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

<table>
<thead>
<tr>
<th>PROJECT AREA</th>
<th>Plant Size</th>
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<tbody>
<tr>
<td>Menengai</td>
<td>105 MW</td>
</tr>
<tr>
<td></td>
<td>60 MW</td>
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<tr>
<td></td>
<td>100 MW</td>
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<td>100 MW</td>
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<td>100 MW</td>
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<tr>
<td>Suswa</td>
<td>50 MW</td>
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<td>100 MW</td>
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<tr>
<td>Baringo - Silali</td>
<td>100 MW</td>
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<td>100 MW</td>
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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

<table>
<thead>
<tr>
<th>Category</th>
<th>Activities</th>
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<tbody>
<tr>
<td><strong>Removing upfront Risks and Costs</strong></td>
<td><em>Infrastructure development, surface exploration and drilling</em></td>
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<td><strong>Direct Use</strong></td>
<td><em>Industrial process heat, floriculture, aquaculture and others</em></td>
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<td><strong>Capacity Development</strong></td>
<td><em>Training to increase expert pool in the region</em></td>
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<td><em>Providing capacity to support the industry (consultancy)</em></td>
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<td><strong>Funding</strong></td>
<td><em>Providing technical input - policies, strategies and regulations</em></td>
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<td><em>Develop projects to a bankable stage (feasibility)</em></td>
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<td><em>Engage Investors and assess investment appetites</em></td>
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<td><strong>Power Plant</strong></td>
<td><em>Support Private Sector entry</em></td>
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<td><em>Handling land and community issues</em></td>
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<td><em>Facilitate local licensing</em></td>
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<td><em>Evaluate and recommend technologies to IPP's</em></td>
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<td><em>Facilitate 5,000MW steam to IPPs/KenGen by 2030</em></td>
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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