Document of
The World Bank

Report No: ICR00002943

IMPLEMENTATION COMPLETION AND RESULTS REPORT
(TF-92324)

ON A

GLOBAL ENVIRONMENT FACILITY (GEF) GRANT

IN THE AMOUNT OF US$4 MILLION

TO THE

REPUBLIC OF INDONESIA

FOR A

GEOTHERMAL POWER GENERATION DEVELOPMENT PROJECT

December 30, 2013

Indonesia Sustainable Development Unit
Sustainable Development Department
East Asia and Pacific Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective November 30, 2013)

Currency Unit = Indonesian Rupiah
IDR 11,962.5 = US$ 1

FISCAL YEAR
July 1, 2012 – June 3, 2013

ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank	MDB	Multilateral Development Bank
CAS	Country Assistance Strategy	MEMR	Ministry of Energy and Mineral Resources
CER	Certified Emission Reduction	MIGA	Multilateral Investment Guarantee Agency
CTF	Clean Technology Fund	MoF	Ministry of Finance
CPS	Country Partnership Strategy	M&E	Monitoring & Evaluation
DIPA	Daftar Isian Pelaksanaan Anggaran – Government Budget Execution	MW	Mega-Watt
DG	Directorate General	PAD	Project Appraisal Document
DGESGWM	Directorate for Geothermal Enterprise Supervision and Groundwater Management	PDO	Project Development Objective
DO	Development Objective	PGE	PT. Pertamina Geothermal Energy
ESC	Energy Sales Contract	PIP	Pusat Investasi Pemerintah-Government Center for Investment
FiT	Feed-in-Tariff	PIU	Project Implementation Unit
FMR	Financial Management Report	PLN	PT. Perusahaan Listrik Negara
GDP	Gross Domestic Products	PMU	Project Management Unit
GEF	Global Environment Facility	PPIAF	Private Participation in Infrastructure Advisory Facility
GEO	Global Environment Objective	PSO	Public Service Obligation
GoI	Government of Indonesia	SAG	Stakeholders Advisory Group
GW	Giga-Watt	SSS	Single Source Selection
IBRD	International Bank of Reconstruction and Development	SOE	State Owned Enterprise
IFC	International Finance Corporation	TTL	Task Team Leader
IP	Implementation Progress	QAG	Quality Assurance Group
ISR	Implementation Status and Result Report	QCBS	Quality and Cost Based Selection
JICA	Japan International Cooperation Agency	WBG	World Bank Group
JOC	Joint Operating Contract	WKP	Wilayah Kerja Pertambangan-Geothermal Working Area

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INDONESIA
Geothermal Power Generation Development Project

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D A T A S H E E T

A. Basic Information			
Country:	Indonesia	Project Name:	Geothermal Power Generation Development
Project ID:	P099757	L/C/TF Number(s):	TF-92324
ICR Date:	12/30/2013	ICR Type:	Core ICR
Lending Instrument:	Grant	Borrower:	
Original Total Commitment:	USD 4.00M	Disbursed Amount:	USD 1.48M
Revised Amount:	USD 4.00M		
Environmental Category: C		**Global Focal Area: C**	
Implementing Agencies: Ministry of Energy and Mineral Resources			
Cofinanciers and Other External Partners:			

B. Key Dates				
Process	**Date**	**Process**	**Original Date**	**Revised / Actual Date(s)**
Concept Review:	06/18/2007	Effectiveness:		10/16/2008
Appraisal:	12/17/2007	Restructuring(s):		06/17/2011
Approval:	05/29/2008	Mid-term Review:		
		Closing:	06/30/2011	06/30/2013

C. Ratings Summary	
C.1 Performance Rating by ICR	
Outcomes:	Unsatisfactory
Risk to Global Environment Outcome	High
Bank Performance:	Unsatisfactory
Borrower Performance:	Moderately Unsatisfactory

C.2 Detailed Ratings of Bank and Borrower Performance			
Bank	**Ratings**	**Borrower**	**Ratings**
Quality at Entry:	Unsatisfactory	Government:	Moderately Unsatisfactory
Quality of Supervision:	Unsatisfactory	Implementing Agency/Agencies:	Moderately Satisfactory
Overall Bank Performance:	Unsatisfactory	**Overall Borrower Performance:**	Moderately Unsatisfactory

C.3 Quality at Entry and Implementation Performance Indicators			
Implementation Performance	**Indicators**	**QAG Assessments (if any)**	**Rating**
Potential Problem Project at any time (Yes/No):	No	Quality at Entry (QEA):	None
Problem Project at any time (Yes/No):	Yes	Quality of Supervision (QSA):	None
GEO rating before Closing/Inactive status	Unsatisfactory		

D. Sector and Theme Codes

	Original	Actual
Sector Code (as % of total Bank financing)		
Central government administration	25	
Other Renewable Energy	50	100
Thermal Power Generation	25	
Theme Code (as % of total Bank financing)		
Climate change	67	67
Other Private Sector Development	33	33

E. Bank Staff

Positions	At ICR	At Approval
Vice President:	Axel van Trotsenburg	James W. Adams
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	Xiaoping Wang	

F. Results Framework Analysis

Global Environment Objectives (GEO) and Key Indicators(as approved)

The global environment objective of the project is to promote on-grid electricity from geothermal sources, reducing the need for coal-based generation capacity and avoiding associated greenhouse gas emissions.

Revised Global Environment Objectives (as approved by original approving authority) and Key Indicators and reasons/justifications

There was no revision to the GEO during the project implementation.

(a) GEO Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 1 :	Installed geothermal power capacity that resulted from the investment transactions assisted by the project.			
Value (quantitative or Qualitative)	0	350 MW	Same as the original value	0 MW
Date achieved	05/01/2008	06/30/2011	06/30/2013	06/30/2013
Comments (incl. % achievement)	The target value has not been achieved			
Indicator 2 :	Reduction of CO2 emissions by off-setting fossil fuel-based power generation (i.e. coal) with geothermal power			
Value (quantitative or Qualitative)	0	2,000,000 tonnes/year	Same as the original value	0 tonnes/year
Date achieved	05/01/2008	06/30/2011	06/30/2013	06/30/2013
Comments (incl. % achievement)	The target value has not been achieved			

(b) Intermediate Outcome Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 1 :	Component 1: Pricing mechanism to provide adequate economic incentives developed			
Value (quantitative or Qualitative)	Not available	Applied in transactions implementation	Same as the original	The mechanism was adopted but not implemented
Date achieved	05/01/2008	06/30/2011	06/30/2013	06/30/2013

Comments (incl. % achievement)	The target has been partially achieved.			
Indicator 2 :	Component 1: Upstream resource risk mitigation mechanism developed			
Value (quantitative or Qualitative)	Not available	Arrangement developed	Same as the original	The arrangement in place
Date achieved	05/01/2008	06/30/2011	06/30/2013	06/30/2013
Comments (incl. % achievement)	The target has been achieved without direct support by the project			
Indicator 3 :	Component 1: Implementation regulations of the Geothermal Law issued			
Value (quantitative or Qualitative)	Not available	Applied	Same as the original	13 MEMR decrees were issued
Date achieved	05/01/2008	06/30/2011	06/30/2013	06/30/2013
Comments (incl. % achievement)	The target has been achieved			
Indicator 4 :	Component 2: Model procedures and standardized documentation for competitive bidding of geothermal power transactions developed			
Value (quantitative or Qualitative)	Not available	Applied	Same as the original	Model procedures were developed, not yet adopted by MEMR
Date achieved	05/01/2008	06/30/2011	06/30/2013	06/30/2013
Comments (incl. % achievement)	The target has been partially achieved			
Indicator 5 :	Component 2: Structure offers to mobilize investments for additional geothermal power in fields that are controlled by existing operators.			
Value (quantitative or Qualitative)	Not available	Target Achieved	Same as the original	The structure offers was not developed.
Date achieved	05/01/2008	06/30/2011	06/30/2013	06/30/2013
Comments (incl. % achievement)	The target has not been achieved			
Indicator 6 :	Component 2: Develop and implement a pilot transaction for one power project in a new geothermal field competitively tendered based on the Geothermal Law.			
Value (quantitative or Qualitative)	Not Applicable	Target Achieved	Same as the original	TOR prepared and site identified. The transaction has not been initiated
Date achieved	05/01/2008	06/30/2011	06/30/2013	06/30/2013
Comments (incl. % achievement)	The target has not been achieved			

Indicator 7 :	Component 3: Relevant agencies for undertaking geothermal transactions trained through on-the-job programs as well as 5-10 workshops and seminars.			
Value (quantitative or Qualitative)	Not Applicable	7 workshops	Same as the original	Four workshops as part of consultancies on pricing and transaction packages
Date achieved	05/01/2008	06/30/2011	06/30/2013	06/30/2013
Comments (incl. % achievement)	The target has been partially achieved			
Indicator 8 :	Component 3: Awareness raising and information dissemination activities about sector policies and business opportunities conducted through promotional campaigns including 5-10 stakeholder-dialogue seminars.			
Value (quantitative or Qualitative)	Not available	7 workshops	Same as the original	Several workshops/seminars by MEMR own funds
Date achieved	05/01/2008	06/30/2011	06/30/2013	06/30/2013
Comments (incl. % achievement)	The target has been achieved			
Indicator 9 :	Component 3: Strategy for domestic geothermal technology development formulated.			
Value (quantitative or Qualitative)	Not Applicable	Final draft	Same as the original	Strategy has not formulated
Date achieved	05/01/2008	06/30/2011	06/30/2013	06/30/2013
Comments (incl. % achievement)	The target has not been achieved			

G. Ratings of Project Performance in ISRs

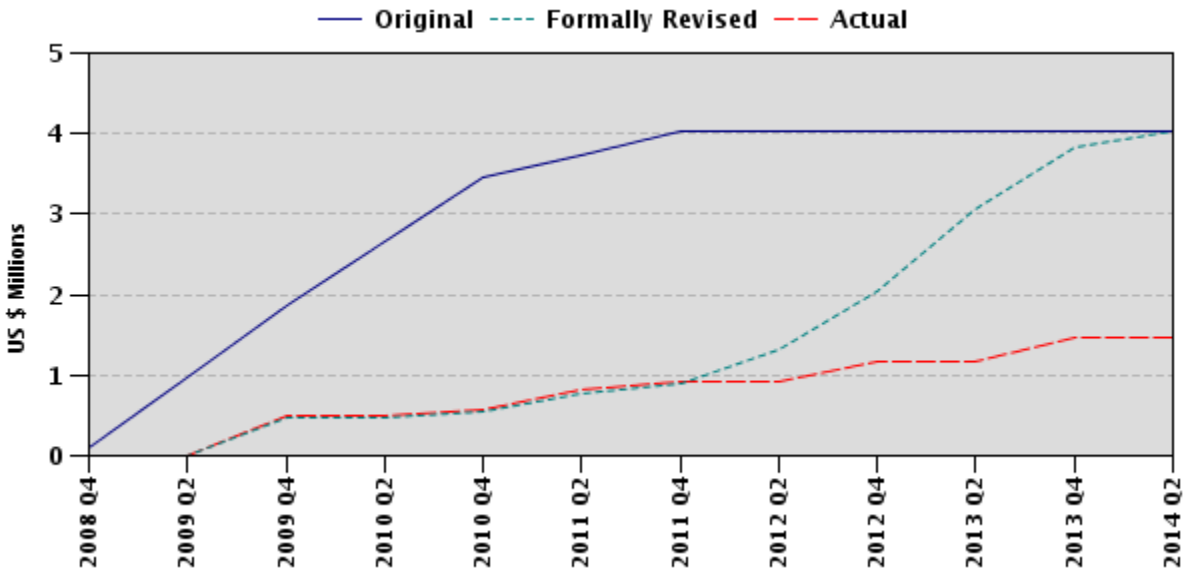
No.	Date ISR Archived	GEO	IP	Actual Disbursements (USD millions)
1	04/02/2009	Satisfactory	Satisfactory	0.50
2	06/05/2009	Satisfactory	Satisfactory	0.50
3	06/30/2010	Moderately Satisfactory	Moderately Satisfactory	0.58
4	06/29/2011	Moderately Satisfactory	Moderately Unsatisfactory	0.91
5	04/27/2012	Moderately Satisfactory	Moderately Unsatisfactory	1.16
6	04/13/2013	Moderately Satisfactory	Moderately Unsatisfactory	1.48

7	06/25/2013	Unsatisfactory	Unsatisfactory	1.48

H. Restructuring (if any)

Restructuring Date(s)	Board Approved GEO Change	ISR Ratings at Restructuring		Amount Disbursed at Restructuring in USD millions	Reason for Restructuring & Key Changes Made
		GEO	IP		
06/17/2011	N	MS	MS	0.80	1) Extension of closing date by two years, from June 30, 2011 to June 30, 2013. 2) Revision of the implementation schedule to align with the proposed extension. 3) Reallocation of US$ 654,850 from Components 1 and 3 to Components 2 and 4.

I. Disbursement Profile



1. Project Context, Global Environment Objectives and Design

1.1 Context at Appraisal

1. **Country Background.** At project appraisal, Indonesia had made a strong economic recovery from the 1997 financial crisis. Its gross domestic product (GDP) grew at an average of 4.8 percent per year from 2000 to 2006, and registered 5.6 and 5.5 percent growth rates in 2005 and 2006, respectively. The economy was projected to grow at 6 to 7 percent per year during the next few years. Primary energy consumption increased by 5.2 percent per year from 2000 to 2006, and electricity consumption grew by about 6 percent per year during the same period. The demand for electricity was expected to grow at 7 to 9 percent per year between 2007 and 2020.

2. **Power Sector Issues.** In 2007 before the advent of the Indonesia GEF Geothermal Project, the country's power demand had begun to outstrip supply, as its energy-intensive economy grew at around 6% per year, outpacing the country's ability to develop new generation capacity. In the meantime, PLN, the national power utility, relying heavily on oil in the generation mix, was not able to recover its costs after the removal of the petroleum subsidy in 2005. Its financial viability became entirely dependent on the GoI's public service obligation (PSO; electricity subsidy), which was increased six times from IDR 13 trillion in 2005 to IDR 79 trillion in 2008, following the increase in international oil prices.

3. To combat high supply cost and meet increasing demand, the GoI and PLN were focusing on facilitating private investments and increasing public financing in the sector; improving generation fuel mix; and enhancing PLN's management efficiency. Under the strategy, PLN had embarked on a substantial expansion program and in 2006 initiated a 10,000 MW coal-based "crash" program (Fast Track Program I) to replace oil-fired generation. The strategy posed significant negative impacts to the local and global environments.

4. With nearly 40% of the world's geothermal potential at the time, the GoI realized that geothermal power could serve as a suitable base-load substitute for coal-fired capacity in many areas with far lower emissions of air pollutants and greenhouse gases. More importantly, the country could significantly diversify its energy mix with an increase in geothermal capacity, resulting in a number of benefits: 1) its indigenous nature and local utilization would ostensibly enhance energy security; 2) its non-tradeable nature would make geothermal power a natural hedge against the volatility of fossil-based commodity prices; and 3) it would contribute to limiting the impacts of increasing coal share on the environment. Thus, the GoI took considerable steps to mainstream development of geothermal resources, fully aware that any shortfall in the expansion of geothermal power generation capacity would most likely to be met by additional coal-fired power plants.

5. At the time, Indonesia had developed (through both public and private channels) about 970 MW, less than 4% of its total potential for 27 GW of geothermal power. In 2006, the GoI adopted the Roadmap of Geothermal Development for 2006 to 2025 as part of the Presidential Decree No 5/2006 on National Energy Policy and in 2007 issued the Geothermal Blueprint to implement the Road Map. The documents had set a target of developing 6,000 MW of geothermal power capacity by 2020, meaning, adding another fleet of 5,000 MW within 13 years. At the time, geothermal fields with a total potential of 4,500 MW were already under concession to various developers, based on agreements reached during the 1990's under Presidential Decree 45/1991 (also called legacy fields). A majority of those assets (2,760 MW) were with the public sector- under the control of Pertamina, the national oil and gas-company; private developers had retained concessions of 1,740 MW under joint operating contracts (JOCs) with Pertamina. The Geothermal Blueprint was exploring the prospect of competitively tendering 1,500 MW of new geothermal concessions (called green fields) to private developers, following the new concession regulation under the Geothermal Law (Law 27/2003).

6. The government strategy, targeting rapid scaling-up of both legacy fields and green fields, was ambitious, and would require both strong government commitment and supportive policies in order to realize its aims. As of 2007, the geothermal industry was facing a number of barriers undermining the overall investment climate and the ability to implement the Geothermal Law. These barriers included: (i) an inadequate policy framework, including the lack of a pricing policy and sufficient incentives that would compensate developers commensurate with the risks associated with the technology; (ii) limited institutional capability to properly plan geothermal development and sufficiently engage suitable developers, including a lack of transparent assignment of concessions; (iii) weak domestic capacity in the areas of resource assessment, equipment manufacturing, construction, operation and maintenance of geothermal energy facilities; and (iv) the poor credit history of PLN as the single off-taker for independent power producers.

7. **Rationale for Bank Assistance.** At that time, the Bank was well-equipped to engage in geothermal policy development, through its on-going activities to assist the GoI in infrastructure and energy sector reform efforts. The project was very timely, as the GoI was already launching initial attempts to implement the Geothermal Blueprint. The Bank carried out two background studies that addressed key issues in the geothermal sector. The studies identified barriers preventing greater levels of investments in the geothermal sector, and analyzed the related pricing and transaction issues. The economic analysis by the Bank's team of 51 geothermal fields listed in the JICA-financed Master Plan Study for Geothermal Development in Indonesia of 2007 (Master Plan, 2007) indicated that over 9 GW of geothermal power could be economically justified in Indonesia when its environmental benefits are considered. The Bank was also facilitating a carbon-finance transaction for the Lahendong 2 geothermal project in North Sulawesi, which provided greater insights into the challenges facing geothermal developers. In parallel, the Bank had provided significant assistance to the GoI to expand investments in the infrastructure sector through public-private partnerships (PPPs), which would also benefit geothermal power development.

8. The project aligned with the Bank's sector strategy at the time, which focused on three major themes: (i) improving efficiency on both the supply and demand sides, as well as reducing supply costs; (ii) moving the sector toward an environmentally friendly and low-carbon development path; and (iii) increasing modern energy access to the poor, as well as to small and medium sized businesses. It was further consistent with the strategic objectives of the Country Assistance Strategy (CAS) for Indonesia in 2004-2007 in two areas: (i) helping to improve the climate for high quality investment and (ii) helping to improve service delivery by the utilization of a more efficient energy resource. It was also consistent with the GEF-4 Climate Change Focal Areas Strategic Objective 4 to promote on-grid renewable energy, by scaling up geothermal power generation.

1.2 Original Global Environment Objectives (GEO) and Key Indicators

9. The project development objectives (PDO) were to promote the expansion of economic and environmentally-friendly geothermal power generation in Indonesia, and to reduce CO2 emission from the power system. The project would assist the GoI to prepare and implement its geothermal sector reform program, designed to remove the key policy and institutional barriers which presently prevent greater development of geothermal resources. It would also assist in the transaction of geothermal power investments.

10. The global environment objective (GEO) of the project was to promote on-grid electricity from geothermal sources, to reduce the need for coal-based generation capacity, and to avoid associated greenhouse-gas emissions.

11. Key PDO/GEO indicators included: (i) installed geothermal power capacity resulting from the policy reforms and investment transactions assisted by the project, and (ii) reduction in CO2 emissions by offsetting fossil-fuel based power generation with geothermal power.

1.3 Revised GEO and Key Indicators, and reasons/justification

12. No changes in the GEO or key indicators were made during project implementation.

1.4 Main Beneficiaries

13. The main beneficiaries of the Project are stakeholders of the geothermal sector in Indonesia, including project developers, potential geothermal investors and financial institutions, as well as central and local government agencies involved in policy and regulation for the geothermal industry. The indirect beneficiaries of the Project include PLN customers who would receive additional and clean energy supply from the geothermal energy. The project will also benefit the international communities as it would contribute to reduction of greenhouse emission at global level and thus mitigate related climate change impacts.

1.5 Original Components

14. The project has four original components:

15. *Component 1*. Policy Framework for Scaling-up the Development of Geothermal Power. This component would assist the GoI in developing and implementing an integrated set of policies that would provide sufficient regulatory certainty, risk mitigation, and economic incentives for increased public and private investments toward developing geothermal power in Indonesia. Three key areas of assistance were proposed as follows:

C1.l: Development and implementation of policy to address incremental costs.

C1.2: Development and introduction of upstream risk mitigation measures.

C1.3: Support the implementation of the Geothermal Law.

16. *Component 2*. Transactions Management for Mobilizing Investments in the Geothermal Power Generation. This component would assist the GoI, especially the MEMR, to develop the capacity for planning and transacting geothermal power developments in an efficient and transparent manner. Two main activities were planned under the component as follows:

C2.1: Expanding power generation in geothermal fields already allocated to investors.

C2.2: Facilitating transactions of new geothermal fields for power development.

17. *Component 3*. Geothermal Sector Technical Capacity Building. This component would help address the limited domestic technical capacity for handling most geothermal related activities, and support the long-term development prospects of the sector. Three activities were envisaged as follows:

C3.1: Training of government officials and technical staff in planning and transaction management.

C3.2: Building awareness among stakeholders.

C3.3: Options for long-term cost reduction.

18. Component D. Project Management Assistance. This component will provide the necessary technical consultant support to the Directorate of Geothermal Enterprise Supervision and Ground Water Management, the executive implementation unit, for the management and supervision of the project.

Details of each component are provided in Annex 2.

1.6 Revised Components

19. During the June 2011 restructuring, a new activity-- Data upgrade and validation for geothermal green fields-- was added to Subcomponent 2.2 of Component 2. There were no changes to the other components.

1.7 Other significant changes

20. ***Closing Date***. The closing date of the GEF Grant was extended from June 30, 2011 to June 30, 2013 in order to compensate for initial delays, and to allow time for the completion of the critical activities under the Project. The project restructuring, which included a closing date extension, was approved on June 22, 2011 by the Regional Vice President.

21. ***Reallocation of GEF funds between different components***. The project restructuring in 2011 also reallocated GEF funds from Components 1 and 3 to Components 2 and 4. It was estimated that US$ 654,850 was freed up due to cost savings resulting from the actual contract values under some activities and revision of the scope of other subcomponents. Specifically, US$ 600,000 of the saved funds was allocated to a new assignment to upgrade and validate data for geothermal fields that were proposed for the demonstration tender under Sub-component 2.2. The remaining US$ 54,850 was reallocated to Component 4- Project Management Assistance- to improve overall project implementation. None of the changes in activity details or the implementation arrangements impacted the Project Development Objectives, nor the expected outcomes of the individual activities.

2. Key Factors Affecting Implementation and Outcomes

2.1 Project Preparation, Design and Quality at Entry

22. ***Preparatory Studies***. The project was designed based on a solid background assessment of current geothermal development in Indonesia, as mentioned above, as well as several lessons learned from international experiences in geothermal development. The key resource document was the "Master Plan Study for Geothermal Power Development in the Republic of Indonesia" (JICA Master Plan) financed by Japan International Cooperation Agency (JICA) in 2007. The Bank's thorough economic analysis of geothermal power generation in Indonesia, using technical data generated for the JICA Master Plan, produced a good estimate of economic optimal level of geothermal energy in the country, as well as rationales of the Bank's support to geothermal development. The project was designed to respond directly to the main barriers to geothermal investment, which were identified in the background studies. These barriers were found to be comprehensive and relevant, and they remain valid at the time of this evaluation.

23. ***Lessons Learned from Other Countries***. The project identified several important and relevant international experiences for Indonesia and incorporated them in the project design. The main lesson was that aspirational government targets for both renewable energy development in general and geothermal in particular, need concrete, clear regulatory provisions and economic incentives to materialize. For renewable energy-based power in general and geothermal in particular, the policy framework must address the question of how incremental costs relative to conventional sources can be recovered, and by whom. Importantly, the mitigation of financial risks associated with the upstream steam-field development represents a major hurdle for geothermal investors internationally; therefore the development of an appropriate mechanism to address the risk is necessary.

24. ***Relevance of GEO***. The project's objectives were consistent with the CAS, the sector strategies and the GEF strategic objectives. The objectives were relevant to address the challenges of geothermal development in Indonesia, and would enable realization of the Roadmap of Geothermal Development 2006 – 2025, which was approved as part of the Presidential Decree No 5/2006 on National Energy Policy. However, the GEO were broadly phrased and could be better formulated.

25. ***Indicators***. The GEO indicators were the installed geothermal capacity resulted from the investment transactions assisted by the project and the associated reduction in CO2 emission. These indicators, while could be achieved in the long horizon were not realistic within the project's duration as it would take 5-7 years after successful transactions for geothermal fields to be developed and to generate electricity. One would understand that these quantitative indicators were required by GEF for investment projects with tangible results during the project life, but not for technical assistance projects for which the tangible results take more time to come into fruition. As the PAD rightly pointed out that an improved investment environment for geothermal power projects and enhanced government capacity to support sector are the principal outcomes of the project, and thus the more realistic indicators would be the geothermal capacity with secured financing resulted from both the reform and transactions implemented through the project. The intermediate indicators were deliverables of planned activities and thus appropriate and measurable. Data collection instruments were also adequate.

26. ***Project components***. The project activities were structured as four components: the first three components comprehensively addressed three key barriers to geothermal development, while the fourth component supported the project's implementation. Component 1 would enable the reform of key GoI policies in the sector, while Components 2 and 3 would support demonstration implementation of these policies through transaction management and capacity-building. While these components were technical sound to address the identified barriers to geothermal development in Indonesia, there are operational challenges, due to the interdependence of the proposed activities. For example, the outputs of Component 1- change in government policies- would have impacts on the key inputs of transaction management under Component 2 and the capacity building program under Component 3, Therefore these components could be launched only after the key results of Component 1 are largely completed. There was an

inherent risk in such a design: a delay in Component 1 would lead to a delay in the remaining components, as well as the project performance as a whole. Furthermore, implementation of Component 2 alone, especially the intended advisory support to the demonstration transaction, which could be designed as a single project of its own and may take significantly longer than one year as envisaged in the original design.

27. ***Adequacy of Government Commitment, Stakeholder involvement and participatory processes***. The government commitment was high at entry, as the project would address barriers hampering implementation of the adopted GoI Geothermal Blueprint. The project objectives were aligned with MEMR's own performance target of facilitating development of geothermal energy. MEMR also discussed and agreed on the establishment of a broad based Stakeholder Advisory Group (SAG), which could facilitate consultative processes for the project activities. However, as discussed later in the ICR, in hindsight, the government commitment and the implementation capacity might be overestimated at project design or didn't materialize as promised. It is worth noting that the restructuring of the implementing agency was not possible to be foreseen at entry.

28. **Assessment of Risks**. The PAD correctly identified that the main obstacle to support new pricing incentives was consensus-building on financing the associated incremental costs and therefore, lack of consultation and support from other government ministries, notably the MOF, was the key risk to achieve the GEO. The risk, however, was underrated as moderate, with assumptions that the funding necessary to pay for the incremental cost of additional 2000 MW of geothermal capacity would be relatively low and could be brought down by a strong carbon market. For example, the collapse of the carbon market, as it has happened in the last few years, was difficult to envisage at that time for the project team or anyone else, its impact was proven to be marginal to the economics of large scale renewable energy projects. However, an important factor influencing the MOF position was not adequately addressed. The MOF's focus was to manage the government budget, which had been impacted by the increasing electricity subsidy to PLN. The incremental costs of additional geothermal energy could potentially increase this burden and hence undermine MOF support. The proposed establishment of the SAG was the right instrument but not properly followed up on later. The key risks to the intermediate outcomes, the implementation capacity of MEMR and government's complex budget procedure, were rated optimistically as moderate at entry. The risk of delay due to the DIPA process was assessed as substantial at appraisal, but no mitigation measure was envisaged.

29. ***Quality at Entry Assessment***. There was no Quality Assurance Group (QAG) assessment of the project.

2.2 Implementation

30. The project experienced substantial delays in initiating and completion of the first two major activities, which left no time for launching the remaining activities; and thus affecting substantively its performance and progress toward achieving GEO. Delay on the

procurement activities, and at the same time there were changes of leadership in the MEMR institution, had caused the substantial delays. On the other hand, several planned activities were carried out by the GoI using its own funds. The implementation performance (IP) was rated satisfactory in the first year of 2009. The rating to IP was downgraded to MS in 2010; then further downward to MU in 2011 until early 2013. The IP and GEO rating was downgraded to U at the project closing in June 2013. The restructuring in June 2011 did not help to alter this trajectory.

31. Utilization of the available funds was low. Only US$1.450 million, or 36% of the total budget, was disbursed. The disbursement process was also slow. Until November 2013, not all invoices of the completed activities were paid. Upstream resource risk mitigation and Implementation of a pilot transaction for a new geothermal project under Components 1 and 2, in an estimated cost 60% of total budget, were not carried out. The former was addressed through a separate initiative to establish a geothermal fund led by the MOF; the latter was not able to be implemented as one of the preconditions, geothermal feed-in-tariff was never made effective due to lack of stakeholder support. A lengthy and complex government budget process (Daftar Isian Pelaksanaan Anggaran, or DIPA) severely affected the project procurement and disbursement.

32. **Major Implementation Issues**. Key factors affecting the project performance are summarized below.

33. ***Multiple Institutional Changes at MEMR***. A major re-organization of the implementing agency occurred in the midst of the project's implementation, which negatively impacted the project. The Directorate for Geothermal Enterprise Supervision and Groundwater Management (DGESGWM), reporting to the Directorate General of Mineral, Coal and Geothermal (DGMCG), was the Implementing Agency at the commencement of the project. In April 2010, a new directorate general, the Directorate General for New, Renewable Energy, and Energy Conservation (DGNREEC), was established with a mandate to manage all renewable energy resource. Not until November 2010 was the Geothermal Directorate (GD) established under the new DGNREEC. Most of the staff under the original DGESGWM was transferred to the GD, which also took over the responsibility as the Project Implementing Agency. Apart from reshuffle in leadership at various levels, the reorganization also resulted in turnover of the key project staff. The project progress was impacted from April 2010 to the end of the year before the new structure was settled in. Apart from this major reorganization, there were also several changes of the leadership at the DGNREEC and GD, all of which had impacts on the directions and support to the project implementation. Overall, the turnover of the key project staff was high and thus let to numerous delays and lower performance periods.

34. ***Work Load of Project Implementing Agency***. During the project life-cycle, the DGESGWM and its replacement, the GD, had a remarkably productive work program financed by the government's own budget. From 2008 to 2012, it issued eleven ministerial decrees on various policies and regulations for the geothermal sector. In addition, it also issued twenty four other decrees to assign geothermal fields or working areas to developers. To support its program, the DGESGWM/DG recruited and managed

a large number of consultants using the government budget. For example, forty consultant assignments were advertised and procured by the directorate in 2011 alone. This work load placed substantial pressure on the limited capacity of the agency, and hence diverted its focus and efforts away from the project implementation.

35. ***Interdependence of Project Activities***. The results of the first two consultant contracts [1] would define the scope of other project activities, including Terms of Reference for the largest package, Adviser to Geothermal Investment Transaction consuming 40% of the total available funds. In addition, the pricing scheme to be proposed under Package 1 was the key assumption for the work under Package 2, which was executed in parallel. The Feed-in-Tariff Regulation issued by MEMR in 2012 altered the tariff assumption for Package 2; as a result, a large part of the work already completed required revision, further delaying completion of this work.

36. ***Procurement Capacity***. The implementing agency was new to the Bank and thus not familiar with the Bank procurement procedures. Furthermore, the obligation to comply with the national procurement policy and the Bank's procedures complicated and lengthened the procurement process. The procurement responsibility was given to a limited number of staff, who was also in charge of procurement for other activities financed by MEMR. Although training on consultant selection was provided to the procurement team at the beginning, it did not help much due to the major unexpected change in organization structure and turnover of the project key staff. Apart from delays in completion of all procurement activities, weak oversight by the PMU, weaken by staff turnovers, led to undue expiration of two major consultant contracts during implementation, resulting in further and unnecessary delays.

37. ***Prolonged and Complex Budget Process***. The project was designed as client-executed grant for which the disbursement was processed as part of State's Budget or DIPA. The project budget was not included in MEMR main budget process; instead, it was included in following rounds of budget revision, initiated later during the budget year. Concurrence and signature of many divisions of MEMR and MOF were required and as a consequence, it took several months to obtain approvals and normally not before September or October of the budget year. The process was largely beyond the control of the project implementation agency. Due to this delay, it was practically impossible to contract international individual consultants[2] and pay consultants timely according to contract obligations[3]. In the hindsight, it would be more effective if the project involved

[1] These consulting services are (i) Package 1: Development of Implementation Pricing and Incentive Policy to Address Incremental Costs of Geothermal Development; and (ii) Package 2: Design and Preparation for Geothermal Investment Transaction.

[2] PMU reported that some individual consultants were paid once a year instead of monthly.

[3] Although the Project closing date was June 30, 2013, until November 2013, the project budget for 2013 was not approved. MEMR was given two extra months of disbursement grace period to settle the pending invoices for the completed work.

early all concerned divisions within MEMR which were responsible for government budget process.

38. ***Lack of Effective Coordination with Stakeholders***. The Stakeholders Advisory Group (SAG) was established but practically did not function during the project. MOF, the key stakeholder for the pricing incentives for geothermal development under Package 1 was not adequately consulted. As the result, the proposed pricing scheme and the necessary changes in other GoI regulations to make the new pricing regime workable was not supported by key stakeholders. It is worth noting that different objectives and performance indicators assigned by the government to MEMR and other ministries might play a factor in hindering cooperation between them.

39. **Mid-term review**. No official mid-term review was carried out for the project.

40. **Responsiveness to problems**. There was no substantial attempt to enforce mitigation measures against the project risks or restructure the project to address its implementation problems except one effort at the last supervision in February 2013. The PDO indicators were not revised in 2009, when all projects in the Bank were supposed to systematically review their PADs and legal agreements and correct any inconsistencies or mistakes. The project restructuring at 2011 was done mainly to extend the project closing date for two years to allow completion of the on-going activities and added a new activity to support implementation of the pilot geothermal transaction mechanism. The new activity, aiming to validate data of a green-field geothermal field prior the tender for it, was cancelled a few months later because the concerned GoI regulation on such data management was suddenly changed. The only one attempt to utilize the unused funds for capacity building by shifting it to Pertamina Geothermal Energy (PGE) and extension of the project closing date for another two years was discussed a few months before the closing date but not supported up by MEMR.

41. The project tried to avoid procurement delays and the unfriendly budget process by mobilizing other sources of funds to support some of the project's planned activities. For example, the Bank's team secured a grant of US$75,000 from the Private Participation in Infrastructure Advisory Facility (PPIAF) to undertake evaluation on geothermal resource risk, planned under Component 1. Partly by the same token, MEMR financed entirely Sub-component C1.3 by using its own funds.

2.3 Monitoring and Evaluation (M&E) Design, Implementation and Utilization

M&E design.

42. The monitoring and evaluation (M&E) design was anchored by the results-based framework, which should include specific and measurable performance indicators for the proposed project.

43. Project Management Unit was responsible for collection of qualitative and quantitative data, as well as for assessment of the relevance, effectiveness and efficiency of the proposed interventions on an annual basis through the project reports. The baseline

was set to zero at the appraisal since the GEO indicators were measuring installed geothermal power capacity and reduction of CO2 emission from any geothermal projects assisted by this project. The Project Management Manual stated that quarterly reports would be submitted by PMU which would include Interim Financial Report, Procurement Management Report, and Project Progress Report. The M&E would be strengthened by Bank supervision missions during which the progress toward delivery of outputs and achievement of results will be reviewed, key implementation issues will be identified, and actions to solve them will be initiated.

44. **M&E implementation**. The Client and the Bank team had performed the monitoring and evaluation throughout the project period. The monitoring was carried out during the supervision mission and supported by reports provided by the PMU which included progress of the project, procurement management, and financial management.

45. **M&E utilization**. The progress reports were used to assess and evaluate the project performance. Delay in procurement processes by MEMR prompted the Bank's team to secure another funding to address geothermal resource risk with a Bank's executed grant. The need to support data validation and mitigation which was added as new sub-component during project restructuring also came up while evaluating the activity under Component 2 on Transaction Mechanism.

2.4 Safeguards and Fiduciary Compliance

46. **Safeguards**. As a technical assistance operation, this project has no direct environmental or social impacts, since it does not directly finance any power projects. Therefore, the project is classified as environmental assessment Category C, where an environmental assessment is not required. However, one of its key aims was to facilitate increased private sector investment in geothermal power generation projects, which will require the developer to comply with the environmental regulations in Indonesia. The project planned to support the development of a guidance note on safeguards obligations for geothermal investment transactions that involve public or private sector. This guidance was not prepared as the pilot transaction was not implemented.

47. **Procurement.** The original procurement included eleven packages, out of which five were large consulting assignments between $200,000 to 1.7 million using Quality and Cost Based Selection (QCBS). By the end of the project, two key assignments (Development and Implementation Pricing and Incentive Policy to Address Incremental cost of Geothermal Power Development, and Design and Preparation for Geothermal Investment Transaction) were procured and completed. In addition, a number of local individual consultants to support the PMU were procured. During the project implementation MEMR experienced significant delays in procurement. It took nearly two years to have the two key consultant contracts signed in April and May 2010 respectively. However, in February and April 2011 these two contracts were expired while the services had not been completed. This prompted MEMR to use single source selection (SSS) to appoint the same consultants to continue their work. Since the national procurement policy is very strict against any SSS, it took MEMR another six months to

have these contracts approved and signed. Slow responsiveness in completing procurement actions, inadequate quality assurance and monitoring of the procurement process, and weak contract management by the project management team undermined procurement performance.

48. **Financial Management**. The financial management aspect was moderately unsatisfactory. Serious challenges were faced in the financial management of the project, including (a) delays in approval of annual budget (DIPA), (b) recurrent delays of Financial Monitoring Reports (FMRs), (c) weak internal controls reflected by audit findings, in particular related to project monitoring and payment verification in consultant services, (d) lengthy follow-up of audit findings and some findings were not resolved until the project closed. Although some of problems were partially addressed in December 2011, the project financial management continued to be weak until the end of the project. There were still overdue payments which had not been been paid until the closing date. MEMR is in the process to finalize the revised budget and expected to pay before end of 2013.

2.5 Post-completion Operation/Next Phase

49. After the project was closed, MEMR discussed with the Bank to secure its support to continue the project unfinished activities. An action plan with support from the WB and ADB was adopted by MEMR in November 2013 to revisit the feed-in-tariff regulation. In addition, IFC expressed its interest to support the geothermal demonstration transaction after the new tariff scheme is approved. The results of the project, including its lessons learned will be useful for the completion of these activities.

3. Assessment of Outcomes

3.1 Relevance of Objectives, Design and Implementation

Relevance Rating: Substantial

50. The Project's objectives, design and implementation remain substantially relevant in light of its alignment with the government priorities, global trend for GEF projects and the Bank's Country Partnership Strategy for Indonesia.

51. The GoI remains strongly committed to promote geothermal development to improve the country's generation mix to reduce its reliance on oil products and to alleviate carbon emission from the increasing share of coal fired power generation. It has been revising its policies and regulations, including the Geothermal Law of 2003 aiming at removing bottlenecks in the industry development. It allocated vast resource to the Geothermal Fund to support developers to mitigate upstream resources risks.

52. The Project also remained aligned with the priorities set in the Bank's Country Partnership Strategy for FY13-15, which calls for engagement areas that are Pro-Poor, Pro-Growth and Pro-Green. In addition, the Project also addresses country needs

elucidated by the Bank's Energy Sector Directions Paper (2013) which considers renewable energy, including geothermal, as one of the priority areas for securing the affordable, reliable, and sustainable energy supply needed to end extreme poverty and promote shared prosperity.

53. The Project's activities are still relevant today, as the key barriers to geothermal development that the project attempted to address remain valid, including lack of an adequate policy framework that incorporates the environmental benefits of geothermal energy and provides sufficient economic incentives for investing in the sector, lack of government planning and management capabilities to efficiently conduct transactions of geothermal power projects, and lack of domestic technical capabilities to support long-term growth in the sector. On the other hand, the implementation design could be improved: it is questionable whether to implement all these activities in a single project or rather in phases. The MEMR remains the most appropriate implementing agency to execute such a Project, given their policy mandate, a dedicated in-house geothermal energy unit, and its existing capacity albeit inadequate.

3.2 Achievement of Global Environmental Objectives

Rating of Project Outcome: Unsatisfactory

54. The GEO was not achieved. It is difficult to measure the GEO indicators against the target values, because both indicators-installed geothermal power capacity resulting from the policy reforms and investment transactions assisted by the project, and reduction in CO2 emissions by offsetting fossil fuel based power generation with geothermal power-reflect the time horizon that extends far beyond the project life as the policy reforms and investment transactions supported under this project will go have longer term impacts on installed geothermal power capacity than the project life. Estimating the actual values of the GEO indicators is further complicated by the fact that geothermal investment projects benefitting from this project typically take 5 to 10 years to develop. The investment climate, to which the project was supported to contribute, was not improved and the whole geothermal development is assessed by stakeholders as stalled. Up to now, no investment projects have benefitted from the intervention of this project.

55. Although the Project did not achieve its development objectives, its efforts were not wasted. One of the major contributions of the Project is that the three key barriers identified in the project appraisal document (PAD) have been partially addressed, such that the foundation work has been done in identifying pricing and incentive policy options (geothermal feed-in-tariff was issued through MEMR Regulation No 22/2012), geothermal risk mitigation mechanism (Geothermal Fund was established with secured state budget funding under MOF) and developing standard documentation for geothermal transactions. MEMR has also issued a number of regulations to support the implementation of the Geothermal Law.

56. Another major achievement of the Project is that the institutional capacity and awareness was significantly enhanced. A new geothermal unit was created under MEMR,

recognizing the high importance of geothermal development for Indonesia. A core team of professionals is now working in MEMR with increased knowledge and experience about concerned technical issues and improved knowledge and capacity in managing donor-funded operations, and better engagement with other government agencies and other stakeholders. With support of this project, a number of technical training sessions were held on international experience in geothermal development, resource risk management, and implementation of geothermal transactions.

57. At the time when the Bank was starting to reengage in the energy sector in Indonesia and build up the Bank presence and interventions, this project was instrumental in opening the door for the Bank to engage the government on very important policy dialogues and discussions in the energy sector, and laid the foundation for further engagements in the geothermal sector, including the Geothermal Clean Energy Investment Project with a total cost of US$581.65 million.

58. However, the gaps remain between actual achievements and expected outcomes (target values). The issued geothermal feed-in-tariff (FiT) scheme could not be implemented as it was discovered to be incompatible with other GoI regulations and not supported by key stakeholders. The model transaction procedure could not be adopted and implemented, given the uncertainty with the tariff scheme. MEMR is revisiting the original design of the scheme in coordination with MOF and other key government agencies and reconcile any potential conflicts with other existing regulations. MEMR has requested assistance from the World Bank and ADB in putting together a reputable team involving both international and local experts for this effort.

59. The Geothermal Fund to overcome geothermal resource risks was successfully established and capitalized but no geothermal projects have received support from the Fund. The challenges to the fund are that few projects would meet the requirements to be eligible for the support while the terms of the support deem not attractive enough to geothermal developers. No transactions were carried out because they are dependent upon the effectiveness of the feed-in-tariff scheme.

60. It is important to note that even if the project activities were partially completed, the GOI is committed to complete unfinished business, including improving the geothermal feed-in-tariff scheme, operationalizing the Geothermal Fund, and eventually implementing geothermal tenders.

(a) GEO Indicator(s)

61. The two GEO indicators, namely 350 MW of installed geothermal power capacity resulted from the investment transactions assisted by the project and the annual reduction by 2 million tons of CO2 emissions by off-setting fossil fuel based power generation (i.e coal) with geothermal power, have not been achieved by the closing date of the project. As discussed earlier, these indicators would not be achieved even if all the project activities were completed satisfactorily. The results were mixed for the intermediate indicators: for the nine planned indicators, three target values were achieved, three others

were partially achieved and the remaining three targets were not achieved by the project closing date. Details of each indicator and its completion status are provided in the Data Sheet, Section F (a).

3.3 Efficiency

62. The project financed a number of technical assistances to assist GoI to reform policies and enhance institutional capacities related to geothermal development, and did not directly fund any investments. Therefore, an economic and financial analysis of the project was not applicable. It worth noticing that the detailed economic analysis in the PAD was for the geothermal sector in Indonesia but the project itself and therefore, served well for the project relevance rather than its efficiency.

63. The project suffered from delays in key activities; as a result, many planned activities were not carried out, even with two years extension of the closing date. Only about 36% of the available project funds were utilized. On the other hand, for the implemented activities, its efficiency is satisfactory. The two main consulting contracts were competitively awarded at lower prices than the original cost estimates thanks to the international competitive selection process. In overall, the project efficiency is low given its record in implementation time and funds utilization.

3.4 Justification of Overall Outcome Rating

Overall Outcome Rating: Unsatisfactory

64. The project's objectives, design and implementation are still substantially relevant given the current government and global priorities and the Bank's Indonesia CPS FY2013-15. The Project's GEO was not achieved; the foundational work in identifying and designing the feed-in-tariff scheme and Geothermal Fund were completed but they are not yet operational and require further improvement and inter-ministerial coordination and consultations. The project efficiency was low. Although the project outcome was not achieved, the project has made important accomplishments. The institutional capacity and awareness were significant enhanced, which potentially would have a lasting impact in formulating proper policy and regulations related to geothermal development.

65. It is also important to point out that this project opened the door for the Bank to engage in the geothermal sector in Indonesia, strengthened the working relationship with MEMR and other government agencies in energy sector issues, and paved the way for the subsequent geothermal investment project (one of the first among all MDBs) that the Bank approved in 2011 to support the development of two geothermal fields with a total capacity of 150MW and involves $125 million of CTF loans and $175 million of IBRD loans.

3.5 Overarching Themes, Other Outcomes and Impacts

(a) Poverty Impacts, Gender Aspects, and Social Development

66. The Project doesn't have direct impacts on poverty, gender and social development. However, the project indirectly benefited the poor by improving enabling environment for geothermal development, leading to more reliable and environmentally friendly energy supply to Indonesia's disadvantaged populations and more favorable socioeconomic development in the beneficiary communities.

(b) Institutional Change/Strengthening

67. Institutional strengthening and capacity building was one of the main components of this Project. The Project potentially has a sustainable long-term institutional impact, as evidenced by: (i) increased capacity building for the Agency, especially a better understanding of geothermal barriers and challenges, (ii) lessons learned from international experience on geothermal development, (iii) the experience with the consultant to prepare and drafting the geothermal policies, and (iv) a strengthened working relationship between the Bank and the Implementing Agency MEMR. These are all contributing factors towards enhanced capacity and accumulating a body of geothermal-energy knowledge.

(c) Other Unintended Outcomes and Impacts (positive or negative, if any)

68. Not Applicable

3.6 Summary of Findings of Beneficiary Survey and/or Stakeholder Workshops

69. A roundtable discussion on the current challenges and opportunities of Indonesia's geothermal power development was carried out by the Bank at September 18, 2013. The event participants included MEMR, PLN, public and private geothermal developers, Indonesia Geothermal Association, and the World Bank Group (IBRD and IFC). The discussions concerning the project related issues are summarized below. Full discussions, covering broader issues of the sector are summarized in Annex 6.

Context. Despite Government efforts to encourage geothermal development, there is widespread agreement among most stakeholders that geothermal development has stalled. Having reached 1,200 MW by 2010, in the last three years 2010-2012, just 135 MW was added. It is likely that at most only 200 MW of new capacity will be added by 2016-2017 (including two projects financed by the World Bank), bringing the total to around 1,500MW – as opposed to the 4,000 MW geothermal target of the Fast Track II program.

Challenges in Resource Risk. Although financing the power generation component poses few difficulties once the steam resource is proven, debt finance for exploration and delineation drilling is generally unavailable. In 2012 the Government established a Geothermal Fund, which is now funded to US$300 million, however a satisfactory model for the use of these funds has yet to be developed, and no disbursements have yet been made.

Challenges in the Transaction Mechanism. The tendering process required by the Geothermal Law has severe deficiencies. Most important is that bidders are expected to bid on estimated ultimate electricity prices (typically 7-9 years in the future) based on little and poor quality below-surface data.

The quality of bids could be improved by providing the data from at least 3 exploration wells for each work area, within the context of an international best practice database. This would require the existence of a competent agency to undertake the work, and consideration of how those wells (which are both assets and liabilities) could be transferred to the developer as part of the bid package. Also problematic is that poor pre-qualification standards have encouraged unqualified bidders to set unrealistically low prices that cannot be achieved. The technical capacity of some local Government tender committees is also inadequate.

Challenges in Pricing Policy. Government targets for geothermal development are aspirational statements, made in ignorance of the incremental costs necessary to achieve the stated targets. The reality is that at least over the next decade, geothermal projects in Indonesia will be significantly more expensive than coal if externalities are ignored, particularly since the best and most accessible projects on Java (whose incremental costs are relatively small) are already developed.

The international experience shows that where renewable energy cannot compete with thermal generation, the first prerequisite for a successful renewable energy program is the development of a transparent mechanism to recover the incremental costs. Worse, the 2012 feed-in tariff was introduced by MEMR without proper consultation with MoF, and could not be implemented because it stood in conflict with other existing regulations. Again the international experience shows that few renewable energy incentive tariffs are successful without adequate stakeholder consultation, and without a demonstration of the impact of a proposed tariff on the stakeholders (e.g. what impact would the geothermal tariff have on PLN's subsidy from MoF). Tariffs should be transparent, based on a clearly understood methodology, with clear provisions for covering transmission connection costs, and with uniformly applied principles for escalation and indexation.

4. Assessment of Risk to Development Outcome

Rating: High.

70. The expected outcomes, in terms of installed geothermal capacity and CO2 emission reduction, were not achieved, which is, however, not surprising since these indicators were not appropriate for measuring the project outcomes and their target values were too ambitious, as discussed in Section 2. Nonetheless, the expected intermediate outputs of the project were only partially achieved, as shown in Section 3 and Annex 2, due to the cancellation of several planned activities. To issue and implement related regulations based on the consultants' recommendations is key to achieving the expected outcomes of increasing installed geothermal capacity and CO2 emission reduction, but was not carried out during the project life. The GoI is committed to continue developing

supportive policies for geothermal power expansion, including both the proposed geothermal feed-in-tariff policy with support from the World Bank and the ADB, and the Geothermal Fund from other donors. However, the risk to a successful outcome in the foreseeable future is high given the great uncertainty about their future development. Geothermal transactions and private sector participation in geothermal development will continue to falter without these enabling policy and risk sharing mechanisms in place.

5. Assessment of Bank and Borrower Performance

5.1 Bank

(a) Bank Performance in Ensuring Quality at Entry

Rating: Unsatisfactory

71. The project preparation was based on solid analytic work carried out by the Bank and other agencies for Indonesia and international experience, and rightly identified key barriers that hinder the expansion of geothermal power in Indonesia. The Bank mobilized a strong technical team and additional resources in project preparation and related upstream analytical activities. The PAD rightly identified inter-governmental coordination as one of the project main risks and proposed an appropriate mitigation measure through the establishment of a Stakeholders Advisory Group, although this group did not function during implementation. The Bank also correctly recognized the weak procurement and financial management capacity of MEMR and provided training during the project preparation to mitigate the risk. However, in the hindsight, project design is deficient of operational realism. The project scope could not be implemented within 3-5 years, given the complex government procedures and the sensitive nature of the policies to be addressed. The inputs of several components were dependent on the outputs-the government policies which are expected to be developed under the first component. In addition, it is not possible to monitor the PDO/GEO indicators during the project life since the value of these indicators materializes several years after the project is closed. Finally, the risk of delays due to government budget procedure was not mitigated adequately.

(b) Quality of Supervision

Rating: Unsatisfactory

72. The Bank carried out regular supervision of the project, monitoring project progress and solving outstanding issues as they occurred, except that there was a time gap in 2012 when the TTL changed. The project supervision was well-documented in aide memoires and ISRs. The Bank team also mobilized additional resources to implement some activities originally intended under the project, but could not move forward, because of MEMR capacity issues. Fiduciary specialists were actively involved in project supervision and provided guidance and support to the Project Management Unit on a regular basis. In response to the need for additional time for the project to complete

planned activities, the Bank carried out a project restructuring to extend the closing date for two years. However, no serious and timely attempt to address the design flaws, implementation issues and to better utilize the project resources was undertaken by the Bank. The Bank's team did not follow up on capacity building for the PMU, especially after MEMR restructuring; and its inadequate oversight also played a factor to the undue expiration of the two major consultant contracts. The extension was helpful for completing some of the planned activities, but couldn't change the project performance trend. No mid-term review of the projects was officially carried out and the opportunity to substantially to address the design and implementing issues to revert its performance was lost.

(c) Justification of Rating for Overall Bank Performance

Rating: Unsatisfactory

73. The Bank demonstrated strong technical orientation during project preparation, but inadequate operational realism. The quality at entry was negatively impacted by ambitious GEO indicators, overly optimistic assessment of the feasibility of achieving the proposed target, underestimation of implementation duration, and flawed sequencing of project components. During implementation, although the Bank team was active and responsive during supervision, its responses to implementation problems were not effective. It missed the opportunity to address the project design flaws during project restructuring, and thus was not able to restore the project's performance.

5.2 Borrower

(a) Government Performance

Rating: Moderately Unsatisfactory

74. The GoI's commitment on the expansion of geothermal power was strong, which was demonstrated by its adoption of various important initiatives, e.g., the second Fast Track Program in 2008, aiming at developing additional 4000 MW of geothermal generation capacity; the establishment of the Geothermal Directorate in 2010 and GFF in 2011. However, the commitment and high target did not translate into effective actions during the project's implementation. The restructuring of MEMR, leading to the establishment of the Geothermal Directorate in the midst of the project implementation, combined with frequent changes in the leadership, resulted in high turnover of the project staff and inconsistent high-level support to the project. Coordination and consultation among inter-governmental institutions was inadequate, hampering effectiveness of the policy-making process and viability of the issued regulations. The budget procedure was complex, rigid and time-consuming, making it difficult to utilize effectively project available funds and causing delays in payments to completed activities.

(b) Implementing Agency or Agencies' Performance

Rating: Moderately Unsatisfactory

75. The staff in the Project Management Unit was very committed despite the frequent change in organizational structure and leadership. Despite heavy workload, the staff closely reviewed the consultants' output and pushed for quality deliverables. They also learned about Bank fiduciary processes and procedures by doing, and diligently reconciled the differences between Bank procurement processes and the national procurement processes, both of which this project is subject to. In parallel they completed enormous work program financed by MEMR budget, including those activities planned under the project. Their performance was hindered by the lack of strong and consistent high-level support and internal coordination. Inadequate representatives of other related sub-directorates in the PMU were also slowing down the decision making process at mid-level management.

(c) Justification of Rating for Overall Borrower Performance

Rating: Moderately Unsatisfactory

76. The GoI is committed to geothermal development and set a long term vision for this. However, the GoI didn't pay adequate attention to this project and its potential impacts. The constant leadership changes in the relevant DG and director related to the project affected the project performance and caused unnecessary delays. The complex and prolonged budget procedure undermined the project quality and effectiveness. The PMU had very committed hard-working staff. However, inter-government coordination which is essential to policy and regulation making was not adequate, affecting the project's outcome.

6. Lessons Learned

77. A number of lessons learned should be considered for future projects.

78. **Successful Renewable Energy Incentive Policy Requires Addressing Incremental Costs in Transparent and Consultative Manner**. The problems of the FiT scheme once again confirms the international experience that few incentive tariffs for renewable energy were successful without satisfactory handling of the incremental costs of renewable energy compared with the costs of conventional energy resources. Tariff regulation should be transparent, based on a clearly understood methodology, with a proper consultation about the advantages and disadvantages of the proposed scheme and backed up by a demonstration of its impact on the stakeholders (e.g. what impact would the geothermal tariff have on PLN's subsidy from MoF). Despite having a comprehensive background study, the FiT regulation was short of providing a clear understanding on the methodology used and its impacts to stakeholders. The Stakeholder Advisory Group was established at the project early stage, but did not function to contribute to the policy making process under the project. Thus key stakeholder concerns were not adequately addressed or consulted which undermines the robustness of the policy and support to its implementation.

79. **Consideration of Constraints by Government Budget Procedure at Entry**. Client-executed grants could significantly increase ownership of the implementing agency to the project objectives and activities. However, this benefit could be diluted given potential delays, inflexibility in mobilizing the funds and reduced competition if the project budget is subject to the government budget procedure (DIPA). The constraint should be understood, discussed with Client and taken into account at entry. All responsible units in charge of the budget process within the implementing ministry and MOF should be consulted and involved in the project at early stage. In addition, some just-in-time support using other resources, if available, should be mobilized early or get ready to address emerging issues during implementation. Finally, for Government-executed grants, the project cycle should be aligned with the DIPA process. The project closing date of June 31, 2013, which falls in the middle of the government budget cycle, did not give adequate time for the implementing agency to complete the project DIPA procedure and the payment of the completed activities.

80. **Technical soundness and operational realism are critical**. Both are important for a project to be effective and successful and should be taken into account in project design. For example, at project appraisal, it would be helpful to set up realistic, minimum requirements for Component 2, in particular the subcomponents of tendering, to take place, not to make it entirely subsequent to the delivery of the policy incentives. Alternatively, phased approach could be considered when project activities can only be implemented in sequence; the first phase could be smaller in size for new clients who are government entities to mitigate capacity constraints.

81. **Continuous capacity building throughout project implementation could improve project performance significantly**. Training to the PMU at early stage was necessary but not sufficient, given the frequent organizational changes at MEMR and the high turnover of key staff. In the hindsight, continuous and practical capacity building especially before important milestones (such as the evaluation of consultant proposals), would help avoid unnecessary misunderstanding and hence speed up progress substantially. Similarly, the support to the PMU could be more effectively provided by an internationally experienced and competent project manager who would build capacity of new staff and maintain the PMU's continuity through frequent institutional changes at MEMR.

7. Comments on Issues Raised by Borrower/Implementing Agencies/Partners

(a) Borrower/implementing agencies

82. Comments raised by the Implementing Agency are summarized from the Borrower Completion Report as follow. Full Borrower Completion Report is provided in Annex 7.

Evaluation of the Recipient's Performance
Preparation

- The organization of Project Implementing Unit needs to be supported with clear tasks and responsibilities (viz. terms of reference or job descriptions), including the coordination with related stakeholders.
- The early presence of project management consultant to support the implementation of the project is important.

Implementation

- The consultation of WB grant project to other units in MEMR, for example the Planning and Financial bureau under Secretariat General, is important to acquire sufficient support during implementation,
- The commitment of top-level management in the PIU is the key for success in project implementation.
- There were several restructurings in the Directorate General's organization, as well as key management replacements during the project implementation. These multiple changes negatively affected both the project's activities and performance.

Evaluation of the Bank's Performance

- The Bank's team could improve its responsiveness to project activities in line with Service Standards;
- The procurement training was provided, however the training material was too generalized. The training should be customized, practical, implementable, and refer to the needs as on-going procurement activities.
- The accuracy in assessing and approval of PIU's report needs to be increased.
- The requirement on wider stakeholder consultation should be followed up consistently during the implementation by the Bank team.

(b) Cofinanciers. No co-financiers were available under the project.

(c) Other partners and stakeholders. See Annex 6

Annex 1. Project Costs and Financing

(a) Project Cost by Component (in USD Million equivalent)

Components		Appraisal Estimate (USD millions)	Actual / Latest Disbursement of (USD millions)	Percentage of Appraisal
Component 1	**Policy Framework**	**3.60**	**0.81**	**23%**
C1.1	Development & Implementation of Economic Incentives	2.40	0.81	34%
C1.2	Development & Introduction of Risk Mitigation Measures	0.90	-	-
C1.3	Support the Implementation of the Geothermal Law	0.30	-	-
Component 2	**Transaction Management**	**3.35**	**2.71**	**81%**
C2.1	Expanding Power Generation in " Brown" Geothermal Fields	0.60		
C2.2	Facilitating transactions of "Green" Geothermal Fields	2.75	-	-
Component 3	**Technical Capacity Building**	**1.65**	**-**	**-**
C3.1	Training of Government Officials and Technical Staff	0.48	-	-
C3.2	Building Awareness	0.70	-	-
C3.3	Options for Long Term Cost Reduction	0.47	-	-
Component 4	**Project Management Assistance**	**0.40**	**0.34**	**85%**
	Total	**9.00**	**3.86**	**43%**

(b) Financing

Source of Funds	Type of Financing	Appraisal Estimate (USD millions)	Actual / Latest Disbursement of (USD millions)	Percentage of Appraisal
Global Environment Facility (GEF)	Grant	4	1.45	36%
Borrower	Government budget	5	2.41	48%

Project Cost by Component at Appraisal

Components		Appraisal Estimate (USD millions)		
		GEF	GoI Cash & In-kind	Total
Component 1	**Policy Framework**	**1.10**	**2.50**	**3.60**
C1.1	Development & Implementation of Economic Incentives	0.60	1.80	2.40
C1.2	Development & Introduction of Risk Mitigation Measures	0.40	0.50	0.90
C1.3	Support the Implementation on the Geothermal Law	0.10	0.20	0.30
Component 2	**Transaction Management**	**2.35**	**1.00**	**3.35**
C2.1	Expanding Power Generation in " Brown" Geothermal Fields	0.35	0.25	0.60
C2.2	Facilitating transactions of "Green" Geothermal Fields	2.00	0.75	2.75
Component 3	**Technical Capacity Building**	**0.35**	**1.30**	**1.65**
C3.1	Training of Government Officials and Technical Staff	0.15	0.33	0.48
C3.2	Building Awareness	0.05	0.65	0.70
C3.3	Options for Long Term Cost Reduction	0.15	0.32	0.47
Component 4	**Project Management Assistance**	**0.20**	**0.20**	**0.40**
	Total	**4.00**	**5.00**	**9.00**

Actual Project Cost by Component

Components		Actual / Disbursement (USD millions)		
		GEF	GoI Cash & In-kind	Total
Component 1	**Policy Framework**	**0.53**	**0.28**	**0.81**
C1.1	Development & Implementation of Economic Incentives	0.53	0.28	0.81
C1.2	Development & Introduction of Risk Mitigation Measures	-	-	-
C1.3	Support the Implementation on the Geothermal Law	-	-	-

Components		Actual / Disbursement (USD millions)		
		GEF	GoI Cash & In-kind	Total
Component 2	**Transaction Management**	**0.73**	**1.98**	**2.71**
C2.1	Expanding Power Generation in " Brown" Geothermal Fields	0.73	1.98	2.71
C2.2	Facilitating transactions of "Green" Geothermal Fields	-	-	-
Component 3	**Technical Capacity Building**	**-**	**-**	-
C3.1	Training of Government Officials and Technical Staff	-	-	-
C3.2	Building Awareness	-	-	-
C3.3	Options for Long Term Cost Reduction	-	-	-
Component 4	**Project Management Assistance**	**0.19**	**0.15**	**0.34**
	Total	**1.45**	**2.41**	**3.86**

Annex 2. Outputs by Component

Component 1: Policy Framework for Scaling-up the Development of Geothermal Power

1. This component was designed to assist the GoI in terms of developing and implementing an integrated set of policies that would provide sufficient regulatory certainty, risk mitigation, and economic incentives for increased public and private investments toward developing geothermal power in Indonesia.

C1.1: Development and implementation of policy to address incremental costs

2. The objective of the activity was to support the development and implementation of a pricing and incentive policy to address incremental costs of geothermal power development to be undertaken by the Government of Indonesia.

3. A consulting contract for the assignment was signed in April 2010 as a result of a competitive selection process, and later re-awarded under single source selection in September 2011. The assignment included three phases: i) review and analysis of prevailing geothermal policies, regulations and costs; ii) development of geothermal policy framework; and iii) support to the implementation of the recommended pricing and incentive policy framework.

4. Six tasks were conducted under Phase 1 of the contract: (i) Assessment of production cost for geothermal power and coal-fired generation; (ii) Review of current and pending regulations governing geothermal development; (iii) Due diligence on the Government's geothermal development targets; (iv) Review of prevailing processes for new geothermal working areas (WKP)[4] and Legacy WKP[5]; (v) Risk assessment of stages throughout the geothermal value chain; and (vi) Assessment of the incremental cost gap.

5. Phase 2 focused on four principal areas of policy making: (i) Funding the incremental cost gap; (ii) Addressing geothermal exploration risk; (iii) Establishing a segmented pricing framework; and (iv) Rationalizing the tender process for new WKP. The consultant suggested several options for covering the incremental cost gap, e.g. PLN PSO Subsidy, Tariff increase, Green electricity scheme, and Sale of CERs. Three scenarios were provided to address the exploration risk: exploration by the Government prior to the tender, a financial mechanism to share risk, and developers bearing the risk. Regarding the issue of pricing framework, segmented price and cost type options were suggested. Several options of price segmentation were discussed: location, size, exploration status, and new vs. legacy. The cost type options included cost-based,

[4] WKP: Geothermal Working Area

[5] Legacy WKP: Geothermal Working Areas allocated by GOI before the Geothermal Law of 2003

market-based, production cost feed-in-tariff (FiT), and "value-based" FiT. The report discussed the proposed institutional framework for the development of the new WKP, and recommended incorporating an exploration body to address the need of greenfield data upgrade and validation prior to tender.

6. Phase 3 was the continuation of the previous work at Phases 1 and 2. After MEMR selected the options to use the PLN PSO subsidy to cover the gap of incremental cost, and "value-based" FiT for the pricing framework, the consultant elaborated and evaluated the selected option. Based largely on the recommendations of the study, MEMR issued a ministerial regulation No. 22/2012 dated August 2012, to adopt a FiT scheme for geothermal development.

7. However, the regulation stood in conflict with other existing regulations for geothermal development, and hence could not be implemented. The revision of these regulations to allow implementation of the FiT scheme was not supported by other agencies, notably the MOF. The issuance of the FiT Regulation No 22/2012 has not improved the business environment for the geothermal development as intended and hence, the intended outcome was not achieved.

C1.2: Development and introduction of upstream risk mitigation measures

8. This sub-component was designed to create a mechanism for mitigating upstream resource development risks faced by geothermal developers in Indonesia. The activities planned included: the selection of a risk mitigation scheme to be implemented, the development of procedure for implementing the scheme and the arrangement of necessary funding.

9. To alleviate MEMR's heavy workload in terms of the implementation of the pricing and transaction packages, the Bank mobilized a grant from the Private Participation in Infrastructure Advisory Facility (PPIAF) to undertake an evaluation of geothermal resource risks in Indonesia. The study evaluated a sample of nearly 80 percent of all geothermal wells that have been drilled in Indonesia, and the results indicated that the geothermal resource risks in Indonesia are not as exceptional as expected. Instead it is likely to be similar to that of other countries, and perhaps even less so, given Indonesia's rich endowment of geothermal resources.

10. In parallel, MOF also took the initiative to address geothermal resource risks with support from JICA and ADB; as a result, the Geothermal Fund Facility (GFF) was established in 2011. The objective of the GFF is to support local governments in obtaining sufficient data through exploration drilling, prior to the tender of WKPs, and to support geothermal developers in order for them to execute exploration. Despite the fact that MEMR did not lead in the GFF establishment, it contributed to the preparation of the fund, through discussions with the MOF. The MEMR was well equipped to do so, as the output of the Sub-component 1.1 proposed a similar institutional framework for resource risk mitigation by the government. With the GFF in place, the intended outcome for this activity is deemed to be achieved.

C1.3: Support the implementation of the Geothermal Law

11. The purpose of this sub-component was to review the Geothermal Law and the draft Implementation Rules and Regulations of the Geothermal Law as well as other related policies, identify gaps within the documents and potential hindrances to future geothermal power project investments, and recommend necessary changes and supplementary policies and regulations, in view of the coherence of the overall policy frameworks for geothermal power development in Indonesia.

12. The consulting services under C1.1 provided a comprehensive assessment of the existing regulatory framework for the geothermal development, serving as the foundation for MEMR to design additional geothermal supporting regulations under the Geothermal Law. However, because of the delay of the assignment, the results of the assessment were not delivered until the middle of 2011. In the meantime, the MEMR developed and issued a series of regulations and policies on geothermal development using its own resources during the implementation of the project as listed below.

(a) MEMR Regulation No 11/2009 regarding the Guideline for Geothermal Business Development.
(b) MEMR Regulation No 2/2009 regarding the Guideline for Assignment of Geothermal Preliminary Survey.
(c) MEMR Regulation No 5/2009 regarding the PLN's Standard Electricity Price from Cooperative or Any Other Business Entities.
(d) MEMR Regulation No 11/2009 regarding the Guideline for Geothermal Business Development.
(e) MEMR Regulation No 32/2009 regarding PLN's Standardized Electricity Price from Geothermal Power Plants (Ceiling Tariff US$ 9.7cents based on negotiation)
(f) MEMR Regulation No 15/2010 regarding The List of Fast Track Projects on Renewable, Coal, Gas, and related Transmission.
(g) Government Regulation No 70/2010 regarding the Amendment of Government Regulation No 59/2007 on Geothermal development, that if the developers do not exploit the geothermal field until December 31, 2014, then the concession have to be given back to the government.
(h) MEMR Regulation No 2/2011 regarding Assignment for PLN to Buy Geothermal Electricity and Standardized Electricity Price from Geothermal Power plants (Ceiling Tariff US$ 9.7cents based on submitted price in the bidding, final and not for negotiation)
(i) Government Regulation No 9/2012 regarding Types and Tariffs on Non-Tax State Revenue for Activities under MEMR (Geothermal resource data is free to attract the investment)
(j) MEMR Regulation No 1/2012 regarding the revision of MEMR regulation No 15/2010 on The List of Fast Track Projects on Renewable, Coal, Gas, and related Transmission.

(k) MEMR Regulation No 18/2012 regarding the amendment of MEMR Regulation No 11/2009 on the Guideline for Geothermal Business Development.
(l) MEMR Regulation No 22/2012 regarding the Assignment to PT. PLN to Buy Geothermal Electricity and Standard Electricity Price for PT. PLN to Buy the Geothermal Electricity (or popular as FiT mechanism)
(m) MEMR issued six decrees during the project period to assign several geothermal developers for particular geothermal greenfields.
(n) A total of 18 MEMR decrees were issued to determine the new Geothermal Working Areas from 2008 to 2013.

13. In light of the outputs delivered under this subcomponent using both GEF grant funds and the GOI's own resources, the outcome indicators to support the implementation of Geothermal Law under this sub-component were deemed to be achieved.

Component 2: Transactions Management for Mobilizing Investments in the Geothermal Power Generation

14. This component was designed to assist the GoI, especially the MEMR, to develop the capacity for planning and transacting geothermal power developments in an efficient and transparent manner. Two main activities were originally planned: (i) design and preparation for geothermal investment transaction, including green fields and fields already allocated to investors (i.e. brown fields); and (ii) Geothermal Investment Transaction. During the restructuring of 2011, a third activity- Data Upgrade and Validation for Greenfield Areas- was added.

1. Design and Preparation for Geothermal Investment Transaction.

15. This activity covered sub-component C2.1 *Expanding power generation in geothermal fields already allocated to investors* and the preparation for sub-component 2.2 *Facilitating transactions of new geothermal fields for power development*.

16. The consulting contract for the assignment was signed in June 2010 and expired in April 2011 with a number of incomplete tasks remaining. The same consultant was re-appointed in September 2011 to complete the contract.

17. The first task was designed to catalyze investments by existing developers to expand geothermal power generation in brown fields. The consultant delivered a Report Concerning Expansion of Brownfield Capacity in March 2013. The study classified the brownfields into three categories: Category 1 included the fields which have already been developed partially, installed production or power plant and in continuous operation; Category 2 included the fields whose reserves have been proven but have not yet developed; and Category 3 included the fields which still require additional drilling to prove the existence of reserves. A number of factors impeding the developers for existing field expansion were identified, for example, low steam price dictated by the ESCs with PLN, barriers to development related to regulations and permits, perceived non-bankable

projects because of the low energy sales price, and other issues associated with development financing and limited human resources. Furthermore, the rights and practical opportunities for MEMR to intervene in the brownfields were found strictly limited because the developers were bound by the commercial obligations contained in the JOC agreement with Pertamina and the ESC with PLN. Though the new FiT policy might be applied to the expansion of the brownfields, no specific provision concretely establishes the rights of the developers in the context of future price policy. Further legal due diligence for the brownfields ESCs is recommended in order to assess any incentive offers for expansion.

18. With the consultant's report, the proposed structure that offered to mobilize investments for additional geothermal power in brown fields is not yet in place. The outcome of the first task, therefore, has not been achieved.

19. The second task was designed to develop the transaction procedures for greenfields. This included development of criteria for project selection, the transaction procedures, model bidding documents and the terms of reference (TOR) for the transaction advisor for the demonstration transaction, using the new procedures. The consultant delivered all the intended outputs, namely, the TOR for Transaction Advisor for a Demonstration Greenfield Project (October 2012), Handbook for Geothermal Transactions (November 2012), and Guidelines for Prioritization of the Development of Greenfield Projects (February 2013). The Transaction Advisor was originally proposed to assist the Tender Committee for the demonstration tender, and was planned as the central activity of Component 2. The Handbook for Geothermal Transactions proposed guidelines for a new WKP tender, included necessary institutional structure for the tender, review of the project's status quo to establish a tender strategy, and the guidance for tender mechanism with or without PQ process. The Report on Greenfield Prioritization provides guidance and a practical approach to systematically rank the identified geothermal areas for development prioritization. The approach of prioritization would be based on four levels of activities: (i) Open area identification; (ii) Open area Reconnaissance and Ranking; (iii) Preliminary survey and WKP determination; and (iv) Exploration and a feasibility study by Government. At present, MEMR has not been able to adopt the proposed procedure and documents for application given the deadlock concerning the FiT regulations. The procedures may also need adjustment, should the tariff scheme change. Given that the above, the intermediary outcome of having in place model procedures and standardized documentation for competitive bidding of geothermal power transactions has been partially achieved.

2. Geothermal Investment Transaction.

20. The activity was designed to support MEMR to carry out a pilot investment transaction using the new pricing scheme and model transaction procedure and standard documents. MEMR indicated that a geothermal field was selected for this demonstration transaction and the TOR for the Transaction Adviser was prepared. The activity was not launched because of the impasse with the FiT regulation, as well as because of

insufficient time for implementation. The outcome for the activity, therefore, has not been achieved.

3. Data Upgrade and Validation Study (added after the 2011 restructuring)

21. The activity was designed to update and validate geothermal data for the geothermal field which MEMR considered for the demonstration transaction. The activity was not launched because the government regulations on data for WKP were unexpectedly changed, rendering it no longer implementable.

Component 3: Geothermal Sector Technical Capacity Building

C3.1: *Training of government officials and technical staff in planning and transaction management*

22. This sub-component was designed to train government officials and technical staff in planning and transaction management skills. Because of the delay in developing the model transaction procedures, the training was not delivered as intended. Nevertheless, the expected output of improved transaction management skills and knowledge of concerned government agencies and officials were partially achieved, through the discussions and stakeholders' workshops during the consulting services for the preparation of the model transaction procedure.

C3.2. *Building Awareness among Stakeholders*

23. The sub-component was designed to enhance the familiarity of various stakeholders with the implementation aspects of the Geothermal Law. To this end, MEMR organized a number of workshops and seminars for the stakeholders in order to build awareness using its own funds. Although the allocated funds under the project intended for this activity were not used, the expected outcome has been deemed to be achieved.

C3.3: *Options for long-term cost reduction*

24. An industrial analysis was planned to identify key areas where local industries maintain a comparative advantage, and to then develop a sector strategy to strengthen their roles and participation in the geothermal development industry. The expected output was a national strategy on increasing domestic participation and technology development. The activity was not carried out during the project life-cycle. The outcome, therefore, was not achieved.

25. In parallel, the Bank secured grant funding from the Government of the Netherlands to enhance long–term capacity building of PGE to prepare investment projects. MEMR considered that increased capacity of PGE, the single largest domestic developer, would improve the efficiency and progressively reduce costs of developing geothermal resources. Hence, the funds allocated to this subcomponent were no longer

necessary. During project restructuring in 2011, the funds originally allocated to this subcomponent were reallocated to other activities.

Component 4: Project Management Assistance

26. This component provided the necessary individual consultant support to the PMU for the management and supervision of the project. The consultants included a project manager, as well as additional consultant assistants for procurement and financial management. The appointment of the Project Manager was delayed from the very beginning. The complex DIPA procedure and delay in payment to individual consultants made it difficult to employ competent consultants for the positions. The support to the PMU under this component was not effective, except for the preparation of progress reports. The consultants, being outside the procurement committee or regulation drafting committee, were not able to contribute to the process in technical and procedural domains. Therefore, the outcome has been partially achieved.

Annex 3. Economic and Financial Analysis

Not applicable for this project.

Annex 4. Bank Lending and Implementation Support/Supervision Processes

(a) Task Team members

Names	Title	Unit	Responsibility/ Specialty
Lending			
Migara Jayawardena	Senior Energy Specialist	EASTE	
Leiping Wang	Lead Energy Specialist	EASTE	
Noureddine Berrah	Consultant	EASTE	
Jeffrey John Delmon	Senior Private Sector Development	FEU	
Yuling Zhou	Lead Procurement Specialist	EASTE	
Feng Liu	Senior Energy Specialist	EASCS	
Emil Elestianto	Consultant	EASTE	Dev. Specialist
Rajiv Sondhi	Senior Finance Officer	LOAFC	
Ximing Peng	Energy Specialist	EASCS	
Bisma Husen	Procurement Specialist	EAPCO	
Unggul Suprayitno	Financial Management Specialist	EAPCO	
Thomas E. Walton	Consultant	AFTTR	Environmental Spec.
Viviante Rambe	Environmental Specialist	EASIS	
Bruce M. Harris	Consultant	EASTE	Social Dev. Specialist
Teresita G. Velilla	Temporary	EASTE	Program Assistant
Julia Hanniawaty	Team Assistant	EACIF	
Supervision/ICR			
Anh Nguyet Pham	Senior Energy Specialist	EASIS	TTL
Migara Jayawardena	Senior Energy Specialist	EASIS	Former TTL
Peter Johansen	Senior Energy Specialist	EASWE	
Xiaoping Wang	Senior Energy Specialist	SEGES	
Leiping Wang	Lead Energy Specialist	SASDE	
Dhruva Sahai	Sr Financial Analyst	EASWE	
Defne Gencer	Energy Specialist	EASIN	ICR Peer Reviewer
Emil Elestianto	Consultant	EASIN	
Elvi Yani Schaefer	Energy Specialist	EASIS	
Muchsin Qadir	Consultant	EASIS	Energy Specialist
Olivia Tanujaya	Consultant	EASIS	Energy Specialist
Brian Roy White	Consultant	EASIS	Geothermal Expert
Noureddine Berrah	Consultant	EASIS	Energy Advisor
Niruban Balachandran	Consultant	EASIS	Editor

Names	Title	Unit	Responsibility/ Specialty
Khairy Al-Jamal	Senior Infrastructure Specialist	EASIS	
Jeffrey John Delmon	Senior Private Sector Development	FEU	
Zhentu Liu	Senior Procurement Specialist	EAPFM	
Yash Gupta	Senior Procurement Specialist	EASR1	
Indrajit Kartorejo	Procurement Specialist	EASR1	
Budi Permana	Procurement Analyst	EAPFR	
Rajat Narula	Sr Financial Management Specialist	EAPFM	
Christina I. Donna	Financial Management Specialist	EASFM	
Tatong Permana Anggrimulja	Consultant	EASFM	FM Specialist
Arip Syaman Sholeh	Consultant	EASFM	FM Specialist
Sri Oktorini	Program Assistant	EACIF	
Christina Hernandez	Program Assistant	EASWE	
Shawna Fei Li	Junior Professional Associate	EASIN	
Mitsunori Motohashi	Energy Specialist	AFTG1	ICR Peer Reviewer

(b) Staff Time and Cost

Stage of Project Cycle	Staff Time and Cost (Bank Budget Only)	
	No. of staff weeks	USD Thousands (including travel and consultant costs)
Lending		
FY06	4.83	21,763.10
FY07	15.19	86,041.73
Total:	**20.02**	**107,804.83**
Supervision/ICR		
FY08	0.00	9,288.60
FY09	12.72	53,748.60
FY10	5.87	36,736.95
FY11	11.44	54,425.80
FY12	8.72	48,596.66
FY13	9.83	62,725.27
FY14	6.60	38,994.28
Total:	**55.18**	**304,516.16**

Annex 5. Beneficiary Survey Results

Not available for the project.

Annex 6. Stakeholder Workshop Report and Results

A recent geothermal roundtable discussion was held on September 18, 2013, with the World Bank as the host. The topic was the recent update of Indonesia's geothermal development, challenges and barriers on scaling up the development, and the required actions to address these issues. The participants of the roundtable discussion included MEMR, Pusat Investasi Pemerintah or the Indonesia Investment Agency (MoF), SOEs, and private geothermal developers. The key issues in the discussion were summarized below:

Context

- Indonesia possesses excellent geothermal resources – whose estimates are as high as up to 27,000 MW, much of it located in the three most inhabited islands, and for which the Government presently has a development target of some 6,000 MW.
- Despite the GoI's efforts to encourage geothermal development, there is widespread agreement among most stakeholders that geothermal development has stalled. Having reached 1,200 MW by 2010, in the last three years 2010-2012, just 135 MW was added. It is likely that at most only 160 MW of new capacity will be added by 2016-2017 (including two projects financed by the World Bank), bringing the total to around 1,500MW – as opposed to the 4,000 MW geothermal target of the Fast Track II program.

Challenges

- There is uncertainty about the size of the resources, and Indonesia urgently needs to adopt international standards for resource estimation and reporting (for example the widely accepted Australian Geothermal Reporting Code).

- Government targets for geothermal development are aspirational statements, made in ignorance of the incremental costs necessary to achieve the stated targets.

- Various impediments (e.g. regulatory) and a lack of world-class expertise within the state-owned agencies who have been tasked with developing the largest portion of the resource have meant that geothermal sector in Indonesia struggles to compete with other energy sources, despite the fact that in certain other countries with de-regulated energy markets, it can do so.

- The reality is that at least over the next decade, geothermal projects in Indonesia will be significantly more expensive than coal if externalities are ignored, particularly since the best and most accessible projects in Java (whose incremental costs are relatively small) have already been developed.

- The international experience shows that where renewable energy cannot compete with thermal generation, the first prerequisite for a successful renewable energy program is the development of a transparent mechanism is to recover the incremental

costs – such as a consumer surcharge (as recently enacted in Malaysia), or as earmarked taxes (such as the Thai Energy Conservation Fund, funded by a tax on petroleum products), or preferential loans (as provided by the Brazilian National Development Bank).

- This has led to conflicts between the aspirations of MEMR in seeking to promote geothermal energy, the pressure of the MSOE (responsible for both Pertamina and PLN) to improve commercial performance, and the pressure of MoF to reduce the PSO subsidy for PLN (rather than increase as is necessary to increase the geothermal share). Only a clear directive from the Government on how the incremental costs are to be covered will break this deadlock.

- The 2012 feed-in tariff was introduced by MEMR without proper consultation with MoF, and could not be implemented because it stood in conflict with other existing regulations. Again, the international experience shows that few renewable energy incentive tariffs are successful without adequate stakeholder consultation, and without a demonstration of the impact of a proposed tariff on the stakeholders (e.g. what impact would the geothermal tariff have on PLN's subsidy from MoF). Tariffs should be transparent, based on a clearly understood methodology, with clear provisions for covering transmission connection costs, and with uniformly applied principles for escalation and indexation.

- The 2012 tariff was also issued without a proper consultation about the advantages and disadvantages of a tariff based on PLN's avoided costs, or one based on estimates of geothermal production costs. Decisions about incentive tariff structures should be informed by a financial model that illustrates the aforementioned impact on stakeholders. Tariff reform is the most urgent priority, and needs immediate attention.

- In reality, Indonesia has two very different geothermal regimes. There are good resources in Java, Bali and Sumatra, where geothermal projects of 100-200 MW are often achievable because they connect to the large interconnected grids, which are of interest to the main domestic and international geothermal entities. These geothermal projects compete with large coal projects (particularly the new super-critical and ultra-supercritical projects that are fitted with state-of-the-art pollution controls). However, in East Indonesia (esp. on most of the smaller Islands), where the resources are equally good, projects are rarely more than 20MW because of market or grid constraints, and therefore are of less interest to the best qualified firms. Here they displace either small diesels, or are very small scale (5-10 MW size) coal projects that are being proposed – which have major environmental sustainability risks. This duality should be recognized in both tariff design and additional incentives for the smaller projects. PGE may need to take a leading role in the East (and be provided with the funding to do so).

- Other regulatory delays are no less onerous for timely completion of projects. Long delays in clarifying the legal status of assets that have passed back and forth from public to private ownership, and lengthy delays in obtaining the necessary forest

access permits, are often cited by developers. An amendment to the Geothermal law to declassify geothermal development as "mining" is pending, but in the ideal case, such permits would already be in place at the tendering stage. If that is not achievable, then there needs to be at least a fast track or "one stop" mechanism for negotiating access.

- Although financing the power generation component poses few difficulties once the steam resource is proven, debt finance for exploration and delineation drilling is generally unavailable. This is a particularly difficult problem for PGE, which faces sometimes lengthy delays in securing additional equity from its Pertamina parent for exploration drilling, after having already expended significant funds. The lack of a clear definition of what constitutes resource proving and an in-house inability to produce industry-standard bankable feasibility studies exacerbates the problem.

- The fundamental problem in securing equity for drilling pre-financial closure is that the ultimate returns based on regulated utility prices are not commensurate with the risks – quite unlike the oil and gas sector, which is often cited as a model.

- Although in 2012 the Government established a Geothermal Fund now funded to US$300 million. A satisfactory model for use of these funds has yet to be developed, and no disbursements have yet been made. From the point of view of private developers, access to loan funds for exploration phase drilling is subject to onerous conditions (100% collateral) and therefore is of little benefit. A viable model is urgently required.

- The tendering process required by the Geothermal Law has severe deficiencies. Most importantly, the bidders are expected to bid on estimated ultimate electricity prices (typically 7-9 years into the future) based on little below-surface data. What data exists is often of poor quality, inaccessible, or poorly presented.

- The quality of bids could be improved by providing the data from at least three exploration wells for each work area, within the context of an international best practice database. This would require the existence of a competent agency to undertake the work, as well as consideration of how those wells (which are both assets and liabilities) could be transferred to the developer as part of the bid package.

- Also problematic is that poor pre-qualification standards have encouraged unqualified bidders to set unrealistically low prices that cannot be achieved. The technical capacity of some local Government tender committees is also inadequate. Rules to return WKPs, where demonstrable exploratory well drilling has not occurred within reasonable timeframes, need to be rigorously enforced. In addition, pre-qualification standards need to be tightened. However, minimum expenditure levels are not favored, as they are potentially subject to abuse.

- PGE's proposed commercial partnerships are one approach to bring additional equity and expertise into the sector, particularly in view of other calls on Pertamina's resources. However these partnerships will not succeed in the absence of clarity on tariffs.

List of Participants:

1. Director of Geothermal, Directorate General of New Renewable Energy and Energy Conservation, MEMR (Mr. Tisnaldi)
2. Expert Staff to Minister of Energy and Mineral Resources (Mr. Djadjang Sukarman)
3. Sub-Director of Geothermal Business Development, MEMR (Mr. Syaiful Ruchiat)
4. Pusat Investasi Pemerintah (PIP) – MoF
5. PT. Sarana Multi Infrastruktur (Persero)
6. PT. PLN (Persero)
7. PT. PGE
8. PT. Geodipa Energy (Persero)
9. PT. Star Energy
10. PT. OTP Geothermal
11. PT. Tangkuban Perahu Geothermal Power
12. PT. Medco Cahaya Geothermal
13. Indonesia Geothermal Association (INAGA)
14. The World Bank/IBRD
15. IFC

Annex 7. Summary of Borrower's ICR and/or Comments on Draft ICR

Ministry of Energy and Mineral Resources, Indonesia
Directorate General for New, Renewable Energy, and Energy Conservation
Directorate of Geothermal

Completion Report
for
Geothermal Power Generation Development Project
(Grant of World Bank, Grant Agreement No TF092324-IND)

The Geothermal Power Generation Development Project had an important role to support the development of policies in the geothermal sector. The presence of the project was at the right time, since the Government of Indonesia had also been taking considerable steps to mainstream the development of the country's geothermal resources for power generation. This project had included some activities to develop policies related to geothermal development. The project was started in 2008, and later the closing date was extended to 2013. The completion report will summarize the project achievements, implementation aspects, and the evaluation of both the Borrower and the Bank's performance.

1. Project Background

1.1. Project Summary

Project Name	: Geothermal Power Generation Development Project
Executing Agency	: MEMR – Directorate General of New, Renewable Energy and Energy Conservation.
Source of Funds	: GoI US$5 million World Bank / GEF US$4 million
Begin Negotiation	: March 2008
Dates of Signing	: June 23, 2008
Effectiveness Date	: October 16, 2008
Closing Date	: June 30, 2013

1.2. Project Description

Project Development Objectives:

The development objective of the project is to promote the expansion of economic and environmentally-friendly geothermal power generation in Indonesia, and to reduce carbon-dioxide emissions from the power system. The project will assist the GoI to prepare and implement its geothermal sector reform program, designed to remove the key policy and institutional barriers which prevent greater development of geothermal resources. It will also assist in the transaction of geothermal power investments.

The global environment objective of the project is to promote on-grid electricity from geothermal sources, reducing the need for coal-based generation capacity

and avoiding associated greenhouse-gas emissions. The outcome would be increased geothermal energy in electricity grids.

Financing Sources:
The project was financed by GEF (Global Environment Facility) with co-financing from the Government of Indonesia, as summarized below:

Components	Initial Estimate (US$ millions)		
	WB/GEF	GoI	Total
Component 1. Policy Framework	**1.10**	**2.50**	**3.60**
1. Development & Implementation of Economic Incentives	0.60	1.80	2.40
2. Development & Introduction of Risk Mitigation Measures	0.40	0.50	0.90
3. Support the Implementation of the Geothermal Law	0.10	0.20	0.30
Component 2. Transaction Management	**2.35**	**1.00**	**3.35**
1. Expanding Power Generation in " Brown" Geothermal Fields	0.35	0.25	0.60
2. Facilitating transactions of "Green" Geothermal Fields	2.00	0.75	2.75
Component 3. Technical Capacity Building	**0.35**	**1.30**	**1.65**
1. Training of Government Officials and Technical Staff	0.15	0.33	0.48
2. Building Awareness	0.05	0.65	0.70
3. Options for Long Term Cost Reduction	0.15	0.32	0.47
Component 4. Project Management Assistance	**0.20**	**0.20**	**0.40**
Total	**4.00**	**5.00**	**9.00**

1.3. Project Components

Component 1. Policy Framework for Scaling-up the Development of Geothermal Power
C1.1: Development and implementation of policy to address incremental costs.
C1.2: Development and introduction of upstream risk mitigation measures.
C1.3: Support the implementation of the Geothermal Law

Component 2. Transactions Management for Mobilizing Investments in the Geothermal Power Generation

C2.1: Expanding power generation in geothermal fields already allocated to investors.

C2.2: Facilitating transactions of new geothermal fields for power development.

Component 3. Geothermal Sector Technical Capacity Building

C3.1: Training of government officials and technical staff in planning and transaction management.

C3.2: Building awareness among stakeholders

C3.3: Options for long-term cost reduction

Component 4. Project Management Assistance

1.4. Intermediate Outcome Indicators

Indicator	Baseline Value	Target Values
Component 1 (Improved investment environment for geothermal power projects)		
- Pricing mechanism to provide adequate economic incentives developed	Not Applicable	Applied in transactions implementation
- Upstream resource risk mitigation mechanism developed	Not Applicable	Arrangement developed
- Implementation regulations of the Geothermal Law issued	Not Applicable	Promulgated
Component 2 (Increased market uptake of geothermal power)		
- Model procedures and standardized documentation for competitive bidding of geothermal power transactions developed	Not Applicable	Applied
- Structure offers to mobilize investments for additional geothermal power in fields that are controlled by existing operators.	Not Applicable	Target achieved
- Develop and implement a pilot transaction for one power project in a new geothermal field competitively tendered based on the Geothermal Law.	Not Applicable	Target achieved
Component 3 (Enhanced government capacity to support sustained sector development)		
- Relevant agencies for undertaking geothermal transactions trained through on-the-job programs as well as 5-10 workshops and seminars.	Not Applicable	7 Workshops
- Awareness raising and information dissemination activities about sector policies and business opportunities conducted through promotional campaigns including 5-10 stakeholder-dialogue seminars.	Not Applicable	7 Workshops
- Strategy for domestic geothermal technology development formulated.	Not Applicable	Dropped

1.5. Project Outcome Indicators

Indicator	Baseline Value	Target Values
Installed geothermal power capacity that resulted from the investment transactions assisted by the project.	0	350 MW
Reduction of CO2 emissions by off-setting fossil fuel-based power generation (i.e. coal) with geothermal power	0	2,000,000 tonnes/year

1.6 Project Restructuring

Restructuring Date	Changes during the Restructuring
June 17, 2011	- The closing date was extended from June 30, 2011 to June 30, 2013. - The implementation schedule was revised. - Reallocation of budget for activities from certain components to others.

2. Implementation Aspects

2.1 Component 1: Policy Framework for Scaling-up the Development of Geothermal Power:

The objective of Component 1 was to develop a set of policies related to geothermal tariffs, upstream risk mitigation measures, and implementation regulations, in order to support the enforcement of Geothermal Law. There were three activities under this component:

C1.1: Development and implementation of policy to address incremental costs.

The objective was to develop a pricing mechanism to provide adequate economic incentives for developing geothermal resources. It would have also addressed any incremental costs that may have been associated with some geothermal developments as a result of the market failure to incorporate the environmental externalities into investment decisions (which remains a key barrier to geothermal development).

Activities for this sub component consisted of three phases, which were:

1. Phase 1: Critically reviewing studies, analyses and options under consideration by MEMR.
2. Phase 2: Assisting MEMR in reaching a decision on the preferred price support mechanism, as well as on how funds for the additional price support will be sourced.
3. Phase 3: Assistance in the implementation of the selected price support mechanism.

During the implementation, the Consultant proposed three types of tariff mechanism: cost-based pricing, feed-in-tariff, and market pricing. Some analysis provided by the Consultant later became the basis of the FiT chosen by the GoI. The FiT mechanism, issued in August 2012 as Ministerial Regulation no 22/2012, was designed based on technology type, project size, resource quality, and location.
However, the FiT mechanism could not be implemented due to its incompatibility with Government Regulation no 59/2007 and the lack of transparency in tariff calculations. One of the lessons learned from these activities is that they need to collaboratively involve all stakeholders in drafting policy related to others' institutions.

C1.2: Development and introduction of upstream risk mitigation measures.
This sub-component was included with aiming to design a mitigation scheme for upstream resource risk encountered by the developers.
A study funded by the PPIAF/World Bank had three studies related to this sub-component: international experience in identification and mitigation of geothermal development risk; geothermal project risk in Indonesia; and options for mitigating geothermal resource risk in Indonesia. The results of these studies are summarized below:

1. The typical merit measures for geothermal resource risk in Indonesia are sensitive to reserves, well capacity and drilling cost per well, and relatively insensitive to drilling success rate & well capacity decline rate.
2. The risk in geothermal projects is higher than in conventional power projects, and therefore developers will require a higher return.
3. This study shows that the resource risk profile of a geothermal project in Indonesia is relatively low, and might not be the major barrier to scale up geothermal resources. Addressing other barriers (i.e. policies, prices) are more essential in scaling up.

The results of the study have been discussed with other government institutions such as Bappenas/ National Planning Agency and the Ministry of Finance. One of the risk-mitigation activities agreed to be implemented was to provide a geothermal fund to support the exploration activities. The geothermal fund would then be administered by PIP under MoF. In parallel, MEMR would finance the surface investigations (geology, geochemistry, and geophysics) as part of exploration studies for Oka Ile Ange and Songa Wayaua geothermal fields, which are both located in East Indonesia. Later those two sites were determined as new WKPs.

C1.3: Support the implementation of the Geothermal Law.
This sub-component would review the Geothermal Law and the draft Implementation Rules and Regulations of the Geothermal Law as well as other related policies, identify gaps within the documents and potential hindrances to future geothermal power project investments, and recommend necessary changes and supplementary policies and regulations, in view of the coherence of the overall policy framework for geothermal power development in Indonesia.

During the implementation, it was agreed by MEMR and the Bank to review only at the ministerial decree or the regulation level. Reviewing the Geothermal Law and

Government Regulation No 59/2007 may take a long time, and beyond the project period. As part of co-financing activities, MEMR had issued several regulations as follows:

1. MEMR Regulation No 11/2009 regarding the Guideline for Geothermal Business Development.
2. MEMR Regulation No 2/2009 regarding the Guideline for Assignment of Geothermal Preliminary Survey.
3. MEMR Regulation No 5/2009 regarding the PLN's Standard Electricity Price from Cooperative or Any Other Business Entities.
4. MEMR Regulation No 11/2009 regarding the Guideline for Geothermal Business Development.
5. MEMR Regulation No 32/2009 regarding PLN's Standardized Electricity Price from Geothermal Power Plants (Ceiling Tariff US$ 9.7cents based on negotiation)
6. MEMR Regulation No 15/2010 regarding The List of Fast Track Projects on Renewable, Coal, Gas, and related Transmission.
7. Government Regulation No 70/2010 regarding the Amendment of Government Regulation No 59/2007 on Geothermal development, that if the developers do not exploit the geothermal field until December 31, 2014, then the concession have to be given back to the government.
8. MEMR Regulation No 2/2011 regarding Assignment for PLN to Buy Geothermal Electricity and Standardized Electricity Price from Geothermal Power plants (Ceiling Tariff US$ 9.7cents based on submitted price in the bidding, final and not for negotiation)
9. Government Regulation No 9/2012 regarding Types and Tariffs on Non-Tax State Revenue for Activities under MEMR (Geothermal resource data is free to attract the investment)
10. MEMR Regulation No 1/2012 regarding the revision of MEMR regulation No 15/2010 on The List of Fast Track Projects on Renewable, Coal, Gas, and related Transmission.
11. MEMR Regulation No 18/2012 regarding the amendment of MEMR Regulation No 11/2009 on the Guideline for Geothermal Business Development.
12. MEMR Regulation No 22/2012 regarding the Assignment to PT. PLN to Buy Geothermal Electricity and Standard Electricity Price for PT. PLN to Buy the Geothermal Electricity (or popular as FIT mechanism)
13. MEMR issued six decrees during the project period to assign several geothermal developers for particular geothermal green-fields.
14. A total of 18 MEMR decrees were issued to determine the new Geothermal Working Areas from 2008 to 2013.

2.2. Component 2: Transactions Management for Mobilizing Investments in the Geothermal Power Generation

The objective of Component 2 was to design incentives to increase the geothermal development in the assigned WKPs, and also design a tender mechanism for new geothermal WKPs. There were two main activities for Component 2:

C2.1: Expanding power generation in geothermal fields already allocated to investors.

This sub-component was aiming to design incentives for existing developers to increase geothermal power development. There was consultation process with the existing developers to collect any information related to proposed incentives for them. Later it was discovered that the existing developers were bound to the signed PPA, and the new proposed incentives would only be allowable to the new geothermal fields.

C2.2: Facilitating transactions of new geothermal fields for power development.

This sub-component would create a tender mechanism for new geothermal sites. After the proposed mechanism had been implemented through a formal regulation, a pilot transaction for a selected site would be carried out under the new tender regulation. There were two activities from this sub-component:

1. Guidelines Document on Geothermal Project Selection Criteria;
   A document that provides guidelines, criteria and the process (scoring, weighting etc.) that can be applied by the GoI to select and prioritize greenfield geothermal power projects to be offered to developers through competitive tender.
2. Competitive tender process;
   The consultant would design a tender process (from project selection to financial closing), reflecting international best practices tailored to the specific needs of the geothermal sector in Indonesia, to be implemented by the DG-DGNREEC in close coordination with local governments, in order to address Greenfield projects.

Several issues were raised with respect to the tender or transaction mechanism:

1. A standard PPA is necessary to be included in a greenfield tender documents package.
2. It was recommended to include Pre-Qualification (PQ) process in the WKP tender.
3. The submission of bidding documents (technical / financial and price) should be in separate envelopes and submitted at the same time.

The outputs for this sub-component were:

1. Transaction Guidelines for Geothermal Resources.
2. Standard form documentation, including tender documents, PPA, and Guidance Documents on Safeguards.
3. Handbook for Geothermal Transactions.
4. An output on pilot implementation for transaction of new geothermal fields was not executed, because the tender regulation based on the results of this component was not formulated.

2.3. Component 3: Geothermal Sector Technical Capacity Building:

The objective of Component 3 was to build the capacity of government officials and technical staff to support the implementation of geothermal policies and regulations. There were three activities under this component:

C3.1: *Training of government officials and technical staff in planning and transaction management*.

This sub-component aimed to provide training related to the proposed transaction or tender mechanism, after the regulations on tender was officially formulated.

C3.2: *Building awareness among stakeholders*.
This sub-component had an objective to carry out socialization of new geothermal regulations as the results of the activities under Component 1 and 2.

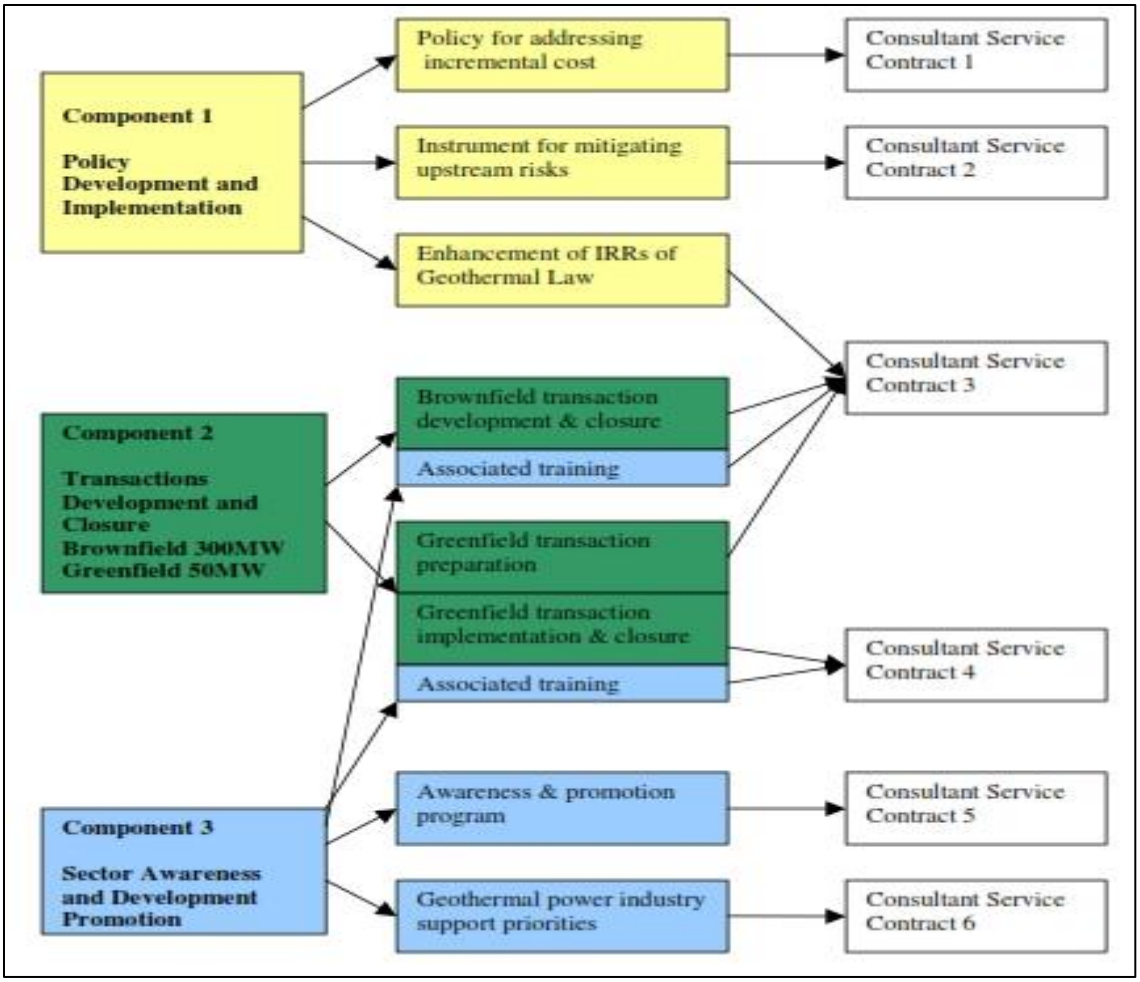
C3.3: *Options for long-term cost reduction.*
This sub-component would provide support to local industries in order to increase the competitiveness and participation in Indonesia's geothermal power development.
The activities under this component were to increase capacity-building and carry out socialization for the new regulations proposed by the project. However, since no regulations were formulated as the result of this project, in the end, no capacity building or socialization activities were executed.

2.4. Component 4: Project Management Assistance

This component would provide necessary consultant support for the Geothermal Directorate to implement the project.
The consultant team supporting project management included a Project Manager, a Financial Manager, a Procurement Specialist, and Administration Staff. An evaluation about the project's management was as follows:

- Project Manager needs to know the administration and budgeting process, besides the technical knowledge.
- Experience in multilateral donor projects is necessary for both the Financial Manager and the Procurement Specialist to be effective.
- The presence of Administration Staff is necessary until the completion of the project.

The overall implementation scheme for activities under Component 1, 2, 3 and 4 is shown in the figure below:



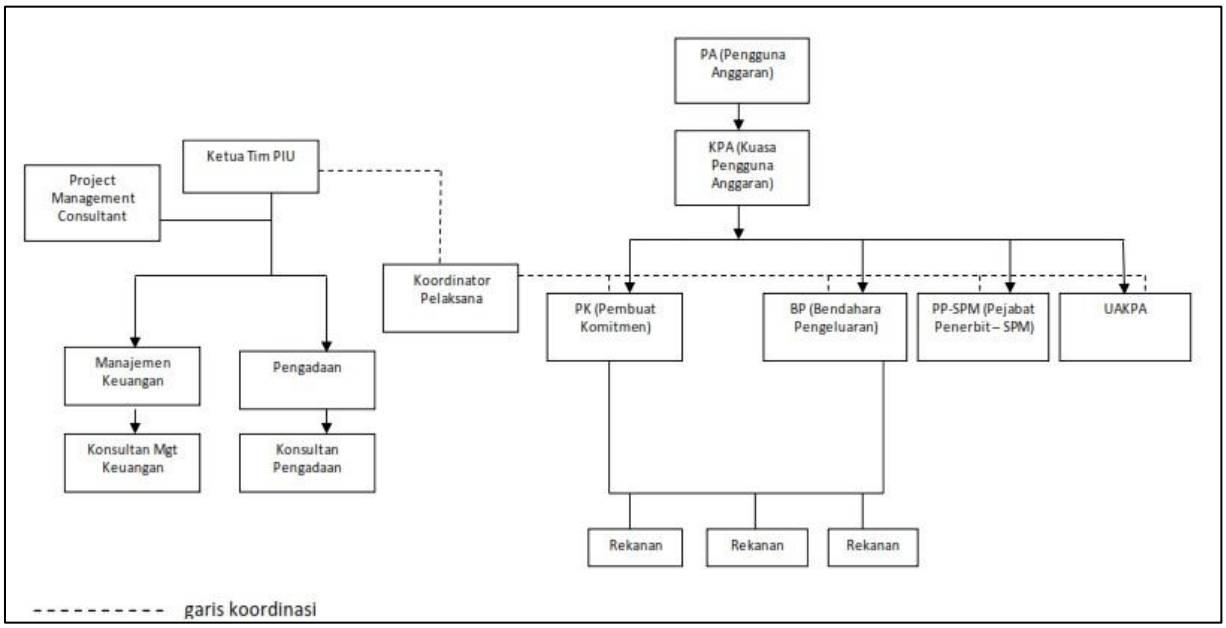
Activities Diagram of the Project

2.5 Project Disbursement and Budget

Components	Initial Estimate (US$ millions)		
	WB/GEF	GoI	Total
Component 1. Policy Framework	**0.53**	**0.28**	**0.81**
1. Development & Implementation of Economic Incentives	0.53	0.28	0.81
2. Development & Introduction of Risk Mitigation Measures	-	-	-
3. Support the Implementation on the Geothermal Law	-	-	-

Components	Initial Estimate (US$ millions)		
	WB/GEF	GoI	Total
Component 2. Transaction Management	**0.73**	**1.98**	**2.71**
1. Expanding Power Generation in " Brown" Geothermal Fields	0.73	1.98	2.71
2. Facilitating transactions of "Green" Geothermal Fields	-	-	-
Component 3. Technical Capacity Building	-	-	-
1. Training of Government Officials and Technical Staff	-	-	-
2. Building Awareness	-	-	-
3. Options for Long Term Cost Reduction	-	-	-
Component 4. Project Management Assistance	**0.19**	**0.15**	**0.34**
Total	**1.45**	**2.41**	**3.86**

2.6 Institutional Arrangement



Notes:

Ketua Tim PIU	: Head of PIU Team	Kuasa Pengguna Anggaran	: Authorized Budget User
Manajemen Keuangan	: Financial Management	Pembuat Komitmen	: Commitment Maker
Pengadaan	: Procurement	Bendahara Pengeluaran	: Treasury
Konsultant Mgt Keuangan	: Consultant of Financial Management	Pejabat Penerbit SPM	: Officer who issues Instruction to Pay
Konsultan Pengadaan	: Procurement Consultant	Rekanan	: Vendor / Consultant
Pengguna Anggaran	: Baudget User		

3. Assessment

3.1. Assessment of the outcomes of the operation against the agreed objectives

Component	Target Values	Remarks
Component 1		
- Pricing mechanism to provide adequate economic incentives developed	- Achieved	- FiT was selected
- Upstream resource risk mitigation mechanism developed	- Achieved	- GoI has established a geothermal fund
- Implementation regulations of the Geothermal Law issued	- Achieved	- GoI issued several ministerial regulations
Component 2		
- Model procedures and standardized documentation for competitive bidding of geothermal power transactions developed	- Achieved	- It could not be implemented yet, due to pending higher regulation revision
- Structure offers to mobilize investments for additional geothermal power in fields that are controlled by existing operators	- Not achieved	- Price incentives were impossible to be implemented for existing developers.
- Develop and implement a pilot transaction for one power project in a new geothermal field, competitively tendered based on the Geothermal Law	- Not achieved	- The activity was not continued because of the decision from the Head of PIU, in light of time constraints.
Component 3		
- Relevant agencies for undertaking geothermal transactions trained through on-the-job programs as well as 5- 10 workshops and seminars	- Not achieved	- No activities, since the transaction mechanism was not implemented in formal regulations.
- Awareness raising and information dissemination activities about sector policies and business opportunities conducted through promotional campaigns including 5-10 stakeholder dialogue seminars	- Not achieved	- No activities, since the new proposed policies were not implemented in formal regulations.
- Strategy for domestic geothermal technology development formulated	- Not achieved	- Canceled and budget re-allocation.

Outcome Indicator	Baseline Value	Original Target Values	Actual Value Achieved at Completion or Target Years
Installed geothermal power capacity that resulted from the investment transactions assisted by the project.	0	350 MW	0
Reduction of CO2 emissions by off-setting fossil fuel-based power generation (i.e. coal) with geothermal power	0	2,000,000 tonnes/year	0

3.2 Evaluation of the Borrower's Performance

Preparation

- The organization of Project Implementing Unit needs to be supported with clear tasks and responsibilities (viz. terms of reference or job descriptions), including the coordination with related stakeholders.
- The early presence of project management consultant to support the implementation of the project is important.

Implementation

- The consultation of WB grant project to other units in MEMR, for example the Planning and Financial bureau under Secretariat General, is important to acquire sufficient support during implementation,
- The commitment of top-level management in the PIU is the key for success in project implementation.
- There were several restructurings in the Directorate General's organization, as well as key management replacements during the project implementation. These multiple changes negatively affected both the project's activities and performance.

3.3. Evaluation of the Bank's Performance

- The Bank's team could improve its responsiveness to project activities in line with Service Standards;
- The procurement training was provided, however the training material was too generalized. The training should be customized, practical, implementable, and refer to the needs as on-going procurement activities.
- The accuracy in assessing and approval of PIU's report needs to be increased.
- The requirement on wider stakeholder consultation should be followed up during the implementation by the Bank team.

Annex 8. Comments of Co-financiers and Other Partners/Stakeholders

Not applicable for the project.

Annex 9. List of Supporting Documents

1. Master Plan Study for Geothermal Power Development in the Republic of Indonesia, JICA, 2007
2. Project Appraisal Document; WB, May 2008
3. GEF Grant Agreement, 2008
4. Aide Memoires
5. Implementation Status and Result Reports
6. Project Progress Reports
7. Government Regulations on Geothermal Development, 2008-2013
8. Phase 1 Report: Review & Analysis of Prevailing Geothermal Policies, Regulations and Cost; Castlerock, 2010
9. An Assessment of Geothermal Resource Risks in Indonesia; PPIAF-Geothermex, 2010
10. Phase 2 Report: The New Geothermal Policy Framework (Draft); Castlerock, 2011
11. Project Restructuring Action Plan, May 2011
12. Development and Implementation of Pricing & Incentive Policy; Castlerock, 2012
13. Handbook for Geothermal Transactions; Fichtner, 2012
14. ToR Follow-on Advisory Services to Prepare and Tender a Selected Geothermal Field for Development (Transaction Advisor for a demonstration Greenfield Project); Fichtner, 2012
15. Report Concerning Expansion of Brownfield Capacity; Fichtner, 2013
16. Guidelines for Prioritization of the Development of Greenfield Projects; Fichtner, 2013
17. Borrower Implementation Completion Report, 2013

MAP

I N S E R T

M A P

H E R E

AFTER APPROVAL BY COUNTRY DIRECTOR

AN ORIGINAL MAP OBTAINED FROM GSD MAP DESIGN UNIT

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