

DOCUMENT OF THE INTER-AMERICAN DEVELOPMENT BANK

**MEXICO**

**FINANCING PROGRAM FOR THE PROMOTION OF  
COGENERATION IN MEXICO**

**(ME-L1151)**

**LOAN PROPOSAL**

This document was prepared by the project team consisting of Ramón Guzmán (IFD/CMF), Project Team Leader; Alberto Elizalde (ENE/CVE), Alternate Project Team Leader; Leticia Riquelme (CMF/CME); Isabel Haro (IFD/CMF); Pablo Carrión (IFD/CMF); Annabella Gaggero (IFD/CMF); Gloria Lugo (IFD/CMF); Ignasi Nieto (CID/CID); Juan Carlos Pérez-Segnini (LEG/SGO); Maria Da Cunha (VPS/ESG); Víctor Escala (FMP/CME); Miriam Garza (FMP/CME); and Gloria Coronel (FMP/CME).

This document is being released to the public and distributed to the Bank's Board of Executive Directors simultaneously. This document has not been approved by the Board. Should the Board approve the document with amendments, a revised version will be made available to the public, thus superseding and replacing the original version.

## CONTENTS

### PROJECT SUMMARY

I.	DESCRIPTION AND RESULTS MONITORING .....	1
	A. Frame of reference, problem, and rationale.....	1
	B. Problems identified and proposed solution.....	7
	C. Objectives, expected results, and outcome indicators .....	10
II.	FINANCING STRUCTURE AND PRINCIPAL RISKS .....	11
	A. Financing instrument.....	11
	B. Principal risks and mitigating measures .....	12
III.	IMPLEMENTATION AND MANAGEMENT PLAN .....	13
	A. Summary of implementation provisions.....	13
	B. Monitoring and evaluation provisions .....	15

ANNEXES	
Annex I	Summary Development Effectiveness Matrix (DEM)
Annex II	Results Matrix
Annex III	Fiduciary Agreements and Requirements

ELECTRONIC LINKS
<b>REQUIRED</b>
1. Monitoring and Evaluation Plan <a href="http://idbdocs.iadb.org/wsdocs/getDocument.aspx?Docnum=38147609">http://idbdocs.iadb.org/wsdocs/getDocument.aspx?Docnum=38147609</a>
2. Environmental and Social Management Report <a href="http://idbdocs.iadb.org/wsdocs/getDocument.aspx?Docnum=38149035">http://idbdocs.iadb.org/wsdocs/getDocument.aspx?Docnum=38149035</a>
<b>OPTIONAL</b>
1. Economic Analysis <a href="http://idbdocs.iadb.org/wsdocs/getDocument.aspx?Docnum=38149022">http://idbdocs.iadb.org/wsdocs/getDocument.aspx?Docnum=38149022</a>
2. Study on Cogeneration in Mexico. CONUEE/CRE/GIZ 2009 <a href="http://www.conuee.gob.mx/work/sites/CONAE/resources/LocalContent/7174/12/EstudioCogeneracion.pdf">http://www.conuee.gob.mx/work/sites/CONAE/resources/LocalContent/7174/12/EstudioCogeneracion.pdf</a>
3. Initiative for Development of Renewable Energies in Mexico. Efficient Cogeneration. SENER/PwC 2012 <a href="http://www.energia.gob.mx/webSener/res/0/D121122%20Iniciativa%20Renovable%20SENER_Cogeneración.pdf">http://www.energia.gob.mx/webSener/res/0/D121122%20Iniciativa%20Renovable%20SENER_Cogeneración.pdf</a>
4. National Energy Strategy. Mexico 2013-2027 <a href="http://idbdocs.iadb.org/wsdocs/getDocument.aspx?Docnum=37957550">http://idbdocs.iadb.org/wsdocs/getDocument.aspx?Docnum=37957550</a>
5. Outlook for Natural Gas Market. Mexico 2012-2026 <a href="http://idbdocs.iadb.org/wsdocs/getDocument.aspx?Docnum=37957570">http://idbdocs.iadb.org/wsdocs/getDocument.aspx?Docnum=37957570</a>
6. Principal Characteristics of Energy Reform. SENER 2013 <a href="http://sener.gob.mx/res/prensa/Reforma_Energetica-principales_caracteristicas.pdf">http://sener.gob.mx/res/prensa/Reforma_Energetica-principales_caracteristicas.pdf</a>
7. Energy Reform – Electricity Sector. SENER 2013 <a href="http://idbdocs.iadb.org/wsdocs/getDocument.aspx?Docnum=38578014">http://idbdocs.iadb.org/wsdocs/getDocument.aspx?Docnum=38578014</a>
8. Energy Reform – Hydrocarbons. SENER 2013 <a href="http://idbdocs.iadb.org/wsdocs/getDocument.aspx?Docnum=38349648">http://idbdocs.iadb.org/wsdocs/getDocument.aspx?Docnum=38349648</a>
9. Initiative on Financial Reform. Mexico 2013 <a href="http://idbdocs.iadb.org/wsdocs/getDocument.aspx?Docnum=38026836">http://idbdocs.iadb.org/wsdocs/getDocument.aspx?Docnum=38026836</a>
10. Cogeneration and District Energy: Sustainable Energy Technologies for Today and Tomorrow. International Energy Agency 2009 <a href="http://www.iea.org/publications/freepublications/publication/CHPbrochure09.pdf">http://www.iea.org/publications/freepublications/publication/CHPbrochure09.pdf</a>
11. Infrastructure Problems in Mexico. IDB, 2013 <a href="http://idbdocs.iadb.org/wsdocs/getDocument.aspx?Docnum=38173655">http://idbdocs.iadb.org/wsdocs/getDocument.aspx?Docnum=38173655</a>

## ABBREVIATIONS

BTU	British thermal unit
CCLIP	Conditional credit line for investment projects
CFD	Cubic feet per day
CFE	Comisión Federal de Electricidad [Federal Electricity Commission]
CO <sub>2</sub>	Carbon dioxide
CONUEE	Comisión Nacional para el Uso Eficiente de la Energía [National Commission for Efficient Energy Use]
CRE	Comisión Reguladora de Energía [Energy Regulatory Commission]
ENE	Estrategia Nacional de Energía [National Energy Strategy]
ESMF	Environment and Social Management Framework
GCI-9	Ninth General Increase in the Resources of the Bank
GHG	Greenhouse gases
GIZ	Gesellschaft für Internationale Zusammenarbeit GmbH
GW	Gigawatt
IEA	International Energy Agency
IFC	International Finance Corporation
LIBOR	London Interbank Offered Rate
LP	Liquefied petroleum
MMCFD	Millions of cubic feet per day
Mt	Metric tons
MW	Megawatt
NAFIN	Nacional Financiera S.N.C.
PEMEX	Petróleos Mexicanos
PGPB	Pemex Gas y Petroquímica Básica [Pemex gas and petrochemicals company]
SEN	Sistema Eléctrico Nacional [National Electrical System]
SENER	Department of Energy
tCO <sub>2</sub> e	tons of CO <sub>2</sub> equivalent

## PROJECT SUMMARY

### MEXICO FINANCING PROGRAM FOR THE PROMOTION OF COGENERATION IN MEXICO (ME-L1151)

Financial Terms and Conditions				
<b>Borrower:</b> Nacional Financiera S.N.C. (NAFIN) <b>Guarantor:</b> United Mexican States <b>Executing agency:</b> Nacional Financiera S.N.C			Flexible Financing Facility*	
			Amortization period:	25 years
			Original WAL:	15.25 years**
			Grace period:	5.5 years
			Disbursement period:	4 years
			LIBOR-based	
<b>Source</b>	<b>Amount (US\$ millions)</b>	<b>%</b>	Interest rate:	***
IDB (Ordinary Capital)	350	100	Inspection and supervision fee:	***
Total	350	100	Credit fee:	***
			Currency:	U.S. dollars from the Bank's Ordinary Capital
Project at a Glance				
<b>Project objective and description.</b> The objective of the program is to help achieve the cogeneration development targets in Mexico's industrial sector through: (i) increased investment in the transportation, storage, and distribution of natural gas, to ensure the feasibility of developing cogeneration projects over the medium and long term; and (ii) increased investment in cogeneration projects in industry.				
<b>Special contractual conditions precedent to the first disbursement.</b> As a special condition precedent to the first disbursement, NAFIN will approve the entry into effect of the program Operating Regulations, based on prior agreement with the Bank (paragraph 3.5).				
<b>Exceptions to Bank policies:</b> None.				
<b>Project qualifies as:</b> SEQ [ ]      PTI [ ]      Sector [ ]      Geographic [ ]      Headcount [ ]				

\* Under the Flexible Financing Facility (document FN-655-1), the borrower has the option of requesting changes to the amortization schedule, and currency and interest rate conversions, subject in all cases to the final amortization date and the original weighted average life (WAL). When considering such requests, the Bank will take market conditions into account, along with operational and risk-management considerations.

\*\* The original weighted average life will be determined on the date the loan contract is signed.

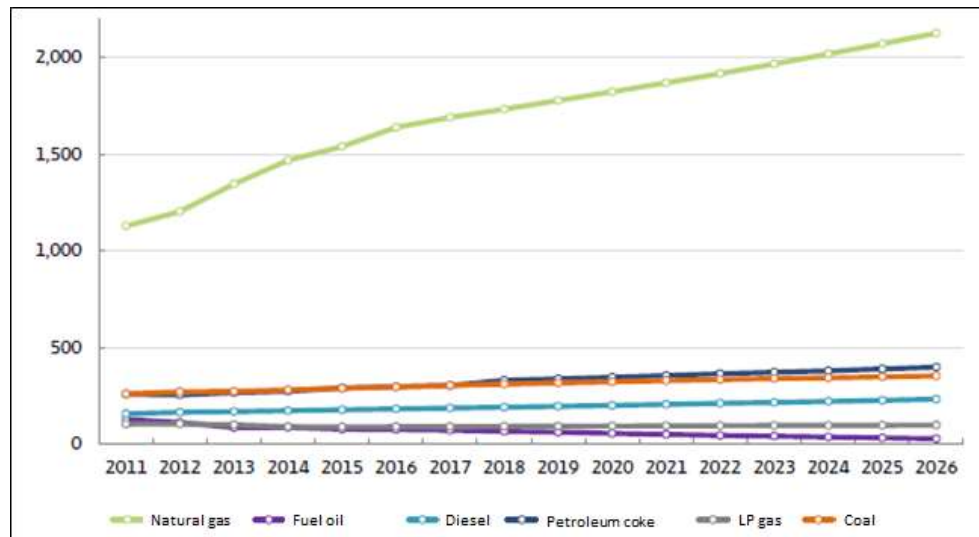
\*\*\* The credit fee and the inspection and supervision fee will be established periodically by the Board of Executive Directors as part of its review of the Bank's lending charges, in accordance with the corresponding policies.

## I. DESCRIPTION AND RESULTS MONITORING

### A. Frame of reference, problem, and rationale

- 1.1 Competitive prices for natural gas<sup>1</sup> and efficient technologies for generating electricity based on natural gas (including cogeneration)<sup>2</sup> have made natural gas a suitable fuel for the transitional phase between a traditional generation system and a more efficient and less polluting system, driving demand for this fuel. For the 16,300 additional megawatts (MW) of power generation that the Comisión Federal de Electricidad [Federal Electricity Commission] (CFE) plans to supply for 2020, at least 70% of its new plants will use natural gas.<sup>3</sup> In the industrial sector, the penetration of natural gas as a fuel has increased, reaching 63.4% of the total in 2011 (up from 49.3% in 2001).

Figure I.1. Demand for fuels, industrial sector, Mexico 2011-2026 (MMCFD nat. gas equiv.)



Source: Outlook for the Natural Gas Market, 2012-2026.

- 1.2 The expansion of natural gas as a fuel preferred by industry and for electricity generation over the last 20 years is based on its use in productive processes and in

<sup>1</sup> The price for this fuel has fallen by 70% in North America since 2008 due to the development of shale gas in the U.S. and Canada.

<sup>2</sup> Cogeneration is defined as the simultaneous production of electrical energy and useful thermal energy (heat) from a single fuel or primary energy source. The fundamental principle is recovery of residual heat from combustion in a power plant that can be put to various end uses, thus achieving a higher degree of energy efficiency.

<sup>3</sup> The Mexican electricity sector has been prioritizing the construction of combined cycle plants, which have the advantages of lower unit investment costs and shorter construction periods (two to three years), as well as greater stability given their ability to provide solid and stable power compared to intermittent power from some renewable technologies.

cogeneration technologies and combined cycles that have increased the economic and environmental efficiency of those processes. Cogeneration systems achieve efficiency levels far superior to those of conventional systems, by utilizing waste heat and reducing energy losses, so that considerable savings can be achieved in industry and in power generation (between 20% and 45% of primary energy from conversion efficiency alone, CONUEE/CRE/GIZ 2009). Thus, cogeneration offers two significant economic benefits: (i) it saves fuel in electrical and steam generation and increases the competitiveness of industries, in addition to potential income from selling surplus electricity to the grid;<sup>4</sup> and (ii) it helps to reduce losses in the transmission and distribution of electrical energy, since it is generated at the point of use.

- 1.3 Thanks to increased efficiency and the use of cleaner fuels such as natural gas, cogeneration also helps to reduce CO<sub>2</sub> emissions. The International Energy Agency (IEA) estimates that cogeneration may contribute as much as 4% to reducing the CO<sub>2</sub> emissions of new energy generated in 2015 and 10% (950 Mt/year) in 2030. In Mexico, if cogeneration's potential is utilized in industry, it is estimated that the fuel savings achieved could generate reductions in greenhouse gas (GHG) emissions of 8.67 to 11.99 metric tons of carbon dioxide (MtCO<sub>2</sub>) per year.<sup>5</sup>
- 1.4 Electricity generation is responsible for approximately 20% of GHG emissions in Mexico. At the same time, it is the sector with the greatest GHG abatement potential (SENER, 2012). Mexico ranks 13th in the world in terms of the volume of GHG emissions and is the second highest CO<sub>2</sub> emitter in Latin America after Brazil (official communication under the United Nations Framework Convention on Climate Change). The Government of Mexico voluntarily pledged to reduce its GHG emissions by 35% by 2020 from the base scenario. Sixty percent of this potential reduction is in the energy sector and utilizing that potential entails a significant transformation in systems of production and in the use of energy over the medium term.
- 1.5 **Cogeneration potential in Mexico.** Cogeneration now represents one of the best opportunities for reducing energy consumption per unit of gross domestic product (GDP) and for achieving emissions reduction targets in Mexico. However, the share of cogeneration in the country is still very limited, with installed capacity of 2,878 MW in 2011, representing less than 7% of the total installed power of the national electrical system (SENER/PwC, 2012). It is estimated that there is unused

---

<sup>4</sup> According to data from the Comisión Nacional para el Uso Eficiente de la Energía [National Commission for Efficient Energy Use] (CONUEE), the operation of cogeneration systems that meet 100% of a company's thermal requirements generally produce primary energy savings of 30% to 35% compared to consumption before the project and excess electrical energy can be obtained and sold to suppliers (i.e. CFE) or consumed in other facilities associated with the cogeneration system.

<sup>5</sup> The average and maximum scenarios, respectively, consider 70% and 80% utilization of total cogeneration potential in industry (CONUEE/CRE/GIZ, 2009).

cogeneration potential of nearly 12 GW<sup>6</sup> primarily in the industrial sector. That sector is the country's second largest consumer of energy (Energy Balance Sheet, 2012) and is responsible for more than 25% of national energy consumption; the subsectors with the highest consumption are steel, cement, chemicals, and mining. Thus, this sector shows the highest cogeneration potential, reaching 7 GW, that is, 60% of total generation potential using this technology in Mexico. Petróleos Mexicanos (PEMEX) has the second highest potential for cogeneration (see Table I.1). In summary, although cogeneration installed capacity in Mexico has been increasing by 10% a year over the last decade,<sup>7</sup> it currently represents only 28% of its potential at the national level, with total authorized capacity under the cogeneration method primarily concentrated in the petroleum and petrochemical industry (CRE, 2012).

**Table I.1. Maximum cogeneration potential economically feasible in Mexico\***

Sector	Potential (GW)
PEMEX	3.3
Industrial	7.0
Commercial	1.5
<b>Total</b>	<b>11.8</b>

Source: CRE; CONUEE/GIZ; PEMEX; PwC.

\* The determination of the potential in industrial sectors includes industries with electricity demands greater than 1 MW and load factors greater than 50% (CONUEE/PwC, 2012). The numbers include potential that becomes economically feasible if there are surpluses to be delivered to the Sistema Eléctrico Nacional [National Electrical System] (SEN). The industrial potential of projects that are economically feasible without surpluses provided to the SEN amounts to 2.3 GW.

**1.6 Availability of natural gas.** The possibility of developing cogeneration in industry depends to a great extent on the availability and cost of the fuel supply, most often natural gas. Its thermal unit price is attractive compared to the other fuels that can be used for cogeneration, with higher efficiency levels, lower investment requirements,<sup>8</sup> and lower pollution levels.<sup>9</sup> For these reasons, it is also the fuel currently used most in European cogeneration systems (IEA, 2008).

<sup>6</sup> From the perspective of demand for gas, to the supply needed to meet this potential one must add the gas that will be needed to generate the additional electricity the CFE plans to supply by 2020 (with 70% of its new plants using natural gas), as stated in paragraph 1.1 above.

<sup>7</sup> Amendments to the Ley del Servicio Público de Energía Eléctrica [Electrical Energy Utilities Act] (LSPEE) in 1992 opened the doors to cogeneration. Since then, and despite the promotion and dissemination efforts carried out by SENER through CONUEE and other bodies, the country's cogeneration capacity has only increased gradually.

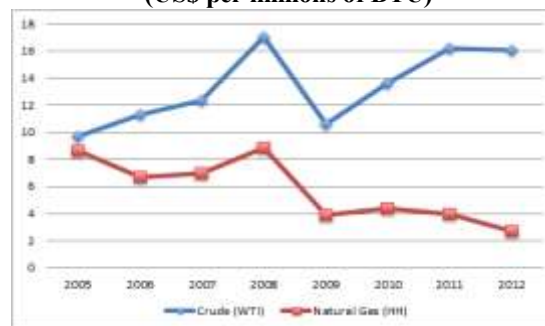
<sup>8</sup> Outlook for the Natural Gas Market 2012-2026 (SENER, 2012).

<sup>9</sup> Natural gas emits up to 60% less CO<sub>2</sub> than fuel oil in the generation of electricity. *The Outlook for Energy: A View to 2040*. ExxonMobil, 2012.



1.7 Despite the significant productive potential of natural gas in Mexico, increased demand for this fuel has exceeded the ability to meet that demand in two ways. First, between 2000 and 2011 national production of natural gas increased by an average of 3.9% per year, while demand increased by 5.7% (ENE 2013-2027). To cover that shortfall, the country had to resort to imports, which grew by an average of 18.1% per year, supplying 22.1% of the demand. Given natural gas production and demand over the next 15 years, the system will require an increase in imports estimated at an average annual rate of 4.9%. The absence of a supply response on the part of PEMEX<sup>10</sup> in recent years is due in particular to changes in the relative price of crude oil compared to gas over the last decade (see Figure I.2), with the result that PEMEX assigns a higher priority to projects using oil than projects using natural gas.

**Figure I.2. Fuel price variations  
(US\$ per millions of BTU)**



Source: Compiled by author.

- 1.8 Second, increased demand has not been accompanied by a proportional increase in the infrastructure for transporting and distributing natural gas. With demand exceeding transport capacity throughout the country, the Sistema Nacional de Gasoductos [National Pipeline System] is saturated—with usage levels at 85% and higher—so it is not feasible to import greater volumes of gas (ENE 2013-2027). This results in insufficient generation of electricity in some regions of the country and has produced critical alerts and interruptions in the supply to industrial consumers,<sup>11</sup> which is a constraint to cogeneration (see paragraph 1.6).
- 1.9 There are various reasons for this transportation situation. Liberalization of the sector in 1995 and the regulatory reform initiated at that time left natural gas transportation and distribution operations open to private initiative.<sup>12</sup> However, that reform did not provide for third-party access to the pipeline network of Pemex Gas y Petroquímica Básica (PGPB), leaving a temporary system pending definition of access and rates by the Comisión Reguladora de Energía [Energy Regulatory Commission] (CRE). Since then, the only significant investment has been promoted

<sup>10</sup> Pemex Gas y Petroquímica Básica (PGPB) produces an average of 3.724 billion cubic feet per day (CFD) of natural gas and transports an average of 4.9 billion CFD, which it sells to a total of 838 clients. To carry out its production, transportation, and direct marketing activities, it has a total of 9,037 km of pipeline.

<sup>11</sup> The transporter gives a critical alert when there are operational risk conditions that affect the delivery of natural gas transportation and supply service. The cost of the critical alerts issued in 2012 is estimated at approximately US\$1.5 billion (18.9 billion Mexican pesos) (ENE 2013-2027).

<sup>12</sup> In May 1995, the law implementing Article 27 of the Constitution with respect to petroleum was amended to allow the private sector to construct, operate, and own natural gas transportation, storage, and distribution systems, activities formerly reserved to the State. Supplementing this amendment, in November 1995, the Natural Gas Regulations were issued and established provisions governing the participation of PEMEX and private operators in the natural gas industry.

by the CFE, which bids out to the private sector the construction and operation of pipelines to supply combined cycle power plants.<sup>13</sup> PGPB owns and manages most of the national pipeline network. Both institutions are key actors in expansion of the network and in the consumption of natural gas (see [Institutional Arrangement of the Gas and Electrical Sector in Mexico](#)). PGPB, separated from commercial distribution due to liberalization, lacks sufficient incentives for investing in transportation beyond that limited to its direct customers or the also limited cogeneration projects in its own plants (three permits in operation<sup>14</sup> to date). The prospect of free access to its pipelines, the lower profitability of gas projects compared to projects using oil, given a limited budget from the Department of Finance (SHCP), and the situation on the international credit markets since 2008 explain this underinvestment by the dominant actor in the gas market. Thus, while national demand increased by 5.7% per year on average in the 2000s, the transportation of gas using PGPB pipelines grew by 2.9%.

- 1.10 Ultimately, incomplete liberalization of the national gas transportation network and the barrier to entry due to higher financial costs for investing in logistical infrastructure in a market like the natural gas market (characterized by economies of scale and of network) have stalled investment, coinciding with a strong increase in demand due to plummeting natural gas prices since 2008 and the global credit squeeze resulting from the international financial crisis. The reform process addressing pending issues in gas market regulation is already under way, with the government having committed to beginning its implementation in the second half of 2014 (see paragraphs 1.15 and 1.16). However, the lack of availability of natural gas is still the principal obstacle to expanded cogeneration and the use of natural gas in industry in a region with an overabundance of low-priced natural gas.
- 1.11 **The gas supply problem is coupled with other specific problems in the development of cogeneration.** In particular, it shares the financing problems of natural gas logistical infrastructure projects, as evidenced in the limited supply of credit and/or unsuitable conditions on the credit available for projects of this kind. The causes for these deficiencies are:
  - a. The high level of capital investments needed and long periods before projects reach maturity. A 1 MW capacity plant may require between US\$0.5 million and US\$1.5 million in investments. Installing one kilometer of 30-inch pipeline in Mexico costs more than US\$1 million.

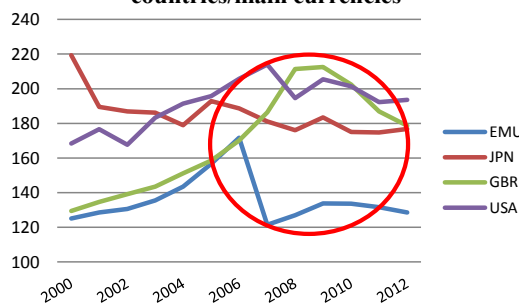
---

<sup>13</sup> Always on the basis of firm transportation contracts to ensure the cash flow that is financing the project. The pipelines supply power plants that sell all the electricity they produce to the CFE.

<sup>14</sup> The CRE is responsible for issuing operating permits.

b. The deleveraging of the international banking system (Figure I.3) and volatility and risk perception in international markets since 2007-2008 limit the availability of U.S. dollars over the long term, including in Mexico. The banking system as a whole maintained a portfolio of long-term U.S. dollar denominated loans

**Figure I.3. Credit to the private sector/GDP, countries/main currencies**



Source: World Bank and compiled by author. EMU = European Monetary Union; JPN = Japan; GBR = Great Britain.

amounting to US\$67 million in 2011 and US\$126 million as of the same date in 2013 (July, data from the National Banking and Securities Commission-CNBV).

c. Nearly non-existent financing based on own funds payment sources (project finance), as well as the lack of a track record for investments of this kind, which increases the perception of risk and reduces the ability to access suitable credit conditions.<sup>15</sup>

1.12 Despite favorable developments in the regulatory framework for cogeneration, difficulties in obtaining adequate financing present significant obstacles for the developers. Between 2009 and now, there have been only 30 permits granted by the CRE for cogeneration (three belong to PEMEX), for cumulative installed capacity of 0.79 GW.<sup>16</sup>

1.13 The [sector analysis performed by COGENEREA Mexico](#) (2013)<sup>17</sup> agrees that the supply of gas and financing are the two priority areas of intervention for developing cogeneration in Mexico. The study on regulatory barriers to energy efficiency (Sustainable Energy Finance Program, IFC, 2013)<sup>18</sup> reiterates that access to dedicated lines of credit for energy efficiency, including cogeneration, has a significant impact on development and concludes that in the case of cogeneration one of the main barriers in Mexico is uncertainty regarding the development of the

<sup>15</sup> SENER/PwC, 2012; Energy Technology Perspectives, 2012; IEA, 2012.

<sup>16</sup> Despite the progress made, there are gaps that need to be closed in order to promote the use of this technology, such as limitations on the power that can be delivered to the SEN and the price of that power, permitting requirements, and interconnection agreements/contracts with equal conditions for large generators and cogenerators, etc. (IDB, 2013).

<sup>17</sup> COGENEREA is a public-private partnership that seeks to develop Mexico's cogeneration market. Preparation of the diagnosis included the participation of developer companies, equipment suppliers, the national and international financial sector, installers, and consulting firms, as well as academia, the public sector, expert advisors, and international cooperation organizations.

<sup>18</sup> The study was conducted within the framework of initiatives for improved use of energy to increase energy sustainability. It included an analysis of the regulatory situation, international initiatives, and potential solutions for mitigating barriers in Mexico.

pipeline network. Lastly, the [SENER/PwC](#) study (2012), based on 60 interviews with major actors in the sector in Mexico, also identifies difficulties accessing financing and underestimation of the associated benefits due to ignorance on the part of lenders and potential developers.

- 1.14 In addition, the significance of resolving the problem of credit for infrastructure projects with significant capital needs in Mexico, which include natural gas projects, is based on a series of factors that restrict the availability of sufficient funds to finance them (reduced public investment, limited credit, little utilization of debt markets, and other factors). The problems described in the preceding paragraphs are part of an effort to pursue the financial resources needed to cover infrastructure requirements that, without support, cannot reach their optimum level, in that they are public goods and require high-risk investments (Infrastructure Problems in Mexico, IDB 2013). From the developers' perspective, the lack of competitive financing significantly inhibits the development of projects and puts them at a disadvantage compared to their international counterparts (Mexican Chamber of the Construction Industry, 2013).

## **B. Problems identified and proposed solution**

- 1.15 The diagnosis identifies two fundamental aspects of the problems described: (i) financing for natural gas and cogeneration logistical infrastructure projects; and (ii) improvements in the regulatory structure of the natural gas and cogeneration market. Although there are difficulties and room for improvement in the regulatory framework (see paragraphs 1.9 and 1.10), the new scheme that will take effect in the context of the [Energy Reform](#), approved in December 2013, will take the form of regulations more conducive to investment both in expanding the gas transportation and distribution network and in installing cogeneration systems (see Secondary Legislation Initiative).<sup>19</sup> This new legislation allows private companies to not only participate in transportation and distribution, but also to supplement PEMEX's investment through contracts for the exploration and extraction of oil and gas, not only to produce more hydrocarbons at lower cost but also to obtain better results under competitive conditions in refining, transport, and storage activities. It also enables cogenerators to deliver surpluses to the grid at competitive prices and establishes centralized control of the operation of the SEN by an impartial public body.<sup>20</sup>
- 1.16 The Mexican government, through the Department of Energy (SENER), has reiterated its commitment to correct the planning deficit that emerged over the last

---

<sup>19</sup> The secondary legislation was submitted to the Senate Chamber of the Congress in April 2014 and the schedule for discussion and approval of the four packages of secondary legislation on energy has already been approved by the leaders of the Senate for June. Changes are expected to be approved during the first half of 2014 (SENER, 2014).

<sup>20</sup> For a summary of these changes, please see [Energy Reform – Electricity Sector](#) and [Energy Reform – Hydrocarbons](#).

- 15 years.<sup>21</sup> Thus, in response to critical alerts and the problem of developing the gas and cogeneration market, energy policy is structured around three horizons: (i) in the short term, supply through regasification plants and road transport of liquefied gas; (ii) in the medium term, promotion of an aggressive plan for investment in pipelines, strategically directed to expanding the connection with the U.S. market and ensuring delivery to the independent power producers that supply the CFE; and (iii) in the long term, proper implementation of energy reform and its corresponding secondary legislation (see paragraph 1.15) is expected to help consolidate a favorable market that promotes the necessary complementary investments in both the electricity and gas sectors. Thus, the program focuses on addressing the financing-related problems that impede a more accelerated pace in the development of medium-term investments, while also having a demonstration effect in the sector.
- 1.17 **Proposed intervention.** To help promote cogeneration in Mexico, the program proposes to channel financing under suitable conditions through the development banking system in order to promote the investments needed for accelerated, sustainable development of the sector based on two fundamental approaches: (i) expansion of the natural gas transportation, storage, and distribution network, a necessary condition for promoting the take-off of the cogeneration industry over the medium and long term; and (ii) increased cogeneration installed capacity in sectors identified as having high potential, in order to increase the generation and efficient use of energy in the short term (see paragraph 2.2).
- 1.18 An [IEA analysis](#) (2009) identifies financial incentives as one of the main characteristics common to the strategies implemented in those countries that have shown the best results when tackling barriers to cogeneration (CONUEE/CRE/GIZ, 2009), emphasizing how financing can help to resolve shortcomings in energy markets. In addition, the experience working with financing for projects in the energy sector through development banks in Mexico, specifically Nacional Financiera S.N.C. (NAFIN), is supported by programs under CCLIP ME-X1010 (ME-L1051, ME-L1081, ME-L1119, and ME-L1148) on support for the private sector and investment in power plants based on renewable sources.<sup>22</sup>
- 1.19 **Size of demand for resources.** SENER estimates that Mexico will require more than US\$10.4 billion for infrastructure in natural gas transportation and distribution as of 2020. To strengthen the existing infrastructure, SENER, in conjunction with PEMEX, the CFE, and the CRE, has proposed a comprehensive strategy for

---

<sup>21</sup> Last August the government presented the Integrated Natural Gas Supply Strategy to mitigate the incidence of critical alerts and ensure a reliable, safe, and timely supply of natural gas to industry at competitive prices and promote economic growth (Address by the Secretary of Energy, Pedro Joaquín Coldwell, when presenting that strategy on 13 August 2013).

<sup>22</sup> Experience gained and lessons learned by NAFIN with these previous operations help to build the institution's capacity for structuring and implementing new financial schemes and leveraging funds from various sources. This previous work has also demonstrated the need to incorporate robust environmental and social perspectives in the management of sustainable energy projects, among both developers and lenders, not only to comply with Bank requirements but also to maximize the positive impact and minimize conflicts.

developing the natural gas transportation and distribution network, thanks to the implementation of new projects that would require an estimated investment of US\$1.446 billion.<sup>23</sup> In addition, the [Study on Cogeneration in the Industrial Sector in Mexico](#) estimates that the potential cogeneration that could feasibly be developed in the industry would range between 849 MW and 8,457 MW, depending on the utilization scenario that is reached.<sup>24</sup> For example, a capital expenditure of US\$1 to US\$1.4 per watt for a cogeneration system that reduces energy expenditure by 30% to 50% and generates surpluses to the grid (PwC, 2012) would have minimum investment needs for reaching at least the lower range of the estimated potential amounting to US\$850 million to US\$1.19 billion, in the industrial sector alone. A shorter-term approximation of the financing needs for cogeneration projects can be estimated based on information from the permits granted by the CRE over the last five years, which equal a total investment of about US\$760 million (30 projects with cumulative capacity of 0.79 GW).

- 1.20 The end beneficiaries of the loans will be the developers of gas transportation and cogeneration infrastructure projects, whether public or private,<sup>25</sup> that help to increase cogeneration and the efficient use of energy in Mexico (see paragraph 2.2 for more detail on eligibility criteria). The anticipated results of the program, in environmental and economic terms, will benefit the population as a whole. Expansion of the gas infrastructure network will also allow the energy-using population to benefit from increased and improved availability of a cleaner fuel at more competitive prices.
- 1.21 **Strategic alignment of the program.** The operation is in line with the sectoral priorities of the lending program under the Ninth General Increase in the Resources of the Inter-American Development Bank (GCI-9) (document AB-2764) with respect to: (i) lending to support climate change initiatives, sustainable energy (including renewable), and environmental sustainability; and (ii) lending to support regional cooperation and integration, through the criterion of multi-country targeting in the context of infrastructure (physical support),<sup>26</sup> since it promotes the development of infrastructure integrating member countries of the Bank.<sup>27</sup> The program contributes to the regional development targets on: (i) the percentage of firms using banks to finance investments; and (ii) CO<sub>2</sub> emissions (kilograms) per US\$1 of GDP (PPP).

---

<sup>23</sup> Adding 33,422 km for 1,672 users in 17 states ([Outlook of Natural Gas Market 2012-2026](#)).

<sup>24</sup> That study presents scenarios for utilizing total cogeneration potential that depend on the ability to eliminate barriers and create incentives and motivation in the industrial sector.

<sup>25</sup> See paragraph 1.5 for reference on industries with cogeneration potential. Regarding transportation, a small number of companies are potential beneficiaries, primarily gas consortia and/or large construction companies.

<sup>26</sup> See “Guidelines for the Classification and Validation of Operations Eligible for the GCI-9 Regional Cooperation and Integration Lending Priority” (document GN-2733).

<sup>27</sup> United States of America and Mexico.

- 1.22 The program contributes to the Mexican government's development objectives, both in energy and finance. The [2013-2027 National Energy Strategy](#) (ENE)<sup>28</sup> is based on the objective of more inclusive growth, emphasizing both energy production and energy savings. The ENE contains a diagnosis of the barriers to energy efficiency, notably financial problems, and establishes the promotion of cogeneration as a priority line of action. The ENE devotes two strategic themes to natural gas, to take advantage of the opportunities that natural gas production offers and to improve the transportation, storage, and distribution network. In addition, the overall goal called [Mexico Próspero](#) incorporates the need to: (i) facilitate suitable financing for the private sector;<sup>29</sup> (ii) encourage and guide green and inclusive growth; and (iii) supply energy at competitive prices, with quality and efficiency all along the productive chain.
- 1.23 It has already been noted how the program is aligned with the [Energy Reform](#) approved by the new government in late 2013, emphasizing how that reform will foster increased investment in technological development and the adoption of less polluting, low-cost sources of energy (see paragraphs 1.15 and 1.16). In addition, the reform would promote the participation of private companies in the sector, including gas storage and transportation activities, to ensure that the country has sufficient supplies under competitive conditions and to promote greater diversity of sources of electricity generation, including renewables and cogeneration.<sup>30</sup> The [Financial Reform](#) would provide increased flexibility and incentives so that the private sector and development banks, together, will grant more loans under better conditions. Specifically in its first pillar, this reform would make the operation of development banks more flexible in order to help expand credit, with particular emphasis on areas strategic to national development.

### C. Objectives, expected results, and outcome indicators

- 1.24 The objective of the program is to contribute to achieving the cogeneration development targets in Mexico's industrial sector, through: (i) increased investment in natural gas transportation, storage, and distribution, to make the development of cogeneration projects feasible over the medium and long term; and (ii) increased investment in cogeneration projects in industry. The program provides for execution of two components:
- 1.25 **Component I. Credit to the natural gas logistical chain.** Financing through development banks for projects to expand the natural gas transportation, distribution, and storage network, that contributes to the development of cogeneration systems based on natural gas, increasing the availability of clean, quality fuel and minimizing losses in transportation (see paragraph 2.2). The Bank would thus help to scale up public-private efforts to develop the sector, improving the cost and conditions of the financing available.

---

<sup>28</sup> The ENE is part of a larger strategic plan called the [2013-2018 National Development Plan](#) (PND).

<sup>29</sup> Through proposed strengthening of the role of development banks as a lever of growth.

<sup>30</sup> The current legal framework in Mexico recognizes efficient cogeneration within the same context as renewable energies, granting it the same benefits.

- 1.26 **Component II. Credit for cogeneration.**<sup>31</sup> Financing through development banks for cogeneration projects from 1 MW of capacity (licensees),<sup>32</sup> in the subsectors identified as having high potential (see paragraph 2.2). The aim is to reduce the obstacles to financing and encourage investments in the sector. This will also familiarize market agents with investments of this kind (demonstration effect), promoting the participation of the banking system and potential investors, as well as the mobilization of capital and technical capacity on the part of energy services companies. The participation of the Bank and development banks would help to foster the creation of a track record of projects of this kind and of project finance.
- 1.27 The program is supplemented by technical support activities in regional technical cooperation operation RG-T2160 (ATN/MC-13341-RG), such as: (i) the design and implementation of methodologies for valuation of cogeneration projects by the lending banks; (ii) information and awareness programs for various agents (lenders and potential generators) regarding the benefits associated with cogeneration and the most effective way to assess their value; and (iii) compliance with national standards and Bank policies in the area of environmental and social safeguards. Project execution is also expected to produce information and knowledge related to the advancement of cogeneration in Mexico that can be used as a basis for developing similar programs both in the country and at the regional level.
- 1.28 **Program indicators.** The proposed impact, outcome, and output indicators are described in detail in Annex II, [Results Matrix](#).
- 1.29 The cost-benefit analysis that accompanies the proposal shows that the updated benefits, calculated based on energy savings in the generation of electricity due to the use of gas as the fuel and the installation of cogeneration systems, and the reduction in GHG emissions, exceed the updated costs under the assumed scenarios, with a net current value exceeding US\$300 million for the program as a whole. In addition, the analysis presents the standard cost-efficiency ratio, making a comparison of the total IDB investment per expected unit of reduced CO<sub>2</sub>, which is calculated at US\$12.5/tCO<sub>2</sub>e (see [Economic Analysis](#)).<sup>33</sup>

## II. FINANCING STRUCTURE AND PRINCIPAL RISKS

### A. Financing instrument

- 2.1 The program will consist of a Global Credit Operation to be executed by NAFIN in its role as a development bank, through the two components described above: (i) Component I. Credit to the natural gas logistical chain, for US\$300 million,

---

<sup>31</sup> The great variety of possible configurations of cogeneration systems makes it difficult to establish standard models, so that the scope of this component encompasses cogeneration in the broad sense.

<sup>32</sup> Any cogeneration system with more than 0.5 GW of capacity requires a permit granted by the CRE. Among other aspects, this involves complying with the criteria and guidelines of the national energy policy and interconnection contracts with the CFE.

<sup>33</sup> This cost is considered effective relative to the international standard. By way of reference, the abatement cost (cost per reduced tCO<sub>2</sub>e) for international donors such as the Clean Technology Fund is considered acceptable up to the amount of US\$200/tCO<sub>2</sub>e.



- which will provide long-term credit to finance natural gas transportation, distribution, and storage projects; and (ii) Component II. Credit for cogeneration, for US\$50 million, which will channel resources through the financial system to cogeneration projects in industry. Given the connection between the two components in terms of problems with access to credit that the program seeks to combat as well as the complementary nature of the components, the relative weight of the components is indicative and may be adjusted based on final demand.
- 2.2 For both components, the program will finance projects that are considered eligible based on a series of conditions established in the program's Operating Regulations. Those conditions will include a maximum amount to be committed per project relative to the total project cost and the NAFIN pipeline,<sup>34</sup> a minimum amount of shareholder capital, and aspects related to environmental and social safeguards. For Component II, an attempt will also be made to prioritize projects with higher levels of efficiency in the cogeneration systems to be installed.<sup>35</sup> NAFIN will select a portfolio of projects that meets these conditions and will finance them based on demand, by itself or through financial intermediaries. Projects may be financed against the assets of the beneficiary companies themselves, but off-balance-sheet project finance will be promoted.
- 2.3 **Retroactive financing and subsequent disbursements.** The Bank may recognize eligible expenditures<sup>36</sup> made by the beneficiary starting on 20 September 2013, the approval date of the project profile, and until the date this loan proposal is approved by the Bank's Board of Executive Directors (in no case 18 months before that approval), for an amount equivalent to up to 20% of the approved amount, provided requirements substantially similar to the Bank's procurement policies and those established in the loan contract have been met. Subsequent disbursements that are not part of retroactive financing can be committed and paid by NAFIN within the loan disbursement period and in accordance with Bank policies through advances or reimbursements, based on NAFIN programming of the portfolio (advances) or of the committed portfolio (reimbursements).
- B. Principal risks and mitigating measures**
- 2.4 **Environmental and social risks.** According to Directive B.13 of the Environment and Safeguards Compliance Policy (document GN-2208-20 and operational policy manual, section OP-703), this operation does not require classification. However, the projects financed by the program could have some adverse environmental and/or social risks and impacts; therefore, the project proposes to establish an effective assessment system for the appropriate mitigation and management of those risks. For this purpose, an Environmental and Social Management Framework (ESMF) will be established, making it possible to identify the potential

---

<sup>34</sup> The remaining financing may come from NAFIN, commercial banks, or multilateral institutions, including the IDB's private sector window.

<sup>35</sup> For example, those that meet efficient cogeneration criteria in accordance with local regulations.

<sup>36</sup> NAFIN, as program executing agency, has been working on the development of a portfolio of eligible projects that could be ready for financing in the short term.

risks associated with eligible projects and ensure that loan beneficiaries implement assessment, prevention, and mitigation measures consistent with national legislation and the Bank's safeguard policies. This strategy seeks to maximize alignment of the use of country systems and will be ready for incorporation in the program Operating Regulations, which are thus a requirement for the first disbursement (see paragraph 3.5). The Bank is also supporting NAFIN in the strengthening of its Corporate Financing and Sustainable Projects Office (see paragraphs 1.27 and 3.1). To implement the social and environmental management strategy, NAFIN will: (i) reach agreement with the Bank regarding an ESMF; (ii) establish the interagency arrangements needed to implement the ESMF; and (iii) ensure that projects financed by the program are executed in accordance with the requirements of the ESMF. The ESMF will be prepared in accordance with the social and environmental conditions described in the ESMR.

- 2.5 **Development risk.** A medium risk is anticipated in terms of delays in the execution of works associated with the projects financed by the program due to their nature.<sup>37</sup> To mitigate that risk, continuous monitoring of the status of the project pipeline in conjunction with the executing agency is proposed. Execution of the ESMF is also expected to prevent delays related to community opposition and/or environmental problems (see [Risk Matrix](#)).
- 2.6 **Fiduciary risks.** No risks are anticipated. NAFIN has extensive experience with the Bank; loans 2631/TC-ME (ME-L1109), 2843/OC-ME (ME-L1119), 2226/OC-ME (ME-L1051), and 2671/OC-ME (ME-L1081), all related to support for private investment in energy sector projects, have recently and successfully been executed by NAFIN. The institutional analysis conducted in 2009 for loan 2226/OC-ME (ME-L1051) yielded a weighted average rating of 97.94, indicating a satisfactory level of development and a low risk for project execution. This level of development of its fiduciary systems has been confirmed during Bank visits to NAFIN (see [Risk Matrix](#)).

### III. IMPLEMENTATION AND MANAGEMENT PLAN

#### A. Summary of implementation provisions

- 3.1 **Borrower and executing agency.** The borrower and executing agency for the program will be NAFIN, which will have the guarantee of the United Mexican States. NAFIN's corporate goals include supporting projects that seek to use clean, efficient energy, and for this purpose it has been working on: (i) development of a portfolio of eligible projects; (ii) improvement of its technical capacities, in financial terms as well as in terms of the environment, energy, and infrastructure,

---

<sup>37</sup> The size of the investment associated with these projects, their scope, and implementation times entail risks that may include late submission of the financial, technical, and environmental study reports required to obtain permits for works of this kind; local communities' opposition to construction; the cost and availability of labor, transportation, and land; among other risks.

- with Bank support;<sup>38</sup> and (iii) the strengthening of its network of intermediaries with capacity for channeling financing to projects of this kind.
- 3.2 NAFIN has an excellent track record of working with the Bank and has been actively collaborating in the Bank's programming in Mexico. To date, NAFIN has handled four operations amounting to over US\$300 million under CCLIP ME-X1010,<sup>39</sup> demonstrating that it is an executing agency with extensive experience in managing resources related to private sector support in projects targeting the efficient use of energy, the generation of energy based on renewable sources, and the promotion of sustainable development in general.
- 3.3 **General execution and management scheme.** NAFIN will execute the program within the framework of its current organizational structure. The provisions governing the execution of the program as well as the participation of financial intermediaries and the eligibility of individual loans, will be established in the program Operating Regulations agreed upon by the Bank and NAFIN, in accordance with NAFIN and Bank rules and policies and with the country's financial laws and practices.
- 3.4 **Procurement.** Since this lending program will operate primarily on the basis of demand, no procurement of works, goods, services, or consulting services is anticipated as part of program execution. Thus, the proposal does not include an execution plan or a procurement plan. Any procurement of services or consulting that may be required as part of program management and/or evaluation should comply with the procurement policies established in documents GN-2349-9 and GN-2350-9.
- 3.5 **Disbursements and execution period.** Program resources will be committed and disbursed over a period of 48 months from the effective date of the loan contract. The exchange rate for converting expenses incurred in local currency to U.S. dollars will be that used by NAFIN's systems on the date of the transfer to the intermediary or credited entity, which is the rate in effect in the borrower's country on the effective date of payment. In addition to the conditions precedent stipulated in Article 4.01 of the General Conditions, **as a special condition precedent to the first disbursement, NAFIN will approve the entry into effect of the program Operating Regulations, based on prior agreement with the Bank.** Cumulative recoveries from the program, whether payments, prepayments, cancellations or terminations of subloans, that exceed the amounts necessary for service of the loan to the Bank during five years from the date of the last disbursement must be used to finance new operations consistent with program objectives. The Bank may request a special audit or review of the above.

---

<sup>38</sup> In August 2013, the Bank formalized the granting of US\$135,000 in nonreimbursable funds to NAFIN, charged to technical cooperation operation RG-T2160 (ATN/MC-13341-RG) (see paragraph 1.27).

<sup>39</sup> To date the results of these operations include: US\$5.371 billion in investment in electricity generation based on renewable energy, the mobilization of US\$440 million in third-party financing, 2,622 MW of renewable energy installed capacity financed, and the participation of 13 financial intermediaries.

- 3.6 **Financial statements.** Within 180 days following the end of each financial year and during the disbursement period, NAFIN will submit the program's audited financial statements, duly containing an opinion by an independent auditing firm acceptable to the Bank and appointed by the Civil Service Department. The last of these reports will be submitted within 180 days following expiration of the disbursement period. NAFIN's audited financial statements are posted on its website; thus, it is not considered necessary to ask for their submission.

**B. Monitoring and evaluation provisions**

- 3.7 The general procedures established by the Bank for the monitoring and evaluation of investment operations will be applied, based on the indicators in the [Results Matrix](#), agreed upon by the Bank and NAFIN, and the [Monitoring and Evaluation Plan](#). The evolution of the indicators must be periodically reported to the Bank during program execution. Based on the annual monitoring of indicators, NAFIN will prepare a final evaluation report upon conclusion of the program. In addition, NAFIN will compile and store, in accordance with legal requirements on file maintenance, the information, indicators and parameters—including annual plans, midterm reviews and final evaluations—needed for preparing the Project Completion Report and the Bank's ex post evaluation. The proposed evaluation method uses a before and after evaluation with respect to expansion of the natural gas distribution network and electrical generation achieved based on cogeneration. In addition, once the values are collected for the impact indicators toward the end of the program execution period, an ex post cost-effectiveness analysis may be done based on the results achieved with program resources (see [Monitoring and Evaluation Plan](#)).

Development Effectiveness Matrix			
Summary			
<i>i. Strategic Alignment</i>			
<b>1. IDB Strategic Development Objectives</b>		Aligned	
Lending Program	i) Lending to support climate change initiatives, renewable energy and environmental sustainability, and ii) Lending to support regional cooperation and integration.		
Regional Development Goals	i) Percent of firms using Banks to finance investments, and ii) CO2 emissions (kilograms) per \$1 GDP (PPP).		
Bank Output Contribution (as defined in Results Framework of IDB-9)	Percentage of power generation capacity from low-carbon sources over total generation capacity funded by IDB.		
<b>2. Country Strategy Development Objectives</b>		Aligned	
Country Strategy Results Matrix	GN-2749	i) Increase the level of finance to the real economy; and ii) Support the implementation of national climate change policy mechanisms fostering adaptation measures taking a long-term approach.	
Country Program Results Matrix	GN-2756	The intervention is included in the 2014 Country Program Document.	
Relevance of this project to country development challenges (if not aligned to country strategy or country program)			
<i>ii. Development Outcomes - Evaluability</i>			
	Evaluable	Weight	Maximum Score
	8.8		10
<b>3. Evidence-based Assessment &amp; Solution</b>			
	9.6	33.33%	10
<b>3.1 Program Diagnosis</b>			
	3.0		
<b>3.2 Proposed Interventions or Solutions</b>			
	3.6		
<b>3.3 Results Matrix Quality</b>			
	3.0		
<b>4. Ex ante Economic Analysis</b>			
	10.0	33.33%	10
<b>4.1 The program has an ERR/NPV, a Cost-Effectiveness Analysis or a General Economic Analysis</b>			
	4.0		
<b>4.2 Identified and Quantified Benefits</b>			
	1.5		
<b>4.3 Identified and Quantified Costs</b>			
	1.5		
<b>4.4 Reasonable Assumptions</b>			
	1.5		
<b>4.5 Sensitivity Analysis</b>			
	1.5		
<b>5. Monitoring and Evaluation</b>			
	6.7	33.33%	10
<b>5.1 Monitoring Mechanisms</b>			
	2.5		
<b>5.2 Evaluation Plan</b>			
	4.2		
<i>iii. Risks &amp; Mitigation Monitoring Matrix</i>			
Overall risks rate = magnitude of risks*likelihood		Medium	
Identified risks have been rated for magnitude and likelihood		Yes	
Mitigation measures have been identified for major risks		Yes	
Mitigation measures have indicators for tracking their implementation		Yes	
Environmental & social risk classification		B.13	
<i>iv. IDB's Role - Additionality</i>			
The project relies on the use of country systems			
Fiduciary (VPC/PDP Criteria)			
Non-Fiduciary			
The IDB's involvement promotes improvements of the intended beneficiaries and/or public sector entity in the following dimensions:			
Gender Equality			
Labor			
Environment		Yes	The project will allow for the expansion of the transport, distribution, and storage of natural gas, which will facilitate cogeneration stemming from natural gas, thus increasing the availability of a clean and quality fuel and minimizing losses during transport. Greenhouse gas emissions will be reduced through the cogeneration projects financed thus benefitting the 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		Yes	Regional Technical Cooperation "Technical Support to Development Banks with Financing Strategies for Climate Change Mitigation" (ATN/MC-13341-RG), which includes activities such as: (i) the design and implementation of methodologies for financing banks to assess cogeneration projects; (ii) information and awareness programs for actors involved (funders and potential generators) about the benefits associated with cogeneration and the most effective way to evaluate them; and (iii) compliance with national standards and policies of the Bank's environmental and social safeguards.
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			

The objective of the project is to contribute to the long term development goals of cogeneration in Mexico's industrial sector, through (i) an increase in the investment in transport, storage, and distribution of natural gas, that will make medium and long term cogeneration projects viable, and (ii) the increment in the investment in cogeneration projects in the industry. The project will benefit the environment given the corresponding greenhouse gas emission reductions and will contribute to the results framework output on the percentage of power generation capacity from low-carbon sources over total generation capacity funded by IDB.

The diagnostic presents adequate information on the factors leading to a low supply of natural gas in a country where it is abundant. Evidence is presented on the shortfall in supply despite an increase in demand for natural gas. Moreover, evidence is presented on the importance of financing as the solution in Mexico where studies have shown it is a lack of access to finance that has halted the development of natural gas and cogeneration. As such, the vertical logic is adequate. The proposed indicators will allow measuring the project results. The cost benefit analysis is adequate and quantifies the program benefits on the basis of a monetization of the reduction in greenhouse gas emissions given their unit price in international markets per ton of CO2. The monitoring and evaluation plan is adequate and sets forth clear responsibilities as well as incorporating a plan for an ex-post validation of the estimated benefits. The document identifies the risks and corresponding mitigating measures.

**RESULTS MATRIX**

<b>Objective of the program:</b>	The objective of the program is to help achieve cogeneration development targets in Mexico's industrial sector through: (i) increased investment in the transportation, storage, and distribution of natural gas, to ensure the feasibility of developing cogeneration projects over the medium and long term; and (ii) increased investment in cogeneration projects in industry.
----------------------------------	--

Indicators	Unit	Base	Y1	Y2	Y3	Objective	Description / Source of verification
<b>OUTPUTS, COMPONENT I</b>							
Natural gas transportation, distribution, and storage projects financed	Number	0	1	1	-	2	Records gas transportation, storage, and distribution projects financed with program resources, on which construction has begun. Source: NAFIN report on the program.
<b>OUTPUTS, COMPONENT II</b>							
Cogeneration projects financed	Number	0	1	2	-	3	Records cogeneration projects based on natural gas and financed with program resources, on which installation has begun. Source: NAFIN report on the program.
<b>OUTCOMES</b>							
Volume of natural gas that can be supplied by the transportation, distribution, and storage projects financed	Millions of cfd	4,900 <sup>1</sup>	500	500	500	6,400	The objective of the indicator is to measure the increase over the baseline at the end of the program. Source: NAFIN report on the program. Information would be obtained from Pemex Gas y Petroquímica Básica and the National Pipeline System to corroborate these data as the program is implemented. cfd = cubic feet per day.

<sup>1</sup> Average daily transportation capacity (Pemex Gas y Petroquímica Básica, 2013).

Indicators	Unit	Base	Y1	Y2	Y3	Objective	Description / Source of verification
Installed capacity in cogeneration projects financed	MW	2,878 <sup>2</sup>	-	20	40	2,938	The objective of the indicator is to measure the increase over the baseline at the end of the program. Source: NAFIN report on the program. Information will be obtained from the CRE and CFE to corroborate these data as the program is implemented.
Total value of investment cofinanced with program resources (both components)	Millions of US\$	0	280	560	250	1,090	Measures the total value of the investment (financing plus capital) in projects that have received financing from the program, not including the demonstration effect. Source: NAFIN report on the program. Estimates based on NAFIN's initial tentative total average investment in pipeline projects.
Financing of third parties mobilized with projects financed by the program (both components)	Millions of US\$	0	105	210	95	410	Measures leveraged financing (in addition to funds granted by the Bank) for projects benefiting from the program. Includes financing with NAFIN's own resources or those of other banks. Source: NAFIN report on the program. Estimate based on the total value of the investment and a leveraging ratio of 70/30.
Greenhouse gas (GHG) emissions reduced with the cogeneration projects financed	Thous. of tCO <sub>2</sub> e	0	-	70	130	200	Source: IDB estimates based on additional installed capacity generated with the cogeneration projects financed (see above indicator) and the average conversion factor in Mexico. tCO <sub>2</sub> e = tons of CO <sub>2</sub> equivalent

<sup>2</sup> Total capacity at the national level (SENER, 2012).

Indicators	Unit	Base	Y1	Y2	Y3	Objective	Description / Source of verification
<b>IMPACTS</b>							
Number of critical alerts of the natural gas system in one year	Number	22	-	-	-	18	A critical alert is declared due to the existence of operational risk conditions affecting the delivery of service in the natural gas transportation system. Critical alerts lead industrial consumers to reduce their consumption or to replace their consumption of natural gas with other more expensive and polluting fuels. Source: Pemex Gas y Petroquímica Básica, with information from the National Pipeline System.
Energy intensity	kJ/Mex\$	913.5 <sup>3</sup>	-	-	-	905.0	Measures the amount of energy required to produce one peso of gross domestic product (GDP). Source: SENER, National Energy Balance
Total greenhouse gas (GHG) emissions of the energy sector	MT CO <sub>2</sub> e	498.51 <sup>4</sup>	-	-	-	484.0	Source: SENER, National Energy Balance MT CO <sub>2</sub> e = million metric tons of CO <sub>2</sub> equivalent

<sup>3</sup> The baseline value corresponds to the year 2011, the most recent figure published by Mexico's Department of Energy, which uses GDP at 2003 prices (SENER, 2012).

<sup>4</sup> The baseline value corresponds to the year 2011, the most recent figure published by Mexico's Department of Energy (SENER, 2012).



## FIDUCIARY AGREEMENTS AND REQUIREMENTS

<b>Country:</b>	Mexico
<b>Project number:</b>	ME-L1151
<b>Name:</b>	Financing Program for the Promotion of Cogeneration in Mexico
<b>Executing agency:</b>	Nacional Financiera S.N.C. (NAFIN)
<b>Fiduciary team:</b>	Gloria Coronel, Lead Fiduciary Specialist in Financial Management, Víctor Hugo Escala, Lead Fiduciary Specialist in Procurement, and Miriam Garza, Fiduciary Operations Analyst.

### I. EXECUTIVE SUMMARY

- 1.1 NAFIN is an autonomous government agency established in 1934. It has extensive experience with the Bank as an executing agency and financial agent. It is currently executing loans 2631/TC-ME (ME-L1109), 2843/OC-ME (ME-L1119), and 2226/OC-ME (ME-L1051), and for the latter NAFIN is expected to shortly present the justification for funds advanced to close the operation in 2013.
- 1.2 This operation (ME-L1151) will be a Global Credit Loan to be executed through financial intermediaries and/or direct placements by NAFIN. Component I. Credit to the natural gas logistical chain (for up to US\$300 million) will be for projects to expand the natural gas transportation, distribution, and storage network, making it feasible to develop cogeneration systems based on natural gas, increasing the availability of clean, quality fuel, and minimizing transportation losses. Component II. Credit for cogeneration (for up to US\$50 million) will be for cogeneration projects suited to their characteristics, from 1 MW of capacity, in the subsectors identified as having high potential. The program Operating Regulations, previously agreed to with the Bank, will establish the eligibility criteria.

### II. THE EXECUTING AGENCY'S FIDUCIARY CONTEXT

- 2.1 For financial aspects, NAFIN uses a dual currency (US\$ and Mex\$) accounting system, and will thus use the exchange rate on the payment date recorded in its system for converting payments made in Mexican pesos to U.S. dollars, this being the rate in effect in the borrower's country on the effective date of payment. For loans granted for the first and second tier banking system, NAFIN uses the Sistema Institucional de Registro y Administración de Cartera [Institutional Portfolio Recording and Management System] (SIRAC). Each day the SIRAC's

summary information is recorded and reconciled in the Sistema Integral Financiero [Integrated Financial System] (SIF). Since it is a bank regulated by the Comisión Nacional de Bancos y Valores [National Banking and Securities Commission] (CNBV), NAFIN must reconcile its accounts daily. For the last two operations under CCLIP ME-X1010, loans 2671/OC-ME (ME-L1081) and 2843/OC-ME (ME-L1109) the financial fiduciary team confirmed the results from the Institutional Capacity Assessment System (ICAS) with regard to accounting and the internal control environment, as was done for the first operation under the CCLIP loan 2226/OC-ME (ME-L1051) in 2009. For more details on the ICAS, please see IDBDOCS 37048160.

- 2.2 Like other operations with NAFIN, this operation makes no provision for direct procurement by NAFIN or the intermediaries.

### III. FIDUCIARY RISK EVALUATION AND MITIGATING ACTIONS

- 3.1 **ICAS:** The ICAS analysis done in 2009 yielded a weighted average of 97.94%, reflecting its institutional capacity, which has been verified during the fiduciary visits made to the operations currently being executed. The results obtained from the seven systems evaluated in the ICAS are noted below, with a questionnaire for each of them:

Capacity	System	Quantification			Development (ND, ID, MD, SD)	Risk Level (HR, SR, MR, LR)
		Rating %	IR %	Weighted %		
CPO	SPA	<a href="#">100</a>	50	50	<a href="#">SD</a>	<a href="#">LR</a>
	SOA	<a href="#">96.3</a>	50	48.15	<a href="#">SD</a>	<a href="#">LR</a>
TOTAL				98.15	SD	LR
CE	SAP	<a href="#">94.44</a>	30	28.33	<a href="#">SD</a>	<a href="#">LR</a>
	SABS	<a href="#">96.77</a>	30	29.03	<a href="#">SD</a>	<a href="#">LR</a>
	SAF	<a href="#">97.73</a>	40	39.09	<a href="#">SD</a>	<a href="#">LR</a>
TOTAL				96.46	SD	LR
CC	SCI	<a href="#">100</a>	80	80	<a href="#">SD</a>	<a href="#">LR</a>
	SCE	<a href="#">100</a>	20	20	<a href="#">SD</a>	<a href="#">LR</a>
TOTAL		97.94		100	SD	LR

### IV. CONSIDERATIONS FOR THE SPECIAL PROVISIONS OF CONTRACTS

- 4.1 In order to streamline contract negotiation by the project team, primarily the Legal Department (LEG), the agreements and requirements that should be considered in special clauses are noted below:

- a. Conditions precedent to the first disbursement: Entry into effect of the program Operating Regulations previously approved by the Bank.
- b. The exchange rate agreed to with the executing agency for rendering accounts will be the exchange rate on the payment date recorded in the financial and accounting systems of NAFIN in accordance with Mexican government regulations, this being the rate in effect in the borrower's country on the effective payment date.
- c. Retroactive expenses: Eligible expenses incurred by the beneficiary from 20 September 2013, the approval date for the Project Profile, until the approval date of this loan proposal by the Bank's Board of Executive Directors (in no case 18 months prior to that approval) may be recognized, for an amount equivalent to up to 20% of the approved amount, provided requirements substantially similar to the Bank's procurement policies have been met.
- d. Since this is a program that will operate primarily on the basis of demand, for the time being no procurement of works, goods, services, or consulting services has been identified. When the end borrowers are private entities they will use procurement procedures that are customary in the market and acceptable to the IDB, in accordance with Appendix IV of the Bank's Procurement Policy. When the end borrowers are public entities other than those provided in paragraph 3.12 of the procurement policies, the corresponding sections of the Bank's policies for the selection and contracting of consultants will be applied (document GN-2350-9), or the policies for the procurement of goods and works financed by the Bank (document GN-2349-9).
- e. If applicable and before carrying out any procurement process, the executing agency must submit the respective procurement plan for the Bank's review and approval, in accordance with the provisions of the aforementioned procurement policies. This plan must be updated at least every 12 months during program execution, and each updated version will be submitted for review and approval by the Bank. Procurement must be carried out in accordance with that procurement plan, which will indicate the contracts to be reviewed on an ex ante and ex post basis.

## V. AGREEMENTS AND REQUIREMENTS FOR PROCUREMENT EXECUTION

- 5.1 Should the need arise to use loan funds for any procurement, the Fiduciary Agreements and Requirements on Procurement establish the following applicable provisions:
  - a. **Execution of procurement: Procurement of works, goods, and nonconsulting services:** Contracts for works, goods, and nonconsulting services<sup>1</sup> generated under the project and subject to international competitive

---

<sup>1</sup> Policies for the Procurement of Goods and Works Financed by the Inter-American Development Bank (document [GN-2349-9](#)) paragraph 1.1: Nonconsulting services will be treated like goods.

bidding (ICB) and procurement subject to national competitive bidding (NCB) will be executed using the bidding documents harmonized by the Civil Service Department (SFP) and the Bank, which are available at: (<http://www.funcionpublica.gob.mx/unaopspf/credito/normace.htm>). Review of the technical specifications for procurement during preparation of selection processes is the responsibility of the project sector specialist.

- b. **Selection and contracting of consulting firms:** Consulting services contracts with firms financed using project funds will be executed using the standard Request for Proposals (RFP) agreed to between the Bank and the SFP, which may be consulted at: <http://www.funcionpublica.gob.mx/unaopspf/credito/normace.htm>. Review of the terms of reference for contracting consulting services is the responsibility of the project sector specialist.
  - c. **Selection of individual consultants:** Consulting services contracts with individual consultants will use the model contract for individual consultants agreed to with the Bank, which can be consulted at: (<http://www.funcionpublica.gob.mx/unaopspf/credito/normace.htm>).
  - d. **Other:** It has been established that 100% of the loan funds will be allocated so that NAFIN, as a first or second tier financial institution, will channel resources to finance renewable energy projects carried out by developers of electrical generation plants.
- 5.2 When the end borrowers are private entities they will use procurement procedures customary in the market and acceptable to the IDB, in accordance with Annex IV of the Bank's Procurement Policies. In addition, the provisions indicted in Section III., Other Methods of Procurement, paragraph 3.12. Procurement in Loans to Financial Intermediaries.

**1. Table of thresholds (thousands of US\$)**

- 5.3 In the event there is a need to make some purchase using loan funds, the threshold amounts are as follows:

Works			Goods <sup>2</sup>			Consulting	
International Competitive Bidding	National Competitive Bidding	Shopping	International Competitive Bidding	National Competitive Bidding	Shopping	Consulting International Publicity	Shortlist 100% National
>=15,000,000	< 15,000,000 and >= 500,000	< 500,000	>= 3,000,000	<3,000,000 and >=100,000	<100,000	> = 200,000	< 500,000

<sup>2</sup> Includes nonconsulting services.

## 2. Major procurements

- 5.4 No provision has been made for procurements to be made by the executing agency. For the moment, the only stipulation is that 100% of the loan funds will be allocated so that NAFIN will channel funds for financing the natural gas and cogeneration logistical chain to direct projects and as a second tier bank. When the final borrowers are private entities they will use procurement procedures customary in the market and acceptable to the IDB, in accordance with Annex IV of the Bank's Procurement Policies.

## 3. Procurement supervision

- 5.5 Considering the low fiduciary risk of the project and to the extent that there are procurements, there would be an annual inspection visit. In addition, establishment of the supervision system took into account the executing agency's experience in previous operations either as the executing agency or as a financial agent.
- 5.6 For external audit review and overall monitoring of the program, ex post review of procurement will be carried out by an external auditing firm that will submit a special workbook with the procurement report in the event of any procurement, in accordance with the terms of reference agreed to between the IDB and the SFP.

Threshold for ex post review		
Works	Goods	Consulting services
15,000,000	3,000,000	500,000

Note: The thresholds established for ex post review are applied based on the fiduciary execution capacity of the executing agency and may be modified by the Bank as that capacity changes.

## 4. Special provisions

- 5.7 **Measures to reduce the likelihood of corruption:** The executing agency must diligently adhere to the provisions on fraud and corruption established in the Bank's Procurement Policies.

## 5. Records and files

- 5.8 The original basic documentation for verification of expenses before the Bank will remain at NAFIN. The Sustainable Projects Office will be responsible for consolidating program financial and procurement information and will maintain relations with the Bank.

# VI. FINANCIAL MANAGEMENT

## 1. Programming and budget

- 6.1 NAFIN's fiduciary systems are very advanced and it must follow national regulations, as established in the annual budget law issued by the Department of

Finance (SHCP). Planning and programming functions and responsibilities are documented in the Financial Planning and Programming Manual as well as in its planning policies, which are authorized by NAFIN's Board of Directors and by the Congress, in accordance with its organic law. There are clear and established programming and budget procedures certified under ISO 9001-2000. NAFIN has a corporate governance structure to monitor compliance with the plan, it holds meetings in different settings to monitor the indicators submitted to the Board and the various operating committees for each process.

## **2. Accounting and information systems**

- 6.2 NAFIN uses a financial information system for accounting and financial records. This system incorporates the information from the SIRAC used for the management and supervision of the NAFIN's portfolio of credit operations. NAFIN will record all IDB financing transactions in its own system using the exchange rate on the payment date for converting payments made in Mex\$ into US\$. As a government agency, NAFIN uses the International Public Sector Accounting Standards (IPSAS) and must also comply with the regulations established for banks in Mexico issued by the CNBV. NAFIN has a Credit and Operations Manual approved by the Board of Directors, which specifies the nature of operations, purpose, and results of each operation and describes procedures for operations, authorization, movements, records, and oversight of operations.
- 6.3 NAFIN is audited annually by (a) the Auditoría Superior de la Federación [Chief Audit Office of the Federation] (ASF); (b) the CNBV; and (c) an external audit firm. Pursuant to IDB policy, each year NAFIN will submit an audited financial statement on the use of the loan funds, within 180 days and during the disbursement period.

## **3. Disbursements and cash flow (coordinated with use (or not) of the National Cash Flow System)**

- 6.4 The program funds will be deposited in a special account or account designated for the program. The funds to creditor beneficiaries may be through loans directly placed by NAFIN or through loans to intermediaries that will grant loans to the end beneficiaries.
- 6.5 NAFIN will establish a bank account and an accounting entity for the management and recording of payments under this operation. Loan disbursements may be made through the (1) advance of funds, or (2) reimbursement of expenditures. Expenditures will be recognized by: (a) payments made to the intermediary/beneficiaries for eligible activities. Review of disbursements for expenses effectively paid by NAFIN will be on an ex post basis.

## **4. Internal control and internal audit**

- 6.6 Mexico's Federal Law on the Administrative Responsibilities of Civil Servants governs the actions of personnel working in the agencies and entities of the federal government. In addition, NAFIN has a code of conduct applicable to all

staff. It also has an Órgano Interno de Control [Internal Oversight Body] (OIC). The senior management of the OIC consists of SFP officials and the OIC staff consists of NAFIN personnel or personnel contracted for sporadic activities. The SFP approves the work plan of the OIC each year, and there are procedures for reporting and monitoring these activities. The OIC is responsible for monitoring compliance with the observations and recommendations made by the ASF, CNVB, and/or the firm of external auditors. In January 2013, the new government issued a law indicating that the SFP would disappear in 2013. As of the date of this report (October 2013), the SFP continues to carry out its functions and no changes are anticipated until 2014. We believe that these changes will not significantly affect the control environment at NAFIN.

## **5. External control and reporting**

- 6.7 As indicated above, NAFIN is audited annually by the ASF, the CNVB, and by a firm of external auditors appointed by the SFP. Under the law establishing the responsibilities of the SFP, as of now the SFP's Dirección General de Auditorías Externas [External Audits Bureau] (DGAE) is responsible for coordinating the appointment of external auditors to perform the audits of projects financed by international financial organizations.
- 6.8 Each year NAFIN will submit an audited financial statement to the Bank within a period of 180 days after the close of the accounting year, bearing the opinion of firms acceptable to the IDB and with terms of reference agreed to by the IDB and SFP. The audited financial statements of NAFIN as an entity are posted on its website, so it is not considered necessary to ask for their submission.

## 6. Financial supervision plan

Supervision activity	Supervision plan			
	Nature and scope	Frequency	Responsible party	
			Bank	Third party
OPERATIONAL	Review of technical progress of credit activities. Disbursements. Inspection visits to works based on samples	Annual	Fiduciary-Financial and Technical Team	
FINANCIAL	Visit for review/validation of control processes for correct recording and monitoring of eligible activities.	Biannual	Fiduciary-Financial Team	External auditor
	Ex post review of disbursements and financial audit	Annual		External auditor
	Review of disbursement requests and attached reports	Periodic	Fiduciary-Financial Team	
	Submission of audited financial statements	Annual	Fiduciary-Financial and Technical Team	Executing agency/ external auditor
	Conditions precedent to the first disbursement	Once	Fiduciary-Financial and Technical Team	

## 7. Execution mechanism

- 6.9 The technical and financial execution mechanism will be centralized at NAFIN and commitments and payments charged to the operation will be made by the respective responsible technical and financial areas at NAFIN. Coordination with the IDB will be through the Dirección de Organismos Internacionales [International Organizations Office] at NAFIN, which acts as the financial agent for operations with Mexico's federal government.