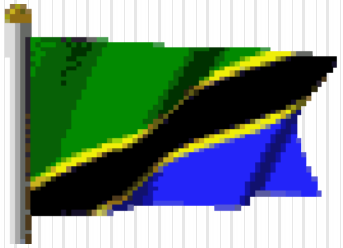


Geothermal Exploratory drilling activities, undergoing and planned in Tanzania

The Global Geothermal Development Plan (GGDP)

19th - 20th November , 2013

THE HAGUE, NERTHERLANDS

Edward Leonard Ishengoma

MINISTRY OF ENERGY AND MINERALS

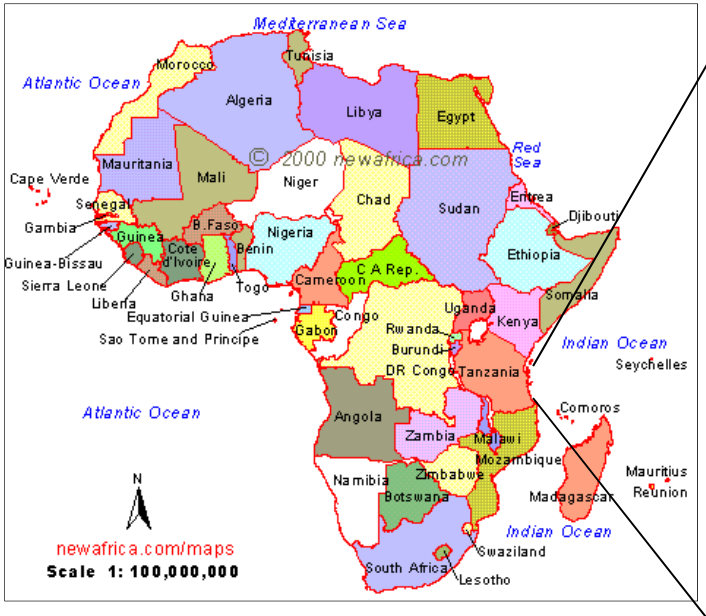
Contents

- Country Profile and Location
- Energy Sector and Its Challenges
- Previous Geothermal Assessment Studies
- Geothermal Energy Prospects and Previous studies
- Current Status of Geothermal Resources Development
- What Has Worked well for Geothermal Development
- Challenges on Geothermal Resources Development
- Future Development Plan

Country Profile - Tanzania

- Located in East Africa;
- Lies between Longitude 29° and 41° East and between Latitude 1° and 12° South;
- Total Area: 945,000 km²;
- Borders:
  - North: Kenya and Uganda;
  - South: Zambia, Malawi and Mozambique;
  - East: Indian Ocean;
  - West: Rwanda, Burundi & Democratic Republic of Congo.

Location


Mediterranean Sea
Atlantic Ocean
Morocco
Tunisia
Algeria
Libya
Egypt
Red Sea
Mauritania
Mali
Niger
Chad
Sudan
Eritrea
Djibouti
Cape Verde
Senegal
Gambia
B. Faso
Guinea
Cote d'Ivoire
Benin
Nigeria
Ethiopia
Guinea-Bissau
Sierra Leone
Liberia
Ghana
Togo
Cameroon
C.A.Rep.
Somalia
Equatorial Guinea
Sao Tome and Principe
Congo
Gabon
Uganda
Kenya
Rwanda
Burundi
DR Congo
Tanzania
Indian Ocean
Seychelles
Atlantic Ocean
Angola
Zambia
Malawi
Mozambique
Comoros
Namibia
Zimbabwe
Botswana
Madagascar
Mauritius
Reunion
Indian Ocean
Swaziland
South Africa
Lesotho
© 2000 newafrica.com
N
newafrica.com/maps
Scale 1: 100,000,000


UGANDA
KENYA
Kagera
Lake Victoria
Mara
RWANDA
Mwanza
BURUNDI
Arusha
Shinyanga
Kilimanjaro
Kigoma
DR CONGO
Tabora
Singida
Tanga
Dodoma
Zanzibar
Rukwa
Dar es Salaam
Morogoro
Pwani
Mbeya
Iringa
Indian Ocean
Lindi
ZAMBIA
Ruvuma
Mtwara
MALAWI
MOZAMBIQUE
© 2000 newafrica.com
N
newafrica.com / maps
Scale 1:8,600,000

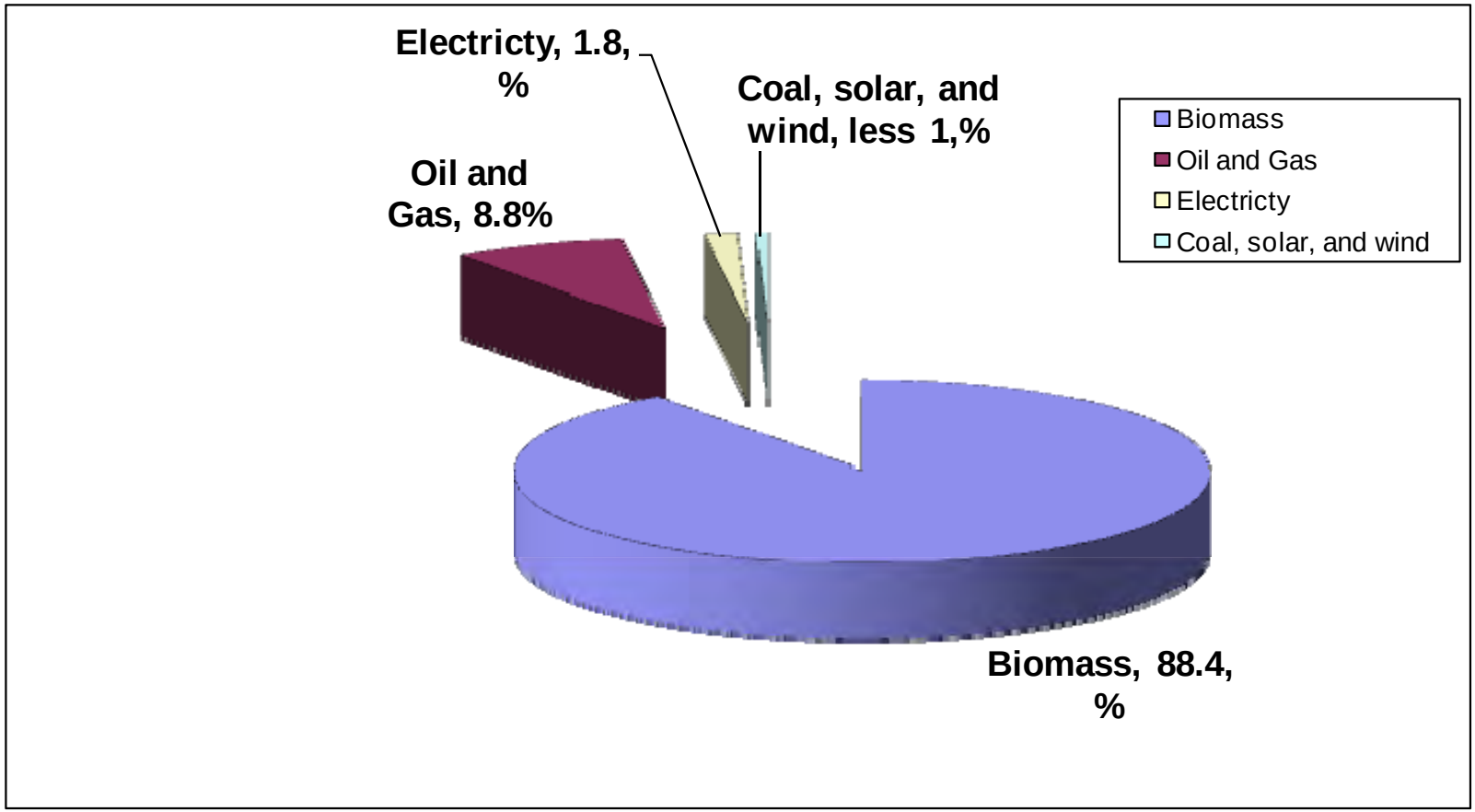
The Energy Sector and Its Challenges

Energy Sector

- About 80% - no access to power
- About 90% - use biomass energy
- About 75% - live in rural areas
- Contribution of the Energy Sector to GDP < 2.3%
- The country has a potential of using renewable energy sources

The Energy Sector and Its Challenges

Energy Balance



The Energy Sector and Its Challenges

Challenges

- Fast increasing power demand due to accelerating productive investments and a growing population.
- Risk of interruption of electricity generation associated with price shocks due to fluctuating price of oil and increasing unpredictability of hydropower
- Low access to reliable electricity due to dispersed and low density of population which makes grid extension too expensive
- Health risks and environmental degradation from household reliance on biomass energy, causing annual loss of forest cover of about 100,000 - 125,000 hectares

The Energy Sector and Its Challenges

Strategy to Address Challenges

- Increasing the generation capacity from different sources
- Restructuring/Reform the State Utility (TANESCO)
- Construction of new distribution and transmission lines
- Development of new/review current policy, legal and regulatory frameworks
- Development of mini-grids and stand-alone projects
- Committed Government Budget and funds from DPs
- Implementation of projects for green sources of power

Previous Geothermal Assessment Studies

- Preliminary Reconnaissance Survey of Geothermal Resources in Tanzania begin in 1976. The study was carried out by SWECO, VIKIR ORKINT and the Government of Tanzania (GoT).
- Rural Electrification Study (2005) financed by AfDB was carried out by SWECO and GoT at Songwe, Manyara, Lake Natron, Rufiji and Luhoi.
- Geothermal as an Alternative Source of Energy for Tanzania (2006) Phase I (Geological and Geochemical) & Phase II (2010) detailed exploratory study using Geophysical and Geochemical methods at Songwe.

Geothermal Energy Prospects

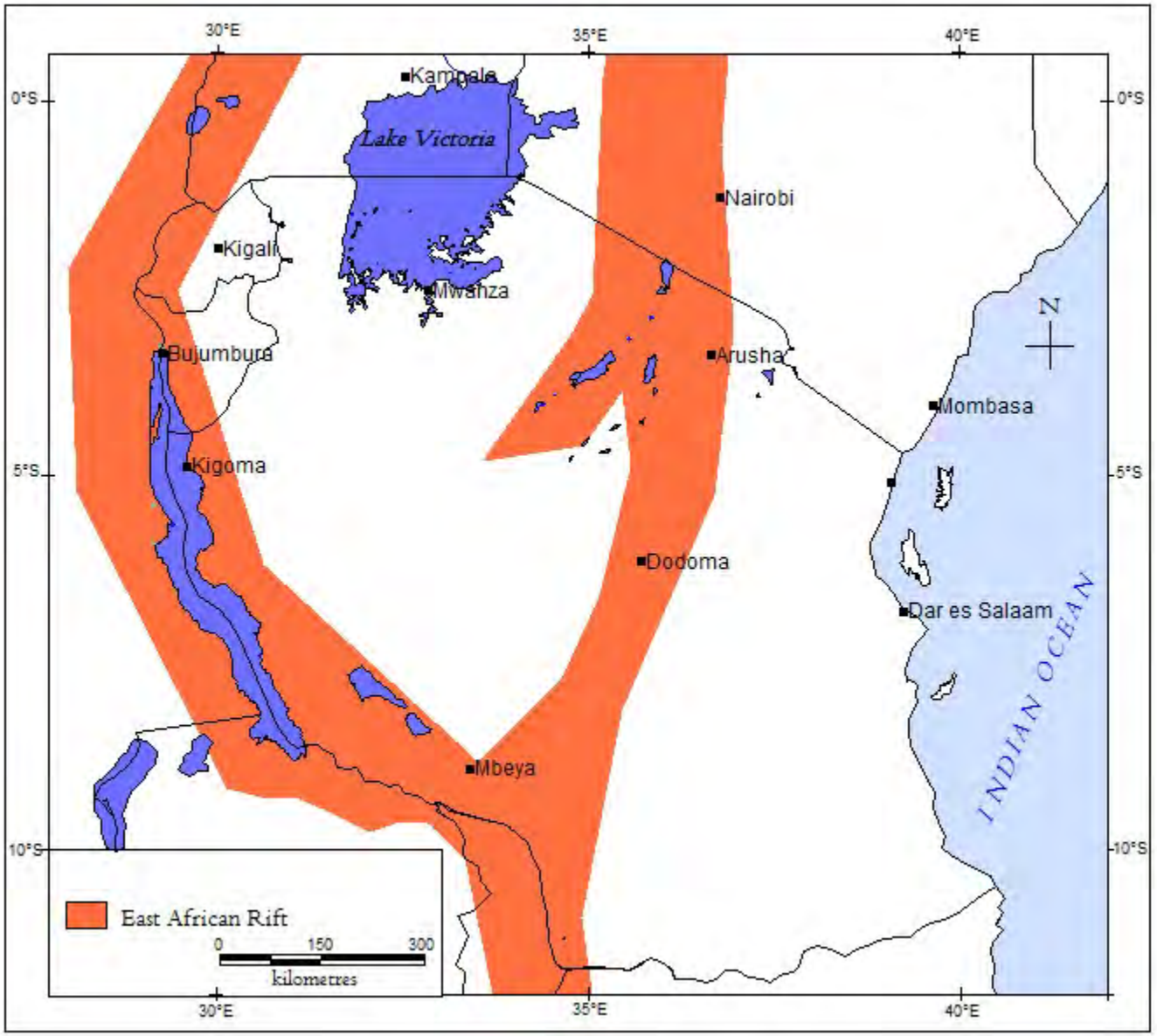
- Tanzania is one of countries which are crossed by the East African Rift Valley.
- Estimated geothermal energy potential more than 650 MW
- There are about 50 geothermal prospects in the country
- The prospects are localized in three zones.

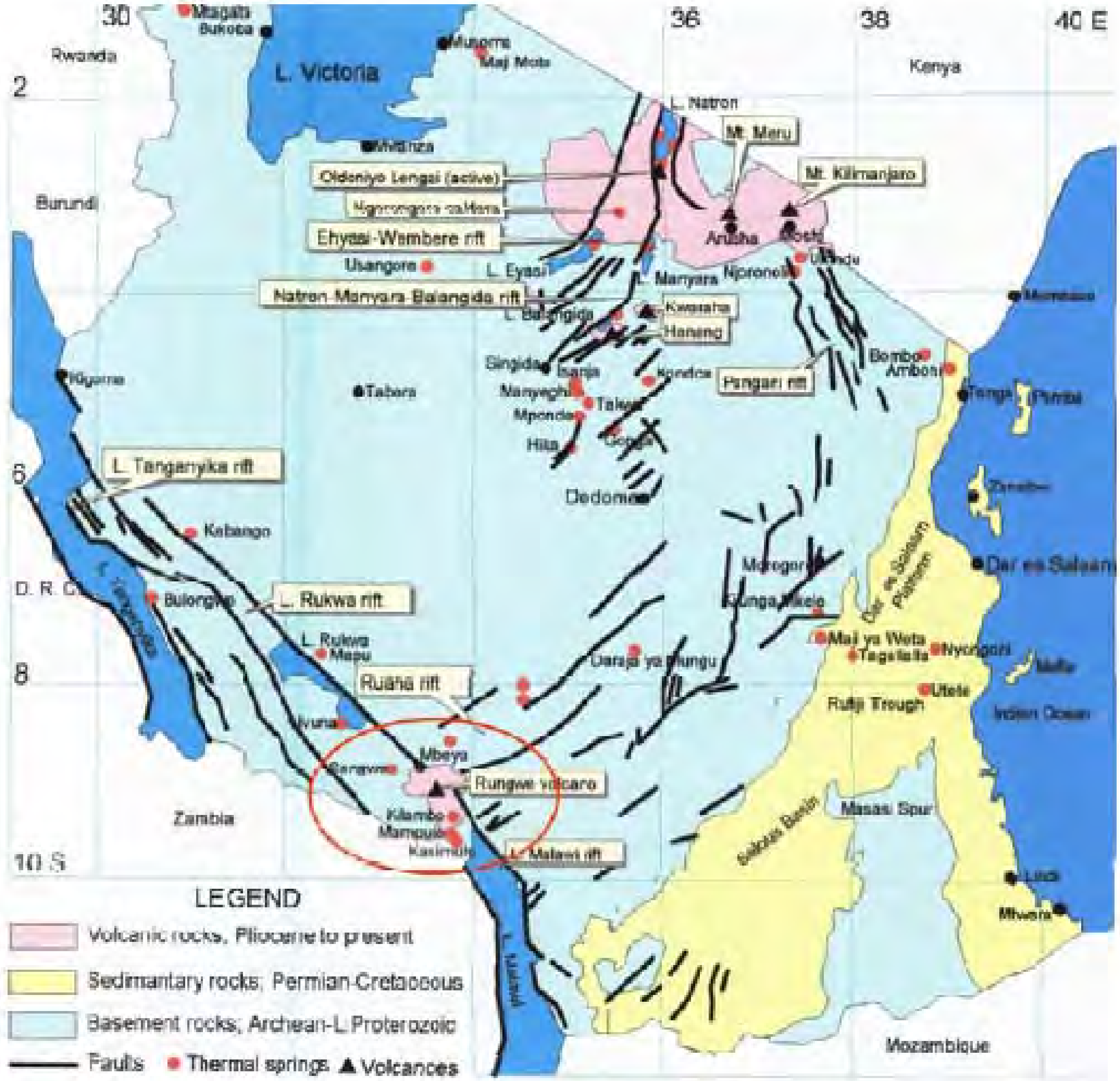
Geothermal Energy Prospects (Cont.…)

1. North-Eastern area;
   - Lake Natron, Lake Manyara and Musoma

2. South-Eastern coastal area;
   - Kisaki, Utete, Luhoi and Luhombero

3. South-Western area;
   - Songwe River, Rukwa trough, Kasumulo, Mampulo and Rungwe volcanic complex


30°E
35°E
40°E
0°S
5°S
10°S
Kampala
Lake Victoria
Nairobi
Kigali
Mwanza
Bujumbura
Arusha
Mombasa
Kigoma
Dodoma
Dar es Salaam
INDIAN OCEAN
Mbeya
N
East African Rift
0
150
300
kilometres



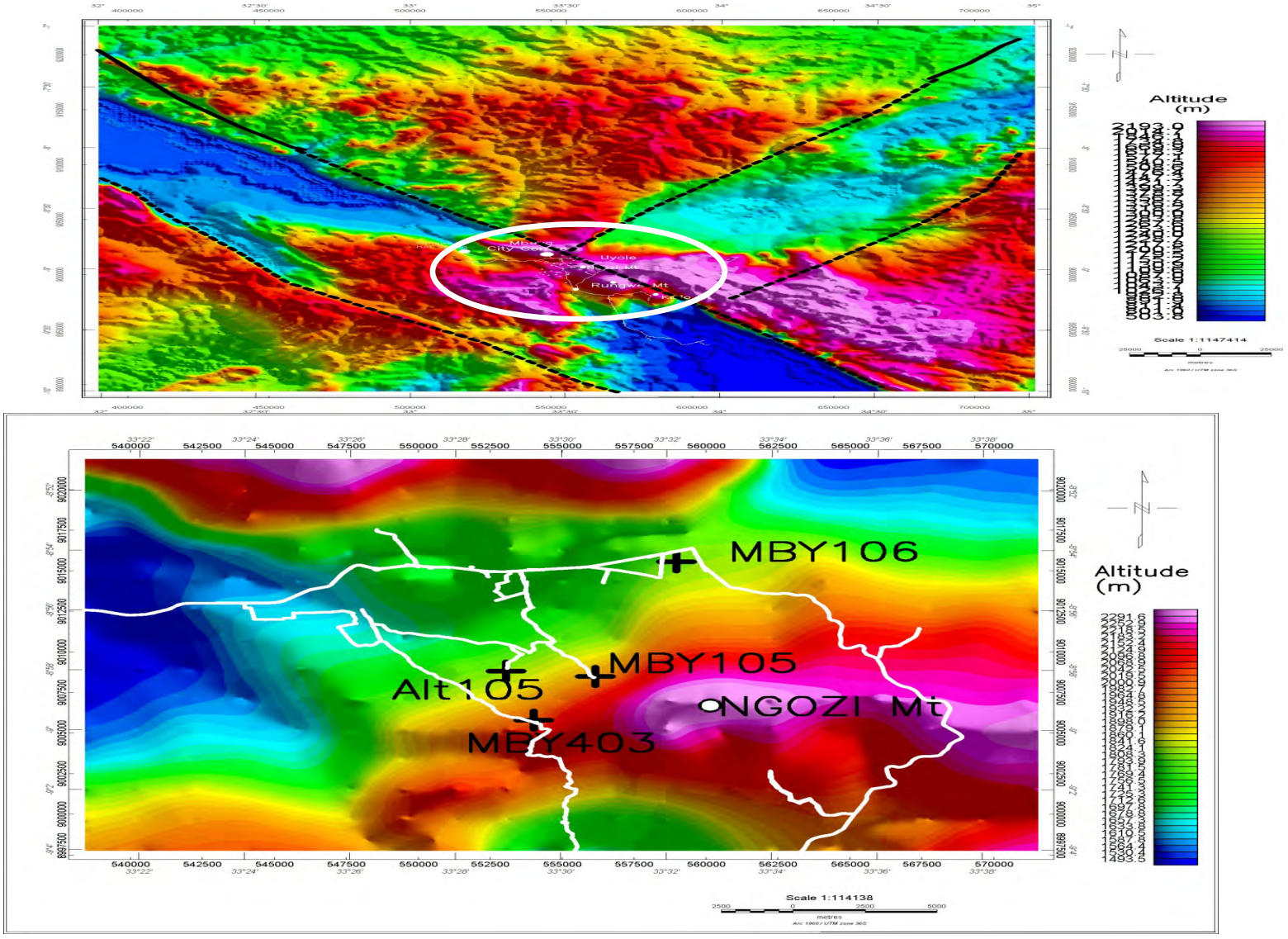
30
36
38
40 E
2
6
8
10 S
Rwanda
Bukoba
L. Victoria
Kenya
Mwanza
L. Natron
Mt. Meru
Oldoniyo Lengai (active)
Mt. Kilimanjaro
Burundi
Ehyasi-Wembere rift
Arusha
Moshi
Usangore
L. Eyasi
L. Manyara
Natron-Manyara-Balangida rift
L. Balangida
Hanang
Singida
Bombo
Amboni
Tabora
Kondoa
Pangani rift
Tanga
Pemba
L. Tanganyika rift
Dodoma
Kabango
Dar es Salaam
D. R. C.
L. Rukwa rift
L. Rukwa
Maji ya Weta
Ruaha rift
Utete
Rufiji Trough
Indian Ocean
Mbeya
Rungwe volcano
Zambia
Masasi Spur
L. Malawi rift
Lindi
Mtwara
L. Malawi
Mozambique
LEGEND
Volcanic rocks, Pliocene to present
Sedimantary rocks; Permian-Cretaceous
Basement rocks; Archean-L.Proterozoic
Faults
Thermal springs
Volcanoes

Current Status of Geothermal Resources Development

- Three locations have been identified for drilling of shallow wells at Songwe near Lake Ngozi.

- Wells will assist to collect subsurface information (temperature gradient, electrical conductivity and natural gamma).

Location and Proposed Drilling Sites



Current Status of Geothermal Resources Development (cont..)

- The GoT through MEM established a National Geothermal Task Force which comprise of members from MEM, GST, TANESCO, REA, UDSM, and TAREA.
- The overall objective is to monitor and facilitate the development of geothermal resources in the country
- Main task is to strategize and advise the Government on how Geothermal Resources Development could be effectively strengthened, coordinated and streamlined to enable the country to achieve the envisaged goal in geothermal energy sector.

Worked best for geothermal development

- **Formation of the Geothermal Task Force**: members of the taskforce are from the government, geological survey, academic institutions, power utility and the private sector. They have provided good advisory support to the government.
- **Providing training to policy and decision makers**: After the short course in Kenya they are supporting geothermal development.
- **Cooperation with development partners:** MDBs are supporting resource mapping and training of experts.
- **Streamlining institutional setup:** Geothermal development activities are now being moved to the energy department making coordination more efficient and effective

Challenges to Geothermal Resources Development

- **Limited awareness -** Inadequate awareness to most stakeholders including decision makers and planners.
- **Lack of supporting Policy, Legal and Regulatory framework** – The National Energy Policy, 2003 acknowledges the importance of geothermal but does not address geothermal development strategies. There is no Legal and Regulatory framework.
- **Lack of supporting Institutional setup** – Geothermal is handled by both mineral and energy departments, creating conflicts in licensing and coordination.

Challenges to geothermal resources development (cont.....)

- **Technical Expertise** – Inadequate human capacity and equipment to develop geothermal resources
- **Financial** – Large upfront investment in geothermal exploration and test drilling.
- **Attracting private sector:** Inadequate interest of the private sector investment in geothermal projects especially in the resource confirmation phase.

Future Development Plan

- Establish partnerships with experienced countries/geothermal companies.
- Implementation of SREP project; prepare and put in-place strategy, Legislation and Regulations for geothermal industry
- Raise awareness to decision makers to win support for development of geothermal resources.
- Capacity building to geothermal experts
- Institutional arrangements: Establishment of Geothermal Unit/Section and a Geothermal Company.
- Resource Assessment

THANK YOU FOR YOUR ATTENTION