GEOTHERMAL FINANCING AND THE NEED FOR RISK MITIGATION

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INTRODUCTION (I)

Why the need for geothermal risk mitigation?

- To allow developers to get to construction through the early stages of exploration, reservoir confirmation drilling and well field development.

- And the key to that is to reduce risk to those that provide financing at each stage of the exploration and development process.
INTRODUCTION (II)

- Unfortunately, we find ourselves in a new era relative to financing. The global credit crunch and economic contraction have made all phases of financing much more difficult.

- This has resulted in fewer players, less available equity and credit and greater risk aversion by those remaining.
FACTORS IMPACTING AVAILABILITY OF FINANCING

Other factors impacting availability of financing include:

- The number of projects experiencing financial difficulty has increased substantially over the past years and has created a great deal of negative press.

- Increased environmental concerns, especially relative to induced seismicity have made permitting more difficult by increasing public concerns and giving opposition groups a new means by which to try and block projects.
All of these factors put increased emphasis on the need to do everything possible to reduce risk to those that provide financing.
What are the key requirements of geothermal financing?

And how can governments play a major role in reducing risk throughout the development process?
KEY REQUIREMENTS OF FINANCING (I)

The major requirements are as follows:

- Fuel Supply – The Geothermal Resource:
  Access through concessions and production license.

- Regulation:
  Reducing regulatory risk expedited process of environmental reviews, permitting and licensing.

- Developer Qualifications:
  Experienced in project development and preferably with equity commitment.
KEY REQUIREMENTS OF FINANCING (II)

- Engineering:
  Reservoir and construction – well established firms that are highly respected preferred.

- Equipment:
  Proven track record in similar applications, prefer manufacture warranties.

- Construction:
  Well known, highly regarded experienced companies coupled with a completion guarantee.
KEY REQUIREMENTS OF FINANCING (III)

- **Operation and Maintenance:**
  Experience in operating geothermal fields and plants. (Capacity and availability are the keys to revenue generation.)

- **Power Sales Agreements:**
  Guaranteed revenue stream, reasonable terms, reasonable prices without regulatory out clauses.
FINANCING PHASE ONE: EXPLORATION AND RESERVOIR CONFIRMATION DRILLING

The three earliest and highest risk phases – reconnaissance, resource evaluation, and reservoir confirmation drilling – present the most difficulty for those raising capital.

Geothermal developers must target investors’ comfortable with high levels of risk and long-development horizons. The task is further complicated due to a lack of familiarity with geothermal power by those most able to provide equity financing. And in our case a lack of experience in working in Africa.
PRIMARY SOURCES OF RISK CAPITAL

The primary sources of risk capital include:

- Private equity placements of a portfolio of projects.
- Exchange-traded corporate equity.
- Balance sheet financing by established firms.
## EARLY-STAGE EQUITY FINANCING REQUIREMENTS

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<tr>
<th>Sources</th>
<th>Financial Metrics</th>
<th>Non-Financial Requirements</th>
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<tr>
<td>Public Exchanges and Private Equity</td>
<td>• 2x to 5x multiple on investment.</td>
<td>• A long-term concession (20-30 years beyond initiation of production).</td>
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<td>• Reasonable financial plan including wells costing $2 to $6 million each and</td>
<td>• Production licenses.</td>
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<td>anticipation of 2 to 5 failed wells for 10 producing wells.</td>
<td>• All required drilling and construction permits.</td>
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<td>• Clear and secure access to resource area to explore and develop (lease/concession).</td>
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<tr>
<td>Corporate Balance Sheet (established market</td>
<td>• ROE minimum 10%, preferably 13+%.</td>
<td>• Respected reservoir engineering firm.</td>
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<td>investors)</td>
<td>• ROE 100 to 200 basis points higher than wind.</td>
<td>• Qualified management team: Ability to raise capital and carry out business plan.</td>
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<td>• Risk mitigation strategies, e.g., drilling in a proven field.</td>
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ROLE OF GOVERNMENT PROGRAMS AND INCENTIVES (I)

The role of government programs and incentives:

1. Government grants, cost-sharing, and drilling insurance can all contribute greatly to the obtainment of risk capital regardless of the source.

2. Availability of a Renewable Portfolio Standard and such things as a Production Tax Credit will also be looked upon favorably by equity investors.

3. A reasonably attractive Feed-In Tariff (generally over $0.10 US/kWh).

4. Equitable and attractive tax policy that encourages international investments and development.
Such incentives can be a significant physiological boost and instill confidence in investors.
However, all such incentive programs to be truly meaningful and effective must give full consideration to the needs of the multi-year geothermal project development process (generally 5-8 years).
Once a successful reservoir confirmation well or wells has been completed, mezzanine debt financing which allows the provider to benefit from the equity upside of the project becomes available:
MEZZANINE DEPT FINANCING

- The financing is used for the drilling out of the well field, well testing and the preparation of a reservoir engineering report.

- The debt is secured by liens on the projects assets, allowing the provider to take possession of the project should the developer default.

- Mezzanine financing is typically repaid with proceeds from a senior loan used for plant construction.
REQUIREMENTS FOR MEZZANINE DEPT FINANCING

- Lender can require an equity position ranging from a low of 20% to a high of 30% of the project.

- Requires a minimum of 25% developer equity/contribution.

- Developer must have a signed PPA with attractive terms.

- Reservoir must have been proven by drilling and flow testing the resource – completing 2-3 successful wells is ideal and a preliminary reservoir report must be available.
## MEZZANINE FINANCING REQUIREMENTS

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| Historical mezzanine debt or bridge loan providers | • ROE usually in the 25%-29% range, +30% preferable, typically including debt priced at 15% plus 10% to 30% of project equity. | • A long-term concession (20-30 years beyond initiation of production).  
• Production licenses.  
• Clear and secure access to resource area to explore and develop (lease/concession).  
• Respected reservoir engineering firm.  
• A resource assessment by well-respected firm.  
• PPA with credit-worthy counter party.  
• Drilling contract in place. |
| Potentially project financiers seeking new markets | • Developers able to provide 20% to 25% of the equity themselves. | |

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CONSTRUCTION FINANCING

• Once the well field is substantially completed (generally 80% of the required steam/brine flow), the developer can seek project/construction debt to finance construction including completion of drilling, construction of the gathering system and the transmission intertie.

• The construction loan is often repaid with a term loan, generally with a term approximating that of the PPA term, although some construction loans have a term in excess of the construction period (5-7 years).

• This provides the developer/operator time to establish an operation/performance record which can result in a lower cost for term financing.
REQUIREMENTS FOR CONSTRUCTION FINANCING (I)

- 50-80% of production proven – ideally with long-term flow and interference testing and a comprehensive reservoir engineering report. (The only one you need to take with you to the bank is the reservoir engineer!!)

- Substantial equity on the part of the developer.

- All permits, licenses and environmental approvals should be in hand or at a minimum have assurances that they will be available when required. (Financiers do not like regulatory risk).

- A sound business plan.

- Experience in project development on the part of the developer.
REQUIREMENTS FOR CONSTRUCTION FINANCING (II)

- Proven equipment with a track record of performance and with appropriate warranties.

- An EPC contract with an experienced firm familiar with the design and construction of similar facilities and with penalties for non-performance.

- Operation and maintenance experience or contract for the provision of same.

- A PPA that obligates the off-taker to purchase power for the term of the debt at a price which covers debt service, operation and maintenance, and developer/equity investor anticipated return.
### POSSIBLE CONSTRUCTION FINANCING REQUIREMENTS

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<td>For Debt:</td>
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<td>• Insurance companies</td>
<td>• Previous debt (lending) to equity (ownership) of 75%:25%, now requiring 40% to 45% equity.</td>
<td>• PPA required.</td>
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<td>• Large pension funds</td>
<td>• Debt service coverage ratio of 1.5 to 1.75 (previously 1.4 to 1.5).</td>
<td>• Construction permits.</td>
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<td>• Selected banks</td>
<td>• 7-year mini-perm (two years construction and five years operation) priced in May 2010 at LIBOR plus 325 escalating to plus 375*.</td>
<td>• Interconnection Agreement.</td>
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<td>Private equity investors</td>
<td>• 20+% returns</td>
<td>• Engineering, procurement, construction (EPC) contract that wraps around the entire plant must be in place.</td>
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<td>• Engineer’s report stating that available resources can support a 20-year financing.</td>
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<td>• Experienced management team.</td>
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<td>• At least 50% to 80% of production wells need to be drilled.</td>
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ROLE OF INCENTIVES

A number of government incentive programs can greatly facilitate obtaining construction financing:

- Government guaranteed loans
- Investment tax credit
- Production tax credit
- Accelerated depreciation
Finally, when production begins it is not the time to relax – meeting the requirements of term financing and the terms of the Power Purchase Agreement are dependent upon achieving the capacity and availability goals built into the business plan.
Any significant change in governmental policies, environmental laws, tax programs or incentive programs can have a devastating impact upon long term economic viability on any project.
Questions?

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