



UNEP - ARGeo

UNEP-African Rift Geothermal Development Facility



Role of ARGeo in Developing Geothermal Resources in Iceland

www.theargeo.org

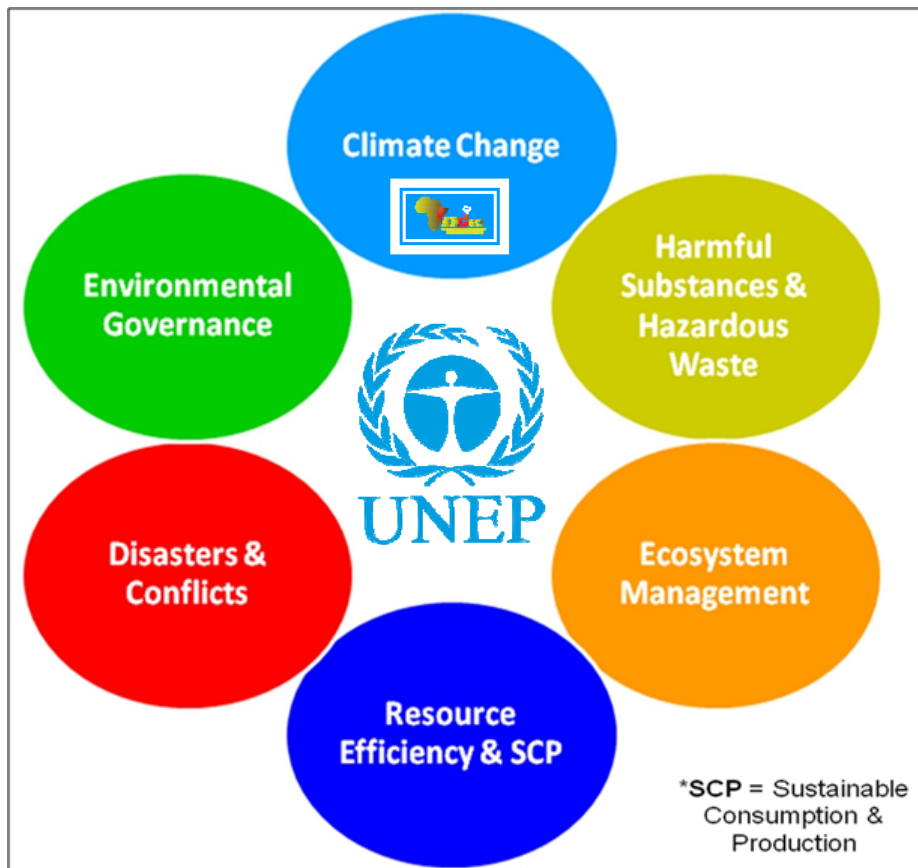
MESERET T.ZEMEDKUN
UNU-GTP-GDC- KENGEN Short Course IX on
Exploration of Geothermal Resources
18 November 2014
Naivasha, Kenya



UNEP is the lead organization to coordinate **environmental matters** within the United Nations system. We produce **environmental assessments and analyses, norms, guidelines** and methods for use by stakeholders looking for guidance on how to effectively manage the **environment** for their **sustainable development** and economic growth



UNEP'S seven THEMATIC AREAS



7 Divisions and Six Regional OFFICES

The **Energy branch** leads UNEP's work on **climate change mitigation** by addressing the environmental consequences of energy production and use.

UN “SUSTAINABLE ENERGY FOR ALL “ INITIATIVE”

THE GOAL of SE4AALL: **To defeat poverty and save the planet, AND must achieve sustainable energy for all by the year 2030.**

Three Linked Objectives:

- **Ensuring universal access to modern energy services.**
- Doubling the rate of improvement in energy efficiency.
- **Doubling the share of renewable energy in the global energy mix.**

SE4ALL should advance **national, regional, continental and global** energy programmes.



The challenge

- Accessible, **Affordable** and **reliable energy resource** is a driver for Socio economic development.
- However, **Africa continues** to face challenges related to its energy sector mainly due to **lack of access** to modern energy services (rural areas), **poor infrastructure**, low purchasing, low investment and over-dependence **on biomass** to meet basic energy needs.





Africa in the eyes of



YEAR 2000!

“... It has **poverty and disease** in abundance, ...

It is unusual only in its brutality: rape, cannibalism and amputation ...

Africa in the eyes of



YEAR 2010!

Over the **10 years to 2010**, six of the **fastest growing economies** were in sub saharan Africa.

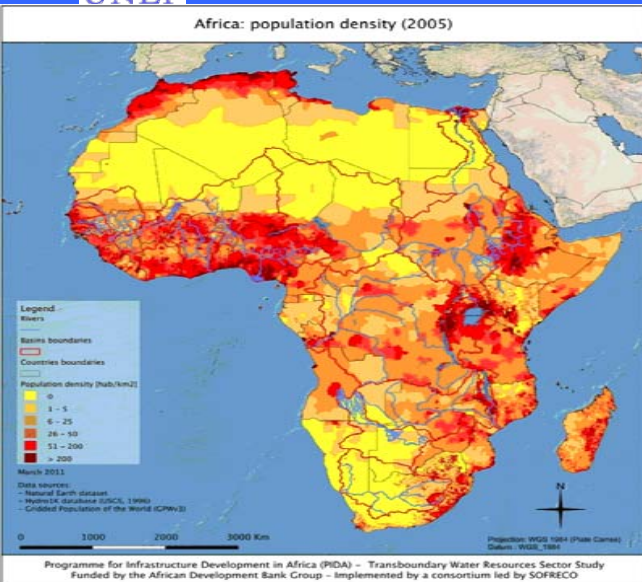
Africa in the eyes of



YEAR 2013!

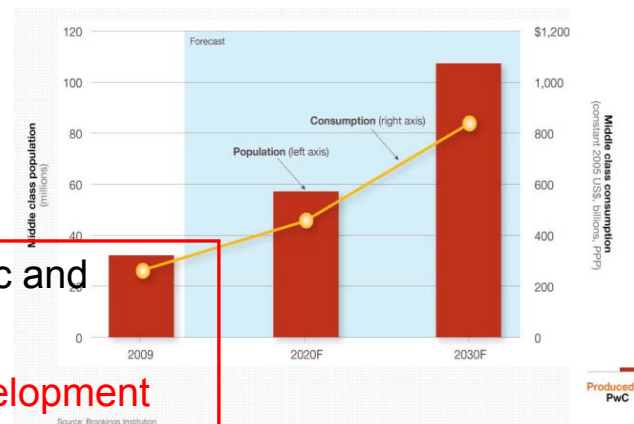
Africa will grab seven of the 10 places over the next 5 years.

Growth in 22 non-oil exporting countries of more than 4% a year since 1998, including Mozambique, Ethiopia, Rwanda, Sierra Leone, Liberia, Uganda



With the average annual GDP growth rate of **6.2%** (PIDA, 2011), predicted **three fold** growth in GDP by 2030 and **seven fold** by 2050.

This entails a much **larger energy demand** and call for a better performing energy sector.



Energy Poverty Remains Obstacle to economic and human development in the Continent.

For Africa Countries, **economic and social development** can not be achieved in the absence of adequate energy supplies.

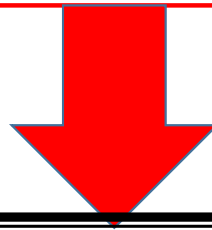
Growth of Sub-Saharan Africa's Middle Class



AFRICA's Response to
SE. for S Development including SE4ALL



Africa is taking the advantage of the new avenues that the All R. Energy Initiative (SE4ALL) Opens to advance its national, regional and continental goals and aspirations regarding energy access, renewable energies and energy efficiency for its sustainable development.





The African Rift Geothermal Development Facility (ARGeo) project is a **GEF Funded regional project** being implemented by UNEP.

ARGeo was **officially launched** in 2010 in Djibouti.

As a **UNEP stand alone project** in July 2012

www.theargeo.org

ARGeo provides **Fast**, targeted and demand driven technical and financial support to East African Countries to fast track the development of huge and untapped geothermal resource for power generation and direct uses.

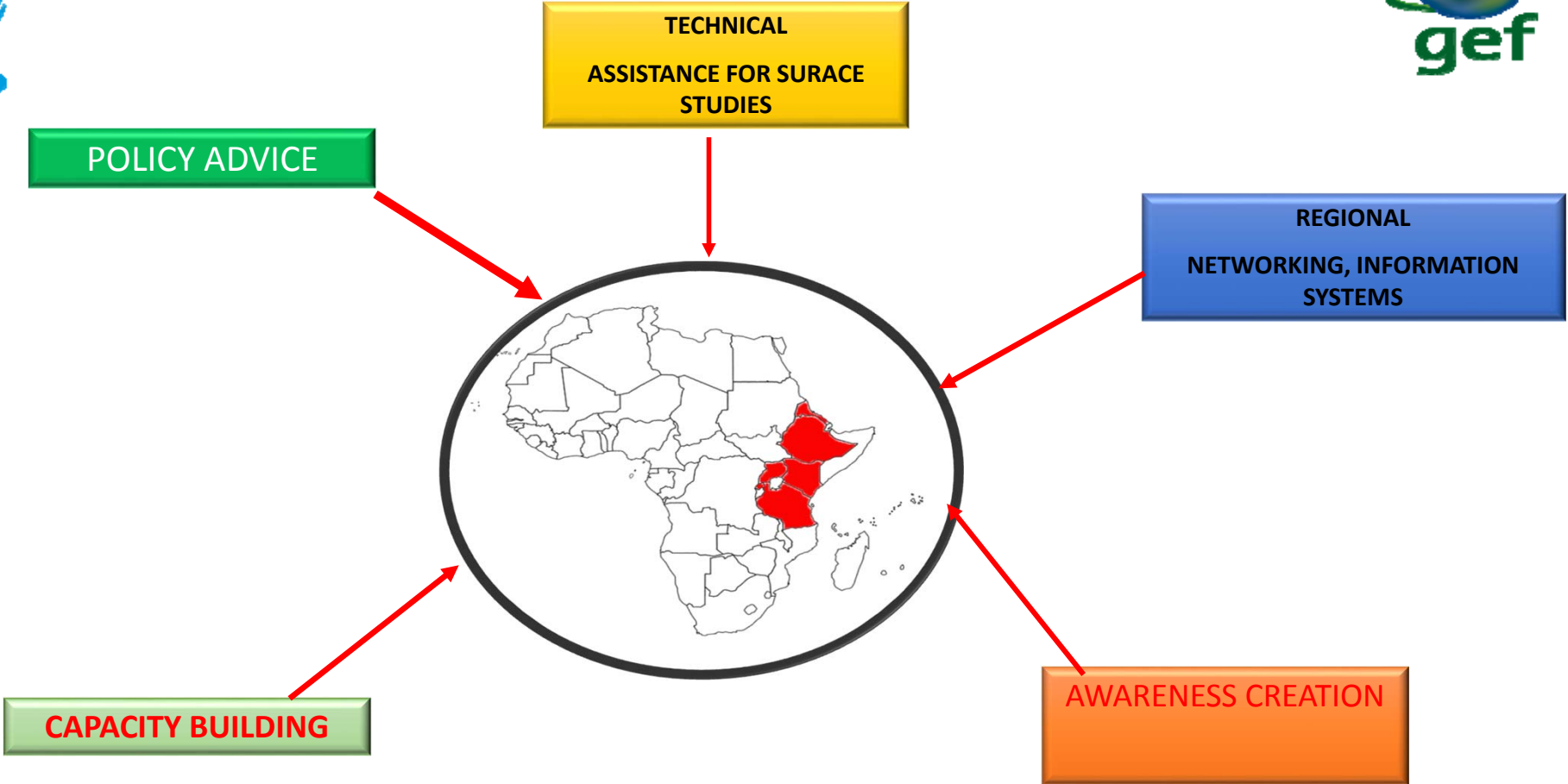
It **brings** solution through mitigation of risks associated with resource exploration and **catalyzes** investment.

OVERALL OBJECTIVE: UNEP-ARGeo project encourages both **Private and Public** developers to accelerate development of geothermal resource in the East Africa Region.



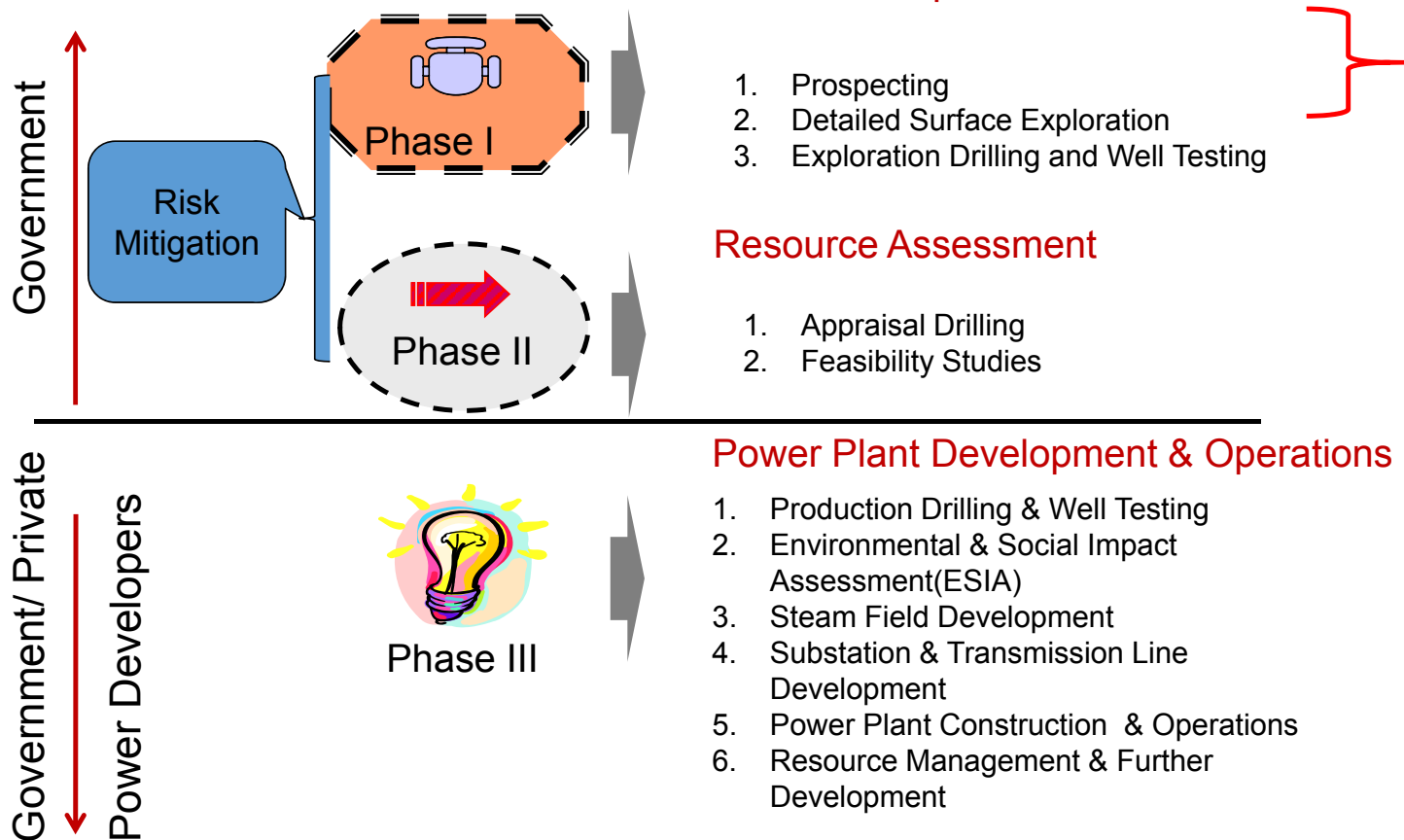


ARGeo: **Project Components**

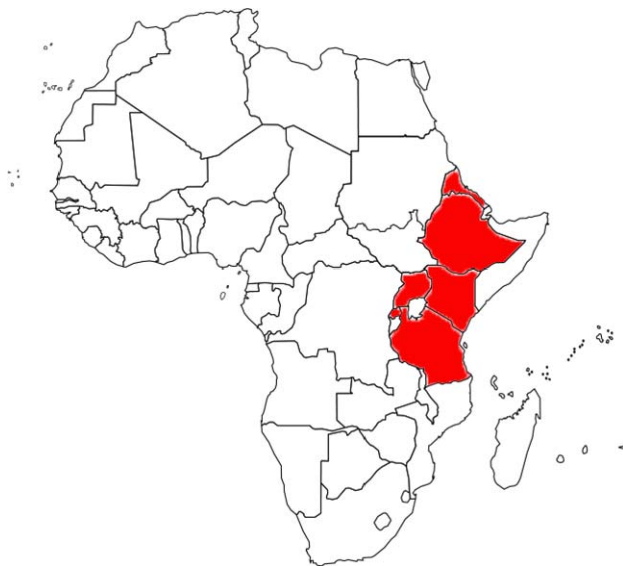




TECHNICAL ASSISTANCE for Surface Exploration Studies



GEF-FUNDED ARGeo TARGET COUNTRIES

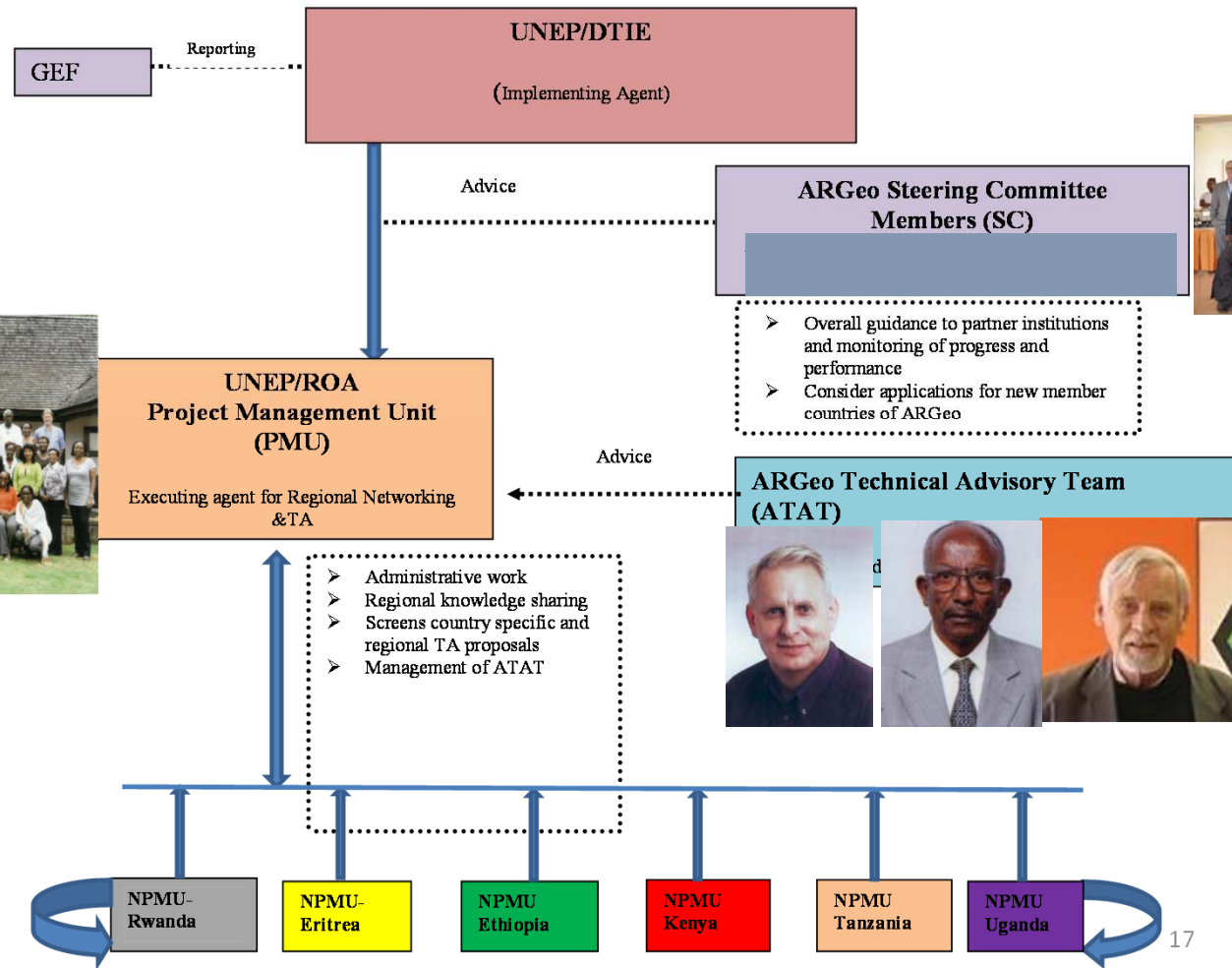


COUNTRIES -AGID



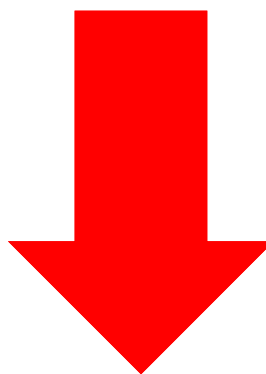


IMPLEMENTATION STRUCTURE OF ARGEO





UNEP-ARGeo Spearheads Efforts in
CIFGD
With
MEMBER COUNTRIES with PARTNERS





Created Country Ownership: VB



Countries own and lead the project - UNEP gives service as per needs and expectations of countries



KENYA



ETHIOPIA



UGANDA



RWANDA



Tanzania



Created Partnership and Synergy



- **UNEP created partnership and Synergy with (i) AUC and (ii) ICEIDA**
- **Developed action plan to jointly implement the geothermal activities in the East Africa Region on the basis of areas of collaboration indicated in the Memorandum of Understanding (MoU) signed by the organizations.**



Created Awareness to Financiers



UNEP FACILITATED A FIELD VISIT TO GEF-STAP TEAM TO THE GEOTHERMAL FIELDS OF KENYA (Olkaria and Menengai) to create awareness and showcase the contribution of the on-going African Rift Geothermal Development Facility (ARGeo) to cost and risk reduction of geothermal resource exploration and in catalyzing the investment of power development.



AC: SHARING KENYA'S EXPERIENCE WITH DECISION MAKERS



Meseret Teklemariam, UNEP

i)
ii)



Created Awareness to Policy and Decision makers
Ministers of ARGeo member countries , AfDB



UNEP discussing with Minister for Infrastructure in Rwanda, Regional Director of African Development Bank in Nairobi, with and other ARGeo member countries



Consult with recently established Tanzanian GDC





Meeting with recently established GDU





Participate and Contribute to UNU-GTP-KENGEN-GDC SHORT COURSE VII
November 2013, Naivasha, Kenya



**Spurred Geothermal interest through organization of Biennial Geothermal conferences
(ARGeo-C4)- November 2012**



In Collaboration with
GoK (GDC, KENGEN
..)

- **ARGeo-C4 was one of the UNEP ARGeo Project Biennial Geothermal Conferences being implemented under the “Regional networking, information systems, capacity building and awareness creation”.**
- **ARGeo-C4 brought together more than 600 international and regional delegates from 35 countries that includes policy makers, technical experts as well as developers and financiers.**

Strengthened institutional and infrastructural capacities through trainings and hands on experience (November 2012)



Three parallel Short Course trainings:

(A) Geoscience Exploration Techniques, Drilling Technology and Reservoir Engineering facilitated by University of Auckland, New Zealand;

(B) **Planning, Managing and Financing of Geothermal Projects** facilitated by **USAID** and

(C) Geothermal Database Management for East Africa facilitated by ISOR through the support of Icelandic International development Agency.

AWARD OF CERTIFICATE TO TRAINEES- November 2012



INSTRUCTORS FACILITATING CERTIFICATE
AWARD TO TRAINEES





Provided support to Tanzania in Preparation for ARGeo-C5 with GDC



Spurred Geothermal interest through **organization of Biennial Geothermal conferences**
(ARGeo-C5)- October-November 2014



MoEM, TGDC, KGDC, and other partners

ARGeo **Biennial Geothermal Conferences** being implemented under the “Regional networking, information systems, capacity building and awareness creation”.

ARGeo-C5 brought together more **than 500 international and regional** delegates from about 20 countries that includes policy makers, technical experts as well as developers and financiers.

C5.theargeo.org



Spurred Geothermal interest through organization of Biennial Geothermal conferences (ARGEo-C5)



UNEP ARGeo Project served s a **platform for Regional Networking and capacity building** and spurring geothermal exploration and development in the East Africa Region.

TMoEM, TGDC, KGDC and other partners



Organized three parallel Pre-ARGeo C5 Short courses



Participants of the Pre ARGeo-C5 Short course, 28 October 2014,
Arusha, Tanzania



Strengthened institutional and infrastructural capacities through trainings- ARGeo C5

27-28 October 2014



A



B



C

Three parallel Short Course trainings: More than 150 attendees from 14 East African countries and other parts of the world participated in the three parallel pre-conference short courses.

A. Geothermal Exploration techniques and Conceptual modelling- US Power Africa

B. Financing of geothermal Projects- US Power Africa

C. Drilling technology Options- ICEIDA

AWARD OF CERTIFICATE TO TRAINEES- 28 October 2014



Instructors facilitating award of Certificate



Developed and Launched ARGeo East African Information Database



ARGeo - African Geothermal Inventory Database (GID)
 UNEP - African Rift Geothermal Development Facility Project


gef UNEP

About the ARGeo-GI Database
 The ARGeo-GI database provides an overview of geothermal development in the African region by storing information on geothermal projects, their progress and funding, as well as related information on human resources capacity and equipment available or required in the countries concerned. The AGI database is not designed to store actual geothermal research or production data. The structure of the database is simple, and it is easy to use.

Filter by country (Dropbox) Open the database New or updated Entry (Dropbox) Logout

About the ARGeo Project
 The African Rift Geothermal Development Facility (ARGeo) Project is a GEF funded project implemented by United Nations Development Programme (UNEP).
 UNEP-ARGeo project aims at supporting the development of the unexplored geothermal resource potential in the Eastern African region with main objective of reducing the risks associated with the resources exploration. ARGeo also aims to reduce greenhouse gas (GHG) emissions by promoting the adoption of geothermal energy in the region. ARGeo will also help demonstrate that the resource is reliable, cost effective and indigenous as compared to other sources of power in the Eastern Africa region. The utilization of geothermal resource in agriculture and industry will also be promoted. UNEP-ARGeo created operational linkage and coordination with the African Union Commission (AUC)-Geothermal Development Bank (GDB) project on Geothermal Risk Management Facility (GRMF). UNEP has also other partners such as Icelandic International Development Agency (ICEIDA), German Federal Institute for Geosciences and Natural Resources (BGR), United Nations University-Geothermal Training Programme (UNU-GTP) and Six ARGeo member countries.
 The GEF funded ARGeo project has six member countries, namely: Eritrea, Ethiopia, Kenya, Tanzania, Rwanda and Uganda.
 The Project has two main components:
 • Regional Networking, Information Systems, Capacity Building and Awareness Creation, the database is developed under this component.
 • Technical Assistance in terms of surface exploration studies.

ISOR iceida





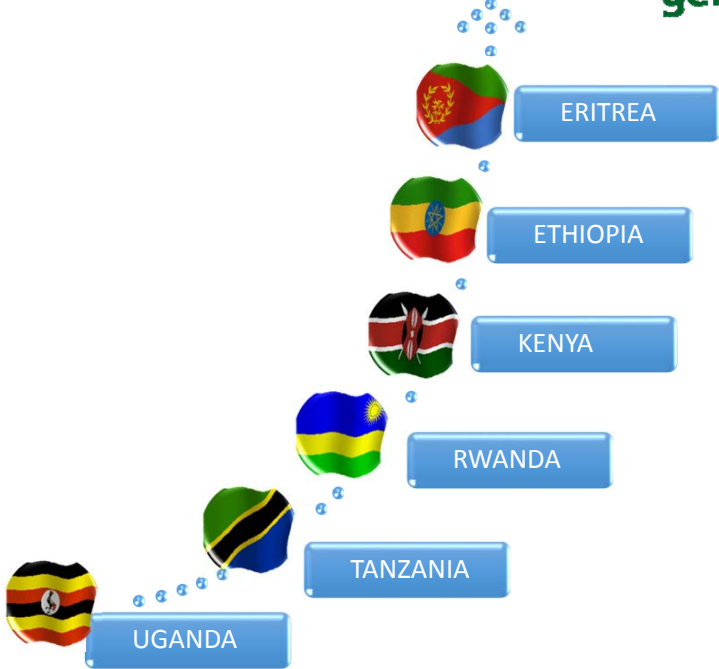
UNEP and ICEIDA Launching AGID, 29 October 2014, Arusha, Tanzania

Country	Email Address	Focal P.Name
Comoros	ahmedachka@yahoo.fr	Ahmed Said
Rwanda	amugabo2002@yahoo.fr	Assouman Mugabo
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Ethiopia	berhanu.bekele52@yahoo.com	Berhanu Bekele
Burundi	co.nira@yahoo.com	Constantin Niragira
Eritrea	ermiasyohannes@yahoo.com	Ermias Yohannes
Djibouti	hakam55@hotmail.com	Hamza Abdi Ali
Malawi	hendrixkaonga@yahoo.com	Hendrix Kaonga
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Uganda	sylgracen@yahoo.com	Sylvia Grace Nasaka
D.R Congo	yaliremat@yahoo.fr	Yalire Mapendano Mathieu





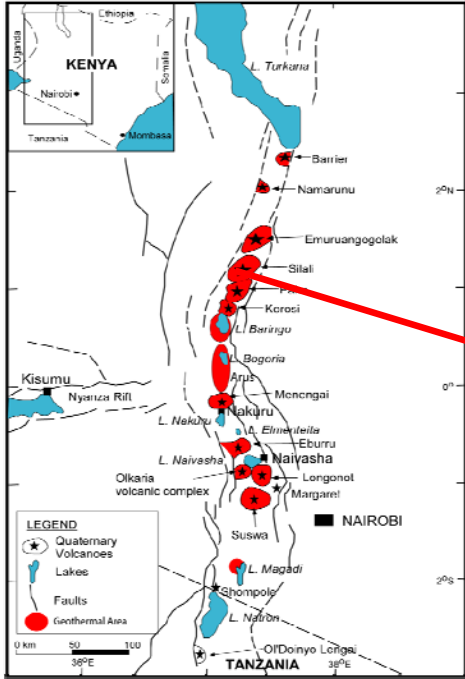
Technical assistance for surface Exploration studies



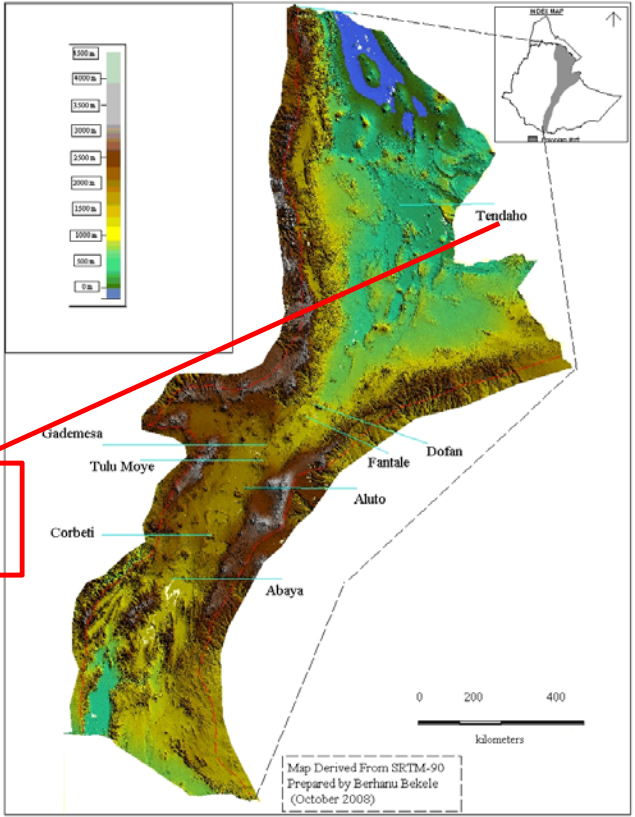


First two project pipelines

The UNEP ARGeo Project in 2014 developed two project pipelines of **Silali (Kenya)** and **Tendaho (Ethiopia)**, which will be used for future investment and development to be financed through **AUC-KfW Geothermal Mitigation Facility, DFID and EU**. These two projects have a target of developing about 200 MWe by the year 2017.



Silali



Tendaho(Dubti-Ayrobera)

Map Derived From SRTM-90
Prepared by Berhanu Bekele
(October 2008)



Technical Assistance for Surface exploration studies Silali Geothermal Prospect, Kenya



- Provisioned Scientific equipment and softwares
- Recruited Senior consultants
- Conceptual Model with location of target sites for deep drilling
- Hands on experience and on the job training



Technical Assistance for Surface exploration studies Tendaho Geothermal Prospect, Ethiopia



- Provisioned Scientific equipment and softwares
- Recruited Senior Consultants
- Conceptual Model with location of target sites for deep drilling
- Hands on experience and on the job training





UNEP ARGeo Technical Review Meeting, 10-11 June 2014



Consultants for Silali Project



UNEP ARGeo Technical Advisors

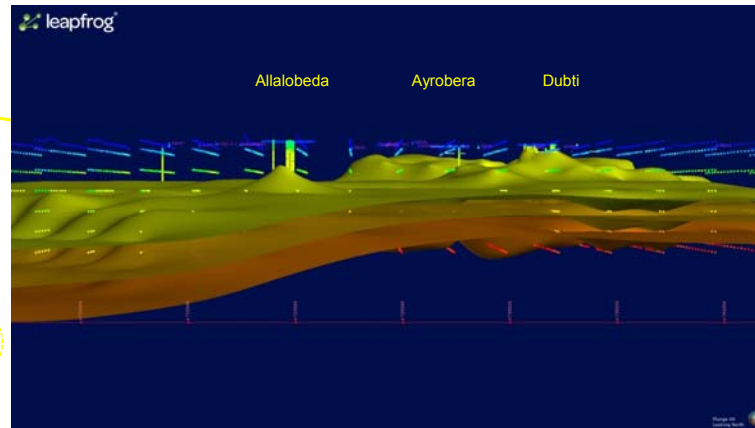
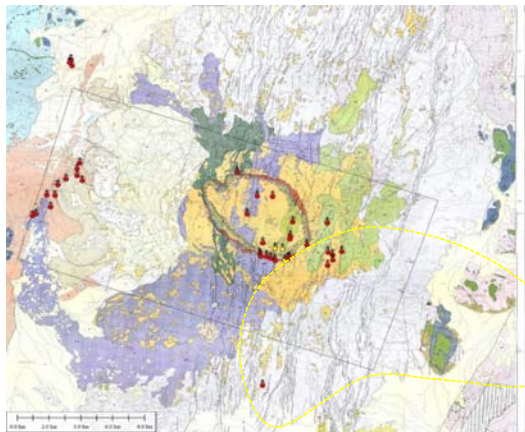


Consultants for Tendaho Project





Geological and Initial Conceptual Models of the project pipelines



TO BE COMPLETED BY END OF THIS YEAR (2014)



Projects in preparation to start implementation of surface studies
Alid (Eritrea) and Kibiro (uganda)



**Alid Geothermal Prospect,
Eritrea**



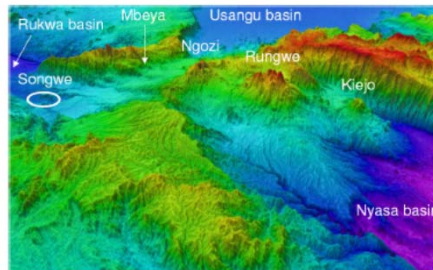
**Kibiro Geothermal
Prospect, Uganda**



Proposal under Review for Surface exploration studies in Rwanda and Tanzania



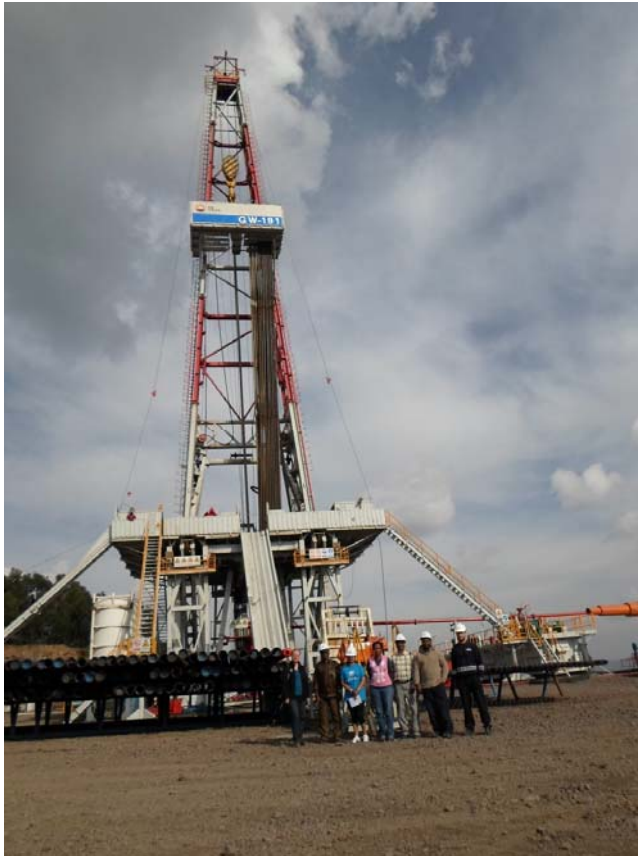
Kinigi Geothermal Prospect, Rwanda- Reviewed



Ngozi (Mbeya) Prospect, Tanzania



UNEP- Rwanda Geothermal Workshop



Rwanda:

- Reviewed the ISOR report on existing data in Rwanda
- Reviewed of the Kinigi Geothermal proposal



Scenarios for GED in the region (AMC)



Country	Geothermal Prospect	Developer	Status of prospects	Request for		Drilling Activity	TAF (Market, regulatory)-Feasibility	Potential electricity generation (MWe)
				SE	Drilling			
Ethiopia (7.2 MWe)	Corbett	Private (RG)	SE completed	-	✓	Subjected to Drilling	Institutional and Regulatory Framework; Draft Feed in Tariff; PPA	450
	Tendaho	Public	Limited SE required (more geophysics)	✓				
	Dofan-Fantale	Private (UK, COSZUS)	Detailed SE is required	✓	✓			
Kenya (250 MWe)	Longonant	Private (SKM)	SE Completed	✓	✓	Subjected to Drilling	IF in place... Feed in tariff about BUS cents/KWh	800
	Silali			✓				
	Suswa			✓				
Rwanda	Karimbi (Gisenyi)	Public	Limited SE and eligible for GRMF	✓		Subjected to Drilling	Draft Feed in Tariff in place	100
	Kiringi	Public	Detailed SE	✓	✓			
Tanzania	Mbeya	Private	Limited SE	✓	✓	Subjected to Drilling	IF & IFR not in place. Task force is set up for IFR.	
	Rufiji	Private (Local P)	Detailed SE	✓	✓			
Uganda	Kibiro	Public	SE required	✓		Subjected to Drilling		100
	Katwe	Private (PERTAMINA)	Limited SE	✓	✓			
Eritrea	Afid	Public	Limited SE	✓		Subjected to Drilling- WFS		
	Nabbro Dubbi	Public	Detailed SE	✓				
ARGeo+ GRMF +ICEIDA+BGR							USAID+BGR, EU funded Proj.	WB, AfDB, EI, KfW etc.
Public developers are encouraged to								

UA, ICEIDA, BGR, JICA, GRMF

GRANTS

GRMF (40%) 60%??

PPA/EIT

PRG

Resource proven-risk mitigation power development should be in place





Next Steps



- **Finalize the two project Pipelines (Silali) and Tendaho (Ethiopia)**
- **Start implementation of the next two surface studies in other ARGeo member countries (Eritrea and Uganda) by 3Q 2014**
- **Skill Gap Analysis for the African Geothermal Center of Excellence**
- **Continous intercation with focal points and enhance the geothermal database and create regional networking among member countries .**
- **Continue synergy and complementarities with various Renewable energy including geothermal support programmes**
- **Resource mobilization for the ARGeo Phase II yo deepen the support of existing Argeo Countries and expand to 13 countries**

CONCLUSION

- Overall strategy to accelerate geothermal development in the countries of EARS is to adopt a regional geothermal resource development approach
- Harmonization, coordination and synergy of various geothermal programmes in the region will significantly contribute to accelerate GERD by maximizing the benefit of countries, increase efficiency and quality of the work
- Knowledge, skill and Finance are the main factors where local CB is crucial and PS can significantly contribute to accelerate GED in the region.
- Conducive policy, legislation and regulation are crucial to attract PS.
- Holistic Utilization of Energy resource (both PG and DU) can create wealth, tackle food insecurity and boost socio economic development.



THANK YOU

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