

GLOBAL GEOTHERMAL ALLIANCE STAKEHOLDERS' MEETING

Geothermal Energy Challenges & Opportunities in EA

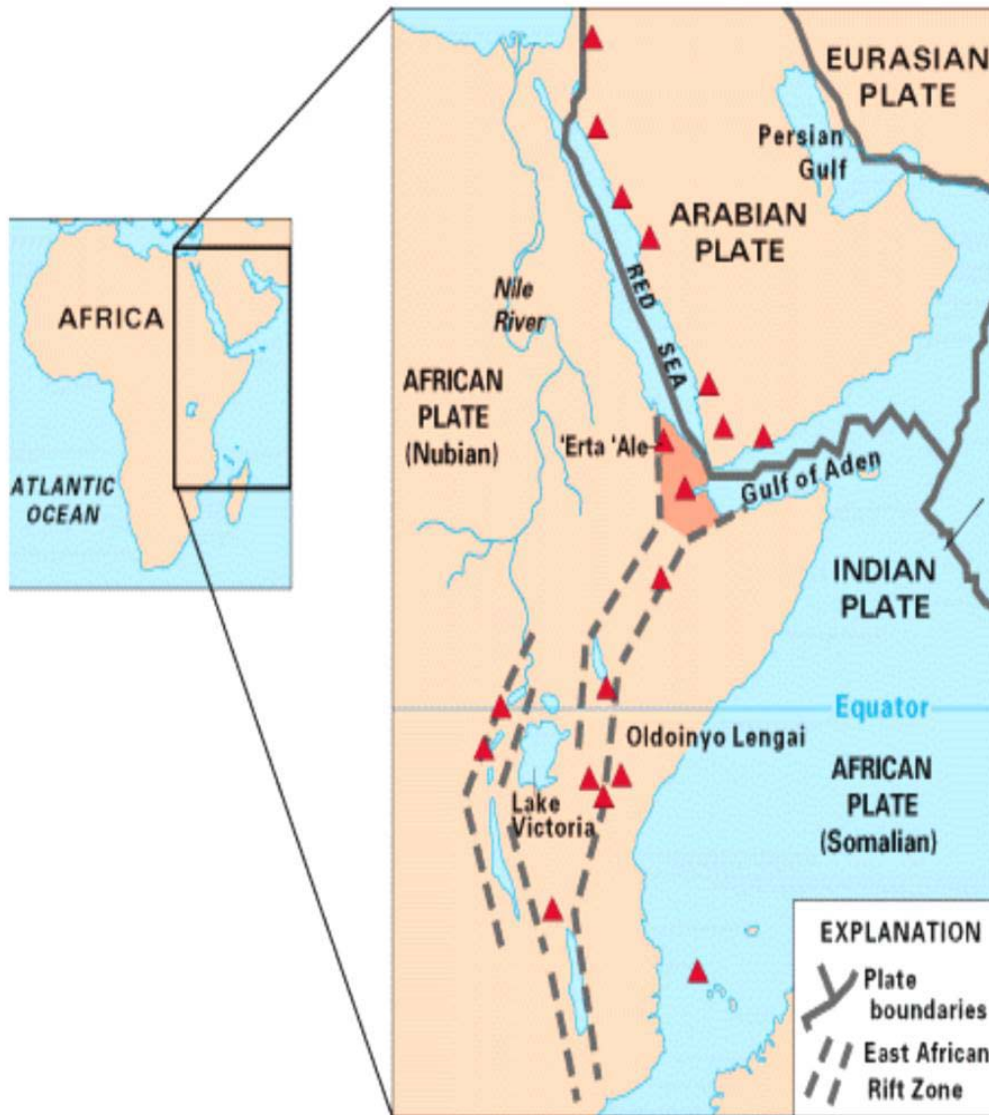
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Introduction: Geothermal in East Africa



✓ Eastern Rift

Countries

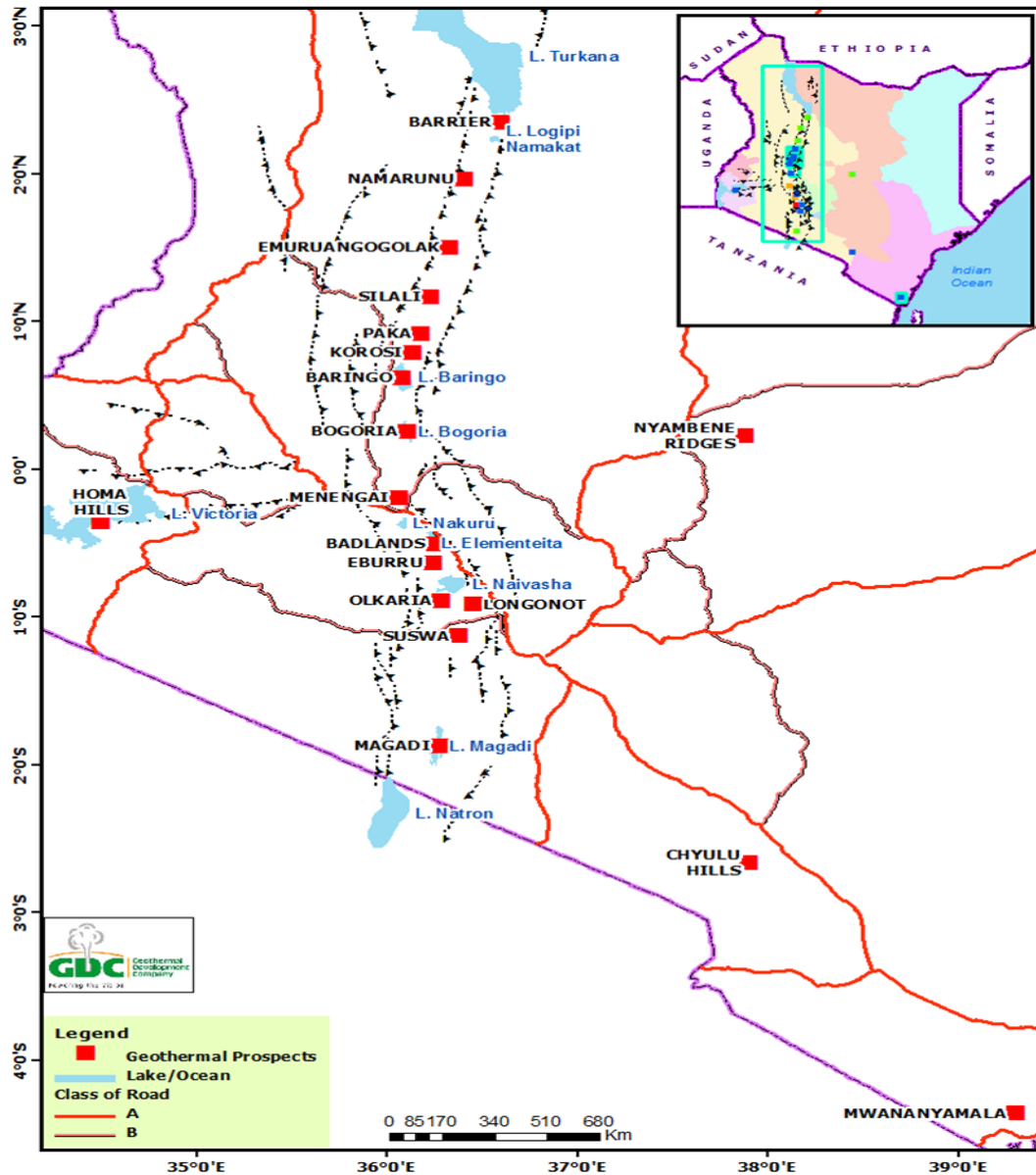
- Eritrea
- Ethiopia
- Tanzania
- Djibouti
- Kenya

✓ Western Rift

- Uganda
- Rwanda
- Burundi

Estimated Potential is in excess of 15,000 MW

Geothermal in Kenya



- ✓ Suswa,
- ✓ Longonot,
- ✓ Olkaria,
- ✓ Eburru,
- ✓ Menengai,
- ✓ Arus-Bogoria,
- ✓ Lake Baringo,
- ✓ Korosi,
- ✓ Paka,
- ✓ Lake Magadi,
- ✓ Badlands,
- ✓ Silali,
- ✓ Emuruangogolak,
- ✓ Namarunu
- ✓ Barrier
- ✓ Mwananyamala
- ✓ Homa Hills
- ✓ Nyambene Ridges
- ✓ Chyulu Hills

Phases of Geothermal Development

Resource Exploration (SPV/GDC)

- Prospecting
- Detailed Surface Exploration
- Exploration Drilling & Well
Testing

Resource Assessment (SPV/GDC)

- Appraisal Drilling
- Feasibility Studies
- Production Drilling
- Resource Management &
Further Development

Power Plant Development & Operations (IPP)

- Financing
- ESIA for Power Plant
Development
- Power Plant Construction &
Operations
- Substation & Transmission
Line

Observation on Past Development Challenges

- **Funding**
 - Financial arrangements mainly by Development Financing Institutions
- **Project Strategy**
 - Large power plants emphasizing economies of scale. Need to prove substantial steam availability before financial commitment.
- **Slow pace of development**
 - 45 MW Olkaria I Power Plant (30yrs from 1955 to 1985)
 - 105 MW Olkaria II Power Plant {17 – 23yrs from 1986 to 2003 (Unit 1 & 2) and 2009 (Unit 3)}.
 - 280 MW Olkaria IV and I (Unit 4&5) (16yrs from 1998 to 2014)



GDC Projects



PROJECT AREA	Plant Size
Menengai	105 MW
	60 MW
	100 MW
	100 MW
	100 MW
Suswa	50 MW
	100 MW
Baringo - Silali	100 MW
	100 MW

Geothermal Energy Challenges

Determination of resource depends on the geological system thus requiring exploration drilling to confirm the resource potential

Limited technical expertise in the region

High project costs needed to mobilize resources

High project risks which requires facilitation of Partial Risk Guarantees

GDC 's role in addressing challenges

Removing upfront Risks and Costs

- *Infrastructure development, surface exploration and drilling*

Direct Use

- *Industrial process heat, floriculture, aquaculture and others*

Capacity Development

- *Training to increase expert pool in the region*
- *Providing capacity to support the industry (consultancy)*

Funding

- *Providing technical input - policies, strategies and regulations*
- *Develop projects to a bankable stage (feasibility)*
- *Engage Investors and assess investment appetites*

Power Plant

- *Support Private Sector entry*
 - *Handling land and community issues*
 - *Facilitate local licensing*
 - *Evaluate and recommend technologies to IPP's*
 - *Facilitate 5,000MW steam to IPPs/KenGen by 2030*

Investment Opportunities

Supplies and Services

- Rigs, Geo-exploration tools, instruments and equipment
- Drilling materials and services
- Steam field design, equipment supply and steam pipeline construction services
- Consulting services including feasibility studies
- Direct geothermal resource uses

Indirect Opportunities

- Specialized engineering services
- Generation equipment both wellhead and conventional power plants
- Transmission and substation equipment
- Civil construction works

THANK YOU