

TC Document

I. Basic Information for TC

▪ Country/Region:	PARAGUAY
▪ TC Name:	Supporting the Preparation and Implementation of Clean Energy Projects under PR-O0004 and PR-L1156
▪ TC Number:	PR-T1285
▪ Team Leader/Members:	Aiello, Roberto Gabriel (INE/ENE) Team Leader; Marzolf, Natacha (INE/ENE) Alternate Team Leader; Alarcon, Arturo (INE/ENE); Aoki, Issei (INE/ENE); Cabrera, Ruth Alicia (CSC/CPR); Correa Poseiro, Cecilia (INE/ENE); Marquez Barroeta, Fidel (INE/ENE); Mendoza Benavente, Horacio (LEG/SGO); Miguez Morais, Julia (VPS/ESG); Sawada, Emilio (INE/ENE); Snyder, Virginia Maria (INE/ENE); Suber, Stephanie Anne (INE/ENE); Villalba, Alberto Esteban (VPS/ESG)
▪ Taxonomy:	Operational Support
▪ Operations Supported by the TC:	PR-L1156, PR-T1264, PR-O0004, PR-L1173, PR-O0004, PR-L1156, PR-L1173
▪ Date of TC Abstract authorization:	15 Oct 2019.
▪ Beneficiary:	National Electricity Administration (ANDE)
▪ Executing Agency and contact name:	Inter-American Development Bank
▪ Donors providing funding:	Japan Special Fund(JSF)
▪ IDB Funding Requested:	US\$850,000.00
▪ Local counterpart funding, if any:	US\$0
▪ Disbursement period (which includes Execution period):	36 months
▪ Required start date:	February 2020
▪ Types of consultants:	Individual and consulting firms
▪ Prepared by Unit:	INE/ENE-Energy
▪ Unit of Disbursement Responsibility:	CSC/CPR-Country Office Paraguay
▪ TC included in Country Strategy (y/n):	Yes
▪ TC included in CPD (y/n):	No
▪ Alignment to the Update to the Institutional Strategy 2010-2020:	Productivity and innovation; Environmental sustainability

II. Description of the Associated Loan

- 2.1 This Technical Cooperation (TC) will be associated to the Conditional Credit Line for Investment Projects (CCLIP) PR-O0004 “Sustainable Energy Investments Program in Paraguay”, including its first operation PR-L1173: “Expansion of the High Voltage Transmission System and Energy Efficiency Actions”, as well as to operation PR-L1156: “Rehabilitation and Modernization Program for the Acaray Hydropower Plant”.
- 2.2 The general objective of the CCLIP is to contribute to the economic development of the country through a sustainable, reliable and efficient electricity supply. The specific objectives of the first operation (PR-L1173) are (i) to support the improvement of the reliability and efficiency of the electrical service through the expansion of the transmission system and the implementation of efficient technologies in transmission and distribution to minimize technical losses, and (ii) to improve energy efficiency in ANDE's (*Administración Nacional de Electricidad*) commercial buildings and public

lighting. The proposed amount for the CCLIP is US\$ 400 million and the total cost of its first operation is estimated at US\$165 million (IDB US\$70 million, Japan International Cooperation Agency-JICA, US\$85 million¹, ANDE US\$10 million). Subsequent investment projects under the CCLIP will be discussed with Government under the bi-annual programming exercise.

- 2.3 The general objective of the operation PR-L1156 is to contribute to the modernization of Paraguay's electricity sector through the financing of rehabilitation investments of ANDE's electric infrastructure. The specific objective is to support ANDE to rehabilitate and modernize the 214 Megawatts (MW) installed capacity of Acaray Hydroelectric Project (AHP), which is the only hydroelectric plant owned by ANDE, to contribute to: (i) extending its useful lifetime; (ii) improving its availability and reliability; and (iii) increasing its generation capacity. The sovereign guaranteed investment loan will support the short-term investment plan of the AHP with an expected execution of six years. The total cost of the program is estimated at US\$145.20 million (IDB US\$125 million, ANDE US\$20.20 million). The project is aligned with the Bank's "Sustainable Infrastructure for Competitiveness and Inclusive Growth" Strategy. The rehabilitation and modernization of the plant will be done considering the implementation of the latest technologies and will follow IDB's social and environmental safeguard policies.

III. Objectives and Justification of the TC

- 3.1 **Objective.** The objective of the proposed TC is to support ANDE in the preparation and implementation of clean energy projects under the PR-O0004, including its first operation PR-L1173, and the implementation of operation PR-L1156.
- 3.2 Paraguay has a power generation capacity of 8,814 Megawatts (MW) and a maximum demand of 3,481 MW (February 2019).² The National Interconnected System has 720 km of lines in 500 kilovolts (kV) and 4,600 km in 220 kV. The country has an electricity coverage of 99.1% (99.6% in urban areas and 96.0% in rural areas). The annual electricity demand in 2018 was 16,579 Gigawatt hours (GWh) with an average annual growth of 5.2% in the last five years and an average annual increase in the maximum power demand of 5.6%.^{3,4} Approximately 65% of the demand is concentrated in the central and metropolitan area, which are feed by transmission lines from Itaipú and Yacyretá. Securing supply considering such sustained growth in demand is a challenge for the country.
- 3.3 **Potential for Nonconventional Renewable Energy (NCRE) and Energy Efficiency (EE).** Almost 100% of the electricity supplied to the National Interconnected System (NIS) is hydroelectric with 98% generated in the binational hydropower complexes (Itaipú and Yaciretá) and 2% in Acaray (2018).⁵ On the other hand, although Paraguay has good potential for the development of NCRE, the use of these technologies has

¹ Co-financing with JICA has been requested (approval pending) in accordance with the Framework Agreement between IDB and JICA through CORE, subscribed on March 16th, 2012 and further amendments.

² Source: National Electricity Administration ([ANDE](#)).

³ [Annual Report 2017, ANDE](#). Electricity demand is concentrated mainly in residential customers (43.8%) and commercial, general and municipal customers (35.0%), and the rest is distributed among industrial, public lighting and others.

⁴ [Memoria Anual 2017, ANDE](#).

⁵ In the gross supply of primary energy, hydropower represents 60.9%. However, if seen from domestic energy demand, 44.2% corresponds to biomass, 40.1% to oil derivatives and electricity only 15.7%. [National Energy Balance 2017, Viceministry of Mines and Energy, August 2017](#).

not been extended. The country has an average solar irradiance of 1,725 kWh/m²/year⁶ which would allow its use mainly for residential generation or generation in isolated systems. It has stable winds that would allow energy generation especially in the northwest Chaco region and has livestock industry with good prospects for biogas projects. These technologies are presented as an option to electrify those populations that still do not have electricity and replace some very small isolated diesel generation systems that are currently under operation.⁷ These technologies would also contribute with Paraguay commitments, on the Paris Agreements framework, of reducing the consumption of fossil fuels by 20% and developing a sustainable energy matrix that includes NCRE. Likewise, there is a high potential to implement EE measures, both on the demand side (EE in buildings based on the age of the facilities and equipment), as well as on the supply side (loss reduction). Electrical losses are of 24.5% (2018), with 5.7% corresponding to transmission and 19.9% to distribution.

- 3.4 **Energy sector programs and requested support.** ANDE is updating its power sector development plan with: (i) an expansion program in high and very high voltage (estimated cost US\$ 650 million); (ii) an EE program; and (iii) potential renewable energy solutions in isolated populations. The CCLIP (PR-O0004) and its first operation (PR-L1173) will support the implementation of projects under this plan. In this line, ANDE requested comprehensive assistance from the Bank that will support: (i) the implementation of the investment project PR-L1173; (ii) the identification and preparation of subsequent investment projects under the CCLIP PR-O0004, including potentially small-scale innovative pilot projects; and (iii) the implementation of the investment project PR-L1156.
- 3.5 **IDB experience with ANDE.** The IDB has extensive knowledge of the sector and has been a strategic partner of ANDE. In recent years the Bank has financed: Multi-Phase Electric Transmission Program of ANDE - Phase I (1835 / OC-PR, US\$69 million) (2006) and Phase II (2891 / OC-PR, US\$50 million) (2012). More recently, a loan has been approved for the Rehabilitation and Modernization of the Acaray Hydroelectric Plant (PR-L1156, US\$125 million). In addition, the Bank is executing a non-reimbursable TC (ATN/OC-15910-PR) that includes technical support for the infrastructure modernization, energy access in isolated areas of the country and EE in public lighting.
- 3.6 **Strategic alignment.** The project is aligned with the Country Strategy with Paraguay 2019-2023 (GN-2958), particularly with the strategic objective of improving the coverage of quality infrastructure by improving the quality of the electricity service and expanding the use of NCRE. The project is consistent with the Institutional Strategy 2010-2020 (AB-3008) and is aligned with: (i) productivity and innovation; and (ii) Climate Change and environmental sustainability by encouraging the use of innovative technologies for a more efficient use of the energy and NCRE projects. Additionally, the project is aligned with the Sustainable Infrastructure Strategy for Competitiveness and Inclusive Growth (GN-2710-5), by contributing to the development of infrastructure that will help with climate change mitigation and promote access to electricity in isolated systems using NCRE. It is also aligned with the Energy Sector Framework (GN-2830-8) by contributing with the Energy sustainability pillar.

⁶ [Situación de Energías Renovables en el Paraguay. GIZ 2011.](#)

⁷ ANDE has some isolated systems like Bahía Negra of 0.2MW.

The project is aligned with Japan Quality Infrastructure Initiative (JQI) as the TC will support the preparation and implementation of loans that focus on promoting quality infrastructure by (i) considering cost-effective solutions that support the provision of efficient electricity services; (ii) contributing with infrastructure resilience against natural disasters by providing redundancies to the interconnected electric system and by modernizing Acaray Hydropower Plant; and (iii) fulfilling all IDB environmental and social safeguards.

IV. Description of activities/components and budget

- 4.1 The TC contemplates four components:
- 4.2 **Component I. Support project preparation (US\$420,000).** This component will finance (i) assessments to evaluate technical, economic, and environmental/social feasibility of new EE and clean energy projects; and (ii) preliminary design studies for the implementation of EE and clean energy projects. The outputs of this component will be studies and technical designs for the application of innovative technologies that will support the structuring of new sustainable infrastructure operations under PR-O0004, including environmental and social assessments of these projects. Proposed projects will be design considering the application of the latest technologies.
- 4.3 **Component II. Support project implementation (US\$ 320,000).** This component will finance activities to support the implementation of project under the CCLIP including the PR-L1173 that includes investments to promote sustainable energy in Paraguay such as transmission lines, EE on public buildings) and the PR-L1156 Rehabilitation and Modernization of the Acaray hydropower plant, including technical assistances, and implementation support to ensure the achievement of quality infrastructure. The outputs of this component will be diagnostics, designs, assessments, and supervision reports submitted.
- 4.4 **Component III. Support for the design and testing of innovative clean energy projects (US\$65,000).** This component will finance (i) the identification of innovative clean energy projects, such as floating and inland solar PV, to be tested within the premises of the Acaray Hydropower Complex owned by ANDE (ii) commercial and technical feasibility studies for a selected clean energy technology that could be used as a pilot project; and (iii) engineering designs and technical specifications for the procurement and construction of such project. The output of this component will be the designs and terms of references for the project concluded.
- 4.5 **Component IV. Knowledge dissemination (US\$20,000).** This component will finance knowledge dissemination events such as trainings on sustainable energy technologies and workshops to disseminate experiences and findings of the pilot project for ANDE's staff, the academic community and other energy sector stakeholders.
- 4.6 **Other costs (US\$25,000).** This amount will finance project management support costs which are not recurrent and are important and necessary for the support to ANDE and for the achievement of the outcome of this TC and the supported operations. The project management activities include the review of technical specifications, technical control of products delivered under the components, monitoring of the schedule and procurement plan.

Indicative Budget (in US\$)

- 4.7 The total amount of this Technical Cooperation is US\$850,000 that will be financed by the JQI⁸. The Table below summarizes the allocation of funding per component:

Table 1

Activity/Component	Description	IDB (JQI) (US\$)
Component I	Support project preparation	420,000
Component II	Support project implementation	320,000
Component III	Support for the design and testing of innovative clean energy projects	65,000
Component IV	Knowledge dissemination and execution support	20,000
Other costs	Project management support	25,000
TOTAL		850,000

V. Executing agency and execution structure

- 5.1 At the request of the beneficiary and in line with the Operational Guidelines for Technical Cooperation Products (GN-2470-2), the Bank will act as the executing agency for this TC. This condition has been established as a special circumstance considering that the benefited entity has limited operational capacity and workforce to execute properly, in time and manner the activities of this TC. The Bank will be responsible for the selection and contracting of consulting firms and individual consultants, which will be carried out in accordance with the policies for the selection of consultants (GN-2765-1) and the operational guidelines (OP-1155-4) for the contracting of consulting firms, and the human resources standards (AM-650) for the hiring of individual consultants. In addition, the Financial Management Guide OP-273-6 (GN-2811) will be applied. The initial procurement plan provides information on the contracts foreseen and their applicable monitoring and contracting methods. In accordance with the Technical Cooperation Policy (GN-2470-2), this TC is classified as an Operational Support product.
- 5.2 The technical responsibility will be of the Energy Division (INE/ENE), which will receive support from the IDB's Country Office in Paraguay (CPR). The focal point designated and responsible for executing this TC will be the Energy Principal Specialist, Roberto Aiello, with support from other ENE's energy specialists. ANDE has designated a technical focal point for the coordination with the Bank regarding the TC execution. The project team will be responsible for reporting annual progress, or completion report when applicable, by March 15 through the use of the Bank's system.
- 5.3 This TC will finance the execution of feasibility studies, design and pilot projects of EE and NCRE that will support ANDE's EE and electrification plan. The sustainability of this TC will be guaranteed by the continuation of ANDE's plan.

⁸ The donor has no objection to ANDE not including counterpart contribution to the TC.

VI. Major issues

- 6.1 The main risk is that due to the many projects from different development agencies ANDE is executing at the same time, there may not be enough technicians to review the technical documents for the implementation of the TC, and therefore may be potential delays on the approval or agreement of the activities and on the execution of the TC. This risk will be mitigated by involving the counterpart from the beginning of the execution of the TC, following up the exchange of the required information, providing technical support and discussing the project progress and schedule on a regular basis.

VII. Exceptions to Bank policy

- 7.1 No exceptions to Bank policies are requested.

VIII. Environmental and Social Strategy

- 8.1 This TC has no environmental or social implications because it is the elaboration of studies and operational support. The TC has been classified by ESG as category "B" because this is the classification of the associated loans. (See [Safeguard Policy Filter Report](#) and [Safeguard Screening Form](#)).

Required Annexes:

[Request from the Client_5549.pdf](#)

[Results Matrix_23911.pdf](#)

[Terms of Reference_30913.pdf](#)

[Procurement Plan_3130.pdf](#)