Global Geothermal Development Plan

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The Global Geothermal Development Plan
Geothermal: 
A Global Coalition Needed for Clean, Reliable and Green Energy
Geothermal (hydrothermal) is wonderful ...

- **Geothermal energy = strong energy security benefits**
  - Renewable
  - Low operational costs
  - Long lifetime
  - Dispatchable nature (24/7)
  - (often) Least cost @ US cents 8-12 per kWh

- **Geothermal energy = additional development benefits** from heating and cooling (canning, drying, etc.)

- **BUT,**
  - Long project lead time means that terms of financing tend to determine the final price outcome
  - Significant risks (resource, regulatory)
  - 11GW installed worldwide, potential much larger
Lessons learnt

Validating geothermal resource through test drilling is capital intensive and risky.
Commercial financing for test drilling is hard to find.
Private equity (and government support) are only capital to undertake test drilling.
Resource risk penalizes tariffs

Much higher levelized tariff required because:
- Lead time is longer by 3 years
- Required rate of return on equity (Re) is higher (25%) due to high risk premium of early entry
- The $30m cost of exploration (i.e., test drillings) is still ahead
- Result: levelized tariff >14 US cents/kWh (for 50 MWe power plant!)
Scaling-up geothermal through innovative financing

**US cents 8 – 11 per kWh**
Required levelized tariff reduced because:

- Lead time is shorter by 3 years
- Required rate of return on equity (Re) is lower due to reduced risk
- Multi-year amortization of contingent grant / loans is possible
- Some of the exploration cost may be grant financed

US cents 8 – 11 per kWh
Resource risk mitigated: learning by doing

Average drilling success rate vs. number of wells drilled in Indonesia

Source: Sanyal & al. forthcoming 2012, ESMAP
Are MDBs focusing on mitigating resource risks?

(well... not really)

(Three Decades of Cumulative Multilateral Development Bank Lending for Geothermal Energy Development)

Exploratory phase
- World Bank: 117
- African Dev. Bank: 4
- Asian Dev. Bank: -
- European Inv. Bank: -
- Interamerican Dev. Bank: 3

Production phase
- World Bank: 1,544
- African Dev. Bank: 124
- Asian Dev. Bank: 554
- European Inv. Bank: 256
- Interamerican Dev. Bank: 403

Total
- World Bank: 1,710
- African Dev. Bank: 129
- Asian Dev. Bank: 557
- European Inv. Bank: 256
- Interamerican Dev. Bank: 416

Total $3,068
Building a global coalition of funding agencies

Concept being developed in consultation with...
Global Geothermal Development Plan (GGDP)

Scaling-up geothermal by addressing the resource risk through sustained international effort

Raising $500M
initial 25 projects funded
for large scale exploratory drilling activity
(>100 wells)

How Transformational?

• Expands reach of donors’ support by diversifying risks across multiple investments
• Opens new areas for development by enabling riskier investments
• Catalyses investments in entire sector value chain by validating geothermal resources
• Triggers reduction in final costs of electricity by reducing the need for equity
GGDP Design principles

Target resource risk to expand market for commercially viable projects

Design instruments focused on mitigating resource risk (primarily expenditures for test drilling programs and well testing activities)

Deploy financial instruments to re-distribute resource risk between developers, donors and private sector (financiers, insurance companies, etc)

Optimize donor concessional resources by:

- Customizing the level of concessionnality
- Utilizing existing MDB instruments to address other projects risks (political, credit, etc.) + MDB regular financing
- Pre-identifying a pipeline of investment-ready resource assessment projects (drilling programs) with diverse risk profiles
GGDP Financial Instruments

- Partial capital grant
- Contingent loan convertible to partial grant
- Soft loan
- Partial grant to buy down insurance/risk guarantee costs

concessionnality

project total risk
GGDP Implementation Arrangements

GGDP Trustee

Global Geothermal Development Program

- Helps identify investments
- Develops financial plan
- Supports project preparation

Pipeline of investment ready Projects

- Procurement of drilling programs
- Project implementation by MDBs & bilateral donors

Operational Manual
Env. Safeguard Mgt Framework

determining the investment readiness of eligible prospects
Standard indicators for promotion of clean energy
- Tons of GHG avoided
- Leveraged capital for geothermal energy capacity development
- Reduction in levelized electricity tariff

Geothermal resource assessment specific indicators
- Validating adequacy of resource base (commercial attractiveness of potential, MW)
- Validating adequacy of well productivity (>2-3MW)
- Validating acceptable levels of drilling cost per well (function of depth, size)
- Validating benign nature of fluid chemistry
GGDP: country scope for a significant share of supply?

38+ developing countries
Expand energy access
Increase energy security
Reduce fossil fuel imports
Reduce GHG emissions
Drive economic growth

Near term test drilling targets

Source: ISOR / ESMAP, 2012
You are invited to join the preparation of the Global Geothermal Development Plan

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