FINANCING GREENFIELD GEOTHERMAL PROJECTS

Eyob Easwaran
Free Agent

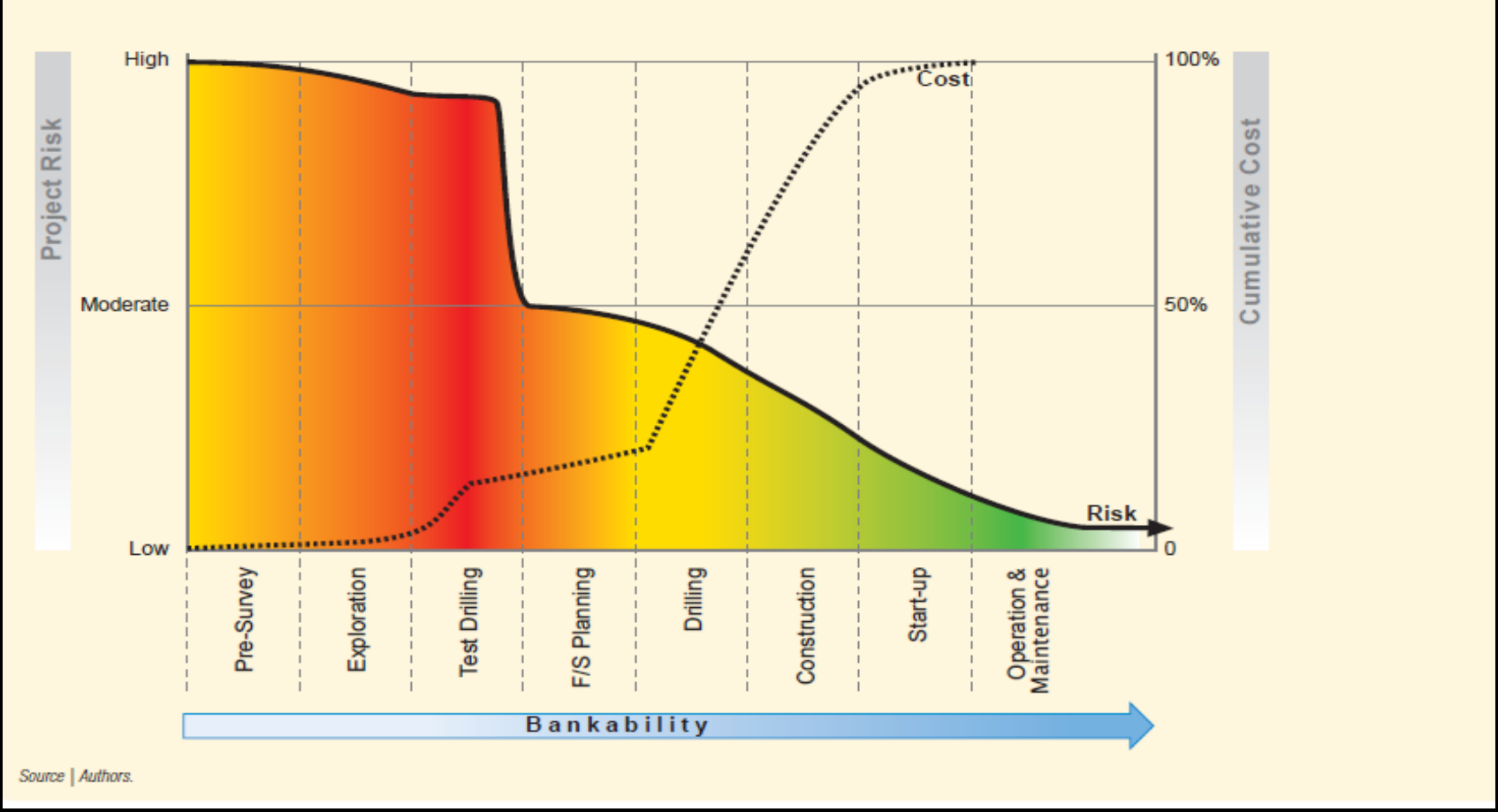
PRIVATE FINANCING SOURCES

- Developers willing to de-risk early stage resource risk
- Strategic investors such as global IPP's
- Infrastructure, Private Equity and Hedge Funds with specific region and sector mandates
- Original Equipment Manufacturers
- Development Finance Institutions
- Direct Institutional Investors
- Local investors willing to diversify

DEVELOPERS AND DEVELOPMENT CAPITAL

- Developers are critical players in de-risking projects for financial investors
  - Sophisticated in managing project risk and development
  - Many times their role is not well understood
  - Could be confused with flippers
- Development capital very scarce, expensive and binary in nature
  - Can face total write off if not successful in reaching financial close
  - Requires development cost recovery and premium at financial close and COD
- A proven Developer with Development Capital can serve as the catalyst to de-risk an early stage greenfield project

PROJECT COST AND RISK PROFILE AT VARIOUS STAGES OF DEVELOPMENT



Source: ESMAP Geothermal Handbook : Planning and Financing Power Generation

A fumarole could be a good indicator of a potential resource but it is far from telling whether the resource will make money

RISK ASSUMPTION

Pre-Drilling Resource Risk	Post-Drilling Resource Conversion
Highest level of risk	Moderate to low level of risk
Uncertainty with quantity and quality of resource	Proven or quasi-proven resource
Long lead times to construction	Short lead times to construction
Non-bankable and difficult to finance	Bankable and less difficult to finance
Easier as Government, Multilateral or DFI undertaking	Private sector undertaking as an Energy Conversion Contract • Steam Purchase Agreement • Power Purchase Agreement

INVESTMENT RISKS AND TIMING

Investment Risks	Timing of Risk
Sovereign Risk	
• Macroeconomic Conditions	Initial
• Foreign Exchange Reserves	Constant
• Political Situation	Constant
Finance	
• Credit Risk	Initial
• Resource Viability Risk	Initial
• Grid Interconnection	Initial
• Fiscal and Tax Incentives	Constant
Regulatory	
• Licensing and Permitting	Initial
• Tariff	Periodic
• Environmental	Periodic
Market	
• Competition	Constant
• Power Purchase Agreement	Initial / Periodic
Legal	
• Contract Enforceability	Constant
• Governing Law	Constant
• Conflict Resolution	Constant

FISCAL AND REGULATORY INCENTIVES

Various incentives are in place in the US, Europe and other parts of the world, including:

- Production Tax Credit (PTC) - a credit over time based on the amount of energy produced
    - An inflation-adjusted per-kilowatt-hour (kWh) tax credit for electricity generated by qualified energy resources and sold by the taxpayer to an unrelated person during the taxable year. The PTC in 2016 is US$0.023/kWh. The duration of the credit is 10 years after the date the facility is placed in service for all facilities placed in service after a certain year (August 8, 2005).
- Investment Tax Credit (ITC) - an upfront credit against the capital expense used to build out a project
    - A grant of 30 percent of the total cost of qualified projects – if at least 5 percent of the project has been built prior to a certain year (December 31, 2010). The other cash option is to sell the ITC to financial/institutional investors who will buy them

FISCAL AND REGULATORY INCENTIVES (CONTINUED)

- Feed In Tariffs
  - A policy mechanism designed to accelerate investment in renewable energy technologies by offering long-term contracts typically based on cost-based compensation and ensuring the price certainty/guarantee that helps finance renewable energy investments.

Table 2. Examples for Geothermal FiTs.

	Years	Tariff, EURO / kWh
Switzerland (<5 MW)	20	0.489
France		
continental	20	0.200
overseas territories & Corsica	20	0.130
Croatia	12	0.168
Germany (<10 MW)	20	0.250 (since 2012) + 0.05 technology bonus for petrothermal
Greece	20	0.150
Taiwan	20	0.117
Ecuador		
continental	15	0.098
Galapagos	15	0.108
Kenya	20	0.089
Ukraine	10	0.080
Austria	13	0.075

Source: "Feed-in Tariffs Blessing or Curse for Geothermal Energy? Worldwide Background and Overview", E. Buescher, GRC Transactions, Vol 36, 2012

CONCLUSION

- Risk sharing in early stage development critical for success
- Transparent and easy to execute contractual structure
- Attractive fiscal and regulatory incentives
- Ultimate goal is on certainty of delivering electrons to the grid and being paid for it
- Easier form of engaging financiers is through energy conversion contracts
- Upfront understanding of responsibility and economics of make up wells key to long term success
- Regardless, Geothermal is a proven source of baseload power