Global Geothermal Development Program Roundtable

- Migara Jayawardena, World Bank (Moderator)
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- Martin Schubert, KfW
- Shinji Yamamoto, IFC
- Dung, Ho, Standard Chartered Bank

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The Hague, Netherlands
Risks and Costs of Geothermal Development

<table>
<thead>
<tr>
<th>Stage</th>
<th>Risks</th>
<th>Risk Level</th>
<th>Cumulative Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Surface Reconnaissance</td>
<td>High</td>
<td>Upstream Resource Development</td>
</tr>
<tr>
<td></td>
<td>($1-2 mil)</td>
<td></td>
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<tr>
<td>II</td>
<td>Exploration Drilling</td>
<td>High/Mod</td>
<td></td>
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<tr>
<td></td>
<td>($20-30 mil)</td>
<td></td>
<td></td>
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<tr>
<td>III</td>
<td>Production Drilling</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(~$20-120 mil)</td>
<td></td>
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<tr>
<td>IV</td>
<td>SAGS + Power Plant</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(~$20-200 mil)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V</td>
<td>Operation + Maintenance</td>
<td>Low</td>
<td></td>
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</tbody>
</table>

- Identification of Resource
- (High) Resource Risk
- Risk Capital
- (Lower) Resource Risk
- (High) Financing Risk
- Construction Risk
- Financing Risk
- Operational Risk
Risks and Costs of Geothermal Development

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<tr>
<td>II</td>
<td>High</td>
<td>(High) Resource Risk</td>
<td>Downstream Plant Construction/Ops</td>
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<tr>
<td>III</td>
<td>Low</td>
<td>(Lower) Resource Risk</td>
<td></td>
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<tr>
<td>IV</td>
<td>Low</td>
<td>Construction Risk</td>
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**Risks**
- **Identification of Resource**
- **(High) Resource Risk**
- **(Lower) Resource Risk**
- **Construction Risk**
- **Operational Risk**

**Cumulative Costs**
- **$1-2 mil**
- **$20-30 mil**
- **~$20-120 mil**
- **~$20-200 mil**

**Risks Mitigation Schemes**
- **Risk Mitigation Schemes that pay out on Success/Failure**
  - Insurance
  - Guarantee

**Incentives**
- **Incentives that enhance overall project viability**
  - FIT
  - RPS (Indirectly)
  - Tax Incentives

**Initiatives that create liquidity in risk capital**
- Public financing
- Cost sharing
- Development Finance

**Incentives that create liquidity in risk capital**
- Public financing
- Cost sharing
- Development Finance

**Operational Risk**
- Identifies risks associated with operating the geothermal plant
- Includes factors such as maintenance, operational efficiency, and regulatory changes