

# PROJECT INFORMATION DOCUMENT (PID) CONCEPT STAGE

Report No.: PIDC25143

<b>Project Name</b>	Indonesia: Geothermal Energy Upstream Development Project (P155047)
<b>Region</b>	EAST ASIA AND PACIFIC
<b>Country</b>	Indonesia
<b>Sector(s)</b>	Other Renewable Energy (100%)
<b>Theme(s)</b>	Infrastructure services for private sector development (40%), Climate change (30%), Other environment and natural resources management (30%)
<b>Lending Instrument</b>	Investment Project Financing
<b>Project ID</b>	P155047
<b>Borrower(s)</b>	Ministry of Finance, Republic of Indonesia
<b>Implementing Agency</b>	Bioenergy Department, Ministry of Energy and Mineral Resources
<b>Environmental Category</b>	A-Full Assessment
<b>Date PID Prepared/Updated</b>	17-Apr-2015
<b>Estimated Date of Appraisal Completion</b>	17-Dec-2015
<b>Estimated Date of Board Approval</b>	29-Mar-2016
<b>Concept Review Decision</b>	

## **I. Introduction and Context**

### **Country Context**

1. Over the past decade Indonesia has seen strong growth and job creation. Following the recovery from the Asian financial crisis, annual growth averaged 5.6 percent over 2001-2012. However, the commodities downturn has reduced potential Gross Domestic Product (GDP) growth and exposed structural challenges for Indonesia's economy. Sound macroeconomic management has helped to mitigate the impacts of a major trade shock and a bout of external financing pressure in mid-2013. Fiscal management has been prudent, but weak revenue performance has emerged as a major fiscal challenge. Within this context, much-needed increases in development spending, notably infrastructure, though below budgeted levels, remain in prospect and will be critical to unlocking Indonesia's development potential in the years to come.

### **Sectoral and Institutional Context**

2. Indonesia's rapid economic growth – and with that poverty reduction and shared prosperity efforts – has been fueled by an ever-expanding power sector. Within this context, high electricity demand is a key development challenge. In recent years, the Government of Indonesia (GoI) has

launched two 10 GW Fast-Track Programs to increase the country's electricity generation capacity to meet demand. The second program is predominantly made up of renewable energy, with geothermal making up 40 percent of the target.

3. Geothermal power is one of the best options to diversify Indonesia's energy mix. It is a baseload generation technology not subject to the intermittency and variability associated with most renewable electricity sources. Geothermal resources in Indonesia are also ideally located on islands with major population centers where electricity demand is high and continues to grow. Furthermore, as an indigenous and non-tradable energy source, it will also enhance the country's energy security and serve as a natural hedge against the volatility of fossil-fuel prices.

4. Indonesia's geothermal power potential is estimated at around 27,000 MW, roughly 40 percent of the world's endowment. However, less than ten percent of the total geothermal resources in Indonesia are currently developed to produce power. Geothermal development is a pillar of the country's Low Carbon Growth Strategy and a key development priority for the GoI. As part of the Electricity Supply Business Plan 2015-2024, or Rencana Usaha Penyediaan Tenaga Listrik (RUPTL), GoI has set a target of installing 4,800MW of geothermal capacity of which over 90% is to be developed by Independent Power Producers (IPPs). Roughly one-fourth of the targeted megawatts is scheduled to come on-line as part of the 2015-2019 35GW plan to address the country's most immediate energy needs, leaving the bulk of geothermal investments for the period 2020-2024.

5. In an effort to support geothermal development, GoI through MOF's Indonesia Investment Agency (PIP) established the US\$300 million Geothermal Fund Facility (GFF) in 2011. However, geothermal development has stalled due to a combination of insufficient power purchase prices, cumbersome licensing arrangements and insufficient financial mitigation from the GFF, which has not yielded a satisfactory operating model to de-risk projects at the exploration stage. The GFF aimed to provide loans against collateral only, ultimately resulting in a zero-disbursement rate. Consequently, only a handful of existing geothermal operations (brownfields) in Indonesia have expanded production over the past decade while no new greenfield projects that carry greater risks have been developed.

6. GoI has realized that the present framework for geothermal development has been ineffective and unable to deliver the planned capacity of clean domestic electricity generation. Important steps have already been taken to remedy these shortcomings. With support from World Bank, Asian Development Bank and several bilateral development partners, a new Geothermal Law was passed in 2014 addressing institutional, regulatory and tariff constraints.

7. The 2014 Law is an important first step but GoI realizes that further regulations will be required to set out detailed implementation guidelines and procedures for the Law and to address other important shortcomings in tender processes, forestry and environment safeguards procedures, etc. In addition, the GFF will need to be restructured so that it can effectively provide the risk mitigation needed to attract investments in exploratory drilling from project developers.

### **Relationship to CAS**

8. The Joint IBRD/IFC/MIGA Country Partnership Strategy (CPS) with Indonesia for FY13-15 is aligned with the country's Master Plan for "Acceleration and Expansion of Indonesia's Economic Development 2011-2025", which seeks to accelerate development through a pro-growth,

pro-jobs, pro-poor and pro-green strategy.

9. The proposed project supports two pillars identified in the draft 2015 Systematic Country Diagnostics (SCD) that are necessary to reduce poverty and increase shared prosperity in Indonesia, namely: (i) economic growth, which may be hampered by inadequate electricity infrastructure; and, (ii) the quality of natural resource governance and management, through an expansion of renewable energy development.

## **II. Proposed Development Objective(s)**

### **Proposed Development Objective(s) (From PCN)**

10. The Project Development Objective (PDO) is to facilitate investments in geothermal-based electricity.

### **Key Results (From PCN)**

11. Key results indicators to monitor progress toward achievement of the PDO are:
- Financial closure on geothermal power plant projects securing investments in new capacity (MW)
  - Private capital mobilized (US\$)
  - Estimated GHG emission reduction compared to a business-as-usual baseline (tCO<sub>2</sub>/year)

## **III. Preliminary Description**

### **Concept Description**

12. Project Design: The proposed intervention complements GoI's efforts to reform the country's energy sector, supported through a wider WBG assistance program including a Development Policy Loan which is expected to include specific prior actions and indicative triggers related to geothermal development.

13. The Project will specifically address (i) the need for continued support for implementation of geothermal policy, tariff and licensing reform building on recently completed and ongoing technical assistance (TA) engagements and (ii) development of an effective risk mitigation tool in support of geothermal exploratory drilling using successful elements from international best practice.

14. The Project will target current and prospective geothermal business permits holders across the Indonesian archipelago, including the main geothermal markets of Java and Sumatra. For prospective licensees, the Project's emphasis will be on the utilization of medium-enthalpy resources to displace high-cost fossil alternatives outside the main load centers in Eastern Indonesia – where electrification rates are lowest and poverty rates are highest.

15. The proposed Project consists of two components. Component 1 would target the operationalization of the GFF through a risk-sharing arrangement with a CTF US\$50 million convertible loan. Support eligibility would apply to both prospective and existing license holders.

### **Prospective Licensees:**

16. If the exploration – to be funded by GFF with support from the Project and executed by a service company on behalf of GoI – is successful, a development and operation license will be

issued to a developer through a competitive auction. At the time of financial closure, the developer will be required to refund the total costs of the exploration to GFF plus a risk premium to be paid to a dedicated facility. This replenishment of the GFF and CTF support would ensure sustainability in the risk mitigation scheme.

17. If the project does not come to financial closure, the licensee will not pay the full cost of the exploration back to the GFF. At this point the GFF will be refunded from the funds accumulated in the CTF-backed dedicated facility. If the funds are insufficient, part of the shortfall will be covered with a WB/CTF contingent loan pay-out, which could be partially or fully refunded if the dedicated facility receives more funds from risk premiums.

18. Finally, it is suggested that the CTF funds will be given as a loan, and that the loan be converted into a grant if there is an unpaid balance in favor of the WB/CTF after 15 years of operation.

#### Existing Licensees:

19. Existing license holders would be entitled to sell their geotechnical data related to a given field to the Geological Agency (Badan Geologi) at a discounted price. The returned license could then be re-auctioned and, upon new licensing, the GFF and dedicated facility procedures and conditions for prospective license holders would apply.

20. Component 2 would comprise a coordinated multi-donor technical assistance package for which the key partners and areas of support have been identified as follows:

- Geothermal Up-Stream Development (US\$6.25 million): Building on the previous GEF engagement with the Indonesian geothermal sector, GEF support will mainly be focused on strengthening the indigenous capabilities for geothermal development by providing the resources needed in order to establish an efficient and effective exploration program. This effort will be supported by the Ministry of Finance with an indicative US\$5 million allocation. The partnership is key to attracting CTF financing (US\$50 million) and ultimately unlocking government and private sector investment commitments of about US\$2.5 billion.

- The Government of New Zealand: (US\$3.75 million): The resources put forward by the Government of New Zealand will support the identification of potential sites for geothermal development through geological surveys (US\$2.75 million) and capacity building through the provision of international experts (US\$1 million).

- AFD – Geothermal Development Field Studies (US\$500 thousand): Building on Agence Française de Développement (AFD)’s engagement with the Climate Change Development Policy Loans, AFD will provide support through: (i) the preparation of pre-feasibility and feasibility studies; and (ii) project management. Further details will be provided following AFD’s internal technical discussions.

21. In a later phase it is envisaged that an IBRD loan in the amount of US\$300 million (tentative) could support mid-stream investments such as production drilling of steam fields. Furthermore, a partnership with the Carbon Partnership Facility (CPF) on “New Scaled-up Crediting Mechanisms” for emission reductions will be explored. A detailed description of the

project design is provided in the supplementary Information Note.

22. **Project Cost and Financing:** A summary table of project cost and financing is provided below.

	Exploration Drilling	Technical Assistance	Contingent Loan	Total
Geothermal				
Fund Facility	US\$300.00 M			US\$300.00 M
GEF		US\$6.25 M		US\$6.25 M
Govt. of NZ		US\$3.75 M		US\$3.75 M
AFD		US\$0.50 M		US\$0.50 M
CTF		US\$50.00 M		US\$50.00 M
Total	US\$300.00 M	US\$10.50 M	US\$50.00 M	US\$360.50 M

23. In addition, the project is expected to unlock downstream investments of about US\$2.5 billion. It is assumed that about 20% would be implemented by the public sector (possibly supported by a subsequent IBRD loan), with another 80% provided by the private sector.

	Operation Funding	Total
IBRD	US\$300.00 M	US\$300.00 M
Private Sector		
& PLN/PGE	US\$2,200.00 M	US\$2,200.00 M
Total	US\$2,500.00 M	US\$2,500.00 M

24. **Rationale for Public Sector Financing:** GoI expects 90% of new geothermal capacity to be developed by IPPs. To incentivize private sector participation, public interventions would need to be targeted at removing – or at least reducing – key geothermal development barriers, first and foremost: exploration drilling risks.

25. Exploration drilling comes with a hefty price tag of up to US\$8 million per well, which can be prohibitive for equity-constrained project developers who are not guaranteed downstream returns on their pre-production investments. Exploratory drilling also constitutes the biggest barrier to obtaining financing as it increases investors' equity returns requirements. Moreover, there is little appetite from the private sector to fund projects where the nature and extent of the resource are unknown.

26. The original GFF design based on collateral-backed loans failed to adequately address the high exploration risk issues. Building on the knowledge distilled from the international experience (mainly in the US where risk sharing arrangements are common) and engagements such as Turkey's Geothermal Development Project and Armenia's Geothermal Exploratory Drilling Project, the proposed Project will utilize CTF resources to develop a risk-sharing arrangement with GFF in order to deal with exploratory risks and unlock GoI's commitments and private sector investment.

27. Sustaining the achievements of previous and existing engagements, GEF, AFD and Government of New Zealand resources will be mobilized to provide technical assistance (TA) which would play a critical role in enabling the proposed Project.

28. **Value-added of Bank's Support:** This stems from the complementarity of services offered by the WBG and its global presence and knowledge applicable to the Indonesian energy sector.

29. **Complementarity of Services Offered:** It is envisaged that the Project will bring together grant-funded technical assistance from the Global Environmental Facility (GEF) and funding for risk mitigation models from the Clean Technology Fund (CTF). This could at a later stage be followed up by mid- and down-stream investments in the form of IBRD and/or IFC commitments. Given the structure of the power market in Indonesia, there is also an opportunity to include MIGA through its Non-Honoring of Sovereign Financial Obligations product.

30. **Global Presence and Knowledge:** The Bank's support would build on the existing body of work and previous engagements in the global and Indonesia geothermal space. Globally, experiences such as, the Turkey's Geothermal Development Project and Armenia's Geothermal Exploratory Drilling Project provide relevant input to the project design.

31. In the Indonesian context, past World Bank activities which inform this operation are: (i) the PPIAF-funded Assessment of Geothermal Resource Risks, which took stock of the international experience with geothermal development and distilled mitigations options applicable to Indonesia; and (ii) the GEF-funded Geothermal Power Generation Development Project, which inter-alia supported the development of a pricing and compensation policy for geothermal power.

32. In addition to the Bank's past experience, ongoing activities which inform this operation are: (i) the CTF-backed IBRD, ADB Private Sector Operations Department (PSOD) and IFC downstream investment projects and related technical assistance programs, which target to bring on-line 1560MW of new geothermal installed capacity; and (ii) the Climate Change Development Policy Loans, which, provided collectively by the World Bank, JICA and AFD, further support the development of a pricing and compensation policy that is necessary to address the higher financial cost of geothermal electricity compared with coal-based power.

#### IV. Safeguard Policies that might apply

<b>Safeguard Policies Triggered by the Project</b>	<b>Yes</b>	<b>No</b>	<b>TBD</b>
Environmental Assessment OP/BP 4.01	✗		
Natural Habitats OP/BP 4.04	✗		
Forests OP/BP 4.36	✗		
Pest Management OP 4.09		✗	
Physical Cultural Resources OP/BP 4.11	✗		
Indigenous Peoples OP/BP 4.10	✗		
Involuntary Resettlement OP/BP 4.12	✗		
Safety of Dams OP/BP 4.37		✗	
Projects on International Waterways OP/BP 7.50		✗	
Projects in Disputed Areas OP/BP 7.60		✗	

#### V. Financing (in USD Million)

Total Project Cost:	360.50	Total Bank Financing:	0.00
Financing Gap:	0.00		
<b>Financing Source</b>			<b>Amount</b>
Borrower			300.00
International Bank for Reconstruction and Development			0.00
Climate Investment Funds			50.00
FRANCE French Agency for Development			0.50
Global Environment Facility - Cofinancing Trust Funds			6.25
NEW ZEALAND, Govt. of (Except for Min. of Foreign Affairs)			3.75
Total			360.50

## VI. Contact point

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