



Board of Executive Directors
For consideration
On or after 18 January 2017

PR-4473
3 January 2017
Original: Spanish
Public
Simultaneous Disclosure

To: The Executive Directors
From: The Secretary
Subject: Ecuador. Proposal for a loan for the "Program for the Reconstruction of Electricity Infrastructure in Areas Affected by the Earthquake in Ecuador"

Basic Information: Loan typeGlobal Multiple Works Operation (GOM)
Borrower Republic of Ecuador
Amount up to US\$60,000,000
SourceOrdinary Capital

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Remarks: This operation is not included in Annex III of document GN-2849, "2016 Operational Program Report", approved by the Board of Executive Directors on 3 March 2016. In Addition, its amount exceeds the ceiling established for Group D countries. Therefore, the operation does not qualify for approval by Simplified Procedure.

Reference: GN-1838-1(7/94), DR-398-17(1/15), GN-2849(3/16), PR-3838-1(12/14), DE-243/14, PR-4423(9/16)

DOCUMENT OF THE INTER-AMERICAN DEVELOPMENT BANK

ECUADOR

**PROGRAM FOR THE RECONSTRUCTION OF ELECTRICITY INFRASTRUCTURE
IN AREAS AFFECTED BY THE EARTHQUAKE IN ECUADOR**

(EC-L1219)

LOAN PROPOSAL

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ABBREVIATIONS

AIFk	Average Interruption Frequency Per Kva Installed
CGE	Contraloría General del Estado [Office of the Comptroller General of the State]
CME	Cambio de la Matriz Productiva [Energy Matrix Transition]
CNEL EP	Corporación Nacional de Electricidad Empresa Pública [National Electricity Corporation, Public Enterprise]
CUT	Cuenta Unica del Tesoro [Unified Treasury Account]
EDCs	Electricity distribution companies
ENPV	Economic net present value
eSIGEF	Sistema de Información de la Gestión Financiera [Financial Management Information System]
ESMF	Environmental and Social Management Framework
ESSs	Electrical substations
GWh	Gigawatt-hour
ICB	International competitive bidding
IRR	Internal rate of return
kV	Kilovolt
kVA	Kilovolt-ampere
MEER	Ministry of Electricity and Renewable Energy
NCB	National competitive bidding
NDN	National Distribution Network
NEC	Norma Ecuatoriana de la Construcción [Ecuadorian Construction Standards]
NPV	Net present value
PGA	Peak ground acceleration
PRIZA	Proyecto de Reconstrucción Integral de las Zonas Afectadas [Comprehensive Reconstruction Project for Affected Zones]
PTT	Program Technical Team
SENPLADES	Secretaría Nacional de Planificación y Desarrollo del Ecuador [National Planning and Development Department]
SIGPRO	Sistema de Información de Gestión de Proyectos [Project Management Information System]
STLs	Subtransmission lines
TITk	Total Interruption Time Per Kva Installed

PROJECT SUMMARY

ECUADOR PROGRAM FOR THE RECONSTRUCTION OF ELECTRICITY INFRASTRUCTURE IN AREAS AFFECTED BY THE EARTHQUAKE IN ECUADOR (EC-L1219)

Financial Terms and Conditions				
Borrower: Republic of Ecuador			Flexible Financing Facility^(a)	
			Amortization period:	25 years
Executing agency: Ministry of Electricity and Renewable Energy (MEER)			Original WAL:	15.25 years ^(b)
			Disbursement period:	3 years
			Grace period:	6 years ^(b)
Source	Amount (US\$)	%	Inspection and supervision fee:	(c)
IDB (Ordinary Capital)	60,000,000	86.66	Interest rate:	LIBOR-based
Local	9,234,000	13.34	Credit fee:	(c)
Total	69,234,000	100	Currency:	U.S. Dollars from the Ordinary Capital
Project at a Glance				
<p>Program objective and description: The overall objective is to improve electricity service by rebuilding electricity infrastructure in the earthquake-affected provinces of Esmeraldas, Manabí, and Santo Domingo, incorporating earthquake-resistant features. The specific objectives are as follows: (i) to help reestablish electricity supply in the subtransmission systems of electricity distribution companies affected by the earthquake; and (ii) to facilitate the reliable supply of electricity service to end users by implementing distribution projects.</p>				
<p>Special contractual conditions precedent to the first disbursement: The executing agency will provide evidence of the following, to the Bank's satisfaction: (i) signature and entry into force of a subsidiary agreement between the Ministry of Finance and the executing agency, indicating that the loan proceeds will be transferred to the program's codified account and recorded thereunder in a timely manner and used according to the terms and purposes agreed upon in the loan contract; (ii) approval by the Ministry of Finance of procurement guarantees under Components I and II; (iii) creation by the executing agency of a technical team for program execution, consisting (at a minimum) of a general coordinator, a procurement specialist, a financial specialist, a planning and monitoring specialist, an environmental specialist, and an electrical engineer; (iv) submission and entry into force of the Program Operations Manual approved by the MEER, including a frame of reference for environmental and social management of the projects, with tracking sheets; and (v) demonstration by the executing agency to the Bank's satisfaction that sufficient resources have been allocated to cover program execution, at least during the first calendar year (paragraph 3.2).</p>				
<p>Special contractual conditions of execution: Prior to starting the works under Components I and II, the executing agency will submit the following to the Bank: (i) evidence that an Environmental and Social Management Framework (ESMF) has been implemented for the program; (ii) a right-of-way maintenance plan; (iii) a mechanism for receiving complaints and grievances; (iv) a scrap metal management plan for electrical substations; (v) a plan for dismantling out-of-service subtransmission line infrastructure; (vi) a plan for the removal, transportation, storage, and final disposal of polychlorinated biphenyls (PCBs); and (vii) a plan for demarcating, fencing, and installing signage for the electrical substations targeted under the program. Prior to the start of the bidding process for the works, the executing agency will ensure that: (i) the bidding documents contain the social and environmental specifications for the projects, including requirements stemming from the issuing of permits and the ESMF; (ii) contracts with construction companies, contractors, and subcontractors include clauses referring to activities to mitigate and control social and environmental impacts; and (iii) these companies have environmental/social specialists, consistent with the specifications described in the ESMF (paragraph 2.4).</p>				
Exceptions to Bank policies: Not applicable				
Strategic Alignment				
Challenges:^(d)		SI <input checked="" type="checkbox"/>	PI <input type="checkbox"/>	EI <input type="checkbox"/>
Crosscutting themes:^(e)		GD <input type="checkbox"/>	CC <input type="checkbox"/>	IC <input type="checkbox"/>

^(a) Under the terms of the Flexible Financing Facility (FN-655-1), the borrower has the option of requesting changes in the amortization schedule as well as currency and interest rate conversions. The Bank will take operational and risk management considerations into account when reviewing such requests.

^(b) The maximum original weighted average life and grace period may be shorter, depending on the effective signature date of the loan contract.

^(c) The credit fee and the inspection and supervision fee will be established periodically by the Board of Executive Directors as part of its review of the Bank's lending charges, in accordance with relevant policies.

^(d) SI (Social Inclusion and Equality); PI (Productivity and Innovation); and EI (Economic Integration).

^(e) GD (Gender Equality and Diversity); CC (Climate Change and Environmental Sustainability); and IC (Institutional Capacity and Rule of Law).

I. PROJECT DESCRIPTION AND RESULTS MONITORING

A. Background, problem addressed, and rationale

- 1.1 **Background.** On 16 April 2016, an earthquake occurred measuring 7.8 on the moment magnitude scale,¹ with its epicenter in the areas of Cojimíes and Pedernales in the province of Manabí on Ecuador's coast. The intensity of the earthquake was greater in the northeast of the country, affecting 14 cantons² in the provinces of Manabí, Esmeraldas, and Santo Domingo.³
- 1.2 The earthquake and its aftershocks mainly affected more vulnerable areas, due largely to an expansion in the number of structures built to inadequate standards for areas of high earthquake risk (paragraph 1.11). The natural disaster killed 663 people and injured 4,859. More than 80,000 people were displaced, of whom around 30,000 were accommodated in shelters and refuges and 15,000 in foster homes, while the rest chose to migrate.⁴
- 1.3 Against this backdrop, the Ecuadorian government declared a 60-day state of emergency⁵ in the affected provinces through Executive Decrees [1001](#) and [1002](#) of 17 and 18 April 2016. The declaration mobilized central and institutional government bodies, the armed forces, the national police, and the decentralized autonomous governments of the affected provinces, with a view to taking action to tackle the emergency. Given the severity of the damage and the repeated aftershocks, on 15 July and 13 September 2016, the government issued Executive Decrees [1116](#) and [1191](#), which extended the state of emergency by 60 and 30 additional days, consecutively, in Esmeraldas and Manabí (the most affected provinces).
- 1.4 On 26 April 2016, the Government of Ecuador issued Presidential Decree [1004](#), establishing the Reconstruction and Productive Reactivation Committee. The committee is responsible for the construction and reconstruction of the infrastructure necessary to mitigate the impact of the earthquake. The decree also established a technical secretariat attached to the committee, responsible for cross-sector coordination of the following phases: (i) emergency, (ii) reconstruction, and (iii) reactivation. The emergency phase includes the immediate post-earthquake activities of rescue, health care, feeding, shelter, debris removal, and demolition of damaged structures. The Ministry for the Coordination of Internal and External Security was responsible for the execution of these actions, which were partially financed with US\$160 million in IDB funds under the Contingent Loan for Natural Disaster Emergencies (3670/OC-EC—part of the Contingent Credit Facility),

¹ A scale created in 1979 to avoid the limitations of the Richter scale. Unlike the Richter scale, the moment magnitude scale does not compare one earthquake with another, but instead calculates the absolute value of each event. The moment magnitude scale was developed to compare the values obtained from the seismic moment and the Richter scale.

² Muisne, Pedernales, Sucre, Manta, San Vicente, Bolívar, Rocafuerte, Chone, Jaramijó, Montecristi, Jama Portoviejo, Santo Domingo, and La Concordia.

³ According to a 10 June 2016 report by the Geophysics Institute of the National Polytechnic School, in the days following the event there were six aftershocks measuring between 6.0 and 6.7.

⁴ Bureau of Risks, status reports [65](#) and [71](#).

⁵ Constitutional mechanism under the authority of the president that establishes legal institutional procedures to protect the stability and security of the country or a particular area of the country in response to exceptional situations such as catastrophes, natural disasters, etc.

- disbursed on 22 April 2016. Operation 3751/OC-EC⁶—Emergency Program for an Immediate Response to the Earthquake in Ecuador—is supporting the transition from the emergency phase to the reconstruction phase by financing road and water and sanitation system rehabilitation works.
- 1.5 The second phase includes the construction and reconstruction of public infrastructure; comprehensive rehabilitation of public services; and planning and construction of housing for those affected. Execution of these activities falls under the responsibility of each lead ministry. Lastly, the third phase—involving the reactivation of production—includes the execution of production plans, programs, policies, and regulations; the reactivation of local and national employment; and financing for the affected areas.
- 1.6 **Macroeconomic and institutional impact.** According to the report “[Evaluación de los Costos de Reconstrucción: sismo en Ecuador \[Assessment of Reconstruction Costs: Ecuadorian earthquake\], April 2016](#),”⁷ prepared by the National Planning and Development Department (SENPLADES), the earthquake is expected to reduce GDP growth in the country by 0.7% in 2016. More than 21,823 jobs are estimated to have been lost in the affected areas and unemployment in the province of Manabí increased by 3.45%.
- 1.7 As part of the immediate response activities, the government enacted a “[law on citizen solidarity and co-responsibility for reconstruction and reactivation in the areas affected by the earthquake](#).” Its objective is to raise revenue through temporary taxes on wealth, profits, and earned income (between one and five days of wages depending on the level of income). The value added tax was also increased from 12% to 14%. As of 15 September 2016, the Internal Revenue Service reported that US\$791.2 million had been collected as a result of these measures.⁸ The government also signed a Rapid Financing Agreement with the International Monetary Fund,⁹ and allocated funds from the General Budget of the State.
- 1.8 **Ecuadorian electricity sector.** The Electric Utility Act ([LOSPEE](#)) stipulates that the Ministry of Electricity and Renewable Energy (MEER) is the lead agency for electricity sector policy and planning. The State-run enterprise Corporación Eléctrica del Ecuador is responsible for generation and transmission, while electricity distribution and marketing is carried out by 10 electricity distribution companies (EDCs). One of these is the State-run enterprise Corporación Nacional de Electricidad (CNEL EP), which consists of 11 business units.¹⁰ Operation and administration of the technical and commercial processes of the national interconnected power grid and international interconnections are the responsibility of the national electricity operator. The Electricity Regulation and Control Agency (ARCONEL) is the technical and administrative agency responsible for regulating

⁶ Operation EC-L1218 was approved by the Bank’s President on 28 September 2016.

⁷ Prepared using the Post Disaster Needs Assessment methodology, and with the support of the Economic Commission for Latin America and the Caribbean and the United Nations Development Programme.

⁸ <http://www.sri.gob.ec/web/guest/recaudacion-por-contribucion-solidaria>.

⁹ [International Monetary Fund, US\\$364 million, approved in July 2016](#).

¹⁰ The CNEL EP’s business units are as follows: Bolívar, El Oro, Esmeraldas, Guayaquil, Guayas-Los Ríos, Los Ríos, Manabí, Milagro, Santa Elena, Santo Domingo, and Sucumbíos.

and controlling activities related to public electric power utility and general street lighting services.

- 1.9 Electricity in the areas affected by the earthquake is distributed by CNEL EP through its subsidiaries CNEL EP-Esmeraldas, CNEL EP-Manabí, and CNEL EP-Santo Domingo. In 2015, these EDCs had 629,628 customers, with annual per capita electricity consumption of 936 kWh and 808 kWh in Manabí and Esmeraldas, respectively. For reference purposes, the number of electricity customers nationwide was 4,811,150, with average consumption of 1,162 kWh.¹¹
- 1.10 The MEER reports that most of the damage to the affected EDCs' electrical system involves subtransmission¹² and distribution infrastructure. An estimated 294,935 customers (47%) lost electricity service as a result of damage to: (i) 635 km of subtransmission lines (STLs); (ii) 7,149 km of medium- and low-voltage power grids; (iii) 22 electrical substations (ESSs); (iv) 854 transformers; and (v) 2 buildings and 14 electricity service agencies. Electricity not supplied as a result of the earthquake in the affected area is estimated to have reached 17 gigawatt-hours (GWh) (37%) over a one-month period, equivalent to losses of US\$1.8 million.
- 1.11 The damage that has affected the quality and reliability of electricity services was especially severe in the case of infrastructure in operation that was close to the end of its useful life. There was less damage to recently constructed infrastructure (2014-2015). According to the study "*Infraestructura Eléctrica Resiliente en Ecuador* [Resilient Infrastructure in Ecuador],"¹³ Ecuadorian construction standards (the NEC)¹⁴ include classifications of risk areas and parameters for the execution of civil works and structures, subject to earthquake-resistant criteria. The NEC recommends that for non-building structures—including electrical structures, which have a different dynamic behavior—additional special considerations should be applied. Specifically, the electricity sector has a list of technical specifications¹⁵ for works and equipment that includes design parameters based on peak ground acceleration (PGA). The aforementioned study shows that there is room for improvement in the supervision works contracted by the EDCs to ensure that electricity works comply with earthquake-resistant standards, as well as in the use of PGA values linked to seismic zoning in Ecuador.
- 1.12 The identified problem concerns earthquake-related damage to electricity subtransmission and distribution infrastructure, and fractured basic/essential electricity services in the provinces of Manabí, Esmeraldas, and Santo Domingo, which have led to unreliable electricity supply in these provinces. The magnitude of

¹¹ *Evaluación de los Costos de Reconstrucción: sismo en Ecuador* [Assessment of Reconstruction Costs: Ecuadorian earthquake], April 2016.

¹² Power transmission at 69 kilovolts (kV). The >138 kV transmission system was not affected.

¹³ The study, financed by the Inter-American Development Bank, also includes a proposal for the development of technical standards for the sector, based on prevailing practices in countries with similar seismic characteristics. The proposal includes: (i) the need to accredit test laboratories for construction materials and soil mechanics, to strengthen their performance and support oversight activities; and (ii) a review of current practices surrounding financial resilience in the electricity sector.

¹⁴ The scope of the study did not include verification of mandatory compliance with the NEC in the case of obsolete infrastructure. However, the study mentions that compliance with the 2002 updated NEC is mandatory, by executive decree.

¹⁵ *Unidades de propiedad* [Property units]: <http://www.unidadesdepropiedad.com/>.

these deficiencies can be seen in the following facts: (i) in terms of subtransmission, the average amount of power supplied fell from 85.58 GWh per month before the earthquake to 72.65 GWh afterwards; and (ii) in terms of distribution, the total interruption time per kilovolt-ampere (kVA) installed (the TITk index)¹⁶ rose from 17.68 hours per year before the earthquake to 25.24 afterwards, while the average interruption frequency per kVA installed (the AIFk index) remained at 13.5 outages per year before and after the earthquake.¹⁷

1.13 **Interventions in the affected areas.** Presidential Decree [1004](#) (paragraph 1.4) provides that the actions to construct and rebuild affected electricity infrastructure be executed through the MEER. These actions are structured into the following phases: (i) Immediate Response/Emergency Phase: consists of the immediate restoration of electricity services. With an allocation of US\$25 million under operation 3670/OC-EC,¹⁸ the electricity sector used resources for: (a) the mobilization of 200 groups of electricians and 796 technicians from the EDCs; (b) 35 contracts with suppliers of electrical goods and works; (c) 79 cranes, 42 aerial lift trucks and special vehicles; (d) 15 light towers; and (e) 40 generators and a mobile substation. As of 1 May 2016, the sector had provisionally restored 98.6% of electricity services under this phase; (ii) Reconstruction Phase: under this phase, a sector management team is responsible for developing the Comprehensive Reconstruction Project for Affected Zones (PRIZA). The estimated cost of the PRIZA is US\$103.4 million. It seeks to ensure the reliability of subtransmission and distribution systems in coordination with land management plans, by (i) constructing and reconstructing ESSs and STLs; (ii) constructing and reconstructing primary and secondary aerial distribution networks; (iii) upgrading administrative buildings, offices, and civil infrastructure; (iv) purchasing communication network infrastructure; and (v) undergrounding power cables in “ground zero” areas. The PRIZA will include technical recommendations (for immediate introduction) for the design and construction of electrical infrastructure based on earthquake-resistant standards; (iii) Economic Reactivation Phase: in the case of the electricity sector, there is no financing for this phase, which has an expected cost of US\$34 million. The goal of this phase is to prioritize the development of new electricity projects that support the area’s social, productive, and strategic development, giving priority to the use of local labor and materials.¹⁹

1.14 **Knowledge of the sector.** The Bank has accumulated considerable experience and lessons learned in the Ecuadorian electricity sector—the result of its support for the process of sector transformation under the Energy Matrix Transition (CME) initiative. The CME aims to improve electricity supply and service quality through the strategic exploitation of renewable resources. The Bank is supporting the CME through planned investments in the National Transmission Network and the National Distribution Network (NDN), with the financing of two operations for which execution was completed satisfactorily between 2014 and 2015 ([2608/OC-EC](#) and

¹⁶ Refers to the total amount of time (in hours per year) without service at the point of delivery.

¹⁷ Given that this is a weighted reference value that represents just one system in a case of a catastrophic event such as an earthquake.

¹⁸ Contingent Loan for Natural Disaster Emergencies (3670/OC-EC).

¹⁹ The MEER considers subtransmission, distribution, and street lighting projects, promoting energy efficiency.

[2457/OC-EC](#)), as well as five new operations that began execution in the same period. Of the latter, the operation “Support for the Transition of the Energy Matrix in Ecuador” ([3420/OC-EC](#)) was executed in full, while the others—the “National Transmission System Strengthening Program” ([3167/OC-EC](#)); the “Electrification Program for Rural and Marginal Urban Areas - II” ([3087/OC-EC](#)); and the “Program to Strengthen the National Electricity Distribution System of Ecuador I and II” ([3187/OC-EC](#), [3188/CH-EC](#), [3494/CH-EC](#) and [3494/OC-EC](#))—are expected to attain financial execution levels of 90%, 100%, 95%, and 76%, respectively, by the end of 2016.²⁰ In addition, the program “Investment Plan to Support the Transition of the Energy Matrix in Ecuador” ([3710/OC-EC](#), [3711/KI-EC](#)) was approved in August 2016; this includes initial support for critical reconstruction projects prioritized by the MEER, in addition to the contingent financing of the emergency phase (paragraph 1.4).

- 1.15 IDB support for the sector has helped generate good practices, resulting in a satisfactory level of execution in financed operations. These include: (i) the preparation of loans in close cooperation with executing agencies; (ii) projects selected for financing based on prioritization criteria; (iii) continuous strengthening of executing agencies; (iv) continuous interaction with executing agencies to facilitate understanding of the Bank’s procurement and monitoring procedures; (v) ongoing monitoring of outcomes by Ecuadorian government authorities; and (vi) the use of improved technical specifications for resilient infrastructure in the construction of electricity projects.²¹ All of these good practices are replicated in each of the Bank’s new loan operations for the sector in Ecuador.
- 1.16 In line with the CME targets, the outcomes expected from approved operations in execution to strengthen the NDN include²² (i) 18,505 households with new and/or improved electricity service in rural and marginal urban areas; (ii) 178 kilometers of STLs and 2,737 kilometers of distribution lines, new and/or upgraded; (iii) 78 new and/or upgraded electrical substations with 171 megavolts-amperes (MVA) of new capacity. These investments have helped to maintain and improve indicators and their sustainability, resulting in improved service quality indicators²³ and a reduction in total electricity losses of up to 12.2% nationwide in 2015.
- 1.17 **Rationale.** According to SENPLADES, total reconstruction costs in the areas affected by the earthquake will be US\$3.344 billion (3.5% of GDP), of which the public sector is expected to absorb 67% (US\$2.253 billion) and the private sector, 33% (US\$1.092 billion). Approximately 41% of damage figures pertain to the social sector, with the productive, infrastructure, and other sectors accounting for 31%,

²⁰ Physical execution is expected to reach 50%, 95%, 90%, and 34%, respectively, by the end of 2016.

²¹ Improvements in executing Bank projects in the electricity sector are partly due to the following actions: (i) detailed knowledge of national and sector priorities; (ii) an in-depth understanding of government processes for selecting projects for financing; (iii) close coordination with sector authorities in due diligence processes for new funding; and (iv) considerable work prior to approving loan operations, to accelerate project execution.

²² In addition to financing infrastructure, the Bank is supporting the CME through a programmatic operation ([3420/OC-EC](#), first tranche approved in 2015). This operation reflects the priority decision issued by the National Planning and Development Department (SENPLADES) supporting execution of the National Distribution Network Strengthening Program and facilitating CME implementation.

²³ TITk=7.17; and AIFk=8.27. Results obtained during the 2015 rolling year.

- 26%, and 2%, respectively. In the infrastructure sector,²⁴ reconstruction costs amount to US\$862.2 million, of which US\$103.4 million pertain to the electricity system.
- 1.18 The effective execution of Bank-financed investments supporting the CME has been essential for this sector. The Ecuadorian government therefore wishes to have Bank support in moving ahead with the financing of projects to rebuild electrical infrastructure (paragraph 1.4), so as to ensure the quality and reliability of the service and the use of best practices in earthquake-resistant infrastructure in the affected areas. The proposed operation aims to rebuild damaged electrical infrastructure,²⁵ helping to establish conditions to facilitate implementation of the next phase of economic reactivation.²⁶ This program does not overlap with the Bank's support for the emergency phase or with the reallocation of budgetary resources by the government (paragraph 1.4); instead, it focuses on the next phase of the electricity sector's infrastructure reconstruction.
- 1.19 **IDB Country Strategy with Ecuador (2012-2017) (document GN-2680).** The program is aligned with the Bank's country strategy with Ecuador 2012-2017 as it facilitates adequate energy supply and the recovery of reliable access to electricity by rebuilding the electrical infrastructure affected by the earthquake, with better standards of quality and earthquake resistance, given that electricity is essential to the progress of the recovery of basic services—health, housing, and food—as well as for the timely takeoff of the economic reactivation phase, which is expected to reduce the negative impact of the earthquake on the area's economic growth (paragraph 1.5).
- 1.20 **The program is consistent with the Update to the Institutional Strategy 2010-2020 (document AB-3008),** and is aligned with the development challenge of social inclusion and equality: it provides project financing for the electrical infrastructure reconstruction phase, thus ensuring that earthquake-affected communities have access to electricity. The reconstruction process is coordinated

²⁴ The infrastructure sector groups damages in the following subsectors: electricity, telecommunications, water and sanitation, and transportation.

²⁵ The effectiveness of the selected intervention is based on similar intervention experiences: (i) The [Electricity Distribution Rehabilitation Project in Turkey](#) (World Bank) sought to improve the reliability of the distribution network by rehabilitating and expanding it in seven regions in the country, resulting in the construction of new substations and distribution lines, measured by reductions in the frequency of outages (from an average of 12,147 in 2006 to 4,353 in 2011) and the duration of those outages (from an average of 6,407 hours per region in 2006 to 3,214 hours in 2011). (ii) The objective of the [Transmission, Distribution and Disaster Reconstruction Project in Vietnam](#) (World Bank) was to strengthen the transmission and distribution grid by building new transmission and distribution lines and substations. It resulted in a strengthened 500-kV transmission line, measured by a reduction in the power deficit in the south of the country (increased power supply from 1,300/1,400 MW in 1998 to 2,200 MW in 2014) and a reduction in losses from 21.4% in 1995 to 11.8% in 2005 (there was no improvement in the interruption duration index due to the impact of the rapid increase in load factor). This type of project is also similar to Bank interventions in other countries, such as the Bank's Response to the Earthquake in Haiti (document GN-2556) and its practice of participating in the reconstruction of damaged infrastructure following natural disasters (Evaluation of the Bank's policy and operational practice related to natural and unexpected disasters, document RE-292).

²⁶ The studies referred to in the previous footnote are presented for the purposes of internal validity, with the qualification that the effects are not completely attributable to that program, given the parallel execution of other projects at the same time in Turkey; furthermore, the effects are not attributable given the execution of another project by the European Investment Bank.

with land management plans that mitigate risks to inhabitants currently living next to electrical infrastructure. In addition, the program is aligned with the Corporate Results Framework (CRF) (document GN-2727-6), through the auxiliary indicator “distribution and transmission lines installed or upgraded.”

1.21 The program is consistent with the Energy Sector Framework (document GN-2830-3) in the thematic areas of energy access and security, since it finances projects that: (i) facilitate the recovery of quality electricity service for affected users; and (ii) help to ensure electricity supply and reduce the time taken to restore services following natural disasters. Similarly, the program is aligned with the priority areas of the Strategy of Sustainable Infrastructure for Competitiveness and Inclusive Growth (document GN-2710-5), because it finances the rehabilitation of subtransmission and distribution infrastructure in earthquake-affected areas, thus ensuring access to reliable electricity services that help to improve beneficiaries’ quality of life.

1.22 **Public Utilities Policy (document GN-2716-6).** The program is consistent with the pillars of the Public Utilities Policy, since it fulfills the following conditions: (i) financial sustainability: the projects financed under the program are financially sustainable because (a) electricity rates cover asset operation and maintenance costs, and (b) the projects help to improve electricity billing and collections by improving the quality and reliability of services, thus reducing energy losses and service interruptions; (ii) economic evaluation: the selection of the portfolio of projects to be financed is based on a strict financial, economic, and technical feasibility analysis (paragraph 1.28) (see [Program justification under the Public Utilities Policy, document GN-2716-6](#)). The sector is consistent with the principles of support for basic needs, transparency, financial sustainability, and an effective institutional framework, since it has clearly defined: (i) the separation of roles between the MEER (as lead agency), the Electricity Regulation and Control Agency (as regulator), and the generation, transmission, and distribution companies; (ii) private participation in electricity generation; (iii) the reform of public enterprises to improve their management; and (iv) rate adjustments to ensure the system’s operation and maintenance, and contributions from the Ecuadorian government to ensure the sector’s expansion.

B. Objective, components, and cost

1.23 **Objective.** The overall objective is to improve electricity service by rebuilding electricity infrastructure in the earthquake-affected provinces of Esmeraldas, Manabí, and Santo Domingo, incorporating earthquake-resistant features. The specific objectives are as follows: (i) to help reestablish electricity supply in the subtransmission systems of electricity distribution companies affected by the earthquake; and (ii) to facilitate the reliable supply of electricity service to end users by implementing distribution projects.

1.24 **Beneficiaries.** Approximately 295,000 dwellings (1.26 million people) located in the provinces of Esmeraldas, Manabí, and Santo Domingo will benefit from reestablished and/or improved electricity service under the program.

1.25 **Component I. Comprehensive reconstruction plan for the 69-kV electrical power subtransmission system (US\$47.18 million).** This component will finance the relocation/reconstruction of 27 subtransmission projects with improved earthquake-resistant features: (i) 7 projects in the province of Esmeraldas, with

28 km of STLs and 5 substations (including the Propicia-Atacames and Santas Vainas-Las Palmas STLs and the Atacames and Tonsupa substations); (ii) 12 projects in the province of Manabí, with 107 km of STLs and 8 substations (including the Rocafuerte-Tosagua and Tosagua-San Vicente STLs and the San Vicente, Bahía, and Playa Prieta substations); and (iii) 8 projects in the province of Santo Domingo, with 35 km of STLs and 5 substations (including the San Vicente-Jama and Sesme-Flavio Alfaro STLs and the Pedernales and Jama substations).

- 1.26 **Component II. Comprehensive reconstruction plan for the electrical power distribution system (US\$20.91 million).** This component will support the reconstruction of electrical power distribution infrastructure with improved earthquake-resistant features, contributing to the reliability of the NDN in all of its functional stages (through to the end user). Financing will be provided for the reconstruction of 26 distribution system projects (13.8 kV/0.22 kV) in affected population centers and outlying areas, consisting of: (i) 6 projects in the province of Esmeraldas (including 13.8-kV feeder lines belonging to the El Salto-Atacames subsystem and the strengthening of the Borbón-Cacagual and Rocafuerte-Lagarto systems); (ii) 9 projects in the province of Manabí (including the reconstruction of feeder lines for the Calceta, San Vicente, and Bahía substations, the reconstruction/repowering of distribution feeders in the canton of Portoviejo, and strengthening of the distribution system in Manta); and (iii) 11 projects in the province of Santo Domingo (including reconstruction of the Pedernales Centro feeder and the Palmares and Jama-San Isidro distribution subsystems).
- 1.27 **Cost and financing.** The estimated cost of the program is US\$69.234 million, of which US\$60 million will be financed by the Bank from its Ordinary Capital (OC) in U.S. dollars, and US\$9.234 million will be financed by local counterpart funds.²⁷

Table 1. Program costs (US\$)

COMPONENTS	FINANCING		TOTAL
	(OC)	LOCAL	
C.I. Comprehensive reconstruction plan for the electrical power subtransmission system	41,393,000	5,795,000	47,188,000
C.II. Comprehensive reconstruction plan for the electrical power distribution system	18,347,000	2,569,000	20,916,000
Program administration	260,000	870,000	1,130,000
Monitoring	-	168,000	168,000
Program technical team	-	666,000	666,000
Midterm and final evaluations	110,000	15,000	125,000
External audit	150,000	21,000	171,000
TOTAL	60,000,000	9,234,000	69,234,000

- 1.28 **Economic and financial analysis.** An analysis demonstrating the viability of the investments was carried out for each of the projects in a representative sample of

²⁷ Counterpart funds cover the program's eligible administration and operation expenses as well as value added taxes where necessary (documents GN-2331-5 and CC-6004-2).

- 24 projects under the program's two components (see [Program Cost-Benefit Analysis](#)). Project returns were evaluated at market and efficiency prices using shadow pricing. With a 12% discount rate, the economic evaluation of the program yields an economic net present value (ENPV) of US\$389.4 million. The program's internal rate of return (IRR) is 50.6%. The market price analysis yields an IRR of 20.2% and a net present value (NPV) of US\$55.9 million.
- 1.29 A sensitivity analysis was carried out based on a +/-15% variation in the following parameters: (i) investment; (ii) growth; (iii) electricity sales price; (iv) electricity purchase price; (v) cost of energy not supplied; (vi) price elasticity of demand; (vii) load factor; and (viii) economic cost of generation. The parameters with the highest sensitivity are: (i) the electricity sales price, which yields variations of $\Delta\text{NPV}=\text{US}\22.3 million and $\Delta\text{ENPV}=\text{US}\77.9 million; (ii) growth, which results in $\Delta\text{NPV}=\text{US}\19.9 million and $\Delta\text{ENPV}=\text{US}\94.7 million; and (iii) price elasticity of demand, which generates a difference of $\Delta\text{ENPV}=\text{US}\65.4 million.

C. Key outcome indicators

- 1.30 **Detailed Results Matrix.** The program's Results Matrix presents the overall objective, the specific objectives, and the outputs associated with achieving program outcomes. The expected outcomes are as follows: (i) to help reestablish electricity supply in the subtransmission systems of electricity distributors affected by the earthquake; and (ii) to facilitate reliable electricity service to end users by implementing distribution projects.

II. FINANCING STRUCTURE AND MAIN RISKS

A. Financing instruments

- 2.1 The program is structured as a multiple-works investment loan, justified by the fact that the projects are independent of each other but physically similar and meet eligibility criteria. Of the 53 projects evaluated, 43% have final designs, equivalent to 49% of the program amount.²⁸ The program's procurement processes are described in the procurement plan. The eligibility criteria are that the project: (i) has been prioritized by the MEER and the Technical Secretariat of the Reconstruction and Productive Reactivation Committee; (ii) contributes to the reconstruction phase for damaged electrical infrastructure; (iii) contributes to improving the quality of electricity service and strengthening the 220-V NDN; (iv) complies with the Bank's social and environmental safeguard policies;²⁹ and (v) complies with economic and financial assessment criteria as set forth in the Public Utilities Policy (paragraph 1.28). Resources will be disbursed over three years.

²⁸ There is technical information available for all projects under the program. However, to ensure that bidding documents can be prepared for execution to begin immediately, the projects were evaluated based on the completeness of such information, as follows: (i) total compliance: projects for which all technical and environmental documents are available; (ii) substantial compliance: projects for which most technical and environmental documents are available; and (iii) partial compliance: projects that require final approved technical and environmental documents. Pending information for projects in the second and third groups is being prepared by the MEER and is expected to be ready when program execution begins. Based on the level of information presented, the execution period has been set at three years (2017-2019). See [Technical Feasibility Report](#).

²⁹ [Environmental and Social Management Report \(ESMR\)](#).

Table 2. Disbursement projection (U.S. dollars)

Source	Budget	2017	2018	2019
Ordinary Capital	60,000,000	37,887,751	21,491,331	620,918
TOTAL Bank:	60,000,000	-	-	-
Counterpart	9,234,000	2,733,312	6,100,110	400,579
TOTAL:	69,234,000	40,621,063	27,591,441	1,021,497

B. Environmental and social risks

2.2 This operation has been classified under Category B in accordance with both directive B.13 of the Environment and Safeguards Compliance Policy (Sector Policy OP-703) and the [Social and Environmental Analysis](#), and based also on the sample of projects under the program (paragraph 3.6). Social and environmental impacts, for which there are effective mitigation measures used in the electrical infrastructure sector, are expected to be localized, temporary, and short-term in nature. Possible negative social and environmental impacts would mainly occur during the reconstruction phase³⁰ and, to a lesser extent, during operation. In the case of the STL construction to be financed, (i) this does not require the creation of new rights-of-way (except where STLs are relocated for the purposes of safety and maintenance); and (ii) the designs are flexible in relation to the current land-use plan. In the case of substation works, part of the works will be carried out on existing facilities (activities to replace equipment and structures), in addition to civil works where new substations are to be built. Involuntary resettlement or economic displacement are not expected in any case (STLs or substations). The works generally seek to reduce negative impacts and social and environmental risks, as well as the radius of influence and duration of these risks and impacts. With respect to the risk of natural disasters (Disaster Risk Management Policy, Sector Policy OP-704), this operation is classified as high risk given that the infrastructure works are located in an area that is exposed to seismic events of high magnitude. Nonetheless, the program itself represents a great opportunity since the works will include the use of good practices and improved standards for earthquake resistance. The necessary provisions will be included in the Environmental and Social Management Framework (ESMF) developed for works under the program.

2.3 The program will generate positive impacts by improving the reliability and quality of electricity supply and enhancing the population’s safety. The reconstruction and/or relocation of STLs will help to reduce risks associated with the exposure of communities to subtransmission infrastructure, with the inclusion of alternative routes in the designs to avoid the need for lines to pass directly over human settlements.

2.4 **Special contractual clauses relating to execution.** Prior to the start of the works under Components I and II, the executing agency will submit the following to the

³⁰ These include (i) a worsening of air quality owing to uncontrolled emissions of particulate matter into the atmosphere from reconstruction work; (ii) noise in the vicinity of the construction sites, due to the operation of construction machinery and equipment and the installation of towers; (iii) the production of liquid, solid, and gaseous waste; and (iv) an increased risk of accidents due to the presence of machinery, inadequate disposal of debris or materials, or a lack of signage at construction sites.

Bank: (i) evidence that an ESMF has been implemented for the program; (ii) a right-of-way maintenance plan; (iii) a mechanism for receiving complaints and grievances; (iv) a scrap metal management plan for electrical substations; (v) a plan for dismantling out-of-service subtransmission line infrastructure; (vi) a plan for the removal, transportation, storage, and final disposal of polychlorinated biphenyls (PCBs); and (vii) a plan for demarcating, fencing, and installing signage for the electrical substations targeted under the program. Prior to the start of the bidding process for the works, the executing agency will ensure that: (i) the bidding documents contain the social and environmental specifications for the projects, including requirements stemming from the issuing of permits and the ESMF; (ii) contracts with construction companies, contractors, and subcontractors include clauses referring to activities to mitigate and control social and environmental impacts; and (iii) these companies have environmental/social specialists, consistent with the specifications described in the ESMF.

C. Fiduciary risks

- 2.5 According to the project completion report for operation 2608/OC-EC, the MEER's performance in the execution of the operation was favorable. However, given the level of coordination necessary to execute the program, opportunities were identified to improve accountability processes through financial and procurement reports. Improvements will be implemented by: (i) replicating the best practices identified in the execution of previous operations; (ii) using the Integrated Project Management System (SIGPRO) as the main method to support communications and monitoring of financing programs executed by the MEER; and (iii) continuing the IDB's training and support workshops for the executing agency. The identified risks are considered to be medium and are associated with delays in the transfer of loan proceeds from the Ministry of Finance to the executing agency, as well as delays in complying with the procurement plan due to a lack of program procurement guarantees,³¹ thus affecting execution periods. Mitigation measures include a condition precedent to the first disbursement that provides for a subsidiary agreement and approval of the respective guarantees (Annex III).
- 2.6 Identified procurement risks involve a lack of interest in the market in responding to bid solicitations and a failure to comply with the procurement plan. To mitigate these risks, it is proposed that the General Procurement Notice be published in a timely manner, and that early approval of procurement guarantees under the program be obtained from the Ministry of Finance. The IDB will oversee bidding through ex ante review in the case of works exceeding US\$3 million, goods over US\$250,000, consulting services over US\$200,000, and over US\$50,000 for individual consultants. All others will be reviewed ex post.

D. Execution risks.

- 2.7 The identified risks are considered to be medium, and concern the following: (i) geotechnical uncertainty in the targeted areas; and (ii) an inability to execute

³¹ Pursuant to Ministerial Agreement 149 of 13 April 2015, the Ministry of Finance is required to prioritize and optimize public investment in procurement processes. This applies to all government agencies and institutions as well as public enterprises. Before budget certification is issued, and in order to start the contracting processes, these entities will request that the Ministry of Finance issue the procurement guarantees.

works due to natural and anthropogenic phenomena. To mitigate these risks, the executing agency will conduct soil mechanics studies before beginning construction in projects that require them, and it will propose the execution of priority works as part of the National Contingencies Plan.

E. Other special considerations and risks

- 2.8 **Sustainability of investments.** The program will finance the reconstruction of electrical power subtransmission and distribution infrastructure affected by the earthquake in Ecuador. The operation and maintenance costs for this infrastructure are covered by electricity rates.³² Inasmuch as the program is being prepared as a multiple works operation, an evaluation of the projects' technical feasibility was conducted (paragraph 2.1). The projects' technical sustainability includes improved design criteria based on earthquake-resistant standards according to the recommendations of the "Resilient Electrical Infrastructure in Ecuador" study (paragraph 1.13), as well as a series of social and environmental measures to be implemented prior to the execution of the works. As part of the evaluation, a rigorous [economic and financial feasibility analysis](#) of the projects was conducted in parallel to determine their sustainability; a sensitivity analysis was also completed (paragraph 1.28 and paragraph 1.29).

III. IMPLEMENTATION AND MANAGEMENT PLAN

A. Summary of execution arrangements

- 3.1 The executing agency is the MEER (paragraphs 1.8 and 1.10), as the entity responsible for executing the actions coordinated by the Technical Secretariat of the Reconstruction and Productive Reactivation Committee for the sector in the affected areas. This committee is responsible for cross-sector coordination with all actors in the national and international public and private sectors, for the development of plans, programs, and projects for the reconstruction and productive reactivation of areas affected by the earthquake.³³ In the electricity sector, the committee coordinates all reconstruction activities through the MEER. In executing this program, the MEER will use similar execution arrangements to those agreed upon under operations 2608/OC-EC, 3087/OC-EC, 3187/OC-EC, 3188/CH-EC, 3494/OC-EC, 3494/CH-EC, 3710/OC-EC, and 3711/KI-EC. With support from the program's technical team, this includes (i) the coordination and approval of contracting processes in the procurement plan and requests for the Bank's no objection therefor; (ii) budgetary management of program resources; (iii) financial management; (iv) program planning and monitoring; and (v) monitoring of the environmental and social management plan. The MEER will also receive technical assistance from the National Electricity Corporation's business units for Esmeraldas, Manabí, and Santo Domingo, which provide electricity service in the affected areas and have the capacity to ensure the operation and maintenance of the electrical infrastructure. In view of the MEER's experience with the operations

³² Pursuant to the Electric Utility Act (LOSPEE), consumer or end user rates are based on the costs of generation, transmission, distribution, and marketing, as well as general street lighting. Electricity rate schedules are required to observe principles of solidarity, equity, cost coverage, and energy efficiency, as well as principles of social and environmental responsibility.

³³ Consistent with the responsibilities established in [Presidential Decree 1004](#).

mentioned above, and based on the design of the program management documents, the planned execution period is three years (paragraph 2.1).

- 3.2 The following conditions precedent to the first disbursement have been identified: **(i) signature and entry into force of a subsidiary agreement between the Ministry of Finance and the executing agency, indicating that the loan proceeds will be transferred to the program's codified account and recorded thereunder in a timely manner and used according to the terms and purposes agreed upon in the loan contract; (ii) approval by the Ministry of Finance of the procurement guarantees under Components I and II; (iii) creation by the executing agency of a technical team for program execution, consisting (at a minimum) of a general coordinator, a procurement specialist, a financial specialist, a planning and monitoring specialist, an environmental specialist, and an electrical engineer; (iv) submission and entry into force of the Program Operations Manual approved by the MEER, including a frame of reference for environmental and social management of the projects, with tracking sheets; and (v) demonstration by the executing agency to the Bank's satisfaction that sufficient resources have been allocated to cover program execution, at least during the first calendar year.**
- 3.3 **Program Operations Manual.** The program must have procedures and eligibility criteria clearly established in the Operations Manual (paragraph 2.1), including an extensive system for monitoring and evaluating actions and outcomes. Approval of the manual by the MEER and its entry into force are a special condition precedent to the first disbursement (paragraph 3.2). This document will establish that it is the executing agency's responsibility to use its own financing to complete designs and information for the remaining projects under the program (paragraph 1.28).
- 3.4 **Procurement plan and policies.** A procurement plan has been agreed upon for the first 12 months of execution. The executing agency will update the procurement plan annually to coincide with annual evaluations and before the end of each calendar year, or whenever substantial changes occur. An execution and monitoring system to be determined by the IDB will be used to update the procurement plan. The procurement of goods, works, and consulting services will be conducted pursuant to policy documents GN-2349-9 and GN-2350-9, respectively.
- 3.5 **Disbursements and advances of funds.** Disbursements will be made in the form of advances of funds reflecting estimated program liquidity needs (based on the [annual work plan](#) and the [procurement plan](#)). These will be justified in each request, when at least 80% of the balance of advances has been executed. The programming of cash requirements will have a moving horizon of 12 months, and advances will cover needs for six months of execution.
- 3.6 **Retroactive financing and recognition of expenditures.** Given that these projects are required to reestablish an essential public service for the affected population, and that considerable technical and coordination efforts will be needed for their swift execution (see [Retroactive financing and recognition of expenditures under program EC-L1219](#)), the Bank may, at the request of the MEER, retroactively finance up to US\$18 million (30% of the loan) against the loan proceeds. It may also recognize as part of the local contribution up to US\$2.77 million (30% of the local contribution) in

- eligible expenditures³⁴ incurred by the executing agency for advance procurement and progress on project works prior to the loan approval date, provided that requirements substantially analogous to those established in the loan contract were met. Such expenditures must have been made on or after 11 October 2016 (when the project profile was approved). Expenditures incurred more than 18 months prior to loan approval will not be eligible.
- 3.7 During the due diligence process for the program, the current process used for the early launch of reconstruction works funded by the MEER with government funds was reviewed. It was confirmed that the portfolio of projects constitutes part of the portfolio approved by the Technical Secretariat for Reconstruction; that monitoring of and financial reporting on projects in execution is carried out using SIGPRO; and that bidding processes are based on national procedures acceptable to the Bank.
- 3.8 **Audit.** External audit services for the program will be provided by a firm of external auditors acceptable to the IDB, to be paid from the loan proceeds and contracted based on terms of reference agreed upon with the executing agency.
- B. Summary of arrangements for results monitoring**
- 3.9 **Monitoring arrangements.** The IDB team will conduct periodic technical visits in coordination with the executing agency in order to review the progress of works and make adjustments based on execution. Fiduciary oversight visits will be conducted once a year. External audits of accounting and operations are planned to validate the use of loan proceeds and the internal operational controls and processes to be implemented by the executing agency. The information compiled will be analyzed every six months and the monitoring and progress report will be prepared on an annual basis (see [Monitoring and Evaluation Plan](#)).
- 3.10 **Evaluation arrangements.** Program evaluation includes one midterm evaluation and one final evaluation, financed by the executing agency from loan proceeds. The executing agency will commission the midterm evaluation within a maximum of two months after 50% of the loan proceeds are committed, and the final evaluation after 95% of the loan proceeds are disbursed, or as indicated in the Bank's applicable guidelines for preparing evaluations. The final evaluation will determine the level of attainment of the targets established in the Results Matrix. The executing agency will present semiannual and annual reports in accordance with the program's Monitoring and Evaluation Plan.

³⁴ Eligible expenditures are those that satisfy requirements substantially analogous to those established in the loan contract concerned.

Development Effectiveness Matrix			
Summary			
I. Strategic Alignment			
1. IDB Strategic Development Objectives	Aligned		
Development Challenges & Cross-cutting Themes	-Social Inclusion and Equality		
Regional Context Indicators			
Country Development Results Indicators			
2. Country Strategy Development Objectives	Aligned		
Country Strategy Results Matrix	GN-2680	i) Reduce social and environmental vulnerability to risks posed by natural and man-made processes; ii) Create a long-term energy strategy that promotes a sustainable energy framework, facilitates adequate energy supply, and improves access to electric power.	
Country Program Results Matrix		The intervention is not included in the 2016 Operational Program.	
Relevance of this project to country development challenges (If not aligned to country strategy or country program)			
II. Development Outcomes - Evaluability	Highly Evaluable	Weight	Maximum Score
	9.0		10
3. Evidence-based Assessment & Solution	9.6	33.33%	10
3.1 Program Diagnosis	3.0		
3.2 Proposed Interventions or Solutions	3.6		
3.3 Results Matrix Quality	3.0		
4. Ex ante Economic Analysis	10.0	33.33%	10
4.1 The program has an ERR/NPV, a Cost-Effectiveness Analysis or a General Economic Analysis	4.0		
4.2 Identified and Quantified Benefits	1.5		
4.3 Identified and Quantified Costs	1.5		
4.4 Reasonable Assumptions	1.5		
4.5 Sensitivity Analysis	1.5		
5. Monitoring and Evaluation	7.5	33.33%	10
5.1 Monitoring Mechanisms	2.5		
5.2 Evaluation Plan	5.0		
III. Risks & Mitigation Monitoring Matrix			
Overall risks rate = magnitude of risks*likelihood	Medium		
Identified risks have been rated for magnitude and likelihood	Yes		
Mitigation measures have been identified for major risks	Yes		
Mitigation measures have indicators for tracking their implementation	Yes		
Environmental & social risk classification	B		
IV. IDB's Role - Additionality			
The project relies on the use of country systems			
Fiduciary (VPC/FMP Criteria)	Yes	Financial Management: Budget, Treasury, Accounting and Reporting. Procurement: Information System, National Public Bidding.	
Non-Fiduciary			
The IDB's involvement promotes additional improvements of the intended beneficiaries and/or public sector entity in the following dimensions:			
Gender Equality			
Labor			
Environment			
Additional (to project preparation) technical assistance was provided to the public sector entity prior to approval to increase the likelihood of success of the project			
The ex-post impact evaluation of the project will produce evidence to close knowledge gaps in the sector that were identified in the project document and/or in the evaluation plan			

Note: (*) Indicates contribution to the corresponding CRF's Country Development Results Indicator.

On April 16th 2016, Ecuador experienced a 7.8 magnitude earthquake, mainly affecting the provinces of Manabi, Esmeraldas and Santo Domingo. As a consequence, the electrical sub-transmission and distribution systems suffered damages, especially in the infrastructure that was reaching the end of its life span. The Contingent Loan to Natural Disasters (3670/OC-EC) served as an immediate response to temporarily recover the electrical system in 98.6%. However, the electric infrastructure is still damaged, which results in an unstable and unreliable service that cannot provide the capacity required to respond to future demand. The loan EC-L1219 seeks to resolve this condition by reestablishing the electricity supplied by the distribution companies at the sub-transmission level and the reliability of the electricity service to the final users. These objectives will be achieved by the reconstruction of electric infrastructure with earthquake resistant characteristics (27 sub-transmission projects and 26 distribution projects).

The vertical logic has been correctly identified, by quantifying the determinants of the general and specific objectives. The results matrix, which reflects the diagnosis and proposed intervention, is correctly defined; precisions and details for one of the results indicators were defined in annex documents.

The economic analysis presents results for each of the 24 projects of the sample. The analysis is solid, resulting in a positive NPV when considering a 12% discount rate. The sensibility analysis mainly considers scenarios of increased costs and prices, and changes in the elasticity of demand, showing large returns when each factor is individually evaluated. However, neither a frontier analysis nor combined factors' effects are provided.

The monitoring and evaluation plan is adequate and consistent with the intervention. It correctly identifies the phases, responsibilities, budget and timelines. The ex post evaluation of results proposes a before and after methodology and an ex post cost benefit analysis, which will validate the economic benefits related to a higher energy consumption by the final users and energy savings due to a more reliable electric system.

The project has an overall risk valued as medium. The identified medium risks in the risk matrix are: (i) geotechnical uncertainty in the intervention zone, and (ii) impossibility of civil works execution due to natural and anthropic phenomena's effects. Both risks present mitigation measures.

RESULTS MATRIX

Project Objective:	The overall objective is to improve electricity service by rebuilding electricity infrastructure in the earthquake-affected provinces of Esmeraldas, Manabí, and Santo Domingo, incorporating earthquake-resistant features. The specific objectives are as follows: (i) to help reestablish electricity supply in the subtransmission systems of electricity distribution companies ¹ affected by the earthquake; and (ii) to facilitate the reliable supply of electricity service to end users by implementing distribution projects.
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EXPECTED OUTCOMES

Expected outcomes	Unit of measurement	Baseline		Intermediate		Targets		Means of verification	Comments
		Value	Year	Value	Year	Value	Year		
Outcome 1. Help restore electricity supply in the subtransmission systems of electricity distributors affected by the earthquake									
Average power supplied by the EDCs through the subtransmission system in the affected provinces of Manabí, Esmeraldas, and Santo Domingo (GWh/month)	GWh/month	72.65	2016	87.30	2018	90.83	2020	Program's midterm and final reports	MEER
Outcome 2. Facilitate reliable electricity service to end users by implementing distribution projects									
AIFk: Average interruption frequency per kVA installed in the provinces of Manabí, Esmeraldas, and Santo Domingo.	Number of interruptions/year	13.50	2016	11.77	2018	7.76 ²	2020	Program's midterm and final reports	MEER
TITk: Total interruption time per kVA installed in the provinces of Manabí, Esmeraldas, and Santo Domingo.	Number of hours/year	25.24	2016	15.28	2018	14.75 ³	2020		

1 The EDCs are responsible for the operation and maintenance of subtransmission systems (up to 69 kV) and medium- and low-voltage distribution systems (<13.8 kV and 200V, respectively), depending on their concession areas.

2 Target established based on the projections of EDCs in the affected zones.

3 Target established based on the projections of EDCs in the affected zones.

OUTPUTS

Outputs ⁴	Estimated cost (US\$, including VAT)	Unit of measurement	2016 baseline	2017	2018	2019	2020	Final target	Means of verification
Component I. Comprehensive reconstruction plan for the electrical power subtransmission system									
Subtransmission projects inspected and live.	47,187,940	Number of projects	-	4	22	1	-	27	Semiannual project progress report
Component II. Comprehensive reconstruction plan for the electrical power distribution system									
Distribution projects inspected and live.	20,915,660	Number of projects	-	10	16	-	-	26	Semiannual project progress report

⁴ The financed works will be designed and constructed according to earthquake-resistant standards (based on existing technical specifications and the recommendations of the resilient infrastructure study to be conducted under this loan operation). Those projects that are fully constructed and connected to the EDC's commercial system are considered to be inspected, live outputs. These criteria ensure that the new infrastructure is on line and in operation.

FIDUCIARY AGREEMENTS AND REQUIREMENTS

Country:	Ecuador
Project name:	Program for the Reconstruction of Electricity Infrastructure in Areas Affected by the Earthquake in Ecuador (EC-L1219)
Executing agency:	Ministry of Electricity and Renewable Energy (MEER)
Prepared by:	Gumersindo Velázquez and Gustavo Palmerio (FMP/CEC)

I. SUMMARY

- 1.1 The institutional assessment for the program's fiduciary management was based on: (i) the fiduciary context of the country; (ii) the outcomes of the fiduciary risk assessment; (iii) supervision activities for the programs executed under loan contracts 3087/OC-EC, 3167/OC-EC, 3187/OC-EC, 3188/CH-EC, 3494/OC-EC, 3494/CH-EC, 3710/OC-EC, and 3177/KI-EC; and (iv) inputs from meetings with personnel from the MEER and entities involved in program execution. As a result, the following fiduciary agreements have been prepared.

II. FIDUCIARY CONTEXT OF THE COUNTRY

- 2.1 **Procurement system.** On 25 February 2013, the Bank's Board of Executive Directors approved the use of the National Public Procurement System for procurement below the threshold for international competitive bidding (ICB) (smaller works below US\$3,000,000, goods and services below US\$250,000, and consulting firm services below US\$200,000). For all other cases, the IDB's procurement and consulting services policies will apply.
- 2.2 **Financial management system.** Since January 2008, government entities have been using the financial administration system eSIGEF, which effectively integrates the budget, accounting, treasury, and electronic payments processes, a centralized information technology structure, and the use of web technology. In addition, central government entities are subject to control and monitoring by the supreme audit institution, the Office of the Comptroller General (CGE). In general, the country financial management systems are at an acceptable level of development. However, they need to be supplemented for the time being in order to execute Bank-financed projects, with regard to specific financial reports and external audits (to be performed by a firm acceptable to the Bank).

III. FIDUCIARY CONTEXT OF THE EXECUTING AGENCY

- 3.1 The MEER is the lead agency for electricity sector policy, subject to the Electric Utility Act. The executing agency is responsible for executing the sector actions

- coordinated by the Technical Secretariat of the Reconstruction and Economic Reactivation Committee in the affected areas. The executing agency will use similar execution arrangements to those agreed upon under operations 2608/OC-EC, 3087/OC-EC, 3187/OC-EC, 3188/CH-EC, 3494/OC-EC, 3494/CH-EC, 3710/OC-EC, and 3711/KI-EC. With the support of the program's technical team, this includes (i) the coordination and approval of contracting processes in the procurement plan and requests for the Bank's no objection therefor; (ii) budgetary management of program resources; (iii) financial management; (iv) program planning and monitoring; and (v) monitoring of the environmental and social management plan. The MEER will also receive technical assistance from the National Electricity Corporation's business units for Esmeraldas, Manabí, and Santo Domingo, which provide electricity service in the affected areas.
- 3.2 The MEER uses Ecuador's country procurement and financial management systems. The CGE exercises internal control of the MEER through the MEER's internal audit unit.
- 3.3 The same execution structure used in this program is used successfully in the operations mentioned in paragraph 1.1. As the executing agency, the MEER demonstrated that it documents, approves, and formalizes all its activities through its information system and that it has employees who have been gaining experience in administering financial management and procurement processes in Bank-financed operations.
- 3.4 In April 2015, an analysis with the project management information system (SIGPRO) showed satisfactory outcomes. SIGPRO systematizes the prioritization, monitoring, control, and settlement processes of the MEER's current projects, and includes lessons learned during the execution of the operations mentioned in paragraph 1.1.

IV. FIDUCIARY RISK EVALUATION AND MITIGATION MEASURES

- 4.1 Based on the assessments conducted and using available program information, fiduciary risks were identified and included in the respective risk matrix:
- a. **Weaknesses in the accountability process. Factors:** (i) multiple actors and works; (ii) lack of uniformity in the procedures used by the electricity distribution companies for project execution; and (iii) geographically decentralized records at these companies. **Impact:** Delays in proper delivery of reports and financial statements. **Mitigation actions:** (i) replicate the best practices identified in the execution of operations 2608/OC-EC, 3087/OC-EC, 3187/OC-EC, and 3494/CH-EC; (ii) continue to support monitoring and improvement of SIGPRO, which is the main communications and monitoring support for the programs; (iii) conduct training and awareness workshops on processes for key electricity distribution company personnel; and (iv) provide support, training, and assistance for program execution through the Bank's fiduciary team.
 - b. **Insufficient market capacity to respond to bid solicitations. Factors:** The local and international markets must have the capacity to provide the materials, equipment, and labor called for in the bid solicitations for project construction. **Impact:** Execution delays and lost opportunity costs. **Mitigation actions:** (i) solicitations will take into account materials, equipment, and labor that meet

domestic and international standards; and (ii) the program's General Procurement Notice will feature business opportunities, and efforts will be made throughout the year to announce bid solicitations in the media outlets as necessary to ensure broad dissemination.

- c. **Cash flow delays from the Ministry of Finance to the executing agency.** **Factors:** The current fiscal situation may cause delays in the transfer of proceeds from the Unified Treasury Account (CUT) to the executing agency. **Impact:** Execution delays and lost opportunity costs due to nonpayment to contractors and suppliers. **Mitigation actions:** In interagency agreements, include a commitment to transfer loan proceeds to the executing agency in a timely manner once each advance is received from the Bank.
- d. **Execution delays in the program's procurement plan.** **Factors:** Because of a complicated fiscal situation, there may be delays in the Ministry of Finance's issuing of procurement guarantees¹ for the program. **Impact:** Execution delays due to a failure to initiate contracting processes. **Mitigation actions:** Early approval of the program's procurement guarantees by the Ministry of Finance.

V. CONSIDERATIONS FOR THE SPECIAL CONDITIONS OF THE CONTRACT

- 5.1 For consideration: approval of the Program Operations Manual (POM).

VI. AGREEMENTS AND REQUIREMENTS FOR PROCUREMENT EXECUTION

- 6.1 **Procurement execution.** For the purposes of procurement planning, the executing agency is expected to use the execution and monitoring system that the Bank determines. The initial procurement plan will cover the first 18 months and will be updated annually or as necessary.
 - a. **Procurement of goods, works, and nonconsulting services (procurement policy document GN-2349-9).** The threshold for the use of ICB² will be made available to the MEER at www.iadb.org/procurement. Below this threshold, the selection method will be determined according to the complexity and characteristics of each procurement transaction or contract, as will be reflected in the Procurement Plan (which is subject to the Bank's no objection). Contracts for goods, works, and nonconsulting services generated under the program and subject to ICB will be executed using the standard bidding documents issued by the Bank. Processes subject to national competitive bidding (NCB) and the shopping method will be executed using documents agreed upon with the Bank. In the case of ICB processes, a reduction of up to four weeks with respect to the period specified in the policies may be accepted

¹ Pursuant to Ministerial Agreement 149 of 13 April 2015, the Ministry of Finance is required to prioritize and optimize public investment in procurement processes. This applies to all government agencies and institutions as well as public enterprises. After the budget certification is issued, in order to initiate contracting processes, these entities will request that the Ministry of Finance issue procurement guarantees for the amounts certified and/or committed.

² For works, the current threshold for ICB is applicable for amounts of US\$3,000,000 or more. For goods and nonconsulting services, ICB is applicable for amounts of US\$250,000 or more.

for the submission of bids for noncomplex works, goods, and nonconsulting services, and the period stipulated under local rules will be accepted for NCB processes. In the case of contracts for noncomplex works and off-the-shelf goods under the threshold for ICB, the shopping method may be used in accordance with the rules published on the IDB portal mentioned above. The executing agency will submit technical justification documenting the reasons why such items are defined as noncomplex works and off-the-shelf goods.

- b. **Selection and contracting of consultants.** For the selection and contracting of consulting services (document GN-2350-9), any of the methods described in those policies may be used, provided that said method has been identified in the procurement plan approved by the Bank, which may be updated as necessary. The threshold for the formation of the shortlist with international consultants³ will be made available to the program at www.iadb.org/procurement.

Contracts for consulting services firms generated under the program will be executed using the standard request for proposals issued by the Bank. For consulting services with an estimated budget of up to US\$200,000, the executing agency will promote the use of the selection method based on consultants' qualifications, pursuant to paragraph 3.7 of the policy.

- c. **Selection of individual consultants.** In the cases identified in the approved procurement plans, the contracting of individual consultants may be requested through notices in order to create a shortlist of qualified candidates, as set out in document GN-2350-9, section V, paragraphs 5.1 to 5.4.
- d. **Training.** The procurement plan lists the program procurement processes that involve training and are contracted as nonconsulting services.
- e. **Use of the country procurement system.** The National Public Procurement System⁴ will be used in IDB-financed projects for contracts to supply goods and nonconsulting services, and construction works with an estimated cost below the ICB threshold established by the Bank for Ecuador,⁵ as well as for consulting services involving amounts below those for the international shortlist.
- f. **National preference.** Offers of goods originating in the country of the borrower will have a price preference⁶ equivalent to 15% in contracts subject to ICB.
- g. **Retroactive financing and recognition of expenditures.** The Bank may retroactively finance up to US\$18.0 million (30% of the loan) against the loan proceeds, and recognize up to US\$2.770 million (30% of the local contribution) as part of the local contribution, in eligible expenditures incurred by the executing agency prior to the loan approval date, for payments made for advance contracting and progress on the works, provided that they satisfy

³ For contracting consulting firms, the threshold is for amounts of US\$200,000 or more. For amounts below that, the shortlist may be comprised of national consulting firms.

⁴ If the IDB validates another system or subsystem, it will apply to the operation, pursuant to the provisions of the loan contract.

⁵ For amounts below these thresholds, NCB or other competitive methods may be used, depending on the value and nature of the procurement.

⁶ Policies for the procurement of goods and works financed by the IDB ([GN-2349-9](#)), Appendix 2, and the loan contract.

requirements substantially analogous to those established in the loan contract. Such expenditures must have been made on or after 11 October 2016 (project profile approval date), but in no case may they include expenditures made more than 18 months prior to the loan approval date.

6.2 Threshold amounts for ICB and shortlist with international consultants.

Table VI-1. Table of threshold amounts (US\$000)

Works			Goods			Consulting services	
ICB	NCB	Shopping	ICB	NCB	Shopping	International publicity	Shortlist 100% national
>3,000	<3,000 >250	<250	>250	<250 >50	<50	>200	<200

6.3 The procurement specialist will be responsible for the main procurement processes, since they are part of the Fiduciary Agreements and Requirements. The program's most significant procurement processes will be prepared with information generated to prepare the procurement plan, through joint work by the procurement specialist, the executing agency's procurement and technical units, and the sector specialist, in alignment with the operation's outcomes and outputs. After the loan has been approved, the executing agency will be responsible for preparing the procurement plan,^{7, 8} and the procurement specialist will verify that it complies with procurement policies.

Table VI-2. Main procurement processes

Activity	Selection method	Estimated date for call for proposals/notice	Estimated amount (US\$)
1.- Works			
Reconstruction/repowering of subtransmission lines, substations, distribution systems, feeders, etc. This plan provides for 53 processes. 2 ICB – 43 NCB – 8 Shopping For details, see expanded procurement plan.	NCB/Shopping	1st quarter 2017	64,350,325.55
2.- Consulting services - firms			
WORKS SUPERVISION: This plan provides for 46 processes. See expanded procurement plan.	QCBS*	1st quarter 2017	3,721,494.08
AUDIT: This plan provides for 1 process. See expanded procurement plan.	QCBS*	1st quarter 2017	171,000.00
3.- Consulting services - individuals			
This plan provides for 7 processes. See expanded procurement plan.	Comparison of qualifications	2nd half 2016	31,780.37

⁷ Policies for the procurement of goods and works financed by the IDB (document [GN-2349-9](#)), paragraph 1.16; Policies for the selection and contracting of consultants financed by the IDB (document [GN-2350-9](#)), paragraph 1.23: The borrower must prepare and, prior to loan negotiations, submit to the IDB for approval, a procurement plan acceptable to the Bank for an initial period of at least 18 months.

⁸ See [Guide for the Preparation and Implementation of the Procurement Plan](#).

*QCBS: Quality- and cost-based selection

- 6.4 **Procurement supervision.** Contracts subject to ex post review by the Bank are those listed below and will be performed according to the provisions of Appendix I of the respective policies. Contracts for amounts equal to or greater than those indicated in that table will be subject to ex ante review. Ex post review visits by the Bank will be conducted at least once every 12 months and reports will include at least one physical inspection visit, when applicable.

Table VI-3. Ex post review thresholds (US\$)

Works	Goods	Consulting services	Individual consulting services
<3,000,000	<250,000	<200,000	<50,000

Note: The threshold amounts for ex post review are based on the fiduciary capacity of the executing agency and may be modified by the Bank in the event of changes in such capacity.

- 6.5 **Special provisions.** Measures to reduce the likelihood of corruption: Adherence to the provisions of documents GN-2349-9 and GN-2350-9 regarding prohibited practices (lists of ineligible firms and individuals of multilateral organizations).
- 6.6 **Records and files.** The executing agency will maintain updated records and files duly organized with procurement-related documentation in a single file, differentiating processes financed with local counterpart resources from those financed with program resources.

VII. FINANCIAL MANAGEMENT AGREEMENTS AND REQUIREMENTS

- 7.1 **Programming and budget.** The legal instrument establishing the general rules governing budget programming, formulation, approval, execution, control, evaluation, and settlement is the Planning and Public Finance Code. These general rules apply to the execution of Bank-financed programs. The integrated eSIGEF implements and standardizes the application of these general rules for national public management. The program budget will be calculated on the basis of the annual work plan and will serve as the basis for its formal inclusion in the MEER's general budget, which is included in the budget proposal submitted to the legislature for approval.
- 7.2 The MEER will manage disbursements and budgetary allocations for the program and will monitor budget execution through its internal systems every four months.
- 7.3 **Accounting and information systems.** The eSIGEF is used for government accounting, with parameters based on the government accounting chart of accounts issued by the Ministry of Finance. Official accounting for projects receiving external financing is conducted through the eSIGEF, pursuant to the government accounting chart of accounts and the budget classifier. Although the eSIGEF currently allows reports to be prepared for the resources provided by the IDB from the Ordinary Capital and other sources of financing, they do not provide the necessary level of detail and breakdown on all specific aspects. Therefore, separate reports are needed to show the status and development of the projects.
- 7.4 Based on the above, it was agreed that the SIGPRO system would be used for the program's technical and financial monitoring.

- 7.5 **Disbursements and cash flow.** Since 2008, the Government of Ecuador has been using the CUT mechanism, unifying treasury management for all central government entities.
- 7.6 The implementation of this mechanism did not eliminate the system of special accounts, or of specific-purpose accounts, which are kept at the Central Bank of Ecuador to receive financing from multilateral loans, including those of the IDB. Therefore, to receive loan proceeds, the MEER will open an account for the program at the Central Bank of Ecuador. All program payments will be made through the eSIGEF by debiting the CUT.
- 7.7 Disbursements will be made according to the program's actual liquidity requirements, using the advance of funds modality and following a financial plan for a period of up to nine months. The financial plans will be prepared at the start of the program and updated as execution proceeds.
- 7.8 The executing agency will submit each disbursement request to the IDB, along with the financial plan, cash flow, and a reconciled accounting of funds available for each source of financing. Advances of funds will be accounted for as established in document OP-273, "Financial Management Policy for IDB-financed Projects." Disbursements will be justified in the next request, once a minimum of 80% of the total advances have been executed.
- 7.9 The Bank will review supporting documentation for eligible expenditures made for each source after it disburses the resources.
- 7.10 **Internal control and internal audit.** The Constitution of the Republic of Ecuador establishes that the CGE is responsible for directing the public sector control system. As part of that sector, the MEER has its own internal audit unit that reports directly to the CGE. However, the Bank will not use its services, since that unit does not include review of the project in its audit plans. The Program Operations Manual will include the main internal control processes necessary to ensure that the controls are operating effectively.
- 7.11 **External control and reporting.** Given that the General Planning Coordination Office does not, at this time, have sufficient capacity to exercise control of projects financed with resources from external loans, external audits will be conducted by tier-1 independent auditors acceptable to the Bank (international audit firms), in accordance with IDB requirements. During execution, on an annual basis within 120 days after the closing date of each fiscal year, the MEER will submit audited financial reports for the program and reports on the eligibility of expenditures, in accordance with the Bank's guidelines and pursuant to previously approved terms of reference. The costs of the audit will be covered by the IDB loan proceeds (Ordinary Capital). The executing agency will submit unaudited financial reports on the activities financed during the previous six-month period for the program's components. Such reports will include at a minimum the bank reconciliation for the program's special account with its respective annexes and the semiannual report on the local contribution's execution.
- 7.12 There is no national policy regarding public disclosure of audit reports; however, pursuant to the current policy on information access and disclosure, the program's audited reports will be published in the Bank's systems.

Table VII-1. Supervision plan

Supervision activity	Nature and scope	Frequency	Responsible party	
			IDB	Third party
Operational	Review of the progress report	Semiannual	Fiduciary and sector team	MEER
	Review of the portfolio with the executing agency and Ministry of Finance	Pursuant to the Ministry of Finance's requirements		
Financial	Inspection visits	Annual	Fiduciary specialist	
	Review of audited financial reports			
	Ex post review of disbursements			
	Review of unaudited financial reports	Semiannual	Fiduciary specialist	
	Review of disbursement requests	Periodic	Fiduciary and sector team	
Procurement	Ex ante review of procurement	Initially, during first year	Project team leader and procurement specialist	
	Updated procurement plan	Annual		
Compliance	Compliance with conditions precedent	Once	Fiduciary and sector team	
	Review of budget allocation	Annual		
		Delivery of audited financial reports	Annual	Project team leader and fiduciary specialist

- 7.13 **Execution mechanism.** The MEER will be responsible for the program's financial administration and internal control.
- 7.14 Within the MEER, the Department for Energy Distribution and Marketing (SDCE) will lead program execution.
- 7.15 All administrative activity (budget, accounting, payments, etc.) will be handled by the MEER through its Finance Division with support from the SDCE, which will monitor the applicable contracts, payments, documentation, and reports. To this end, a program technical team (PTT) will be formed and devoted full-time to program execution. The PTT must be made up of professionals with relevant experience in executing programs of this kind and have personnel trained to perform accounting and financial reporting functions.
- 7.16 The PTT will prepare its cash flow projections, applicable requests, and supporting documentation for the use of funds, submitting the relevant documents to the Bank pursuant to the requested formats and requirements. It will be responsible for program leadership vis-à-vis the Bank, coordinating with the parties involved and preparing any management information to be submitted, including progress reports, project execution plans, annual work plans, and audit and evaluation reports.

- 7.17 The Program Operations Manual will establish in detail the program execution mechanism, the composition of the PTT, and the mechanisms for recording, communications, and reporting.
- 7.18 [Procurement plan](#).

DOCUMENT OF THE INTER-AMERICAN DEVELOPMENT BANK

PROPOSED RESOLUTION DE-___/16

Ecuador. Loan ____/OC-EC to the Republic of Ecuador
Reconstruction Program of the Electricity Infrastructure
in the Areas Affected by the Earthquake in Ecuador

The Board of Executive Directors

RESOLVES:

That the President of the Bank, or such representative as he shall designate, is authorized, in the name and on behalf of the Bank, to enter into such contract or contracts as may be necessary with the Republic of Ecuador, as Borrower, for the purpose of granting it a financing to cooperate in the execution of a reconstruction program of the electricity infrastructure in the areas affected by the earthquake in Ecuador. Such financing will be for the amount of up to US\$60,000,000 from the resources of the Bank's Ordinary Capital, and will be subject to the Financial Terms and Conditions and the Special Contractual Conditions of the Project Summary of the Loan Proposal.

(Adopted on __ _____ 2016)