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IMPLEMENTATION COMPLETION AND RESULTS REPORT

IBRD 7994-PY

ON A

LOAN

IN THE AMOUNT OF US\$ 100 MILLION

TO THE

REPUBLIC OF PARAGUAY

FOR A

PY ENERGY SECTOR STRENGTHENING PROJECT

June 25, 2019

Energy and Extractives Global Practice
Latin America And Caribbean Region

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CURRENCY EQUIVALENTS
(Exchange Rate Effective May 21, 2019)

Currency Unit = Paraguay Guaranies (PYG)

PYG 6,186.80 = US\$1

US\$ 1 = PYG 0.00016

FISCAL YEAR
July 1 - June 30

ABBREVIATIONS AND ACRONYMS

ANDE	National Power Utility (<i>Administración Nacional de Electricidad</i>)
CMU	Country Management Unit
CPF	Country Partnership Framework
E&S	Environmental and Social
ESMF	Environmental and Social Management Framework
ESU	Environmental and Social Unit
FM	Financial Management
GDP	Gross Domestic Product
ICR	Implementation Completion and Results Report
ISR	Implementation Status and Results Report
LPI	Public International Tender (<i>Licitación Pública Internacional</i>)
M&E	Monitoring and Evaluation
MOPC	Ministry of Public Works and Communication (<i>Ministerio de Obras Públicas y Comunicaciones</i>)
NPV	Net Present Value
PIU	Project Implementation Unit
RAP	Resettlement Action Plan
SCADA	Supervisory Control and Data Acquisition
SGIDE	Comprehensive Electricity Distribution Management System (<i>Sistema de Gestión Integral de la Distribución Eléctrica</i>)

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DATA SHEET

BASIC INFORMATION

Product Information

Project ID	Project Name
P114971	PY Energy Sector Strengthening Project
Country	Financing Instrument
Paraguay	Investment Project Financing
Original EA Category	Revised EA Category
Partial Assessment (B)	Partial Assessment (B)

Organizations

Borrower	Implementing Agency
Republic of Paraguay	ANDE

Project Development Objective (PDO)

Original PDO

The development objective of the Project is to increase the quantity and quality of the provision of electricity services by the Borrower, while improving the Borrower's performance.



FINANCING

	Original Amount (US\$)	Revised Amount (US\$)	Actual Disbursed (US\$)
World Bank Financing			
IBRD-79940	100,000,000	100,000,000	90,105,043
Total	100,000,000	100,000,000	90,105,043
Non-World Bank Financing			
Borrower/Recipient	25,000,000	25,000,000	8,780,000
Total	25,000,000	25,000,000	8,780,000
Total Project Cost	125,000,000	125,000,000	98,885,043

KEY DATES

Approval	Effectiveness	MTR Review	Original Closing	Actual Closing
30-Nov-2010	09-Feb-2012	02-Dec-2013	31-Dec-2015	31-Oct-2018

RESTRUCTURING AND/OR ADDITIONAL FINANCING

Date(s)	Amount Disbursed (US\$M)	Key Revisions
14-Dec-2015	44.40	Change in Results Framework Change in Components and Cost Change in Loan Closing Date(s) Reallocation between Disbursement Categories Change in Implementation Schedule
19-Sep-2017	81.75	Change in Loan Closing Date(s) Reallocation between Disbursement Categories

KEY RATINGS

Outcome	Bank Performance	M&E Quality
Moderately Satisfactory	Moderately Satisfactory	Modest

RATINGS OF PROJECT PERFORMANCE IN ISRs

No.	Date ISR Archived	DO Rating	IP Rating	Actual Disbursements (US\$M)
01	22-Feb-2011	Satisfactory	Satisfactory	0
02	08-Jun-2011	Satisfactory	Satisfactory	0
03	01-Jan-2012	Moderately Unsatisfactory	Moderately Unsatisfactory	0
04	04-Aug-2012	Moderately Satisfactory	Moderately Satisfactory	0
05	14-Apr-2013	Moderately Satisfactory	Moderately Unsatisfactory	0
06	03-Dec-2013	Moderately Unsatisfactory	Moderately Unsatisfactory	.13
07	20-Jul-2014	Moderately Satisfactory	Moderately Satisfactory	17.63
08	07-Oct-2014	Moderately Unsatisfactory	Moderately Unsatisfactory	17.63
09	11-Jun-2015	Moderately Unsatisfactory	Moderately Satisfactory	39.00
10	28-Sep-2015	Moderately Satisfactory	Moderately Satisfactory	42.60
11	07-Jun-2016	Moderately Satisfactory	Moderately Satisfactory	45.50
12	25-Dec-2016	Moderately Satisfactory	Moderately Satisfactory	73.42
13	28-Jun-2017	Moderately Unsatisfactory	Moderately Satisfactory	73.42
14	31-Dec-2017	Moderately Satisfactory	Moderately Satisfactory	81.75
15	24-Sep-2018	Moderately Satisfactory	Moderately Satisfactory	88.28
16	07-Nov-2018	Moderately Satisfactory	Moderately Satisfactory	93.33

SECTORS AND THEMES

Sectors

Major Sector/Sector	(%)
Energy and Extractives	100
Other Energy and Extractives	100



Themes	
Major Theme/ Theme (Level 2)/ Theme (Level 3)	(%)
Private Sector Development	17
Jobs	17
Job Creation	17
Urban and Rural Development	51
Urban Development	17
Urban Infrastructure and Service Delivery	17
Rural Development	34
Rural Infrastructure and service delivery	17
Land Administration and Management	17
Environment and Natural Resource Management	34
Renewable Natural Resources Asset Management	34
Biodiversity	17
Landscape Management	17

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I. PROJECT CONTEXT AND DEVELOPMENT OBJECTIVES

A. CONTEXT AT APPRAISAL

Context

1. Paraguay is nestled between Brazil, Argentina, and Bolivia, has an area of 406,750 km², and, at the time of project appraisal, in 2010, had a population of 6.7 million. The country experienced a sustained economic growth of 4.6 percent, on average, during the previous five years, after a deep financial and political crisis. In 2009, the per capita gross domestic product (GDP) was US\$2,350.
2. Paraguay's growth was fueled by rising domestic consumption and investment and increasing exports of primary goods, favored by high international commodity prices, especially in the agriculture sector. Nearly 38 percent of Paraguay's GDP derived from trade and exports to Brazil and Argentina. Economic performance resulted in a substantial decline in overall poverty levels, from 49.7 percent to 37.9 percent between 2002 and 2008, and in extreme poverty levels from 24.4 percent to 19.4 percent over the same period. However, further progress was challenged by the isolation of rural populations (41.6 percent of the total population in 2009); high population growth rates (2.37 percent in 2007); and the impact of the 2008 financial crisis, high food prices, and declining incomes. Redoubled efforts were needed to provide services to poor and marginal areas beyond the eastern region around the capital, Asunción.
3. The priorities established by the Government in its 2008–2013 Economic and Social Plan included Paraguay's transition to a modern economy by improving governance, reducing corruption, addressing the needs of vulnerable groups, and restoring growth. It also aimed to strengthen the management of the country's vast hydroelectric resources.

Sectoral and Institutional Context

4. While Paraguay has abundant hydropower generation capacity (primarily from the binational Itaipú and Yacyretá hydroelectric power plants), weaknesses in transmission and distribution were hindering the development of productive activities in both rural and urban areas. While electricity coverage reached 93.8 percent of all households (just below the Latin America and the Caribbean average of 94.6 percent), the average per capita consumption per year was only 853 kWh, far lower than in Chile (2.745 kWh per capita per year) or in Brazil (2.166 kWh per capita per year).
5. Electricity tariffs were set by the National Economic Team, which consisted of the Ministry of Public Works and Communications (*Ministerio de Obras Públicas y Comunicaciones*, MOPC); the Ministries of Finance, Agriculture and Livestock, Commerce, and Industry; and the Central Bank. The Vice Ministry of Mines and Energy (*Vice Ministerio de Minas y Energía*, VMME), which reported to the MOPC, was in charge of power sector policy and strategy, planning and monitoring, technical regulations and quality of service standards, and developing new programs. The National Power Utility (*Administración Nacional de Electricidad*, ANDE), the state-owned power utility, was in charge of generation, transmission, and distribution of electricity within the country.



6. The maximum capacity of the transmission system, estimated to be 1,700 MW in 2010, had problems to fully attend to the demand at peak time. Electricity service provision was facing significant outages and voltage fluctuations as the projected growth in electricity demand exacerbated the challenges faced by the electric system: lack of network capacity to increase supply, low quality of service, large system losses, and low collection rates.

7. The Government's strategy aimed at developing an efficient electricity sector; benefiting from the abundant hydroelectric resources; and transforming ANDE into a modern, efficient, and financially sustainable public sector utility. To address the energy sector's weaknesses, the Government recognized the need for institutional strengthening of the sector, increasing its efficiency, reducing distribution and transmission losses, optimizing the purchasing agreements with the binational generators, introducing more transparency and efficient management practices in ANDE, and progressively decentralizing the company's decision making to its regional managers. To this end (a) the Ministry of Finance and ANDE were negotiating a three-year performance contract with quantitative and qualitative indicators aimed at improving the utility's performance and (b) the Ministry of Finance and the VMME were developing an action plan to strengthen the role of the VMME with respect to energy policy, strategy and program formulation, regulations, and general oversight. ANDE prepared a 10-year Master Plan (2009–2018) built upon three broad objectives: (a) reducing power losses in distribution and transmission, (b) expanding transmission system capability, and (c) enhancing the company's efficiency and revenues by increasing the exporting capacity of ANDE to neighboring countries. In 2010, Congress approved an emergency plan as a response to the increased outages and voltage fluctuations of the summer of 2009/10.

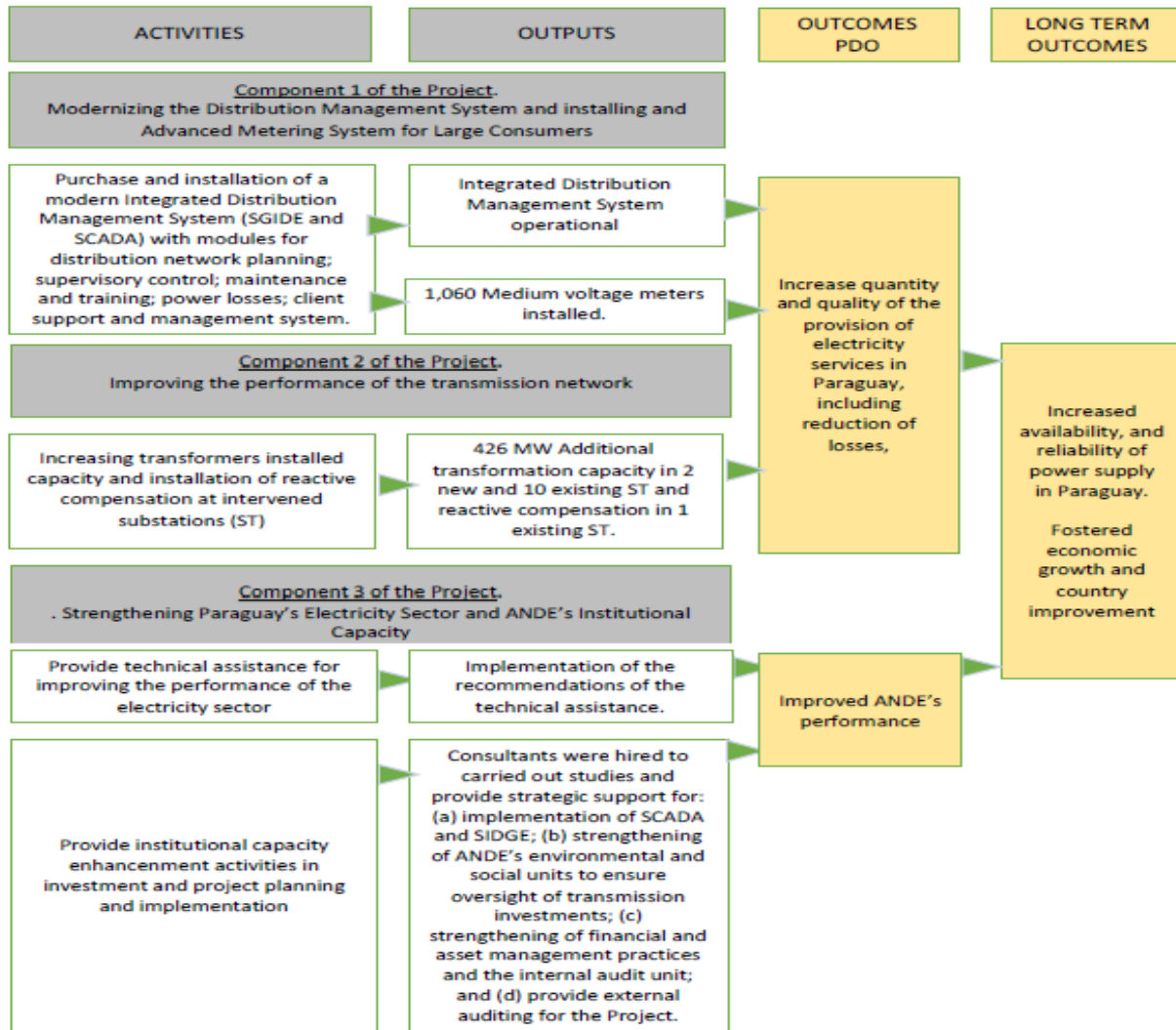
8. The Energy Sector Strengthening Project—described in the next section—was prepared by the World Bank during 2009/2010 and approved in November 2010.

Theory of Change (Results Chain)

9. The desired change or long-term impact of the Energy Sector Strengthening Project was to increase availability and reliability of power supply and improve economic growth in Paraguay. The steps needed to achieve those impacts are described in figure 1.



Figure 1. Original Results Chain



Note: SCADA = Supervisory Control and Data Acquisition; SGIDE = Comprehensive Electricity Distribution Management System (*Sistema de Gestión Integral de la Distribución Eléctrica*).

Project Development Objectives (PDOs)

10. The PDOs, as indicated in the Project Appraisal Document and the Loan Agreement, were to increase the quantity and quality of the provision of electricity services by the borrower, while improving the borrower's performance. The PDOs were not changed during project implementation.

Key Expected Outcomes and Outcome Indicators

11. The expected outcome indicators are closely tied to the PDO. The indicators designed to evaluate the achievement of the outcomes updated after the restructuring of the project in 2015 were (a) increased energy invoiced to medium voltage customers, (b) increased energy supplied in the transmission network,



and (c) improvement of the voltage quality in the metropolitan area. Annex 1 presents baseline, targets, and achievements for the outcome and output indicators after restructuring.

Components

12. The project was composed of three components directly linked to the three expected outcomes: Component 1: Modernizing ANDE's Distribution Management System and Installing an Advanced Metering System for Large Customers (US\$20 million IBRD) to enhance service quality, reduce losses, and improve the utility's performance; Component 2: Improving the Performance of the Transmission Network (US\$77 million IBRD) to increase the quantity and quality of electricity supplied; and Component 3: Strengthening Paraguay's Electricity Sector and the Borrower's Institutional Capacity (US\$2.75 million IBRD) aimed at strengthening ANDE's capacity in investment planning and project preparation and improving the sector and ANDE's performance and transparency.

B. SIGNIFICANT CHANGES DURING IMPLEMENTATION (IF APPLICABLE)

13. The project was restructured twice. The first restructuring took place in December 2015 and had four main purposes: (a) a 22-month extension, (b) changes in specific investments in all components, (c) reallocation of loan proceeds, and (d) changes in the Results Framework. The reallocation of loan proceeds was due to the realization that some of the activities initially included in the project design (SGIDE) would not be completed in the lifetime of the project, and thus they were excluded from the project. The resulting available loan amount was then allocated to other critical investments, in line with ANDE's priorities and the PDO. The second loan restructuring, dated September 19, 2017, postponed the closing date of the loan for 12 additional months (from October 31, 2017, to October 31, 2018) and included a reallocation among disbursement categories. This extension resulted in an overall extension of the project implementation of 34 months.

Revised PDOs and Outcome Targets

14. The PDOs and outcome targets were not modified during project implementation.

Revised PDO Indicators

15. As the project restructuring of December 15, 2015, included changes at the activity level, the indicators were changed consequently. The original indicators were found to be difficult to track and measure because instead of measuring the impact of project-related investments, they measured overall system parameters in Paraguay (that is, losses, service interruptions, and energy transferred) that could be affected by multiple reasons not directly linked to the specific operation. Therefore, three of the five PDO outcome indicators were replaced and two were dropped. As for intermediate/output indicators, one was dropped and four were updated. The current outcome and output indicators are presented in annex 1.



Revised Components

16. The December 15, 2015, Loan Agreement Amendment restructured the three project components, modifying some of the activities under each component, and adjusting the Results Framework accordingly. The detailed changes are available in annex 7.

Other Changes

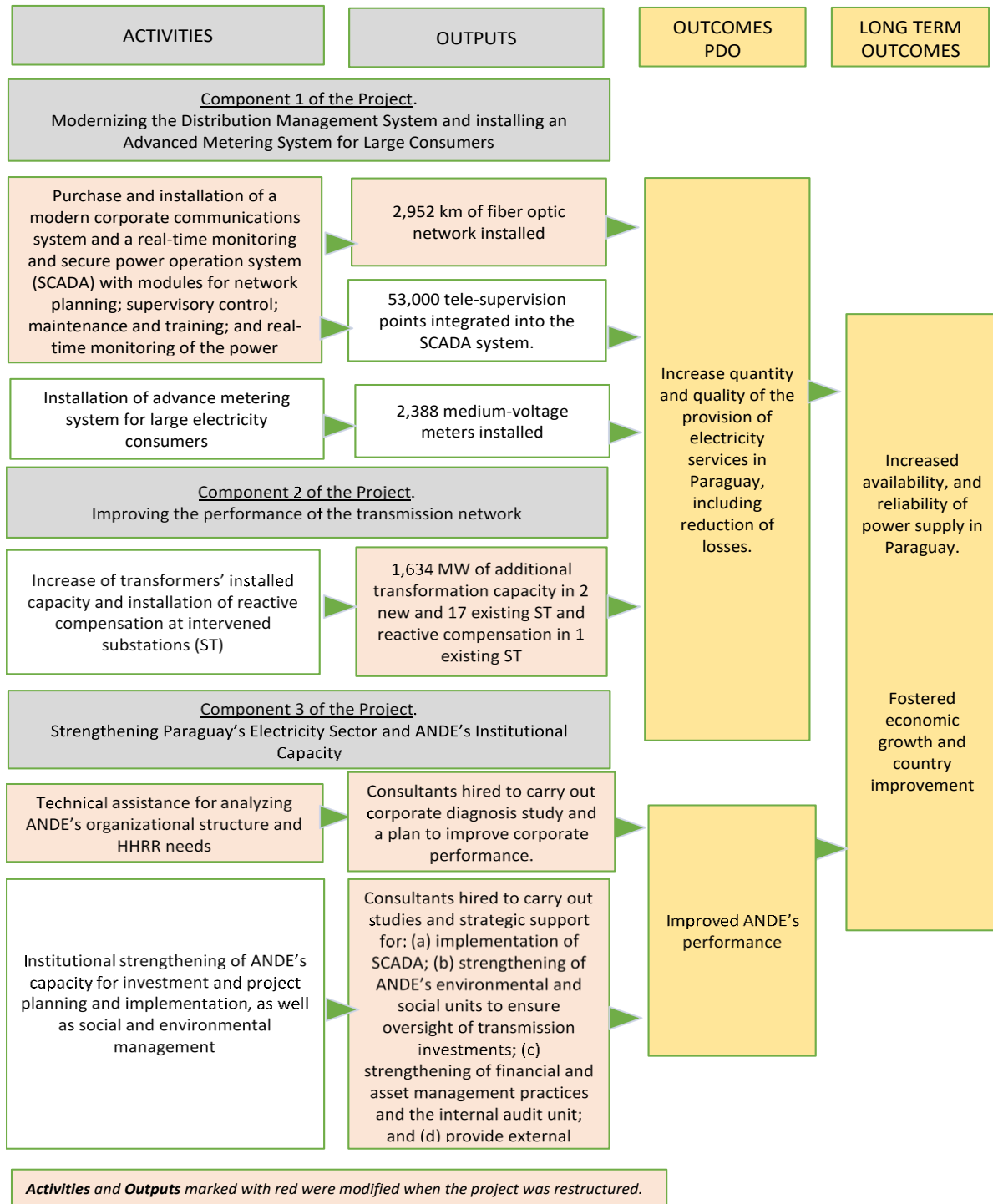
17. **In addition to revising the components, the 2015 restructuring resulted in changes to the Environmental and Social Management Framework (ESMF).** Additional information on these changes can be found in annex 7.

Rationale for Changes and Their Implication on the Original Theory of Change

18. As already explained, changes were introduced to maximize the impact of the project under the existing circumstances and to better assess results. The changes, at activity and output level, are reflected in the revised results chain shown in figure 2.



Figure 2. Revised Results Chain



Note: SCADA = Supervisory Control and Data Acquisition



II. OUTCOME

A. RELEVANCE OF PDOs

Assessment of Relevance of PDOs and Rating

19. **Rating: High.** The project aimed to increase the quantity and the quality of electricity services in Paraguay and strengthen the performance of ANDE, the public utility responsible for the provision of electricity services.

20. The Country Partnership Framework (CPF) for FY19–FY23 (Report 131046PY) continues to support the strengthening of Paraguay's electricity sector, starting with the improved governance and performance of ANDE. The CPF states that the World Bank's support under the Energy Sector Strengthening Project (P114971) helped increase the quantity and quality of electricity services, including improving coverage in the poorest regions of the country.

21. The PDOs were designed to improve electricity services, and during implementation they continued to be in line with the CPF, by supporting in increasing the quantity and quality of the electricity services and improving ANDE's performance. The project supported Pillar II of the CPF: boosting pro-poor Delivery of Public Goods and Services and Objective 5: Increasing energy supply through the transmission network from 3.008 GWh (2015) to 5.800 GWh (2018). In conclusion, as the PDOs are relevant to the country and are supported by the CPF, the rating is considered High.

B. ACHIEVEMENT OF PDOs (EFFICACY)

Assessment of Achievement of Each Objective/Outcome

22. Efficacy is assessed for the three objectives stated in the PDO: (a) increase quantity of electricity services, (b) increase quality of electricity services, and (c) improve borrower's (ANDE's) performance.

Outcome 1: Increase quantity of electricity services

23. This outcome is assessed by two PDO-level indicators: 'increase of energy invoiced to medium voltage costumers' and 'increase of energy supplied through the transmission network in a year'. As presented in annex 1, the first indicator target was overreached by 2 percent (102 percent). As for the second one, the target was reached up to 93 percent. The second target was not fully achieved because, following initial project delays, the transformers financed by the World Bank were installed in different substations than the ones for which the target had been set, resulting in a lower energy flow, and a lower final value was defined for this indicator to consider these changes. However, all the originally planned transformers were procured and are already installed or will be installed soon by ANDE.

24. **Conclusion.** The overall rating of Outcome 1 is Substantial.

Outcome 2: Increase quality of electricity services



25. This outcome is assessed based on the PDO-level indicator ‘improvement of the voltage quality in the Metropolitan Area (number of hours in which the voltage is between 190 kV to 242 kV in a year)’. The baseline in 2015, when this indicator was introduced, was 6,600 hours, the target was 8,040 hours, and the project overachieved the target at project closure with a value of 8,729 hours (achievement rate 109 percent).

26. **Conclusion.** The overall rating of Outcome 2 is High.

Outcome 3: Improve Borrower’s performance

27. There are no specific indicators to assess borrower performance nor an indication of any specific area in which performance was expected to be improved and measured. Therefore, it becomes relevant to understand what activities were done by the project to improve ANDE’s performance, in different areas. Activities under this component (a detailed list can be found in annex 2) (a) enhanced capacity for the implementation and management of the distribution management systems; (b) strengthened the planning unit, in particular the Environmental and Social Unit (ESU), through access to consultants, best practices, methodologies, and technologies; and (c) strengthened the financial management (FM) unit, in particular with respect to asset management practices and internal auditing. In summary, the substantial support provided to improve ANDE’s performance allowed for the successful implementation of the project and this could be considered as the indicator of the borrower’s performance. As the performance improvements have been incorporated in ANDE’s culture, it is expected that they will contribute to the sustainability of the project outcomes.

28. **Conclusion.** The overall rating of Outcome 3 is Modest.

Justification of Overall Efficacy Rating

29. Given that the ratings of each one of the three project outcome indicators are Modest, Substantial, and High, the overall efficacy rating is considered Substantial.

C. EFFICIENCY

Assessment of Efficiency and Rating

30. **The efficiency rating is Modest.** At project completion, the economic and financial analysis of the Energy Sector Strengthening Project indicates that its rates of return and net present values (NPVs) are positive and reasonable compared with the values estimated at the time of the appraisal, taking into consideration the recent and projected evolution of main prices and costs. However, the rating is Modest, taking into account that the project took a much longer time to fulfill its objectives.

31. **Tables 1 and 2** compare the results of the economic and the financial evaluations at the project closing and at appraisal. The results of the evaluation at appraisal show the range of results under different scenarios of energy prices and sales and operational and investment costs.



Table 1. Summary of Economic Analysis

Investment	Units	Project at Appraisal	Project at Completion
NPV at 10%	US\$, millions	495–218	48
Economic rate of return	%	37–28	15

Table 2. Summary of Financial Analysis

Investment	Units	Project at Appraisal	Project at Completion
NPV at 10%	US\$, millions	190–78	70
Financial rate of return	%	24–15	34

32. The low case scenario at project appraisal combined an increase of 20 percent in project costs together with a decrease of 20 percent in additional electricity to be provided by the investment and an increase of 20 percent in the value of the electricity sold to Brazil.

33. The latest analysis took into consideration updated and projected costs figures. The main changes include a higher opportunity cost of the energy used domestically to support the growing domestic demand, instead of selling it to Brazil or the regional market. The difference between domestic and export prices of electricity is now estimated lower than expected at appraisal, taking into consideration the probable evolution of the export prices in the regional market exchanges, with tariffs similar to those practiced in the national wholesale electricity markets. At the time of appraisal, the current Itaipú tariff was expected to remain constant during the life of the project and, if these tariffs remain effectively unchanged for some period, the rentability of the project will consequently increase. A longer-than-expected implementation period has negatively affected project evaluation. Domestic electricity tariffs are at a similar level, in constant currency, now and at appraisal, after a recent tariff increase. Other factors positively affecting the project results were the increase in the equipment installed after project restructuring—such as the additional transformation capacity that will allow the increase of electricity sales—and the lower-than-expected project investment cost.

34. ANDE’s financial condition is currently sound. After the recent tariff increase in March 2017, for fiscal years 2017 and 2018, the net financial results were US\$67.5 million and US\$97.8 million, respectively.

D. JUSTIFICATION OF OVERALL OUTCOME RATING

35. **The overall rating is considered Moderately Satisfactory**, in line with the ratings for relevance of PDOs (High), efficacy (Substantial), and efficiency (Moderate), taking into consideration the delay in the project’s implementation as well as the fact that this delay was provoked by factors that were not under the full control of the borrower. Also, the appropriation by ANDE of the organizational tools that will ensure the future development of the project outcomes was taken into consideration. ANDE is planning to continue investing in the extension and improvement of its transmission and distribution networks to continue improving the quality and quantity of the electricity services.



E. OTHER OUTCOMES AND IMPACTS (IF ANY)

Gender

36. The project was not designed with a gender-informed approach in mind, and thus, the implementation did not take a gender-informed approach.

Institutional Strengthening

37. This was the first project financed by the World Bank implemented by ANDE. The World Bank played an active role supporting ANDE in project execution. To this end, the World Bank (a) organized training activities, particularly on fiduciary aspects, for the staff of ANDE in Paraguay and abroad; (b) contributed to the strengthening of the Project Implementation Unit (PIU); and (c) discussed with ANDE the restructuring of the loan to update/improve the components and indicators. These activities contributed to the acceleration of the project execution after the initial delays caused by the external and internal factors, which are described in section III. In addition, the project financed multiple activities to strengthen ANDE's auditing and ESUs (trainings, south-south exchanges, individual consultants, studies, and so on). Therefore, it is expected that any future project financed by any bilateral or multilateral institution could be implemented more efficiently, taking advantage of ANDE's institutional strengthening resulting from this operation. Safeguards related to institutional strengthening activities are also described in the safeguards section.

Mobilizing Private Sector Financing

38. The current structure of Paraguay's electricity sector, with abundant hydroelectric resources, a power generation market with the dominant participation of binational generating entities, and a limited size consumer market limits the opportunities for private sector participation. Therefore, the Government has been focused on seeking efficient management of the power sector within a public sector framework. Transforming ANDE into a modern, efficient, and financially sustainable public sector utility is a first step. The success of this strategy could help mobilize private sector financing in the future.

Poverty Reduction and Shared Prosperity

39. The project will increase the quantity and improve the quality of electricity supply, reducing power outages and expanding access to electricity as demand continues to grow. The substantial reduction of service disruptions will positively affect the country's economy because the very high economic cost of the energy not delivered will be avoided. This economic effect will benefit the consumers of goods and services, including the poorest consumers, who will also directly benefit from the improvement of the electricity services.

Other Unintended Outcomes and Impacts

40. The installation of the SCADA system and the deployment of the optical fiber network will optimize ANDE's institutional management and the optical fiber network will also be used by the national communications company (Compañía Paraguaya de Comunicaciones, COPACO) to improve the communications in the country. This consolidated communication network will contribute to connecting



essential services in the areas of health, education, and security benefiting the whole population of Paraguay.

III. KEY FACTORS THAT AFFECTED IMPLEMENTATION AND OUTCOME

A. KEY FACTORS DURING PREPARATION

41. Key factors identified during project preparation that affected its design were related to the perceived weakness of the energy sector institutions responsible for oversight, policy planning, and regulatory functions and ANDE's implementation capacity. To mitigate these risks, the project included resources to provide strategic support from international consultants to planning, environmental, social, financial, asset management, and internal auditing functions.

B. KEY FACTORS DURING IMPLEMENTATION

42. The loan was approved on November 30, 2010, and, due to the country's legislative processes, signed into law on December 13, 2011. Therefore, due to the delay in getting the approval of the specific law in congress, it was only possible to declare effectivity on February 9, 2012, 14 months after its approval. Once effective, project implementation had a very slow takeoff due to the country's political activities covering the entire year 2012 until April 2013—when national elections were held—and during the period required for the new authorities to assume office, in August 2013, and adjust to their functions.

43. During the abovementioned period, ANDE started to prepare bidding documents, but progress was affected because ANDE's organizational structure was not yet adequate for project execution and required to be strengthened. The PIU lacked an exclusively dedicated manager and clear action plans (until early 2015), and there were not enough trained personnel available to carry out procurement and fiduciary activities under the World Bank's rules.

44. Because of the situation described earlier, the World Bank's supervision missions assumed a very active role and the missions were carried out with the criteria of supporting the project's execution by helping ANDE improve its organization, rearrange the project activities, prepare detailed execution plans, and review and update the monitoring and evaluation (M&E) framework.

45. The World Bank's supervision missions and the authorities of ANDE recognized the need to strengthen the PIU to ensure the project's success and a PIU manager was appointed in 2015 with total responsibility for planning and executing the project and full-time qualified personnel were appointed to manage it. In parallel, training activities on the World Bank's procurement policies and other disciplines were developed with the participation of the PIU staff. Consultants were contracted to perform specialized activities and conduct training activities. The environmental management unit of ANDE was also strengthened through its participation in the project through (a) various training events oriented to staff and environmental consultants who worked with ANDE; (b) procurement of equipment for environmental monitoring and supplies to commission a polychlorinated biphenyls laboratory; (c) implementation of an information system on environmental and health and safety aspects; and (d) purchase and installation of signage in the Natural Reserve Iguazu, owned by ANDE.



46. The reorganization of the PIU, the strengthening of the areas of ANDE involved in the project's implementation, and the training of key personnel allowed for the acceleration of the project's execution and completion, with minimal deviations, at the time of the postponed closing date.

IV. BANK PERFORMANCE, COMPLIANCE ISSUES, AND RISK TO DEVELOPMENT OUTCOME

A. QUALITY OF MONITORING AND EVALUATION (M&E)

M&E Design

47. **The M&E design is rated Modest.** The responsibility of M&E of project activities was assigned to ANDE, as the implementing entity, in coordination with the Ministry of Finance. Comprehensive M&E arrangements, consistent with the World Bank guidelines and requirements for measurement and evaluation, were defined as well as key performance indicators.

48. The proposed indicators had some deficiencies. Some of them were not included and others were too general (that is, losses), making it difficult for results to be clearly attributed to project-related activities. As indicated in the Achievement of PDO section of this Implementation Completion and Results Report (ICR), the 'improving borrower's performance' outcome had no PDO indicator associated. This flaw hindered the assessment of the PDO achievement.

49. The World Bank was expected to carry out project reviews, supervision missions, and a midterm review. The reports to be prepared by the implementing entity, ANDE, would include (a) interim financial reports, (b) quarterly reports provided by ANDE in coordination with the Ministry of Finance, and (c) independent annual financial audits of the project and ANDE's financial statements. M&E activities would be performed on the basis of the activities, outputs, and indicators that were part of the results chain. The World Bank's missions were expected to play an active role by not just monitoring and supervising the project but also providing implementation support for improving the project's execution. ANDE maintained a good statistical system with sufficient data to monitor project outputs, outcomes, and indicators. Data on equipment installed throughout the country, electricity transported, sales, distribution and transmission losses, and reliability statistics (consumer level, transmission lines, transformers, and so on) would be provided by ANDE on an annual basis.

M&E Implementation

50. **The M&E implementation is rated Modest.** The project outputs/intermediate results were monitored and provided as expected. The project progress was monitored by ANDE's project team relying on the information provided by ANDE's regional and headquarters offices. During the early stages of the project implementation, progress monitoring focused on progress of procurement activities against the agreed Procurement Plan and implementation of the agreed capacity-building measures and measures related to environment and social safeguards. When investments started to materialize, the project monitoring system focused on progress of commissioning and execution of subprojects. The assessment on the improvement of the performance of the electricity sector and the execution of its key recommendations was carried out by ANDE in coordination with the Ministry of Finance, which also provided oversight for the project's overall implementation. When the project was restructured, the updated design incorporated the fact that prices of the project activities were lower than originally



expected and the realization that the original PDO-level outcomes and outputs were not capturing the real effects of the project activities. As these realizations were only evident once implementation was advanced after the initial delay, the restructuring was viable several years after the project was approved. Under the circumstances, the project restructuring was a demonstrative result of the active participation of the borrower complemented with productive World Bank supervision.

51. An additional challenge related to M&E was associated with a change in the deployment of the transformers financed by the project, which were installed in other transformation substations instead of in those originally selected. Due to the initial project delays and the urgent need to guarantee grid stability, ANDE had to procure and install with its own resources the required transformers in the abovementioned substations and the transformers financed by the project were later installed in different substations. As a consequence, the indicator related to PDO number 2 ('increase of energy supplied through the transmission network in a year'), which depends on the energy distributed from each substation, was re-estimated from 2017 onward on the basis of the energy distributed from the substations where the transformers financed through the project were finally installed. Taking this into account, the updated end target was estimated as 5,051,000 MWh and the achievement of this indicator is 93 percent.

M&E Utilization

52. **The M&E utilization is rated Substantial.** The M&E information related to the project was collected and reported, as well as the relevant issues, in the Implementation Status and Results Reports (ISRs) and the Aide Memoires of the supervision missions on the basis of information provided by the PIU. These M&E arrangements helped identify and address implementation issues and take corrective actions as necessary, such as restructuring and revising the project components and indicators. This active role and the collaborative relationship with the borrower facilitated implementing the measures needed to improve and accelerate the project's execution by improving ANDE's performance after the initial implementation delays and restructure the project when required.

Justification of Overall Rating of Quality of M&E

53. **The overall quality of M&E was rated Modest.** ANDE was effective and efficient in collecting and providing the information required to monitor and evaluate project implementation, including safeguards information. ANDE produced periodic progress reports, including technical, procurement, and environmental and social (E&S) aspects. Similarly, financial monitoring reports were submitted on a trimester basis. Supervision missions and a midterm review were also performed. Detailed information on outputs, outcomes, and indicators set out in the Project Appraisal Document or revised for each component was monitored closely by the PIU and the World Bank. In addition, the World Bank supervision teams carried out periodic missions that took advantage of the M&E system to help ANDE improve implementation.

B. ENVIRONMENTAL, SOCIAL, AND FIDUCIARY COMPLIANCE

54. **Environmental and Social (E&S).** The project triggered four environmental and two social safeguard policies: Environmental Assessment (OP/BP 4.01), Natural Habitats (OP/BP 4.04), Forests (OP/BP 4.36), Physical Cultural Resources (OP/BP 4.11), Indigenous Peoples (OP/BP 4.10), and Involuntary



Resettlement (OP/BP 4.12). The E&S management instruments were prepared and consulted by ANDE and disclosed by ANDE and the World Bank according to the applicable World Bank requirements and national legislation, including an ESMF, an Indigenous Peoples Planning Framework, and a Resettlement Policy Framework. The works-specific instruments prepared during project implementation included Environmental and Social Impact Assessments and Environmental and Social Management Plans, the key content of which was incorporated in the bidding documents, and two Resettlement Action Plans (RAPs) for small plots of land to construct the new substations in San Pedro and Minga Porá. The Indigenous Peoples Plans did not materialize because indigenous peoples were not affected by the project works. The RAP for Minga Porá was not implemented because construction was finally to be in the area that already belonged to ANDE.

55. The project's safeguards risk was rated Moderate throughout the implementation period and the performance was considered Moderately Satisfactory. More information on E&S compliance can be found in annex 8.

56. **Financial management (FM).** ANDE assumed fiduciary responsibilities for all the activities financed by the World Bank loan and produced the requisite interim and annual project reports and financial statements, relying on its operational departments. The project FM risk was assessed as Substantial at entry and changed to Moderate during implementation. The FM performance has been reviewed periodically by the project FM specialist in accordance with the assessed FM risk. The FM performance rating has been consistently Satisfactory throughout the entire implementation period except for the latest supervision that was rated Moderately Satisfactory because of the late submission of project's audited financial statements. The FM arrangements were generally in compliance with the World Bank requirements with timely reporting. Unqualified audited financial statements were received by the World Bank generally on time and were always found to be acceptable. The final audit report covering a period of 14 months until February 28, 2019, is still to be received by the World Bank and is due on June 30, 2019.

57. Though the actual disbursed amount is US\$93,578,209, there is a total amount of US\$3,473,166 in ANDE's Designated Account that has been disbursed but was not used. ANDE has informed that these funds will be returned to the loan account. The deadline to return the funds is June 30, 2019, and then the amount of the final disbursements will be US\$90,105,043 (90.1 percent of the total loan amount instead of 93.5 percent).

58. **Procurement.** At the beginning of project implementation, the coordination among different areas/departments inside ANDE was deficient to address procurement aspects, causing significant delays and back and forth in the contracting processes. The incorporation of a general coordinator with strong commitment, understanding of the World Bank's procurement criteria, and a great influence on all ANDE internal players substantially improved the performance of the PIU. This measure was a key decision and a milestone in the life of the project. In general, procurement activities were carried out in accordance with the World Bank's Procurement Guidelines owing to close supervision of the World Bank's team and a fluid relationship with ANDE's staff. The incursion of nontraditional providers for the Latin America and the Caribbean market in international competitive biddings was a big challenge, especially in contract management. ANDE's lack of experience to deal with nontraditional providers generated additional supervision efforts. However, this situation had a positive impact on prices, yielding savings and freeing up resources for other procurement activities that were not originally envisioned.



C. BANK PERFORMANCE

Quality at Entry

Rating: Moderately Satisfactory

59. The project was designed considering essential electricity sector priorities, ANDE's capacities and weaknesses, sectorial plans, and government commitment, consistent with the World Bank's fiduciary role. The FY09–FY13 Country Partnership Strategy for the Republic of Paraguay recognized among the most important sectoral policies necessary to foster growth the ones related to the electricity sector because "key weaknesses in transmission and distribution hamper the development of productive activities in both rural and urban areas, as well as the prospects for true formal exports." The FY19–FY23 CPF supports the strengthening of the power sector as a country priority

60. To strengthen Paraguay's electricity sector and improve ANDE's institutional capacity, the project included a component aimed to assess and carry out an action plan to improve the legal framework, the organizational structure, and operational procedures of the electric sector. Fiduciary and safeguards issues were adequately addressed, and provisions were made for M&E during implementation. Economic and financial evaluations were carried out, and the financial capacity of the borrower was evaluated. The perceived risks were addressed through covenants in the Loan Agreement.

61. There were some shortcomings in the original design of the results indicators that were partially addressed and improved in the first project restructuring. However, an indicator for measuring improvements in the governance outcome was never included. In addition, ANDE's organizational structure for project execution was not adequate, and there was the lack of a dedicated manager—these issues are absent from the analysis. The World Bank's performance in ensuring quality at entry is therefore rated Moderately Satisfactory.

Quality of Supervision

Rating: Moderately Satisfactory

62. The extended period between the loan's approval, effectiveness, and the start of implementation delayed project execution because of factors that were mainly beyond the control of the borrower, that is, national elections and change of national and ANDE's authorities.

63. After the initial delay, the project's progress was regularly supervised through World Bank missions and other interactions with ANDE and the Government. Active support and guidance to ANDE and the PIU on project implementation, organization, FM, procurement, and environment and social safeguards were provided by the World Bank's team on a regular basis. In addition, the World Bank's team supervised progress of the training activities provided to ANDE's staff on these matters. The fact that the fiduciary World Bank team was based in a neighboring country facilitated missions and communications. During the last years of project implementation, the task team leader was also based in a neighboring country. This helped supervise the project in a more frequent, efficient, and cost-effective manner to address issues head on.

64. This active supervision and collaborative approach of the World Bank with the borrower helped identify project issues that were solved during implementation, that is, updating the project components



and redesigning the intermediate and PDO indicators. However, the first restructuring took place five years after Board approval. This delay was due to the fact that, once the project started implementing its activities after the initial delays, it took the project at least a year to start identifying the main issues in implementation and the main changes needed.

Justification of Overall Rating of Bank Performance

Rating: Moderately Satisfactory

65. Quality at entry and supervision were Moderately Satisfactory because of shortcomings in the original selection of indicators, which were partially adjusted during project restructuring, and the delay in processing the first restructuring. Therefore, the overall World Bank performance rating is Moderately Satisfactory.

D. RISK TO DEVELOPMENT OUTCOME

66. **The risk to development outcome is rated Modest.** From the technical side, project outcomes are the results of investments that were key to improving quality of service and are currently part of ANDE's permanent operation of its transmission and distribution grids. ANDE has financial and budgetary resources to fulfil its mission and is committed to implementing its Investments Master Plan whenever it can access multilateral/bilateral funding.

67. On the performance side, the project (a) provided strategic support from international consultants experienced in the implementation of distribution management systems (Component 1); (b) financed the strengthening of ANDE's planning unit, in particular the ESU, through access to consultants, best practices, methodologies and technologies, and training to ensure oversight of transmission investments (Component 3); and (c) strengthened ANDE's FM practices, in particular with respect to asset management practices and internal auditing (Component 3). The substantial support provided to improve ANDE's performance allowed for the successful implementation of the project and, as the performance improvements have been incorporated in ANDE's culture, it is expected that they will contribute to the sustainability of the project outcomes.

68. A future perceived risk for the electricity sector is related to the evolution of the regional power market in terms of availability and prices of electricity. However, due to mutual convenience, traditional interaction/cooperation between countries, and lessons learned, this risk is not considered substantial. Improvements in the Paraguayan sector governance and the efficiency of the power utility will also contribute to moderate this potential risk.

69. Therefore, no risks are identified that could substantially affect the sustainability of the results achieved.

V. LESSONS AND RECOMMENDATIONS

70. **Design.** When designing complex projects, it is important to deeply assess the legal framework under which the implementation agency will be operating, especially regarding its flexibility and agility. ANDE is the electricity utility of Paraguay however, it is not an SOE. It operates as part of the Government, following very cumbersome operational and financial processes. The real characteristics of the



implementing agency should inform the design of the implementation arrangement and the length of the implementation period.

71. **When implementing a World Bank project with a utility, the PIU needs capable full-time professionals and a strong footing within the sector agency.** Utilities always have their own internal structure that operates with a logic that goes beyond a specific World Bank project. It is then necessary to establish a strong PIU, as early as possible, with high operating capacity; knowledge of World Bank operation's specificities (procurement criteria, E&S compliance, and so on); and full-time trained staff. This PIU should interact with all areas inside the utility and should have a unique focus on project implementation.

72. **World Bank projects can upgrade implementing agencies' procurement capacity beyond the scope of the project-financed contracts.** The training of ANDE's procurement specialists in the utilization of the World Bank's procurement norms helped adopt technical and commercial specifications and improve criteria for evaluating proposals and negotiating contracts in a way appropriate for a wider international market with the participation of new providers and contractors. This procurement approach contributed to reducing the costs of project components, allowing for the financing of additional goods and works. The cost was the additional work of inspecting goods and equipment coming from distant markets and, in certain cases, delays in the delivery of such goods and equipment.

73. **New providers have a different modus operandi.** When procuring goods following international bidding standards, PIU teams need to be prepared to deal with suppliers, with technical and commercial practices different from those applied by traditional providers. PIU teams also need to internalize the costs associated with contract management, under these new scenarios.

74. **Continuity of the World Bank fiduciary team members facilitates World Bank supervision in benefit of the implementing agency.** The continuity of the World Bank's fiduciary team throughout the execution of the project allowed a thorough understanding of ANDE's weaknesses, the provision of continuous and consistent support to improve the organization and methods of its involved fiduciary areas, and a smooth transition between task team leaders.

75. **The institutional capacity-building component can be the facilitator of activities otherwise unreachable for implementing agencies.** The evaluation of the project context; electricity sector governance; borrower's strengths, weaknesses, and implementation capacity; the Government of Paraguay's priorities; and the goals of the World Bank Country Partnership Strategy for the Republic of Paraguay for FY09–FY13 were taken into consideration in the project design. Thus, in addition to two physical components, a third component on strengthening ANDE's capacity was incorporated. This third component was critical to improve the implementation capacity of the borrower, ensure project completion, and allow the development of tasks that push ANDE's modernization agenda and otherwise will be very difficult to implement. As an example, owing to the project, Paraguay had the first certified internal auditor under the institute of internal auditors.

76. **Continued and firm oversight is needed to secure satisfactory E&S management.** The level of E&S management required by the World Bank was considered high against the prevailing sector standards in Paraguay. The project experienced both highly successful and poor E&S risk management of specific activities. The difference in performance depended strongly on the contractor staff, both the responsible



engineer and technical specialist, as well as on the continuity and firmness of both ANDE and World Bank supervision. In countries with relevant gaps between local and World Bank E&S standards, similar operations should (a) ensure that contractors' hiring of E&S specialists is done in satisfactory and attractive terms and conditions to ensure the interest of capable and experienced professionals and (b) somehow condition the contractor's payments to comply satisfactorily with the environmental, health, and safety requirements included in the bidding documents.



ANNEX 1. RESULTS FRAMEWORK AND KEY OUTPUTS

A. RESULTS INDICATORS

A.1 PDO Indicators

Objective/Outcome: Increase the quantity of the provision of electricity services by the borrower

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Increase of energy invoiced to 2,388 medium voltage customers in a year (annual)	Megawatt hour(MWh)	571940.00	589098.00		601871.00
		20-Nov-2015	31-Oct-2018		31-Dec-2018

Comments (achievements against targets):

Objective/Outcome: Increase the quantity of the provision of electricity services by the borrower

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Increase of energy supplied through the transmission network in a year (annual)	Megawatt hour(MWh)	3008000.00	5819000.00	5051000.00	4704000.00
		20-Nov-2015	31-Oct-2018	31-Dec-2018	31-Dec-2018

Comments (achievements against targets):



The calculation methodology for this indicator was modified from 2017 onwards to take into account that the transformers which the project planned to install in the substations whose energy was to be counted had already been financed and installed by ANDE. Thus, the transformers financed with the project are being installed in different sub-stations, resulting in a different energy flow, and a different indicator value for this indicator.

However, it is worth mentioning that all planned transformers were procured and are currently being installed by ANDE. Thus, this indicator was not achieved during the life of the project, but will probably be achieved during the year 2019.

Taking into account this change in methodology, and following the CMU's advice, in order to make the numbers showing under these indicators more meaningful, the baseline and the end targets were updated using the adjusted methodology in the last ISR showing an end target of 5,051,000 MWh.

Objective/Outcome: Increase the quality of the provision of electricity services by the borrower

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Improvement of the voltage quality in the Metropolitan Area (No. of hours in which the voltage is between 198 kV -242 kV, in a year).	Hours	6600.00	8040.00		8729.00
		20-Nov-2015	31-Oct-2018		31-Dec-2018

Comments (achievements against targets):

A.2 Intermediate Results Indicators



Component: Component 1 - Modernizing ANDE's Distribution Management System and Installing an Advanced Metering

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Number of tele-supervision points integrated to the SCADA system (cumulative)	Number	0.00	53000.00		38200.00
		20-Nov-2015	31-Oct-2017		31-Dec-2018

Comments (achievements against targets):

The project was able to successfully integrate all of the needed tele-supervision points.

The original target had not taken into account that some of the points counted where a "system reserve" that did not exist in reality, but where only "place holders" inside the SCADA system. The actual number of points that needed to be integrated into the system was 38,200, all of which where successfully integrated.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Installation of advanced energy meters to 2.388 medium voltage clients (cumulative)	Number	0.00	2388.00		2773.00
		20-Nov-2015	31-Oct-2017		31-Dec-2018

Comments (achievements against targets):

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised	Actual Achieved at Completion
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				Target	
Number of kms of new fiber optic network installed (accumulated)	Kilometers	0.00	2952.00		3611.00
		20-Nov-2015	31-Oct-2017		31-Dec-2018

Comments (achievements against targets):

Component: Component 2 - Improving the Performance of the Transmission Network.:(Cost \$71.77 M)

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Increase of transformers' installed capacity at intervened substations.	Kilovolt-Amphere(KVA)	791000.00	2425000.00	1755000.00	1592000.00
		20-Nov-2015	31-Oct-2017	31-Dec-2018	31-Dec-2018

Comments (achievements against targets):

Only half of the advances in the increase in transformation installed capacity is attributable to the project. The rest was financed by ANDE.

All of the transformers financed by the project where procured and have been received by ANDE, and the works needed to install the transformers that where procured through the project are still ongoing. Thus, this indicator was not achieved during the life of the project, but will probably be achieved during the year 2019.



A. KEY OUTPUTS BY COMPONENT

Objective 1: Increase the quantity of the provision of electricity services by the borrower		Contracted amount (US\$, millions)
Outcome Indicators	1. Increase of energy invoiced to 2,388 medium voltage customers in a year (annual) 2. Increase of energy supplied through the transmission network in a year (annual)	
Intermediate Results Indicators	1. Installation of advanced energy meters to 2,388 medium voltage clients (cumulative) 2. Increase of transformers' installed capacity at intervened substations	
Key Outputs by Component (linked to the achievement of the Objective/Outcome 1)	1. a. 2,873 medium voltage electricity meters procured.	1.8
	1.b. Two installation trucks with cranes procured, to enable quick installation of meters.	0.2
	2.a. Two new substations built.	8.6
	2.b. Existing electricity substations upgraded with new transformers	19.2
	2.c. Procurement of specialized trucks for the transportation of transformers	1.5
	2.d. Acquisition of structures, measuring and communication equipment, protection equipment, cables, replacements, and varied distribution grid material to support the upgrading and maintenance of the distribution network.	12.7
Objective 2: Increase the quality of the provision of electricity services by the borrower		
Outcome Indicators	Improvement of the voltage quality in the Metropolitan Area (No. of hours in which the voltage is between 198 kV–242 kV, in a year).	
Intermediate Results Indicators	1. Number of tele-supervision points integrated to the SCADA system, and SCADA system upgraded 2. Number of kms of new fiber optic network installed (accumulated)	
Key Outputs by Component (linked to the achievement of the Objective/Outcome 2)	1. 38,200 tele-supervision points integrated into the SCADA system, upgrade of SCADA monitoring stations, procurement of GIS system licenses	9.1
	2.a. 3,600 kms of fiber optic network installed.	7.7



	2.b. 510 fiber optic connection points procured and installed throughout the network, installation, analysis, and optimization tools procured	4.6
	3. Installation of capacitive equipment, and necessary auxiliary equipment) in Guarambaré substation, to improve voltage quality.	23.7
	4. Supply of mobile transforming stations to deal with blackouts	2.3
	5. Supply of 'carrier-wave' communications equipment to improve transmission grid management	0.6
Objective 3: Improve borrower's performance.		
Outcome Indicators	None	
Intermediate Results Indicators	None	
Key Outputs by Component (linked to the achievement of the Objective/Outcome 3)	1. Corporate diagnosis study and a plan to improve its corporate performance were carried out by specialized consultants	0.9
	2. Consultants hired to carry out studies and provide strategic support to various activities:	
	2.a. Implementation of SCADA	0.7
	2.b. Strengthening of ESUs through workshops and purchase of equipment of environmental surveys	0.15
	2.c. Strengthening of financial and asset management practices, as well as internal audit units	0.3
	2.d. Providing external auditing of the project	0.1

Ongoing activities at the closing date

At the closing date (October 30, 2018), the project had approved 65 procurement processes for activities under Components 1, 2, and 3 with a committed amount of US\$96 million. Of these, 26 processes were completed (for a total of US\$59 million) and 23 processes were under implementation (for a total of US\$37 million). In several cases, the amount of goods and works finally purchased was greater than what was originally planned because of lower-than-expected market prices, as explained earlier.

Of those packages under implementation (active contracts, for a total of US\$37 million), most processes are well under way and almost finalized. The state and prospects of the delayed activities were discussed during the September 2018 mission, and an action plan was agreed to ensure the completion of as many



processes as possible before the project closing date. Nonetheless, the PIU expressed they had secured the funds needed by ANDE to continue financing those activities that were not be 100 percent completed by the closing date.

Among those activities that were not 100 percent completed by the project closing date, and were thus only partially financed with World Bank resources, are:

- (a) **LPI 1181: Mobile transforming substation.** Delayed due to pending arrival of the acquired material to the port. A total of 10 percent of the contract amount remains to be payed, but ANDE will most probably fine the company for that amount, based on the delays in fulfilling the contract.
- (b) **LPI 1167: SCADA (addended contract to include additional sites).** Delayed due to pending arrival of the acquired material to ANDE. The remaining cost of this activity is being financed by ANDE.
- (c) **LPI 1260: Distribution materials.** Delayed due to pending arrival of the acquired material to the port. A total of 10 percent of the contract amount remains to be payed, but ANDE will most probably fine the company for that amount, based on the delays in fulfilling the contract.
- (d) **CD 3/2017: SCADA expansion.** Delayed due to pending arrival of the acquired material to the port. The remaining cost of this activity is being financed by ANDE.
- (e) **LPI 1191: Fiber optic network installation (addended contract to include additional 600 km).** The implementation of the contract expansion was delayed, and the installation of the last 600 km of optic fiber remains to be completed. The cost of the activities performed after the project closing date is being financed by ANDE.

Physical progress of all project activities to March 2019—five months after the closing date—was estimated as 97.3 percent. Note: This number will be updated by ANDE before ICR publication.



ANNEX 2. BANK LENDING AND IMPLEMENTATION SUPPORT/SUPERVISION

A. TASK TEAM MEMBERS

Name	Role
Preparation	
David Reinstein	Task Team Leader(s)
Michel Layec	CO – Task Team Leader
Janina Franco	Energy Specialist
Frank Fragano	Environmental Specialist
Pilar Larramendy	Social Specialist
Jose Zevallos	Social Specialist
Pilar Gonzalez	Counsel
Maria Lucy Giraldo	Procurement Specialist
Alejandro Solanot	Financial Specialist
Jose Janeiro	Finance Officer
Supervision/ICR	
Lucia Spinelli	Task Team Leader(s)
Gustavo Adrian Canu	Procurement Specialist(s)
Alejandro Roger Solanot	Financial Management Specialist
Gloria Dure	Team Member
Graciela Sanchez Martinez	Social Specialist
Tuuli Johanna Bernardini	Environmental Specialist
Rosa Arestivo de Cuentas Zavala	Team Member
Roberto Luis Estevez Magnasco	Team Member

A. STAFF TIME AND COST

Stage of Project Cycle	Staff Time and Cost	
	No. of staff weeks	US\$ (including travel and consultant costs)
Preparation		



FY09	20.868	125,900.07
FY10	65.151	301,623.73
FY11	40.191	272,219.46
Total	126.21	699,743.26
Supervision/ICR		
FY11	4.875	22,502.07
FY12	16.655	156,022.21
FY13	22.733	116,885.40
FY14	39.288	278,208.96
FY15	24.737	227,569.04
FY16	19.113	188,026.32
FY17	8.501	61,823.86
FY18	12.745	88,423.71
FY19	12.948	88,543.72
Total	161.60	1,228,005.29



ANNEX 3. PROJECT COST BY COMPONENT

Components	Amount at Approval (US\$, millions)	Actual at Project Closing (US\$, millions)	Percentage of Approval
Component 1: Modernizing ANDE's Distribution Management System and Installing an Advanced Metering System for Large Customers.	20.00	25.63	128
Component 2: Improving the Performance of the Transmission Network.	77.00	71.77	93
Component 3: Strengthening Paraguay's Electricity Sector and the Borrower's Institutional Capacity.	2.75	2.35	85
Front-end fee	0.25	0.25	100
Total	100.00	100.00	100



ANNEX 4. EFFICIENCY ANALYSIS

Table 4.1 provides a financial analysis of the project, for a 40-year time frame. The financial internal rate of return obtained was 40 percent and the NPV, at a 10 percent weighted average cost of capital, was US\$86 million.

Table 4.1. Project Financial Analysis

Period	Years	Investments	Engineering & Administration	O&M	Opportunity cost of additional energy purchased from Itaipu for domestic consumption	Capital Amortization	Financing Costs	Taxes	Total costs	Incremental savings for loss reduction	Total increased energy sales with Project	Increased energy sales. Medium voltage consumers	Incremental energy sales. Transmission component	Total incremental energy sales with project	Total benefits (including increased energy sales and loss reduction)	Net benefits
		Million USD	Million USD	Million USD	Million USD	Million USD	Million USD	Million USD	Million USD	Million USD	GWh	GWh	GWh	Million USD	Million USD	Million USD
1	2013	0.38	0.04				0.00	0.07	0.11							(0.11)
2	2014	17.12	1.71				0.09	3.08	4.88							(4.88)
3	2015	23.50	2.35				0.35	4.23	6.93							(6.93)
4	2016	27.97	2.80	0.81	12.76		0.99	5.03	22.39	1.02	379.70	21.7	358.0	23.84	24.86	2.47
5	2017	14.36	1.44	1.37	13.07		1.68	2.58	20.14	1.22	389.00	36.0	353.0	24.42	25.64	5.51
6	2018	18.50	1.85	1.66	11.93		2.96	3.33	21.73	1.49	355.00	-6.0	361.0	22.29	23.78	2.05
7	2019	2.28	0.23	2.03	13.07	0.00	3.40	0.41	19.14	1.84	389.06	17.2	371.8	24.43	26.27	7.13
8	2020			2.07	13.84	0.00	3.44		19.35	2.31	411.89	17.8	394.1	25.86	28.17	8.82
9	2021			1.97	14.65	0.00	3.44		20.06	2.35	436.07	18.3	417.8	27.38	29.73	9.67
10	2022			1.87	15.51	0.00	3.44		20.82	2.40	461.69	18.8	442.9	28.99	31.39	10.57
11	2023			1.78	16.42	0.00	3.44		21.64	2.43	488.82	19.4	469.4	30.69	33.12	11.49
12	2024			1.69	17.23	0.00	3.44		22.36	1.26	512.88	20.0	492.9	32.20	33.46	11.10
13	2025			1.69	18.08	0.00	3.44		23.21	1.28	538.12	20.6	517.5	33.79	35.07	11.86
14	2026			1.69	18.97	0.00	3.44		24.10	1.31	564.62	21.2	543.4	35.45	36.76	12.66
15	2027			1.69	19.91	0.00	3.44		25.03	1.33	592.42	21.8	570.6	37.19	38.53	13.50
16	2028			1.69	20.89	0.00	3.44		26.01	1.36	621.61	22.5	599.1	39.03	40.39	14.38
17	2029			1.69	21.92	0.00	3.44		27.04	1.39	652.24	23.2	629.1	40.95	42.34	15.30
18	2030			1.69	23.00	0.00	3.44		28.12	1.42	684.39	23.9	660.5	42.97	44.39	16.27
19	2031			1.69	24.13	0.00	3.44		29.25	1.45	718.13	24.6	693.6	45.09	46.54	17.29
20	2032			1.69	25.32	0.00	3.44		30.44	1.49	753.54	25.3	728.2	47.31	48.80	18.36
21	2033			1.69	26.57	0.00	3.44		31.69	1.53	790.71	26.1	764.6	49.64	51.17	19.48
22	2034			1.69	27.88	0.00	3.44		33.00	1.57	829.73	26.8	802.9	52.09	53.66	20.66
23	2035			1.69	29.25	0.00	3.44		34.38	1.61	870.68	27.7	843.0	54.66	56.28	21.90
24	2036			1.69	30.70	0.00	3.44		35.82	1.66	913.66	28.5	885.2	57.36	59.02	23.20
25	2037			1.69	32.21	0.00	3.44		37.34	1.71	958.77	29.3	929.4	60.20	61.90	24.56
26	2038			1.69	33.81	0.00	3.44		38.93	1.76	1,006.12	30.2	975.9	63.17	64.93	26.00
27	2039			1.69	35.48	0.00	3.44		40.60	1.82	1,055.83	31.1	1,024.7	66.29	68.10	27.50
28	2040			1.69	37.23	0.00	3.44		42.35	1.88	1,107.99	32.1	1,075.9	69.56	71.44	29.09
29	2041			1.69	39.07	0.00	3.44		44.19	1.94	1,162.75	33.0	1,129.7	73.00	74.94	30.75
30	2042			1.69	41.00	0.00	3.44		46.13	2.01	1,220.23	34.0	1,186.2	76.61	78.62	32.49
31	2043			1.69	43.03	0.00	3.44		48.15	2.08	1,280.56	35.0	1,245.5	80.40	82.48	34.33
32	2044			1.69	45.15	0.00	3.44		46.84	2.16	1,343.89	36.1	1,307.8	84.37	86.53	39.69
33	2045			1.69	47.39	0.00	3.44		49.08	2.24	1,410.36	37.2	1,373.2	88.55	90.79	41.71
34	2046			1.69	49.73	0.00	3.44		51.42	2.29	1,480.14	38.3	1,441.9	92.93	95.21	43.79
35	2047			1.69	52.19	0.00	3.44		53.88	2.38	1,553.38	39.4	1,513.9	97.53	99.90	46.02
36	2048			1.69	54.78	0.00	3.44		56.47	2.48	1,630.26	40.6	1,589.6	102.35	104.83	48.36
37	2048			1.69	57.49	0.00	3.44		59.18	2.52	1,710.96	41.8	1,669.1	107.42	109.94	50.76
38	2048			1.69	60.33	0.00	3.44		62.02	2.56	1,795.67	43.1	1,752.6	112.74	115.30	53.27
39	2048			1.69	63.32	0.00	3.44		65.01	2.60	1,884.59	44.4	1,840.2	118.32	120.92	55.91
40	2048			1.69	66.46	0.00	3.44		68.15	2.64	1,977.93	45.7	1,932.2	124.18	126.82	58.67
41	2048			1.69	69.75	0.00	3.44		71.44	2.68	2,075.92	47.1	2,028.8	130.33	133.01	61.57
42	2048			1.69	73.21	0.00	3.44		74.90	2.72	2,178.77	48.5	2,130.3	136.79	139.51	64.61

FIRR 40%
NPV @ 10% 86



Table 4.2 provides an economic analysis of the project, for a 40-year time frame. The economic internal rate of return obtained was 15 percent and the NPV, at a 10 percent weighted average cost of capital, was US\$48 million.

Figure 4.1. Project Economic Analysis

Period	Years	Investments	Engineering & Administration	O&M	Opportunity cost of additional energy purchased from Itaipu for domestic consumption	Total costs	Incremental savings for loss reduction	Total increased energy sales with Project	Increased energy sales. Medium voltage consumers	Incremental energy sales. Transmission component	Total incremental energy sales with project	Total benefits (including increased energy sales and loss reduction)	Net benefits
		Million USD	Million USD	Million USD	Million USD	Million USD	Million USD	GWh	GWh	GWh	Million USD	Million USD	Million USD
1	2013	0.38	0.04			0.42							-0.42
2	2014	17.12	1.71			18.83							-18.83
3	2015	23.50	2.35			25.85							-25.85
4	2016	27.97	2.80	0.81	12.76	44.34	1.02	379.70	21.7	358.0	23.84	24.86	-19.48
5	2017	14.36	1.44	1.37	13.07	30.23	1.22	389.00	36.0	353.0	24.42	25.64	-4.59
6	2018	18.50	1.85	1.66	11.93	33.94	1.49	355.00	-6.0	361.0	22.29	23.78	-10.16
7	2019	2.28	0.23	2.03	13.07	17.61	1.84	389.06	17.2	371.8	24.43	26.27	8.66
8	2020			2.07	13.84	15.91	2.31	411.89	17.8	394.1	25.86	28.17	12.26
9	2021			1.97	14.65	16.62	2.35	436.07	18.3	417.8	27.38	29.73	13.11
10	2022			1.87	15.51	17.38	2.40	461.69	18.8	442.9	28.99	31.39	14.00
11	2023			1.78	16.42	18.20	2.43	488.82	19.4	469.4	30.69	33.12	14.92
12	2024			1.69	17.23	18.92	1.26	512.88	20.0	492.9	32.20	33.46	14.54
13	2025			1.69	18.08	19.77	1.28	538.12	20.6	517.5	33.79	35.07	15.30
14	2026			1.69	18.97	20.66	1.31	564.62	21.2	543.4	35.45	36.76	16.09
15	2027			1.69	19.91	21.60	1.33	592.42	21.8	570.6	37.19	38.53	16.93
16	2028			1.69	20.89	22.58	1.36	621.61	22.5	599.1	39.03	40.39	17.81
17	2029			1.69	21.92	23.60	1.39	652.24	23.2	629.1	40.95	42.34	18.73
18	2030			1.69	23.00	24.69	1.42	684.39	23.9	660.5	42.97	44.39	19.70
19	2031			1.69	24.13	25.82	1.45	718.13	24.6	693.6	45.09	46.54	20.72
20	2032			1.69	25.32	27.01	1.49	753.54	25.3	728.2	47.31	48.80	21.79
21	2033			1.69	26.57	28.26	1.53	790.71	26.1	764.6	49.64	51.17	22.91
22	2034			1.69	27.88	29.57	1.57	829.73	26.8	802.9	52.09	53.66	24.09
23	2035			1.69	29.25	30.94	1.61	870.68	27.7	843.0	54.66	56.28	25.33
24	2036			1.69	30.70	32.39	1.66	913.66	28.5	885.2	57.36	59.02	26.63
25	2037			1.69	32.21	33.90	1.71	958.77	29.3	929.4	60.20	61.90	28.00
26	2038			1.69	33.81	35.50	1.76	1,006.12	30.2	975.9	63.17	64.93	29.43
27	2039			1.69	35.48	37.17	1.82	1,055.83	31.1	1,024.7	66.29	68.10	30.94
28	2040			1.69	37.23	38.92	1.88	1,107.99	32.1	1,075.9	69.56	71.44	32.52
29	2041			1.69	39.07	40.76	1.94	1,162.75	33.0	1,129.7	73.00	74.94	34.18
30	2042			1.69	41.00	42.69	2.01	1,220.23	34.0	1,186.2	76.61	78.62	35.93
31	2043			1.69	43.03	44.72	2.08	1,280.56	35.0	1,245.5	80.40	82.48	37.76
32	2044			1.69	45.15	46.84	2.16	1,343.89	36.1	1,307.8	84.37	86.53	39.69
33	2045			1.69	47.39	49.08	2.24	1,410.36	37.2	1,373.2	88.55	90.79	41.71
34	2046			1.69	49.73	51.42	2.29	1,480.14	38.3	1,441.9	92.93	95.21	43.79
35	2047			1.69	52.19	53.88	2.38	1,553.38	39.4	1,513.9	97.53	99.90	46.02
36	2048			1.69	54.78	56.47	2.48	1,630.26	40.6	1,589.6	102.35	104.83	48.36
37	2048			1.69	57.49	59.18	2.52	1,710.96	41.8	1,669.1	107.42	109.94	50.76
38	2048			1.69	60.33	62.02	2.56	1,795.67	43.1	1,752.6	112.74	115.30	53.27
39	2048			1.69	63.32	65.01	2.60	1,884.59	44.4	1,840.2	118.32	120.92	55.91
40	2048			1.69	66.46	68.15	2.64	1,977.93	45.7	1,932.2	124.18	126.82	58.67
41	2048			1.69	69.75	71.44	2.68	2,075.92	47.1	2,028.8	130.33	133.01	61.57
42	2048			1.69	73.21	74.90	2.72	2,178.77	48.5	2,130.3	136.79	139.51	64.61

EIRR 15%
NPV @ 10% 48

ANNEX 5. BORROWER, CO-FINANCIER AND OTHER PARTNER/STAKEHOLDER COMMENTS

1. In March 2019, ANDE shared with the World Bank team its final project report. Its main findings are summarized in this annex. In May 2019, the World Bank team shared with ANDE a draft ICR document for its review. After reviewing the document, ANDE indicated that it did not have general nor specific comments.

Summary of ANDE's Final Report: Performance Evaluation during the Preparation and Implementation of the Operation and Lessons Learned

2. In general, the project indicators yielded results as envisaged or higher. For those indicators whose results were lower than expected, ANDE will continue the tasks that will enable to achieve the targets.

3. An objective evaluation of ANDE's performance indicates that, although at the beginning of the process, the performance was scarce and slow, it had a different impulse from March 2014, when the following measures were taken:

- (a) ANDE appointed a full-time project manager in charge of the PIU, with direct access to ANDE's executives, and a full-time technical assistant of the project manager.
- (b) All the areas of ANDE involved in project execution nominated specialists in the different disciplines to interact directly with the PIU.

4. The experience obtained allowed to obtain the following lessons applicable to expedite the execution of future projects:

- (a) Strengthen the staffing of the PIU, the Environmental Management Division, and, above all, the areas responsible for the elaboration of the technical specifications for the projects, instead of depending on part-time specialists who are also carrying out tasks associated with other projects.
- (b) Implement an institutional information system to carry out strict monitoring of the processes, including the financial, administrative, and hiring aspects, and their progress with respect to the expected deadlines. The project contracted consultancies for the provision of "systematic and orderly information to control and carry out the administrative and financial management of the project..." This systematization was carried out, and for later projects an 'Enterprise Resource Planning' software is expected to be incorporated to manage the abovementioned processes.
- (c) Create a unique database containing all the scanned information related to the projects, such as supervision mission reports, meeting minutes, notes received and forwarded, and reports prepared and received, among others.

Sustainability of the Achieved Results

- (a) ANDE aims to complete the outstanding works at the end of the closing date of the project in the foreseen deadlines and has made the budgetary and financial arrangements to cover the corresponding payment commitments.
- (b) No risks are identified that could affect the sustainability of the results achieved, taking into account that the institutional responsibility to provide reliable electricity services is guaranteed by the availability of technical personnel, equipment, and vehicles to operate and maintain the system.
- (c) In addition, ANDE has sufficient financial and budgetary coverage to fulfil its mission, resulting from its own funds and other sources of funding. In addition, ANDE continues to carry out numerous infrastructure works, according to its Investments Master Plan, which will complement the works executed under the project, to continue satisfying the requirements of the market and to fulfil its mission of "meeting the country's electrical energy needs...."

Conclusions

5. This was the first time that ANDE operated with the World Bank and the learning curve was slow at first. However, the quality of documents and the execution of tasks improved considerably with the guidance of the World Bank as well as the commendable efforts and the will of ANDE's staff to learn about the procurement rules of the World Bank.

6. The objectives of the project were adequate and most of them were achieved. The execution of the planned works allowed to fulfill the objectives of the Government to improve the quality of the electricity services.

7. The experience achieved by ANDE's staff involved in the project, in terms of management, administration, and execution, is a valuable contribution to ANDE, because this experience will be applied to other projects aimed at improving the quality of the electricity services.



ANNEX 6. SUPPORTING DOCUMENTS (IF ANY)

ANDE. Proyecto de Fortalecimiento del Sector Energético. Informe Final.



ANDE Proyecto de
Fortalecimiento del Se

ANNEX 7. CHANGES TO PROJECT COMPONENTS

Revised Components

1. The December 15, 2015, the Loan Agreement Amendment restructured the project components as follows:

Component 1: Modernizing ANDE's Distribution Management System and Installing an Advanced Metering System for Large Consumers

2. **Subcomponent 1.1.** The purchase and installation of (a) a SCADA operating system with an energy management system application, including the provision of training to ANDE's staff on its use, maintenance, and upgrading; (b) a fiber optic network; (c) active communication equipment for exchange of data from deployed remote terminal units to the SCADA operating system; (d) a wireless meshed network; and (e) a digital carrier equipment, all as part of ANDE's corporate communication system and real-time monitoring and secure operation power system.

3. **Subcomponent 1.2.** Installation of a 66 kV and 23 kV advanced metering system that allows remote consumption metering and disconnection or reconnection of ANDE's large customers.

Component 2. Improving the Performance of the Transmission Network

4. **Subcomponent 2.1.** Construction of two new substations below the existing transmission lines (excluding transmission line investments), including (a) the construction of a new 220/23 kV substation in the area of Barrio San Pedro in the Paraguayan District of Guajayvi and (b) the construction of a new 66 kV substation in the Paraguayan District of Minga Porá.

5. **Subcomponent 2.2.** (a) Modernization of seventeen (17) existing substations including the expansion of the transformation capacity of said substations (excluding transmission line investments) through the purchase and installation of 35 three-phase power transformers and (b) the purchase of (i) a mobile 66/23 kV–30 MVA substation, (ii) an 8x6 truck with modular trailer to transport power transformers, and (iii) a mobile 23 kV distribution center (a container with compact 23 kV cells and auxiliary operations support equipment).

6. **Subcomponent 2.3.** Purchase and installation of reactive power compensation equipment at the Guarambaré substation in the Paraguayan Central Department.

Component 3. Strengthening Paraguay's Electricity Sector and the Borrower's Institutional Capacity

7. **Subcomponent 3.1.** Provision of technical assistance for the analysis of the borrower's organizational structure and human resources needs.

8. **Subcomponent 3.2.** Institutional strengthening of the borrower's capacity in investment and project planning and implementation through, among others, (a) strategic support from international consultants with successful experience in the implementation of the supervisory control and data acquisition operating system with an energy management system application during the implementation of Part 1 of the project; (b) strengthening of the borrower's ESU through provision of best practices and methodologies and capacity building to ensure oversight of transmission investments under Part 1 and 2

of the project; and (c) strengthening of the borrower's financial and asset management practices, its internal auditing unit, and provision of external auditors for the project.

Other Changes

9. The December 15, 2015, Loan Agreement Amendment also modified the ESMF of the project to incorporate an overall Environmental Management Plan, dated November 20, 2015, for Component 1 and Subcomponent 2.2 of the project. It also postponed the closing date of the loan from December 31, 2015, to October 31, 2017.

10. The original project's total cost was US\$125 million of which the IBRD loan amount was US\$100 million and ANDE's counterpart funds totaled US\$25 million. ANDE's counterpart funds decreased from US\$25 million to US\$8.78 million because the market prices of goods and works turned out to be lower than originally expected and also because some of the works executed by ANDE were done after the project closing date (thus not accounted for). Other changes included reallocation among disbursement categories and modifications of the disbursements and the implementation schedules.

11. A new loan restructuring dated September 19, 2017, postponed the closing date of the loan from October 31, 2017, to October 31, 2018, and included a reallocation among disbursement categories. This extension, together with the lower prices than expected in various bidding processes, allowed to implement more activities than what was originally foreseen in the 2015 restructuring. Lower prices were due to an overall decrease of international prices for these types of goods, plus the fact some new players entered the market, bidding at significantly lower prices than what the Paraguay market was used to.

12. After restructuring, supervision missions took place in December 2017 and in May 2018, assessing the implementation progress of different project activities, including the status of the project's E&S management scheme, and the committed amounts and projected disbursements schedule.

13. The next supervision mission in September found that ANDE had not been able to start implementing some of the project's activities because of delays in the processing of budget reallocations by the Ministry of Finance. As the budget reallocation was processed in the second quarter of 2018, some of the proposed new activities were implemented, while others had to be cancelled as their implementation would have required more time than what was left of the project's implementation period. The World Bank and the PIU agreed to move forward with most of these activities, under ANDE's commitment to continue financing the implementation of any part of the activities that fell after the project closing date.

ANNEX 8. ENVIRONMENTAL AND SOCIAL COMPLIANCE

- 1. E&S.** The project triggered four environmental and two social safeguard policies: Environmental Assessment (OP/BP 4.01), Natural Habitats (OP/BP 4.04), Forests (OP/BP 4.36), Physical Cultural Resources (OP/BP 4.11), Indigenous Peoples (OP/BP 4.10), and Involuntary Resettlement (OP/BP 4.12). The E&S management instruments were prepared and consulted by ANDE and disclosed by ANDE and the World Bank according to the applicable World Bank requirements and national legislation, including an ESMF, an Indigenous Peoples Planning Framework, and a Resettlement Policy Framework. The works-specific instruments prepared during project implementation included Environmental and Social Impact Assessments and Environmental and Social Management Plans, the key content of which was incorporated in the bidding documents, and two RAPs for small plots of land to construct the new substations in San Pedro and Minga Porá. The Indigenous Peoples Plans did not materialize because indigenous peoples were not affected by the project works. The RAP for Minga Porá was not implemented because construction was finally to be in the area that already belonged to ANDE.
- 2.** The project's safeguards risk was rated Moderate throughout the implementation period and the performance was considered Moderately Satisfactory. The project investments in increasing the capacity of the existing substations and constructing two new substations in San Pedro and Minga Porá implied limited direct and no irreversible impacts. E&S management was supervised by ANDE with the support of two dedicated consultants and the supervision results were registered in bimonthly reports that provided a basis for systematic E&S monitoring. The Moderately Satisfactory safeguards performance was because of the challenges ANDE faced in securing timely compliance with E&S management in case of the Guarambaré and Minga Porá substations. Minga Porá works faced continued challenges with low E&S capacity/performance of the contractor, and a greater effort with support by the World Bank was needed to address the situation. All the other project-financed contracts were finalized in time in compliance with the applicable E&S requirements. Minga Porá works got overall delayed but reached an accumulated advance of 98 percent on March 2019. However, on April 2019, ANDE found that the mobile substation being installed in Minga Porá failed to comply with some technical specifications and the acceptance certification was therefore delayed. The contractor was given 30 days to deal with this problem. Works' closure in terms of E&S management is pending.
- 3.** Two RAPs were prepared. The RAP prepared for the San Pedro substation completed implementation in 2015 in satisfactory terms. Social management focused on communication with people living close to the work sites and implementation of a grievance redress mechanism that was generally effective in resolving claims that were mostly related to complementary works around the targeted substations.
- 4.** The World Bank supervision focused on a continued process of strengthening ANDE's E&S management capacity and covered processes, human resources, and equipment, and the same proved to be a key project result as ANDE expanded the use of the related project standards and instruments beyond the project-financed contracts. Strengthening the E&S practices and tools related particularly ANDE's consolidation of the Division of Environmental Management when the project-contracted E&S consultants were also incorporated in it. The reform eased various coordination and logistics/resource challenges that had affected the project's efficiency in E&S supervision and follow-up. The project added to ANDE's capacity especially in terms of (a) training and procurement of goods for improved E&S monitoring and supervision, including health and safety conditions at work sites; (b) improved coordination between the Division of Environmental Management and other technical areas in



supervision of contracted civil works; and (c) inclusion of strengthened environmental, health, and safety specifications in standard bidding documents. The World Bank also supported ANDE in preparation of an integrated waste management plan for its principal storage site in San Lorenzo that had faced a serious fire incident and consequent environmental penalties.