

Geothermal Energy and Sustainable Development

Tom Hamlin
Climate Change Coordinator
Global Environment Facility /
Technology Industry and Economics



United Nations Environment Programme

برنامج الأمم المتحدة للبيئة • 联合国环境规划署

PROGRAMME DES NATIONS UNIES POUR L'ENVIRONNEMENT • PROGRAMA DE LAS NACIONES UNIDAS PARA EL MEDIO AMBIENTE

ПРОГРАММА ОРГАНИЗАЦИИ ОБЪЕДИНЕННЫХ НАЦИЙ ПО ОКРУЖАЮЩЕЙ СРЕДЕ

Is the Baseline projecting sustainable development?

- Fossil Fuel dominated power sector
 - high recurrent costs
 - imported fuel
 - local pollution, global greenhouse gas emissions
- Hydro
 - Potential exhausted?
 - Seasonal or drought prone?

Climate Change Impact

- sea level rise (freshwater lens salination?)
- increasing severity and frequency of storms (more oil spills?)
- drought

Promoting the alternative development scenario

- baseline fossil fuel investments are diverted to geothermal energy
 - life cycle and economic feasibility criteria replace short term financial feasibility
- carbon dioxide emission credits (investment stage)

Incremental Cost alternative

- Operational Program #6 Promoting the Adoption of Renewable Energy by Removing Barriers and Reducing Implementation Costs
- Incremental cost of removing barriers
 - Policies for independent power purchase, tax incentives, environmental impact and socio/economic studies
 - Technical Assistance
 - Risk sharing, contingent finance, near commercial business models

Incremental Cost

- Baseline: ongoing activity at the national or international level that contributes to sustained activity (current fossil fuel use)
- Increment: the intervention that will divert the baseline to the alternative
- Alternative development (generally expanded geothermal energy use in the market)

Geothermal projects in the GEF

- World Bank: Leyte Philippines (GEF Pilot program)
 - IFC: Olkaria (Cancelled - drilling risk only), Vanuatu, Samoa (stalled)
 - UNDP Djibouti (Cancelled - single developer, could not establish the deal)
 - IADB Guatemala (drilling risk guarantee, proceeding)
- UNEP/KfW African Rift Geothermal (project



Lessons learned

- Single developer awards stall ::>: transaction advisor service
- private capital to high risk drilling activities results in high Power Purchase Agreement prices :> early resource risk best shared by public agencies against future royalties
- turn-key plants do not work (Ethiopia) > policy frameworks and capacity building works (Kenya, Philippines)

Logical Framework for GeoCaribes project

- Goal: GHG reductions and sustainable development
- Outcomes: a sustained geothermal market with replication and scale-up in the Caribbean and SIDS
- Outputs: direct project impact in terms of feasibility studies and financed availability, cost reduction
- Activities: Barrier removal, promotion, capacity building, risk sharing instruments

GEF Priorities

- Policy environments for RETs
- High volume markets for equipment and processes
- Productive uses of RETs (direct uses?)
- Increasing access to finance



The Geothermal Sustainable Alternative

- an expanding geothermal market with
 - lower price power
 - minimal environmental impact