Olkaria III Geothermal power plant, Kenya

Second Geothermal Dialogue

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Why Olkaria III?

• First and only privately funded and developed geothermal project
• Staged development expansion of the plant power capacity
• Private financing with long-term support from Development Finance Institutions provided once proven the commercial operation

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**Phase 0**
- Tender for 64 MW Geothermal
- Ormat awarded the tender for BOO

**Pilot Phase**
- July: 8 MW commissioned (total 12 MW)
- Appraisal of the field for a total capacity available of 64 MW at that time

**Phase I**
- December: +4 MW commissioned (total 16 MW)
- Negotiation on PPA for plant expansion

**Phase II**
- Full plant +36 MW commissioned (total 48 MW)
- March: Financial closure

**Phase III**
- Full plant +36 MW commissioned (total 84 MW)
- Full plant +16 MW commissioned (total 100 MW)
- December: Ormat announced PPA expansion to 134 MW by second half 2016

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**Project Development**
- 1996
- 1998
- 2000
- 2001
- 2002
- 2003
- 2007
- 2008
- 2009
- 2011
- 2013
- 2014

**Agreements**
- PPA AGREEMENT with KPLC
- July 21st: First supplement agreement PPA 12 MW PLANT
- Financial closure
- PPA amended and restated
- PPA 2nd amendment to extend the capacity
Financing of the project

- Phase I entirely financed with Equity by Ormat Technologies
- International development actors supporting refinancing of equity and financing of subsequent project development

<table>
<thead>
<tr>
<th>Financial structure Olkaria III</th>
<th>Detail per Phase, USDm</th>
<th>Total contribution, USDm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Phase I</td>
<td>Phase II</td>
</tr>
<tr>
<td>Kengen</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>Ormat Technologies</td>
<td>40</td>
<td>110</td>
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<td>DEG and KfW</td>
<td>105</td>
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<td>OPIC</td>
<td>85</td>
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<tr>
<td>OPIC</td>
<td>180</td>
<td>45</td>
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<td><strong>Total Finance mobilized, USDm</strong></td>
<td><strong>635</strong></td>
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<tr>
<td><strong>Total Project Costs (excluding refinancing), USDm</strong></td>
<td><strong>445</strong></td>
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Source: CPI elaborations
Project Cash Flow

Source: CPI elaborations
Risk Allocation and Mitigation

- What was the role of the public sector in risk allocation?
- How did the private developer manage the risks?

<table>
<thead>
<tr>
<th>Exploration</th>
<th>Kenya Govt</th>
<th>MIGA</th>
<th>Lenders</th>
<th>Developer</th>
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<tbody>
<tr>
<td>Initial exploration risk (KenGen)</td>
<td></td>
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<td>Subsequent exploration risk (borne by Ormat)</td>
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<thead>
<tr>
<th>Development</th>
<th></th>
<th>Financing Risk</th>
<th>Lenders</th>
<th>Initial financing, Construction, Exploration and Commercial drilling risk</th>
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<tbody>
<tr>
<td>Forex risk and resource risk</td>
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<td>PPA payment Risk</td>
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<td>Loan repayment risk</td>
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- What was the role of the public sector in risk allocation?
- How did the private developer manage the risks?
Olkaria III: Early Takeaways

**Challenges**

- Improve overall risk management
- Exploratory and early stage risks
- Financing for plant expansion

**Responses**

- Modular approach for plant development
- Drilling data by local public actor and + 8 MW wells to initiate the plant
- GoK security package enabled refinancing of Phase I & debt financing to build Phase II & III
Thank you!
Questions for discussion

• What are the Lessons learned from this project that the Kenyan Government could consider for its geothermal development strategy going forward?

• How has the local Regulatory framework influenced the development and financing of Olkaria III?

• What has been the role of International public financial institution to ensure feasibility? What has influenced their engagement and how could they get engaged differently?

• Were all Risks allocated to those best suited to manage them?

• What are the elements of the plant development approach that could be replicated in other context?

• What strategies to increase private sector’s participation in geothermal development in Kenya to achieve its 5000 MW goal by 2030?