

**PROJECT INFORMATION DOCUMENT (PID)  
CONCEPT STAGE**

Report No.: 52723

<b>Project Name</b>	PY Energy Sector Strengthening Project
<b>Region</b>	LATIN AMERICA AND CARIBBEAN
<b>Sector</b>	General energy sector (100%)
<b>Project ID</b>	P114971
<b>Borrower(s)</b>	Republic of Paraguay
<b>Implementing Agency</b>	ANDE and Vice Ministry of Mines and Energy (VMME)
<b>Environment Category</b>	<input type="checkbox"/> A <input checked="" type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> FI <input type="checkbox"/> TBD (to be determined)
<b>Date PID Prepared</b>	December 14, 2009
<b>Estimated Date of Appraisal Authorization</b>	May 2010
<b>Estimated Date of Board Approval</b>	July 2010

**I. Key development issues and rationale for Bank involvement**

1. The Government's key priorities are set out in the 2008-2013 Economic and Social Plan. They include hastening Paraguay's transition to a modern economy by improving governance and reducing corruption, addressing the needs of vulnerable groups, and restoring growth in light of the effects of the global crisis. The Plan includes clear objectives and measures for each of these themes and reflects a pragmatic economic policy stance. It also aims to strengthen the management of the country's vast hydroelectric resources.

2. Strong economic performance resulted in a substantial decline in overall poverty levels in Paraguay, from 46.4 to 35.6 percent between 2002 and 2007 and to a lesser extent in extreme poverty levels from 21.7 percent to 19.4 percent over the same period. However, despite recent economic growth, achieving the Millennium Development Goals (MDGs) by 2015 remains a considerable challenge for the country due to the isolation of rural populations and to high population growth rates (41.4 and 1.84 percent respectively for year 2007). Attaining the MDGs will require redoubled efforts to provide services to poor and marginal areas beyond the eastern region around the capital Asunción.

3. The electricity sector plays an important role in Paraguay's economy for several reasons. Current installed power generation capacity stands at over 8,766 MW, nearly five times Paraguay's peak demand of 1,810 MW (2009). Revenues from electricity exports to Brazil and Argentina represent about 23 percent of Government total revenues and 4 percent of GDP. Access to cheap and abundant electricity constitutes a clear advantage in the country's efforts to diversify its economy, provide more rewarding jobs to citizens - who today depend on low paying activities in the rural and informal sectors - and gradually move into high value-added activities such as transformation, agro-processing, metal and mechanical industries, or packaging. In the medium-term, the Government aims to harness Paraguay's abundant hydropower resources to improve the country's competitiveness.

*Paraguay's Electricity Sector*

4. **Government Power Sector Strategy.** The Government's strategy aims to develop an optimal and efficient electricity sector within the existing institutional framework. The limited size of the

market, the abundant power available from the Itaipú and Yacyretá hydroelectric plants, and the current regulations have limited interest from independent private generators in investing in Paraguay's electricity market. The Authorities have therefore sought to promote the efficient management of resources within a public sector framework. Short term efforts to increase efficiency aim to reduce losses, to optimize the purchasing agreements with the bi-national generators, and to introduce more efficient management practices in the *Administración Nacional de Electricidad* (ANDE), Paraguay's main power utility. In the medium and long term, it is expected that the Government will strengthen the power sector regulatory framework and in particular the role of the Vice Ministry responsible for Energy (VMME), maintaining however the public nature of ANDE.

5. **Electricity Sector Institutional Structure.** VMME reports to the Ministry of Public Works and Communications (MOPC) and is responsible for delineating the sector policy and strategy (with the exception of tariffs and subsidies), for planning and monitoring, technical regulations, quality of service standards and also for developing new programs. However, VMME capacities are weak and the Government has sought Bank support to strengthen them. Paraguay has no regulatory entity dedicated to the electricity sector. Public service tariffs including electricity tariffs are set by the National Economic Team, comprising MOPC, the Ministries of Finance, Agriculture and Livestock, Commerce and Industry, and the Central Bank. Electricity services are provided by ANDE.

6. **Paraguay benefits from one of the best hydrological situations in the World.** It produces over 8,700 MW per year, most of it exported to Brazil and Argentina. On its Southeastern border, the Paraná River provides abundant water for the operation of the Itaipú, Yacyretá and Acaray hydroelectric power plants. *Itaipú* is the second largest hydroelectric power plant in operation in the world with 14,000 MW of installed capacity and is owned and operated by the Itaipú bi-national entity co-owned with Brazil. *Yacyretá* has an installed capacity of 3,100 MW and is co-owned and operated by the Yacyretá by-national entity co-owned with Argentina. Paraguay has rights to up to 50 percent of the electricity generated by both plants, but currently uses less than 10 percent of the plants' output. As per the contractual arrangements, surpluses not used domestically must be sold to Brazil and Argentina. *Acaray* (210 MW) is fully owned and operated by ANDE. Four small thermal plants with a total capacity of 6 MW are also owned and operated by ANDE. The electricity sector is also characterized by: (a) a high access rate (96.8 percent in 2008 as compared with 94.6 percent average for the Latin America region) with however a relatively low domestic consumption (853 kWh/month, about one third of Chile and Brazil consumption); (b) relatively low tariffs because of inexpensive hydroelectric generating sources; (c) frequent outages and frequency fluctuations due in part of insufficient investments in transmission and distribution; and (d) high system losses in part due to inadequate investments over the last 10 years.

7. **Outages and frequency fluctuations are hampering growth.** Unlike many other countries, Paraguay's sector constraints do not lie in insufficient generation. Together insufficient transmission capacity and rapid demand growth have resulted in a deterioration in the quality of service due to repeated and prolonged outages and frequency fluctuations. As the 2006 Investment Climate Survey for Paraguay shows, electricity is a major or severe constraint to business activities according to 28.5 percent of the respondents. Driven by increases in private consumption and by the formation of fixed capital in the construction, agriculture and goods export sectors, electricity demand has increased by 5.8 percent on average from 1995 to 2004. Since 2005 it has accelerated to close to 9.0 percent per year. Even if electricity demand growth is forecast to slow somewhat to 5.6 percent on average per

year for the next 10 years due to the financial crisis, electricity demand will nearly double by 2019 (raising total consumption to 10,277 GWh in 2019).

8. **High System losses.** System losses have increased steadily over the last 10 years, from 21 percent in 1999 to 34 percent in 2005. Technical transmission system losses are mainly caused by the deterioration of infrastructure and overloading of the networks and transformers. Through a loss reduction program launched in 2006 by ANDE with financial support from IDB, system losses dropped slightly to 32.7 percent in 2008 (broadly estimated to be 9% in transmission and 23.7% in distribution, of which 12% in technical losses and 11.7% in non-technical losses). These losses remain however well above the 13.5% weighted average for the LAC region. ANDE's target to further reduce system losses in 2009 was 29%. Even if this target is reached, it remains a modest achievement. Significantly reducing losses presents however a considerable technical and financial challenge and additional efforts and resources need to be allocated to address the problem.

9. **To meet growing demand, improve the quality of service, and reduce losses, investments in transmission are required.** The current maximum capacity of the transmission system, estimated by ANDE to be 1,700 MW, has been reached (peak demand reached 1,810 MW in 2009). In 2005 customers saw 16.4 interruptions for an average of 7.5 hours per interruption. These outages are due to the fact that transmission lines are operating close to their thermal technical limits causing shutdowns of the system whenever there is a shock. Warm summer weather, heavy rains or thunderstorms regularly result in the activation of the transmission lines protection devices and in interruptions. In the metropolitan area, in addition to outages, frequency and voltage fluctuations have hindered economic operators and households. Additional transmission capacity is therefore urgently needed to avoid a supply crisis, to stem increases in losses, prevent the further deterioration of the service quality and reliability of the service and to meet the growing domestic demand.

### **Rationale for Bank Involvement**

10. The Government has requested IBRD financing to: (a) implement part of the high priority investments delineated in ANDE's transmission Master Plan for the country and including new and upgrading of 220 kV and 66 kV substations and transmission lines; and to (b) strengthen the capacity of the Vice Ministry of Mines and Energy. The rationale for Bank involvement is three-fold:

- First, the Project is in line with the Bank's efforts to support Paraguay's economic development through the development of its power sector. By removing transmission bottlenecks the Project has significant potential to contribute to Paraguay's economic growth and social development.
- Second, the Project will improve the security of electricity supply for the country in line with the Bank's efforts to enhance electricity security supply throughout the region. A more robust transmission network will optimize the utilization of existing production capacity, and the economic and financial value of past investments in power generation.
- Third, the proposed Project will contribute to improving the utility's technical and financial performance and to strengthening the capacity of the Ministry responsible for energy. The strengthening of VMME will improve policy and strategy formulation, planning and monitoring.

## **II. Proposed objective(s)**

11. The overarching objective of the proposed Project is to increase the availability, quality and reliability of power supply in Paraguay, thereby fostering economic growth and improving the country's competitiveness. The specific Project Development Objective is to increase electricity supply capacity in a cost effective and environmentally sound manner, to reduce transmission and distribution losses as well as service interruptions, and to strengthen capacity in energy policy and strategy formulation, in planning and implementation monitoring.

12. The proposed Project will finance: (a) high priority investments delineated in ANDE's transmission Master Plan, including new and upgrading of 220kV and 66kV substations and transmission lines, as well as strengthening ANDE's capacity to fully undertake all social and environmental due diligence procedures to develop sound energy projects; (b) improvement of the technical and commercial performance of ANDE's distribution activities, by providing the tools for modern and efficient distribution management allowing ANDE to inter alia optimize its distribution investment and focus its loss reduction effort; and (c) strengthening of the VMME by supporting the development and implementation of strategic energy planning, performance indicators and monitoring mechanisms. The Project is currently estimated to cost US\$136 million and scheduled to be completed within 5 years (July 2010-June 2015).

13. Key indicators for the proposed Project will be: (i) kms of transmission line completed; (ii) growth in transformation capacity (MVA); (iii) acquisition of equipment and implementation of a Management Information System (MIS); and (iv) strengthening of implementation and planning capacity of the Vice Ministry of Mines and Energy, and of the power utility ANDE.

## **III. Preliminary description**

14. The proposed Project involves the following three main components:

**Component 1. Investments in transmission (IBRD US\$82 million).** This component comprises a transmission investment package which includes the construction and upgrade of 220 kV and 66 kV substations and transmission lines, which will strengthen and stabilize the region electricity transmission network to guaranteed electricity supply with adequate quality and reliability standards for the interconnected system. The investment package will focus on the East, Metropolitan, Central and North Subsystems and will be implemented by ANDE:

**Component 2. Modernization of the Distribution Management System and Loss Reduction (IBRD US\$15 million).** This component will support the development of an integrated management system which will provide a high degree of control and knowledge of the network to improve the operation and planning functions, and is an essential tool in the implementation of the loss reduction program. It will be complemented by the implementation of loss reduction measures in two distribution feeders reaching the medium and low voltage customer levels. This component will be implemented by ANDE.

**Component 3. Institutional Strengthening and Technical Assistance to the Vice Ministry of Mines and Energy (IBRD US\$3 million).** This component will provide Technical Assistance (TA) to VMME to strengthen its capacities in policy and strategy formulation, in planning and program development, and in monitoring. It will be implemented by VMME.

#### IV. Safeguard policies that might apply

Safeguard Policies Triggered by the Project	Yes	No	TBD
Environmental Assessment (OP/BP 4.01)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Natural Habitats (OP/BP 4.04)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Pest Management (OP 4.09)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Physical Cultural Resources (OP/BP 4.11)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Involuntary Resettlement (OP/BP 4.12)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Indigenous Peoples ( OP/BP 4.10)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Forests (OP/BP 4.36)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Safety of Dams (OP/BP 4.37)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Projects in Disputed Areas (OP/BP 7.60)*	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Projects on International Waterways (OP/BP 7.50)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Piloting the Use of Borrower Systems to Address Environmental and Social Issues in Bank-Supported Projects (OP/BP 4.00)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

#### V. Tentative financing

Source:		(\$m.)
Borrower		36
International Bank for Reconstruction and Development		<u>100</u>
	Total	136

#### VI. Contact point

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