Subcommittee
Abel Rotich
KENGEN



Member
Dansette Kenani
Geothermal Development Company (GDC)



Head, Comm. & Protocol Subcommittee
Ryan Ndobi
UNEP, Office for Africa



Chair, Finance and Budget Subcommittee
Rosemary Olonde



Chair Logistics & Exhibition Subcommittee
Peter Ndirangu

Chair, Procurement Subcommittee
Nemuel Abuga



Member
Mohammed Yerima Kway
Nigeria



Member
Solomon Kebede
Ethiopia



Member
Kato T. Kabaka
Tanzania Geothermal Development Company Ltd.



Member
Godfrey Bahati
Ministry of Energy and Mineral Development, Uganda.



Member
Nicholas Mariita
Geothermal Training, Dedan Kimathi University



Member
Moses Mbego
UNEP, Office for Africa



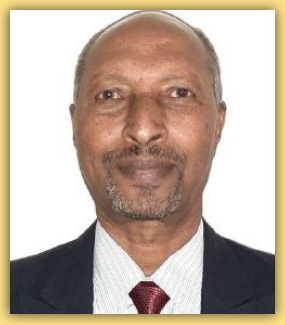
Member
Ermias Yohannes Berhane



Member
Tina Nduta



Member
Victoria Mwaisakenyi



Member
Yiheyis Amdebrhan
Ethiopia



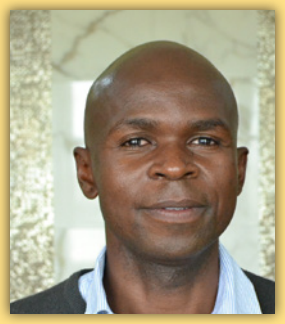
Member
Risper Sangut



Member
Fredrick Apollo



Member
Lucy Mukiri



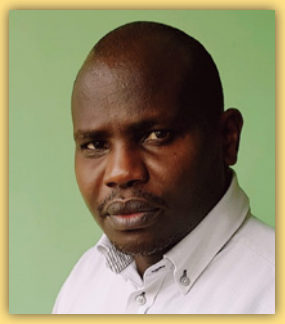
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Ethiopia



Member
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Member
Uwera Rutagarama
Rwanda

Richard Mavisi, Ministry of Energy
Kizito Yaola, KENGEN
Lilian Wanjama
Solomon Sankaire
Paul Ngugi, GDC
Stephen Onacha
Vincent Kato
Ezekiel Kipyegon, GDC
Ebbysibah Amoro, GDC
Anthony Ng'ang'a, GDC
Duncan Lizunela
Tarameli Mnjokava
Charles Masio, KENGEN
Maureen Apunda
Isaac Kanda
Moses Kachumo
Gabriel Wetangula, GDC
Willis Ambusso
Irene Moraa, GDC
Shakiru Iddrissa
Esther Njuguna

Profiles of the Sponsors

United Nations Environment Programme

The United Nations Environment Programme is the leading global environmental authority that sets the global environmental agenda, promotes the coherent implementation of the environmental dimension of sustainable development within the United Nations system and serves as an authoritative advocate for the global environment.

UNEP work encompasses:

Assessing global, regional and national environmental conditions and trends

Developing international and national environmental instruments

Strengthening institutions for the wise management of the environment

Mission

"To provide leadership and encourage partnership in caring for the environment by inspiring, informing, and enabling nations and peoples to improve their quality of life without compromising that of future generations."

Kenya Electricity Generating Company Limited (KENGEN)

Kenya Electricity Generating Company Limited, KenGen is the leading electric power generation company in Kenya, producing about 80 percent of electricity consumed in the country. The company utilizes various sources to generate electricity ranging from hydro, geothermal, thermal and wind. Hydro is the leading source, with an installed capacity of 819.9 MWe, which is 51 per cent of the company installed capacity. The Company is the premier and leading developer of geothermal resources in Africa, with electricity generation from geothermal resources now at 705 MWe (Out of which 83.5 MWe comes from the innovative wellheads technology with (Olkaria-81.1 MWe and Eburru 2.4 MWe). This represents 32.6% of the total installed capacity.

KenGen owns thirty one (31) power generating plants with a combined installed capacity of 1,632 MWe from diverse generation modes comprising of hydro, thermal (Diesel & Gas), geothermal and wind technologies. The Company vision is to be the market leader in the provision of reliable, safe, quality and competitively priced electric energy in the Eastern Africa region, while the mission of the company is to efficiently generate competitively priced electric energy using state of the art technology, skilled and motivated human resource to ensure financial success. KenGen strives to achieve market leadership by undertaking least cost and environmentally friendly capacity expansion.

Ministry of Energy, Kenya

The Ministry of Energy is the institution mandated by of the Government of the Republic of Kenya to develop and implement policies that create an enabling environment for efficient operation and growth of Kenya's energy sector. The Ministry sets strategic directions to facilitate the growth of the sector while providing long term vision for all sector players.

The vision of the Ministry is to have affordable quality energy for all Kenyans. In the context of this vision, the Ministry's is to facilitate provision of clean, sustainable, affordable, reliable, and secure energy services at least cost while the environment".

The institutions under the Ministry's supervision include: Renewable Energy Resource Advisory Committee; Nuclear Power and Energy Agency; Rural Electrification and Renewable Energy Corporation; Energy and Petroleum Tribunal; Energy and Petroleum Regulatory Authority; Kenya Power and Lighting Company; Kenya Electricity Transmission Company'; and Geothermal Development Company.

Geothermal Development Company (GDC)

The Geothermal Development Company (GDC) is 100% state-owned corporation registered under the Companies Act Cap 486. It was incorporated in 2008 as a Special Purpose Vehicle to accelerate the development of geothermal energy in Kenya.

GDC falls under the Ministry of Energy and is mandated to explore, drill, concession development blocks and promote alternative uses and facilitate investor entry into the geothermal sector.

MISSION: Develop Green Energy for Kenya from geothermal resources

VISION: To be a world leader in the development of geothermal resources

CORPORATE VALUES

Integrity: GDC subscribes to high ethical standards, openness and honesty

Professionalism: GDC embraces excellence, quality service, and continual improvement

BRIEF DESCRIPTION OF GDC PROJECTS

Menengai and Baringo-Silali geothermal projects are some of the main pillars for 5000MW that the country is targeting to generate from geothermal sources by 2030 to meet Kenya's rapidly increasing demand for power while providing clean energy.

The Menengai Geothermal field has an estimated potential of 1600MW. The field is at an advanced stage of development by GDC and will be developed in phases. GDC has contracted three (3) Independent Power producers (IPPs) to construct three power plants under Phase 1 of the Menengai.

The Baringo-Silali Block has an estimated potential of 3,000MW. The geothermal fields shall be developed in stages: Korosi - 100MW, Paka - 100MW and Silali - 100MW.

The Suswa Geothermal Prospect has an estimated potential of 750MW. GDC plans to develop 300MW from this geothermal field in phases.

Geothermal Association of Kenya

The Geothermal Association of Kenya (GAK) is a professional scientific and educational organization registered in Kenya in 2010 to encourage, facilitate and promote coordination of activities related to local and worldwide research, development and application of geothermal resources. Our Vision is to be the hub and the fulcrum that catalyzes geothermal sector growth in Kenya and the region. Our Mission is to be the representative voice of the geothermal sector that promotes successful investments, develops professionals, facilitates research, collaborations and innovations to enhance productivity and sustainability. GAK has a membership base of over 400 professionals and corporates from the geothermal sector in Kenya, Africa and the rest of the world. Our member organizations include, KenGen, GDC, Turboden, Sosian Energy, Kipya Africa and Dedan Kimathi University of Technology.

The Geothermal Association of Kenya engages in the following activities in-line with our Strategic Plan:

- Research: Technical Research on the development of clean environmentally friendly and reliable geothermal resources in Kenya. Market Research: Business / market surveys and research on geothermal sector in Kenya.
- Promote domestic and foreign investments through advisory and consultancies related to Geothermal Energy in Kenya.
- Promote professionalism through training and other capacity building programs: Carry out professional development programs for growth of its members through topical information transfer, sponsored study tours to geothermal sites in Kenya, sponsored participation at conferences and workshops, career fairs at educational institutions among others.
- Providing platforms for interaction, networking, business to business engagements and dialogue between members, industry stakeholders on various topics on geothermal energy.
- Support enactment and adoption of appropriate legislation, rules and regulations that promote development and utilization of geothermal resources.
- Promote development and use of local expertise / skills in all phases of geothermal development.
- Information dissemination on geothermal energy through various channels.

Ministry of Foreign Affairs-Icelandic International Development Agency (MFA - ICEIDA)

Government of Iceland
Ministry for Foreign Affairs

Iceland´s official international development assistance is carried out by the Directorate for International Development Cooperation within the Ministry for Foreign Affairs. ICEIDA is the term used for Iceland's development cooperation.The main objectives of Iceland's development cooperation is to contribute to the fight against poverty by improving living standards in the world's poorest countries. Partnerships for peace and reconstruction of conflict-affected communities are also an important component of Iceland's development cooperation. Iceland cooperates bilaterally with partner countries and with key multilateral institutions. In the field of geothermal energy, Iceland leads the Geothermal Exploration Project with joint co-financing of the Nordic Development Fund (NDF), which provide support for geothermal exploration and capacity building in Eastern Africa. Iceland also cooperates with the World Bank, UNEP, the African Union and Sustainable Energy for All, to advance geothermal development.

International Geothermal Association (IGA)

The International Geothermal Association is a non-governmental not-for-profit entity and is the leading global authority in matters concerning the research and development of geothermal energy. The IGA connects the Global Geothermal Community, serving as a platform for networking opportunities aimed at promoting and supporting global geothermal development.

The mission of the IGA is to encourage, facilitate and promote the development of geothermal resources through visible and integrated position and representation of geothermal power, heat, geo-exchange, cooling and other uses.

Corbetti Geothermal Power

Advancing Dependable, Clean Geothermal Energy in Ethiopia

Corbetti Geothermal PLC is an Ethiopian company established for geothermal development and operations. The company is focused on the development of high temperature (high enthalpy) geothermal resources for utility scale power production in the main Ethiopian rift. Corbetti plans to develop a geothermal power project of 500MW in several phases with the first 10-20MW of power to be online 18 months after commencement of drilling and the remaining capacity to be completed within approximately 5 years.

This project will set new standards for clean, dependable and sustainable power throughout the world. It will be the first Independent Power Project in Ethiopian history and is supported by Power Africa along with a multitude of Development Financial Institutions (DFIs). When completed, the Corbetti Power Project will be the largest foreign direct investment in Ethiopia. It should also be noted that it has received strong support from both national and local level political leaders in Ethiopia.

Global Environmental Facility (GEF)

The Global Environment Facility (GEF) was established on the eve of the 1992 Rio Earth Summit, to help tackle our planet's most pressing environmental problems. Since then, the GEF has provided $14.5 billion in grants and mobilized $75.4 billion in additional financing for almost 4,000 projects. The GEF has become an international partnership of 183 countries, international institutions, civil society organizations, and private sector to address global environmental issues.

Since 1991, the GEF has provided new and additional grants and concessional funding to cover the "incremental" or additional costs associated with transforming a project with national benefits into one with global environmental benefits. The projects they handle are: biodiversity, climate change, chemicals & waste, land degradation, international waters and sustainable management of forest REDD +.

Iceland Geosurvey (ISOR)

Iceland GeoSurvey was established 2003, when the GeoScience Division of Orkustofnun, the National Energy Authority of Iceland, was spun off as a separate entity. It is based on seven decades of continuous experience in the field of geothermal and hydropower research and development. During this period Iceland GeoSurvey has provided consulting, training, and scientific services to the Icelandic power industry and the Icelandic government, and to numerous foreign companies and governments all over the world. Although our focus is on geothermal exploration, development, and utilization, our experience covers many other geoscience-related fields as well, including groundwater studies, marine geology, and environmental monitoring.

Iceland GeoSurvey is committed to: being in the forefront of geoscientific research, development, and service; finding ways to enhance and augment geothermal resources; enhancing the environment and contributing to the debate on environmental issues; actively promoting geothermal development by increasing public and political awareness and understanding; training scientists throughout the world in geothermal science and development; and participating in international geothermal development projects. Iceland GeoSurvey is a self-financing, state-owned, non-profit institution. It receives no direct funding from the government and operates on a project and contract basis like a private company.

International Geothermal Association – Africa Regional Branch

The International Geothermal Association–Africa Regional Branch (IGA-ARB) as registered in 2013 under the Kenyan laws as one of the Regional Branches of the International Geothermal Association (IGA). IGA-ARB is a non-political, non-profit, non-governmental organization whose objectives are: to encourage, facilitate, and promote research and holistic development of geothermal resources in the continent. The activities of IGA-ARB include managing and sharing of information between members, organizing conferences and meetings, and training on technical areas, and awareness among stakeholders. IGA-ARB membership comprises associations and individual members with the founding associations being the Ethiopian Geothermal Association and the Geothermal Association of Kenya. Membership is open to national geothermal associations of African countries whose members are therefore automatic members of the IGA-ARB. Individual members are also allowed to join IGA-ARB. Currently the membership is drawn from Burundi, Comoros, Democratic Republic of Congo, Djibouti, Eritrea, Ethiopia, Kenya, Malawi, Mozambique, Nigeria, Rwanda, Sudan, Tanzania, Uganda, Zambia, and international members. The medium and long term target of IGA-ARB is to increase awareness of the potential of geothermal resources to positively transform the economy of the continent through clean and affordable energy solution and integrated utilization of the abundant geothermal resources to help meet most of the continent's SDGs.

Mannvit

Mannvit is an international consulting firm offering comprehensive engineering, geoscience, drilling, environmental, operational and EPCM services. We offer geothermal development services to projects in Europe, Asia and the Americas and can manage the entire geothermal development process or defined parts as the client wishes. Mannvit's experience is based on more than 50 years of experience in geothermal energy projects in Iceland.

From Resource to Power Production:

The services range from exploration of high- and low-temperature geothermal fields and designing flash steam power plants that produce electricity and hot water for district heating to the design of geothermal power plants that produce electricity utilizing low-temperature geothermal fluid via binary cycle (ORC).

Exploration and Drilling Consulting:

Our team comprises highly trained professionals across all relevant disciplines, e.g. geology, geochemistry and reservoir modeling, capable of carrying out geothermal exploration under diverse conditions. Mannvit offers 40 years of experience in geothermal drilling engineering and related services as well as acting as the client's representative during drilling.

Services:

•Feasibility studies and Due Diligence, Geothermal exploration, Environmental consulting and EIA, Drilling engineering and supervision, Geothermal plant design, HV Transmission and distribution, Operations Software, Start-up and commissioning, Training, operations and maintenance consulting.

www.mannvit.com/services/geothermal-development

Seequent

Seequent is a world leader in geoscience software that enables better decision making in the mining and exploration, civil, environmental, and energy sectors.

As a rapidly growing, privately owned business, we have more than 450 employees in 16 office locations around the world and we serve customers in over 100 countries.

Our story began because people struggled with only having part of the picture to make good decisions.

From the very beginning we have understood that context is the key to connecting the right information to give us the right insights to make the right decisions. For more than 10 years Seequent has been leading in the visualisation of complex geoscientific data to make meaningful differences to people, companies and the environment.

Our customers are tackling some of the world's most challenging problems using our software and they use our solutions on global, large-scale projects, including road and rail tunnel construction, groundwater detection and management, geothermal exploration, subsea infrastructure mapping, resource evaluation, and subterranean storage of spent nuclear fuel.

UNESCO GRO-GTP

United Nations Educational, Scientific and Cultural Organization · Geothermal Training Programme Under the auspices of UNESCO

The Geothermal Training Programme (GTP) is a postgraduate training programme, aiming at assisting developing countries in capacity building within geothermal exploration and development.

The programme's core activity is six-month training for practicing professionals from developing and transitional countries with significant geothermal potential. The programme has operated in Iceland since 1979 and is hosted by the National Energy Authority (Orkustofnun). Up to 31 December 2019 GTP was a cooperative undertaking between the United Nations University (UNU) and the Government of Iceland, which has financed the operations to a large extent through its official development assistance.

Since 1979, more than 700 scientists and engineers from energy agencies and research organizations as well as universities in 69 countries have come to Iceland to undertake highly specialized studies in geological exploration, borehole geology, geophysical exploration, reservoir engineering, borehole geophysics, chemistry of thermal fluids, environmental science, geothermal utilization, drilling technology, as well as project management and finances.

GTP also offers successful candidates the possibility of extending their studies to MSc, or PhD degrees, in geothermal sciences or engineering in cooperation with the University of Iceland and Reykjavik University. Finally, GTP has organized about 70 short courses in Africa and Central-America, on various aspects of geothermal exploration and development. As of 1 January 2020, GTP and UNU decided to part ways, and GTP joined hands with the other three training Programmes in Iceland (Fisheries Training Programme, Land Restoration Training Programme, and Gender Equality Studies Training Programme) to form GRÓ: the Centre for Capacity Development – Sustainable Use of Natural Resources and Societal Change in Iceland.

Phoenix Geophysics Limited

PHOENIX GEOPHYSICS LIMITED is a geophysical manufacturing and contracting company founded in 1975. They deliver cost-effective, reliable instruments and services that produce superior results. They are the world leader in magnetotelluric (MT) and Induced Polarization (IP) instrumentation. Phoenix systems are used in more than 80 countries for exploration and research. Their clients include mining and oil companies, geophysical contractors, universities, research agencies and government earth science agencies.

TM Geothermal Operations PLC

TULU MOYE GEOTHERMAL

Tulu Moye Geothermal Operations PLC ("TMGO") was established in December 2017 with the aim to generate geothermal power (in the Main Rift Valley, Oromia Regional State, Ethiopia) and sell the electrical output to the Ethiopian Electric Power (EEP). The company initially signed a Power Purchase Agreement and Implementation Agreement with EEP and the Government of Ethiopia in December 2017 which was then amended and restated in March. With its prominent and supportive sponsors, Meridiam (global investor and asset manager based in Paris) and Reykjavik Geothermal (geothermal development company that specifically identifies and targets high quality geothermal resources in combination with underserved power markets), TMGO intends to develop a total generation capacity of 150 MW in two phases. The first phase will have a generation capacity of 50 MW and is expected to be commissioned in the second quarter of 2023 (250 Million US Dollars investment); two years later, the second phase, 100 MW, representing an additional 550 Million US dollars investment, is expected to be finalized.

Near a decade of scientific study of the area shows prominent signs of very good geothermal resource waiting to be tapped. So far, TMGO has improved access to site through a series of civil work upgrades which allowed the geothermal drilling contractor (KenGen: decades of experience in the field and from Kenya). KenGen has currently drilled up to 1340 meters which has already shown signs of good resource in the area.

Our Vision: "To become the Leading Geothermal Development Company in Ethiopia."

Our Mission: "Together, we deliver sustainable electricity from natural geothermal resources to support the economic development of Ethiopia."

Geothermal Resource Group

Geothermal Resource Group
TAPPING THE EARTH'S ENERGY

Geothermal Resource Group (GRG) provides drilling engineering, onsite drilling management and supervision, off- or on-site drilling engineering support, resource analysis and well site geology.

GRG's international engineering staff has experience designing and drilling wells in nearly every major geothermal field in the world. Every type of well and productive phase including high enthalpy flash plant wells, moderate enthalpy binary production, and low-enthalpy direct-use, have been designed, planned, and managed by our engineering staff. As important, GRG staff has hands-on skill in addition to technical knowledge – every drilling engineer on staff has also worked as a drilling supervisor and field coordinator. The result is a drilling engineering staff that has seen the problems, and that knows how to resolve the problems in a method that is appropriate to the realities of remote job sites.

In the past five years, GRG has provided numerous due diligence reviews, resource assessments, and reservoir models for prospects and existing fields. Our resource analysis and quantification are aimed at gathering information on well characteristics and production potential as well as reservoir properties and conditions. We provide reservoir modeling to evaluate resource capacity, estimate productive lifetime, and determine the optimal development strategy, using both a geologic conceptual model and a natural state numerical model.

GRG's drilling supervision team is recognized as the most experienced, dedicated, and responsive to customer needs. GRG drilling supervisors are among the most experienced in the world. GRG has also provided senior expatriate and local geothermal well site geologists as well as local well site geologists on several projects.

Panelists

PLENARY SESSION : Global geothermal outlook and sustainable development 2020.



Moderator: **Kato Kabaka**

Kato Kabaka is the General Manager and CEO of Tanzania Geothermal Development Company (TGDC). He has over 20 years' experience in the energy sector. He joined TGDC in 2014 in the position of Director for Business Development was promoted in 2016 to the position of General Manager. Prior to joining TGDC, he was a Manager at TANESCO. Responsible for renewable energy development. He was a member of the National Geothermal Group and National Task force which was advising the Government on geothermal development from 2005 to 2012.

Kato Kabaka has educational background in geoscience, engineering and business administration. He specializes in geothermal energy project planning, management, financing, and direct use applications.



Keynote Speaker: **Prof. Roland N. Horne**, Stanford University

Prof. Roland N. Horne is the Thomas Davis Barrow Professor of Earth Sciences and Professor of Energy Resources Engineering at Stanford University, and Director of the Stanford Geothermal Program. He was formerly the Chairman of the Department of Petroleum Engineering at Stanford from 1995 to 2006.

He is best known for his work in well test interpretation, production optimization, and tracer analysis of fractured geothermal reservoirs. So far in his academic career he has supervised the graduate research of 53 PhD and 120 MS students, including about 60 in geothermal topics.

He served on the International Geothermal Association (IGA) Board 1998-2001, 2001-2004, and 2007-2010, and was the 2010-2013 President of IGA. He was Technical Program Chairman of the World Geothermal Congress 2005 in Turkey, 2010 in Bali, Melbourne in 2015, and will be again in Iceland in 2020-2021. Roland is one of the founders of the IGA online database of geothermal conference papers.

Roland is a member of the US National Academy of Engineering and an Honorary Member of the Society of Petroleum Engineers. He is also a Fellow of the School of Engineering, University of Tokyo and an Honorary Professor of China University of Petroleum – East China.



Panelist: **Surya Darma**, Indonesia

Surya Darma is the chairman of the Indonesia Renewable Energy Society (METI), chairman of the Renewable Energy Certification Institute (LSP-ET). He is also the founder and Chairman of PT. Hasera Sagoesa. He is also a lecturer of the Geothermal Exploration Master Program, University of Indonesia (UI) and assessor for the Renewable Energy and Geothermal Profession Certification (BNSP), Principal Adviser of Green Energy Geothermal (GEG) UK. He is and was a board of director of the International Geothermal Association (IGA) from the periodic year of 2007-2010, 2010 -2013, 2016 – 2020 and 2020 – 2023, Vice Chairman of the HRD Team for Geothermal in Indonesia established by Minister of Energy and Mineral resources of Indonesia among others.



Panelist: **Hiroto Kamiishi**, Japan

Hiroto Kamiishi, is the group director for Energy and Mining, Japan International Cooperation Agency (JICA). His responsibility includes the management of wide range of technical cooperation and grant aid projects for energy and mining development. His management portfolio includes the African geothermal development (Kenya, Djibouti, and Ethiopia), master plan formulation programs (Myanmar, Sri Lanka, and Angola), energy saving programs (Bangladesh and Egypt), and capacity development programs for O&M of thermal power plants (Mozambique and Tanzania).

He has been working for JICA since 1991. His career in JICA includes JICA overseas office in Indonesia, strategic planning, program management of ASEAN countries, and aid coordination. The most recent assignment was the senior representative of JICA USA office and responsible for promoting collaboration with other donors, such as the World Bank and USAID.

He received a bachelor degree (Liberal Arts) from International Christian University, Japan and a master degree (Public Administration) from Columbia University, USA



Panelist: **Greg Usher**, New Zealand

Greg Ussher has a 40 year involvement with geothermal exploration and development and is an enthusiastic sponsor for the sensible development of geothermal to support sustainable human development. Greg's career as a consultant has enabled him to work on projects in almost all geothermal regions across the Pacific, Asia, Africa, Central America, South America, the USA, and Europe. His original technical expertise was in geophysics where he was instrumental in developing interpretation approaches for the deep resistivity imaging of geothermal systems that became possible with the magneto-telluric (MT) method in the 1990's. Greg has been involved in the concept modelling of all types of geothermal systems, and assisting clients with preparation of exploration and development strategies for geothermal projects.

Greg has worked on several fields in Kenya and Ethiopia, and is presently involved with supporting the NZ Government geothermal program for East Africa and has review roles for private sector developments in Ethiopia.



Panelist: **Adele Manzella**, Italy

Adele Manzella is Senior Scientist and works as a geophysicist in geothermal exploration to conduct field and theoretical investigations of geothermal systems in Italy and abroad. She worked in seismology, numerical modeling for seismic and electromagnetism and conducted magnetotelluric surveys for crustal investigation, groundwater exploration and, mainly, for geothermal exploration. On 2006 she won the G.W. Hohmann Award, for "outstanding application of electrical and electromagnetic methods to the study of geothermal resources".

She coordinated for CNR the Italian geothermal evaluation projects VIGOR and Geothermal Atlas of Southern Italy (2010-2014), and since 2005 she led the participation of CNR and was WP leader in eight of the ten EU projects dedicated to geothermal energy that saw the participation of CNR and dedicated to exploration methods development, coordination of research efforts and geothermal networking, and promotion and support for the development of geothermal energy.

In the recent years she expanded her interest also to the social aspects of geothermal energy, and edited for Springer Ed. the first book entirely dedicated to this topic. On 2018 she won the Patricius Medal for "providing geothermal knowledge for accelerating the deployment of geothermal energy".

She is President of the Italian Geothermal Association and participates to the Steering Committee of the European Technology & Innovation Platform of Deep Geothermal energy (ETIP DG) and the Board of the International Geothermal Association (IGA).

Author and co-author of publications on national and international scientific journals and proceedings of conferences/workshop, convener at national and international conferences, lecturer in international geothermal courses, conferences, schools and workshops, and reviewer for many international journals in geophysics and geothermal exploration research.



Panelist: **Peter Omenda**, Kenya

Dr. Peter Omenda is a geothermal development expert who has pioneered several geothermal exploration and development projects in Eastern Africa. Dr. Omenda is currently an energy resources development and management consultant with Scientific and Engineering Power Consultants Ltd (SEPCO) based in Nairobi, Kenya,

Director of the International Geothermal Association (IGA), and President of the IGA-Africa Regional Branch. Dr. Omenda previously worked at Geothermal Development Company (GDC) and Kenya Electricity Generating Company Ltd (KenGen). He graduated with B.Sc. and M.Sc. degrees in geology from the University of Nairobi, post graduate Diploma in Geothermal Energy Technology from University of Auckland, New Zealand and PhD from University of Texas at El Paso, USA. He also has a Master in Business Administration degree of Jomo Kenyatta University of Agriculture and Technology, Kenya. He has published widely in international journals and presented in many international workshops and conferences.

PLENARY SESSION 2: Innovative financing scheme for geothermal projects in Africa.



Moderator: **Mike Allen**

Dr. Mike Allen has been involved in the renewable / clean energy industry for over 40 years with extensive international experience, particularly in the geothermal industry. He has been an independent consultant since 2002.

His first overseas work was with GENZL from 1974 on the Kamojang and Darajat projects in Indonesia and he was later project director for PLN's power facility in Gunung Salak. He spent over 25 years with GENZL involved in the geothermal industry, undertaking project developments in Indonesia, Japan, Africa, Latin America and the Mediterranean. He lived in Indonesia and Kenya during the early stages of their geothermal developments.

He has provided independent geothermal advisory support in East Africa, the Comoros Islands and a number of islands within the Caribbean. He has been engaged by the IFC (World Bank) supporting the evaluation and due diligence on a range of geothermal opportunities globally.

Mike was appointed Executive Director of Geothermal New Zealand Inc. (GEONZ) (www.geothermalnewzealand.com) an industry association that he helped establish in 2012 to promote export opportunities for New Zealand companies and institutions engaged in the industry.

From 2009 to late 2016, Mike was a non-executive member of the board of Mercury NZ Ltd (formerly Mighty River Power) in New Zealand, a power utility with significant hydro and geothermal generation. The company has 51% state ownership after it was partially listed in 2013.



Keynote Speaker: **Eyob Easwaran**, Trade and Power Development Bank

Mr. Easwaran is a seasoned Project Finance and Private Equity professional with over 30 years of experience in the power and finance industries in various capacities including equity and debt investing, project financing, and asset management for private equity funds and other financial institutions. Currently, Mr. Easwaran serves as Senior Advisor on Power and Infrastructure for the Trade and Development Bank for Eastern and Southern Africa. Most recently, he served as a Director of Development for Black Rhino based in Addis Ababa. Prior to that, he was a Managing Director at Power Capital Partners LLC, a startup private equity firm. Previously, Mr. Easwaran was a Partner at Conduit Capital Partners, a private equity firm investing in Latin America and the Caribbean.

Mr. Easwaran received a B.E. in Mechanical Engineering from CUJAE in Havana, a Post-Graduate Diploma from Auckland University and an M.S. in Business from Johns Hopkins University.



Panelist: **Julian Richardson**

Julian Richardson is full time CEO of Parhelion Underwriting, with 19 years' experience in climate finance and 25 years' experience in the re/insurance sector. He is a recognized innovator in climate risk and sustainable finance. He is a Specialist advisor on insurance and resilience to the UK government Department for International Trade. He spent 12 years as a broker at Marsh responsible for Middle East energy business before moving to GE where he was the senior underwriting risk manager responsible for the Global Markets portfolio.

Parhelion is a mission orientated business working at the nexus of policy makers, private sector investors, re/insurers, development finance institutions and NGOs. Parhelion uses private sector insurance underwriting capital to support the deployment of other forms of capital in to sustainable development investment opportunities.

Julian has an MBA from Cranfield School of Management and is a Research Associate of the Geochemical and Environmental Research Group at Texas A&M University. He is also an INSEAD Alumni and has spoken at numerous international conferences on climate finance and risk.



Panelist: **Elin Hallgrimsdottir**, The World Bank

Elín joined the Energy Sector Management Assistance Program (ESMAP) at the World Bank in 2019 as a Senior Energy Specialist. She holds a M.Sc degree in Engineering from Denmark's Technical University and has over twenty years' experience in geothermal energy utilization. Her key qualifications include design and commissioning of geothermal power and district heating plants, project management and project planning.



Panelist: **Philippe Dumas**

Philippe first worked in a European engineering company as representative in Brussels for EU affairs (2000-2007). Firstly involved in geothermal energy with EGEC, starting as project manager for European projects.

Since September 2008, He's the EGEC Secretary General in Brussels managing the association with a staff of 8 people: The European Geothermal Energy Council (EGEC) is an international association, founded in May 1998 and based in Brussels, Belgium.

EGEC unites more than 120 companies and organizations, representing more than 500 entities from 25 European countries, working in the geothermal field in Europe.

The main goal of EGEC is to foster market development for geothermal energy and to work for improvement of business conditions in Europe.

Author and co-author of several publications (Market reports, policy-financial & socio-economical papers, Research& Innovation agendas and roadmaps); frequent contributor to conferences, workshops and seminars; active in a number (more than 20) of EU-funded research and market uptake projects, from 2000 until today, on climate and energy, with a focus on geothermal.



Panelist: **Alemayehu Wubeshet**, African Development Bank

Alemayehu Wubeshet has over 29 years' professional experience in the power and energy sector, and is an expert in project development, planning, design, management, operation, appraisal, financing and subsequent monitoring and evaluation. He first joined the African Development Bank Group (AfDB) in 2012 and served as a Chief Regional Power Systems Officer, managing power projects in the energy sector. During these periods, he has successfully overseen all phases for nine national power generation, transmission and electricity access projects and three regional power interconnections projects in seven African countries, worth a total of $2.6 billion. In doing so, Mr. Wubeshet has leveraged his extensive repository of managerial, technical and interpersonal skills to effectively steward complex power generation and interconnection projects, working collaboratively with AfDB's internal ecosystem as well as a variety of stakeholders, from development partners to co-financiers.

Prior to joining the AfDB, Mr. Wubeshet served in leadership roles at the Ethiopian Electric Power Corporation, distinguishing himself as a leader across all dimensions of complex power infrastructure projects. Mr. Wubeshet has also excelled at forming excellent relationships with leading international lenders such as the World Bank, African Development Bank and other development financing institutions and agencies, negotiating a career total of over $1.2 billion in loan and grant agreements for Ethiopian energy projects.



Panelist: **Michael Andres**, GRMF – German Development Bank (KfW.)

Michael has been involved in the international finance sector for over 20 years. He is currently a member of the Oversight Committee of the Geothermal Risk Mitigation Facility (GRMF) of the African Union being jointly funded by German, Britain and the European Union.

After several years of originating and structuring commercial lending operations at KfW IPEX Bank, Frankfurt he joined KfW Development Bank in 2008. There, he is responsible for acquiring, structuring and implementing of projects within the German financial cooperation. He various stations comprise Director of Energy Sector Coordination at the KfW Regional Office in Tbilisi, Georgia, Principal Project Manager of infrastructure and financial sector operations in East Asia and Pacific, and non-executive Director of the Board of a microfinance bank in Shenzhen, China.

Since 2017 Michael is working within the Eastern Africa Department as Principal Portfolio Manager of energy projects in Kenya (e.g. Olkaria) and with AU.

Michael holds master degrees in Economics (Berlin) as well as in Law and Economics (Stockholm). In 2005 he became a Certified International Investment Analyst (CIIA).

PLENARY SESSION 3: Unlocking the contribution of Private sector players and developers in the region.



Moderator: **Tim Jackson**

Tim is a Chartered Engineer and Fellow of the Institution of Mechanical Engineers where he is a past chair of the Power Industries Division Board. Tim has over 28 years of experience developing conventional, industrial and renewable power stations and since 2009 he has focused on geothermal projects in Europe and Africa. He provided the technical content for the IMechE report on geothermal energy and was lead author for one of the first reports on the geothermal potential of the UK for the Renewable Energy Association. Tim provided support for a number of private sector geothermal development in Kenya including project managing the initial technical and environmental development of Longonot as well as the surface exploration. Tim currently identifies and manages power project developments for InfraCo Africa where he is responsible for the investment in Corbetti Geothermal power project.



Keynote Speaker: **Magnús Ásbjörnsson**, Reykjavik Geothermal

Magnús Ásbjörnsson is a co-founder and Chief Investment Officer of Reykjavik Geothermal (RG), one of the world's leading geothermal development companies. He has been responsible for RG's development activities in Africa since the company's founding, including the development of the twin Corbetti and Tulu Moye geothermal projects in Ethiopia, which are expected to be among Africa's largest IPP investments.

He is also responsible for RG's financing and investment activities around the world. In addition to serving on the board of RG, Magnus is a board member of Corbetti Geothermal and a founding investor in other ventures including Enerwhere, a rapidly growing distributed solar utility focused on the Middle East and Africa.

Before founding RG, Magnus was a management consultant, advising corporate and government leaders on strategy, investments, and economics across Europe, Africa and the Middle East. He has eighteen years of advisory, investment and general management experience spanning five continents and speaks five languages. He holds an MBA from London Business School and Columbia Business School, and a Bachelor's degree (First in Class) in International Relations and Economics from Schiller International University.



Panelist: **Eddy Njoroge**, Corbetti Geothermal

Eddy Njoroge is a seasoned business man with rounded experience in the corporate and financial sector. He is the former CEO of Kenya Electricity Generating Company (KenGen), where he spearheaded the transformation of the company from a parastatal to a publicly listed company with a greater commercial and sustainability orientation.

From 2008 to 2012, he was the President of the Union of Producers and Distributors of Electric Power in Africa, giving him a unique overview and perspective of Africa's Power sector. He was awarded a Life-time Award by the Africa Energy Forum in recognition of his contribution to the transformation of the energy sector in Africa.

He currently serves as Chairman of Telkom Kenya and is the Immediate Past Chairman of the Nairobi Securities Exchange. He also sits on the board of Britam General

Insurance Ltd, Britam Life Insurance, Kenya Bureau of Standards, Proctor & Allan among other companies. He is a Member of the Investment Committee of the Africa Renewable Energy Fund (AREF) - a renewable energy fund focusing on renewables in sub-Saharan Africa. He also sits on the board of Globeleq- a Pan- African power company, and Chairs Corbetti Geothermal Company in Ethiopia and Tanalec Zambia.

Mr. Njoroge was in September 2018 elected as the President of the 164 country membership organization-International Organization for Standardization (ISO) with effect from January 2020. He will be the first person from a developing country to hold this position in ISO's seventy year history.

He is the recipient of several awards honoring his contribution to industry development, including the Ordre National du Mérite from the President of France, an EBS and CBS from the Kenyan President

He has a BSc. (Hons) degree in Chemistry/Biochemistry from Makerere University and an MBA (Leadership and Sustainability) from University of Cumbria.



Panelist: **Darell Boyd**, Tulu Moye

Darrell has thirty-five years of experience working in project, culture change and company management. Mr. Boyd's power sector experience includes successfully delivering 50 projects across east and southern Africa and as COO and Head-In-Country for Symbion Power, where he was responsible for the award and delivery of all projects in Iraq and Afghanistan.

He secured and managed over $330 million of projects commissioned by the U.S. and Iraqi governments in the electrical sector including substations, transmission lines and generation reconstruction.

Prior to that, he has also been the country manager in Ethiopia for NORICIL, a subsidiary of the Norwegian civil engineering firm Veidekke on the construction of Aluto Langano Geothermal Pilot Plan, and he later served as NORICIL's operations manager for all countries across East and Southern Africa.

Darrell first joined the Meridiam family in 2009 for project development delivery to financial close on a range of their health investments, becoming COO for those investments before being seconded to TMGO in Ethiopia.



Panelist: **Mugwe Manga**, Olsuswa Energy

Mugwe Manga is the managing director and co-founder of Olsuswa Energy Limited and has served as Managing Director since 2016. He manages the company's business development strategy and has been integrally involved in the implementation of its Barrier Volcanic Complex (BVC) geothermal exploration program in Turkana County, Kenya. After having completed his IB diploma from the prestigious Sevenoaks School (UK), he garnered a BA (Hons) in Economics from the University of Nottingham and a Masters in International Business (MIB) from Grenoble École de Management. He has gained experience in the banking industry working at Goldman Sachs International, London under the Private Wealth Management division specializing in institutional portfolios. He has gained over 10 years of experience working in Kenya, where he sits on various boards including ICEA Lion Life Assurance and ICEA Lion General Insurance both part of the ICEA Lion Group. Mugwe is also an alumni of the Swedish Institute Management Program (SIMP).



Panelist: **Peter Neal Vivian,** Kalahari GeoEnergy

Founder and CEO of Kalahari GeoEnergy Ltd. Came to geothermal in 2010 having spent the previous two decades in the mining and mineral exploration industry. Founded KGE in Zambia to assess, explore and if appropriate develop geothermal resources in the Karoo/Permian basins of southern Africa. Their Bweengwa Project is now at 'contingent reserve' and drilling is currently underway to raise confidence to reserve, prior to a feasibility study on an initial ~10 MWe.

As a privately funded company PVN is an exponent of least cost options including slim wells for exploration. He is also passionate about integrating direct applications into development strategy.



Credit: Rod Waddington/Flickr

PLENARY SESSION 4: "Role of geothermal in renewable energy mix".



Moderator: **Markos Melaku**

Markos is a professional engineer with close to 30 years of experience specialising in the energy and mining industry and has worked for private and government sectors in east Africa, Asia, Oceania and the South Pacific. This has given him a wide understanding of the technical and commercial requirements of energy and mining projects encompassing all phases of development from initial resource investigation to project development.

Markos currently manages the New Zealand-Africa Geothermal Facility, a regional project encompassing 11 east African countries, and is responsible for providing technical support to pipeline renewable energy projects through this Facility, funded by the government of New Zealand through a partnership arrangement with the Africa Union Commission.

In the past, Markos has worked in numerous senior positions both independently and remotely but also as a key member within diverse teams of project stakeholders. He has delivered seminars and presented papers at numerous international meetings. In all his professional and personal engagements, he actively engages in and promotes best practice in health and safety, community development and care and protection of the environment.



Keynote Speaker: **Atef Marzouk**, African Union Commission (AUC)

Mr. Marzouk is a holder a Master degree in New and Renewable Energy Faculty of Engineering, Cairo University.

Over 20 years, Mr. Marzouk has served in the electrical energy production from renewable energy especially from wind turbine, energy strategies and policies, international cooperation, he has held various posts among which: Manager of the Zafaran, wind farm the biggest wind farm in the Middle East and North Africa, in the New and Renewable Energy Authority (NREA), Egyptian Ministry of Electricity and Renewable Energy, Senior Engineer at the Haurgahada demonstration wind farm.

In August 2007 Mr. Marzouk, appointed as Senior Policy Office in charge of Renewable Energy at the African Union Commission, Department of Infrastructure and Energy. In 1st November 2015 reappointed as an Acting Head of Energy Division from 1st July 2016 the Commission Seconded me as Interim Executive Director at the African Energy Commission (AFREC) in Algiers, Algeria and 1st December 2018 repointed as Head of Energy Davison, African Union Commission, Department of Infrastructure and Energy.

Mr. Marzouk, portfolio as Head of Energy Division covers the following: Harmonization of energy policies and strategies in Africa, harnesses of energy resource for increase rate of energy access in the continent, monitoring and facilitation of implementation of energy projects, mobilization of resources for energy development, coordinator partnership.



Panelist: **Zelalem Gebre Hiwot**, EAPP

Zelalem is currently working for EAPP at the post of Technical Director. Mr. Zelalem earned his BSC in Electrical engineering from Addis Ababa University and his MBA from the University of Cumbria of UK in energy and sustainability. Following his graduation from Addis Ababa University he joined the Ethiopian Electric power Corporation (EEPCO) where he served at the junior and senior engineers' position in planning and operations departments until the year 2001.

Between 2002 and 2005 he has served as the Coordinator of the National Power System Expansion Master Plan study. From 2005 to 2009 he has served at the post of Manager of the then Power System Planning Division at the Ethiopia Electric Power Corporation (EEPCO). During the same time he represented EEPCO as member of the Power Technical Committee for the Eastern Nile Power Trade Program Study and the Regional Power Trade Project under the NBI. Over the years he attended advanced trainings in Canada, UK and Sweden on energy planning tools, management of hydro power development, regional power System planning and operation, economic and financial analysis of generation and transmission projects.

He joined the EAPP on September 2009 where he is responsible for coordination of various technical studies and implementation of programs aimed at facilitation of: - (i) optimal development of the Eastern Africa regional interconnected power system, (ii) reliable operation of the regional interconnected power system and (iii) facilitation of enhanced cross boarder electricity trade

Panelist: **Stephen Dihwa**, SAPP



Panelist: **Zerubabel Getachew Tefera**, UoN

Zerubabel Getachew is currently a PhD candidate at the University of Nairobi. His dissertation topic is titled "Energy Cooperation for Sustainable Development: A Comparative Analysis of Eastern and Southern Africa Power Pools."

Zerubabel holds his Master of Arts in International Relations from Addis Ababa University. He wrote his thesis on "The Energy factor in the International Relations of North Eastern Africa." He also holds his Bachelor of Arts in English Literature with Political Science and International Relations at Addis Ababa University. He also holds a Postgraduate Diploma in Diplomacy from Ethiopian Civil Service University and a Graduate Certificate in Project Planning and Management accredited by University of Cambridge International Examinations.



Panelist: **Malama Chileshe**, COMESA

Malama Chileshe is currently serving as Energy Economist for the Common Market for Eastern and Southern Africa (COMESA) where he is responsible for coordinating implementation of regional initiatives in the energy sector including policy and regulatory harmonization and physical infrastructure development. He has worked in the Energy Sector for 17 years. His work experience spans 10 years in the Ministry of Energy and Water Development in Zambia, mainly focusing on energy policy implementation and promotion of renewable energy. He then spent another 4 years at the Swedish International Development Agency (Sida) in Lusaka, Zambia as a Programme officer responsible for energy and environment where he was involved in supporting financing of various in Zambia. The engagement at Sida encompassed financing of various initiatives targeting various facets of the energy and environment sector including electricity access, policy, regulation, capacity building, biogas, innovative financing mechanisms and sustainable agriculture. He holds Bachelor of Science degree in Natural Resources from the University of Zambia and a Master of Science in Sustainable Energy Systems and Management from the University of Flensburg in Germany.



PLENARY SESSION 5: Direct use application of low to medium geothermal systems and its contribution to SDGs.



Moderator: **Martha Nyambura Mburu**, Kenya

Martha Nyambura Mburu is the Manager - Direct Use at Geothermal Development Company (GDC). She joined GDC in 2009 and between 2010 and 2017 was the Area Manager, South Rift as well as the Manager Direct Use application. Her key focus is commercializing geothermal direct use applications. Before joining GDC, she worked as a Reservoir Engineer specializing in various aspects of reservoir engineering.

With over 20 years experience in geothermal industry, Martha is widely published, having authored and co-authored many peer reviewed papers, many of which have won awards. In 2002, her paper to Geothermal Resources council (GRC) won a best paper award while Her MSc research, based on utilization of low heat energy from geothermal brine, a Kenyan case study, was considered one of the best and was awarded a gold medal from The Royal academy of engineering.

Martha has gained wide exposure in geothermal reservoir engineering and geothermal energy utilization from geothermal conferences, seminars and interactions with geothermal experts from different parts of the world. In 2007, she had an opportunity to work and interact with the reservoir engineers and other geothermal experts at PNOC EDC for one week prior to their annual geothermal conference.

She studied Mechanical engineering at the University of Nairobi. This was followed by a diploma in Geothermal Energy Technology at the Geothermal Institute, University of Auckland, and Reservoir engineering at the United Nations University Geothermal Training Programme (UNU-GTP) in Iceland. In 2008, she did a Master's degree in Renewable Energy: Technology and Sustainability at the University of Reading (UK), specializing in geothermal direct use applications, and a course on geothermal reservoir modeling in 2009 at the West Japan Engineering company (WestJEc), Japan. She is a member of Institute of Engineers of Kenya, Engineers registration Board and Geothermal Association of Kenya.



Keynote Speaker: **Jon Orn Johnsson**, Iceland

Jón Örn is an experienced project manager and has over the last decade been focusing on managing greenfield geothermal development projects and direct use in East Africa and Asia. Jón Örn has successfully managed various projects related to the first steps of geothermal project development, such as surface exploration, resource modelling, licensing, legal and contracting. Jón Örn is also responsible for the successful application, negotiation and project management of grant funded projects, funded by EU, AUC and NDF.

Jon Örn is the current Head of Project Development and Ethiopian Country Manager at Reykjavik Geothermal.



Panelist: **Andrea 'Andy' Blair**, International Geothermal Association

Andy is the President of the International Geothermal Association and co-founder of Upflow (NZ), a geothermal science, research and innovation company that builds expert teams to provide intelligent solutions to global industry. The nexus between science, business and community is where her expertise sits. She has a deep understanding of the drivers relating to the business of science, and a proven ability to turn scientific ideas into economic gains.

In her previous role as Business Development Manager at GNS Science (NZ) she was responsible for leading and coordinating sub-surface geothermal geoscience contracts worldwide for over 10 years.

Awarded the role of Geothermal Business Development Lead for New Zealand (2017-2020), Andy was tasked with driving commercial investment in geothermal industrial direct use projects. The desired outcome was the development of large projects with significant positive impacts on local economies, communities, and the environment.

Andy has experience in leading strategic planning and tactical thinking across several industries including governance roles that required strategic investment decision making. This includes chairing the commercial arm of a Maori organisation with a significant geothermal asset base (~$500m).

A co-founder and Global Chair of Women in Geothermal (WING) (2013-2020), Andy grew the organisation from 83 members to over 1800 members in 48 countries worldwide, making it the single largest geothermal association in the world. A not-for-profit organisation, WING has grown into a global movement of people, both men and woman, supporting the empowerment and advancement of women within the industry.

Andy is a Director for the Geothermal Resources Association (US), Advisory Board Member for The Rogue Bore geobrewery (NZ) and Co-Chair of the NZ Regional Skills Leadership group.



Panelist: **Jacques Varet**

Jacques Varet is an expert in geothermal resource assessment, exploration, feasibility studies and development. Senior engineer with 50 years' experience in geothermal resources and technologies world-wide, and more particularly in the Euro-Mediterranean and Arabo-African plate's environment. Originally geologist, volcanologist specialized in petrology and mineralogy and relations between tectonics and magma genesis (Paris South & Addis Ababa Universities). IAVCEI Wager Prize with F. Barberi (1975). Head Geothermal Dt., BRGM: resource assessments in Europe, ECWA, OLADE, East Africa, SE Asia, & developments in France (now serving more than 300.000 households). Created Compagnie Française de Géothermie (CFG) in 1984, and in 2011 Géo2D (Ressources Géologiques pour le Développement Durable) operating mainly in EARS: Kenya, Ethiopia, Djibouti, Rwanda, Eritrea, Tanzania, Yemen and RDC. Associate Professor DEKUT (Kenya), directing research of young Kenyan geothermal engineers from KenGen and GDC. Co-PI for Geopower Africa USAID research project. Member of the Technical Advisory Team (TAT) for the Geothermal Centre or Excellence (under UNEP). Renown for geosciences applied to exploration, & geothermal energy technologies for local development, particular cascade uses, medium and low enthalpy, including binary systems. Promoting project appropriation by local communities for sustainable development and climate resilience. Most recent (last 10 years) references: France (ALCEN group, Electerre), Ethiopia (Afar with AGAP, MER with Boortmalt, Belgium and Meridiam), Djibouti Republic (advising Minister of Energy, Asal-Fiale for AFD, Resources assessment for UNDP; strategic planning for ODDEG's under BGR support), Kenya (with DeKUT, KenGen, GDC, SEPCO); Rwanda (EDCL, under EU contract).



Panelist: **Meseret Zemedkun**, UNEP, Africa

Dr. Meseret Teklemariam Zemedkun (PhD, Earth Science, Geothermics), is an Ethiopian woman internationally recognized and acclaimed professional with over 20 years' experience in Energy field, management, project management, international donor relations and more.

Since 2011, she has worked at the United Nation Environment Programme's Africa office in Kenya, as Programme Manager for Africa Rift Geothermal Development Programme (ARGeo) and also as Regional Energy Programme Manager in Africa. Is a recipient of many international awards and has authored more than 20 professional papers some of which have won international awards. She has also served as international consultant on geothermal energy in various assignments (including African Union Commission and UNIDO).

Dr. Zemedkun has played a seminal and stellar role in conceptualization, visibility and institutionalizing the ARGeo activities; and, in coordination with donors and institutions, she has helped to mobilize funds for projects, programmes and investments. She has led the development of energy initiatives, policies and programmes as Regional Energy Programme Coordinator. She has played a leading role in the initiative and development of programmes for support to Women Entrepreneurs in Energy sector in Africa. She is currently implementing this programme with various partners through the Africa Women Energy Entrepreneurs Framework (AWEEF).

She has been a regular faculty of UN University- Geothermal Training Programme in Iceland for many years. She has also been training geothermal staff in Africa as invited faculty. She focusses on Capacity Development in Africa with zeal and has been instrumental in conceptualizing and making possible the African Geothermal Center for Excellence.

Panelist: Prof. Pan, China

Opening Ceremony



H.E. Ólafur Ragnar Grímsson
Chairman of the Arctic Circle, President of the Republic of Iceland 1996-2016.



H.E. Dr. Amani Abou-Zeid
African Union Commissioner in charge of Infrastructure, Energy, ICT and Tourism.



Dr. Juliette Biao Koudenoukpo
UNEP - Regional Representative and Director for Africa Office.



Hon Charles Keter, EGH
Cabinet Secretary, Ministry of Energy, Kenya.



Andrea 'Andy' Blair
International Geothermal Association President.



Dr. Eng. Joseph Njoroge, MBS
Principal Secretary, State Department of Energy.



Eng. Jared O. Othieno
Managing Director & CEO of the Geothermal Development Company (GDC).



Eng. Abel Rotich
Geothermal Development Director, Kenya Electricity Generating Company (KenGen).

Programme

Pre Conference Meetings (2-3 November 2020)

Meeting	Dates	Times	Venue
IGA BOD Meeting	1st November 2020		Virtual. To be convened by IGA
Twelfth ARGeo Steering Committee meeting (ARGeo - SC 12)	2nd November 2020	10:30 - 13:00	Virtual
Ninth steering committee Meeting of the African Geothermal Center of Excellence (AGCE-SC 9)	2nd November 2020	14:30 - 15:30	Virtual
Kenya Investment Forum- Moderated (Organized) by GAK	3rd November 2020		Virtual

Pre- Conference Short Courses, 2-3 November 2020 under the Auspices of IPCU-AGCE

SC No.	Expected Participants	Short Course	Facilitator	Convener	Venue
1	30	Low-medium temperature Geothermal Systems and Direct Use Applications	IPCU-AGCE	GRO-GTP	Virtual
2	30	Geothermal Project Management and Financing for Development	IPCU-AGCE	NZGAF	Virtual
3	30	Geothermal Reservoir Engineering and Modeling	IPCU-AGCE	GRG	Virtual
4	30	Geothermal Resource Decision Modules 1 and 2: Volcanic and Deep Circulation	IPCU-AGCE	SEEQUENT	Virtual
03 November 2020 - Award of Certificates					

**Separate programmes have been developed for the four parallel short courses*



DAY 1: Wednesday, 4th November 2020

08:30 - 09:00	**Geothermal Theme song**				
09:00 - 10:30	**PLENARY SESSION 1: Global Geothermal Outlook and sustainable Development 2020**				
	Moderator: Kato Kabaka, Tanzania, TGDC				
	Key Note Speaker: Prof. Roland Horne, Stanford University, USA				
	Panelist 1: Surya Darma - Indonesia				
	Panelist 2: Hiroto Kamiishi - Japan				
	Panelist 3: Adele Manzella - Italy				
	Panelist 4: Greg Usher - New Zealand				
	Panelist 5: Peter Omenda - Africa				
10:30 - 10:50	Cultural Show				
OPENING CEREMONY: MC – Meseret T. Zemedkun					
10:50 - 12:00	Welcoming remarks by the chair, ARGeo C8 Organizing Committee - Chrispin Lupe				
	Remarks by the PS Ministry of Energy, Kenya - Dr. Eng. Joseph Njoroge				
	Remarks by KENGEN - Geothermal Development Director - Eng. Abel Rotich				
	Remarks by GDC - MD and CEO - Eng. Jared O. Othieno				
	Remarks by IGA President - Andy Blair				
	Remarks by UNEP – Regional Director, Africa Office - Dr. Juliette Biao Koudenoukpo				
	Remarks by Africa Union Commission, Commissioner for Infrastructure and Energy - H.E Dr. Amani Abou-Zeid				
	Remarks by Minister for Energy, Kenya - H.E. Charles Keter				
	H.E. Ólafur Ragnar Grímson, Former President of Iceland and Global Geothermal Ambassador (Guest of Honour)				
12:00 - 13:00	Ministerial – Roundtable: Science-Policy- implementation for sustainable geothermal development towards the objective of achieving SDG's (Chair – CS Charles Keter, Co-Chair AUC/UNEP)				
	Ministerial makers of the following countries: Burundi, Comoros, Democratic Republic of Congo, Djibouti, Ethiopia, Kenya, Malawi, Mozambique, Rwanda, Somalia, South Sudan, Tanzania, Uganda, Zambia.				
13:00-13:30	Launch of African Women Advancing Geothermal Regional Director, Africa Office - Dr. Juliette Biao Koudenoukpo Chief Guest: H.E. Ólafur Ragnar Grímson Former President of Iceland and Global Geothermal Ambassador				
Opening of Exhibition / Press Conference					
13:30 - 14:30	Lunch Break				
14:30 - 16:30	**Break out Sessions**				
	Parallel 1: Country Update-1: Moderator- Stephen Onacha	**Parallel 2: Exploration - 1 (Geology):** Moderator- Geoffrey Mibei	**Parallel 3: Geophysics-1:** Moderator- Anna Mwangi	**Parallel 4: Social Aspects of Geothermal Development:** Moderator - Thecla Mutia	**Parallel 5: Geochemistry:** Moderator- James Natukunda
14:30 - 14:50	Country Update for Kenya 2020 - *Omenda et al.*	Giant geothermal sites along the EARS: the determinant volcano-structural control - *Jacques Varet and Peter Omenda*	Resistivity Structure of High-Temperature Geothermal System In Arta Prospect, Republic Of Djibouti- *Ibrahim Ahmed*	Women Empowerment, Improvement and Implementation of a gender policy for the geothermal sector in case of the Djiboutian Office of Geothermal Energy Development- *Abdek Mahamoud and Soumeya Ali Aouad*	Geochemical Characterization of the Kyavitumbi Thermal Spring, D.R. Congo-*Mukandala et al.*

	Parallel 1: Country Update-1: Moderator- Stephen Onacha	**Parallel 2: Exploration - 1 (Geology):** Moderator- Geoffrey Mibei	**Parallel 3: Geophysics-1:** Moderator- Anna Mwangi	**Parallel 4: Social Aspects of Geothermal Development:** Moderator - Thecla Mutia	**Parallel 5: Geochemistry:** Moderator- James Natukunda
14:50 - 15:10	Geothermal Development and Exploration in Malawi-Country Update - Charleson *Eliyasi*	Mapping Land Surface Temperature Using LANDSAT 8 OLI/TIRS Satellite data and GIS -ArcGIS Model Builder for geothermal exploration purpose-*Lisbeth Garcia*	Smooth Magnetotelluric Transfer Functions estimated by an Inverse Method - *Rizzello et al.*	Gender Mainstreaming Initiatives; A Geothermal Sector Perspective on diversity and inclusion - Lucy *Mukiri*	Multivariate Analysis as An Insight into Mechanisms and Processes Affecting Geothermal Fluids at Panyimur, Uganda: Towards Selecting an Appropriate Geothermometer - *Achieng Jacinta and Yasuhiro Fujimitsu*
15:10 - 15:30	Geothermal Resource Exploration in Rwanda: A Country Update - *Uwera Rutagarama*	Evaluation of Structural Permeability of the Northern Lake Abaya Geothermal Field, Southern Main Ethiopian Rift, Using Soil Gas Approach- *Gebrewold et al.*	1-D, 2-D and 3-D Inversions Method of Magneto telluric Data to Characterized the Depth and Nature of Resistivity of the Cap rock and Geothermal Reservoir of Aluto Langano field, Ethiopia - *Hadush Nega*	Community-based geothermal projects along the EARS: the need for another (or a new) approach of ESIA-ESMP - Susan *Onyango*	Geochemical study of Arta geothermal field, Djibouti-*Sadik Bashir et al*
15:30 - 15:50	Geothermal Energy Exploration in Uganda, Country Update - *Godfrey BAHATI and James Natukunda*	Structural Geology, a control of the North and South Kivu Geothermal sites, A Preliminary Report - *K. Wisdom and M. Syangehwa.*	Analysis of a Geothermal System Based on 3D Resistivity and Gravity Method - *Gichira, J. and Noor, Y.*	Social acceptance and social acceptability of geothermal project: In case of East-African Countries - *Abdek Abdi*	Mapping and Geochemistry of Geological Formations around the Lilida Thermal Spring, DR Congo - *Kawa et al*
15:50 - 16:10	Geothermal Development in Djibouti - *Kayad Moussa*	Application of Landsat 8 Sattelite Images, Hydrothermal Alteration Mapping, Thermal Anomalies And Correlation With XRD Analysis: Case Study of Ne Goubbet Area (Djibouti) - Idil *Aden*	Subsurface Characterization of Panyimur Geothermal Prospect, NW Uganda using Magnetotellurics - *Eriya et al.*	Community Engagement in Geothermal Development in Uganda - *Aijuka Brian*	Geochemistry Of Extensional-Type Geothermal System in Uganda - Benjamin *Twesigye*
16:10 - 16:30	Geothermal Development in the Democratic Republic of the Congo-a Country Update - *Pacifique S. Mukandala, Célestin K. Mahinda*	Progress of Geothermal Energy Exploration at Buranga Prospect, Western Uganda – *Natukunda and Bahati*	A joint geophysical analysis of the Arta geothermal field, Djibouti - *Fahman Abdallah et al.*	Geothermal for Peace: explore the Bidu-Dubbi, a huge geothermal potential along the border (Bidu Woreda, Afar Regional State, Ethiopia and Southern Red Sea Region, Southern Denkhalya subregion, Eritrea) - *Jacques Varet*	The Relationship Between Seismicity and the Occurrence of Geothermal Springs - *Charleson Eliyasi*

DAY 2: Thursday 5th November 2020

End of Day 1					
09:00 - 10:00	**PLENARY SESSION 2: Innovative Financing Scheme for Geothermal Projects in Africa**				
	Moderator: Mike Allen / Representative from the Region				
	Key note Speaker: Eyob Easwaran - Trade and Power Development Bank				
	Panelist 1: Alemayehu Wubishet - African Development BanK				
	Panelist 2: Elin Hallgrimsdottir - The World Bank				
	Panelist 3: Michael Andres, GRMF – German Development Bank (KfW.)				
	Panelist 4: Philippe Dumas, (Geo Risk) - EGEC				
	Panelist 5: Julian Richardson - GeoFutures				
01:00 - 11:00	**PLENARY SESSION 3: Unlocking the Contribution of Private sector players and developers in the Region.**				
	Moderator – Tim Jackson, Infra Africa / Representative from the Region				
	Key note Speaker: Magnus Asbjornsson - Reykjavik Geothermal				
	Panelist 1: Eddy Njoroge - Corbetti				
	Panelist 2: Darell Boyd - Tulu Moye				
	Panelist 3: Mugwe Manga - Olsuswa Energy				
	Panelist 4: Peter Neal Vivian - Kalhari				
11:00 - 11:30 Break					
11:30 - 13:00	**PLENARY SESSION 4: Role of Geothermal in RE Mix.**				
	Moderator – PN / Representative from the Region				
	Key-note Speaker: Atef Marzouk - African Union Commission (AUC)				
	Panelist 1: Mr. Stephen Dihwa - SAPP				
	Panelist 2: Zelalem Gebre Hiwot - EAPP				
	Panelist 3: Zerubabel Getachew Teferra - UON				
	Panelist 4: Tichakunda Simbini - NEPAD				
	Panelist 5: KENGEN				
	Panelist 6: Malama Chileshe - COMESA				
13:00 - 14:00 Lunch Break					
14:00 - 16:00 Break out Sessions					
	Parallel 1: Direct Use 3: Moderator- *Martha Mburu*	**Parallel 2: Capacity Building:** Moderator- *Peketsa Mangi*	**Parallel 3: Geochemistry:** Moderator- *Isaac Kanda*	**Parallel 4: Country Update/ Exploration:** Moderator- *Vincent Kato and Peter Ndirangu*	**Parallel 5: Power Plant:** Moderator- *Cyrus Karingithi*
14:00-14:20	Opportunities of Geothermal Aquaculture Development in Uganda - Asenath *Kwagalakwe*	Geothermal Training Programs in Japan - *Itoi et al.*	Optimized analyses of soil gas emissions in geothermal exploration - *Anna Jentsch and Egbert Jolie*	Geothermal Exploration and Development in Ethiopia - *Fikru et al.*	Operations Strategies in Olkaria Geothermal Power Plants - Gideon *Kemboi*
14:20-14:40	Opportunties for Direct Geothermal Utilization in Ethiopia - *Solomon Kebede and Yiheyis Amdebirhan*	UNU Geothermal Training Programme 1979-2019: The Legacy in Africa - *Lúdvík S. Georgsson*	New evidence of potential sites for geothermal helium mining in the East African Rift - Michael *Kraml*	Geothermal Development: Case of Cameroon - *Tuwa et al.*	Extra Power from Geothermal Brine - Leonard *Langat*

	Parallel 1: Direct Use 3: Moderator- *Martha Mburu*	**Parallel 2: Capacity Building:** Moderator- *Peketsa Mangi*	**Parallel 3: Geochemistry:** Moderator- *Isaac Kanda*	**Parallel 4: Country Update/ Exploration:** Moderator- *Vincent Kato and Peter Ndirangu*	**Parallel 5: Power Plant:** Moderator- *Cyrus Karingithi*
14:40-15:00	Potential of Direct Use of Geothermal Energy Uganda - James *Natukunda and Godfrey Bahati*	JICA's Cooperation in Geothermal Development in Africa's Great Rift Valley - *Hiroto Kamiishi et al.*	The Rift 4.0 – Digitalization as a new opportunity for emerging Geothermal Hotspots - *Gregor Rumberg and Marit Brommer*	Geothermal Exploration in Eritrea: Country Update - Ermias *Yohannes*	Wellhead Turbine Rotor Repairs – A KenGen Experience - Christopher Kutswa, George Maingi
15:00-15:20	Direct Utilisation of Geothermal Resources -overview with focus on Africa - *Lilja Tryggvadóttir et al.*	UNESCO GRÓ Geothermal Training Programme: Maintaining the momentum of UNU-GTP training for Africa - *Ingimar G. Haraldsson and Gudni Axelsson*	Helium Isotopes As Heat Source Indicator - *Sinetebeba et al.*	Geothermal Progress in *Tanzania- Kajugus et al.*	Energy Analysis of a Proposed Wellhead Geothermal Plant in Menengai Field - Janet *Okoth*
15:20-15:40	Direct uses of geothermal energy: A case of Chinyunyu hot springs - Musenge *Chomba*	Geothermal Data Management and Best Practices - *Jeffrey Benegar and Robert Kennedy*	The Value of 3D Models in the Communication and Advancement of Geothermal Projects - *Chelsea Cervantes*	1D Joint Inversion of Electromagnetic Data from Meteka Geothermal Prospect - *Getenesh et al.*	Brine Recovery Solution from existing Single Flash Unit - *Pingaro Emanuele and Bonafin Joseph*
15:40 - 16:00	Valuation of Geothermal Grain Dryers - Esther Njuguna *Nyambura*	An Innovative Approach to Geothermal Prospecting through Interactive Analytics - *Harms et al.*		Multiscale workflow and methodology for the assessment of geothermal potential - *Marchetti et al.*	A Remote-Diagnostics and Predictive Maintenance Solution for Geothermoelectric Plants - *Renato Papale*
16:00 – 17:00: Annual General Meeting- Africa Regional Branch of International Geothermal Association					



Credit: https://magicalkenya.com/

DAY 3: Friday 6th November 2020

09:00-10:00	**PLENARY SESSION 5: Direct use application of low to medium temperature geothermal systems and its contribution to SDGs and AU Agenda 2063.**				
	Moderator: Representative from the Region				
	Key note Speaker: Jon Orn Johnsson (Iceland)				
	Panelist 1: Andy Blair (New Zealand)				
	Panelist 2: Prof. Pan Zang (China)				
	Panelist 3: Jacques Varet (France)				
	Panelist 4: UNEP				
10:00 - 10:30 Break					
10:30 - 12:30 Break out Sessions					
	Parallel 1: Environment: Moderator- *George Muia*	**Parallel 2: Finance** Moderator- *Paul Ngugi*	**Parallel 3: Drilling:** Moderator- *Kayad Moussa and Risper Kandie*	**Parallel 4: Exploration:** Moderator- *Nicholas Mariita*	**Parallel 5: Reservoir Engineering:** Moderator- *Cornel Ofwona*
10:30 -10:50	Unique, resource rich Olkaria in Hells Gate National Park - *Josphat R. Mwandigha*	The Silent Killer of Geothermal Projects: Long-Term Resource Risk - Hezy *Ram*	Drilling of Shallow Production and Re-injection Wells at Tendaho (Dubti) Geothermal Field (Project), Afar Region, Ethiopia - Samson *Tadese*	A Geothermal Civilization in the Afar Region: Era Boru (Teru woreda, Ethiopia) - Jacques *Varet*	Analysis of Well Testing, Temperature and Pressure in High-Temperature Wells of Aluto-Langano, Ethiopia - Mesay Fekadu *Biru*
10:50 -11:10	Environmental, Health, Safety and Social Factors in Geothermal Development - Mundia *Sitali*	GEORISK - Framework conditions for establishing a risk mitigation scheme- *Nicole Lupi and Gunter Siddiqi*	How Oil & Gas Expertise Can Benefit Geothermal Well Design- *Kakoma et al.*	Identification of Thermal Springs in Eastern DRC, Case Study of Katanga, Kivu and Ituri Provinces - *Odhipio et al.*	Simulation Studies of Various Extraction Schemes and Recovery Factors of a Geothermal Reservoir – *Shibani Khanra and Harish Puppala*
11:10 -11:30	Impacts of Alalobad Geothermal Project on wild Animals - Gutu *Degefa*	Geothermal Risk Mitigation Facility, AUC - *Sylvain Ngaryo*	Analysis of Equipment Performance of a Drilling Rig in Menengai Geothermal Field - Jeffrey *Roti*	Impacts of lithological heterogeneity and anisotropy on geothermal drilling techniques And risks, methods and costs and well productivity in the East African Rift setting - Stephen *Onacha*	Geothermal Reserevoir Evaluation Using Current Modeling Techniques & Drawdown Test Data from Olkaria Domes Geothermal Field-A Case Study of Ow-907B, Ow-912B & Ow-917 – *Stephen Ouma Otieno*
11:30 -11:50	Environmental Baseline Survey for Geothermal Development in Uganda - Oris *Ouma*	Results of risk assessment to support the development of risk mitigation schemes in Europe and beyond - *Ferid Seyidov et al*	Effective interpretation of directional drilling measurements in drilling geothermal wells: Case study of Well MW-35A in Menengai, Kenya - Martin *Rotich*	Investigating the Geothermal Resource Potential Sites in Areas Around Lake Natron, Tanzania in the East Africa Rift System by Using Remote Sensing Satellite Data - *Maswi Mwita Solomon*	The Comparison of Reservoir Characterizations and Operational Challenges at High Temperature Geothermal Reservoirs in Western Anatolia (Turkey) and Kenya - *Füsun S. Tut Haklıdır, Jesse Nyokabi*

	Parallel 1: Environment: Moderator- Rapporteur-	**Parallel 2: Finance** Moderator- Rapporteur-	**Parallel 3: Drilling:** Moderator- Rapporteur-	**Parallel 4: Exploration:** Moderator- Rapporteur-	**Parallel 5: Reservoir Engineering:** Moderator- Rapporteur-
11:50-12:10	Effective stakeholder engagement & Management in geothermal development by private sector – *Rebecca Supeyo and Stephen Alumasa Onacha*	Private Sector Geothermal Energy Development constraints in the East Africa Region - *Stephen Alumasa Onacha*	Impacts of abstraction of surface water for geothermal drilling on Alalobad geothermal project - Addis *Bekele*	Borehole Geology of Well Fiale 3, Asal-Fiale Geothermal Field, Djibouti - *Ahmed et al.*	Production well steam-lifting - Calyst Nyambu Kitimo
12:10 – 12:30	The essence of Surface Geology and Shallow Temperature Gradient Wells for Geothermal System Characterization in Kiejo-Mbaka Prospect, SE Tanzania - *Adonias Mkangala and Anthony Sylvester*	The Geothermal Village project (GV1): Supported by the LEAP-RE Research Programme launched by the EU in partnership with the AU - Jacques *Varet*	The Barrier Volcanic Complex: Exploration Techniques Employed In A Surface Studies Program – *Njau et al*	Strategies to Mitigate Potential Problem During Planning and Designing a Geothermal Well - Makda *Kinfe*	Efficient Methods for Planning and Evaluating Geothermal Energy Projects in Developing Countries-Real Option Analysis- *Kiprotich et al.*
12:30 - 14:00 Lunch Break					
14:00 - 15:00 CLOSING CEREMONY					
	Summary of Resolutions - UNEP				
	Announcement of ARGeo - C9				
	Closing Remarks by Chief Guest - GOK				



Credit: https://magicalkenya.com/

Poster Presentations

Virtual poster presentations will run throughout the conference duration

	Exploration/Geochemistry	Geology	Geophysics	Geothermal Development	Geothermal Projects
1	A Geochemical Study of Springs in a volcanic field, case of Virunga and Kahuzi Bienga, DRC - *Kambale et al*	Petrology And Hydrothermal Alteration Mineral Distribution Of The Wells (La-9d & La-10d) In Aluto Geothermal Field - *Dereje Moges*	Design of Wind and PV-Solar Hybrid System for Transient Electromagnetic Method (TEM) Equipment in Geophysical Exploration for Geothermal Energy - *Musila*	Geothermal investment in Democratic Republic of Congo - *Kambale and Kambale*	Direct Uses of Geothermal Resources - *Wangari*
2	Application of Multiferroic Alloy to Convert Waste Heat from Brine to Electricity - *Kulundu*	Report on Dallol Geothermal Prospect - *Abdulahi and Mengiste*	Multidimensional Resistivity Imaging Using Magnetotelluric Data and its Geological Interpretation in Kiejo-Mbaka Geothermal *Field - Tumbu et al.*	Review of Geothermal Development in the Western Branch of the East African Rift System - *Mugagga et al.*	Application of Geothermal Energy in Agro-based industries: A Case study of Geothermal Dryer in Menengai Geothermal Field - *Towett et al.*
3	Harnessing geothermal resource in radioactivity prone potential sites - A case of Lubungu hot springs - *Chomba et al*	Geology of Extensional-Type Geothermal Systems in Uganda - *Rusoke*	An Integrated Leapfrog/Autough2-SC model of the Menengai Geothermal Field - *Baraza*	A Goal Programming Approach to Resource Allocation in Geothermal Energy Projects - *Mubiru*	Geothermal Tour Management - *Srivastava*
4	A Study on recovery of lithium from Geothermal Water: Case of Djibouti - *Daoud et al.*	Comparative Study of Petrography and Hydrothermal Alteration Mineralogy Between the Lake-Asal and the Hatchobaru Geothermal Fields - *Mohamed et al.*	Structural interpretation of a 3D gravity and magnetic models over Arta geothermal prospect - *Awaleh*	Project for Development of Geothermal Resources in the Ruwenzori Sector - *Mukandala et al.*	
5	Exploration Surface Study of Arta Geothermal Prospect, Republic of Djibouti - *Suge et al.*	Lithogeochemical approaches and effect of alteration: An application to the Asal-rift geothermal field - Mohamed *Abdillahi et al.*	Geothermal Wells Productivity Controls Case Study of Wells Drilled In The Greater Olkaria Geothermal Area, Kenya - *Nyandigisi*	Overcoming Accessibility, Economic and Power Evacuation Constraints in Geothermal Power Development - *Mukuka et al.*	Infrastructural and Environmental Challenges Affecting Geothermal Development in Kenya - *Omeny and Aruya*
6	Application of Spectral Analysis of Magnetic Data to Determine Curie Point Isotherm Depth for Geothermal Temperature Estimation - *Nyakundi*	Preliminary geological exploration for geothermal resources with emphasis on faults a case study of Nord - Ghoubbet- *Samod Youssouf et al.*	Evaluation of Potential Recompletions of Asal offset wells: Techniques and Challenges Assets Evaluations - *Farah*	Automation of Continuous Portable Water Distribution System at the Menengai Geothermal Project in Kenya - *Kiok*	Geothermal Knowledge in educational institutions, case of Democratic Republic of Congo - *Kambale and Kambale*
7	Another geothermal site in North-Eastern Afar: Harak (Bidu woreda, Afar regional state, Ethiopia), that marks the southernmost extension of the Danakil Sea 110m bsl - *Varet*	Hydrothermal alteration mapping for geothermal exploration in Manda-Inakir area - *Ahmed*	Alteration Mineralogy of Well KW02 in the Karisimbi Geothermal Prospect - *Ngaruye*		

Conference Layout

Day 1

LAYOUT FOR THE ARGeo C8 MAIN CONFERENCE PROGRAMME
04 November 2020

Cultural Performance: 8AM - 9AM
Opening Session of Main Conference: 9AM - 12PM
Ministerial Round Table Discusion: 12PM - 1PM

Promotion of Products and Services of Sponsors of the Conference

Launch of African Women in Geothermal: 1 - 1:30PM

BREAK OUT SESSION: 2 - 4 PM (30 Papers)

Virtual Room 1. **Technical Session 1**	Virtual Room 2. **Technical Session 2**	Virtual Room 3. **Technical Session 3**	Virtual Room 4. **Technical Session 4**	Virtual Room 5. **Technical Session 5**

Day 2

LAYOUT FOR THE ARGeo C8 MAIN CONFERENCE PROGRAMME
05 November 2020

PLENARY SESSION 2: Innovative Financing Scheme for Geothermal Projects in Africa (9-10am)
PLENARY SESSION 3: Opportunities and Solutions for Private Developers in the Region (10-11am)

Promotion of Products and Services of Sponsors of the Conference

PLENARY SESSION 4: Role of Geothermal in RE Mix. Moderator – PN/ Representative from the Region (11.30-1pm)

BREAK OUT SESSION: 2 - 4 PM (30 Papers)

Virtual Room 1. **Technical Session 1**	Virtual Room 2. **Technical Session 2**	Virtual Room 3. **Technical Session 3**	Virtual Room 4. **Technical Session 4**	Virtual Room 5. **Technical Session 5**

Annual General Meeting- Africa Regional Branch of International Geothermal Association (4-5pm)

Day 3

LAYOUT FOR THE ARGeo C8 MAIN CONFERENCE PROGRAMME
06 November 2020

PLENARY SESSION 5: Innovative Financing Scheme for Geothermal Projects in Africa

Promotion of Products and Services of Sponsors of the Conference

BREAK OUT SESSION: 10.30 - 12.30 PM (30 Papers)

Virtual Room 1. **Technical Session 1**	Virtual Room 2. **Technical Session 2**	Virtual Room 3. **Technical Session 3**	Virtual Room 4. **Technical Session 4**	Virtual Room 5. **Technical Session 5**

Closing Ceremony: 2 - 3PM



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Conference Highlights

CELEBRATING 14 YEARS OF THIS AFRICAN RIFT BIENNIAL CONFERENCE

The seven previous biennial conferences were held in Ethiopia (2006), Uganda (2008), Djibouti (2010), Kenya (2012), Tanzania (2014), Ethiopia (2016) and Rwanda (2018)

The theme of ARGeo-C8 Virtual conference is: ***"Seizing the Moment: Investing in Geothermal Resources for Sustainable Development".*** The main objective of this virtual conference is to promote regional cooperation, create an information exchange platform on exploration, development, investment and utilization of the geothermal resources in the region and elsewhere in the world. This virtual international conference will bring together policy makers, technical experts as well as developers and financiers of international and regional delegates.

The conference will provide an online platform to explore solutions to: (i) mitigate the risks associated with resource exploration, (ii) attract private investment to fast track geothermal development, (iii) reduce lead times in developing geothermal projects, (iv) to leverage investment to stimulate the growth of industry, and (iv) to effectively develop, construct, and operate successful geothermal power plants and direct use projects.

+ 500

ATTENDEES

THE LEADING GEOTHERMAL ENERGY DEVELOPMENT CONFERENCE IN AFRICA

This longest running regional conference and expo will bring together the entire geothermal community both regionally and globally in what will be the largest VIRTUAL African geothermal conference ever.

Featuring renowned speakers from academia, the business sector as well as governments and NGO's, ARGeo-C8 will be an online platform for the discussion that will shape the development and direction of the industry in Africa in the 21st Century.



EVENT AT A GLANCE

- FOUR PARALLEL PRE CONFERENCE SHORT COURSES (2 - 3 Nov)
- MAIN CONFERENCE (4 to 6 Nov)
- GLOBAL VIRTUAL PARTICIPATION
- PRE CONFERENCE FORUM: INVESTING IN THE GEOTHERMAL SECTOR IN KENYA — 3 November 2020
- ANNUAL GENERAL MEETING (IGA - ARB) — 5 November 2020
- LAUNCH OF AFRICAN WOMEN ADVANCING GEOTHERMAL. November 4 2020
- CERTIFICATE AWARDS CEREMONY — 3 November 2020
- 74th Virtual IGA BOD meeting — 1 November 2020

BE PART OF
AFRICA'S LEADING VIRTUAL
GEOTHERMAL CONFERENCE



DYNAMIC AND INTERACTIVE GEOTHERMAL CONFERENCE FOR THE 21st CENTURY

Find the exact audience you are looking for. The ARGeo – C8 virtual focuses on specific topics from geo-scientific exploration studies, reservoir engineering drilling, country updates, case studies, power plants, direct-use, project management, policy and financing, new technologies, gender and energy, environmental, health, safety & social factors in geothermal development, which means more opportunities to target a specific audience.

VIRTUAL MINISTERIAL ROUND TABLE DISCUSSION

E-meet with a high-level audience of decision makers, ministers, influencers and government officials that are responsible for Africa's growing geothermal energy market. There are numerous networking opportunities, including the certificate awards ceremony, opening and closing sessions, and poster sessions, where you can celebrate and witness the successes of the African geothermal energy elite.



FIND LOCAL AGENTS AND DISTRIBUTORS VIRTUALLY

The ARGeo-C8 Virtual conference offers an ideal B2B networking that allows you to schedule meetings on virtual online rooms, with hundreds of attendees including delegates, speakers, as well as potential local agents and distributors

BENEFIT FROM 14 YEARS OF RELATIONSHIPS

ARGeo's 14 years of stakeholder engagement in the region through its biennial conferences ensures strong relationships with Africa's key players. The event is ideally positioned to deliver a strategic gathering, with the key decision makers all under one roof which saves you valuable time.

FOUR PLENARY SESSIONS WITH DISTINGUISHED PANELISTS

- Global Status of Geothermal Development in Africa
- Role and contribution of Geothermal in Renewable Energy in Africa
- Financing Geothermal projects in Africa
- Opportunities and Solutions for Private Sector involvement in geothermal development in Africa
- Mainstreaming Direct use application of geothermal resources for economic growth in Africa



THANK YOU TO OUR 2020 PARTNERS

EVENT FEATURES

Thought leadership sponsorships

Offer your voice to a pressing issue in the industry. What case studies have you conducted to counter challenges in the market? Have your say during the conference and/or technical workshops.

SHORT COURSE CERTIFICATE CEREMONY

Align yourself with excellence as the ARGeo-C8 Pre-Conference Short Course Awards outstanding geothermal new young professionals from the region in various categories.

NETWORKING WITH HIGH LEVEL EXECUTIVES

Meet your target audience, secure meetings with decision makers and make the most of your time during the event.

EXCITING SPONSORSHIP OPPORTUNITIES

Be seen as a thought leader and align your brand as one of the key sponsors for the event.

PRE CONFERENCE FORUM: INVESTING IN THE GEOTHERMAL SECTOR IN KENYA

(3 November 2020)

Gather relevant information for successful investment in Kenya's Geothermal Sector. Session to be moderated by Geothermal Association of Kenya.

PRE CONFERENCE EVENT:

74TH VIRTUAL IGA BOD MEETING

(1 November 2020)

WHY ATTEND THE VIRTUAL CONFERENCE?



86%

Generating new leads



84%

Promoting company or brand in Africa



80%

Meet existing clients



75%

Industry knowledge



75%

Market intelligence



72%

Launch new products or services





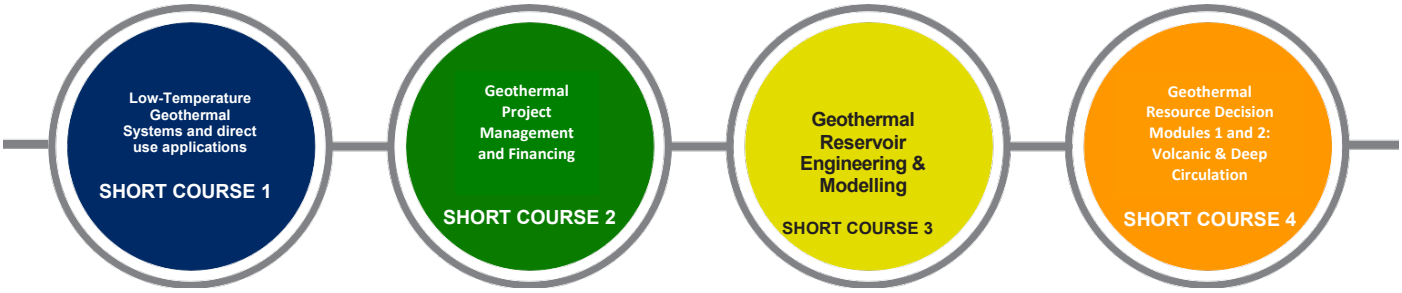


KEY DISCUSSION TOPICS OF THE CONFERENCE

These will cover various topics as seen below:

- Exploration methods - geology, geochemistry, geophysics, heat-flow
- Drilling technology
- Reservoir Engineering
- Environmental, health, safety & social factors in geothermal development.
- Geothermal power-plants
- Direct Use application
- New geothermal technologies, research and innovations
- Policies, legal and regulatory frameworks for geothermal industry
- Project Management, Financing and Economics of geothermal projects
- Case studies - any aspects of geothermal development
- Student papers - to include all aspects for geothermal exploration
- Mineral extraction
- Gender and Geothermal
- Geothermal and Renewable Energy mix
- Global and Continental Development Agendas and Climate Policy (SDG 2030, AU Agenda 2063 and Paris Agreement 2015)

FOUR PRE-CONFERENCE SHORT COURSES:









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