PROJECT INFORMATION DOCUMENT (PID)
CONCEPT STAGE

Report No.: PIDC25143

Project Name	Indonesia: Geothermal Energy Upstream Development Project (P155047)
Region	EAST ASIA AND PACIFIC
Country	Indonesia
Sector(s)	Other Renewable Energy (100%)
Theme(s)	Infrastructure services for private sector development (40%), Climate change (30%), Other environment and natural resources manageme nt (30%)
Lending Instrument	Investment Project Financing
Project ID	P155047
Borrower(s)	Ministry of Finance, Republic of Indonesia
Implementing Agency	Ministry of Energy and Mineral Resources
Environmental Category	A-Full Assessment
Date PID Prepared/ Updated	30-Jul-2015
Date PID Approved/ Disclosed	10-Dec-2015
Estimated Date of Appraisal Completion	25-Apr-2016
Estimated Date of Board Approval	28-Jul-2016
Concept Review Decision	Track II - The review did authorize the preparation to continue

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. Such growth was largely sustained by the external tailwinds of commodity prices and demand, and global financing conditions.

2. 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.

3. Much-needed increases in development spending, notably infrastructure - though below budgeted levels - remain in prospect. The Government of Indonesia (GoI) will need to respond to lower-than-budgeted revenue growth, partly stemming from the negative impact of lower global oil and gas prices on the Indonesian economy. Within this context, sustained capital spending will be critical to unlocking Indonesia's development potential in the years to come.

Sectoral and Institutional Context

4. Indonesia's rapid economic growth – and with that poverty reduction and shared prosperity efforts – has been fueled by an ever-expanding power sector. Sustained increases in electricity consumption (with average annual demand growth of 7.8 percent between 2009 and 2013) are linked with economic growth, urbanization and subsidized electricity tariffs. Installed generation capacity was 50.9 GW as of end-2014, excluding captive generation. Nearly 78 percent of installed capacity is in Java and the remaining capacity is unconnected grids in major islands, and hundreds of isolated mini-grids in rural, remote areas on Java-Bali and outer islands.

5. PT Perusahaan Listrik Negara (PLN), the national power company, supplies consumers through its own generation and purchases from private Independent Power Producers (IPPs) and Public Private Partnership generation (PPU). Some consumers, mainly industries, have captive power plants – an estimated at 2.7 GW in 2013.

6. High electricity demand is a key development challenge. After a period of surplus in power generation caused by the impact of the Asian Financial Crisis, electricity supply experienced shortages as PLN faced difficulties in mobilizing sufficient power generation investments to catch up with demand growth. PLN's financial position, which had already weakened due to the crisis, further deteriorated as a result of the dramatic increase in oil prices on the international market from 2002 to 2008.

7. PLN not only struggled to invest, but required growing government subsidies to keep operating a system highly dependent on petroleum products in order to meet its public service obligation. Private sector investment came to a halt under the combined effect of capital flight from emerging markets, and the institutional turmoil that followed the repeal of the 2002 Electricity Law by the Constitutional Court in Indonesia. Supply barely managed to keep up with increasing demand; brownouts and load shedding impacted economic growth and affected even ordinary consumers.

8. To help meet demand, GoI has set a target of installing 4,800MW of geothermal capacity by 2025, where over 90% of the new capacity 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. The target for commercial operation date tend to conceal the fact that with typically a seven years lead time from exploration to commissioning, much of the preparatory work needs to be undertaken in the very near future. To date, Indonesia's fuel mix - excluding captive generation - shows the dominance of existing coal plants and dependence on oil (53 percent and 12 percent respectively) with a low proportion of renewables (6.5 percent hydro and 4.4 percent geothermal).

9. 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. Indonesia's geothermal power potential is estimated at around 27,000 MW, roughly 40 percent of the world's endowment. Many of the geothermal resources in Indonesia are also ideally located on islands with major population centers where electricity demand is high and continues to grow, though there are also resources in more remote locations such as eastern Indonesia offering an opportunity for poverty alleviation through rural electrification, and/or displacing expensive diesel–fueled generation. 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.

10. Only about five percent of the total geothermal resources in Indonesia are currently developed to produce power but geothermal development is a pillar of the country's Low Carbon Growth Strategy and a key development priority for the GoI . Ministry of Energy and Mineral Resources (MEMR)'s "Roadmap for Accelerated Development of New and Renewable Energy 2015-2025" sees geothermal contributing seven percentage points of GoI's renewable energy (RE) target of 23% by 2025 – today's overall RE installed capacity stands at 6%.

11. In order to increase the pace of geothermal development, the GoI has taken important steps to resolve institutional, regulatory and tariff constraints. In June 2014, the geothermal tariffs were revised for a fourth time, providing some relief to developers willing to take on exploration and development risks. In August 2014, the new Geothermal Law was issued. The Law allows centralizing geothermal concession tenders while securing the interest of local government in geothermal development through a production bonus - a benefit sharing mechanism - levied on top of any applicable taxes. Another important reform is the declassification of geothermal activities as "mining activities" that allows greater latitude for geothermal development in previously off-limits areas.

12. GoI has also established the US$300 million Geothermal Fund Facility (GFF), which did not target the first capital-intensive step and riskiest part of the geothermal development process: exploratory drilling. The GFF aimed to provide loans against collateral only, ultimately resulting in a zero-disbursement rate. To date, the GFF has not yielded a satisfactory operating model to de-risk projects at the exploration stage. As a result, geothermal development has stalled. Only a very limited amount of private sector-led exploration has taken place on the basis of existing long-standing concession arrangements and in recent years only one private sector project (Sarulla - planned for 320 MW) has reached financial closure.

13. Coordinated international development assistance has been focused on assisting GoI with addressing institutional and regulatory shortcomings, and providing support to downstream investment. Technical assistance (TA) from the World Bank (WB), Asian Development Bank (ADB) and several bilateral development partners has been supporting GoI with institutional, regulatory and tariff reforms. Specifically, the WB assisted GoI with the development of a pricing policy and robust regulatory provisions for geothermal development through the Global Environment Facility (GEF) and Asia Sustainable Energy Program (ASTAE). The first Indonesia Energy Sector Reform Development Policy Loan (DPL) will continue strengthening the regulatory environment, particularly focusing on implementation regulation for the Geothermal Law. With funding from the Energy Sector Management Assistance Program (ESMAP), the WB is also providing TA support with developing key risk mitigation models for geothermal exploration.

14. On the investment side, WB, International Finance Corporation (IFC) and ADB have been

supporting downstream operations in geothermal power in Indonesia. However, there are currently no schemes mitigating exploration drilling risks to attract private capital for geothermal development – a model which has proved its strength in developed markets such as, the USA and is being pursued in the developing geothermal markets of Turkey, Armenia and Mexico.

15. GoI's renewed emphasis on and commitment to geothermal development calls for continued technical assistance coupled with upstream investment interventions aimed at mitigating exploratory drilling risk. The 2014 Law marked some important progress in theIndonesian geothermal development landscape, but GoI realizes that meeting its ambitious targets by 2025 will require continued effort and support to remove existing barriers – particularly at the exploration drilling phase. To this end, GoI has transferred the administration of the funds in support of geothermal exploration (i.e. GFF) from Pusat Investasi Pemerintah (PIP) to PT Pusat Investasi Pemerintah (PT SMI), which is better suited to deal with exploration drilling risk than its predecessor. This is a significant change and the new fund administration arrangement offers an entry point for development partners to support geothermal development by replicating the international experience with de-risking exploration through risk-sharing type arrangements.

Relationship to CAS

16. 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.

17. 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)

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

Key Results (From PCN)

19. 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 (tCO2/year)

20. In addition, the following intermediate result indicator will be adopted to track Citizen Engagement:

- Villages located next to exploration sites with at least one public consultation held (%)

III. Preliminary Description

Concept Description

21. 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.

22. 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 .

23. 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 will target both high and medium enthalpy resources. 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.

24. The proposed Project consists of two components. Component 1 would target the operationalization of the revamped 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:

25. 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.

26. 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 from payment of risk premiums. If the funds are insufficient, part (tentatively 50%) of the shortfall will be covered through a WB/CTF contingent loan pay-out, which could be partially or fully refunded if the dedicated facility receives additional funds from risk premiums.

27. 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:

28. In order to provide an incentive for exploration drilling to existing license holders the CTF and GFF funds could be used to reduce the cost of an insurance scheme for instance by entitling licensees to sell the geotechnical data obtained through "dry-hole drilling" related to a given field to the Geological Agency (Badan Geologi) at a price that would cover some of the drilling costs. In case where existing licensees abandon field development all together the returned license could then be re-auctioned and, upon new licensing, the GFF/CTF facility procedures and conditions for prospective license holders would apply.

29. 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 and tendering 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: (i) the effective collation and analysis of existing and new resources data through establishment of an effective, GIS based database, probably to be housed within Badan Geologi; (ii) the establishment of a robust resource and reserve estimation and reporting protocol to an internationally acceptable standard; (iii) the prioritization of potential sites for geothermal development; and (iv) capacity building for tendering as well as executing an exploration program.

30. Building on previous engagement with the Climate Change Development Policy Loans, additional support (tentative US$300 thousand) for Component 2 may be provided by Agence Française de Développement (AFD). Further details will be provided during preparation following AFD's internal technical discussions.

31. In a later phase it is envisaged that an IBRD loan in the amount of US$300 million 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.

32. 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$0.30 M		US$0.30 M

CTF			US$50.00 M	US50.00 M
Total	US$300.00 M	US$10.30 M	US$50.00 M	US$360.30 M

33. In addition, the project is expected to unlock downstream investments of 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

34. 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.

35. Exploration drilling comes with a hefty price tag of up to US$8 million per well plus supporting infrastructure, which can be prohibitive for 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 return requirements. Moreover, there is little appetite from the private sector to fund projects where the nature and extent of the resource are unknown.

36. The original GFF design based on collateral-backed loans failed to adequately address the high exploration risk issues. The GFF loans were to be paid back in full e ven in the case of unsuccessful drilling. The proposed Project will utilize CTF resources to develop a risk-sharing arrangement for resource estimation. This will be done on the basis of 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 GeothermalExploratory Drilling Project.

37. The proposed Project will demonstrate a portfolio approach to exploration drilling, where the overall risk is shared. This would unlock the use of the funds that GoI have committed for GFF (and subsequent private sector investment) through risk sharing with the CTF funds and bringing in international experience to provide comfort against concerns related to possible loss of government funds for unsuccessful projects as per the Law of State Finance 17/2003.

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

39. 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.

40. 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.

41. 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 World Bank's Turkey Geothermal Development Project, Armenia Geothermal Exploratory Drilling Project, Geothermal Energy Development Program (GeoFund), and African Rift Geothermal Development Program (ARGeo), and KfW's Geothermal Risk Mitigation Facility for East Africa all provide relevant input to the project design .

42. 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.

43. In addition to the Bank's past experience, ongoing activities which inform this operation are: (i) the CTF-backed IBRD, ADB Private Section 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

Safeguard Policies Triggered by the Project	Yes	No	TBD
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:	360.30	Total Bank Financing:	0.00
Financing Gap:	0.00		

Financing Source	Amount
Borrower	300.00

International Bank for Reconstruction and Development	0.00
Climate Investment Funds	50.00
FRANCE French Agency for Development	0.30
Global Environment Facility - Cofinancing Trust Funds	6.25
NEW ZEALAND, Govt. of (Except for Min. of Foreign Affairs)	3.75
Total	360.30

VI. Contact point

World Bank

Contact: Peter Johansen
Title: Senior Energy Specialist
Tel: 458-5578
Email: pjohansen@worldbank.org

Borrower/Client/Recipient

Name: Ministry of Finance, Republic of Indonesia
Contact: Mr. Bambang Brojonegoro
Title: Head of Fiscal Policy Office
Tel: 62-21-3441484
Email: aristalyakusuma@gmail.com

Implementing Agencies

Name: Ministry of Energy and Mineral Resources
Contact: Maritje Hutapea
Title: Director
Tel: 620213804242
Email: mhutapea@hotmail.com

VII. For more information contact:

The InfoShop
The World Bank
1818 H Street, NW
Washington, D.C. 20433
Telephone: (202) 458-4500
Fax: (202) 522-1500
Web: http://www.worldbank.org/infoshop