PROJECT INFORMATION DOCUMENT (PID)
CONCEPT STAGE

Report No.: PIDC241

Project Name	ID-Renewable Energy for Electrification Project (P128568)
Region	EAST ASIA AND PACIFIC
Country	Indonesia
Sector(s)	Other Renewable Energy (100%)
Lending Instrument	Specific Investment Loan
Project ID	P128568
Borrower(s)	Republic of Indonesia
Implementing Agency	PT PLN
Environmental Category	B-Partial Assessment
Date PID Prepared	21-Mar-2012
Estimated Date of Appraisal Completion	01-Oct-2012
Estimated Date of Board Approval	20-Dec-2012
Concept Review Decision	Track I - The review did authorize the preparation to continue

I. Introduction and Context

Country Context

Macroeconomic context. Indonesia has improved its macroeconomic and political stability over the last decade, with consistent GDP growth averaging five to six percent annually (6.1 percent in 2010, and 6.5 percent year on year during Q3, 2011). Indonesia waslessaffected by the global economic downturn of 2008-09 than most countries, and by 2010 the economy had recovered to pre-crisis levels. Indonesia's economic growth is projected to be 6.2 percent for 2012 (Indonesia Economic Quarterly, World Bank), while inflation (5.38 % in 2011) is to be managed within the current target band of 4.5% (+/- 1%). Indonesia's fiscal position also remains strong providing the country with options for dedicating additional resources for meeting its infrastructure development needs. A successful implementation of priority infrastructure projects will however be essential for Indonesia to meet its economic growth targets.

Low infrastructure investments and poor maintenance. A decline in investments sparked by the 1997/98 financial crisis has led to a backlog in infrastructure development. In addition, poor maintenance of existing infrastructure continues to lead to the deterioration of existing capacity for providing public services. In recent years however, infrastructure investment has begun to recover, reaching about 4 percent of GDP in 2010. This is not yet at pre-crisis levels and is inadequate to reverse the investment backlog or to meet the growing demand from existing infrastructure users, let alone satisfy the large population which lacks access to basic services. Investments planned and underway also tend to prioritize new infrastructure development while maintenance of existing infrastructure needs ongoing attention.

Reversing lagging infrastructure development. Inadequate infrastructure is a significant constraint to Indonesia's growth potential. The Government of Indonesia (GOI) has adopted an ambitious plan to rebuild and develop infrastructure. In the period from 2010-14, budget expenditure for infrastructure is expected to increase by more than 30 percent compared with the prior five year period. It is, however, essential for Indonesia's infrastructure institutions to translate these resources into better development outcomes. They face significant constraints and challenges in doing so. Coordination among, and clarity of roles and responsibilities between the various levels of government for infrastructure development needs to be improved upon; the capacity of provincial and local governments charged with the responsibility of basic service delivery is still weak; and effective procedures and regulations for financial transfers from central to provincial and local governments have not yet been fully established.

Sectoral and Institutional Context

Indonesia has the lowest per capita electricity consumption and electricity access rate among all of the Bank's larger developing member countries in the East Asia region. After experiencing rapid growth from the early 1980s to the late 1990s, the electric powersector was significantly weakened during the East Asian Financial Crisis of the late 1990s. Growth in demand for electricity slowed and no significant investments were made to expand the capacity of the power system from 1999 to 2004.

Driven by a robust economic recovery since 2004, the demand for electricity has increased by over 6 percent annually in the past few years, leading to power shortages in most parts of Indonesia. The latest forecasts indicate that the national economy will continue to grow at about 7 percent annually in the medium term due to which there is tremendous pressure on the power sector to keep pace with economic growth. Since 2006, the Government has been pursuing an investment program to procure 10,000 MW of coal-fired power plants to be operated by the national power utility, PLN. A second 10,000 MW program is being undertaken in parallel, of which about 50 percent is planned to be from renewable energy sources. The government's power sector strategy focuses on: (a) facilitating private investments and increasing public financing to grow generation capacity; (b) improving the

generation fuel mix by developing renewable energy; (c) rationalizing the electricity tariff and subsidy regime to put the sector on a sound financial footing; and (d) further strengthening institutional capacity and improving the management efficiency of PLN.

Investment needs: The sector will require significant investment to keep pace with economic growth and to increase electricity access rates. PLN's latest development plan entails an estimated US$ 97.1 billion in total investments over 10 years. Although the private sector will finance part of the capacity expansion, PLN is expected to invest around US$ 62.2 billion.

Tariffs below the cost of power supply: Current electricity tariffs are insufficient to cover PLN's cost of power supply, leading to high Government subsidies. Although the electricity tariffs were increased on average by around 10 percent in August 2010, these tariffs are still lower than PLN's cost of electricity supply, and among the lowest in the region. PLN's financial viability is therefore reliant upon the Government's public service obligation (PSO) subsidy which covers the shortfall between electricity tariffs and PLN's cost of power supply. The PSO is estimated to be about 44 percent of total revenues in 2011, raising doubts about the long-term sustainability of this financial support mechanism. Furthermore, tariffs below cost recovery levels are the main barrier for improving energy efficiency and for shifting energy production and consumption towards a low-carbon development path.

The case for renewables: While abundant renewable resources are available in Indonesia, the rapid increase of coal in the generation fuel mix may expose the country to environmental risks, both locally and globally. According to PLN's long-term capital investment plan, the share of coal in the generation fuel mix (in GWh) will increase from around 54 percent today to roughly 60 percent by 2019. The expansion in coal-based generation has raised concerns about the likely negative environmental impact in the heavily populated areas of Java and Bali, and in the environmentally sensitive areas of some of the islands. Although Indonesia is rich in renewable energy resources, especially geothermal (40 percent of the world's geothermal potential), hydropower, and biomass, the lack of incentives, and regulatory uncertainty, combined with the evolving institutional capacity of major national and local institutions, as well as the low coverage of transmission networks has hindered the rapid development of these indigenous and clean energy resources.

The electrification challenge and the role of renewables: At the same time, due to limited system expansion over the past decade that has left the system with inadequate capacity to meet the growth in demand, Indonesia faces an electrification rate of only 65 percent leaving over 78 million people without access to electricity. To meet the Government's target of electrifying 91 percent of the population by 2019 (2010-19 RUPTL), roughly two million new subscribers will need to be connected annually, double the rate of the past few years. Most of those without access to electricity live in the remote areas of Java and Bali or on islands outside the area covered by the Java-Bali system. In addition, investment costs for the medium and low voltage network extensions required for the Government's electricity access scale-up program are estimated at US$1.3 billion per year through 2025. To meet the Government's electrification targets, the power sector will need to significantly strengthen and extend the coverage of the transmission and distribution networks, especially in islands outside Java-Bali. The power sector will also need to accelerate off-grid and micro-grid electrification programs in areas which wi ll not be covered by the main grids in the near future.

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To meet the increasing demand for electricity, the Government of Indonesia (GoI) and PLN are focusing under the second phase of the 10,000 MW program on expanding generation capacity and improving access to electricity significantly through investment in renewable energy generation, and network expansion. As part of this effort, PLN has embarked upon a 1,000 island electrification program under which PLN plans to convert mini-grids in Indonesia's islands from di esel-based generation to renewable diesel hybrid systems, and introduce renewable energy generation (mainly solar PV, and mini-hydro) at greenfield sites, combined with network expansion at project locations.

Proposed Project: The key development challenge for Indonesia's islands is posed by the inter-linked factors of low access to electricity and a spatially dispersed population, combined with the high cost of PLN generation from expensive diesel fuel, and often poor service quality. Meeting coverage targets in an efficient and effective manner, and within the time frames as per priorities set by sub-region in GOI's RUKN (national electrification plan) is unlikely under the business as usual scenario.

The main goal of the investment for which PLN is seeking a joint Bank-KfW loan, is to improve electricity access by using renewable energy resources (grid connected solar-diesel hybrid systems, and stand-alone solar PV and mini-hydro systems, and network expansion), while also reducing the financial losses accruing from near total reliance on diesel based generation in those locations. The proposed project forms an integral part of the Government's capital investment plan. It was proposed by PLN and the GoI as a priority project under the power sector development plan.

The Bank had engaged with the Government in rural electrification, through a AAA (Electricity for All), a policy framework for regional electrification and rural access, and an investment project, the results of which helped in the formulation of the Electricity Law 2009. The Bank's involvement in the proposed project would allow continued policy dialogue with the GoI and build capacity within PLN to design and deliver renewable energy projects, and to improve the financial and environmental sustainability of its large-scale electrification program.

Relationship to CAS

In line with the Bank's Country Partnership Strategy (CPS), for 2009-2012 and the government's strategic priorities, the Bank is implementing and preparing (i) an investment lending program to finance public sector power infrastructure projects, especially renewable energy and transmission projects, to sustain economic growth and increase electricity access; (ii) development policy lending programs to support the government's efforts to establish a sustainable policy environment for infrastructure project

development and move the energy sector towards a low-carbon development path; and (iii) technical assistance to rationalize the electricity tariff and subsidy regime, establish incentives for renewable energy resources development, to support efficient use of energy and to strengthen the capacity of the line ministry and state owned companies in the energy sector.

The proposed project will form an integral part of the Bank's assistance program for the energy sector to improve electricity access by using renewable energy resources. The proposed project is also consistent with the objective of the Country Partnership Strategy to reduce the local and global environmental impact of the sector through the use of clean and renewable energy, and with the objective of improving the technical, managerial and operational capacity of state institutions (Core Engagement 2 - Infrastructure).

II. Proposed Development Objective(s)

Proposed Development Objective(s)

The development objective of the proposed project is to improve electricity access in Indonesia's islands using cost-effective renewable energy generation sources.

Key Results

Achievement of the development objective will be assessed through the following key indicators: (a) the connection of additional consumers to grid-based electricity, (b) increase of service hours to existing consumers; (c) the reductionof PLN's operating costsat existing locations as measured by the conversion of diesel based generation to renewable-diesel hybrid systems; and (d) reduction in the cost of electricity generation relative to the cost of diesel generation from stand-alone PV and mini-hydro projects.

III. Preliminary Description

Concept Description

The proposed project will fund the conversion of existing diesel based generation in Indonesia's islands to renewable-diesel hybrid systems, invest in greenfield solar PV and potentially in mini-hydro systems, and fund network expansion to improve electricity access.

The main components of the proposed project are as follows:

Component 1 –Renewable energy generation (US$ 200 million) with specific subcomponents: (i) investment in cost effective solar PV generation in grid connected mode at PLN's isolated diesel-based generation plants and in the main regional network systems ; and (ii) investment in standalone solar PV and potentially in mini-hydro generation for electrification at numerous new locations.

Component 2 – PLN network extension (US$ 50 million) comprising of 300 km of medium voltage (MV) and low-voltage (LV) distribution lines for increasing access coverage through island grids to be serviced by renewable diesel hybrid systems, and at new solar PV, and mini-hydro locations where component 1 investments are being mobilized - including MV line extensions, LV network strengthening, and new customer connections (to be funded by PLN).

Component 3 – Technical assistance (US$ 5 million) to support PLN during the initial investment phase to immediately take advantage of both Indonesian experience and expertise, as well as international best practice and experience in the design and engineering of solar PV systems, PV diesel hybrids, and mini-hydro plants - to build internal capacities over a wide range of technical areas that are critical for the long term sustainability of these types of investments. In order to handle the rapid scale-up of renewable energy technology in its operations under the project, PLN would also require staffing skills with the requisite core competencies that would need to be acquired, mobilized, and strengthened rapidly to address the scale of this activity.

A separate grant in the amount of US$ 700,000 is being sourced from AusAID and ASTAE for technical assistance (TA) to PLN in least-cost electrification planning. The output of the TA will be a spatial least cost sector-wide investment program and technology mapping. It will also include outputs related to relevant technical aspects, institutional development, and post-operational sustainability. This TA will create a delivery platform for all stakeholders interested in the sector to assist PLN in scaling up electricity access by using renewable energy technology. This leveraging of World Bank support would be an important result of this operation.

The total estimated project cost is US$ 255 million for which an IBRD sector investment loan (SIL) of US$ 105 million is proposed, in addition to which US$ 100 million is proposed to be funded by a KfW loan, with the remaining US$ 50 million to be financed by PLN for network rollout. The proposed project is expected to be prepared during calendar year 2012. Subject to the successful implementation of the first Renewable Energy for Electrification Project (REEP) SIL, and subject to Government approval, the Bank and KfW plan to follow-up with a series of SILs during calendar 2013, and 2014. The relative size of each SIL will be based on the strength of the proposed investment program that PLN will have prepared for implementation for each year of the loan in accordance with the agreed criteria and processes.

Based on PLN's initial estimates, under the REEP program comprising of the proposed series of SILs of which the current loan is the first proposed lending activity, PLN has thus far identified 402 solar PV plants with an installed capacity of 60,564 kWp. PLN

has also requested that mini-hydro plants be considered for funding under the SILs. The Team will explore the potential for integrating mini-hydro sub-projects into the current and future loans under the REEP program.

IV. Safeguard Policies that might apply

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

V. Tentative financing

Financing Source	Amount
Borrower	50.00
International Bank for Reconstruction and Development	105.00
GERMANY KREDITANSTALT FUR WIEDERAUFBAU (KFW)	100.00
Total	255.00

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