DOCUMENT OF THE INTER-AMERICAN DEVELOPMENT BANK

MEXICO

PROGRAM TO SUPPORT IMPLEMENTATION AND STRENGTHENING OF THE ENERGY REFORM

(ME-L1264)

LOAN PROPOSAL

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ABBREVIATIONS

AAGR	Average annual growth rate
AFD	French Development Agency
CCSE	Consejo de Coordinación del Sector Energético [Energy Sector Coordination Council]
CCTE	Consejo Consultivo para la Transición Energética [Advisory Council on Energy Transition]
CELs	Clean energy certificates
CENACE	Centro Nacional de Control de Energía [National Center for Energy Control]
CENAGAS	Centro Nacional de Control de Gas Natural [National Center for Natural Gas Control]
CFE	Comisión Federal de Electricidad [Federal Electricity Commission]
CNH	Comisión Nacional de Hidrocarburos [National Hydrocarbons Commission]
CONUEE	Comisión Nacional para el Uso Eficiente de la Energía [National Commission for Efficient Energy Use]
CRE	Comisión Reguladora de Energía [Energy Regulatory Commission]
ECLAC	Economic Commission for Latin America and the Caribbean
EIL	Electricity Industry Law
ETE	Transition Strategy to Promote the Use of Cleaner Technologies and Fuels
ETL	Energy Transition Law
FSUE	Fondo de Servicio Universal Eléctrico [Universal Electricity Service Fund]
GDP	Gross domestic product
GHG	Greenhouse gases
GW	Gigawatt
GWh	Gigawatt-hour
INEEL	Instituto Nacional de Electricidad y Energías Limpias [National Institute for Clean Electricity and Energy]
IRR	Internal rate of return
MEM	Wholesale Electricity Market
MtCO2e	Million metric tons of carbon dioxide equivalents
NDC	Nationally determined contribution
NPV	Net present value
PBP	Programmatic policy-based loan
PCR	Project Completion Report
PEMEX	Petróleos Mexicanos
PETE	Programa Especial de Transición Energética [Special Energy Transition Program]
POD	Proposal for Operations Development
PREI	Smart Networks Program
PRODESEN	Programa de Desarrollo del Sector Eléctrico Nacional [National Electric Sector Development Program]
PRONASE	Programa Nacional para el Aprovechamiento Sustentable de Energía [National Program for Sustainable Energy Development]
SEMARNAT	Department of Environment and Natural Resources

SEN	National Electric System
SENER	Department of Energy
SHCP	Department of Finance
SISTRANGAS	Sistema de Transporte y Almacenamiento Nacional Integrado de Gas Natural [National Integrated System of Natural Gas Transportation and Storage]
SNG	Sistema Nacional de Gasoductos [National Gas Pipeline System]

PROJECT SUMMARY

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<table>
<tr><th colspan="5">Financial Terms and Conditions</th></tr>
<tr><td colspan="3" rowspan="2">Borrower: United Mexican States</td><td colspan="2">Flexible Financing Facility[b]</td></tr>
<tr><td>Amortization period:</td><td>Bullet payment on 15 October 2030</td></tr>
<tr><td colspan="3" rowspan="2">Executing agency: Department of Energy (SENER)</td><td>Disbursement period:</td><td>12 months</td></tr>
<tr><td>Grace period:</td><td>Bullet payment on 15 October 2030[c]</td></tr>
<tr><td>Source</td><td>Amount (US$)</td><td>%</td><td>Interest rate:</td><td>LIBOR-based</td></tr>
<tr><td rowspan="2">IDB (Ordinary Capital) (OC)</td><td rowspan="2">600,000,000</td><td rowspan="2">100</td><td>Credit fee:</td><td>[d]</td></tr>
<tr><td>Inspection and supervision fee:</td><td>[d]</td></tr>
<tr><td>Total</td><td>600,000,000</td><td>100</td><td>Weighted average life (WAL):</td><td>12.65 years[e]</td></tr>
<tr><td>Parallel financing[a]</td><td>€ 100,000,000</td><td></td><td>Approval currency:</td><td>U.S. dollars from the Bank’s OC</td></tr>
<tr><th colspan="5">Project at a Glance</th></tr>
<tr><td colspan="5">Project objective/description: To recognize the actions that contribute to a secure energy supply and to the sustainability of the Mexican energy sector. The specific objectives are: (i) to strengthen the energy sector’s institutions in terms of regulation, information generation, planning, operation, and coordination; (ii) ensure the supply of natural gas and the expansion of the national gas pipeline network; (iii) reduce electric power distribution losses; (iv) help reduce greenhouse gas (GHG) emissions by promoting both the use of cleaner technologies and fuels in electric power generation and the implementation of energy efficiency measures; and (v) close the gap in access to electricity service in rural communities and marginalized urban areas in a sustainable manner.

This is the first operation in a programmatic policy-based series to be comprised of two independent and technically connected loans, in accordance with document CS-3633-1.</td></tr>
<tr><td colspan="5">Special contractual conditions precedent to the first loan disbursement: The following will be special contractual conditions precedent to the first and only disbursement under the first operation of the series: (i) signing of the agency agreement between the borrower and a financial agent; and (ii) fulfillment of the policy reform conditions set forth in the Policy Matrix (Annex II) and all other conditions provided in the relevant loan contract (paragraph 3.5).</td></tr>
<tr><td colspan="5">Exceptions to Bank policies: None</td></tr>
<tr><th colspan="5">Strategic Alignment</th></tr>
<tr><td>Challenges:[f]</td><td colspan="4">SI ☑ PI ☑ EI ☐</td></tr>
<tr><td>Crosscutting themes:[g]</td><td colspan="4">GD ☐ CC ☑ IC ☑</td></tr>
</table>

[a] The parallel financing is in the form of a loan for development policies from the French Development Agency (AFD).

[b] Under 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. When considering such requests, the Bank will take operational and risk management considerations into account.

[c] Under the flexible reimbursement options provided by the Flexible Financing Facility (FFF), changes in the grace period are possible provided that the original weighted average life (WAL) of the loan and last payment date, as documented in the loan contract, are not exceeded.

[d] The credit fee and inspection and supervision fee will be established periodically by the Board of Executive Directors during its review of the Bank’s lending charges, in accordance with the corresponding policies.

[e] The maximum original weighted average life and the grace period may be shorter, depending on the effective signature date of the loan contract.

[f] SI (social inclusion and equality); PI (productivity and innovation); and EI (economic integration).

[g] 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 **Macroeconomic situation.** Mexico continues to exhibit moderate growth. In 2016 the Mexican economy grew by 2.3%, below the 2015 growth rate of 2.6%. The low international oil prices prevalent since 2014 and the limited growth in industrial activity in the United States affected the performance of the Mexican industrial sector, which in 2016 contracted by 0.1% on an annual basis. Economic growth in 2016 was primarily attributed to the service sector, which grew at an annual rate of 3.3%. This sector benefited from low inflation, which led to higher disposable income, as well as from remittances and tourism, the latter being boosted by the currency depreciation.

1.2 For 2017, growth is expected to be similar to the rate in 2016. In the first half of the year, the economy grew at a 2.8% annualized rate. A moderate slowdown is expected in the second half, as a rise in inflation and a concomitant reduction in disposable household income are projected to lead to lower private consumption. The rise in inflation is the outcome of the gradual lifting of gasoline and gas price controls, transfer of exchange rate changes to prices, and climate factors affecting agricultural prices. These effects, however, are expected to dissipate and inflation is expected to return to the target range of 3.0% +/- 1% in 2018.

1.3 Faced with a reduction in tax revenue as a result of the decline in oil prices and production, coupled with an increase in financial volatility due to uncertainty as to the country's external context, the Department of Finance (SHCP) announced preventive cuts in public expenditure in 2016 on the order of 1.1% of gross domestic product (GDP) and proposed a primary surplus for 2017 that would allow stabilizing the public debt as a percentage of GDP. In addition, in view of the increased risks of a spike in inflation due to a higher exchange rate parity, the Banco de México [Mexico's central bank] raised its monetary policy interest rate on five occasions in 2016 and again four times in 2017, placing it at 6.50%.

1.4 Mexico's energy reform[1] is born of the need to modernize the country's energy sector by allowing private firms to participate in hydrocarbon exploration and development, natural gas processing, and the basic petrochemical industry. The new energy model envisages private participation in the storage, transportation, and distribution of oil, natural gas, and oil derivatives, and guarantees open and equal access to the use of pipeline transportation and storage infrastructure for hydrocarbons and derivatives.

1.5 With regard to electricity, the energy reform provides actions to boost private-sector participation in electrical power generation (including development of geothermal resources), ensuring free access to the national transmission network for generators, as well as in electrical power marketing. The reform also includes a budget mechanism for moving forward on electrification for the population that still lacks access to electricity, setting forth requirements in terms of renewable energy generation along with energy efficiency goals.

1.6 The energy reform was launched in 2013 through amendments to three articles of the Mexican Constitution (articles 25, 27, and 28), giving rise to the enactment of

[1] A detailed explanation may be found at: http://reformas.gob.mx/.

10 new laws, modification of 12 existing laws, and issuance of 25 sets of regulations and a code.

1.7 The objectives of the energy reform notably include: (i) reduce the country's exposure to the financial, geological, and environmental risks associated with oil and natural gas exploration and extraction; (ii) attract greater investment to the energy sector; (iii) obtain a larger supply of energy products at better prices; (iv) ensure international standards of efficiency, quality, and reliability of the energy supply; (v) promote socially and environmentally responsible development; (vi) replenish proven oil and natural gas reserves; and (vii) replace the more polluting power plants with clean power generation technologies.

1.8 **Situation in the energy sector.** In 2015, the energy sector accounted for 7.3% of the GDP and 6.1% of the country's total exports. Of the total primary energy supply (8,529 petajoules, (PJ)), fossil fuels accounted for 91.1%, including 40.5% in crude oil and oil derivatives, 44.4% in natural gas, and 6.2% in coal. Renewable energy had a 7.5% share of the total supply, and nuclear energy a 1.4% share. Final energy consumption totaled 5,095 PJ (74.9% in fossil fuels, 17.6% in electric energy, 5.0% in firewood, and 2.5% in others).[2]

1.9 In 2005, primary energy production began to decline in tandem with a sustained increase in national energy consumption. In 2015, energy consumption in Mexico for the first time exceeded primary energy consumption (by 3.2%),[3] resulting in an energy independence index[4] of 0.97.

1.10 In 2015, natural gas production totaled 4.067 billion daily cubic feet. In the 2005-2015 period, national production declined to an average annual growth rate (AAGR) of -0.4%, while national demand for natural gas recorded an AAGR of 4.0%. This resulted, in 2015, in an energy independence index for natural gas of 0.53. In 2015, demand for natural gas was 7.504 billion daily cubic feet, or 43.8% of total hydrocarbon demand, which was 17.115 billion daily cubic feet of natural gas equivalents. It is estimated that, in 2030, demand for natural gas will rise 20.3% with respect to 2015. Meeting this demand will necessitate an increase in natural gas production, but will also require expanding the national gas pipeline network. As of December 2015, prior to the start of the energy reform, this network totaled approximately 9,000 km[5] and provided limited coverage, as it did not include areas located in the western-central, northern and central Pacific coast, or southern regions of the country.

1.11 With regard to the electricity subsector, installed capacity in 2016 was 73.5 gigawatts (GW) (71.2% fossil fuels, primarily natural gas; 25.2% renewable energy, primarily hydropower; and 3.6% nuclear energy and cogeneration). Generated energy totaled 319,364 gigawatt-hours (GWh). Consumption by sector was as follows: 57.7% industrial; 26.4% residential; 11.2% commercial and services; and 4.7% agricultural. The electricity subsector is one of the most dynamic in the Mexican economy: in the last 10 years it had an AAGR of 4.1%,

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2 SENER, Balance Nacional de Energía [National Energy Balance].

3 SENER, Balance Nacional de Energía 2015.

4 Refers to the ratio between national energy production and consumption.

5 Natural Gas Projections 2016-2030.

exceeding the country's GDP of 2.1% for the same period. In 2016, the electricity subsector accounted for 1.9% of Mexico's GDP.

1.12 In 2013, greenhouse gas (GHG) emissions totaled 665.3 million metric tons of carbon dioxide equivalents ($MtCO_2e$). The energy sector accounted for 207 $MtCO_2e$ and the transportation sector was responsible for 174 $MtCO_2e$. Thus, these two sectors combined generated 57% of all GHG emissions, followed by the industrial sector (17%) and the agricultural sector (12%). The residential, waste, and land-use sectors together accounted for the remaining 14%. Within the energy sector, the electricity subsector generated 127 $MtCO_2e$ and the hydrocarbon sector generated 80 $MtCO_2e$.[6]

1.13 Energy efficiency, measured as energy consumption per unit of GDP, has been continuously improving. This indicator of energy intensity went from 673.7 kJ/unit of GDP in 2010 to 604.5 kJ/ unit of GDP in 2015, for a 10.3% reduction. This means that, in the past five years, the AAGR was -1.2%. However, there is still considerable potential for improvement in energy efficiency: in 2014, Mexico had an energy intensity of 0.16 tons of oil equivalent (toe) per US$1,000 of GDP,[7] compared to 0.04 toe for Switzerland; 0.08 toe for Germany, Spain, and Japan; 0.10 toe for Colombia; 0.11 toe for Costa Rica; 0.13 toe for Brazil; and 0.14 toe for Chile and the United States.

1.14 From 2012 to 2016, electric power distribution losses declined from 15.3% to 12.3% as a result of actions aimed at reducing irregular consumption as well as investments in projects to modernize and optimize the general distribution networks. In 2016, total electric power distribution losses were 35,532 GWh, of which 13,800 GWh were technical losses and 18,539 GWh were non-technical losses.[8] Losses in Mexico well exceed average losses in member countries of the Organization for Economic Cooperation and Development (OECD), which are 6.3%.[9] According to the National Electricity Sector Development Program (PRODESEN), distribution losses in 2016 resulted in a revenue loss of more than US$1.400 billion for the year.

1.15 With regard to access, while the country has a high percentage of electricity coverage (98.6% as of December 2016), more than 40,000 communities and 450,000 families continue to lack access to electricity. This means that there are 1.8 million people in Mexico without this service. The most significant barriers to broader electrification are geographic dispersion and the difficulty of reaching the unserved communities. It is also worth noting that, according to the 2013 Census of Basic and Special Education Schools, Teachers, and Students, these communities house more than 42,000 special, preschool, primary, and secondary education classrooms that have no access to electricity.

1.16 **Energy sector institutions.** The sector's significant institutional actors are: the Department of Energy (SENER), which sets sector policies and is responsible for

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6 SEMARNAT, Instituto Nacional de Ecología y Cambio Climático [National Ecology and Climate Change Institute], Primer Informe Bienal de Actualización ante la Convención Marco de las Naciones Unidas sobre el Cambio Climático [First Biannual Update Report before the United Nations Framework Convention on Climate Change].

7 International Energy Agency, Atlas of Energy.

8 SENER, PRODESEN 2017-2031.

9 World Bank, Electric power transmission and distribution losses.

sector planning; the Energy Regulatory Commission (CRE), which regulates the sector; the National Hydrocarbons Commission (CNH), which regulates hydrocarbon exploration and extraction; the National Center for Natural Gas Control (CENAGAS), which is responsible for the National Integrated System of Natural Gas Transportation and Storage (SISTRANGAS); the National Center for Energy Control (CENACE), which operates the National Electric System (SEN) and the Wholesale Electricity Market (MEM); the National Commission for Efficient Energy Use (CONUEE), which promotes energy efficiency and operates as a technical agency on sustainable energy development issues; the Federal Electricity Commission (CFE), a State-owned production company that participates in the MEM through its subsidiaries and affiliates, engaging in electric power transmission and distribution as well as in electricity supply; the Energy Transition and Sustainable Energy Development Fund, which is a public policy instrument of SENER designed to implement actions to promote renewable energy and energy efficiency use, development, and investment; and the Electric Energy Savings Trust (FIDE), a private, nonprofit entity that provides energy efficiency financing and certification and implements energy efficiency programs. In addition, as a result of the energy reform, electricity market participants include private energy generators, distributors, and suppliers of both basic and qualified services.[10]

1.17 **Legal framework for the energy sector.** The institutional changes made in 2013 led to the enactment of 10 new laws: the Laws on (i) Hydrocarbons; (ii) the Electricity Industry; (iii) Geothermal Energy; (iv) the National Agency for Industrial Safety and Environmental Protection in the Hydrocarbons Sector; (v) Petróleos Mexicanos (PEMEX); (vi) the CFE; (vii) Energy-related Coordinated Regulatory Agencies; (viii) the Fondo Mexicano del Petróleo para la Estabilización y el Desarrollo [Mexican Oil Fund for Stabilization and Development]; and (ix) Hydrocarbon Revenues, published in 2014, and (x) the Energy Transition Law, published in December 2015.

1.18 Based on these new laws, new regulations, instruments, and programs were issued to implement the energy reform and thereby modernize the energy sector in order to ensure sufficient and timely supply of energy at competitive prices and within a framework of environmental sustainability.

1.19 As a result of the new legal framework, SENER's responsibilities were expanded and modified, along with those of the CRE, CNH, CENACE, and the National Institute for Clean Electricity and Energy (INEEL). In addition, the new framework resulted in the creation of CENAGAS.

1.20 Worth noting in the context of the energy reform is the Hydrocarbons Law, which has modified the way in which the industry is structured. Formerly controlled by the State, the hydrocarbons industry is now open to private-sector investment while continuing to be led and regulated by the State, and PEMEX has been transformed from an autonomous State company to a State-owned production company.

1.21 The Hydrocarbons Law provided for the creation of CENAGAS, which in its capacity as manager of the SISTRANGAS, ensures market agents free access to this system and promotes the growth of the national gas pipeline network.

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[10] Qualified services refer to end users that have load centers of more than one MW. Basic services refer to end users that do not participate in the MEM.

1.22 The Electricity Industry Law provided a new regulatory framework to govern this industry. Under this law, the SEN's planning and control areas, as well as the electric power transmission and distribution service, remained in State hands, while power generation and marketing activities were made available for private-sector participation. The Electricity Industry Law created the Universal Electricity Service Fund (FSUE) to provide electricity access to the 1.5% of the population that continues to lack this service.

1.23 The Electricity Industry Law promotes clean energy sources and a reduction of pollutants, particularly GHG emissions. Accordingly, it requires the acquisition of clean energy certificates (CELs) showing that a certain amount of electric energy has been produced from clean energy sources.

1.24 The CELs, to be issued by the CRE, are instruments documenting the production of a certain volume of electric energy from clean energy sources in compliance with the requirements to be met by qualified suppliers and users and published in the Diario Oficial de la Federación [Federal Official Gazette]: (i) 5.0% in 2018; (ii) 5.8% in 2019; (iii) 7.4% in 2020; (iv) 10.9% in 2021; and (v) 13.9% in 2022.[11]

1.25 The Energy Transition Law governs the requirements in terms of clean energy sources and a reduction of electricity industry emissions, while maintaining the competitiveness of the productive sectors.

1.26 **The Government of Mexico's strategy.** Through the energy reform, the Mexican government seeks to foster greater competitiveness on the part of its public companies and open the industry to private-sector participation, as well as effect a change from a fuel consumption-based to a low emissions-based system.

1.27 In the hydrocarbons subsector, the Hydrocarbons Law lays the foundation for achieving greater investments in hydrocarbon exploration and extraction, which will enable an increase in national production, the replenishment of reserves, and expansion of the national oil pipeline network. Under the Hydrocarbons Law, SENER is tasked with issuing a five-year expansion and optimization plan for SISTRANGAS, to be managed by CENAGAS.

1.28 In the electricity subsector, the energy reform will foster an increased share of clean energy sources in the power generation mix and greater energy efficiency in both generation and consumption, leading to reduced GHG emissions. In addition, the energy reform will promote a low-carbon economy, intensifying energy efficiency practices and substantially reducing the use of fossil fuel in electricity generation.

1.29 The Energy Transition Law establishes goals in terms of increasing the share of clean energy sources in the power generation mix.[12] The law's core planning instrument is the Transition Strategy to Promote the Use of Cleaner Technologies

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[11] DOF, AVISO por el que se da a conocer los requisitos para la adquisición de Certificados de Energías Limpias en 2020, 2021 y 2022 establecidos por la Secretaría de Energía [NOTICE describing the requirements established by the Department of Energy for acquiring clean energy certificates in 2020, 2021, and 2022].

[12] The minimum goals in terms of the share of clean energy sources in the generation of electric energy are: 25% by 2018, 30% by 2021, 35% by 2024, 40% by 2035, and 50% by 2050.

and Fuels (ETE).[13] The programs for reaching the above-mentioned goals are: the Special Energy Transition Program (PETE) and the National Program for Sustainable Energy Development (PRONASE).

1.30 **Sector challenges.** In terms of supply security, the main challenges in implementing the energy reform are: (i) ensuring sufficient and timely supply at competitive prices to address the growing demand for natural gas, which requires expanding the capacity and coverage of the transportation infrastructure; and (ii) increasing the electricity generation capacity in view of the projected growth in demand, estimated to reach 471 terawatt-hours (TWh) in 2029, which will require doubling the generation capacity to 125.4 GW.[14] In terms of sustainability, the main challenges are: (i) helping to fulfill the objectives and commitments on GHG emission reductions established in the General Law on Climate Change and in Mexico's Nationally determined contribution (NDC); and (ii) improving energy efficiency so as to reach the existing savings potential and accomplish a greater reduction in energy intensity. In addition, the energy reform faces the challenges of: (i) providing electricity access to the more than 1.9 million inhabitants who lack this service; and (ii) reducing electric power distribution losses.

1.31 **Paris Agreement.** At the Conference of the Parties of the United Nations Framework Convention on Climate Change held in Paris in 2015, the following objectives were agreed upon:[15] (i) hold the increase in the global average temperature to well below two degrees Celsius above preindustrial levels; (ii) achieve net zero GHG emissions by the second half of the 21st century; and (iii) increase the ability to adapt to, foster resilience to, and reduce vulnerability to climate change.

1.32 Mexico's General Law on Climate Change establishes the indicative objective of reducing the country's emissions by 30% by 2020 with respect to its baseline,[16] and by 50% by 2050 with respect to the 2000 emissions.[17] In its NDC, Mexico undertook to unconditionally reduce its GHG emissions by 22% by 2030 with respect to the country's baseline.[18]

1.33 **Proposal.** At the request of the Government of Mexico, the Inter-American Development Bank (IDB) has supported the energy reform process with technical assistance ranging from support for the preparation of the regulatory framework in specific areas to operational mechanisms for the implementation of various aspects included in the energy reform.

1.34 The IDB's experience in energy, and specifically in issues related to energy reform, has added value to the process of formulating and implementing the energy reform in Mexico.

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13 As part of this strategy, SENER created the FSUE, which will finance the electrification of rural communities.

14 PRODESEN.

15 Paris Agreement.

16 For 2020 (baseline), emissions are estimated at 792 $MtCO_2e$.

17 Chamber of Deputies, LXIII Legislature, General Law on Climate Change.

18 For 2030 (baseline), emissions are estimated at 973 $MtCO_2e$.

1.35 With a view to moving forward on energy reform sustainability and security, the Government of Mexico asked the IDB to structure financing in the form of a programmatic policy-based loan (PBP). A reform of this magnitude and scope needs to be implemented sequentially. In addition, implementing the energy reform may necessitate unforeseen adjustments, which could in turn require modifying or creating new triggering mechanisms for the second phase of the program. For these reasons, the Government of Mexico considered that this financing modality would ensure proper implementation and continuity of the reform.

1.36 The changes generated by the energy reform, which entail greater private-sector participation, the creation of new institutions, as well as expansion and modification of existing institutions, require participation, consultation, and coordination mechanisms enabling the development and implementation of procedures, programs, and public policies on a consensual basis with the agents involved and on a coordinated basis among the various government institutions involved. The actions considered in the program will make it possible to strengthen the institutional framework and reinforce coordination with the private and social sectors as a key step in achieving implementation of the energy reform.

1.37 With regard to energy security, it is essential to undertake actions that stimulate greater private-sector participation in the energy market, primarily in the case of natural gas, which has the highest import volume and the supply of which is crucial for electricity generation and for the operation of key Mexican industries. These actions notably include having medium-term plans for the natural gas transportation infrastructure, as well as ensuring a systematic, sufficient, and timely dissemination of key information on the natural gas market. The envisaged actions will help to reduce the existing shortcomings in terms of the size of the national gas pipeline network. Prior to the energy reform, this network totaled 9,000 km. By 2019, it will have an additional 6,000 km, extending coverage to regions of the country that previously did not have access to natural gas. Moreover, reducing electric power distribution losses will make a larger supply of natural gas available for final consumption. According to the PRODESEN, the goal is to reduce losses from 15.3% in 2012 to 9.5% by 2019.

1.38 With regard to sector sustainability, there is a need for measures that can provide a solid programmatic and legislative framework for fulfillment of the clean energy and energy efficiency goals. Such measures will foster an increase in the share of clean, primarily renewable, energy sources in the power generation mix. In 2013, prior to the energy reform, this share was 8.4% and, according to the goals, it will rise to 25% in 2018, 30% in 2021, and 35% in 2024, reaching 50% by 2050. With respect to energy efficiency, the goal is to achieve a final energy consumption index of 341 kJ/$GDP in 2018, as compared to 361 kJ/$GDP in 2013.

1.39 **Extent of fulfillment of policy commitments.** To ensure the continuity of the actions and policies envisaged for the first operation of this PBP, triggering mechanisms are proposed for the second operation, notably including: fulfillment of the responsibilities of the advisory and coordinating entities as mechanisms to enable achievement of the planned electrification rates as well as participation by all agents involved and coordination among energy sector institutions; systematization of information enabling the private sector to actively participate in the use and

expansion of the national gas pipeline network; progress in increasing clean energy's share of electricity generation; and energy efficiency actions.

1.40 **Sector knowledge.** The Bank has extensive experience in the Mexican energy sector. Through technical cooperation projects and loan operations, it supports: (i) implementation of the energy reform; (ii) strengthening of SENER's planning capacity; (iii) management of clean energy knowledge and promotion; (iv) investment in natural gas and clean energy projects; (v) implementation of cogeneration projects; (vi) exploration of sites with geothermal potential; and (vii) energy efficiency in industrial and agro-industrial companies, in homes, and in public buildings and public lighting.

1.41 With regard to technical cooperation operations, the Bank carried out the technical cooperation project Institutional Strengthening for Energy Reform Implementation (ATN/OC-15797-ME; ATN/OC-15798-ME), which supports: (i) preparing 11 manuals on MEM activities. These operating provisions provide calculation principles, rules, instructions, guidelines, examples, and procedures to be followed for MEM management, operation, and planning, as well as detailed formulas, specifications, technical notes, and operational criteria for implementing the terms of the MEM; (ii) reviewing and adjusting the methodology for computing technical losses in the MEM, which is highly important since the management of this methodology determines the funds that will be delivered to the FSUE for purposes of electrifying rural communities and marginalized urban areas that continue to lack access to electricity; (iii) estimating the resources to be received by the FSUE and the investments needed to accomplish the electrification goals; (iv) reviewing and issuing recommendations on the model used for electricity sector planning that serves as a basis for preparing and updating the PRODESEN; (v) determining the key components of public policy on natural gas supply, the objective of which is to foster greater use of natural gas in the residential sector; (vi) preparing the model agreement for medium-term auctions for the purchase of energy, power, and CELs; and (vii) outlining strategic guidelines for a natural gas policy, primarily aimed at identifying components for the adoption of public policies that encourage production growth and replenishment of natural gas reserves.

1.42 The technical cooperation operation Strengthening SENER's Planning Capacity (ATN/OC-15346-ME; ATN/JF-15523-ME) is aimed at developing and launching a decision-making center for information management and deployment, allowing SENER specialists and decision-makers to make energy forecast analyses by simulating various scenarios for electricity and hydrocarbon supply and demand.

1.43 In addition, the Bank is implementing the technical cooperation operation Energy Efficiency Project in Cities – Emerging and Sustainable Cities Program (ATN/FG-16075-ME); grant operation ME-G1012; and grant operation GRT/FM-13249-ME, Promotion and Development of Local Wind Technologies in Mexico.

1.44 Since 2014, the Bank has approved operations in the amount of US$735.8 million for the following programs: CTF-IADB "ECOCASA" Program (2896/OC-ME); Geothermal Financing and Risk Transfer Program (3178/OC-ME); Financing Program for the Promotion of Cogeneration in Mexico (3237/OC-ME); Financial Program to Promote the Gas Market, Cogeneration, and Renewable Energy

(3624/OC-ME); Financing Program for Investment and Risk Management in Gas and Clean Energy Projects (3563/OC-ME); and First Program for the Financing of Rural Sector Productive Restructuring and Investment Projects (3335/OC-ME). Through the IIC, the IDB Group supports the operations Program for the Sustainability of Water Supply and Sanitation Services in Rural Communities III (2512/OC-ME) and Optima Energía Energy Efficient Roadway Lighting (3519A/OC-ME).

1.45 Prior to the above-mentioned technical cooperation projects and loan operations, the Bank supported various activities that paved the way for the energy reform. These activities ranged from assessments of potential and financing of various wind projects to the drafting of the Law for the Development of Renewable Energy and Energy Transition Financing, which facilitated the drafting of the Energy Transition Law.

1.46 **Lessons learned.** The Bank has gained experience and lessons learned in support of policy reforms in the sector through operations in various countries, such as: Nicaragua (3068/BL-NI); Suriname (2848/OC-SU); Peru (2847/OC-PE); Honduras (3619/BL-HO); and Ecuador (3420/OC-EC). These operations share the common feature of support for achieving the objectives of the reforms undertaken, primarily in the areas of: (i) strengthening the regulatory and institutional frameworks; (ii) ensuring financial sustainability for the energy sector; (iii) promoting renewable energy and energy efficiency; and (iv) improving energy security. It should be noted that the Bank's support for the reform processes undertaken by Nicaragua and Ecuador were oriented more toward the implementation thereof, while in the cases of Suriname, Peru, and Honduras, they focused more on their approval.

1.47 From these operations, particularly as made evident in the Project Completion Report (PCR) for the Development of a New Sustainable Energy Mix Program IV,[19] one may conclude that policy-based loan operations are suitable instruments for assisting sector reforms aimed at developing a diversified and sustainable energy supply with the participation of multiple actors, where the end users are the beneficiaries. In the technical note "Design and use of policy-based loans at the IDB" produced by the Office of Evaluation and Oversight (OVE), the Bank identifies bringing policy advice, building capacity, and helping governments create consensus for and legitimize their reform agenda as some of the benefits of using PBLs.[20] The above-mentioned operations yield the following lessons learned: (i) consider policy commitments designed on a technical basis and validated by civil society, since institutional and regulatory reforms per se are not enough to ensure that the sector will operate efficiently; (ii) ensure, through an institutional capacity assessment, that the duties of the agencies responsible for fulfilling the policy commitments are defined by law; (iii) design the program so that the policy measures, particularly the regulatory measures, are implemented gradually; (iv) establish a schedule and clearly assign responsibilities; and (v) closely support the government through technical assistance during the process of implementing the institutional changes and policy measures.

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19 PE-L1121-Development of a New Sustainable Energy Matrix. Project Completion Report (PCR).

20 Technical note on PBP. IDB 2015.

1.48 The above-referenced operations show the potential for developing and the advisability of implementing this program, considering the need for both the approval and implementation of the regulatory and institutional frameworks.

1.49 The Economic Commission for Latin America and the Caribbean (ECLAC) has conducted two studies of energy reforms in Latin America and Europe,[21] which describe the processes followed in different countries, the relative depth of these reforms, the resulting benefits, and the remaining challenges. Among the positive effects of these reforms, the studies point to increased efficiency and sustainability in energy generation, transmission/transportation, and distribution; higher productivity; greater foreign direct investment; and public finance relief.

1.50 The document Las políticas del BID en materia energética y las reformas del sector eléctrico en América Latina [IDB energy policies and electricity sector reforms in Latin America][22] describes the remaining challenges, which notably include fostering new energy markets for efficient energy use, clean energy production, and rural energy, adopting innovative mechanisms and maximizing the potential for self-sufficiency and replenishment.

1.51 The above-mentioned studies focus primarily on the reforms initiated in the 1990s. The existence of these reforms allowed Mexico to rely on the lessons learned to design and implement its own reform.

1.52 This operation will be carried out at a strategic juncture in the process of implementing and strengthening Mexico's energy reform, where the established policy commitments are a determining factor. It should be noted that this operation is carried out in coordination with the French Development Agency (AFD) and that, based on the Bank's proposal, the AFD has agreed on the content of the Policy Matrix, which will also be used in the AFD operation currently being arranged with the Government of Mexico.

1.53 **The IDB country strategy.** The program is framed in the Bank's country strategy with Mexico for 2013-2018 (document GN-2749), which calls for intensifying the dialogue with the Mexican government on energy, education, and citizen security. Specifically, in the territorial development pillar, the strategy indicates that the Bank will contribute to climate change mitigation, continuing its interventions so as to improve access to renewable energy through the financial sector. The program falls within the energy dialogue area, given the type of envisaged actions to implement sector reforms and the international commitments undertaken to reduce GHG emissions. The operation is included in the 2017 Operational Program Report (document GN-2884).

1.54 **Strategic alignment.** The program is consistent with the Update to the Institutional Strategy (UIS) 2010-2020 (document AB-3008) and is aligned with the development challenges of: (i) productivity and innovation, by fostering a reduction in the prices of electric power generation through the development of renewable energy and natural

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[21] ECLAC, Wolfang F. Lutz, Energy sector reforms, regulatory challenges and sustainable development in Europe and Latin America, Santiago de Chile, June 2001. In: http://www.buyteknet.info. ECLAC, Fernando Sánchez Albavera, Hugo Altomonte, Las reformas energéticas en América Latina, Santiago de Chile, 1997. In: http://repositorio.cepal.org.

[22] Liliana Zamudio Vaquiro et al., Las políticas del BID en materia energética y las reformas del sector eléctrico en América Latina, Bogotá, Colombia, 2002. In: http://www.choike.org.

gas, which may have positive repercussions on electricity rates (natural gas and renewable energy);[23] [24] and (ii) social inclusion and equality, by providing more inclusive infrastructure, which will make it possible to increase the number of households with access to electricity and upgrade the quality of this service. The program is aligned with the crosscutting areas of: (i) climate change and environmental sustainability, by helping to reduce GHG emissions through the program's commitments associated with the development of energy efficiency, renewable energy, and natural gas in the country; and (ii) institutional capacity and the rule of law, since the program will strengthen planning and governance aimed at energy preservation and proper energy management. Approximately 52.63% of the operation's resources are associated with policies that will promote climate change mitigation activities, according to the joint MDB climate finance tracking methodology. These resources contribute to the IDB Group's goal of increasing the financing of climate change-related projects to 30% of total approvals by year-end 2020. The program is aligned with the Corporate Results Framework 2016-2019 through the indicators measuring reduction of emissions, households with new or upgraded access to electricity service, and installed power generation from renewable energy sources.

1.55 The program is consistent with the Energy Sector Framework Document (document GN-2830-3) in the thematic areas of energy sustainability, security, and governance, by fostering policy reforms that promote: (i) sustainable development of the sector; (ii) diversification of the power generation mix through the use of renewable energy sources and natural gas; and (iii) energy efficiency. The program is consistent with the Climate Change Sector Framework Document (document GN-2835-3), since the proposed energy policy reforms entail a reduction of GHG emissions.

1.56 **Alignment with the Sector Strategy Sustainable Infrastructure for Competitiveness and Inclusive Growth (document GN-2710-5).** The program is aligned with the priority areas of the Sustainable Infrastructure for Competitiveness and Inclusive Growth Strategy (document GN-2710-5) through reforms that promote construction of a socially and environmentally sustainable infrastructure and by promoting improvements in infrastructure governance designed to make the provision of infrastructure services more efficient.

1.57 **Public Utilities Policy (document GN-2716-6).** The program is consistent with the objectives of the Public Utilities Policy, and the proposed reforms foster economic viability and financial sustainability. In line with the Public Utilities Policy objectives, the policy reforms promoted by this program will contribute to the technical, operational, and financial sustainability of the energy sector by encouraging

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[23] Under the bidding process for electricity supply carried out in Chile in 2015, contracts were awarded at an average price of 47.6 US$/MWh, adding new actors to the electricity market (84 bidders took part), 2/3 of whom use wind and solar technologies. Electricity prices were in the neighborhood of 100 US$/MWh, with a power generation mix that was almost 60% thermal energy. Chilean Ministry of Energy.

[24] In the two competitive bidding processes for the purchase of energy carried out in Panama in 2015, the most economical options were for natural gas-based generation, with a cost per MWh almost 10% lower than the second-best solutions submitted. The implementation of the renewable energy goals established in the Indicative Generation Plan also shows that these technologies would lead to a reduction of more than 10% in generation costs by 2030. See Economic evaluation – energy component.

competition in the energy market and strengthen the sector's institutions (see optional electronic link 3).

1.58 According to the provisions of the Electricity Industry Law, economic viability and financial sustainability will be achieved by operating the MEM pursuant to dispatch security and economic efficiency criteria. To this end, the CRE will issue methodologies for determining and updating rates for: (i) transmission; (ii) distribution; (iii) operation by Basic Service Suppliers; and (iv) operation by the CENACE. These rates will make it possible to recover efficient operating, maintenance, financing, and depreciation costs, including technical and non-technical losses in accordance with CRE standards, as well as the applicable taxes and a reasonable profit.

B. Objectives, components, and cost

1.59 **Objectives.** To recognize the actions that contribute to a secure energy supply and to the sustainability of the Mexican energy sector. The specific objectives are: (i) to strengthen the energy sector's institutions in terms of regulation, information generation, planning, operation, and coordination; (ii) ensure the supply of natural gas and the expansion of the national gas pipeline network; (iii) reduce electric power distribution losses; (iv) help reduce GHG emissions by promoting both the use of cleaner technologies and fuels in electricity generation and the implementation of energy efficiency measures; and (v) close the gap in access to electricity service in rural communities and marginalized urban areas in a sustainable manner. The program has the following components:

1.60 **Component I. Macroeconomic stability.** The objective of this component is to ensure the continuity of a stable macroeconomic context consistent with the program's objectives, as provided in the Policy Matrix and Sector Policy Letter.

1.61 **Component II. The energy sector's institutional framework**. This component helps to strengthen the sector's institutions and coordination among them on regulatory, planning, and operational issues, so as to foster energy reform sustainability and energy security. At the subnational level, this component reinforces the energy efficiency governance systems and entities at the federal, state, and municipal levels, integrating public, private, academic, and social institutions.

1.62 The established policy commitments for the first operation are to: (i) create and launch the Consejo Consultivo para la Transición Energética [Advisory Council on Energy Transition] (CCTE); (ii) approve and publish the CCTE operating rules; (iii) create and launch the Consejo de Coordinación del Sector Energético [Energy Sector Coordination Council] (CCSE); (iv) approve and publish the CCSE operating rules; and (v) approve and publish the agreement whereby the Department of Energy approves and publishes the review and update of the PRONASE 2014-2016.

1.63 The CCTE is a citizen advisory and participation council that provides opinions and advice on achievement of the clean energy and energy efficiency goals. SENER is responsible for creating the CCTE. The representative nature of this council is ensured by the participation of the central government ministries most closely involved with these matters, as well as energy sector institutions, and the private

sector through the leading business associations, academic institutions, and nongovernmental organizations (NGOs).[25]

1.64 The responsibilities of the CCTE are: (i) promote social participation through public consultations; (ii) comment on the criteria for identifying areas with high clean energy potential; (iii) issue opinions and recommendations on preparing and updating the ETE, PETE, and PRONASE; (iv) monitor the policies, actions, and goals; and (v) assist in conducting a public consultation on the obstacles to achievement of the ETE, PETE, and PRONASE goals.

1.65 The CCSE is a mechanism for coordination between SENER, which is responsible for its creation, and the government institutions in the energy sector. The members of the CCSE are: Minister of Energy (chair); CRE and CNH Commissioners-Chair; SENER Vice Ministers; and CENAGAS and CENACE Directors General.

1.66 The responsibilities of the CCSE are: (i) familiarize its members with the energy policy set by SENER; (ii) issue energy policy recommendations and actions to be included in the annual work plans of these member entities; (iii) study the recommendations and proposals; (iv) implement shared information and institutional cooperation systems; and (v) examine cases capable of affecting the implementation of energy-related public policies.

1.67 The PRONASE is the instrument that establishes the strategies, objectives, lines of action, and goals for complying with the provisions of the Energy Transition Law regarding energy efficiency. SENER is responsible for approving and publishing the PRONASE.

1.68 The triggering mechanisms for the second loan operation are: (i) presentation of the obstacles identified in consultations with electricity sector participants, electricity supply users, academia, and civil society as preventing achievement of the clean energy and energy efficiency goals; (ii) issuance of updated criteria for identifying areas with clean energy potential; (iii) presentation of the assessment of progress on achieving the clean energy and energy efficiency goals, including identified barriers, opportunities for improvement, and corrective measures in the case of indicators that fail to reach the committed outcomes; (iv) development and operation of shared information and institutional cooperation systems by CCSE members; (v) issuance of energy sector policy recommendations included in the CRE and CNH work plans; and d (vi) provision of technical assistance on energy efficiency in public services in at least 1,500 municipios by 2018**.**

1.69 The success of the energy reform and concomitant achievement of its objectives in terms of social benefits will hinge on proper coordination among the institutions

[25] The member ministries are the Ministries of: Energy; Agriculture, Cattle Farming, Rural Development, Fisheries, and Food; Communications and Transportation; Agricultural, Territorial, and Urban Development; Finance and Public Credit; Economy; Environment and Natural Resources; and Health. The member sector institutions are: CRE, CONUE, and CENACE. The private sector is represented by: the Consejo Coordinador Empresarial [Business Coordinating Council]; Cámara Nacional de Manufacturas Eléctricas [National Chamber of the Electrical Manufacturing Industry]; and Consejo Mexicano de Energía [Mexican Energy Council]. The member academic institutions are: Universidad Nacional Autónoma de México and Instituto Tecnológico de Estudios Superiores de Monterrey. The member NGOs are: Centro Mario Molina and Red por la Transición Energética [Network for Energy Transition].

responsible for the reform's implementation as well as on solid communication with the sectors involved.

1.70 **Component III. Energy security.** This component will help to ensure the supply of natural gas, expand the national gas pipeline network, and reduce electric power distribution losses. These actions, among other benefits, will foster greater use of natural gas by residential consumers. At present, only 7.2% of residential water heating and cooking needs are met through the use of natural gas,[26] while liquefied petroleum gas (LPG) and firewood account for the remaining 92.8%. Increased natural gas use will entail lower expenditures since the price of natural gas is lower than that of LPG.

1.71 The foregoing will be supported by the following policy commitments for the first loan operation: (i) publication of the public policy for implementation of the natural gas market; (ii) publication of the SISTRANGAS five-year expansion plan for 2015-2019; (iii) activation of the SNG digital platform in the CENAGAS portal; (iv) publication of the actions to reduce electric power distribution losses set forth in the PRODESEN (2017-2031); and (v) publication of the Programa de Redes Inteligentes [Smart Networks Program] (PREI).

1.72 SENER is responsible for setting, steering, coordinating, and supervising public policy for implementation of the natural gas market, which establishes the institutional framework for implementing the free competition model envisaged in the energy reform and provides for the systematic dissemination of information and for clear and transparent rules to bring certainty to market participants.

1.73 This policy is subject to public consultations prior to its publication. It establishes the actions to be taken in terms of commercial transaction reports, prices, capacity reserve, and gradual assignment of contracts, and provides a timetable for their implementation. It defines the resolutions that the CRE must issue to implement the policy, which are to be published in the DOF in order for the policy to become effective.[27]

1.74 SENER is responsible for approving and issuing the five-year expansion plan for SISTRANGAS based on a proposal submitted by CENAGAS and reviewed with technical support from the CRE. The plan is based on an assessment of natural gas availability and demand in the medium term, providing certainty regarding natural gas transportation infrastructure projects, since some of these projects are considered of strategic importance for ensuring efficient development of the SISTRANGAS.

1.75 CENAGAS is responsible for the design and operation of the SNG digital platform. The platform's objective is to enable those interested in the SNG to remain up to

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[26] Based on data from SENER, National Energy Balance 2015, in: https://www.gob.mx/cms/uploads.

[27] The CRE published resolutions in which it: (i) determines the procedure for the Contract Assignment Program (25 January 2017); (ii) voids the methodology for determining the maximum natural gas prices for direct sales, approved by resolution RES/998/2015, and eliminates the maximum natural gas price for direct sales so that it may be arrived at under free market conditions (16 June 2017); and (iii) establishes the entry into force of the capacity reserve regime and the general terms and conditions for direct sales of natural gas (27 June 2017).

date on model agreements, rates, available capacity, operational developments, scheduled maintenance, and open seasons.

1.76 SENER is responsible for establishing the goals for electric power distribution losses and publishing these goals in the PRODESEN.

1.77 SENER is responsible for issuing the PREI based on a proposal submitted by the CENACE and reviewed with technical support from the CRE. The objective of the PREI is to support modernization of the National Transmission Network and General Distribution Networks so as to maintain a reliable and secure infrastructure that satisfies demand for electricity in an economically efficient and sustainable manner and facilitates the inclusion of new technologies that promote cost reductions in the electricity sector, the provision of additional services through its networks, and the inclusion of clean energy and clean distributed energy.

1.78 A sufficient and timely energy supply is indispensable for the country's social development. Accordingly, energy security is essential for achieving the social benefits envisaged in the energy reform.

1.79 The triggering mechanisms for the second loan operation are: (i) update of the natural gas commercial transaction report; (ii) expansion of the national gas pipeline network by 5,159 km by 2019 in accordance with the SISTRANGAS five-year expansion plan; (iii) update of the information contained in the SNG platform on: transportation permits; rates approved by the CRE; transportation capacity; gas quality reports; scheduled maintenance; transportation and interconnection requests; and open SNG season; (iv) reduction of electric power distribution losses from 13.1% in 2015 to 10.0% in 2018 in accordance with the goals established in the PRODESEN (2016-2030); and (v) procurement, installation, and entry into service of 843,433 meters with advanced metering infrastructure, as planned under the PREI.[28]

1.80 **Component IV. Energy sustainability.** This component will support the timely implementation of actions related to the legal, regulatory, and institutional framework of the Energy Transition Law and aimed at achieving the target share of clean energy sources in the power generation mix, energy efficiency promotion, and reduction of GHG emissions in energy generation and consumption. The envisaged actions on energy efficiency will result in direct benefits for the entire population. To this end, the first loan operation establishes the following policy commitments: (i) publish the PRODESEN-2017-2031; (ii) publish the regulations for purchasing CELs; (iii) publish the implementing regulations of the Energy Transition Law; (iv) publish the ETE; (v) publish the PETE; (vi) publish the updated PRONASE; and (vii) present the results of the first two long-term auctions conducted in the MEM.

1.81 SENER is responsible for issuing the PRODESEN, the objectives of which are to: (i) foster diversification of the power generation mix and energy security; (ii) promote the installation of the facilities required to satisfy demand in the SEN and achieve the clean energy goals; (iii) provide the necessary infrastructure to ensure reliability of the SEN; (iv) encourage the efficient expansion of power generation; and (v) establish goals for reduction of electric power distribution losses and for electrification of rural communities and marginalized urban areas.

[28] SENER, Smart Networks Program, May 2016, in: https://www.gob.mx.

1.82 SENER is responsible for issuing the implementing regulations of the Energy Transition Law. Prior to their publication, the regulations will be examined and submitted for public consultation by the Comisión Federal de Mejora Regulatoria [Federal Regulatory Improvement Commission] to ensure that they meet the criteria for clarity and simplified services, so as to obtain the greatest possible value from the available resources and maximize the functioning of commercial, industrial, production, service, and human development activities related to the energy transition.

1.83 SENER is responsible for issuing the ETE and its updates based on the CONUEE proposal, while considering the opinions and recommendations of the CCTE, and based on the projected scenarios provided by SENER.

1.84 The ETE is the instrument that governs medium- and long-term policy on clean energy, improvement of energy productivity, and reduction of polluting emissions by the electricity industry. The objectives of the ETE are: establish goals for clean energy penetration in electricity generation as well as energy efficiency goals; foster a reduction in GHG emissions by the electricity industry; and reduce the country's dependence on fossil fuels as a primary source of energy, consistent with economic viability criteria.

1.85 SENER is responsible for issuing the PETE and its updates based on the CONUEE proposal, while considering the opinions and recommendations of the CCTE.

1.86 The PETE establishes the actions needed to achieve the targets for renewable energy penetration, such as regulatory and financial incentives, as well as the corresponding indicators and evaluation mechanisms.

1.87 SENER is responsible for issuing the PRONASE and its updates based on the CONUEE proposal, while considering the opinions and recommendations of the CCTE.

1.88 The PRONASE establishes the actions needed to achieve the energy efficiency goals as well as the corresponding indicators and evaluation mechanisms.

1.89 The CRE is responsible for issuing the CELs, which are certificates that evidence the production of a certain volume of electricity from clean energy sources and serve to satisfy the clean energy requirements for qualified suppliers and users. These requirements, published in the DOF, are as follows: (i) 5.0% in 2018; (ii) 5.8% in 2019; (iii) 7.4% in 2020; (iv) 10.9% in 2021; and (v) 13.9% in 2022.

1.90 The electric energy auctions allow qualified suppliers and users to enter into competitive agreements to meet their power, electric energy, and CEL needs. The purpose of these auctions is to make it possible to purchase in advance the power and energy that will be consumed by basic supply users and thereby reduce their short-term exposure to the price of these products. The effective validity of the agreements will be 3 years in the case of medium-term auctions, 15 years in the case of long-term auctions for power and electric energy, and 20 years for CELs.

1.91 The second loan operation envisages the following triggering mechanisms: (i) allocation of CELs for 5% of the total electric energy to be consumed in 2018 by

mandatory participants;[29] (ii) preparation of projected scenarios, based on inputs provided by the INEEL, CRE, CENACE, and the Department of Environment and Natural Resources (SEMARNAT), in order to update the ETE's clean energy and energy efficiency targets; (iii) annual estimation and publication of the GHG emissions factor in the SEN; (iv) reduction in the energy intensity of final consumption by 1.9% per year; (v) increase in clean energy's share of electric energy generation from 20% in 2015 to 25% in 2018; (vi) issuance of the general administrative provisions regarding energy efficiency in federal government buildings, vehicle fleets, and industrial facilities, including maximum energy consumption indices for buildings; and (vii) performance of the fourth long-term auction in the MEM.

1.92 The implementation of energy efficiency programs and actions, primarily in the residential sector, will allow families to reduce their energy consumption expenditure and use these resources to address other priority needs, such as housing, education, and food. In addition, the energy efficiency actions will allow industrial, commercial, and service companies to reduce their operating costs and, in turn, avoid increasing or lower the price of their products and services.

1.93 **Component V. Increase in electricity coverage in rural communities and marginalized urban areas in a sustainable manner.** This component focuses on supporting advances in meeting the PRODESEN and FSUE goals for channeling financial and technical resources to achieve access to electricity in approximately 40,000 rural communities and marginalized urban areas distributed practically throughout the country, from the state with the highest electrification rate (99.68%) to the state with the lowest rate (96.01%).[30] The policy commitments for the first loan operation are: (i) publication of the FSUE operating rules; and (ii) publication of the 2017 invitation to distributors to submit electrification projects for rural communities and marginalized urban areas.

1.94 The Electricity Industry Law establishes that SENER is responsible for the electrification of rural communities and marginalized urban areas, and provides for the creation of the FSUE for the purpose of financing such electrification. The FSUE will be funded through the surplus revenue resulting from the management of technical losses in the MEM.

1.95 The first FSUE invitation covers 898 communities in 11 Mexican states. A total of MXN438 million is set aside to install more than 10,000 photovoltaic systems for the benefit of 45,000 inhabitants living in energy poverty.

1.96 The triggering mechanisms for the second loan operation are: (i) achievement of a 99% electrification rate in 2018, in accordance with the PRODENSEN; and (ii) electrification of 1,131 communities that had no access to electricity.

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[29] The mandatory participants are: Suppliers; Qualified Users participating in the market; End Users supplied offgrid; and holders of Bequeathed Interconnection Agreements that include Load Centers in which consumption is not fully covered by renewable energy.

[30] Aguascalientes has an electrification rate of 99.68%, and Oaxaca's electrification rate is 96.01%. Source: CFE, Summary level of electrification as of first quarter 2017, in: https://datos.gob.mx/.

C. Key results indicators

1.97 The program's expected impacts are an increase in energy security and a reduction in CO_2 emissions. The following outcomes will be obtained: (i) increase in the number of municipios supported through technical assistance on energy efficiency; (ii) expansion of the national gas pipeline network; (iii) reduction of electric power distribution losses; (iv) reduction in the annual growth of energy intensity; (v) increase in clean energy's share of electric power generation; and (vi) nationwide increase in electricity access.

1.98 **Economic analysis.** An economic assessment was performed to measure the benefits derived from the energy reform supported by the program. It is estimated that the net present value (NPV) of the benefits of achieving greater economic efficiency is US$11.300 billion. This is due to lower CO_2 emissions, lower generation costs, and lower potential investment costs, with an internal rate of return (IRR) of 60%. With respect to the diversification of the power generation mix resulting from the inclusion of renewable energy sources, the NPV of the benefits associated with lower CO_2 and lower generation costs is US$2.800 billion with an IRR of 13%. A combined analysis of the program yields a NPV of US$10.140 billion (the net benefits for electrification are negative) and an IRR of 32%. The main assumptions used in the analysis are: a marginal cost differential of US$13.8/MWh with the introduction of clean energy, a discount rate of 10%,[31] and a value per ton of CO_2 of US$6.93.

1.99 Sensitivity analyses were performed with respect to changes in the assumed marginal generation cost and monetary value of a CO_2 ton, and they yielded robust results.

II. Financing Structure and Main Risks

A. Financing instruments

2.1 This operation is structured as a programmatic policy-based loan, and is the first of two technically linked but independently financed consecutive loans. The first loan operation is for an amount of up to US$600 million. The amount of this operation is justified by the government's financing needs and is in line with Policy-based Loans: Guidelines for Preparation and Implementation (document (document CS-3633-1). This operation represents close to 0.8% of the public sector's gross financing needs for 2017 and 44% of the public-sector financing provided by multilateral agencies. There will be a disbursement of 100% of the amount of the operation upon compliance with the policy commitments for the first operation set forth in the Policy Matrix and its Means of Verification.

2.2 The Mexican economy is robust and will allow the government to carry out the proposed reform measures.

[31] A discount rate of 10% was used pursuant to provisions of the Finance Department's Office of the Undersecretary for Expenditures for federal government agencies (Official Circular 400.1.410.14.009 dated 13 January 2014).

B. Environmental and social risks

2.3 In accordance with Directive B.13 of the Bank's Environment and Safeguards Compliance Policy (document GN-2208-20, operational policy OP-703), the operation does not require an environmental impact classification. The program does not finance physical investments; its objective is to support the process of implementation of energy reform-related policies. Moreover, the program does not envisage any activities with negative implications for natural resources. On the contrary, the proposed reforms are expected to generate positive environmental and social aspects, supporting greater energy efficiency (which will result in lower energy consumption) as well as greater use of clean energy, primarily from renewable energy sources.

C. Fiduciary risks

2.4 The proposed financial instrument provides freely available funds for budgetary support based on the existence of a responsible fiscal policy framework. Therefore, it is considered that this operation does not pose a fiduciary risk, since the borrower (and recipient of the proceeds) has solid country systems for financial management and solid control systems for the execution of its budget.

D. Other project risks

2.5 Since various governmental agencies are involved in carrying out the policy reforms, there may be a risk of lack of coordination among them. This risk is mitigated by establishing SENER as the entity responsible for monitoring and coordination. In this capacity, SENER will call periodic monitoring and evaluation meetings to determine progress and results with a view to identifying advances and any additional support required to satisfy the established conditions.

III. Implementation and Management Plan

A. Summary implementation arrangements

3.1 The borrower will be the United Mexican States, and the executing agency will be SENER. By engaging in communication and information exchanges and conducting periodic meetings for analysis and monitoring, SENER will coordinate fulfillment of the policy commitments with the CRE, CNH, CENAGAS, CENACE, CONUEE and Electric Energy Savings Trust (FIDE). To improve coordination between SENER and the institutions involved, these institutions will appoint the management and operating staff that will be responsible for coordinating all aspects of program execution.

3.2 **Institutional analysis.** An institutional capacity assessment of the entities related to the program was performed in order to determine their capacity to execute and monitor the program as well as identify the requirements for such monitoring and, as the case may be, the need to strengthen SENER, as executing agency, and/or the other actors involved. The assessment concluded that: (i) the energy reform resulted in changes in SENER's responsibilities and in adjustments to the scope of authority of other entities related to the program, such as the CRE, CNH, CENACE, and CONUEE, as well as in the creation of CENAGAS; (ii) following this institutional recalibration, it was verified that the system comprising SENER and related agencies has an organizational structure with functional capacity to reach the

objectives and comply with the triggering mechanisms set forth in the program's Policy Matrix; (iii) with regard to monitoring and controlling fulfillment of the commitments, it was determined that there are means to verify the characteristics of program implementation and that, since these means are public, they may be consulted in the official websites of the Government of Mexico, SENER, and other related agencies, as well as in the publications of the Diario Oficial de la Federación [Federal Official Gazette]; consequently, the program's Policy Matrix may be efficiently monitored; (iv) since the program objectives are aligned with the energy reform and the various amendments to secondary legislation and associated regulations, it was confirmed that the political risk of non-implementation or of a change of priorities in the medium term is practically nonexistent; and (v) the risk of nonfulfillment of the commitments is low and in most cases nonexistent as virtually all commitments undertaken as of the date of the assessment report have already been met.

3.3 SENER will have the following responsibilities: (i) provide evidence that the policy commitments for each of the phases have been fulfilled, as well as any other program-related evidence needed by the Bank to approve the respective disbursements; (ii) support the actions required for continued fulfillment of the program; and (iii) once the disbursement under the program has been assured, gather the necessary information from the performance indicators to evaluate program outcomes.

3.4 To ensure performance of the identified policy actions, the Bank, acting in coordination with SENER, will create a working group to monitor such performance. The institutions involved in these actions will form a part of the working group.

3.5 **The following will be special contractual conditions precedent to the first and only disbursement under the first operation of the series: (i) signing of the agency agreement between the borrower and a financial agent to facilitate the timely execution of the programmatic loan; and (ii) fulfillment of the policy reform conditions set forth in the Policy Matrix (Annex II) and all other conditions provided in the relevant loan contract.** This fulfillment will be confirmed by means of the instruments identified in the Means of Verification Matrix and the monitoring and evaluation plan. The Bank may request an external audit of the program if it considers it appropriate.

B. Summary of results monitoring arrangements

3.6 A detailed monitoring and evaluation plan has been prepared and includes medium- and long-term outcome and impact indicators, consistent with the policy reform process agreed upon under the Policy Matrix (Annex II). These indicators are reflected in the Results Matrix. The monitoring and evaluation plan envisages monitoring and coordination meetings between the governmental agencies involved in the execution of the policy reforms, with a view to identifying developments and results as the reforms advance. The Government of Mexico and the Bank have agreed to conduct periodic meetings to monitor and evaluate progress on the Results Matrix. Before processing the second operation of the programmatic series, the Bank will produce a progress report reviewing the program's evolution, progress on the reforms, and triggering mechanisms, as well as identifying any modifications or adjustments that may be required in order to achieve the program's goal.

3.7 Once the second operation has been executed, there will be an ex post monitoring and evaluation of the program outcomes, as indicated in the monitoring and evaluation plan. The methodology will be similar to the one used for the ex ante evaluation (cost-benefit analysis), performed at the start of each loan in the series. The project team will prepare a Project Completion Report (PCR) at the conclusion of the second loan operation, in accordance with the Bank's PCR Principles and Guidelines (OP-1242-5). The PCR will evaluate the outcomes obtained, using the cost-benefit analysis as an input.

IV. POLICY LETTER

4.1 The Bank and the Government of Mexico have agreed on the policy commitments that will be supported through the program, which are reflected in the Policy Matrix, Means of Verification Matrix, and Results Matrix. Also included is fulfillment of the commitments reaffirmed in the Policy Letter submitted by the Department of Finance, which ratifies the Mexican government's commitment to the program.

Development Effectiveness Matrix		
Summary		
I. Corporate and Country Priorities		
1. IDB Development Objectives	**Yes**	
Development Challenges & Cross-cutting Themes	**-Social Inclusion and Equality -Productivity and Innovation -Climate Change and Environmental Sustainability -Institutional Capacity and the Rule of Law**	
Country Development Results Indicators	**-Government agencies benefited by projects that strengthen technological and managerial tools to improve public service delivery (#)***	
2. Country Development Objectives	**Yes**	
Country Strategy Results Matrix		
Country Program Results Matrix	**The operation is scheduled for CPD 2018 (ME-O0002)**	**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)		**The program is consistent with the IDB´s Country Strategy with Mexico for the 2013-2018 period, which aims at intensifying the dialogue in the energy sector.**
II. Development Outcomes - Evaluability	**Evaluable**	
3. Evidence-based Assessment & Solution	**9.5**	
3.1 Program Diagnosis	**3.0**	
3.2 Proposed Interventions or Solutions	**4.0**	
3.3 Results Matrix Quality	**2.5**	
4. Ex ante Economic Analysis	**10.0**	
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	**6.5**	
5.1 Monitoring Mechanisms	**1.5**	
5.2 Evaluation Plan	**5.0**	
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		
Mitigation measures have indicators for tracking their implementation		
Environmental & social risk classification	**B.13**	
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, External Control, Internal Audit. Procurement: Information System, Price Comparison, Contracting Individual Consultant, National Public Bidding.**
Non-Fiduciary	**Yes**	**Strategic Planning National System, Monitoring and Evaluation National System.**
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.

The main objective of the project is to contribute to ensure the energy supply and sustainability of Mexico's energy sector. The specific objectives are to: (i) strengthen the institutions of the sector in the following aspects: regulation, generation of information, planning, operation, and coordination; (ii) ensure the natural gas supply and the expansion of the national gas pipeline network; (iii) reduce electricity losses in distribution; (iv) contribute to the reduction of greenhouse gas emissions, by promoting the use of cleaner technologies and fuels in the electric energy generation, and the implementation of energy efficiency measures; and (v) close the gap of sustainable access to electricity in rural communities and marginalized urban areas.

The project presents a complete diagnosis; it includes a comprehensive description of the country's energy sector, energy matrix, institutions, and the obstacles that currently exist to gain more energy efficiency and to provide electrification some rural areas. It also mentions the Bank's experience in supporting similar interventions both in Mexico and in other countries of the Region.

The outcome indicators included in the results matrix have defined baselines and targets, and have means of verification.

The cost benefit analysis (CBA) is consistent with the program logic; it has reasonable assumptions, uses a rigorous methodology, includes sensitivity analysis and concludes that the program is economically feasible. It analyzes different components of the reform: a more energy efficient scenario, a scenario incorporating cleaner energy sources, and the scenario with more coverage of electricity supply.

The project includes a monitoring and evaluation plan. The effectiveness of the proposed intervention will be measured following different methodologies: an ex-post cost benefit analysis, and a before and after approach.

POLICY MATRIX

Objective	Policy conditions Programmatic PBL I	Triggering mechanisms Programmatic PBL II
Component I. Macroeconomic stability		
Stability of the general framework for macroeconomic policies	Stable macroeconomic framework consistent with the program's objectives as set forth in the Policy Matrix and Sector Policy Letter.	Stable macroeconomic framework consistent with the program's objectives as set forth in the Policy Matrix and Sector Policy Letter.
Component II: The energy sector's institutional framework		
Strengthen the sector's institutions with regard to regulations, information generation, planning, operation, and coordination.	Creation and launch of the Advisory Council on Energy Transition (CCTE), as established in the Energy Transition Law (ETL), as a citizen advisory and participation council, including private sector participation, that provides opinions and advice on achievement of the clean energy and energy efficiency goals and has the following primary responsibilities: promote social participation; comment on areas with high potential for clean energy; issue recommendations on the Transition Strategy to Promote the Use of Cleaner Technologies and Fuels (ETE), the Special Energy Transition Program (PETE), and the National Program for Sustainable Energy Development (PRONASE).	Presentation of the obstacles identified in consultations with electricity sector participants, electricity supply users, academia, and civil society as preventing achievement of the clean energy and energy efficiency goals. Issuance of updated criteria for identifying areas with clean energy potential. Presentation of the assessment of progress on achieving the clean energy and energy efficiency goals, including identified barriers, opportunities for improvement, and corrective measures in the case of indicators that fail to reach the committed outcomes.
	Approval and publication of the CCTE's operating rules, based on the provisions of Chapter Seven of the ETL.	
	Creation and launch of the Energy Sector Coordination Council (CCSE) as a mechanism for coordination between SENER and governmental agencies in the energy sector, with the following primary responsibilities: keep its members informed of, and issue recommendations on, energy policy, and implement shared information systems, in accordance with the Law on Energy-related Coordinated Regulatory Agencies.	Development and operation of shared information and institutional cooperation systems for CCSE members. Issuance of energy sector policy recommendations included in the work plans of the Energy Regulatory Commission(CRE) and the National Hydrocarbons Commission.
	Approval and publication of the CCSE's operating rules.	
	Approval and publication of the Agreement whereby the Department of Energy approves and publishes the revision and update of the National Program for Sustainable Energy Development 2014-2018.	Provision of technical assistance regarding energy efficiency in public services in at least 1,500 municipios.

Objective	Policy conditions Programmatic PBL I	Triggering mechanisms Programmatic PBL II
Component III. Energy security		
Ensure the supply of natural gas and the expansion of the national gas pipeline network	Publication of the natural gas market implementation public policy, enabling the development of the free competition model envisaged in the energy reform as well as the systematic dissemination of information and the setting of clear and transparent rules to provide certainty to market participants.	Update of the natural gas commercial transaction report.
	Publication of the five-year expansion plan for the National Integrated System of Natural Gas Transportation and Storage (SISTRANGAS) 2015-2019, providing demand availability of natural gas in the medium term and setting forth strategic projects to ensure efficient development of the SISTRANGAS.	Expansion of the national gas pipeline network by 5,159 km.
	Activation of the National Gas Pipeline System's (SNG) digital platform in the CENAGAS portal, enabling interested agents to consult current versions of model agreements, rates, available capacity, operational developments, scheduled maintenance, and open seasons	Update of the information contained in the SNG platform.
Reduce electric power distribution losses	Publication of the actions to reduce electric power distribution losses set forth in the National Electricity Sector Development Program (PRODESEN) 2017-2031.	Reduction of energy distribution losses to 10% in 2018 (as provided in the PRODESEN, section 6.2. Increasing efficiency in electricity distribution).
	Publication of the Smart Networks Program (PREI), the objective of which is to support modernization of the National Transmission Network and General Distribution Networks.	Procurement, installation, and entry into service of 843,433 meters with advanced metering infrastructure, as planned under the PREI.
Component IV. Energy sustainability		
Help to reduce greenhouse gas (GHG) emissions by promoting both the use of cleaner technologies and fuels in electric power generation and the implementation of energy efficiency measures	Publication of the PRODESEN 2017-2031, the objectives of which are to foster: diversification of the power generation mix, energy security, and electrification of rural communities and marginalized urban areas.	Allocation of clean energy certificates (CELs) in 2018 for 5% of the total electric energy consumed in a given year by mandatory participants.[1]
	Publication of the regulations for acquiring clean energy certificates (CELs), which are certificates that evidence the production of a certain volume of electricity from clean energy sources.	
	Publication of the implementing regulations of the Energy Transition Law.	Preparation of projected scenarios for the energy sector based on input provided by the INEEL, CRE, CENACE, and the Ministry of Environment and Natural Resources (SEMARNAT) in order to update the ETE's clean energy and energy efficiency goals. Annual estimation and publication of the GHG emissions factor in the SEN.

[1] The mandatory participants are: Suppliers; Qualified Users participating in the market; End Users supplied offgrid; and holders of Bequeathed Interconnection Agreements that include Load Centers in which consumption is not fully covered by renewable energy.

Objective	Policy conditions Programmatic PBL I	Triggering mechanisms Programmatic PBL II
	Publication of the Agreement whereby the Department of Energy approves and publishes the update of the first Transition Strategy to Promote the Use of Cleaner Technologies and Fuels (ETE) under the ETL as the governing instrument for medium- and long-term policy, establishing goals for clean energy and energy efficiency and fostering a reduction in GHG emissions.	Reduction in the average annual growth rate of the energy intensity of final consumption by 1.9%.
	Publication of agreement whereby the Department of Energy issues the Special Energy Transition Program (PETE), establishing actions to achieve the clean energy goals.	Increase in clean energy's share of electric power generation to 25% by 2018, as established in the ETL.
	Publication of the updated PRONASE, which establishes actions to reach the energy efficiency goals.	Issuance of the general administrative provisions regarding energy efficiency in federal government buildings, vehicle fleets, and industrial facilities, including maximum energy consumption indices for buildings.
	Presentation of the results of the first two long-term auctions in the Wholesale Electricity Market (MEM), by means of which qualified suppliers and users enter into agreements to meet their power, electric energy, and CEL needs.	Performance of the fourth long-term auction in the MEM.
Component V. Increase in electricity coverage in rural communities and marginalized urban areas in a sustainable manner		
Close the gap in access to electricity service in rural communities and marginalized urban areas in a sustainable manner.	Publication of the operating rules for the Universal Electricity Service Fund (FSUE), which serves as a conduit to finance electrification of rural communities and marginalized urban areas.	Increase in the electrification rate to 99% in 2018.
	Publication of the 2017 invitation to distributors to submit electrification projects for rural communities and marginalized urban areas to be executed in 2018.	Electrification of 1,131 communities that had no access to electricity service.

DOCUMENT OF THE INTER-AMERICAN DEVELOPMENT BANK

PROPOSED RESOLUTION DE-__/18

Mexico. Loan ____/OC-ME to the United Mexican States
Program to Support Implementation and Strengthening
of Energy Reform

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 United Mexican States, as Borrower, for the purpose of granting it a financing to cooperate in the execution of the Program to Support Implementation and Strengthening of Energy Reform. Such financing will be for the amount of up to US$600,000,000 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 __ _____ 2018)

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