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BOLIVIA

PROGRAM TO STRENGTHEN THE ELECTRICITY SECTOR

(BO-L1189)

LOAN PROPOSAL

This document was prepared by the project team consisting of: Sergio Ballón, Project Team Leader (ENE/CBO); Arturo Alarcón, Alternate Project Team Leader (ENE/CBR); Emilio Sawada (ENE/CUR); Virginia Snyder, Wilkferg Vanegas, Stephanie Suber, and Jeanette Bonifaz (INE/ENE); Sisi Larrea (INE/INE); Verónica Tejerina (SCL/GDI); Javier Beverinotti (CAN/CBO); Shirley Foronda and Patricia Toriz (FMP/CBO); Javier Jiménez (LEG/SGO); Robert Langstroth (VPS/ESG); and Adriana Inchauste (CAN/CBO).

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REQUIRED

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2. Means of verification matrix
3. Results matrix
4. Monitoring and evaluation plan

OPTIONAL

1. Economic and social development plan
2. Analysis of compliance with the Public Utilities Policy

ABBREVIATIONS

AFCSE	Autoridad de Fiscalización y Control Social de Electricidad [Office of Electricity Oversight and Social Control]
CNDC	Comité Nacional de Despacho de Carga [National Load Dispatch Committee]
CO_2	Carbon dioxide
ENDE	Empresa Nacional de Electricidad [National Electricity Company]
GWh	Gigawatt-hour
kW	Kilowatt
kWh	Kilowatt-hour
MW	Megawatt
N/A	Not applicable
PBP	Programmatic policy-based loan
SIN	Sistema Interconectado Nacional [National Interconnected System]
VMEEA	Viceministerio de Electricidad y Energías Alternativas [Office of the Deputy Minister of Electricity and Alternative Energy]

PROGRAM SUMMARY
BOLIVIA
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Financial Terms and Conditions			
Borrower:	**Source**	**Amount (US$)**	**%**
Plurinational State of Bolivia	**IDB (Regular Ordinary Capital):**	43,860,000	85
	IDB (Concessional Ordinary Capital):	7,740,000	15
Executing agency: Ministry of Energy	**Total:**	51,600,000	100

	Regular Ordinary Capital (Flexible Financing Facility)[a]	**Concessional Ordinary Capital**
Amortization period:	15 April 2033	40 years
Disbursement period:	1 year	
Grace period:	15 April 2029[b]	40 years
Interest rate:	LIBOR-based	0.25%
Weighted average life:	12.75 years	N/A
Approval currency:	U.S. dollar	

Program at a Glance

Program objective/description: The program's general objective is to help improve the sustainability of the country's electricity sector through a series of policy reforms aimed at strengthening and supplementing the regulatory framework.

The program is the first of two operations under the programmatic policy-based loan (PBL) modality, which are independent but technically linked, structured in accordance with "Policy-based Loans: Guidelines for Preparation and Implementation" (document CS-3633-1).

Special contractual conditions precedent to the sole disbursement of the loan proceeds: Compliance with the policy conditions set forth in the policy matrix, to the Bank's satisfaction, in addition to compliance with all other conditions established in the loan contract (paragraph 3.2).

Exceptions to Bank policies: None

Strategic Alignment

Challenges:[c]	SI	☑	PI	☑	EI	☐
Crosscutting themes:[d]	GD	☑	CC	☑	IC	☑

[a] Under the terms of the Flexible Financing Facility (document FN-655-1), the borrower has the option of requesting changes to the amortization schedule, as well as currency and interest rate conversions. The Bank will take operational and risk management considerations, prevailing market conditions, and the loan's level of concessionality into account when reviewing such requests, in accordance with applicable Bank policies.

[b] Under the flexible repayment options of the Flexible Financing Facility, changes to the grace period are permitted provided that they do not entail any extension of the original weighted average life of the loan or the last payment date as documented in the loan contract.

[c] SI (Social Inclusion and Equality); PI (Productivity and Innovation); and EI (Economic Integration).

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

I. Description and Results Monitoring

A. Background, problem addressed, and rationale

1.1 **Macroeconomic situation.** Bolivia's macroeconomic framework is both appropriate and consistent with the objectives of programmatic loans. Bolivia's real gross domestic product grew 4.2% in 2017 and the International Monetary Fund estimates it will grow approximately 4% in 2018. The country currently has international reserves equivalent to 24% of GDP and 13 months of import coverage, as well as public sector deposits at the Central Bank equivalent to approximately 17% of GDP, as safeguards against external shocks. With oil prices increasing since late 2016, exports are expected to recover, given the relevance of these prices to the export sector.

1.2 **The country continues owing to public investment.** The Bolivian government has been stepping up its public investment, seeking to drive economic growth against a backdrop of decreasing commodity export revenues. Signs point to the government continuing this strategy in 2018. Growth rates in 2015, 2016, and 2017 were 4.9%, 4.3%, and 4.2%, respectively, with executed public investment of nearly 15% of GDP during the first two years and 12.6% in 2017.

1.3 **Socioeconomic context.** As of 2017, Bolivia had a population of 11.3 million, with 69% living in urban areas and 31% in rural areas. From 2005 to 2017, the country's economy grew approximately 295% in nominal terms, primarily due to favorable international commodity prices, as well as the State's larger role in the economy. During that same period, there were also significant decreases in moderate and extreme poverty levels, as well as in income inequality, as a result of economic momentum, redistributive policies, and increased public investment in infrastructure. Despite this progress, poverty in Bolivia continues to be high compared to other countries in the region. This is more evident in rural areas, where as of 2017, 55% of the population was living in poverty, and within this group, 35% experienced extreme poverty. Something similar is observed with regard to electricity access in rural areas, where only 77% of the population has this service, based on data from the 2017 Household Survey. Evidence shows a close correlation between poverty levels and access to electricity.[1]

1.4 **Sector context.** The electricity sector is regulated by the Electricity Act 1604 of 1994, which separated electricity generation, transmission, and distribution activities, and established a competitive market for power generation and criteria for transmission and distribution usage fees and rates. All these mechanisms are currently in effect. This law was written within a specific technological context and with the paradigm of a thermoelectric and hydroelectric power system. To date, therefore, there are no updated technical regulations that take into account the potential addition of new power-generation technologies based on renewable and nonconventional renewable energy sources,[2] distributed power generation, and the implementation of energy efficiency measures.

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1 Rural Electrification Program II (operation 3725/BL-BO).

2 Renewable energy is generated from hydroelectric sources, while nonconventional renewable energy is generated from solar, wind, geothermal, and biomass sources.

1.5 The most relevant actors in the electricity sector are: (i) the Ministry of Energy, the lead agency in charge of policymaking for the sector, created in 2017 to address the specific needs of the electricity sector; (ii) the Office of Electricity Oversight and Social Control (AFCSE), a decentralized public agency responsible for the sector's regulation; (iii) the Office of the Deputy Minister of Electricity and Alternative Energy (VMEEA), a regulatory agency under the Ministry of Energy, which is responsible for promoting energy efficiency programs and establishing guidelines to increase electricity coverage, through its operational arm, the "Living with Dignity Electricity Program"; (iv) the National Load Dispatch Committee (CNDC), the agency tasked with electricity system planning and operation; and (v) the National Electricity Company (ENDE), a public enterprise with its own assets and capital, which is established as a corporation and authorized to participate in the various market segments through its 11 subsidiaries.

1.6 **ENDE.** Founded in 1963, ENDE is a State-owned company. It was responsible for developing the electricity sector from its founding through the mid-1990s, when it was split into several power generation, transmission, and distribution companies, and its assets were bought up by private companies. After this, ENDE was responsible for operating stand-alone systems. As of 2006, and as a result of the 2009 constitutional reform, ENDE was declared a strategic public enterprise. From 2009 to 2012, the State regained ownership of the companies that were previously owned by ENDE. New rules gave ENDE a leading role in the electricity sector's planning, development, and management. Currently, ENDE's subsidiaries are part of the market structure as a corporation (ENDE Corporación), which has a 2016-2020 corporate strategic plan for its development. The private sector also participates in all segments of the sector (generation, transmission, and distribution), both in the form of private companies that existed prior to the sell off and private companies that were set up in Bolivia thereafter.

1.7 **Electricity matrix.** The National Interconnected System (SIN) comprises 6,853 kilometers of transmission lines, interconnecting eight of the country's nine departments and serving almost 2.4 million consumers. In areas not connected to SIN, 151,000 consumers obtain their electricity from 15 stand-alone systems, which include small-scale power generation and distribution. As of December 2016, the installed power capacity was 2,162 megawatts (MW) (91.6% from SIN and 9.4% from stand-alone systems). The electricity produced was 9,403.3 gigawatt-hours (GWh) (8,763.2 GWh from SIN and 640.1 GWh from stand-alone systems). Of the power generated, 20% was from renewable sources[3] and 80% from fossil fuels.[4] Of the thermal power generated by SIN, 97.7% was from natural gas, 1.4% from diesel, and 0.9% from biomass sources. For stand-alone systems, 80.59% of the power was generated from diesel, 17% from biomass, 0.89% from photovoltaic, and 0.66% from hydroelectric sources. Fossil fuel consumption in the electricity sector reached 45 million liters of diesel and 5.085 billion cubic feet of natural gas.

1.8 **Fossil fuels.** All of Bolivia's natural gas is produced domestically. Since 2001, the cost of generating electricity from this fossil fuel has been fixed at US$1.30 per 1,000 cubic feet,[5] which is higher than the cost of extracting it but below the cost of

[3] Statistical Yearbook (2016). AFCSE.

[4] Source: AFCSE.

[5] Supreme Decree 26,037 of 22 December 2000.

exporting it.[6] This represents an opportunity cost for the country of between US$300 million and US$350 million per year. The diesel used to generate power in stand-alone systems is imported and cost more than US$57 million in 2016. Diesel, a subsidized fuel, is provided to generators at a price of US$0.15 per liter, while its import cost is of approximately US$1.27 per liter. In 2016, diesel subsidies totaled more than US$50.1 million, with the remaining costs being covered by rates. In 2016, Bolivia's carbon dioxide (CO_2) emissions totaled 22 million tons.[7] The electricity sector accounted for 4.2 million tons[8] of these emissions (20%), with SIN producing 92% and stand-alone systems 8%.

1.9 In terms of electricity demand, the residential sector is the largest consumer (39%), followed by the industrial sector (26%), commercial and services (19%), mining (9%), public lighting (5%), and others (2%). From 2010 to 2016, the demand for electricity[9] from SIN and stand-alone systems grew at an annual rate of 6%. Based on this growth rate, estimates show that by 2025, the country's total demand for electricity will have doubled to 20,000 GWh.[10] As of July 2018, Bolivia had no interconnected power transmission lines with other countries. Nevertheless, electricity exports have been identified as an opportunity. The government is actively promoting this idea and expects to begin exporting electricity to Argentina in 2019. The possibility of electrical interconnection with Peru and Brazil is also being studied.

1.10 **Rates.** Generation companies in the National Interconnected System dispatch power based on the marginal cost, collecting fees for capacity, reserves, and energy on a competitive basis. Transmission companies receive a usage fee that covers their investment, operating, and maintenance costs, plus a regulated profit margin. Distribution rates for each concession area (including urban and rural areas) are set by the AFCSE every four years, based on the Regulations Governing Pricing and Rates (Supreme Decree 26,094), and cover investment, operating, and maintenance costs, with the right to obtain a regulated profit level. The average national price in 2016 was 9.58 cents per kilowatt-hour (kWh). There is a discounted rate (*tarifa dignidad*) that provides a 25% discount for consumption below 70 kWh, which is covered through cross-subsidies in the sector (does not require external transfers). Pursuant to current regulations, in stand-alone systems, companies and/or cooperatives may be vertically integrated and may perform power generation and distribution. For vertically integrated stand-alone systems, operators must be registered with the AFCSE and their rates are set in accordance with those established for distribution companies.

1.11 **Financial sustainability of the sector.** The rate system ensures the sector's financial sustainability, since all investment, operating, and maintenance costs are recovered, with a profit margin. The level of technical losses in transmission and distribution is reasonable (10%)[11] and below the average for Latin America. The frequency of power outages indicator (6.9 service interruptions experienced by a

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6 The reference price used was the import price reported by Argentine authorities for first quarter of 2018, i.e. US$5.56 per 1,000 cubic feet.

7 Yearbook of Energy Statistics, Latin America Energy Organization, 2017.

8 Source for unit conversion: U.S. Energy Information Administration.

9 In terms of electricity consumption from the SIN, the residential sector was the largest consumer (42%), followed by industry (25%), general (21%), street lighting (6%), mining (4%), and others (2%).

10 The Energy Path of Latin America and the Caribbean (2018). IDB.

11 2017 annual report of the electricity sector. CNDC.

customer in a year) is on par with the average for Latin America (6.6), while the duration of power outages (7.1 hours/customer/year) is half of the average for Latin America (13.3).[12] However, due to the ever increasing demand for electricity (paragraph 1.109), driven primarily by economic growth, it becomes necessary to constantly expand electric power generation, transmission, and distribution capacity. This expansion must be planned properly to ensure its economic efficiency and its environmental and financial sustainability.

1.12 **Main gaps impacting the sector.** The electricity sector confronts gaps related to: (i) institutional strengthening, with the aim of improving sector management and planning, given the sector's growing relevance in recent years, and the recent establishment of an agency tasked with specific responsibility for the sector (paragraph 1.5); (ii) the country's low levels of electricity service coverage, particularly in rural areas, and the lack of coordinated plans for expanding service coverage (paragraph 1.12); (iii) the absence of a legal, technical, regulatory, and institutional framework to promote diversifying the electricity matrix, which would include tapping the potential of renewable and nonconventional renewable energy sources, promoting the financial, economic, and environmental sustainability of these technologies, and reducing CO_2 emissions produced by fossil fuel combustion for electricity generation (paragraph 1.8); (iv) the inexistence of a regulatory, institutional, and policy framework to promote more efficient energy use and the continuity and sustainability of initiatives and programs for that purpose (paragraph 1.17); (v) the absence of policies, plans, and strategies to promote gender equality in the sector's institutions and companies (paragraph 1.18); and (vi) the promotion of regional electricity integration, with the aim of exporting surplus energy (in the context of an opportunity for the sector rather than a gap). These gaps are detailed below:

1.13 **Institutional strengthening.** Until 2016, the electricity sector was overseen by a deputy minister of the Ministry of Hydrocarbons and Energy, which was also responsible for the hydrocarbon sector, the country's principal economic mainstay. Given the electricity sector's growing relevance for the economy and the need for its institutional strengthening to achieve the sector's medium- and long-term targets and plans, the government came to the conclusion that a dedicated ministry with responsibility for the electricity sector was needed. With the establishment of a ministry tasked with specific responsibility for the electricity sector, it is now time to strengthen both the ministry and the sector by developing sector and institutional plans to coordinate the targets and plans of each institution with the sector's development targets and plans (paragraph 1.20), thereby facilitating sector management and control.

1.14 **Access to electricity.** Electricity coverage nationwide is estimated at 90%. In rural areas, that coverage is currently 77%. More than 226,000 households still lack electricity; 71% of them are in rural areas, primarily in indigenous and low-income communities. An estimated investment of US$2 billion is needed to achieve universal coverage. Of rural households without electricity, 90% could be connected to the grid and 10% would be served using alternative energy sources. The current connection cost for new users ranges between US$1,300 and US$1,800. However, as users located in more isolated areas are connected, these costs could become considerably higher. According to Bolivia's Constitution, rural electrification is under

[12] Source: World Bank, Doing Business 2017, Bolivia.

the exclusive jurisdiction of departmental autonomous governments. However, investments are also being made by municipalities and some power distribution companies. Consequently, preparation of a national rural electrification plan is needed to guide investment and stakeholders in achieving universal coverage, using resources in an efficient, coordinated manner.

1.15 **Potential for renewable and nonconventional renewable energy.** Bolivia has great potential sources of renewable and nonconventional renewable energy it can tap for power generation.[13] Solar power is viable nationwide, but is more predominant in the Altiplano region.[14] The potential of wind power is greatest in the departments of Cochabamba, Santa Cruz, and part of the Altiplano.[15] Geothermal power has potential in southwest Potosí. The potential of biomass-fueled power generation is greatest in the departments of Santa Cruz, Beni, Pando, and northern La Paz. Hydroelectric power sources are found throughout various basins and rivers, with emphasis on those located in the department of La Paz and the Cochabamba and Santa Cruz rivers. The country's potential for nonconventional renewable energy sources provides an opportunity for developing distributed power generation[16] as a mechanism to tap these energy sources.

1.16 The regulations for Bolivia's electricity sector were prepared in the 1990s, based on the development of natural gas-fired hydroelectric and thermal plants as part of the National Interconnected System (paragraph 1.8). Consequently, these regulations currently lack mechanisms to set costs and prices for electricity generated from nonconventional renewable energy sources. The current compensation mechanism for power generation is defined by two components: (i) compensation for the energy generated; and (ii) compensation for the capacity that a unit generates in four continuous hours during the peak demand period of the dry season (firm capacity). Because their source of primary power is not controllable, wind and solar power producers are unable to guarantee firm capacity. Consequently, they do not receive the portion of the compensation for capacity. Hence, they are only compensated for the energy, which impacts the financial and economic sustainability of power generated from nonconventional renewable energy sources.

1.17 **Energy efficiency.** The National Energy Efficiency Program was created in 2008, through Supreme Decree 29,466. The former Ministry of Hydrocarbons and Energy (currently the Ministry of Energy), was charged with its implementation and the establishment of projects and actions to use power efficiently. As part of this, energy efficiency programs were implemented between 2008 and 2011 to swap out 9 million incandescent lightbulbs with compact fluorescent bulbs in 1.3 million households, decreasing consumption by 200 GWh and peak demand by 100 MW. Despite the program's success, these specific actions were not replicated due to the lack of an energy efficiency regulatory framework and incentives to promote its sustainability. Likewise, thus far there have been no audits or diagnostic assessments of power consumption by socioeconomic sector. These would identify energy efficiency

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13 2025 Alternative Energy Development Plan, Ministry of Hydrocarbons and Energy, 2014.

14 With annual values of 2,700 kWh per square meter, Bolivia is among the countries of the world with the greatest solar power potential. Global Solar Atlas, http://globalsolaratlas.info/.

15 Bolivia is one of the countries with the largest potential for wind power in South America, at 750 watts per square meter. Global Winds Atlas.

16 Distributed generation is defined as sources of power generation that are directly connected to the distribution grid.

measures with the greatest savings potential for implementation, including institutional and regulatory considerations.

1.18 **Gender considerations for the sector.** In Bolivia, the energy sector, particularly the electricity subsector, represents an important source of jobs and income.[17] The current government plans to turn Bolivia into South America's energy capital; it started this process by restructuring the energy matrix and increasing the use of renewable and nonconventional renewable energy throughout the country.[18] This will mean new job opportunities in the various levels of the sector, for both men and women. However, women currently have a very low rate of workforce participation. For example, of the 148 permanent employees working at ENDE headquarters, only eight women hold technical positions and three hold leadership positions.[19] Women account for only 20% of all jobs at ENDE and 13% of its technical jobs.

1.19 This situation led ENDE, with support from the Bank, to conduct a gender diagnostic assessment[20] with the aim of understanding the low rate of female participation in the company's workforce and strengthening its gender equity policy and operational framework. The diagnostic assessment verified ENDE's willingness and commitment to gender equity, and the need and importance of creating a policy and action plan to address the situation. Based on the assessment's findings, recommendations and guidelines were developed to prepare a gender policy for the company as well as short-, medium-, and long-term action plans. Greater gender equality can enhance productivity, make a company's decision-making more representative of society, and improve development outcomes for the next generation.[21] Gender diversity has also been shown to improve a company's customer orientation, enhance employee satisfaction, reduce conflicts between groups (thereby improving collaboration and loyalty), and foster innovation and creativity through a greater variety of problem-solving approaches, perspectives, and ideas.[22] Given ENDE's significance in the Bolivian electricity sector, the company can become a model of reference with the ability to change viewpoints about gender equity at all its subsidiaries, other companies in Bolivia's electricity sector, and other sectors of the economy.

1.20 **The country's strategy for the sector.** In the 2025 Patriotic Agenda, the Bolivian government defined 13 core tenets that contain the principles and guidelines for the country's long-term economic and social development. In March 2016, the government approved the 2016-2020 Economic and Social Development Plan, which coordinates the sector's medium-term targets, outcomes, and actions with the

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17 Balza, Lenin; Ramón Espinasa, and Tomás Serebrisky (2016). Lights On? Energy Needs in Latin America and the Caribbean to 2040. Inter-American Development Bank.

18 Plurinational State of Bolivia (2016). 2016-2020 Economic and Social Development Plan, within the Framework of Integrated Development for Living Well. Bolivia.

19 This low representation of women in the sector is not unique to Bolivia. According to the 2016 Ernst & Young report, Women in Power and Utilities, women in Latin America and the Caribbean account for less than 20% of the energy sector's total workforce. Also, 9% of board executives, 7% of directors, and 17% of senior managers in the sector are women.

20 The IDB, in coordination with ENDE, conducted a gender equity diagnostic assessment to analyze the reasons for the low participation of women, particularly in leadership and technical positions, in order to support the inclusion of a gender focus and contribute to closing gaps in this area.

21 World Bank (2018). Energy Sector Management Assistance Program. Getting to Gender Equality in Energy Infrastructure: Lessons from Electricity Generation, Transmission, and Distribution Projects. Technical Report 01/18. Washington, D.C., USA.

22 Hunt, Vivian et al. (2014). Diversity Matters. McKinsey & Company. United Kingdom.

core tenets of the 2025 Patriotic Agenda. For the electricity sector, the plan establishes the following courses of action: (i) energy sovereignty, based on a safe, continuous, and reliable supply of electricity; (ii) the universalization of electric power, by increasing coverage of basic electricity service for the population; (iii) energy efficiency and expanding the weight of renewables and nonconventional renewable energy sources; (iv) energy integration through exports of surplus electricity; and (v) energy security, by consolidating the State's key role in the development and planning of the electricity industry.

1.21 The Bolivian government has proposed the following targets to meet increasing demand, reduce CO_2 emissions, and achieve universal access to electricity: (i) achieve 100% electricity service coverage by 2025; and (ii) promote changes in the energy mix, to include adding 1,858 MW of capacity from renewable and nonconventional renewable energy sources to the grid by 2020. In addition, in its Intended Nationally Determined Contribution for the 2015 Paris Agreement, the Plurinational State of Bolivia made several commitments, including: (i) increase the proportion of renewable energy from its 2010 level of 39% to 79% by 2030; and (ii) increase the proportion of nonconventional renewable energy and other power sources (steam combined cycle) from its 2010 level of 2% to 9% of the entire electric grid by 2030, representing an increase of 1,228 MW per year by 2030, compared to 31 MW in 2010.

1.22 **The government's response to electricity sector gaps.** With a view to addressing the sector's gaps and fulfilling its socioeconomic development targets (paragraph 1.20), the Bolivian government has implemented reforms and actions in recent years designed to build up the sector's institutional capacity and sustainability, meet future demand for energy, reduce heavy reliance on fossil fuels for electric power generation and decrease the resulting high CO_2 emissions, and achieve universal access. These reforms and actions include:

1.23 **Institutional strengthening of the sector.** The Ministry of Energy was created by Supreme Decree 3,058 of January 2017.[23] Its objectives are to strengthen and consolidate the institutional framework of the electricity sector, as the agency responsible for the formulation, management, and evaluation of policies, rules, and plans for its comprehensive development. The Office of the Deputy Minister of Electricity and Alternative Energy (VMEEA) and the Office of the Deputy Minister of Advanced Energy Technologies became part of the new ministry. All relevant sector agencies also became part of the ministry's organizational structure.

1.24 **Alignment of sector targets with the country's main development guidelines.** Over the past decade, the Bolivian government has made significant efforts to align the sector's targets with the core guidelines and tenets of the 2025 Patriotic Agenda and the 2016-2025 Economic and Social Development Plan. Some noteworthy actions have included preparing institutional and development plans for the sector, such as: (i) the CNDC's 2012-2022 Optimum Expansion Plan for the National Interconnected System, which is currently being updated with information through 2030; (ii) VMEEA's 2025 Alternative Energy Development Plan (November 2014), which it prepared in November 2015; (iii) VMEEA's 2025 Electricity Plan for the

[23] Before the Ministry of Energy was established, the lead agency for the energy sector was the former Ministry of Hydrocarbons and Energy. Given the growing significance of the electricity sector for the country's development, that latter ministry was divided into two ministries, creating the Ministry of Energy. The VMEEA, which was part of the Ministry of Hydrocarbons and Energy, then became part of the Ministry of Energy.

Plurinational State of Bolivia, which it prepared in January 2014; and (iv) institutional strategic plans for each of the sector's institutions.

1.25 **Increase in reliable and sustainable access to electricity.** Bolivia has consistently increased its electricity service coverage, from 33% in 2005 to 64.4% in 2014, and to 77% as of 2017. This was made possible through service expansions by distributors, departmental and municipal governments, and more than US$280 million in loans and technical cooperation for electrification projects from, *inter alia*, the IDB, the World Bank, the OPEC Fund for International Development, and the Kreditanstalt für Wiederaufbau. The IDB, which has provided 58.8% of that amount, has become the Bolivian government's main partner and source of financing for rural electrification projects.

1.26 The government has also been working on projects to interconnect stand-alone systems to the SIN and is scaling back on thermoelectric power generation in stand-alone systems, which is primarily powered by diesel (emissions factor 953 grams of CO_2/kWh). This is being substituted in the SIN by power generated from natural gas and renewable energy sources, which have a lower emissions factor (414 grams of CO_2/kWh). Power generated in stand-alone systems has decreased from an annual peak of 850 GWh in 2009 to 650 GWh in 2016. For example, interconnection of the Trinidad-Moxos stand-alone system to the SIN in 2010 resulted in an annual decrease of 50 GWh in diesel-fired thermal power generation, with an estimated annual reduction of 30,000 tons in CO_2 emissions. Likewise, the interconnection of stand-alone systems in La Tablada, Yacuiba, and Villamontes (department of Tarija) to the SIN in 2014 decreased annual thermoelectric power generation by 35 GWh, reducing annual CO_2 emissions by 19,000 tons.

1.27 **Development of renewable and nonconventional renewable energy.** As part of the government's efforts to address the lack of a regulatory framework for promoting the development of new energy generation projects from renewable and nonconventional renewable sources, Supreme Decree 2,048 was approved in 2014, with the objective of establishing a compensation mechanism for nonconventional renewable energy. The decree stipulates that the AFCSE will approve the adjustment value for adaptability to be used to pay for power generated through nonconventional renewable energy projects. The decree also stipulated that the former Ministry of Hydrocarbons and Energy, through a ministerial resolution, would be responsible for approving nonconventional renewable energy projects for the SIN, subject to the compensation mechanism and pursuant to sector planning. These timely actions have facilitated the development of renewable and nonconventional renewable energy projects. Currently, solar and wind projects totaling more than 1,000 MW are under construction. Accordingly, the Japan International Cooperation Agency and the IDB are supporting the development of the Laguna Colorada project's geothermal generation plant and transmission line, and the Agence Française de Développement is supporting the implementation of wind and solar energy projects. Nonetheless, the regulations must be further expanded to promote nonconventional renewable energy, and should also consider the potential for small-scale power generation (distributed generation).

1.28 **Promotion of energy efficiency.** The Ministry of Energy, through its Office of the Deputy Minister of Electricity and Alternative Energy (VMEEA), is taking steps that will lay the groundwork for developing and promoting energy efficiency measures, such as preparing power consumption diagnostic assessments for public institutions (with support from the United Nations Development Programme), establishing

technical standards, and implementing energy efficiency pilot projects for street lighting. One such pilot is currently being prepared with IDB support: an initiative of the municipios of Oruro and Cobija to replace more than 35,000 high-pressure sodium vapor streetlights with more efficient fixtures, such as light emitting diodes (LEDs). However, these are still specific actions that need to be reinforced by establishing an appropriate institutional framework and a plan to guide its subsequent development. The National Energy Efficiency Policy is currently being prepared with IDB support and will be submitted for validation by various stakeholders. Deutsche Gesellschaft für Internationale Zusammenarbeit will help the Bolivian government implement the policy by providing support for the design of a national energy efficiency strategy.

1.29 **Regional electric interconnection.** The Bolivian government has prioritized regional energy integration as an opportunity to foster the country's economic and social development. In the electricity sector, a dialogue has been initiated and agreements reached to promote electrical interconnection with Argentina, Brazil, Peru, and Paraguay. Progress is under way on integration with Argentina, which includes the construction of the Juana Azurduy de Padilla international transmission line from Yaguacua, Bolivia, to Tartagal, Argentina, with 132 kilovolts for the first stage and plans for a 500-kilovolt transmission line. With regard to Peru, the IDB is supporting a study for interconnecting Bolivia with that country through technical cooperation operations ATN/FG-15606-RG and ATN/OC-15607-RG. As for Brazil, the IDB is supporting an analysis of the options for the electrical interconnection of Bolivia with Brazil through technical cooperation operation ATN/OC-16652-RG. The Bolivian and Brazilian governments are studying the potential of the section of the Madeira River between the two countries, with resources from the Andean Development Corporation, which is also financing a Bolivia-Paraguay interconnection study.

1.30 **Intervention proposal.** With the aims of supplementing the reform actions, supporting the implementation of sector policy, and closing the aforementioned gaps, the Bolivian government requested support from the IDB for this program in the form of a programmatic policy-based loan (PBP) comprised of two programmatic operations. It includes policy reforms to strengthen and supplement the electricity sector's regulatory framework, with a view to ensuring its sustainability. The operation's objective is to close sector gaps by: (i) strengthening the institutional framework for sector management and planning, given its relevance in recent years, by defining roles and crafting strategic institutional plans aligned with the 2016-2020 Economic and Social Development Plan; (ii) achieving universal access to electricity service and ensuring that the supply of electricity keeps pace with growing demand, through the use of planning and regulatory tools that ensure safe, uninterrupted, and sustainable electricity service; (iii) reducing CO_2 emissions associated with generating electricity from fossil fuels by developing a legal, technical, regulatory, and institutional framework to promote the diversification of the electricity matrix, which would tap the potential of renewable and nonconventional renewable energy sources, and promote the financial, economic, and environmental sustainability of these technologies; (iv) making more efficient use of energy by developing a regulatory, institutional, and policy framework; and (v) promoting gender equity in the sector through plans and strategies that encourage more women to serve in managerial and technical positions of sector institutions and companies. The proposed policy measures' scope of implementation is spelled out in the results matrix (paragraph 1.49).

1.31 The program will develop policy measures to enable reforms in the sector. These include a legislative initiative, sector policies, and decrees and resolutions to close gaps caused by the absence of legal, technical, and regulatory frameworks to promote the sustainable development of renewable energy, nonconventional renewable energy, and energy efficiency. These types of measures represent approximately 35% of the policy commitments and triggers for the program. The operation will also help strengthen the sector's institutional framework, given its growing relevance, by establishing an energy ministry tasked with the sector's management and planning functions, and with preparing strategic plans for its development. It also includes other elements, such as the preparation of sector and institutional strategies and plans that will set a path toward universal access to electric power and the implementation of energy efficiency measures. The IDB is a strategic partner for implementing the reforms, owing to: (i) its experience with similar programs in other countries of the region (paragraph 1.36); (ii) the support it has provided to the country over the last decade on projects to facilitate access to electricity, infrastructure for electric power generation (renewable and nonconventional renewable energy sources), and electricity transmission in both stand-alone systems and the SIN, as well as various technical studies and operations in preparation for implementing energy efficiency measures, promoting gender equity in the sector, and developing sustainable renewable and nonconventional renewable energy sources (paragraph 1.34); and (iii) its close coordination with other cooperation agencies in the country (paragraph 1.35).

1.32 **Effectiveness of sector policy reforms.** According to the Organization for Economic Cooperation and Development,[24] regulatory reforms complement fiscal and monetary policies by creating suitable conditions for the sustainable development of countries. Sector policies should evolve at the same pace that economies transform, to ensure that infrastructure does not become a bottleneck but rather a driver of a country's economic development. The way in which infrastructure is used, meaning the services associated with this infrastructure, is what ultimately determines the impact on users. Therefore, it is a key factor in supporting the comprehensive development of economies. Effective sector policies with a crosscutting focus are essential for ensuring good infrastructure that is used properly. Some theoretical studies[25] conclude that limitations of institutional frameworks, regulations, and management can interfere with the provision of public infrastructure services, decreasing the quality and efficiency of public capital and affecting the incentives for companies to invest. Evidence has shown that regulatory framework reforms in the electricity sector may lead to an increase in investments in expanding electricity service coverage as well as new projects to generate power from renewable energy sources, resulting in diversification of the energy matrix and a reduction in greenhouse gas emissions.[26] Likewise, energy efficiency measures such as replacing light fixtures with more efficient ones are financially viable, since the required outlays can be recovered within three to seven years based on savings in electricity spending.[27]

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[24] Organization for Economic Cooperation and Development (2010), Regulatory Policy and the Road to Sustainable Growth.

[25] Chakraborty and Dabla-Norris (2009). The Quality of Public Investment.

[26] The Effects of Power Sector Reform on Energy Services for the Poor (2005). Department of Economic and Social Affairs, United Nations.

[27] Eficiencia Energética en Alumbrado Público. Technical note (2017). IDB.

1.33 The project completion report for operation 2848/OC-SU concluded that programmatic operations for policy reforms are appropriate instruments for supporting sector reforms involving multiple actors. Moreover, the main beneficiaries of these interventions are end consumers, in terms of their access to a diversified and sustainable energy supply.

1.34 **IDB support for the electricity sector.** During the past decade, the Bank has been a key development partner in the sector. It has provided broad support through five loans, 12 technical cooperation operations, a grant, and a MIF project totaling US$378 million. All these operations are consistent with the measures proposed for this program. Regarding power generation, the Bank financed the Misicuni Renewable Energy Hydroelectric Project (operation 2238/BL-BO), which added 120 MW to the SIN in 2017, resuming the installation of renewable energy sources in Bolivia after almost 20 years. For power transmission, three lines totaling more than 500 kilometers were financed, which strengthened the electricity supply and incorporated stand-alone systems into the SIN. Completed in 2016, the Rural Electrification Program I was responsible for more than 13,770 new connections, including pilot projects with hybrid photovoltaic systems. That operation is being supplemented by the Rural Electrification Program II (operation 3725/BL-BO), which is starting execution and finances measures that include the preparation of a national rural electrification plan; and by the Program for Rural Electrification with Renewable Energy (investment grant GRT/NV-14258-BO), currently in execution. The IDB is VMEEA's the main source of financing for rural electrification projects (US$165 million).[28] Lastly, through the Program to Support Preinvestment for Development (operation 3534/BL-BO), sector institutions[29] are conducting studies for transmission lines and renewable power generation projects to be implemented in coming years.

1.35 **Coordination with other donors.** The Bank coordinates its support for the sector with other cooperation agencies in Bolivia. These include: an ongoing dialogue with the Japan International Cooperation Agency concerning the feasibility analysis of the Laguna Colorada project; work on energy efficiency issues with Deutsche Gesellschaft für Internationale Zusammenarbeit, specifically to prepare a national energy efficiency policy and an energy efficiency strategy for the country; and work on renewable and nonconventional renewable energy issues with Agence Française de Développement, regarding the sustainable expansion of these technologies. The Bank also actively participates in the energy sector's coordination meetings, along with cooperation agencies and the VMEEA, which are part of the Group of Partners for Development in Bolivia (Sub-GruS Energy).[30] All these elements have been significant inputs and relevant sources of information for defining the policy actions for the operation's results matrix.

1.36 **Lessons learned for program design.** The design of this operation took into account the lessons learned from other IDB-financed operations to support policy reforms in the region's energy sector and the policies of other countries. In the

[28] Operations 2460/BL-BO, 3725/BL-BO, and GRT/NV-14258-BO.

[29] Energy, transport, irrigation, and health sectors.

[30] Participants in the Sub-GruS are: Agence Française de Développement, IDB, Embassy of Canada, Embassy of Japan, Financial Fund for the Development of the River Plate Basin, Deutsche Gesellschaft für Internationale Zusammenarbeit, Japan International Cooperation Agency, Kreditanstalt für Wiederaufbau, World Bank, VMEEA, European Union, and United Nations Industrial Development Organization.

energy sector, the most recent operations were: 3821/OC-CH (Chile); 4234/OC-PN (Panama); 3068/BL-NI (Nicaragua); 2848/OC-SU (Suriname); 2847/OC-PE (Peru); 3619/BL-HO (Honduras); and 3420/OC-EC (Ecuador).

1.37 To identify policy and program design commitments, the lessons learned from those operations that were applied to this one include: (i) provide preliminary support to develop technical tools such as action plans and studies, which will serve as inputs to prepare and implement policy commitments, seeking to enhance the impact of institutional and regulatory sector reforms proposed for the program; (ii) design the program's policy commitments to be developed sequentially and with clearly defined schedules and responsibilities, since policy measures, particularly regulatory measures, will require gradual implementation; (iii) prioritize substantive policy commitments such as laws, decrees, and ministerial resolutions, and establish a horizontal relationship between the commitments proposed for the program's two loan operations; (iv) identify and implement institutional and policy measure changes in a way that takes into account the outcomes of Bank-financed projects and technical cooperation operations and an ongoing dialogue with local sector authorities; and (v) involve in all stages of program design, in addition to the executing agency, other relevant sector institutions, such as the AFCSE, the National Load Dispatch Committee, and the Ministry of Development Planning as the entity responsible for budget management.

1.38 **Strategic alignment.** This program is aligned with the IDB country strategy with Bolivia 2016-2020 (document GN-2843), through the strategic objective of improving the delivery of quality public goods and services, and particularly, with instruments to support planning and operations. This program is included in the 2018 Operational Program Report (document GN-2915). The operation is consistent with the Update to the Institutional Strategy 2010-2020 (document AB-3008), and is aligned with the following development challenges: (i) productivity and innovation, by promoting the implementation of modern, more efficient technologies to generate and use energy; and (ii) social inclusion and equality, by promoting increased universal access to electricity services. The program is also aligned with the crosscutting themes of: (i) climate change and environmental sustainability, by helping reduce CO_2 emissions from the electricity sector (Approximately 30% of this operation's resources are associated with policies to promote climate change mitigation activities, according to the joint methodology of the multilateral development banks for tracking climate change adaptation finance. These resources contribute to the IDB Group target of increasing financing for climate-related projects to 30% of approvals by the end of 2020.); and (ii) gender equality and diversity, by promoting gender equity in the electricity sector with an action plan for ENDE's headquarters that promotes gender equity within the company. In addition, the project aligns with the Corporate Results Framework 2016-2019 (document GN-2727-6) through the indicators "reduction of emissions with support of IDB Group financing," "installed power generation from renewable energy sources," and "households with new or improved access to electricity supply."

1.39 The program is consistent with the Energy Sector Framework (document GN-2830-3), under the thematic lines of energy access, sustainability, security, and governance, by driving policy reforms that promote: (i) sustainable development of the sector; (ii) diversification of the energy mix through the use of renewable and nonconventional renewable energy sources; (iii) efficient use of energy; and (iv) increased access to energy. The operation is also consistent with the Climate

Change Sector Framework (document GN-2835-3), since the proposed energy policy reforms entail a reduction in greenhouse gas emissions. The program is also aligned with the priority areas of the IDB Infrastructure Strategy: Sustainable Infrastructure for Competitiveness and Inclusive Growth (document GN-2710-5), with actions that promote the rational use of energy infrastructure through energy efficiency and the development of infrastructure for more reliable, efficient systems.

1.40 **Consistency with the Public Utilities Policy.** The program is consistent with the objectives of the Public Utilities Policy (document GN-2716-6). The program complies with the policy's principles by improving planning to increase access to electricity, strengthening the institutional structure of the sector by separating functions, and establishing regulations that promote investment in renewable energy, nonconventional renewable energy, and energy efficiency. The actions proposed for the program will also help ensure the economic and financial sustainability of generation projects. To ensure that this this operation to support policy reforms complies with the specific conditions established in Section IV of the Public Utilities Policy (document GN-2716-6), cost/benefit and cost efficiency estimates of the reforms included in the proposed program were carried out, as was an analysis of its financial sustainability, which are provided in optional link 2.

B. Objectives, components, and cost

1.41 **General objective.** The program's general objective is to help improve the sustainability of the country's electricity sector through a series of policy reforms aimed at strengthening and supplementing the regulatory framework. The specific objectives are to: (i) ensure a macroeconomic context that is consistent with program objectives, as established in the policy matrix; (ii) strengthen the institutional framework of the sector for optimum planning and management of the generation, transmission, and distribution subsectors; (iii) facilitate diversification of the electricity matrix in a sustainable manner, based on the development of renewable and nonconventional renewable energy, including distributed generation; (iv) increase access to electricity in a reliable, sustainable manner in the country's rural areas; and (v) support increased energy efficiency.

1.42 **Component I. Macroeconomic stability.** This component will focus on consistency within the macroeconomic environment, in line with the program's objectives, and will provide ongoing monitoring to ensure alignment with the policy matrix and the policy letter for the sector.

1.43 **Component II. Consolidation of the sector's institutional framework and planning process.** The objective of this component is to strengthen the institutional framework of the electricity generation, transmission, and distribution subsectors through regulatory, management, coordination, and planning elements. This includes developing regulatory instruments[31] for the sector's operations in the medium term, as well as establishing strategic plans for the sector's most relevant institutions. The policy conditions agreed upon for the first operation are: (i) preparation of a legislative initiative proposal[32] for the electricity sector that promotes the sustainable development of renewable and nonconventional renewable energy, energy efficiency, and distributed generation, as well as the

[31] Laws, regulations, and technical standards.

[32] According to Bolivia's Constitution, the legislative process of enacting laws begins with the preparation of a legislative initiative, which can be proposed by the public, Assembly members, the Executive Branch, the Supreme Court, and/or the autonomous governments of territorial entities.

electricity generation, transmission, and distribution subsectors, in line with recent progress achieved on these domestically and internationally; (ii) establishment of the Ministry of Energy as the agency responsible for formulating, managing, and evaluating policies, rules, and plans for the comprehensive development of the electricity sector; (iii) approval of the Ministry of Energy's 2017-2020 Institutional Strategic Plan, establishing the strategic objectives and actions for the medium-term development of the electricity sector, to contribute to the outcomes, targets, and core tenets of the 2025 Patriotic Agenda and the 2016-2020 Economic and Social Development Plan; (iv) approval by ENDE's board of directors of the updated 2016-2020 Corporate Strategic Plan, pursuant to the provisions of the Ministry of Energy's 2017-2020 Institutional Strategic Plan; and (v) preparation of an action plan for ENDE's headquarters that promotes gender equity in the company's activities. The plan will include specific short-, medium-, and long-term actions.

1.44 The triggers for the second operation are: (i) submission by the Ministry of Energy of a legislative initiative proposal for the electricity sector for approval by the Plurinational Legislative Assembly; (ii) presentation of the public accountability reports of the Ministry of Energy and ENDE, showing progress in meeting the objectives and targets established in their respective strategic plans; and (iii) approval of the gender equity action plan and implementation by ENDE of the short-term actions included in this plan.

1.45 **Component III. Exploitation of renewable resources for electricity generation.** The objective of this component is to: (i) promote the sustainable development of renewable and nonconventional renewable energy based on regulatory and institutional improvements; (ii) facilitate the use of financial resources to develop generation projects using renewable and nonconventional renewable energy; and (iii) prepare rules that facilitate the development of distributed generation based on nonconventional renewable energy sources. These actions will help promote the diversification of the energy matrix in a sustainable manner and the development of renewable and nonconventional renewable energy sources, eliminating barriers that affect their development, and therefore facilitating project identification and execution. The agreed-upon policy commitment for the first operation is the preparation and approval by the Ministry of Energy of the following technical studies: (i) technical conditions to incorporate nonconventional renewable energy into the SIN; and (ii) operating and maintenance costs for nonconventional renewable energy projects, which will serve as input for preparing the technical standards and economic rules to regulate and ensure the sustainability of these projects.

1.46 The trigger for the second operation is the approval of the technical standards and economic rules to regulate and ensure the sustainability of: (i) nonconventional renewable energy projects; and (ii) distributed generation.

1.47 **Component IV. Reliable supply and efficient use of electricity.** The objective of this component is to create conditions to: (i) increase electricity service coverage in rural areas; and (ii) improve the efficiency of energy consumption through the implementation of energy efficiency measures. The energy efficiency measures considered will include the definition of new national regulations, standards, and guidelines to promote the efficient use of electricity in the public and private sectors, through changes in technology and efficient management of demand. The agreed-upon policy commitments for the first operation are: (i) preparation and entry into effect of a subsidiary agreement between the Ministry of Development Planning, the Ministry of Economy and Finance, and the Ministry of Energy, transferring resources

to the latter to prepare a master plan for electrification that optimizes interventions to develop access and expansion programs for nationwide rural electrification; (ii) preparation of a methodology proposal to set maximum recognized investment costs to connect new consumers to rural electrification grids, which will serve as the basis to prepare regulations for these costs; and (iii) preparation of a national energy efficiency policy proposal, to include: (a) an institutional framework; (b) a regulatory framework; and (c) priority sectors.

1.48 The triggers for the second operation are: (i) Ministry of Energy approval of the National Rural Electrification Plan; (ii) Ministry of Energy approval of the regulations to set maximum investment costs to connect new consumers to the rural electrification grid; (iii) Ministry of Energy approval and publication of a National Energy Efficiency Policy, to include: (a) an institutional framework; (b) a regulatory framework; and (c) priority sectors; (iv) approval and publication by means of a Supreme Decree of a National Energy Efficiency Strategy as an instrument to implement the National Energy Efficiency Policy, which will establish minimum quality standards for the efficient use of electricity in the residential, public, and transport sectors, among other; and (v) creation of a unit within the Ministry of Energy to support energy efficiency.

C. Key results indicators

1.49 **Expected results.** The program should generate benefits stemming from the diversification of the energy matrix with renewable and nonconventional renewable energy sources, enabling a reduction in greenhouse gas emissions of up to 3.3 million tons of CO_2, and the implementation of energy efficiency measures in street lighting and in the residential sector, facilitating a reduction of up to 1.4 million tons of CO_2. Other anticipated benefits are exports of surplus natural gas that is being displaced by renewable and nonconventional renewable energy, and lower generation costs from using certain renewable and nonconventional renewable energy technologies compared to using natural gas. These savings could reach US$100 million annually by 2023. In addition, energy efficiency measures will result in lower electricity outlays for street lighting by local entities, thereby freeing up resources for investment or spending in other sectors. Residential consumers will also have more disposable income due to lower electricity expenses, enabling the government to allocate fewer resources for subsidies. The total annual energy savings associated with energy efficiency measures could reach 1,358 GWh annually by 2023.

1.50 The achievement of program objectives will be measured taking as benchmarks the indicators and targets included in the results matrix, which reflects the scope of the two operations of the programmatic series. Table 1 presents the expected outcomes and their indicators.

Table 1. Expected outcomes and indicators

Impact	Indicator
Reduction in greenhouse gas emissions	Cumulative greenhouse gas emissions prevented by the power generation program (millions of tons of CO_2 equivalent)
	Cumulative greenhouse gas emissions prevented by the program due to the implementation of energy efficiency measures (millions of tons of CO_2 equivalent)
Outcome	**Indicator**
Component II. Consolidation of the sector's institutional framework and planning process	
Improved institutional structure of the energy sector through the separation of roles for hydrocarbons and electricity	Specific institutional structure for the energy sector implemented (structure).
Improved institutional framework and planning of institutional development for the sector in a coordinated manner among its most relevant actors	Comprehensive sector development plan approved (plan).
Increased participation of women in technical and leadership positions at ENDE	Percentage participation of women in technical and leadership positions at ENDE (%).
Component III. Exploitation of renewable resources for electricity generation	
Increased proportion of renewable and nonconventional renewable energy in the electricity generation matrix of the SIN	Percentage participation of renewable and nonconventional renewable energy in the electricity matrix (%)
Component IV. Reliable supply and efficient use of electricity	
Energy savings generated due to more efficient energy use	Annual energy savings due to the implementation of energy efficiency measures (GWh/year).
Increased electricity coverage nationwide	Nationwide electricity coverage (%)

* Greenhouse gas emissions calculated as emissions of CO_2 equivalent.

1.51 **Program beneficiaries.** Populations in all energy-demand sectors will benefit from the development of a sustainable energy mix through increased proportions of renewable and nonconventional renewable energy; the institutional strengthening of the sector for improved planning, management, and control; and the design and implementation of energy efficiency measures. They will also benefit from an energy supply that is less polluting, more efficient, and higher quality. The program will also benefit the sector's main institutions, such as the Ministry of Energy and ENDE, by improving sector operating policies and guidelines, as well as their coordination mechanisms.

II. Financing Structure and Main Risks

A. Financing instruments

2.1 The program is the first of two operations under the PBP modality, which are independent but technically linked, structured in accordance with "Policy-based Loans: Guidelines for Preparation and Implementation" (document CS-3633-1). The total for this first operation will be US$51.6 million, with a single disbursement. The loan dimensioning was based on the criterion set out in paragraph 3.27(b) of these guidelines, which refers to the country's broad fiscal resource needs. For 2018, the

central government's financing requirements are equivalent to 4.5% of GDP. The amount of this operation is intended to cover part of that financing (2.8% of the total financing requirements). The amount of the second operation will be defined in accordance with the country's financing requirements and the Bank's programming exercise. This loan modality is appropriate due to the complexity and time lines established for the development, dissemination, and implementation of the reforms included in the program. This could result in adjustments to the triggers going forward, due to the new knowledge acquired. Financing for this operation will be as follows: 85% from the regular Ordinary Capital resources and 15% from concessional Ordinary Capital resources.

B. Environmental and social risks

2.2 According to Directive B.13 of the Environment and Safeguards Compliance Policy (document GN-2208-20 and Operational Policy OP-703), this operation requires no environmental classification. The proposed reforms will not generate adverse environmental or social impacts, and the operation is not financing studies or works for the purpose of generating or transmitting electricity. Consequently, a strategic environmental assessment is not required.

C. Fiduciary risks

2.3 The operation does not pose fiduciary risks, since it provides unrestricted funds for budget support within a solid fiscal policy framework. Bolivia has an extensive track record of managing external loan resources and no financial management risks are anticipated. The Ministry of Development Planning has ample experience executing reform processes and will support the sector authorities that are leading the process in the energy sector for which this PBP is providing resources.

D. Other risks

2.4 As part of the program's design, a risk management workshop was conducted with the beneficiary entities using the Bank's methodology. This operation is considered to have a low risk level, since it has broad political support and a clear commitment from the Bolivian government for the sustainability of the policies agreed upon for this program. A risk assessment revealed a medium level monitoring and accountability risk, as well as potential noncompliance and delays in submitting the means of verification in the agreed-upon formats. The mitigation measures identified are: (i) preparation of a monitoring plan to include a schedule and milestones, in addition to coordination meetings with the respective sector entities (ENDE, VMEEA, AFCSE, CNDC, and the Living with Dignity Electricity Program); and (ii) appointment of staff in sector entities, who will be responsible for coordinating the monitoring and fulfillment of the required tasks. In addition, a medium level development risk was identified, which is the potential for delays in contracting and execution of consulting assignments to conduct agreed-upon activities. Mitigation measures for this risk are: (i) preparation of a monitoring plan with a schedule and major milestones; and (ii) coordination meetings with the respective sector entities and consulting firms. Moreover, the Bank, through a nonreimbursable technical-cooperation operation (ATN/OC-16595-BO) to support the preparation of this, the Program to Strengthen the Electricity Sector (BO-L1189), is supporting the preparation and fulfillment of some of the policy commitments.

III. Implementation and Management Plan

A. Summary of implementation arrangements

3.1 The borrower will be the Plurinational State of Bolivia and the executing agency will be the Ministry of Energy. That ministry will conduct periodical analysis and monitoring meetings to coordinate with the ENDE, the CNDC, the AFCSE, the VMEEA, and the Living with Dignity Electricity Program in order to fulfill programmatic policy commitments and consolidate sector reforms. The Ministry of Energy will be responsible for: (i) promoting the fulfillment of policy objectives; (ii) providing evidence that the agreed-upon policy conditions have been met; and (iii) compiling and providing information that will enable the Bolivian government and the Bank to measure and evaluate the program's results. As the executing agency, the Ministry of Energy will coordinate in advance with the Ministry of Development Planning to submit to the Bank each of the means of verification for the agreed-upon policy commitments.

3.2 **Special contractual conditions precedent to the sole disbursement of the loan proceeds.** Upon the entry into effect of the loan contract and verification that the special and general conditions precedent to disbursement have been fulfilled, a single disbursement of the financing is foreseen. **This single disbursement will be subject to compliance with the policy conditions set forth in the policy matrix, to the Bank's satisfaction, in addition to compliance with the remaining conditions established in the loan contract.** This compliance will be confirmed through the instruments identified in the means of verification matrix. The Bank may request an external audit of the program in the event it deems necessary.

3.3 To support fulfillment of the policy commitments established for the program's second loan operation, the Bank approved nonreimbursable technical-cooperation funding (operation ATN/OC-16595-BO). Specifically, this technical cooperation operation will support the policy commitments associated with: (i) the update of the study on variable operating and maintenance costs for nonconventional renewable energy projects; (ii) preparation of a policy and an action plan for ENDE's headquarters that promotes gender equity in the company's activities, for which the plan will include specific short-, medium-, and long-term actions; (iii) contracting of a consulting assignment to prepare a rural electrification master plan; and (iv) preparation of a national energy efficiency policy proposal.

B. Summary of results monitoring arrangements

3.4 The provisions detailed in the policy, means of verification, and results matrices constitute the key parameters for supervising and evaluating the program's outcomes. The Bolivian government's coordination team will verify that the policy commitments are fulfilled. The IDB will monitor program execution from its Country Office, as well as from the Energy Division. A detailed monitoring and evaluation plan has been prepared and includes the mechanisms to verify that program outcomes and objectives have been achieved. This plan provides for monitoring and coordination meetings with the government agencies involved in executing policy reforms, to follow up on the status and results of reform efforts. The Bolivian government and the Bank agreed to hold periodic meetings for monitoring and evaluation of the results matrix. Before processing the second operation of the programmatic series, the Bank will prepare a progress report to review the program's performance, the progress made on the reforms, and the status of triggers, which

will identify modifications and adjustments that may be required to achieve program targets.

3.5 Pursuant to the guidelines of IDB document OP-1242-5, the program team will prepare a project completion report at the end of the second loan operation. The report will assess the extent to which the program's expected outcomes were achieved.

IV. POLICY LETTER

4.1 The Bolivian government and the Bank have agreed upon the macroeconomic and energy sector policies to be supported by the program, which are included in the policy letter that the Ministry of Development Planning submitted to the Bank. This letter outlines the main components of the strategy for the PBP and confirms the commitment to comply with these agreements.

Development Effectiveness Matrix		
Summary	BO-L1189	
I. Corporate and Country Priorities		
1. IDB Development Objectives	Yes	
Development Challenges & Cross-cutting Themes	-Social Inclusion and Equality -Productivity and Innovation -Gender Equality and Diversity -Climate Change and Environmental Sustainability	
Country Development Results Indicators	-Installed power generation from renewable energy sources (%)* -Households with new or improved access to electricity supply (#)*	
2. Country Development Objectives	Yes	
Country Strategy Results Matrix	GN-2843	Strategic objective of improving the provision of quality public goods and services, and in particular, through instruments to support planning and operation
Country Program Results Matrix	GN-2915.	The intervention is included in the 2018 Operational Program.
Relevance of this project to country development challenges (If not aligned to country strategy or country program)		
II. Development Outcomes - Evaluability		Partially Evaluable
3. Evidence-based Assessment & Solution	7.7	
3.1 Program Diagnosis	3.0	
3.2 Proposed Interventions or Solutions	1.7	
3.3 Results Matrix Quality	3.0	
4. Ex ante Economic Analysis	N/A	
5. Monitoring and Evaluation	5.6	
5.1 Monitoring Mechanisms	1.1	
5.2 Evaluation Plan	4.5	
III. Risks & Mitigation Monitoring Matrix		
Overall risks rate = magnitude of risks*likelihood	Low	
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.13	
IV. IDB´s Role - Additionality		
The project relies on the use of country systems		
Fiduciary (VPC/FMP Criteria)		
Non-Fiduciary		
The IDB's involvement promotes additional improvements of the intended beneficiaries and/or public sector entity in the following dimensions:		
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	Yes	To support compliance with the policy commitments established for the second loan operation of the program, the Bank approved non-reimbursable TC resources BO-T1291.

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

The program is the first operation of a series of two under the modality of Policy Based Programmatic Loan (PBP). The overall objective of the program is to contribute to improving the sustainability of the electricity sector. The specific objectives include: (i) strengthening the sector's institutional framework for its optimal planning and management in the subsectors of generation, transmission and distribution; (iii) facilitate the diversification of the electricity matrix in a sustainable manner, based on the development of RE and NCRE, including distributed generation; (iv) increase the level of access to electric power in a reliable and sustainable manner in rural areas of the country; and (v) support the increase EE. The diagnosis presented is adequate and the proposed policy interventions respond to the problems and factors identified.

The vertical logic presented in the POD is consistent with the indicators presented in the results matrix, and includes indicators at the product, outcome and impact level. The indicators comply with SMART criteria and include baseline values and targets, as well as the sources and means of verification that will be used to measure the changes. In accordance with the changes to the DEM approved on January 30, the PBP does not present an economic analysis and includes the corresponding justification. The monitoring activities comply with the requirements of the DEM and an evaluation is proposed as before and after without attribution.

POLICY MATRIX

Objective: The program's general objective is to help improve the sustainability of the country's electricity sector through a series of policy reforms aimed at strengthening and supplementing the regulatory framework. The specific objectives are to: (i) ensure a macroeconomic context that is consistent with program objectives, as established in the policy matrix; (ii) strengthen the institutional framework of the sector for optimum planning and management of the generation, transmission, and distribution subsectors; (iii) facilitate diversification of the electricity matrix in a sustainable manner, based on the development of renewable and nonconventional renewable energy, including distributed generation; (iv) increase access to electricity in a reliable, sustainable manner in the country's rural areas; and (v) support increased energy efficiency.

OBJECTIVES	Policy commitments 2018 First programmatic operation	Triggers Second programmatic operation
Component I. Macroeconomic stability		
Ensure a macroeconomic context that is consistent with the program's objectives, as established in the policy matrix.	1.1 Maintain a macroeconomic context that is consistent with the program's objectives and the guidelines set forth in the policy letter for the sector.	1.1 Maintain a macroeconomic context that is consistent with the program's objectives and the guidelines set forth in the policy letter for the sector.
Component II. Consolidation of the sector's institutional framework and planning process		
Strengthen the sector's institutional framework for optimum management and planning in the generation, transmission, and distribution subsectors.	2.1 Prepare a legislative proposal[1] for the electricity sector that promotes the sustainable development of renewable and nonconventional renewable energy, energy efficiency, distributed generation, as well as the electricity generation, transmission, and distribution subsectors, in line with recent progress achieved on these domestically and internationally.	2.1 The Ministry of Energy submits a legislative proposal for the electricity sector to the Plurinational Legislative Assembly for approval.
	2.2 Establish the Ministry of Energy as the agency responsible for the formulation, management, and evaluation of policies, rules, and plans for comprehensive development of the electricity sector.	2.2 The Ministry of Energy and the National Electricity Company (ENDE) submit public accountability reports, documenting their progress in meeting the objectives and targets established in their respective strategic plans.
	2.3 Approve the Ministry of Energy's 2017-2020 Institutional Strategic Plan, establishing the strategic objectives and actions for the medium-term development of the electricity sector, with the aim of contributing to the outcomes, targets, and core tenets of the 2025 Patriotic Agenda and the 2016-2020 Economic and Social Development Plan.	

[1] According to the Bolivian Constitution, the legislative process for enacting laws begins with the preparation of a legislative proposal, which can be put forward by the public, Assembly members, the Executive Branch, the Supreme Court, and/or the autonomous governments of territorial entities.

OBJECTIVES	Policy commitments 2018 First programmatic operation	Triggers Second programmatic operation
	2.4 Approval by ENDE's executive board of the updated 2016-2020 Corporate Strategic Plan, pursuant to the provisions of the Ministry of Energy's 2017-2020 Institutional Strategic Plan.	
	2.5 Prepare an action plan for ENDE's headquarters that promotes gender equity in the company's activities. The plan will include specific short-, medium-, and long-term actions.	2.5 ENDE approval of the gender action plan and its implementation of the short-term actions contained therein.
Component III. Exploitation of renewable resources for electricity generation		
Facilitate sustainable diversification of the electricity matrix, based on the development of renewable and nonconventional renewable energy, and distributed generation.	3.1 The Ministry of Energy will prepare and approve the following technical studies: (i) technical conditions for incorporating nonconventional renewable energy into the National Interconnected System (SIN); and (ii) operating and maintenance costs for nonconventional renewable energy projects, which will serve as inputs to prepare the technical standards and economic rules to regulate and ensure the sustainability of these projects.	3.1 Approval of the technical standards and economic rules to regulate and ensure the sustainability of: (i) nonconventional renewable energy projects; and (ii) distributed generation.
Component IV. Reliable supply and efficient use of electricity		
Increase electricity access in rural areas of the country in a reliable and sustainable manner	4.1 Preparation and entry into effect of a subsidiary agreement between the Ministry of Development Planning, the Ministry of Economy and Finance, and the Ministry of Energy, transferring resources to the latter to prepare a master plan for electrification that optimizes interventions to develop access and expansion programs for nationwide rural electrification.	4.1 Ministry of Energy approval of the National Rural Electrification Plan.
	4.2 Prepare a methodological proposal to set maximum recognized investment costs to connect new consumers to rural electrification grids, which will serve as the basis for preparing regulations for these costs.	4.2 Ministry of Energy approval of the regulations to set maximum investment costs to connect new consumers to the rural electrification grid.
Support increased energy efficiency	4.3 Prepare a national energy efficiency policy proposal, to include: (a) an institutional framework; (b) a regulatory framework; and (c) priority sectors.	4.3 Ministry of Energy approval and publication of a national energy efficiency policy, to include: (i) an institutional framework; (ii) a regulatory framework; and (iii) priority sectors.

OBJECTIVES	Policy commitments 2018 First programmatic operation	Triggers Second programmatic operation
		4.4 Approval and publication, via Supreme Decree, of the National Energy Efficiency Strategy as an instrument to implement the National Energy Efficiency Policy, which will establish minimum quality standards for the efficient use of electricity in the residential, public, transport, and other sectors.
		4.5 Creation of a unit within the Ministry of Energy to support energy efficiency.

DOCUMENT OF THE INTER-AMERICAN DEVELOPMENT BANK

PROPOSED RESOLUTION DE-__/18

Bolivia. Loan ____/BL-BO to the Plurinational State of Bolivia
Program to Strengthen the Electricity Sector

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 Plurinational State of Bolivia, as Borrower, for the purpose of granting it a financing to cooperate in the execution of the Program to Strengthen the Electricity Sector. Such financing will be chargeable to the Bank´s Ordinary Capital (OC) resources in the following manner: (i) up to the amount of US$7,740,000, subject to concessional financial terms and conditions ("Concessional OC"); and (ii) up to the amount of US$43,860,000, subject to financial terms and conditions applicable to loan operations financed from the Bank's regular program of OC resources ("Regular OC"), as indicated in the Project Summary of the Loan Proposal, and subject to the Special Contractual Conditions of said Project Summary.

(Adopted on ___ _____ _____)

LEG/SGO/CAN/EZSHARE-1720032226-13010
BO-L1189