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DOCUMENT OF THE INTER-AMERICAN DEVELOPMENT BANK

**PERU**

**DEVELOPMENT OF A NEW SUSTAINABLE ENERGY MATRIX  
PROGRAM IV**

**(PE-L1121)**

**LOAN PROPOSAL**

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<b>REQUIRED</b>	
1.	Policy letter <a href="http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37256503">http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37256503</a>
2.	Means of verification matrix <a href="http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37097788">http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37097788</a>
3.	Results matrix <a href="http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37097786">http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37097786</a>
<b>OPTIONAL</b>	
1.	Monitoring and evaluation plan <a href="http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37097773">http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37097773</a>
2.	Comparison between the triggers of NSEM III and NSEM IV <a href="http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37097805">http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37097805</a>
3.	Economic evaluation report <a href="http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37095358">http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37095358</a>
4.	Preparation of the New Sustainable Energy Matrix and Strategic Environmental Assessment as planning tools, Ministry of Energy and Mines (MEM), 2012 <a href="http://www.minem.gob.pe/publicacion.php?idSector=12&amp;idPublicacion=424">http://www.minem.gob.pe/publicacion.php?idSector=12&amp;idPublicacion=424</a>
5.	Retrospective environmental and social analysis of the program <a href="http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37115599">http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37115599</a>
6.	Evaluation of the promotion of power generation using hydro and renewable sources <a href="http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37185217">http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37185217</a>
7.	Project Monitoring Report (PMR) <a href="http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37192983">http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37192983</a>
8.	Project risk management analysis (PRM) <a href="http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37097801">http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37097801</a>

## ABBREVIATIONS

bpd	Barrels per day
BTU	British thermal unit
CATs	Coordinaciones de asistencia técnica [technical assistance coordination committees]
COES	Comité de Operaciones del Sistema [System Operations Committee]
DGEE	Dirección General de Eficiencia Energética [Energy Efficiency Division] (of the MEM)
EIA	Environmental impact assessment
ERR	Economic rate of return
GCI-9	Ninth General Capital Increase
GDP	Gross domestic product
GWh	Gigawatt hours
MEF	Ministry of Economy and Finance
MEM	Ministry of Energy and Mines
MINAG	Ministry of Agriculture
MINAM	Ministry of the Environment
MPL	Maximum permissible limit
MW	Megawatt
NFPS	Nonfinancial public sector
NSEM	New Sustainable Energy Matrix
NSEM IV	Fourth operation under the programmatic PBL series
OSINERGMIN	Organismo Supervisor de la Inversión en Energía y Minería [investment supervisory agency for energy and mining]
PBL	Policy-based loan
SEA	Strategic environmental assessment
SECCI	Sustainable Energy and Climate Change Initiative
SEIN	National Interconnected Electric System
SNIP	National Public Investment System
TC	Technical cooperation

## PROJECT SUMMARY

### PERU DEVELOPMENT OF A NEW SUSTAINABLE ENERGY MATRIX PROGRAM IV (PE-L1121)

Financial terms and conditions				
<b>Borrower:</b> Republic of Peru <b>Executing agency:</b> Ministry of Economy and Finance (MEF)			<b>Flexible Financing Facility*</b>	
			Amortization period:	8 years
			Original WAL:	6.5 years
			Disbursement period:	12 months
			Grace period:**	5 years
<b>Source</b>	<b>Amount</b>	<b>%</b>	Inspection and supervision fee:	***
IDB (OC)	US\$30 million	100%	Interest rate:	LIBOR-based*
Other	0	0%	Credit fee:	***
Local	0	0%	Currency of approval:	U.S. dollars from the Ordinary Capital
Total	US\$30 million	100%		
Project at a glance				
<b>Project objective:</b> The program will support the development of a New Sustainable Energy Matrix (NSEM) that is based on a comprehensive approach to technical, economic, environmental, and social considerations and is consistent with Peru's development objectives, in order to maximize the benefit derived from energy resources in a sustainable manner. This is the fourth operation (NSEM IV) in a series of programmatic policy-based loans, whose objective is to provide continuity of support for the policy reforms and sector decisions envisioned in the program, including the formulation of subsector plans and implementation of other specific measures.				
<b>Special contractual conditions:</b> The single disbursement of the Bank loan will be contingent upon prior completion of the policy reform measures described in the program components (see paragraphs 1.28 to 1.42) and in Annex II (Policy Matrix).				
<b>Exceptions to Bank policies:</b> None.				
<b>Project consistent with country strategy:</b> Yes [X]      No [ ]				
<b>Project qualifies as:</b> SEQ [ ]      PTI [ ]      Geographic [ ]      Headcount [ ]				
<b>Procurement:</b> Not applicable, as a policy-based loan.				

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

\*\* The period after which the borrower must pay the first amortization installment.

\*\*\* The credit fee and 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 applicable provisions of the Bank's policy on lending rate methodology for Ordinary Capital loans. In no case will the credit fee exceed 0.75% or the inspection and supervision fee exceed, in a given six-month period, the amount that would result from applying 1% to the loan amount divided by the number of six-month periods included in the original disbursement period.

## I. DESCRIPTION AND RESULTS MONITORING

### A. Background, problem to be addressed, and rationale

- 1.1 **Macroeconomic framework: rapid economic growth.** Peru, one of the most dynamic economies in the region, has enjoyed strong macroeconomic performance, an environment of fiscal stability, external balance, and low inflation in recent years. With sound economic fundamentals and prudent, countercyclical economic policies in place, Peru was able to weather the international crisis of 2009 and continue growing in the years that followed. In 2011, real GDP growth was 6.9%, a rate lower than the previous year (8.8%) but still among the highest in the region. During the first half of 2012, real GDP growth was 7.1%, slightly above its 2011 level (6.9%). On the supply side, this growth was driven by trade and services and output in the nonprimary manufacturing sectors, while the main sources of demand were private investment and domestic consumption. Projected GDP growth in 2012 is around 6.0%.
- 1.2 **Inflation under control.** Price pressures due to external factors in certain sectors boosted inflation to 4.2% during 2011, slightly above the monetary policy target band. The Central Reserve Bank of Peru (BCRP) is acting to bring inflation back within the target band by end-2012 and in 2013. In July 2012, year-on-year inflation was 3.3%, below its end-2011 level.
- 1.3 **Progressive fiscal consolidation.** In 2011 the nonfinancial public sector (NFPS) recorded an economic surplus of 1.9% of GDP, after closing 2010 at 0.3%. This improvement was due primarily to the combination of higher current revenues for general government, improved tax revenue intake, and lower public capital expenditure. The outlook for NFPS economic performance is a surplus of 2.0% of GDP in 2012, after closing the first half of the year with a surplus of 6.7% of GDP, and a surplus of 1.4% of GDP in 2013.
- 1.4 **Strength of external sector.** In 2011 exports grew 27.8% over 2010, primarily due to higher prices for exportable commodities. The country ran a trade surplus of 5.3% of GDP and a current account deficit of 1.5% of GDP, which was more than fully financed by net private capital inflows equivalent to 5.2% of GDP. For 2012, this deficit forecast is 1.5% of GDP, due to the anticipated growth in economic activity and its impact on demand for imports, in particular capital goods. Private capital inflows are expected to boost the balance of international reserves.
- 1.5 **Favorable and stable external lending terms.** The Emerging Markets Bond Index Plus (EMBI+) spread for Peru, which was highly volatile in 2011, tended to stabilize toward the end of that year. Peru closed August 2012 with a country risk of 136 basis points, one of the region's lowest, and has maintained an investment grade rating.<sup>1</sup> The medium-term macroeconomic outlook remains positive, with the public finance, external sector, capital flow, and private investment indicators supporting growth rates of 6% on average. The last standby arrangement with the

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<sup>1</sup> According to ratings by Dominion Bond Rating Service (DBRS), Fitch, Standard & Poor's, and Moody's.

International Monetary Fund (IMF) expired in 2009, and since then Peru has been subject only to periodic monitoring in the context of Article IV consultations.

- 1.6 The Bank's independent macroeconomic assessment concludes that Peru's macroeconomic policy framework is consistent with the objectives of policy-based loans. In a scenario of financing requirements on the order of US\$2 billion in 2012, no difficulties are foreseen in narrowing the fiscal deficit. Thus, the greater value-added of this operation will be in supporting efficiency gains in energy use, with a positive impact on long-term growth.
- 1.7 **Background.** Since the year 2000 the Peruvian economy expanded steadily at around 6% per year on average (see paragraph 1.1), feeding strong growth in energy demand. This demand was historically met by supply based essentially on hydrocarbons and biomass, later adding hydroelectric power and, more recently, natural gas and gas liquids. Currently, petroleum and derivatives account for 39% of the energy supply, natural gas and liquids 33%, hydropower 11%, and biomass 17%.<sup>2</sup> In terms of its energy balance, Peru was a net oil exporter until 1995, when crude production reached nearly 200,000 barrels per day (bpd), after which it became an oil importer, with oil output in 2011 on the order of 70,000 bpd. The Camisea gas field introduced a new primary source, which has been applied to electric power generation, export and, thus far to a lesser extent, domestic consumption, with great potential for industrial use. The introduction of natural gas liquids to the market has boosted gas production, raising total hydrocarbon production to 157,000 bpd equivalent in 2010. The rapid development of natural gas has come at a time of growing international demand. At the same time, the legal and contractual framework instituted in the hydrocarbon sector has led to the signature of numerous exploration and operation contracts.<sup>3</sup> These factors have contributed to a perception that hydrocarbon resources are relatively abundant, with some projections<sup>4</sup> calling for output of 500,000 bpd by 2021.
- 1.8 In the early 1990s, the electricity sector began a process of organization leading to its current structure, based on a competitive market in which power generation, transmission, and distribution are independent activities.<sup>5</sup> In 2000 the National Interconnected Electric System of Peru (SEIN) had 4,610 MW of power capacity supplying 17,930 GWh, with 80% of the power being hydroelectric, and 20% thermal. By 2011, with 6,700 MW of power capacity, the SEIN was generating 35,764 GWh, with 58% hydroelectric and 42% thermal. During this time, demand grew 89%, and installed power 49%, with an increase in the share of thermal.

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<sup>2</sup> Source: "Elaboración de la Nueva Matriz Energética Sostenible y Evaluación Ambiental Estratégica, como Instrumentos de Planificación" ["Preparation of the New Sustainable Energy Matrix and Strategic Environmental Assessment as planning tools"], 2012.

<sup>3</sup> More than 50 companies are engaged in exploration. Oil reserves rose by 50 million barrels in 2011, from 533 million to 582 million.

<sup>4</sup> PerúPetro, cited in the country analysis by the U.S. Energy Information Administration (USEIA).

<sup>5</sup> [Regulatory Framework for the Energy Sector in Peru](#), 2009.

Reserve capacity<sup>6</sup> has declined over the same period, and there are warning signs that it could drop to below 6% when water levels are low.

- 1.9 The recent expansion in power generation has been fueled by natural gas (see Figure 1). The price of natural gas for such use is among the lowest in the region, as a result of the policy that promoted its development in Peru.<sup>7</sup> This low cost of natural gas relative to other generation sources puts new hydroelectric power,<sup>8</sup> other renewable energy sources, and even combined-cycle generation at a disadvantage. This, plus the fact that there is only one pipeline for transporting gas from Camisea, has concentrated new thermal generation in the vicinity of Lima. The resulting congestion, not only in the pipeline but also in the SIEN infrastructure for power transmission to the north and south of the country, jeopardizes the system's stability and reliability.

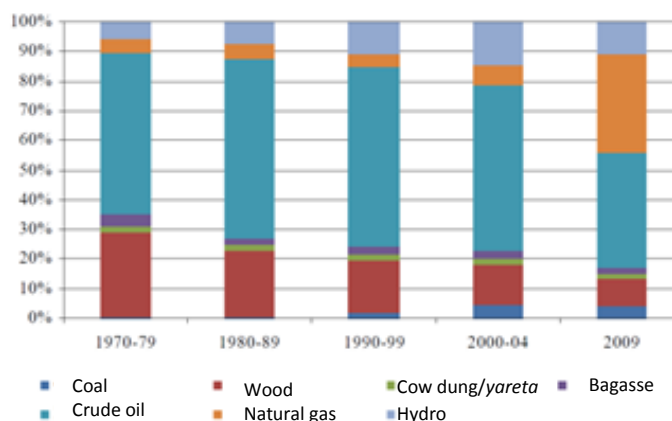


Figure 1

Source: National Energy Balance

- 1.10 If the energy matrix is to be diversified with renewable energy sources, a number of barriers<sup>9</sup> will have to be overcome: these sources are uncompetitive because marginal prices are too low to attract financing; obtaining rights-of-way for the needed infrastructure is a complicated process; and responsibilities for environmental regulation are scattered.<sup>10</sup> The Government of Peru has instituted auctions to make room for the long-term supply of a portion of the system's needs through generation with nonconventional renewable sources, and the results are promising. In the case of measures to promote conventional renewable sources, essentially hydroelectric facilities with an installed capacity greater than 20 MW, the auctions model used to date has had an uneven impact, and the government is

<sup>6</sup> Reserve capacity is the margin between firm capacity and gross demand for power (including losses), and its relative magnitude depends on the regularity of water cycles and other factors such as the state of generating equipment and the security of fuel supply. The current margin is estimated on the basis of information from the Ministry of Energy and Mines (MEM). A reserve capacity of 20% is usually considered adequate.

<sup>7</sup> In 2011 the average price of natural gas for electric power generation in Peru was US\$1.5 per million BTUs (excluding transport). Some examples of regional and nonregional prices for natural gas per million BTUs are: in Argentina, for local natural gas: US\$2.6; Bolivia export: US\$7.6; Brazil local natural gas: US\$10.5, and national average: \$8.7; Henry Hub US\$2.664.

<sup>8</sup> “[Análisis de barreras de entrada para la inversión en centrales hidroeléctricas](#)” [Analysis of entry barriers for investment in hydroelectric power plants], OSINERGMIN.

<sup>9</sup> See note 8.

<sup>10</sup> World Bank, 2010, “[El desarrollo hidroeléctrico en el Perú](#)” [“Hydropower development in Peru”].



now examining alternatives for including hydropower generation without resorting to special mechanisms.<sup>11</sup>

- 1.11 Energy consumption per capita in Peru has grown more than 21% over the last 20 years, but it is still low in comparison to the region. It is estimated that the growth in demand resulting from future economic growth could be met with domestic sources, but this will require expansion of infrastructure, which will take a long time to implement, as well as support for sector management that will require planning and coordination.
- 1.12 The Biofuel Market Promotion Act introduced the blending of gasoline and diesel with biofuels as a way of diversifying fuel sources and fostering agribusiness development. These blends are sold throughout Peru, and the planned implementation targets have been met. The Ministry of Agriculture (MINAG) has formulated a National Agroenergy Plan, and a Multisector Commission on Bioenergy was created to coordinate it.<sup>12</sup> The plan supports initiatives to generate power from agricultural and forestry wastes, among other sources, and to develop energy crops for biofuel production.
- 1.13 With its rich and diverse environmental and social fabric, Peru faces the challenge of reconciling sustainable development of the energy sector with the environmental dimension and community interests, as some key projects have shown.<sup>13</sup> The sector has a direct bearing on efforts to prevent and mitigate climate change, control pollution, and protect ecosystems. Thus, new mechanisms and arrangements have been adopted to mainstream the environmental dimension at the different levels of government. Among other measures, the Strategic Environmental Assessment has been incorporated into the policy-making apparatus.<sup>14</sup> Environmental management in Peru, now given new priority with creation of the Ministry of the Environment (MINAM), is attempting to coordinate responsibilities and functions at the national, regional, and local government levels.
- 1.14 Primary energy sources make a significant and direct contribution to revenues through royalty arrangements,<sup>15</sup> the proceeds of which are distributed between the national government and the regional and local governments where the resources originate.<sup>16</sup> The efficiency and quality with which these revenues are used is key to

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<sup>11</sup> See optional electronic link 7, “Evaluation of the promotion of power generation using hydro and renewable sources.”

<sup>12</sup> Comprising the ministries of Energy, Agriculture, and Environment, Supreme Decree 075-2009-PCM of 24 November 2009.

<sup>13</sup> See link at [Proyecto Camisea](#) [Camisea Project].

<sup>14</sup> Legislative Decree 1078-2008, regulatory implementation in September 2009.

<sup>15</sup> Canon y sobrecanon petrolero [oil royalty and surcharge]; canon hidroenergético [hydropower royalty]; canon gasífero [gas royalty]; Fondo de Desarrollo Socioeconómico de Camisea [Camisea Socioeconomic Development Fund] (FOCAM); in addition to taxes (income, fuel, other).

<sup>16</sup> See “[Cartilla Informativa MEM – EITI](#)” [MEM information bulletin on the Extractive Industries Transparency Initiative (EITI)] for a breakdown of the origin and distribution of resources.

the societal perception of the economic benefit of energy sector activities. Since 2007 these revenues have amounted to some US\$4.1 billion, with a level of execution of less than 60% on average.<sup>17</sup> Improving this budgetary performance will require major efforts by the government at all levels, particularly in terms of strengthening the agencies responsible for project design and execution.

- 1.15 The reforms of the 1990s gave a great boost to the energy sector (see paragraphs 1.7 and 1.8), paving way for private initiative, but led the government to downplay its strategic planning functions in terms both of energy supply development and demand management. There is no mandate or institutionalized practice on integrated planning, and only electricity transmission is governed by a binding planning process.<sup>18</sup> Having assumed a subsidiary role in business activities, the Government of Peru still maintains a substantial involvement through the national oil company PetroPerú (50% of the market for the refining and sale of derivatives) and the public electricity companies (more than 50% of customers), but faces constraints in managing their resources efficiently.
- 1.16 **Problem to be addressed.** The problem identified, consistent with the tensions described above (see paragraphs 1.7 to 1.15), is reflected in: (i) the lagging development of hydropower;<sup>19</sup> (ii) the adoption of inefficient single-cycle gas-fired generation;<sup>20</sup> (iii) geographic concentration of new thermal generation capacity (see paragraph 1.9); (iv) congestion in power transmission and in the capacity of the main gas pipeline (see paragraph 1.9); (v) the continuing vulnerability of power generation to rainfall patterns (see paragraph 1.8); (vi) limited entry of renewable sources; (vii) reduced energy efficiency (see paragraph 1.10); and (viii) asymmetry in electricity infrastructure from region to region, and conflicting societal perceptions about the benefits and impacts of the sector (see paragraphs 1.14 and 1.15). It seems clear that proper management of these tensions will contribute to the efficiency of the Peruvian economy by reducing the fiscal impact and opportunity costs (see paragraph 2.5) and consequently the constraints on development. The economic assessment of the program (see paragraph 2.6) examines the impacts of these factors and the opportunities for the economy that would flow from correcting them.
- 1.17 **Rationale.** The Development of a New Sustainable Energy Matrix Program (NSEM or the Program) (see paragraph 2.1) was agreed upon by the Government of Peru and the IDB as a response to the problem described, to help the government

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<sup>17</sup> Authors' estimates based on data obtained from the website of "Transparencia Económica, Sistema de consulta de transferencias a los gobiernos nacional, regional y local, Ministerio de Economía y Finanzas" [Economic Transparency, Consultation system for transfers to national, regional, and local governments, Ministry of Economy and Finance]

<sup>18</sup> The System Operations Committee (COES) is responsible for transmission planning.

<sup>19</sup> In 2000-2011, hydropower generation increased 33%, while total generation increased 94%.

<sup>20</sup> The COES annual operation statistics 2011 identified 24 gas-fired units, just one of which was combined cycle (EDEGEL's Ventanilla Thermal Power Plant with effective capacity of 492.7 MW).

address energy constraints.<sup>21</sup> The program fosters dialogue and discussion on sector policies with a view to developing the energy matrix<sup>22</sup> while supporting specific measures targeted at some of the main constraints identified (see paragraph 1.16).

- 1.18 The program will benefit the Peruvian population at large through the program contribution to improvements in the economy. The specific beneficiaries will be the populations impacted by the sector projects through better identification of socioenvironmental variables and citizen participation in the discussion of policies and projects; end consumers through the opportunity for a diversified and sustainable energy supply; and sector investors through more predictable long-term time frames built into sector policies.
- 1.19 This fourth operation is the last in a series of programmatic policy-based series (NSEM IV) seeking to address some of the sector's main problems within the framework of a sustainable energy matrix through: (i) support for technical-economic sustainability, supporting the sustainable development of energy resources through diagnostic assessments and technical dialogues (see paragraph 1.30) that support policy formulation, public consultation (see paragraph 1.41), intersector coordination practices (see paragraph 1.31), formulation of clean and efficient energy alternatives (see paragraph 1.34), and the development of renewable energies and energy efficiency (see paragraph 1.33); and (ii) support for environmental and social sustainability through greater attention to the sector's socioenvironmental dimension, with Peru's first experiences in sector-level Strategic Environmental Assessment (SEA) (see paragraphs 1.13 and 1.40), and good governance practices in the use of fiscal resources generated by the energy sector and other sources (see paragraph 1.42).
- 1.20 The program has built upon experience gained in its initial stages, as well as other initiatives in the region to address challenges such as fluctuating prices for hydrocarbons (2006-2012) and concern for energy security.<sup>23</sup> This proposal was also supported by government studies that identified key issues in the sector (see paragraph 1.22).
- 1.21 **Sector knowledge.** The Bank's engagement in Peru's energy sector includes the downstream component of the Camisea project (1472/OC-PE) and the Peru LNG project (1946B/OC-PE), the Program for Institutional Strengthening and Environmental and Social Management Support for the Camisea Gas Project (1441/OC-PE); and support for energy efficiency through a technical cooperation operation (ATN/JF-7040-PE) and a Multilateral Investment Fund (MIF) project

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<sup>21</sup> Official letter 1496/07 of 12 November 2007, sent to the Bank by the MEF.

<sup>22</sup> The energy matrix is the result of the coordination of energy sources and uses, the necessary transformations, and the volumes of the exchanges.

<sup>23</sup> Argentina: discussion of the "Plan estratégico de energía a largo plazo" [Long-term strategic plan for energy], SE Resolution 1284/06. Chile: discussion of "Opciones para la matriz energética eléctrica" [Alternatives for the electric energy matrix], 2007. Brazil: Energy sector experiences 2001-2005, crisis and planning.

(ATN/ME-10711-PE). The technical cooperation operations to support Peru's energy sector (ATN/OC-11010-PE, Infrastructure Fund) and the Strategic Plan for Sustainable Energy and Bioenergy (ATN/OC-10984-PE, SECCI) contributed to the program. The Bank is also assisting the Government of Peru in climate change adaptation through technical cooperation operations ATN/MC-11907-PE and ATN/OC-12399-PE, as well as a loan to help prevent and mitigate the impact of climate change on the country's development (PE-L1080). In 2012 the IDB approved the PROSEMER program (PE-X1007) to strengthen the capacity of sector management agencies.<sup>24</sup>

- 1.22 **The Bank's country strategy and GCI-9.** NSEM IV forms part of the Bank's country strategy with Peru,<sup>25</sup> whose sector-specific objectives include support the development of a new sustainable energy matrix, improve the penetration of renewable energies in the energy matrix, and strengthen the capacity of the Ministry of Energy and Mines (MEM) to undertake medium and long-term energy planning. It is consistent with the Bank's institutional priorities, as reflected in the document on the Ninth General Capital Increase (GCI-9) (document AB-2764), in that it contributes to assisting borrowing member countries in dealing with climate change, sustainable energy (including renewable energy and energy efficiency), and environmental sustainability. NSEM IV is also aligned with the Bank's Integrated Strategy for Climate Change Adaptation and Mitigation, and Sustainable and Renewable Energy (document GN-2609-1).
- 1.23 **Outcomes of previous programmatic operations.** The NSEM programmatic series began in 2009 with approval of the first loan (PE-L1061),<sup>26</sup> which was followed by loans approved in 2010 (PE-L1055),<sup>27</sup> 2011 (PE-L1054),<sup>28</sup> and the present NSEM IV. The program has been successful in achieving its central purposes: (i) approval of a National Energy Policy; (ii) formulation of a target energy matrix for Peru, NSEM, that consolidates plans for the sector; (iii) the first use of the SEA in Peru as a policy and planning tool for analyzing impacts and

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<sup>24</sup> Program for Sustainable and Efficient Management of Energy Resources in Peru (PROSEMER), financed with nonreimbursable resources from the Canadian International Development Agency (CIDA) with the following objectives: (i) strengthen the capacity of sector institutions for regular and inclusive planning; (ii) improve efficiency and transparency in the management of public enterprises in the sector; and (iii) strengthen the institutional capacity and regulatory framework for the promotion of energy projects involving renewable energy and energy saving and efficiency.

<sup>25</sup> IDB country strategy with Peru 2012-2016 (document GN-2668), approved by the Board of Executive Directors on 18 July 2012.

<sup>26</sup> Resolution DE-008/09 (28 January 2009). On 18 November 2009, the Peruvian government and the Bank signed loan contract 2118/OC-PE, for US\$150 million, which was disbursed on 1 December 2009.

<sup>27</sup> Resolution DE-122/10 (29 September 2010). On 15 October 2010, the Peruvian government and the Bank signed loan contract 2417/OC-PE, corresponding to the second operation, for US\$25 million, which was fully disbursed on 13 December 2010.

<sup>28</sup> Resolution DE-58/11 (13 July 2011). On 23 September 2011, the Peruvian government and the Bank signed loan contract 2544/OC-PE, corresponding to the third operation, for US\$25 million, which was fully disbursed on 14 November 2011.

opportunities in the energy sector;<sup>29</sup> (iv) consolidation of citizen participation and prior consultation practices for mining and energy activities; and (v) introduction of transparency in management with the development of a system to track the flow of fiscal resources. As part of these objectives, the program also supported an extensive set of sector policy targets: under the first operation (PE-L1061) 113 targets were identified for the program as a whole; with this fourth operation 94 of them will have been fully met, while the remaining 19 will be partially met or will be further pursued according to different schedules and sequences than originally planned. Thus, the following may be considered to be achievements under the program: (a) the creation of interagency coordination mechanisms in the energy area; (b) regulations to promote renewable energies and energy efficiency; (c) coordination of the sector's various agencies;<sup>30</sup> (iv) creation of the Energy Efficiency Division (DGEE) of the MEM; (v) public consultation on guidelines for formulating a long-term policy; (vi) the holding of auctions for hydroelectric and renewable energy projects; (vii) the introduction of biofuels into commercially marketed blends; (viii) formulation of a matrix of environmental competencies in the energy domain; (ix) progressive implementation of the supply of natural gas in the mid-north and southern parts of Peru; (x) approval of maximum permissible limits for hydrocarbons; and (xi) the establishment and strengthening of technical assistance coordination units to support regional capabilities for the execution of public projects.

- 1.24 The program has been successful in contributing to a systemic approach by the energy sector to its problems, as well as strategies to overcome them, while helping to expand interagency dialogue. It has also given the Bank a successful model to guide other countries of the region in developing similar projects, including valuable lessons in terms of coordination among agencies and institutions to align objectives, avoid overlap, consider sensitivities and interests, and anticipate and resolve conflicts. It is, in fact, the crosscutting policy targets involving different areas of government management that have seen their achievement times extended or have required changes in their sequence. Program execution also revealed the importance of dedicating human and material resources to long-term issues, so as not to be distracted from that focus by urgent circumstances.
- 1.25 The program's rationale and proposals took account of experiences and initiatives that occurred in parallel within the region, particularly as a result of the drastic changes in hydrocarbon prices (2006-2008) and the debate on energy security.<sup>31</sup>

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<sup>29</sup> This included an analysis of the outlook for interconnection with neighboring countries and at the regional level (NSEM report 1.6.1.8).

<sup>30</sup> "Estudio para elaborar una estrategia integral de desarrollo energético" [Study to prepare an integrated energy development strategy], OSINERGMIN, 2009: The workshop "Desarrollo de matriz energética en el Perú" [Development of an energy matrix in Peru], IDB-CPE, April 2009.

<sup>31</sup> Argentina: discussion of the "Plan estratégico de energía a largo plazo" [Long-term strategic plan for energy], SE Resolution 1284/06. Chile: discussion of "Opciones para la matriz energética eléctrica" [Alternatives for the electric energy matrix], 2007. Brazil: Energy sector experiences 2001-2005, crisis and planning.

This proposal has been supported by government studies that identified critical aspects of the energy sector (see paragraph 1.30). It also capitalized on the Bank's experience with PBL operations to support energy sector reforms, introduce regulatory frameworks, or update existing instruments, as in the cases of Guyana (GY-L1014), Barbados (BA-L1021 and BA-L1022), Colombia (CO0270), and others.

**B. Objective, size, and components**

- 1.26 The program will support the development of a New Sustainable Energy Matrix (NSEM) that is based on a comprehensive approach to technical, economic, environmental, and social considerations and is consistent with Peru's development objectives, in order to maximize the benefit derived from energy resources in a sustainable manner. This is the fourth operation (NSEM IV) in a series of programmatic policy-based loans, whose objective is to provide continuity of support for the policy reforms and sector decisions envisioned in the program, including the formulation of subsector plans and implementation of other specific measures.
- 1.27 **Size.** The size of operations under this program was discussed during the programming dialogue between the Bank and Peru,<sup>32</sup> in light of the financing requirements that Peru expects to cover from multilateral sources.<sup>33</sup> NSEM IV would disburse up to US\$30 million.
- 1.28 **Component I: Macroeconomic stability.** A macroeconomic context consistent with the program objectives and with the sector policy letter.
- 1.29 **Component II: Support for the technical and economic sustainability of the NSEM.** This component will support sector policy measures and reforms to ease the transition to an NSEM from the technical and economic standpoints.
- 1.30 **Design and implementation of the NSEM and integration of primary energy sources.** The NSEM has become an important resource for the discussion of sector issues and provides the technical basis for formulation of the subsector indicative plans. It was based on a strategic energy study for Peru with a 30-year horizon and is intended to support sector policy formulation and adaptation of the regulatory framework, as well as to serve as a resource for all stakeholders in the energy sector.<sup>34</sup> NSEM IV reflects the final formulation of the NSEM, as well as its contribution to sector dialogue and support for decision-making.
- 1.31 **Energy planning.** The government has advanced with formulation of a National Energy Plan as well as subsector indicative plans to guide the application of national policies in specific areas of the energy sector. This effort is intended to

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<sup>32</sup> IDB country strategy with Peru 2012-2016.

<sup>33</sup> "Policy-based loans: Guidelines for preparation and implementation" (document CS-3633), paragraphs 2.2(b) and 2.4.

<sup>34</sup> See electronic link: "Preparation of the New Sustainable Energy Matrix and Strategic Environmental Assessment as planning tools."

support sector decision-making in a manner consistent with a medium and long-term vision.

- 1.32 The National Energy Plan is accompanied by indicative plans for: (i) electricity; (ii) biofuels and hydrocarbons; and (iii) renewable energy and energy efficiency. These plans draw upon information and analyses used in formulating the NSEM, and represent a coherent government effort to generate policy proposals, long-term technical studies, national strategies, and sector plans, in a logical sequence
- 1.33 **Identification and implementation of energy plans and projects.** In parallel with sector policy measures, the program also pursued specific actions to address the sector's immediate needs, including: (i) measures to encourage the entry of new hydropower generation; (ii) the use of combined-cycle thermal generation with natural gas; and (iii) full implementation of the 5% biodiesel blend. In connection with NSEM IV, an evaluation was performed of the outcome of changes to the regulatory framework for hydropower development and combined-cycle thermal generation with natural gas, in order to consolidate experience (see paragraph 1.10), improve the proposals, and, if necessary, correct any factors undermining the competitiveness of these sources. The evaluation of the regulatory and institutional framework for promoting hydropower<sup>35</sup> focused on five key aspects: (i) improving the functioning of the spot market; (ii) redefining the methodology for calculating the base price of power; (iii) improvements to auctions under Law 28832 to promote new generation; (iv) coordination of auctions under Law 28832 and auctions of the Proinversión private investment promotion agency; and (v) specific mechanisms for making hydropower generation viable.
- 1.34 **Development of nonconventional renewable energies and bioenergy, and mechanisms for promoting them.** Among the indicative plans in preparation is an Indicative Plan for Renewable Energy and Energy Efficiency and an Indicative Plan for Biofuels and Hydrocarbons, consistent with NSEM and with the National Energy Policy. The renewable energy plan also responds to a commitment made by the Government of Peru in that area,<sup>36</sup> now being pursued within a comprehensive sector policy context. The program also reflects, with respect to NSEM IV, Peru's introduction of the 5% biodiesel blend, implementation of actions consistent with the National Agroenergy Plan and the existence of the Multisector Commission on Bioenergy.
- 1.35 **Development of energy efficiency measures.** The National Energy Plan also calls for the development of indicative plans, including an energy efficiency management plan. From a policy standpoint, the MEM, acting through the DGEE, has revised the general guidelines for labeling, packing, packaging, and advertising pursuant to Law 27345 on the promotion of efficient energy use.

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<sup>35</sup> See electronic link: "Evaluation of the promotion of power generation from hydro and renewable sources."

<sup>36</sup> Legislative Decree 1002, "Law to Promote Investment in Power Generation Using Renewable Energy Sources" (2 May 2008) and its proposed implementing regulations.

- 1.36 **Component III. Support for the environmental and social sustainability of the NSEM.**
- 1.37 **Regulation, supervision, and environmental standards.** This includes the following actions: (i) introduction of a report on environmental performance indicators; (ii) proposed update of the environmental protection regulations for energy sector activities, which have been reviewed by the sector and will be prepublished on the MEM website; and (iii) formulation of terms of reference prepared by MEM for use in the preparation of environmental impact studies of hydrocarbon seismic survey, drilling, transport, refining, and exploration activities.
- 1.38 **Environmental management instruments.** Maximum permissible limits (MPLs) have been approved and implemented for hydrocarbon effluents and emissions. In light of developments in the technologies and in environmental and efficiency criteria, MIMAM has decided to revise the MPLs for gaseous and particulate emissions for the electricity subsector, in order to produce a new proposal consistent with currently accepted standards. To do so, it will convene workshops with the relevant authorities (i.e., MEM, MIMAM, and PRODUCE), as well as with interested third parties, primarily engaging the private sector.
- 1.39 **Climate change adaptation and mitigation in energy projects.** The MEM has formulated its National Energy Plan as well as indicative plans by subsector. These plans provide specifically for mitigation through the quantification of emissions of carbon dioxide equivalent (CO<sub>2e</sub>) associated with the various future options for the sector's development, taking into account the most recent findings in terms of the variability of hydropower in light of climate change scenarios.
- 1.40 **Strategic Environmental Assessment (SEA).** In the study, "Preparation of the New Sustainable Energy Matrix and Strategic Environmental Assessment as planning tools," the MEM conducted a strategic planning exercise for the sector to the year 2040, applying the social and environmental assessment methodology to determine the target sustainable energy matrix for Peru from among the various projected scenarios. The results of the study were published on the MEM website to promote their dissemination and to elicit comments and suggestions from the stakeholders. This practice is consistent with the Bank's environmental safeguard policies<sup>37</sup> and with Peruvian legislation (see paragraph 1.13).
- 1.41 **Social sustainability: citizen participation in hydrocarbon- and energy-related activities.** Progress in this area includes the implementation of guidelines for citizen participation in electricity activities (Ministerial Resolution 223-2010 MEM/DM) and in hydrocarbon-related activities (Supreme Decree 012-2008-EM), which strengthen citizen participation from the outset of negotiation of a hydrocarbon exploration or exploitation contract.
- 1.42 **Social sustainability: training and quality control for the expenditure of proceeds from energy project royalties.** The government has continued to

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<sup>37</sup> Environment and Safeguards Compliance Policy (Operational Policy OP-703), Directive B.5.



strengthen the regional technical assistance coordination committees (CATs), which provide technical support to local governments in preparing their projects. The MEF is currently working on two fronts in this effort: (i) technical assistance, through public investment specialists in 24 regions, to support regional governments and, initially in some cases, local and provincial governments; and (ii) training, through support for the update of regulations, basic training on the government's National Public Investment System (SNIP)<sup>38</sup> in nearly all regional governments, and specialized training courses in project formulation.

### **C. Results indicators**

- 1.43 NSEM IV outcomes will be evaluated against the indicators and targets contained in the Results Framework representing the full scope of the program, whose four individual operations correspond to the policy matrix. The expected outcomes have been analyzed and agreed upon with the agencies involved in the program, which will contribute to their monitoring.

## **II. FINANCING STRUCTURE AND MAIN RISKS**

### **A. Financing instruments and contractual clauses**

- 2.1 The Development of a New Sustainable Energy Matrix Program IV (NSEM IV), is a programmatic policy-based loan (PBL) and the last of four consecutive individual operations with a single disbursement each, technically related to each other, but financed independently, in accordance with documents CA-450-1 and CS-3633. The first three operations were approved in 2009, 2010, and 2011 (see paragraph 1.23). The loan proposal for the first programmatic operation (document PR-3376) was the framework document for the series, which the current document updates, supplements, and monitors.<sup>39</sup> This lending instrument provides flexibility to adapt the strategy and pace of implementation of the reform program to the dynamics of a sector and country. A single disbursement will be made once the loan contract has been signed and fulfillment of the special and general conditions precedent to that disbursement has been verified, using the means of verification identified in the "Means of verification matrix."

### **B. Environmental and social safeguard risks and mitigation measures**

- 2.2 The process of formulating the New Sustainable Energy Matrix (NSEM) began with approval of a series of programmatic PBL operations<sup>40</sup> that supported a set of policy actions in the institutional, energy, environment, and climate change areas. NSEM IV, also designed and catalogued as a PBL, triggers Directive B.13 of the Bank's Environment and Safeguards Compliance Policy (Operational Policy OP-703), and so does not require environmental classification. However, since

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<sup>38</sup> The SNIP certifies the quality of public investment projects.

<sup>39</sup> Pursuant to the guidelines contained in the memorandum EVP/1/2006 (PO-LO-2006) of 6 March 2006.

<sup>40</sup> Loans PE-L1061 approved in 2009, PE-L1055 in 2010, and PE-L1054 in 2011.

NSEM IV is the fourth operation under the program, it also triggers Directive B.14 on multiple phase loans. Consequently, a [retrospective analysis](#) was done of the environmental implications of past operations, and of the present operation's objectives.

- 2.3 NSEM IV supports consolidation of the NSEM through a comprehensive approach to its technical, economic, environmental, and social aspects, as well as the proposed policy decisions and environment sector actions relating to: (i) formulation of subsector plans using strategic environmental assessments (SEAs); (ii) the preparation of environmental policies for the governance and oversight of energy generation and transmission projects; (iii) revision of the maximum permissible limits (MPLs) for electricity effluents and emissions, adapting them to new trends and technologies; and (iv) quantification of emissions of carbon dioxide equivalent (CO<sub>2e</sub>) associated with development of the indicative plans by subsector under the National Energy Plan.
- 2.4 NSEM IV does not finance physical investments; it is therefore expected to have no direct negative social or environmental impact. On the contrary, as a result of the actions and policy decisions under the program, energy projects within the NSEM framework are expected to be socially and environmentally sustainable; and the environmental policy strengthening, regulatory, and monitoring instruments supported by the program will also include the most relevant social and environmental factors in a comprehensive manner.

### **C. Economic evaluation**

- 2.5 To evaluate the benefits of optimizing Peru's energy matrix, the economic performance of the proposed NSEM plan<sup>41</sup> was compared with a base plan that could be defined as "business as usual," i.e., continuing the trend and activities that would occur without government action to change the course of events.
- 2.6 The evaluation quantified the incremental benefits and costs of the NSEM plan in relation to those of the base plan. The results indicate an economic rate of return (ERR) of 13.7% for the NSEM and an associated net benefit of US\$3.263 billion (net present value at 12%).
- 2.7 An analysis was also done of the sensitivity of the NSEM's economic return to the execution of its various options and the materialization of future price and demand scenarios. In the first case, the analysis considered scenarios of total (0%) or partial

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<sup>41</sup> For selection of the NSEM plan, the studies supported by the program looked at 19 alternative plans using a methodology to optimize development of the following attributes associated with Peru's energy sector: (i) diversification of energy sources; (ii) use of renewable energy resources; (iii) energy self-sufficiency; (iv) trade balance of the energy sector; (v) natural gas consumption; (vi) regional energy trade; (vii) energy supply costs; (viii) pollution emissions; (ix) domestic natural gas sufficiency; (x) natural gas service coverage; (xi) average cost of energy supply; and (xii) limitation of flood-prone areas by energy infrastructure. Plan 19 was selected, which minimizes the maximum regret in energy development decisions, as measured by an indicator that weights the listed attributes under seven future scenarios based on: (i) economic growth; (ii) international oil price; and (iii) availability of primary materials.

(50%) nonoccurrence of each option, and in all cases the ERR was above 12%. In terms of sensitivity to prices, it was found that development of the NSEM is attractive even at price levels for liquid fuels and natural gas that are 15% lower than those considered in the evaluation. The results also indicate that development of the NSEM remains attractive under all options, even for levels of future energy demand that are 15% lower than the assumptions in the evaluation.

**D. Fiduciary risk**

- 2.8 As a programmatic PBL, NSEM IV will provide untied funds and does not call for procurement. Given the nature of the lending instrument adopted, fiduciary risk is not assessed.

**E. Execution risk**

- 2.9 The set of policy measures envisaged in NSEM IV are all consistent with the objective proposed for the program<sup>42</sup> since its formulation in the first operation (see paragraphs 1.40 and 2.1). All of the measures in this operation have been completed, so no execution risks are anticipated. NSEM IV proposes strategic definitions that were considered under various Peruvian administrations, demonstrating the continuity that the government has accorded the program. The MEF, MEM, MINAM, and MINAG have each added capacity and sector relevance to the program, while the MEF contributed the experience of its Sector Loan Coordination Unit (UCPS), which mitigates coordination risks.

### **III. IMPLEMENTATION AND MANAGEMENT PLAN**

**A. Institutional arrangements for implementation**

- 3.1 The Republic of Peru will be the borrower, and the Ministry of Economy and Finance (MEF) will be the executing agency. The latter has been monitoring the commitments defined in the Policy Matrix (see Annex II). The Ministry of Energy and Mines (MEM) has a key role in the monitoring and supervision of NSEM IV and the program.
- 3.2 The MEF will have the following responsibilities: (i) furthering achievement of the policy objectives; (ii) providing evidence that the agreed policy conditions have been fulfilled; and (iii) compiling and delivering information to enable the government and the Bank to measure and evaluate program outcomes.

**B. Supervision and evaluation of results**

- 3.3 In general, the medium and long-term impacts are expected to be consistent with a policy reform process. For this reason, in addition to the project completion report (PCR), a final evaluation will be conducted during the first quarter of 2016 and will include an ex post cost-benefit economic evaluation. The borrower will compile the

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<sup>42</sup> The electronic link provides a comparison between the triggers of programmatic operation IV, as specified in the previous operation, and the commitments included in loan PE-L1121.

data needed for monitoring and evaluation and will cover the costs of these activities, which will be coordinated by the executing agency, acting through the Sector Loan Coordination Unit (UCPS). The key variables identified, as well as the procedures and projected budgets for achieving them, are detailed in the monitoring and evaluation plan.

**C. Policy letter**

- 3.4 The Bank has reached agreement with the government on the macroeconomic and sector policies to be supported with the program, as reflected in the policy letter to be sent by the MEF. That letter will describe the main components of the government's strategy for NSEM IV and its commitment to those agreements.

Development Effectiveness Matrix			
Summary			
I. Strategic Alignment			
1. IDB Strategic Development Objectives	Aligned		
Lending Program	The operation contributes to the lending program to support climate change initiatives, renewable energy and environmental sustainability		
Regional Development Goals	Countries with planning capacity in mitigation and adaptation of climate change.		
Bank Output Contribution (as defined in Results Framework of IDB-9)	The operation contributes to the following Bank outputs: (i) Percentage of power generation capacity from low-carbon sources over total generation capacity funded by IDB; (ii) National frameworks for climate change mitigation supported.		
2. Country Strategy Development Objectives	Aligned		
Country Strategy Results Matrix	GN-2668	Improve the penetration of renewable energies in the energy matrix	
Country Program Results Matrix	GN-2661-4	The intervention is included in the 2012 Country Program Document.	
Relevance of this project to country development challenges (If not aligned to country strategy or country program)			
II. Development Outcomes - Evaluability	Highly Evaluable	Weight	Maximum Score
	9.0		10
3. Evidence-based Assessment & Solution	8.9	25%	10
4. Ex ante Economic Analysis	10.0	25%	10
5. Monitoring and Evaluation	7.1	25%	10
6. Risks & Mitigation Monitoring Matrix	10.0	25%	10
Overall risks rate = magnitude of risks*likelihood	Low-Medium		
Environmental & social risk classification	B.13		
III. IDB's Role - Additionality			
The project relies on the use of country systems (VPC/PDP criteria)	Yes	Financial management: Budget, Treasury, Accounting and reporting, External control, and Internal audit.	
The project uses another country system different from the ones above for implementing the program			
The IDB's involvement promotes 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	Yes	TC funds have been used to support the executing agency and for technical coordination and human resources for the management 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.	Yes	The project seeks to introduce policy measures that will result in an optimized energy matrix. The ex-post evaluation will provide information on the effectiveness of the proposed measures.	

This is the third operation under a programmatic loan that supports the government of Peru in developing a New Sustainable Energy Matrix. The operation seeks to support preparation of a national energy policy and other measures related to the technical, economic, environmental and social sustainability of the new matrix. The diagnostic clearly identifies the most important policy restrictions and examines its causes. The proposed solution takes into consideration similar experiences in other countries. All result indicators are adequate.

An ex ante cost-benefit analysis was performed using reasonable assumptions. Monitoring mechanisms have been planned and budgeted. An ex post cost benefit analysis is foreseen as part of the operation's evaluation.

All policy conditions have been complied with and, as a result, there is no execution or fiduciary risk. Given that there will be no investments, no environmental risks are foreseen.

## POLICY MATRIX

**Objective:** The program will support the development of a New Sustainable Energy Matrix (NSEM) that is based on a comprehensive approach to technical, economic, environmental, and social considerations and is consistent with Peru's development objectives.

Objectives	Responsible agency/areas	Commitments Programmatic operation I	Commitments Programmatic operation II	Commitments Programmatic operation III	Commitments Programmatic operation IV
<b>I. General macroeconomic policy framework</b>					
A stable general macroeconomic policy framework.		A macroeconomic framework consistent with program objectives and the guidelines established in the sector policy letter.	A macroeconomic framework consistent with program objectives and the guidelines established in the sector policy letter.	A macroeconomic framework consistent with program objectives and the guidelines established in the sector policy letter.	A macroeconomic framework consistent with program objectives and the guidelines established in the sector policy letter.
<b>II. Support for technical and economic sustainability</b>					
<b>Design and implementation of the New Sustainable Energy Matrix (NSEM) and integration of primary energy sources</b> Provide technical assistance in the design and implementation of the NSEM. Estimate the correlation between primary energy sources as to resource endowment and costs of transformation and transportation to consumption centers.	MEM DGEE	Guidelines have been approved for developing a target NSEM which includes a basic inventory of energy resources, a policy options analysis (risk analysis), and a strategy for achieving the new matrix in the medium term.  Guidelines for conducting studies of the economics of transforming primary energy sources and the potential for substitution between them in:  (i) Power generation (hydro, gas, wind, solar and geothermal sources ), (ii) transportation (gas and liquid fuels), (iii) industry and commerce (gas and other energy sources) (iv) urban and rural residential use (natural gas and LPG and other fuels).	A proposal is being prepared, for an NSEM in the context of the approved guidelines, providing for: (i) its composition in 5, 10, and 15 years' time; (ii) the concept of technical, economic, environmental, and social sustainability; (iii) alternative scenarios involving a different resource endowment and changes in relative prices; (iv) analysis of the potential environmental impacts of developing and transforming the major primary energy sources; and (v) review of the economics of transforming primary energy sources and the potential for substitution between sources in power generation and transport, industry, commerce and final consumption.	The NSEM socioeconomic and energy diagnostic assessments have been formulated.	The NSEM has been published and is being used to support the formulation of sector plans.

Objectives	Responsible agency/areas	Commitments Programmatic operation I	Commitments Programmatic operation II	Commitments Programmatic operation III	Commitments Programmatic operation IV
<b>Energy planning</b> Develop ongoing integrated energy planning practices.	<b>MEM</b> Energy Efficiency Division (DGEE)	Sector-wide mechanisms for coordination of planning between government agencies and offices have been established.	Proposed guidelines for formulating a long-term energy policy have been published and put to public consultation.  The National Energy Balance Sheet has been updated and published.	The 2010-2040 National Energy Policy has been approved.	The National Energy Plan and Indicative Plans have been formulated.
<b>Identification and implementation of energy plans and projects</b> Identify and implement actions for developing primary energy sources, including their transformation and transportation to consumption centers.	<b>MEM</b> Electricity Division (DGE)  <b>MEM</b> DGE  <b>MEM</b> Hydrocarbons Division (DGH)	A modification to the regulatory framework that promotes hydropower has been approved.  A request for commencement of the hydropower project auction has been submitted.  The combined-cycle standard has been approved.  The guidelines and scope of a study analyzing alternatives for supplying and transporting compressed or liquefied natural gas to markets outside Lima have been approved.	The auction process has been completed  The regulations related to the combined-cycle standard have been approved.  A plan for supplying gas to markets outside Lima has been proposed.	Specific projects to supply gas to markets outside Lima are in execution, awarded, or in the tendering process.	The impact of changes to the regulatory framework on the development of hydropower and the use of combined cycle in thermal generation with natural gas has been evaluated.
<b>Development of nonconventional renewable energies and bioenergy</b> Develop the potential of renewable energy sources and biofuels, and convert to the use of energy resources in which Peru has comparative advantages.	<b>MEM</b> DGEE	The guidelines and scope of a study for preparing the Strategic Plan for Sustainable Energy and Bioenergy (PEESB) have been approved.  A standard for the development of renewable energy sources has been approved.	PEESB is in preparation.	The plan for renewable energies and other energy sources consistent with the NSEM and with the National Energy Policy is in preparation.  New regulations implementing the law to promote investment in electricity generation using renewable energies have been approved.	The Indicative Plan for Renewable Energy and Energy Efficiency and the Indicative Plan for Biofuels and Hydrocarbons have been formulated and are consistent with NSEM and the National Energy Policy.

Objectives	Responsible agency/areas	Commitments Programmatic operation I	Commitments Programmatic operation II	Commitments Programmatic operation III	Commitments Programmatic operation IV
	MEM DGH	The Regulations to the Law promoting investment for power generation using renewable energy sources have been approved.			
	MINAG Agriculture Promotion Directorate (DGPA)	The Biofuels Marketing Regulations have been approved	The compulsory blend of 2% biodiesel with diesel fuel has been implemented.	The compulsory blend of 7.8% ethanol with gasoline has been implemented in nine departments, as part of a national biofuels strategy.	The compulsory blend of 5% biodiesel with diesel fuel has been implemented, as part of a national biofuels strategy.
			The National Agroenergy Plan has been drawn up.	Activities consistent with the National Agroenergy Plan are under way.	The National Agroenergy Plan is in execution.
			The Multisector Commission on Bioenergy has been created.	The Multisector Commission on Bioenergy for sustainable biofuel production is functioning.	The Multisector Commission on Bioenergy for sustainable biofuel production is functioning.
<b>Mechanism to promote nonconventional renewable energies and bioenergy</b> Develop a program to increase the appeal of renewable energy sources and bioenergy	MEM Rural Electrification Directorate (DGER)		An initiative to promote investment in renewable energies and the productive use of energy has been implemented.	The initiative to promote investment in renewable energies and the productive use of energy has been evaluated.	
<b>Development of energy efficiency measures</b> Strengthen energy efficiency measures that have an impact on the energy matrix.	MEM DGEE	Guides on minimum standards and energy efficiency labeling have been prepublished.  A standard for saving energy in the public sector has been approved.	Guides on minimum standards and energy efficiency labeling have been approved.  The Benchmark Plan for Efficient Energy Use has been prepared.  The DGEE has been created within the MEM.	Technical regulations for minimum standards and labeling are in preparation.  The Benchmark Plan for Efficient Energy Use has been approved and is being implemented.  The DGEE is being incorporated into the regulations establishing the organization and functions of the MEM, and its director has been appointed.	General guidelines for minimum standards and energy efficiency labeling have been formulated. The Indicative Plan for Renewable Energy and Energy Efficiency has been formulated and is consistent with the NSEM and the National Energy Policy. An evaluation of results from energy efficiency and nonconventional renewable energy activities has been published.



Objectives	Responsible agency/areas	Commitments Programmatic operation I	Commitments Programmatic operation II	Commitments Programmatic operation III	Commitments Programmatic operation IV
<b>III. Support for environmental and social sustainability</b>					
<b>Regulation, supervision, and environmental standards</b> Enhance the role of regulation and supervision, particularly in the environmental sphere, and prepare supplements or adjustments to the environmental standards in the sector as necessary to further the NSEM.	<b>MINAM</b> Secretary General	The proposed matrix of environmental competencies in energy matters has been updated to Ministerial Resolution 097-2012-PCM.	The matrix of comprehensive environmental competencies, including energy matters, has been formulated.		The proposed matrix of comprehensive environmental competencies, including energy matters, has been reviewed by the Office of the President of the Council of Ministers (PCM).
	<b>MINAM</b> Environmental Management Policies, Regulations and Instruments Division (DGPNIGA)	The institutional framework for integrated, coordinated, and efficient environmental and social management has been approved.	The action plan to adjust the institutional framework for integrated, coordinated, and efficient environmental and social management has been formulated.	A report on environmental performance indicators has been prepared.	

Objectives	Responsible agency/areas	Commitments Programmatic operation I	Commitments Programmatic operation II	Commitments Programmatic operation III	Commitments Programmatic operation IV
	<b>MEM</b> Energy-related Environmental Affairs Division (DGAAE)		Environmental protection regulations for electrical sector activities, including new sources for power generation, are being developed.  Environmental standards for evaluation of rural electrification projects, including the respective regulations, have been approved and are being implemented.	Environmental protection regulations for electrical sector activities have been formulated .	The environmental protection regulations for electricity sector activities are being updated.  Environmental guides for the preparation of environmental impact studies of hydrocarbon activities have been formulated.
		Institutional training needs have been identified.	Institutional training is being implemented.	Training of DGAAE staff in field-specific topics has been scheduled .	
	<b>MINAM</b> Agricultural Competitiveness Division (DGCA)	The Eco-efficient Municipios Program has been presented .	The Eco-efficient Municipios Program is being implemented.	The Eco-efficient Municipios Program is being implemented.	
<b>Environmental management instruments</b> Establish environmental management instruments to reduce the effects of environmental pollution from the energy sector.	<b>MINAM</b> DGCA	Maximum permissible limits (MPLs) for hydrocarbon effluents have been approved.	MPLs for hydrocarbon and electricity emissions have been formulated.	MPLs for hydrocarbon emissions have been approved.  A draft Supreme Decree on MPLs for electricity emissions has been drawn up.	MPLs for hydrocarbon effluents and emissions have been implemented, and those for electricity are being revised.

Objectives	Responsible agency/areas	Commitments Programmatic operation I	Commitments Programmatic operation II	Commitments Programmatic operation III	Commitments Programmatic operation IV
<b>Climate change adaptation and mitigation in energy projects</b> Develop the potential of Clean Development Mechanisms or similar mechanisms as an instrument for promoting reduction of greenhouse gases and analyzing the effects of climate change on Peru's energy sector.	MEM DGEE	The guidelines and scope of study for preparation of the Strategic Plan for Sustainable Energy and Bioenergy (PEESB), which will study the potential for mitigating and/or reducing carbon emissions, have been approved.	As part of the PEESB, an analysis of the alternatives for mitigating and/or reducing greenhouse gas emissions in the energy sector is being prepared.	As part of the National Energy Plan, an analysis of alternatives for mitigating and/or reducing greenhouse gas emissions in the energy sector is being prepared.	The National Energy Plan takes into account the impact of greenhouse gas emissions.
	MEM DGE	A contract has been let for a study to assess the vulnerability of hydropower production, infrastructure, and transmission systems to future climate risks based on current climate change scenarios, and an estimate of the costs of losses and impacts.	The assessment of the vulnerability of hydropower production, infrastructure, and transmission systems to future climate risks based on current climate change scenarios, and an estimate of the costs of losses and impacts, has been completed.	Measures to reduce the vulnerability of hydropower production, infrastructure, and transmission systems to future climate risks based on current climate change scenarios, and an estimate of the costs of losses and impacts and adaptation to climate change are being analyzed.	The Indicative Plan for Electricity takes into account the vulnerability of hydropower production, infrastructure, and transmission systems to future climate risks based on current climate change scenarios.
<b>Strategic Environmental Assessment (SEA)</b> Analyze the potential and the social and environmental challenges of developing the NSEM.	MINAM	A standard which provides for an SEA when drawing up policies, plans, and programs has been approved.	Regulations to the National Environmental Impact Assessment System, including specifications regarding SEA, have been approved.		
	MEM DGAAE	Guidelines have been agreed and approved for the execution of an SEA on the potential environmental impacts of developing the major primary energy sources in Peru, as an input to decision-making on changing the country's energy matrix, incorporating a Communication, Consultation, and Participation Plan.	The SEA on the potential social and environmental impacts of developing the major primary energy sources in Peru, as an input to decision-making on changing the country's energy matrix, incorporating a Communication, Consultation, and Participation Plan, is being implemented.	The SEA on the potential social and environmental impacts of developing the major primary energy sources in Peru, as an input to decision-making on changing the country's energy matrix, incorporating a Communication, Consultation, and Participation Plan, is being implemented.	The NSEM SEA recommendations are being applied.

Objectives	Responsible agency/areas	Commitments Programmatic operation I	Commitments Programmatic operation II	Commitments Programmatic operation III	Commitments Programmatic operation IV
<b>Social sustainability</b> Support actions for sustainable development of the sector through the implementation of social responsibility mechanisms, inclusive participation, and quality social management, in addition to promoting the development and strengthening of national, regional, and local technical and institutional capacity to gain access to the resources from development of energy sources.	<b>MEM</b> DGAAE		Social management, local sustainable development, and social responsibility policies, including standards on the social component of environmental impact studies for hydrocarbons projects, have been drawn up.	Social management mechanisms, procedures, and best practices have been approved.	Social management mechanisms, procedures, and best practices are being implemented.
	<b>MEM</b> Office of Social Management (OGGS)	The regulations on citizen participation in hydrocarbon subsector activities have been approved.  The guidelines for citizen participation in hydrocarbon activities have been approved.	The guide to citizen participation in hydrocarbon activities has been drawn up.	The regulations on consultation for hydrocarbon activities have been approved.	
	<b>MEM</b> OGGS	The protocol on involvement in mining and energy cases has been drawn up.	The protocol on involvement in mining and energy cases has been approved.	Periodic reporting on application of the protocol on involvement in mining and energy cases has been implemented.	
	<b>MEF</b> Public Budget Directorate (DGPP) / Multiyear Programming Directorate (DGPM)	Training and technical assistance are being provided to regional and local governments for the design of public investment projects (PIPs) and the execution of (i) ordinary resources; and (ii) PIPs financed with shareouts and royalties from energy development, through the Technical Assistance Coordination Committees (CATs).	Training and technical assistance are being provided to regional and local governments for the execution of (i) ordinary resources; and (ii) PIPs financed with shareouts and royalties from energy development, through the CATs.	Training and technical assistance are being provided to regional and local governments for the execution of (i) ordinary resources; and (ii) PIPs financed with shareouts and royalties from energy development, through the CATs.	Training is being provided to regional and local governments for the execution of (i) ordinary resources; and (ii) PIPs financed with shareouts and royalties from energy development.

Objectives	Responsible agency/areas	Commitments Programmatic operation I	Commitments Programmatic operation II	Commitments Programmatic operation III	Commitments Programmatic operation IV
	MEF DGPP	A “user-friendly system on public sector budget management,” including local governments, has been implemented.	A system of indicators for determining the performance ranking of local governments is being implemented.	A system of indicators for the evaluation of budget execution by local governments is operating.	