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Report No: 63151 - BR

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED LOAN

IN THE AMOUNT OF US$49,604,127

TO THE

FEDERATIVE REPUBLIC OF BRAZIL

FOR THE

ENERGY AND MINERAL SECTORS STRENGTHENING PROJECT

November 17, 2011

Sustainable Development Department
Brazil Country Management Unit
Latin American and the Caribbean Region

CURRENCY EQUIVALENTS
(Exchange Rate Effective July 25, 2011)

Currency Unit = Real (R$)

R$1.00 = US$0.62

US$1.00 = R$1.61

FISCAL YEAR
January 1 – December 31

ABBREVIATIONS AND ACRONYMS

AC	Alternating current
ANEEL	National Electricity Regulatory Agency (*Agência Nacional de Energia Elétrica*)
ANP	National Petroleum Authority (*Agência Nacional do Petróleo*)
CCEE	Electricity Clearing House (*Camara de Compensação de Energia Elétrica*)
CEPEL	National Center for Research in Electricity (*Centro de Pesquisa em Energia Elétrica*)
CMSE	Electricity Industry Monitoring Committee (*Comitê de Monitoramento do Setor Elétrico*)
CNPM	National Company for Mineral Research (*Companhia Nacional de Pesquisa Mineral*)
COFIEX	Committee for Foreign Financing (*Comissão de Financiamentos Externos*)
CONAMA	National Environment Council (*Conselho Nacional de Meio Ambiente*)
CPRM	Company for Mineral Resources Research and Geological Survey (*Companhia de Pesquisa de Recursos Minerais – Serviço Geológico do Brasil*)
CPS	Country Partnership Strategy
DA	Designated Account
DC	Direct current
DDE	Department of Energy Development (*Departamento de Desenvolvimento Energético*)
DNPM	National Department of Mineral Production (*Departamento Nacional de Produção Mineral*)
EIA	Environmental Impact Assessment
EMP	Environment Management Plan
ESMF	Environmental and Social Management Framework
EPE	Energy Planning Company (*Empresa de Pesquisa Energética*)
ESTAL	Energy Sector Technical Assistance
FM	Financial management
FUNAI	National Foundation of Indigenous People (*Fundação Nacional do Índio*)
GAB	Cabinet (*Gabinete*)
GDP	Gross domestic product
GHG	Greenhouse gas
GoB	Government of Brazil
IBAMA	Federal Environmental Agency (*Instituto Brasileiro do Meio Ambiente e dos*

	Recursos Naturais Renováveis)
IBRAM	Brazilian Mining Institute (*Instituto Brasileiro de Mineração*)
IBRD	International Bank for Reconstruction and Development
ICB	International Competitive Bidding
IDA	International Development Agency
IFR	Interim Financial Report
IPPF	Indigenous Peoples Policy Framework
M&E	Monitoring and Evaluation
MME	Ministry of Mines and Energy
NESA	Nucleo for Environmental Sustainability Studies (*Núcleo Estratégico Sócio Ambiental*)
ONS	National Operator of the Transmission System (*Operador Nacional de Sistema Energético*)
OP/BP	Operational policy/Bank policy
PDO	Project development objectives
PMU	Project Management Unit (*Unidade de Gestão do Projeto – UGP*)
PNM	National Mining Plan 2030
PSC	Project Steering Committee (*Conselho de Gestão do Projeto - CGP*)
R&D	Research and Development
SEE	Secretariat for Electricity
SFC	Federal Internal Control Secretariat (*Secretaria Federal de Controle Interno*)
SGM	Secretariat for Geology, Mining and Mineral Processing
SIAFI	Integrated Financial Management System (*Sistema Integrado de Administração Financeira*)
SIGMA	Information Management Systems (*Sistema de Informações Gerenciais*)
SIL	Sector Investment Loan
SIN	National Integrated System (*Sistema Integrado Nacional*)
SMSF	System of synchronized measurement phasors *(Sistema de Monitoramento Sincronizado de Fasores)*
SOE	Statement of Expenditures
SPE	Secretariat for Planning and Energy Development (*Secretaria de Política e Planejamento Energético*)
SPG	Secretariat for Oil, Gas and Bio-fuels (*Secretaria de Petróleo e Gás*)
SPOA	Secretariat for Planning, Budget and Administration (*Secretaria de Planejamento, Orçamento e Administração*)
SSS	Single Source Selection
STN	National Treasury Secretariat (*Secretaria do Tesouro Nacional*)
UHV	Ultra-high voltage

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BRAZIL
ENERGY AND MINERAL SECTORS STRENGTHENING PROJECT

CONTENTS

BRAZIL

ENERGY AND MINERAL SECTORS STRENGTHENING PROJECT

PROJECT APPRAISAL DOCUMENT

LATIN AMERICA AND CARIBBEAN

LCSEG

Date: November 17, 2011 Country Director: Makhtar Diop Sector Manager: Chandra Sekhar Sinha Project ID: P126537 Lending Instrument: SIL Team Leader(s): Christophe de Gouvello	Risk Rating: Low Sectors: Energy and Mining (100%) Themes: Institutional modernization and strengthening (100%) Environmental Category: Partial Assessment

Project Financing Data:

Proposed terms: US Dollar denominated commitment-linked IBRD Flexible Loan with a Variable spread, with payment dates on March 15 and September 15 of each year , with a specific bullet payment date of September 15, 2029 (17.5 years Grace Period and 18 years Final Maturity) with all conversion options selected

[X] Loan [ ] Credit [ ] Grant [ ] Guarantee [ ] Other:

Source	Total Amount (US$)
Total Project Cost:	53,604,127
Cofinancing:	
Borrower:	4,000,000
Total Bank Financing:	49,604,127
IBRD	49,604,127

Borrower: Federative Republic of Brazil
Responsible Agency: Ministry of Mines and Energy
Contact Person: Alexandre Ramos Peixoto
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Estimated Disbursements (Bank FY/US$ m)

FY	FY2012	FY2013	FY2014	FY2015	FY2016
Annual	5.0	20.0	15.0	6.0	3.6
Cumulative	5.0	25.0	40.0	46.0	49.6

Project Implementation Period: January 30, 2012- December 31, 2015 Expected effectiveness date: January 30, 2012 Expected closing date: June 30, 2016	
Does the Project depart from the CAS in content or other significant respects?	○ Yes ● No
If yes, please explain:	
Does the Project require any exceptions from Bank policies? Have these been approved/endorsed (as appropriate by Bank management? Is approval for any policy exception sought from the Board?	○ Yes ● No ○ Yes ○ No ○ Yes ● No
If yes, please explain:	
Does the Project meet the Regional criteria for readiness for implementation?	● Yes ○ No
If no, please explain:	
Project Development Objective To strengthen the capacity of key public sector institutions to improve the contribution of energy and mining resources to accelerated national economic growth and increased social and environmental sustainability in a context of globalization and technological change.	

Project description

Component 1: Strengthening the Capacity of the Government to Drive the Sustainable Development of the Energy and Mineral Sectors (US$8.94 million). Provision of support for strengthening the capacity of the Borrower and the Participating Entities in the areas of planning, social and environmental sustainability, and in managing, evaluating and monitoring activities under their responsibility.

Component 2: Strengthening of Regulatory Institutions (US$2.33 million). Provision of support for : (a) strengthening the frameworks governing the legal, institutional, and oversight functions and responsibilities of the Participating Entities; and (b) capacity building for the formulation of policies, regulations and guidelines on the energy and mineral sectors.

Component 3: Technology Development (US$35.69 million). Provision of support for the development and use of cutting edge technologies to: (i) improve research and development capacity of the Borrower's power sector to transport efficiently and reliably large blocks of energy across continent-wide distances; and (ii) enhance the capacity of the geological survey (Companhia de Pesquisa e Recursos Minerais – CPRM) to use geophysics equipment for the prevention of natural disasters, and to improve its capacity to investigate the quality of mineral deposits, and thus attract investments.

Component 4: Support to South-South Cooperation (US$2.52 million). Provision of support to MME and to selected Borrower's agencies and entities (to be selected by the Borrower and to be acceptable to the Bank) to: (a) assist them in, *inter alia*, developing internal procedures and information and/or knowledge systems for purposes of carrying out South-South Cooperation between Brazil and Participating Countries; and (b) provision of technical assistance, training and carrying out of workshops, to support South-South Cooperation, both in the areas of, *inter alia*, regulation, renewable energy, climate change, clean energy, geological surveys, information systems and environmental and social sustainability, all within the energy and mining sectors.

Safeguard policies triggered?	
Environmental Assessment (OP/BP 4.01)	● Yes ○ No
Natural Habitats (OP/BP 4.04)	● Yes ○ No
Forests (OP/BP 4.36)	● Yes ○ No
Pest Management (OP 4.09)	○ Yes ● No
Physical Cultural Resources (OP/BP 4.11)	● Yes ○ No
Indigenous Peoples (OP/BP 4.10)	○ Yes ● No
Involuntary Resettlement (OP/BP 4.12)	○ Yes ● No
Safety of Dams (OP/BP 4.37)	○ Yes ● No
Projects on International Waterways (OP/BP 7.50)	○ Yes ● No
Projects in Disputed Areas (OP/BP 7.60)	○ Yes ● No

Conditions and Legal Covenants:

Financing Agreement Reference	Description of Condition/Covenant	Date Due

Article 5, 5.01	**Conditions of Effectiveness** consist of the following: 1) The Operational Manual has been adopted by the Borrower in form and substance satisfactory to the Bank. 2) The Subsidiary Agreement with CEPEL has been executed by the respective parties thereto.	Within 90 days of Loan Signing
Schedule 2, Section 1	**Institutional Arrangements** 1) The Borrower shall, through MME and with the assistance of the Participating Entities (each within their respective area of autonomy and competence), carry out the Project in accordance with the Operational Manual, including the Procurement Plan, the Environmental and Social Management Framework and the Environmental Management Plan, and except as the Bank shall otherwise agree, shall not amend or waive any provision of these documents without the Bank's prior written approval. 2) The Borrower shall operate and thereafter maintain, until the completion of the execution of the Project a Project Steering Committee (the PSC), to be responsible for overseeing Project implementation and coordination among the Participating Entities, and with structure and functions satisfactory to the Bank, as set forth in the Operational Manual.	Through-out duration of the Project
Schedule 2, Section 1	3) The Borrower shall operate and thereafter maintain, until the completion of the execution of the Project a Project Management Unit (the "PMU") within the Executive Secretariat of the MME, to be responsible for the overall implementation of the Project. Such unit shall serve as executive secretariat of the PSC and shall have staff in adequate numbers and with qualifications and experience satisfactory to the Bank, as set forth in the Operational Manual, including a general coordinator, a planning and control coordinator, an administrative coordinator, a financial coordinator and a technical coordinator. 4) The Borrower shall operate and thereafter maintain Project Co-executing Units physically located in each of the Participating Entities (referred to as "Participating Entities" in the loan agreement). Such units shall assist the PMU in implementing, supervising and monitoring the activities under the responsibility of the relevant Participating Entity, and have structure and functions satisfactory to the Bank, and staff in adequate numbers and with adequate qualifications as set forth in the Operational Manual and in the respective Subsidiary Agreement.	Through-out duration of the Project

Schedule 2, Section 1	**Subsidiary Agreements** 1) The Borrower, through MME, shall, prior to carrying out any Project activity under the administrative jurisdiction of a Participating Entity, enter into an agreement with said Participating Entity (the Subsidiary Agreement), under terms and conditions approved by the Bank, which shall include, *inter alia*: (a) MME's obligation to: (i) transfer to the Participating Entities, when applicable, on a non-reimbursable basis, part of the Loan proceeds necessary to carry out the Project activities under their responsibility; and (ii) comply with the pertinent obligations under this Agreement, as applicable to the pertinent Project activity; and (b) the Participating Entities' obligation to, when applicable: (i) procure the goods, consultants' services and Non-Consulting services under the Project in accordance with the provisions set forth in Section III of Schedule 2 to the Loan Agreement; and (ii) carry out the Project activities under their responsibility with due diligence and efficiency and to comply with the pertinent obligations under the Loan Agreement, including with the provisions of the Anti-Corruption Guidelines, all as applicable to the corresponding Project activity. 2) The Borrower, through MME, shall exercise its rights and carry out its obligations under each Subsidiary Agreement in such manner as to protect the interests of the Borrower and the Bank and to accomplish the purposes of the Loan. Except as the Bank shall otherwise agree, the Borrower shall not assign, amend, abrogate, terminate, waive or fail to enforce any Subsidiary Agreement or any provision thereof.	Through-out duration of the Project
Schedule 2, Section 1	**Anti-Corruption** 1) The Borrower shall ensure that the Project is carried out in accordance with the provisions of the Anti-Corruption Guidelines.	Through-out duration of the Project

Schedule 2, Section 1	**Environmental and Social Management Framework** 1. The Borrower shall, through the Project Management Unit and with the assistance of the pertinent Project Co-executing Units: (a) (i) implement the Project (with the exception of Part 3.1 of the Project) in accordance with the Environmental and Social Management Framework (including the provisions for environmental assessment, natural habitats, forests, and chance finding of cultural property) and (ii) implement Part 3.1 of the Project in accordance with the provisions of the Environmental Management Plan; and (b) adopt the procedures detailed in said Environmental and Social Management Framework and Environmental Management Plan for environmental and social screening, evaluation, implementation and monitoring of said Parts of the Project. 2. The Borrower, through MME, shall ensure, and/or cause the Participating Entities to ensure, that the terms of reference for any consultancy in respect of any Project activity shall be satisfactory to the Bank following its review thereof and, to that end, such terms of reference shall duly incorporate the requirements of the Bank Safeguards Policies then in force, as applied to the advice conveyed through such technical assistance.	Through-out duration of the Project
Schedule 2-Section V	**<u>Other Undertakings</u>** 1. No later than three (3) months after the Effective Date, the Borrower shall appoint a procurement officer under terms of reference satisfactory to the Bank. 2. By May 31, 2013, or such other date as the Bank shall agree upon, and without limitation to the provisions of Section 5.08 (b) of the General Conditions, the Borrower shall: (a) carry out jointly with the Bank, a mid-term review of the implementation of the Project (Midterm Review). The Midterm Review shall cover the progress achieved in the implementation of the Project; and (b) following such Midterm Review, act promptly and diligently to take any corrective action as shall be agreed between the Borrower and Bank.	

I. Strategic Context

A. Country Context

1. Brazil is the largest country in South America and the fifth most populous country in the world, with 191 million inhabitants. Brazil has experienced a period of economic stability over the past ten years. In 2010 alone, gross domestic product (GDP) grew 7.5 percent, reaching about US$2.1 trillion. This corresponds to a per capita GDP of approximately US$11,000. While Brazil has improved income distribution and access to basic services, the average per capita income masks the remaining challenges. Inclusive growth, in an environmentally and socially sustainable manner, is required to address the needs of millions of Brazilians in the many regions of the country with poor access to basic services.

2. Both energy and mining are crucially linked to Brazil's economic development. The energy sector provides the fuel and electricity with which the country operates and grows. The country is endowed with renewable energy resources, oil, and gas, and has, to date, followed a low carbon development path. Similarly, mining has driven significant economic growth in the country over the past four years, with significant exports of iron ore, manganese, bauxite, columbium, and tantalum.

B. Sectoral and Institutional Context

Energy Sector overview

3. The Brazilian energy sector is one of the largest and most sophisticated in the world. The sector is comprised of a large number of private, national, and international companies with two large, publicly-owned industrial champions: PETROBRAS, in the oil and gas sector, and ELETROBRAS, in the power sector. Its territory is endowed with abundant energy resources that provide energy security and remain largely untapped. Due to the recent discovery of large offshore oil fields in the "pre-salt" geological layer, oil and gas reserves have dramatically increased. Once exploited, these resources are expected to boost Brazilian petroleum production from the 14th to the 7th largest in the world. Brazil is also one of the world's leaders in biofuels, having accumulated significant experience in bioethanol. Finally, the hydropower system is one of the largest in the world, with an installed capacity of 78,000 Megawatts (MW) that provides over 80 percent of the country's electricity, while using only one third of its estimated potential. As a result, the carbon intensity of the Brazilian energy matrix is half of the world average and one-sixth of the OECD average. Brazil continues to aim to be a leader in low carbon development: it adopted in 2010 the Política Nacional sobre Mudança do Clima, under which the Government voluntarily committed to reduce national emissions by 36.1 to 38.9 percent by 2020.[1] Brazil's many successful experiences in the energy field have become considerable assets in its South-South cooperation efforts.

4. **Electricity**. Since the late 1990's, Brazil has implemented successful reforms to make the energy sector more efficient and to attract private capital. Through the 1990s, a state-owned

[1] Emissions from the energy sector are targeted to be reduced by between 6.1 and 7.7 percent, which is important given that the recent WB Brazil Low Carbon study indicates that energy-based emissions could increase 97 percent over the 2010-2030 period.

model dominated the power sector which resulted in highly subsidized tariffs, a large financial deficit, and weakened plants. In the early 1990's, the Government enacted legislation requiring that all concessions be granted competitively: this legislation paved the way for competition and private sector participation. The main changes introduced included: the establishment of an independent regulator, unbundling the earlier vertical integration of the industry, the introduction of wholesale and retail competition, the establishment of new commercial agreements and a wholesale market, new tariff regimes, and the consolidation of an independent national system operator. In 2004, the public energy planning entity, Empresa de Pesquisas Energéticas (EPE), was created and assigned the responsibility to develop energy planning nationwide. Investors participated actively in the privatization and in greenfield investments, with investments of over US$70 billion since 1998.

5. However, the power sector still needs to overcome various challenges in order to enable it to better contribute to environmentally sustainable growth and improved living standards. Following the global economic crisis in 2008, Brazil underwent a recession that lasted only two quarters and now grows at an annual rate of 4-5 percent; the economy recovered quickly, requiring development of reliable energy supplies. Over the next 12 years, the power sector will require R$380 billion to support electricity consumption growth of about 77 percent, from 450 Terawatt Hours (TWh) to 810 TWh. GNP is expected to grow by almost 50 percent over the same period as compared to a modest population growth of 8 percent. Additionally, Brazil's large, integrated multi-source power system has become complex. The development of the generation subsector is driven by a highly intricate multifaceted auctioning system, which involves coordinating the activities of 176 generation companies, 31 trading companies and 49 distribution companies. Large energy blocks have to be transported long distances by 47 different transmission companies. As a result, more sophisticated regulation, planning, technologies, and institutional capacities will be needed, particularly with the country's impending hosting of the World Cup and Olympic Games.

6. **Oil and Natural Gas**. In the oil sector, Brazil has taken many steps to enable the entry of new players and the development of its twenty-three oil basins. In 1997, Brazil revoked Petrobras' monopoly on key segments of the supply chain, such as exploration and production. An independent agency, the National Petroleum Authority (ANP), was created to define and implement a modern process for granting concessions and to monitor industry performance. As part of this transformation, Petrobras became a stronger, more competitive company, further enhancing its technological development capabilities, in particular in the area of deep-sea, offshore exploration and production. Oil production increased to more than 2 million barrels per day, making Brazil self-sufficient for the first time in its history. Attesting to the success of public-private partnerships, the discovery of the pre-salt basin in 2007 was a joint effort between Petrobras, BG Group and Galp Energia. If exploration and production efforts in the pre-salt basin are successful, it is expected that oil production will surpass 5 million barrels per day in 2019, creating a large surplus to be exported. At the same time, Petrobras will have to double its annual investments in the next 12 years, which will present significant challenges.

7. The development of Brazil's natural gas industry over the past decade has also been notable. Through 1998, natural gas represented less than 2 percent of Brazil's energy matrix. The implementation of the Brazil-Bolivia pipeline was transformational, allowing Brazil to import 30

million cubic meters per day. Natural gas now represents almost 9 percent of Brazil's energy matrix. While most initially went to the power sector, natural gas has been adopted by industry and transportation, displacing high-sulfur oil, reducing pollution, and thus improving the quality of life in large cities. Additionally, privatization of the most important local distribution companies, particularly in large cities such as Rio de Janeiro and Sao Paulo, helped attract investments and increased market penetration.

8. **Biofuels**. Brazil has made significant advances in its biofuels sector, mainly as the result of two national programs which have reached industrial scale. First, the Pro-Alcool program, launched in 1975, helped develop a large national industry able to compete with gasoline to fuel the Brazil's flex-fuel vehicles. As a result of the program, Brazil is the lowest cost and second largest producer of ethanol in the world. Brazil produces 6,800 liters of ethanol per hectare, more than double US production. The cost of production is about one third of European costs. Co-generation from sugar/ethanol producing facilities has contributed to the sustainability of the Pro-Alcool program, by allowing sale of excess power to the grid. Sugar cane energy-related products represent 18 percent of the energy matrix in Brazil. Second, the National Program for Biodiesel Production and Use (NPBPU), launched in June 2004, is expected to increase percentages of diesel mix from 3 percent to 20 percent. Research and development in agriculture and biogenetics are contributing to increase productivity.

9. **Outlook.** Brazil has achieved remarkable results in revamping its oil, gas, ethanol and power sectors and will continue to face transformational opportunities, while also facing many challenges. There is large potential to expand energy supply to cover domestic and international markets in a sustainable and cost-competitive way given Brazil's comparative advantage of having cheap, reliable and sustainable energy. However, challenges related to financing, planning, technology, and regulations, will be large. There is also a risk that emissions from the industry significantly increase. A new vision and corresponding improvements in the business model, regulatory mechanisms and capabilities are necessary to meet these demands while also growing in a sustainable way. The success of tackling these changes depends, inter alia, on strong capacity building within Government agencies.

Mineral Sector overview

10. Brazil's growth over the last four years has been driven to a significant extent by the expansion of the mineral sector and related industries. Production, value added and exports in mining have risen rapidly since 2003, with primary mining exports quadrupling in value. In 2008, the mining and mineral processing sector was responsible for 5.8 percent of GDP and 28.3 percent of exports. Currently Brazil is one of the top three producers in the world of iron ore, manganese, bauxite, columbium, and tantalum. It is also an important producer of nickel, copper, zinc, and gold. According to the country's chamber of mines, *Instituto Brasileiro de Mineracao* (IBRAM), the country is expected to attract about US$45 billion in mining investment over the medium term (2011-2015), two thirds of which will be for the production of iron ore.

11. Since 1967, the Mining Code, as amended, has governed all aspects of the mining industry, from exploration and production to end use of mineral resources. Within the Ministry

of Mines and Energy (MME), the Secretariat for Geology, Mining and Mineral Processing (SGM) is responsible for the formulation of the country's mining policy, strategies and long term planning, and the update of the sector's legal and regulatory framework. The SGM oversees two public mining institutions. The National Department of Mineral Production (DNPM) is responsible for the management of mineral resources and the inspection of mineral activity in the country. The Company for Mineral Resources Research and Geological Survey (CPRM) is the country's geological survey agency, and is involved in programs for (i) basic geological mapping, (ii) geophysical, metallogenetic, and hydrogeological mapping, and (iii) prospecting in areas of potential development. CPRM is also developing programs for environmental geology, hydrogeology, and geological hazards, and maintains the country's geological database.

12. While the country is expected to remain a world leader in the production of mineral commodities, the sector is facing a number of serious limitations in terms of economic, social, and environmental impacts. In order to respond to these issues, SGM is preparing a comprehensive sector reform that includes an update of the legal and regulatory framework, and plans for restructuring and strengthening sector institutions. Key elements of the reform include: (i) improving the procedures for the granting of mineral rights and the monitoring of operations in order to reduce speculative investments; (ii) strengthening the Government's supervisory role over issues such as rare fossils, mineral water, mining in indigenous land, and mining in frontier zones; (iii) improving the quality of life in mining areas, notably those affected by artisanal and small-scale mining, and identifying measures to tackle gender issues; and (iv) introducing new policies to address environmental issues, including impacts of dispersed exploration for construction materials, management of health and safety risks, and abandoned mines. The Government also wants to focus on value-added products and increased tax revenues.

13. Recently proposed changes to the legal and regulatory framework will lead to the creation of a new Advisory Board, the National Council of Mineral Policy (*Conselho Nacional de Política Mineral*), and changes in the procedures for granting mineral rights and monitoring social and environmental impacts. The key changes will be the transformation of the DNPM into a new regulatory agency for the sector and the reinforcement of the activities of Brazil's CPRM, including the modernization of its laboratories. CPRM will also upgrade Brazil's geological and mineral sources database (GEOBANK) to facilitate private sector access to the country's geophysical, geochemical and geological data.

14. A new strategic plan for the mining sector – the National Mining Plan 2030 (PNM), which was supported by the Energy Sector Technical Assistance (ESTAL) Project – was also recently approved by the Brazilian government. The PNM has three priority areas: improved governance, value-added processes, and sustainability. The proposed Project will finance studies to assist in the implementation of the PNM and will contribute to support the MME's social and environmental agenda through targeted actions that will improve the quality of life in mining areas, notably those affected by artisanal and small-scale mining.

Dynamic expansion of South-South cooperation in the Energy and Mineral Sectors

15. Due to significant progress over the last decade, Brazil has been recognized as a leader in the developing world in the design and successful implementation of public policies and

programs in the energy and mineral sectors. On the energy side, these include reducing vulnerability to and national dependence on foreign petroleum-based liquid fuels and reducing poverty and social exclusion through access to electricity.[2] In the area of geology and mining, Brazil has engaged in a series of institutional and regulatory reforms and modernization to enable sustainable and efficient economic development. The MME has frequently been approached by other countries to share experiences in the energy sector and has provided support for diplomatic and business development initiatives to promote South-South cooperation, in particular in Latin America, the Caribbean and Africa. So far, this increasing demand has been satisfied on an ad-hoc by different agents in the energy sector. The MME seeks to ensure better preparation and execution of these activities by systematically organizing relevant information and by assigning means and responsibilities to relevant agencies to ensure proper continuity. MME hopes to enhance Brazil's leadership in South-South cooperation while also learning about experiences and best practices from other emerging economies (among other countries) that could help improve the efficiency of Brazil's energy and mineral sectors.

Higher Level Objectives to which the Project Contributes

16. The high-level objective of this multi-year Sector Investment Loan (SIL) is to help ensure the sustainable implementation of the Government's energy and mining strategies through the provision of technical assistance in specific areas and the development of mechanisms for continued dialogue among policy-makers about long-term energy and mining policy reforms. This operation focuses on the power and mineral sectors where the most challenging reforms are needed, but other energy areas, such as biomass, oil and gas, will benefit indirectly. The energy and mineral sectors are highly-complex areas where regulatory and policy gaps still need to be addressed to complete the reform agenda, consolidate the policy framework, eliminate uncertainties, and make better use of public funds to leverage private investment, train public officials, and increase the effectiveness of regulatory agencies.

17. The Borrower is committed to the development of the energy and mineral sectors given their crucial importance for economic growth. The Government of Brazil (GoB) acknowledges the need for regulatory and policy reforms, training public officials and institutional strengthening. The Bank's Brazil Country Partnership Strategy (CPS) 2012-2015 (Report No. 63731-BR) discussed by the Executive Directors on November 1rst, 2011 notes specifically the importance of (i) increasing the efficiency of public and private investments and (ii) improving sustainable natural resources management and climate resilience as two of the four strategic objectives to be pursued for achieving higher rates of inclusive and sustainable growth. The CPS expresses a clear desire to help "strengthen Brazil's policy and regulatory framework for the energy sector, with a view to promote the supply of cost-effective and sustainable energy to meet the evolution of demand in the medium and long-term, by supporting the development and implementation of various sector and sub-sector plans and improving regulators' capacity to monitor and control the power sector". The CPS identifies in particular the need to "finance investments in research and development (R&D) of cutting edge technologies to transport efficiently and reliably large blocks of energy across continent-wide distances". The CPS also

[2] Classic examples are the extensive experience with (i) hydroelectricity, (ii) the bio-ethanol program, PROALCOOL, which combines the key objectives of energy matrix diversification and mitigation of GHG emissions, and (iii) in the area of poverty reduction, the Luz para Todos program, the large scale program for universal access to electricity.

notes that "managing one of world's largest endowments of mineral resources in a sustainable way, combining conservation with the promotion of local and regional economic development implies significant policy and institutional challenges". Finally, the South-South component fits with larger efforts to share Brazil's experience managing a low-carbon energy matrix with others worldwide. A continuation of the ESTAL (or similar project) is specifically mentioned as a way to promote these goals and to continue the analytical work in policy and regulatory reforms.

18. The Bank has been contributing to the transformational process of the energy sector in Brazil. In particular, in addition to the afore-mentioned technical assistance provided under the ESTAL project (including to improving the concessioning of hydropower plants), the Bank approved a $495 million SIL to help Eletrobrás strengthen the efficiency of its distribution business and reduce losses by adopting state-of-the-art technology and management techniques.

II. Project Development Objectives

19. The Project Development Objective (PDO) is to strengthen the capacity of key public sector institutions to improve the contribution of energy and mineral resources to accelerated national economic growth and increased social and environmental sustainability in a context of globalization and technological change.

20. The principal outcome expected from the project is to improve capacity of key institutions in both the energy and the mineral sectors to ensure that they deliver the regulatory adjustments, the improved planning and the modernization of infrastructure - in particular related to information systems and technology development - that are needed in order to support accelerated economic growth that is sustainable from both environmental and social perspectives.

Project Beneficiaries

21. The Project will have as the main beneficiary the Brazilian population as a whole which will benefit from more reliable power at lower prices and from the economic benefits of a growing and more efficient mineral sector. The population will also benefit from improved planning, policies, and execution of more environmentally and socially sustainable projects in the energy and mineral sectors.

22. Immediate beneficiaries from this Project will include the various sectoral agencies and departments, such as (i) MME, together with its Secretariat for Planning and Energy Development (SPE), the Secretariat for Electricity (SEE), the Secretariat for Oil, Gas and Bio-fuels (SPG), the Secretariat for Geology, Mining and Mineral Processing (SGM), the Nucleo for Environmental Sustainability Studies (NESA); (ii) EPE; (iii) the National Electricity Regulatory Agency (ANEEL); (iv) the National Center for Research in Electricity (CEPEL): (v) CPRM; (vi) DNPM; (vii) Secretariat for Planning, Budget and Administration (SPOA); and, (viii) the National Operator of the Transmission System (ONS). Improved institutions will enable enhanced energy security, environmental sustainability, and improved services for the population as a whole. In particular, through strengthening the capacity of these entities, the country will be in a stronger position to adapt to the changing economic conditions and growth it is experiencing. In addition, other developing countries will benefit from the exchange of

information and knowledge with Brazil through South-South interactions. This Project will help establish Brazil as a leader in key areas and will also allow it to benefit from the experience and knowledge of other emerging economies.

A. PDO Level Results Indicators

23. Project progress will be measured through the following two performance results indicators:

a. The enhancement of capacity of key Government institutions in charge of supporting the development of both the energy and mineral sectors.

b. The enhancement of applied sectoral R&D laboratories for providing emerging and state of the art technologies to the energy and mineral sectors.

III. Project Description

Project components

24. The proposed Project would support sector-wide efficiency improvements in the energy and mineral sectors through four components.

25. **Component 1: Strengthening the capacity of the Government to promote the sustainable development of the energy and mineral sectors (US$12.94 million, of which US$8.94 million from IBRD and US$4 million from counterpart funds).** Provision of support for strengthening the capacity of the Borrower and the Participating Entities in the areas of planning, social and environmental sustainability, and in managing, evaluating and monitoring activities under their responsibility, including:

1.1. Planning of the energy and mineral sectors. Strengthen the ability of MME to formulate and implement strategies aiming at: (i) expanding the supply of cost-effective and sustainable energy to meet the evolution of demand, in the medium- and long-term; and (ii) improving governance, increasing value added, and enhancing sustainability in the mining sector, all through the carrying out of studies, collection of data, and development of information systems;

1.2. Strengthening capacity to design and implement policies and practices to facilitate the expansion and improve the sustainability of the energy and mineral sectors. Strengthen the Borrower's capacity to design and implement policies and practices to facilitate the expansion of the energy and mineral sectors, and to improve the environmental and social sustainability of said sectors, including (i) the carrying out of studies and training activities aimed at identifying opportunities, developing policies and disseminating best practices to improve environmental and social sustainability of the energy and mineral sectors, and (ii) the provision of support to improve institutional communication related to the implementation of said policies and practices.

1.3. Management, monitoring and evaluation of activities and dissemination of results. Strengthen the capacity of the Executive Secretary of MME to manage, monitor and evaluate technical assistance activities, in particular Project activities, as well as to disseminate Project results.

26. **Component 2: Strengthening of regulatory institutions (US$2.33 million, of which US$2.33 million from IBRD).** Provision of support for : (a) strengthening the frameworks governing the legal, institutional, and oversight functions and responsibilities of the Participating Entities; and (b) capacity building for the formulation of policies, regulations and guidelines on the energy and mineral sectors, including:

2.1. Strengthening the monitoring and control capacity of the power sector. Strengthening the monitoring and control capacity of the Borrower's power sector, mainly of ANEEL and DNPM, including the development of more efficient tools to take effective regulatory action.

2.2. Institutional strengthening in the area of geology and mineral resources. Institutional strengthening in the area of geology and mineral resources, including provision of support for the modernization of DNPM and CPRM.

27. **Component 3: Technology Development (US$35.69 million, of which US$35.69 million from IBRD**). Provision of support for the development and use of cutting edge technologies to: (i) improve research and development capacity of the Borrower's power sector to transport efficiently and reliably large blocks of energy across continent-wide distances; and (ii) enhance CPRM's capacity to use geophysics equipment for the prevention of natural disasters, and to improve its capacity to investigate the quality of mineral deposits, and thus attract investments, including:

3.1. Investments in research and technological development. Carrying out of selected investments in research and technological development, including: (i) the refurbishment and technology development of the technical laboratories of CPRM and CEPEL[3] to meet the evolving demands for research and technological development in the energy and mineral sectors; and (ii) the implementation of a security technology (phasor measurement units) for the National Interconnected System operated by the ONS.

3.2. Studies in research and technological development. Carrying out of studies in research and technological development in the energy and mineral sectors required for the implementation and development of new technologies in these sectors.

28. **Component 4: Support to South-South Cooperation (US$2.52 million, of which US$2.52 million from IBRD)**. Provision of support to MME and to selected Borrower's agencies and entities (to be selected by the Borrower and to be acceptable to the Bank) to: (a) assist them in, *inter alia*, developing internal procedures and information and/or knowledge systems for purposes of carrying out South-South Cooperation between Brazil and Participating

[3] The major investment (estimated at US$30.50 million) will be located in CEPEL.

Countries (the latter as defined in the Loan Agreement); and (b) provision of technical assistance, training and carrying out of workshops, to support South-South Cooperation, both in the areas of, *inter alia*, regulation, renewable energy, climate change, clean energy, geological surveys, information systems and environmental and social sustainability, all within the energy and mining sectors.

Project Financing

29. **Lending Instrument** The proposed Project is designed as part of a longer program with a Specific Investment Loan for an initial phase of US$49.6 million. A follow-up operation is contemplated with the MME to cover a second set of activities representing another $50 million of capacity building activities.

30. **Project Cost and Financing Plan.** The financing support provided under the IBRD loan will be distributed under the four components of the Project and contingencies as detailed in the table below:

Project Components	Project cost (US$ million)	IBRD Financing (US$ million)	% Financing
1. Component 1: Strengthening the Government's capacity	12.94	8.94	69.1%
2. Component 2: Strengthening of regulatory institutions	2.33	2.33	100.0%
3. Component 3: Technology Development	35.69	35.69	100.0%
4. Component 4: South-South Cooperation	2.52	2.52	100.0%
5. Front-end Fee	0.12	0.12	100.0%
Total Baseline Costs	53.60	49.60	92.5%

Lessons Learned and Reflected in the Project Design

31. The following are lessons learned from former projects that have been incorporated into the project design, including notably lessons gleaned from the predecessor capacity building project:

- Implementation of complex reforms requires a strong, high-level orchestration between MME and the Ministries of Planning and Finance, as well as between ANEEL and ANP on the energy regulatory side. The Project has been designed on the basis of strong inter-agency coordination.

- Government ownership, in particular by the relevant sector's ministry, is paramount to ensure that the allotted resources continue to fund relevant issues and that outputs translate into policy decisions and eventually progress on outcomes. The Government has played an active role throughout project preparation, including notably in delineating early on in project preparation the activities to be carried out.

- Although an initial set of activities has been identified, the project has been designed in a flexible manner so that the support provided to a sector ministry facing the quickly evolving challenges of an emerging economy can be adjusted during implementation.

- It is important that Institutional arrangements reflect public institutions' interest in the Project's benefits by having the Project Management Unit (PMU) located at a high decision level and by allocating competent staff to the PMU in sufficient numbers.

IV. Implementation

Institutional and Implementation Arrangements

32. The META Project will be implemented under the full responsibility of MME. The proposed institutional arrangement for the implementation of the Project is structured in three levels. Further details are provided in Annex 3 on Implementation Arrangements:

- Project Management Unit (PMU) for management, overall coordination and oversight of the project implementation and for the procurement and financial management related to activities implemented by the MME Secretariats. The MME decided to create a PMU within the Executive Secretariat, through a Regulation *(Portaria)* of the Minister of Mines and Energy. It will be headed by an experienced, full time Project Manager who would provide general oversight and inter-agency coordination. The PMU will serve as the executive secretariat of the PSC and will coordinate and oversight the contributions of the Participating Entities, prepare the Manual of Operations, prepare the Procurement Plan and elaborate financial reports to the Bank for the whole Project. The Environmental Sustainability Study Center (NESA) located within MME is assigned to provide all the support and expertise needed to the PMU to fulfill safeguards requirements. In addition, CEPEL will provide the specific support needed to fulfill specific safeguards requirements related to the CEPEL laboratories interventions.

- Project Steering Committee (PSC) for high-level deliberative and decision-making processes. The PSC is a collegiate board composed of representatives of the MME (executor) and the Participating Entities. The PSC will be established by a Regulation *(Portaria)* of the MME. The PSC will oversee implementation, ensure high level coordination between activities undertaken by the different Participating Entities, supervise implementation and evaluate results. The PSC will ensure that the PMU and specific units established in Participating Entities are provided with the proper means and will approve the structure, functions, composition and duration of the PMU.

- Co-executing units in Participating Entities originating the demands for project activities, which are: the MME Secretariats of Energy Planning (SPE), Electricity (SEE), Oil and Gas and Bio-fuels (SPG), Geology, Mining and Mineral Processing (SGM**)**, Planning, Budget and Administration (SPOA), the CPRM, DNPM, the EPE, the National Electricity Regulatory Agency (ANEEL), the National Operator of the Transmission System (ONS) and CEPEL. The Participating Entities will inter into subsidiary agreements with MME. Under these subsidiary agreements, MME will transfer to the Participating Entities, on a non-reimbursable basis, part of the Loan proceeds necessary

to execute the Project activities under their responsibility. The Participating Entities will carry out the corresponding procurement processes and financial management. The Participating Entities will also ensure the enforcement of safeguards policies and the installation, operation and maintenance of the equipment and works financed under the project. In particular, CEPEL will ensure the technical implementation of the largest share of the investment supported by the project (estimated at US$30.50 million).

Results Monitoring and Evaluation

33. The PMU will be responsible for implementing and executing all M&E activities, providing annual reports on the PDO level and intermediate results indicators. Those indicators will be collected, distilled and agreed with the Participating Entities, before being submitted to the Bank. They will also be used as an instrument of Project performance to be examined by the high-level steering community (PSC). No major difficulties are envisioned to collect and process this information. The PMU has gained significant experience in working with the Bank. Furthermore, the Participating Entities are well established, competent organizations in the energy and mineral sectors. Those organizations are capable of specifying the new pieces of equipment and technology as well as of confirming that when the equipment is installed it meets the desired specifications. The incremental cost of M&E for META should be relatively modest. The data collection for the PDO level and intermediate results indicators can be carried out by the PMU staff, with support from Participating Entities.

Sustainability

34. The sustainability of the objectives of the META Project over the long term will rest upon the Government's commitment and ability to carry out the necessary energy and mineral sector policies. In the energy sector in particular, empirical evidence in the last 15 years has demonstrated a strong commitment from the MME to lead the reform process, introduce innovation, and deliver results. The GOB has confirmed MME's central role in the sector and has designated the MME as the coordinating agency for META. Successful results from the previous administration have provided a solid platform for the new administration to build upon and make necessary changes during the course of the project. The Project will help develop capacity among key Participating Entities, to ascertain sustainability of the long term results. The topics to be covered by the technical assistance program have been jointly selected by the project Participating Entities and by the World Bank, and may be revisited as priorities change. They will constantly be fine-tuned in scope and priorities during implementation to ensure that they respond to the most important and urgent needs and demands of the GOB.

V. Key Risks and Mitigation Measures

35. The main risks identified are (i) the Governmental decision making process, which can be lengthy; (ii) the institutional complexity of the Project; (iii) the disbursement capacity of the PMU, (iv) the high transaction costs in supervision, and (v) the indirect environmental and social impacts.

36. Experience from the former ESTAL Project shows that delays can occur when decisions cannot be easily taken to address day-to-day implementation issues. This risk is being addressed by inserting the PMU directly in the Executive Secretariat of the MME, thus giving immediate

visibility of any delay or issue to the highest decision level in the MME. This higher level of commitment to smooth implementation, compared to the former ESTAL Project, has already been observed at the preparation stage of this Project.

37. The proposed Project is bringing the institutional coordination of TA activities to a new scale. While the ESTAL Project was implemented by a single, small PMU which dealt with technical people in different secretaries, the proposed Project will build a high-level coordination structure among the different key secretariats and Participating Entities of the sectors. Each Participating Entity has already assigned a coordination team that will directly liaise with and report to the central PMU located in the Executive Secretariat, concentrating all the formal fiduciary reporting. While preparation and implementing capacity has been considerably increased compared to ESTAL, the central PMU will also be further increased in quantity and quality (17 staff will be selected through public competitive selection based on adequate skills, in addition to the 10 staff of the current Project Preparation Unit) to streamline a larger volume of fiduciary processes and ensure quick disbursement. This change in scale and efficiency is already being demonstrated through the production of TORs corresponding to around 80 percent of the budget of the META Project.

38. To limit transactions costs, it is proposed to rely as much as possible on country systems for financial management, *Sistema Integrado de Administração Financeira* (SIAFI) and *Sistema de Informações Gerenciais* (SIGMA) and to adopt high procurement post-review thresholds in order to streamline disbursement and drastically reduce supervision costs.

39. Another lesson of the former ESTAL Project is that safeguards aspects can be difficult to identify at the stage of planning analytic studies. To mitigate the risk, a careful review of potential safeguards issues has been performed and an environmental and social management framework has been developed to provide for ongoing screening of proposed activities, in particular for new studies that are identified during implementation. (For details, see Annex 4).

40. The potential risks related to financial management are summarized in the Operational Risk Assessment Framework (Annex 4, Section 3) and are primarily related to (a) that staffing of the already established PMU has to be completed, and a Regulation (*Portaria)* has to be issued naming the complementary PMU's staff, and (b) SIGMA needs to be fully implemented. The mitigating measures were proposed and will be incorporated in the Project Operational Manual and monitored through the Project.

VI. Appraisal Summary

Economic and Financial Analyses

41. The Project will strengthen the institutional capacity of key government agencies to improve the management of the energy and mining sector. Some of the activities focusing on technological innovation are likely to have strong economic benefits, including the following:

(i) Technological developments in the design and testing of extra high voltage lines that will enable a more efficient transfer of power between generation and consumption centers, thereby contributing to the reduction of a cost component of the supply chain which has experienced significant increases in the last few years;

(ii) Technological and regulatory developments in the design and implementation of synchronized measurement technology in preparation for real-time monitoring and control of the entire power system in Brazil (as part of a smart grid concept), thereby increasing the transmission capacity of existing transmission lines and reducing the spilling of water in hydropower plant during the rain season; and,

(iii) Development of technologies and regulatory processes to enable the demand side development of smart grids, including, inter alia, the introduction of smart meters, load control at end-user level, and demand side bidding, thereby increasing the efficiency and the reliability of the entire system, from generation to transmission to distribution.

42. A fuller description of the economic benefits is available in the project files, which clearly demonstrates that the project is economically viable.

Technical

43. The project will provide the energy and mineral sectors with state of the art laboratory technologies, notably by equipping their applied research laboratories to better perform their tasks with effectiveness and accuracy. The personnel to manage the labs are familiar with the technologies to be selected and will be able to benefit from those technologies immediately. For example, in the area of transmission (including transportation of large blocks of energy over long distances, optimization in asset utilization, and reliable dispatch of the power system), CEPEL is an internationally renowned applied research institution that understands the needs of the market (e.g. transmission companies, independent system operator) and will make use of state of the art technology to advance leading edge applications such as smart grid, extra-high voltage, phasor measurement systems and others, with direct applications in the field. Those technologies exist today and are being used by large utility companies worldwide. However, they are also in state of development and need to be customized to the specific needs of the Brazilian electricity sector.

Financial Management

44. The Financial Management Risk is rated as Moderate. The Bank conducted a financial management assessment for the proposed Project during Project preparation in accordance with OP/BP 10.02 and the Financial Management Practices in World Bank Financed Investment, dated March 5, 2009. The purpose of the assessment was to determine whether MME and Participating Entities have acceptable financial management and disbursement arrangements in place to adequately control, manage, account and report on Project funds. The financial management arrangements, as set out for this Project, are considered acceptable (see Annex 3).

Procurement

45. The capacity assessment of the Participating Entities reviewed the organizational structure for implementing the Project and verified that the initial procurement packages will be issued very early during project implementation. To strengthen Participating Entities' capacity to execute procurement under the Project, an action plan was agreed upon and recommends: (i) that the PMU should acquire additional procurement expertise through hiring consultants or staff, making sure there is an adequate training program, and (ii) training should be delivered to

procurement and technical teams from the different participating Participating Entities to ensure broad consistency and quality of procurement processes. ONS, particularly, should nominate a permanent procurement team to do all procurement required for the project and to establish a system to review and manage procurement complaints. These steps are discussed in more detail in Annex 3. The residual Project risk for procurement is Moderate.

Social (including safeguards)

46. The proposed Project will not make any investments that directly affect Indigenous Peoples and lands and no direct negative social impacts for Indigenous Peoples are anticipated from its activities. It does not require land acquisition and will not cause the involuntary taking of land, the involuntary physical and/or the economic displacement of people. The client has prepared an Environmental and Social Management Framework (ESMF) that sets clear criteria through which activities to be supported by the Project will be screened to avoid activities which (a) may have direct impacts on traditional communities, (b) may require land acquisition, and (c) may cause involuntary resettlement issues. Compliance with these principles will be monitored by the executors, the client, and the Bank throughout Project's implementation. The ESMF was formally submitted to the Bank, publicly disseminated and consulted on-line prior to Project appraisal. Project appraisal took place only following the release in-country and the filing in the Bank's Infoshop of an acceptable ESMF and the filing of the Integrated Safeguards Data Sheet **(**ISDS).

Environment (including Safeguards)

47. The META Project is expected to have positive environmental impacts, given its focus on capacity building of key institutions of both the energy and the mineral sectors. The Project will promote regulatory adjustments, sector planning and the institutional strengthening. Energy and mining face numerous environmental challenges, arising from accelerated national economic growth. The regulatory and supervision Participating Entities' capacity improvement has important environmental and social implications, particularly related to energy efficiency enhancement and the adoption of sustainable practices in both sectors. The Project includes primarily conceptual studies and activities related to institutional strengthening, which are likely to have minimal or no adverse environmental impacts.

48. The Project has been rated category "B" and safeguard policies have been triggered for Environmental Assessment (OP/BP 4.01). The approach to identifying and managing environmental and social impacts and risks under the Project will be twofold. The Environmental Assessment Safeguard is mandatory for all sub-projects that may potentially have an environmental or social impact. The other safeguards are triggered on a precautionary basis. The Natural Habitats (OP/BP 4.04), Forests (OP/BP 4.36), Physical Cultural Resources (OP/BP 4.11) safeguards will be triggered if specific impacts are identified during Project preparation or Project implementation.

49. The Environmental and Social Management Framework (ESMF) carried out by the Borrower assesses all sub-projects' potential environmental and/or social impacts. It has sub-projects screening and eligibility criteria to make sure that no sub-projects with high potential impacts can be eligible. The Borrower also prepared a specific Environmental Management Plan for the CEPEL Laboratory interventions, including the sub- project characterization, legal

framework, impacts assessment, management plan (mitigation plan, monitoring plan, implementation measures and institutional arrangement), and a brief construction manual for the new facilities construction.

50. The Borrower has conducted two independent consultations with key stakeholders, the first to consult on CEPEL's Environmental Management Plan (EMP) on June 29, 2011, and the second, to present the Project ESMF report findings on June 30, 2011. Project appraisal took place only following the release in-country on June 14, 2011 and the filing in the Bank's Infoshop on August 23, 2011 of acceptable ESMF and EMP and the filing of the ISDS.

Annex 1: Results Framework and Monitoring

COUNTRY: Project Name
Results Framework

Project Development Objective (PDO):
The Project Development Objective is "*to strengthen the capacity of key public sector institutions to improve the contribution of energy and mineral resources to accelerated national economic growth and increased social and environmental sustainability in a context of globalization and technological change*".

PDO Level Results Indicators*	Core	Unit of Measure	Baseline	Cumulative Target Values**					Frequency	Data Source/ Methodology	Responsibility for Data Collection	Description (indicator definition etc.)
				YR 1	YR 2	YR3	YR 4	Total				
Indicator One: Enhancement of capacity of key Government institutions in charge of supporting the development of both the energy and mineral sectors.		• Nb of new database created and utilized	0	0	2	5	9	9	Annual	Annual Progress Report	PMU	Database for planning and socio-environmental monitoring
		• Nb of new methodologies created and utilized	0	0	2	4	6	6	Annual	Annual Progress Report	PMU	Methodologies to internalize long-term sustainability in planning, policies design and regulations
	☐	• Nb of Training Programs	0	0	0	1	3	3	Annual	Annual Progress Report	PMU	Training programs for capacitating staff of ministry, Participating Entities and communities
		• Nb of entities created or restructured as specified in the new Regulatory Framework already	0	0	2	2	2	2	Annual	Annual Progress Report	PMU	Restructuring of Secretary of Geology and Mining and creation of National Counsel for Mineral Production

		prepared by the Ministry of Mines and Energy										
Indicator Two: **Enhancement of applied sectoral R&D laboratories for providing emerging and state of the art technologies to the energy and mineral sectors**	☐	Nb of power transmission technologies developed and/or deployed Nb of geophysical technologies			1 2	1 3	3 4	3 4	Annual Annual	Annual reports of CEPEL and ONS Annual report of CPRM		Power Transmission Technology: 1) Ultra-high Voltage (UHV) transmission technology 2) Synchronized realtime phases measurement technology (PM) 3) Upgrade the computing capacity to state-of-the art technology to enable the simulation of complex power system and its realtime dispatch (Clusters) Geophysical: 4) Electroresistivimeter, 5) Electromagnetic meter, 6) Ground Penetration Radar, 7) Sysmograph

INTERMEDIATE RESULTS

	Core	**Unit of Measure**	**Baseline**	**Cumulative Target Values****				**Frequency**	**Data Source/ Methodology**	**Responsibility for Data Collection**	**Description (indicator definition etc.)**
				YR 1	**YR 2**	**YR3**	**YR 4**				
Intermediate Result (Component One): Strengthening the Capacity of the Government to drive sustainable development of the Energy and Mineral Sectors											
Intermediate Result indicator One: Apply newly-collected and processed energy-use data to improve energy models. Demonstrate improvements in planning documents for one selected sector. (activity 35, 38)		Number of subsectors with improved data incorporated into energy planning models	Low quality non primary data.		2 subsectors with new primary data.	New data for 2 sub-sectors incorporated into energy planning models.	New data for 2 sub-sectors incorporated into energy planning models.	Annual	Verification	EPE	Methodology, toolkit or database

Intermediate Result indicator Two: Development of internal capacity to execute an annual inventory of greenhouse gas (GHG) emissions, both through the development of a methodology and staff training. (activity 5)		Inventory of GHG emissions of the Energy sector	No methodology or internal capacity for GHG accounting.		New methodology and manual adopted by the MME		One GHG inventory completed using the new methodology	One-time	Verification	SPE/DDE	Methodology and manual
Intermediate Result indicator Three: Improve the capacity of the Ministry and the Energy Planning Agency (EPE) to define the potential of wind energy that can be integrated to the grid, consistent with the stability of the power system (activity 8)		Standard to integrate wind energy into the interconnected power system	Data on the full potential exists, but neither data nor criteria on the technical-economic potential that can be integrated safely			Standard to integrate wind energy into the interconnecte d power system elaborated.	Standard to integrate wind energy into the interconnected power system adopted	One-time	Verification	SPE/DPE	Methodology
Intermediate Result Indicator Four: Improve the primary data on small-scale mining in order to facilitate the adoption of an Action Plan for the sector. (activity 10)		% inventoried	Data for 1993 only, and has not been updated.		100% inventoried.	Action Plan for small-scale mining adopted	Action Plan for small-scale mining adopted and implementation has begun	One time	Verification	SGM	Inventory and action plan
Intermediate Result Indicator Five: Training of staff		Nb of staff trained	0	25	75	100	150	Annual	Verification	PMU/MME	Number of staff
Intermediate Result (Component Two): Strengthening of regulatory institutions											
Intermediate Results Indicator One: Reduction of energy used due to the implementation of demand response measures, via Demand Side Bidding.		% of load reduction bid via DSB over total load of SIN % of load actually curtailed via DSB over total load of SIN	0 (DSB mechanism does not exist) 0 (DSB mechanism does not exist)	0 0	0 0	5% 5%	10% 10%	Annual Annual	Database from CCEE Database from CCEE	ANEEL/ CCEE ANEEL/ CCEE	Includes Demand Side Bidding - price responsive demand side. Eligibility to participate to be defined in regulations, therefore number or customers and aggregators, if any. No load control contemplated in this phase
Intermediate Results Indicator Two: Smart Meter deployment		% of Smart Meter									Smart meters defined as devices with remote

		deployed by customer group Large Small	 0% 0%	 0% 0%	 0% 0%	 20% 5%	 40% 10%	 Annual Annual	 Verification Verification	 ANEEL ANEEL	metering, automated disconnection, load control
Intermediate Result Indicator Three: Adjust the structure of SGM to the new legal and regulatory framework, and create the CNPM. This will include creating an action plan, procedural norms, and capacity plan.(activity 13)			SGM remains with old structure without an Advisory Board.	New Legal and Regulatory Framework	SGM restructured	CNPM operational	SGM restructured and CNPM operational.	Annual	Verification	SGM	Units created or restructured
Intermediate Result Indicator Four: Improve the management and security of documents related to mineral rights through implementing an electronic document management system. (activity 17)		Software purchased and customized.	Continue with physical processing of documents.	New program developed and tested	New program being utilized.	New program being utilized	New program being utilized	One-time	Verification	DNPM	Software
Intermediate Result (Component Three): Technology Development											
Intermediate Result indicator One: Developed and demonstrated in the laboratory: a high-performance long-distance transmission line to enhance the design, testing, commissioning and operation of major trunk lines. (activities 44, 45, 46, 48, 49, 50, 51A/B, 52)			No testing capacity for developing and testing high voltage transmission lines above 700kV		Operationalized insulators flashover voltage for ultra high tension for testing.	Be fully operational to test ultra-high tension equipment (insulators, transformers, switchgears) and have tested the transmission lines.	Technology for long distance transmission lines (765 kV AC or 500 kV DC) developed and demonstrated in the laboratory.	Annual report on implementation progress	Verification and testing	CEPEL	Equipment and application
Intermediate Result Indicator Two: Development of a new high-performance version of CEPEL's computer model to		Operational Computational Clusters	0	0	2 clusters acquired	2 new clusters utilized, allowing to	Results of simulation obtained by running the	One-time	Verification and testing	CEPEL	Hardware

support expansion planning and operation of the SIN. (activity 43)						run more efficiently the software	software utilizing the new clusters				
Intermediate Result Indicator Three: Demonstrate, with the help of gauges and real-time digital simulation, the application of phaser synchronization measurement technologies to monitor large-scale disturbances in the SIN. (activity 53)		PMU testing lab	No testing capacity for developing and testing phasor technologies	-	-	Lab fully operational for testing and research on PMU and phasor data concentrators		One time One-time	Verification and testing Verification and testing	CEPEL CEPEL	Laboratory and application Equipment
Intermediate Result Indicator Four: Improved capacity of the CPRM to create maps of the geophysical risk susceptibility of different municipalities in order to reduce natural disaster risk. (activity 16)		Maps of the geophysical risk susceptibility	0		50 maps	100 maps	247 maps	Annual report	Verification	CPRM	Maps
Intermediate Result (Component Four): South-South Cooperation											
Intermediate Result indicator One: Improve capacity of MME to contribute effectively in south-south cooperation in the energy and mining sectors		1) Management information system and procedures 2) Specific South-south activity	Ad hoc response to solicitations, no organized management of MME South-South activities		1) New management information system and procedures for South-South activities in place 2) Two activities		2) Four activities	Annual report	Verification	PMU/MME	

Annex 2: Detailed Project Description

1. The proposed Project Development Objective is to strengthen the capacity of public sector institutions to improve the contribution of energy and mineral resources to accelerated national economic growth and increased social and environmental sustainability in a context of globalization and technological change.

2. The principal outcome expected from the Project is to improve capacity of key institutions in both the energy and the mineral sectors to ensure that they deliver the regulatory adjustments and the planning and modernization of infrastructure—in particular related to information systems and technology development—which are needed in order to meet the requirements of the accelerated economic growth of the country in a sustainable manner, from both environmental and social perspectives.

3. The proposed Project is a Sector Investment Loan (SIL) for $49.6 million, which will support a larger program of the Ministry of Mines and Energy (MME). A follow-up operation is contemplated with the MME, since the original project scope was divided in two stages by request of the Government. The Project as a whole will have four components that will be executed seamlessly over the course of the first and second operation. The proposed Project would support sector-wide efficiency improvements in the energy and mineral sectors, by financing, over the course of the first and second phase (i) strengthening capacity, planning activities, and sustainability, (ii) institutional and regulatory development, (iii) technology development, and (iv) South-South cooperation. The component details are as follows:

4. **Component 1: Strengthening the capacity of the Government to promote the sustainable development of the energy and mineral sectors (US$12.94 million, of which US$8.94 million from IBRD and US$4 million from counterpart funds).** This component will be composed of the following subcomponents.

i. *Subcomponent I: Planning of the Energy and Mineral Sectors.* This sub-component will strengthen the ability of the Ministry to formulate and implement strategies (i) for expanding the supply of cost-effective and sustainable energy to meet the evolution of demand, in the medium and long term and (ii) to improve governance, increase value added and enhance sustainability in the mining sector. In particular, it will finance a set of technical activities focused on the short, medium and long-term planning of the energy and mineral sectors, which will contribute to the development and implementation of various sectoral and sub-sectoral plans. These will include:

   a. strategic studies and development of scenarios to support planning of the energy matrix, particularly assisting the SPE and EPE. This will include the collection of data in order to help the EPE understand energy use and resources, improve energy planning models, and inform planning publications;
   b. studies to support the restructuring of public mining institutions and the creation of CNPM, as well as the implementation of the National Mining Plan 2030 (PNM); and,
   c. development of information systems.

This sub-component scales-up the Bank support in the area of energy and mineral planning provided under the former ESTAL Project.

ii. *Subcomponent II: Strengthening capacity to design and implement policies and practices to facilitate the expansion and to improve the sustainability of the energy and mineral sectors.* This subcomponent will finance studies and training aimed at identifying opportunities, developing policies and disseminating best practice to improve the environmental and social sustainability of both the energy and mineral sectors. This sub-component will also include support to improve institutional communication related to the implementation of the policies and practices. In particular, this sub-component will finance:

a. an inventory and technical-economical analyses of low-carbon energy sources. This is intended to build upon previous analytical work conducted or supported by the World Bank, in particular the Brazil Low-Carbon Study and the preliminary inventory of low-carbon projects financed by a PHRD grant (Strengthening Brazil's Carbon Markets-P105104). It will help to develop capacity within the Ministry so that external consultants do not need to be brought in for carbon analyses;
b. inventory and baseline studies of the environmental and social impacts of artisanal and small-scale mining. This baseline will help to inform a detailed Action Plan for the sector; and,
c. training and capacity building aimed at improving and disseminating best practices regarding gender issues and the mitigation of social impacts on populations affected by investments in the energy and mineral sectors.

iii. *Subcomponent III: Management, monitoring and evaluation of activities, and dissemination of results.* This subcomponent will finance the strengthening of the capacity of the Executive Secretary of MME to manage, monitor and evaluate technical assistance activities, in particular the TA activities supported by this project, as well as to disseminate their results. Specifically, this subcomponent will finance:

a. TA activities management support, including procurement and safeguards and support to the PMU; and,
b. M&E activities.
c. Activities in the Project's communication plan, including promotion, events and dissemination of results to stakeholders.

5. Component 2: Strengthening of regulatory institutions (US$2.33 million, all from IBRD). In particular, this component would aim to provide the support through the following two sub-components:

i. *Subcomponent I: Strengthening the monitoring and control capacity of the power sector*. This sub-component will finance activities aimed at improving the capacity to monitor and manage the electricity sector to address the need to develop more efficient tools for Government to take effective regulatory action in the sector; and,

ii. *Subcomponent II: Institutional strengthening in the area of geology and mineral resources.* This sub-component will finance activities aimed at strengthening various public agencies and entities of the mineral sector. Special emphasis will be given to the modernization of CPRM and DNPM.

6. **Component 3: Technology Development (US$35.69 million, all from IBRD)**. Specific activities will include the following:

i. *Subcomponent I: Investments in Research and Technological Development.* This subcomponent will finance (i) the refurbishment and technology development of the technical laboratories of CPRM and CEPEL to meet the evolving demands for research and technological development in the energy and mineral sectors and (ii) the implementation of a security technology (phasor measurement units) for the National Interconnected System operated by the ONS. This later activity is aimed at implementing recommendations that resulted from TA activities developed under the previous ESTAL Project. The major investment (estimated at US$30.50 million) will be located in CEPEL.

ii. *Subcomponent II: Studies in Research and Technological Development.* The subcomponent includes studies and research in the energy and mineral sectors required for the implementation and development of new technologies in these sectors.

7. **Component 4: South-South Cooperation (US$2.52 million, all from IBRD)**. This component will provide support to MME and possibly other Brazilian public agencies to structure themselves and contribute to South-South Cooperation between Brazil and other Participating Countries (per the Loan Agreement definition), in particular, but not limited to, countries in South America, Central America, in the Caribbean and in Africa, in the energy and mining sectors. The activities will focus on the areas of regulation, renewable energy, climate change, clean energy, geological surveys, information systems and environmental and social sustainability. This component will support to improve the preparation and execution for two-way South-South cooperation activities. In particular, it will support activities to systematically organize information, and to assign the necessary means and responsibilities for activities to ensure concrete results. Specific studies and consultancies will also be financed to facilitate the building of results-oriented cooperative engagements in this area. This will help meet an increasing demand for cooperation that Brazil has been receiving in these areas. Specific activities include, but are not limited to:

i. Mapping of the demands received;
ii. Identification of individual and collective expertise;
iii. Standardization and update of the information;
iv. Instruments for monitoring the quality and effectiveness of actions;
v. Development of tools and methodologies to support knowledge exchange;
vi. Internal organization of MME to adjust to flow of demand and new instruments; and,
vii. Individual or institutional thematic champions to facilitate the concretization of actions and results.

8. The implementation of this component will benefit from the experience, instruments and expertise of the World Bank in the area of South-South cooperation, in particular in the area of knowledge exchange, related information management systems, and results monitoring.

Annex 3: Implementation Arrangements

A. Project Implementation Arrangements

1. META Project will be implemented under the full responsibility of MME. The proposed institutional arrangement for the implementation of the Project is structured in three levels:

- Project Management Unit (PMU) for overall Project coordination and oversight and managerial, fiduciary and operational processes related to activities implemented by the MME Secretariats;

- Project Steering Committee (PSC) for high-level deliberative and decision-making processes;

- Co-executing units in the MME secretariats and Participating Entities originating the demands for project activities, which are: the MME Secretariats of Energy Planning (SPE), Electricity (SEE), Oil and Gas and Bio-fuels (SPG), Geology and Mining (SGM), Planning , Budget and Administration (SPOA), and the Company for Mineral Resources Research and Geological Survey (CPRM), the National Department of Mineral Production (DNPM), the Energy Planning Agency (EPE), the National Electricity Regulatory Agency (ANEEL), the National Operator of the Transmission System (ONS) and the National Center for Research in Electricity (CEPEL). The Participating Entities will enter into subsidiary agreements with MME.

2. The MME decided to create a PMU located within the Executive Secretariat, through a Regulation *(Portaria)* of the Minister of Mines and Energy (*Portarias* n°528 and 529 de 12/09/2011).. The PMU will serve as the executive secretariat of the PSC, coordinating as needed the contributions of the Participating Entities, preparing the Manual of Operations, preparing the Procurement Plan, coordinating with the Participating Entities the elaboration of the TORs and the supervision of the technical works, preparing and executing the procurement processes for activities under the responsibility of MME Secretariats, complying with fiduciary requirements, mobilizing resources from the Treasury, developing and implementing the M&E, preparing monitoring reports, etc. The management of the activities financed by the Project will be shared between the PMU and the Participating Entities. MME will transfer to the Participating Entities, on a non-reimbursable basis, part of the Loan proceeds necessary to execute the Project activities under their responsibility.

3. The basic PMU structure has already been designed. The PMU will be headed by an experienced, full-time Project Manager who will provide general oversight and inter-agency coordination. The Project Manager will have overall responsibility for Project implementation, and will work with a Quality Controller, a Legal Advisor, a Financial/Administrative Manager, a Procurement Specialist, Technical/Operational Managers, and a Secretary. The Project Manager will report directly to the Executive Secretary of the MME. The Quality Controller will have the responsibility for assuring that all Project actions adhere to the proposed principles and objectives, and that state of the art methods are selected and implemented to support modernization, strengthening and sustainability of all actions, both during and after the Project execution period. The Legal Advisor will review and approve all contracts and agreements, and also interface with MME Legal Departments.

4. The PSC is a collegiate board composed of representatives of the MME and the Participating Entities. The PSC will be established by a Regulation *(Portaria)* of the Minister of Mines and Energy. The PSC will oversee implementation, ensure high level coordination between activities undertaken by the different Participating Entities, supervise implementation and evaluate results. The PSC will ensure that the PMU and specific units established in Participating Entities are provided with the proper means and will approve the structure, functions, composition and duration of the PMU.

5. Each co-executor will create a specific internal unit to co-execute the activities under its responsibility. Its function and responsibilities will include the planning, implementation, supervision and monitoring of each of the activities under its responsibility as well as corresponding procurement processes and financial management; it will provide to the PMU all fiduciary elements required for the PMU to elaborate financial reports to the Bank.

6. One of the main lessons learnt from the former ESTAL Project, in particular at the workshop held in April 2009, is that the project management of large TA projects needs to have strong political support and its delivery capacity, particularly regarding preparing and executing procurement processes and other fiduciary requirements, should be high. By creating the high-level Steering Committee (PSC) and locating the PMU in the Executive Secretariat of the MME, the proposed design addresses the need for strong political support. By formalizing the role of the Participating Entities through subsidiary agreements approved by the World Bank, including their participation in the high level PSC, and requiring the formal appointment of specific units to co-execute the activities proposed by these entities, the proposed design increases considerably the implementing capacity of the Project, compared to a single centralized PMU, enabling the parallel implementation of many activities and, consequently, quick disbursement of the resources.

7. The table below lists the current indicative financial allocations to the different Participating Entities by component of the Project. These allocations (in US$ thousands) are expected to change during Project implementation given the flexible demand driven approach.

8.

	Component 1	Component 2	Component 3	Component 4	Grand Total
Sub-Total Energy	**5,157**	**793**	**34,404**	**1,107**	**41,461**
ANEEL		**250**			**250**
CEPEL	**571**		**31,504**		**32,075**
EPE	**1,971**				**1,971**
GAB	**74**				**74**
NESA	**1,159**			**79**	**1,238**
ONS			**2,900**		**2,900**
SPE/DDE	**461**				**461**
SPE/DPE	**921**			**1,028**	**1,949**
SPOA		**543**			**543**
Sub-Total Mining	**2,916**	**1,534**	**1,288**		**5,738**
GAB	**99**				**99**
SGM	**2,817**	**1,173**			**3,990**
SGM/CPRM			**1,288**		**1,288**
SGM/DNPM		**361**			**361**
Common to Energy and Mining	**866**			**1,415**	**2,281**
ASS. INTERN.				**1,415**	**1,415**
GAB	**866**				**866**
Grand Total	**8,939**	**2,327**	**35,692**	**2,522**	**49,480**

Financial management and Disbursement Arrangements

Financial Management Assessment Conclusion

8. The Bank performed a Financial Management (FM) assessment in accordance with (i) OP/BP 10.02, the Financial Management Manual for World Bank-financed operations (March 1,2010); (ii) the World Bank's Audit Policy, and (iii) LCR regional guidelines for quality

assurance and risk management. This FM assessment included the implementing agency, the Ministry of Mines and Energy (including its Secretariat for Planning and Energy Development (SPE); the Secretariat for Electricity (SEE); the Secretariat for Oil, Gas and Bio-fuels (SPG); the Secretariat for Geology, Mining and Mineral Processing (SGM); the Núcleo for Environmental Sustainability Studies (NESA); and Secretariat for Planning, Budget and Administration (SPOA)) and the six Participating Entities (ANEEL, CPRM, DNPM, EPE CEPEL and ONS)[4]. The scope of the assessment included: (i) an evaluation of existing financial management systems in place to be used for program monitoring, accounting and reporting; (ii) review of staffing requirements; (iii) review of the flow of funds arrangements and disbursement methodology; (iv) review of internal control mechanisms in place; (v) discussion in regard to reporting requirements, including the format and content of Interim Financial Reports (IFRs); and (vi) review of internal and external audit arrangements.

9. The financial management arrangements in MME and the Participating Entities are satisfactory to the Bank's minimum requirements and, financial management systems are in place that can provide with reasonable assurance, accurate and timely information on the status of the project. The financial management system SIAFI and SIGMA, when customized and fully implemented, will meet the financial management requirement as stipulated in OP/BP 10.02 subject to implementation of the agreed actions and mitigating measures. Appropriate internal controls are in place and function effectively. According to the ORAF matrix (Annex 4), presenting the potential project FM risks, the residual overall FM risk associated with the Project is rated as **Moderate.** The funds flow, disbursements, monitoring, auditing and supervision arrangements have been designed in a way to respond to the project's implementation.

Overall Financial Management Arrangements

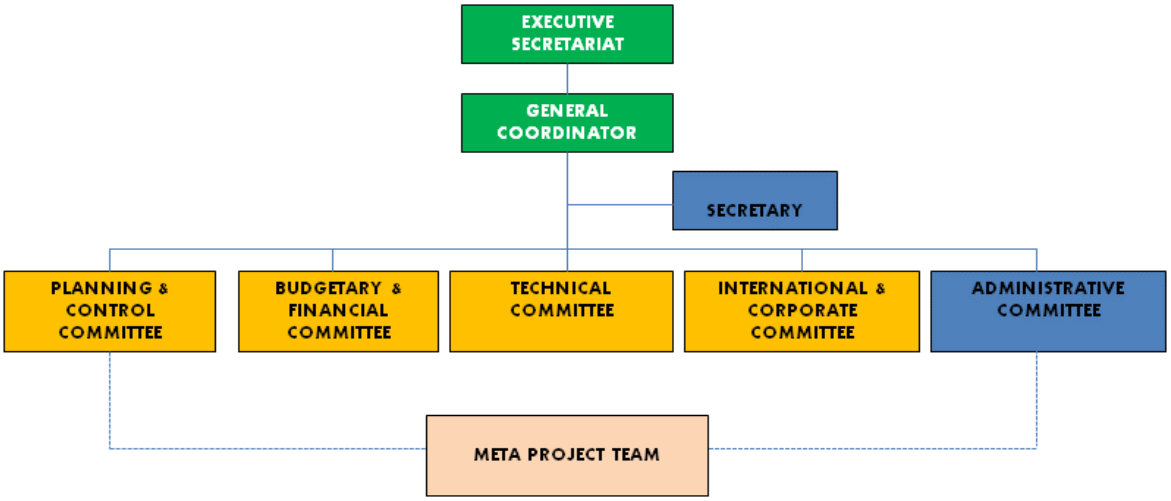
1. Institutional Arrangements, Executing Agency and Staffing

10. The PMU will serve as the executive secretariat of the PSC and as the project management unit, to coordinate as needed the contributions of the Participating Entities**.** The primary fiduciary responsibilities for the project would be carried out by the PMU**.** The primary project coordinating unit fiduciary responsibilities include: (i) preparing and obtaining approval of project FM arrangements; (ii) coordinating and supervising project implementation; (iii) submitting disbursement requests and documentation of expenditures to the Bank; (iv) preparing and submitting project financial reports (IFRs) to the Bank; (v) preparing and providing all financial documentation and project reports requested by external auditors and Bank staff; and (vi) preparing, updating and ensuring that all project executors are in compliance with the Project Operational Manual (OM).

[4] ANEEL - National Electricity Regulatory Agency (*Agência Nacional de Energia Elétrica*); CPRM - Company for Mineral Resources Research and Geological Survey (*Companhia de Pesquisa de Recursos Minerais – Serviço Geológico do Brasil*); DNPM - National Department of Mineral Production (*Departamento Nacional de Produção Mineral*); EPE - Energy Planning Company (*Empresa de Pesquisa Energética*); CEPEL - National Center for Research in Electricity (*Centro de Pesquisa em Energia Elétrica*); and ONS - National Operator of the Transmission System (*Operador Nacional de Sistema Energético*).

11. Each Participating Entity will appoint a representative or create a specific internal unit to co-manage with the PMU the activities it has proposed for financing under this project. Its function and responsibilities will include the planning, implementation, supervision and monitoring of each of the activities under its responsibility; it will participate in the elaboration of TORs and the bidding and contracting processes lead by the PMU.

12. The organizational structure of the project consists of five coordinating committees: Planning and Control; Budgetary and Financial; Technical; International and Corporate Relations; and Administrative, and it is represented below:



13. The PMU's financial management, disbursement, and reporting duties are performed by the Budgetary and Financial Coordinating Committee. It will be composed of 5 professionals, two of which were among the staff of the former MME-implemented ESTAL project. The remaining staff of the project's FM team will be hired through a public competitive selection process, requiring adequate professional qualifications for the performance of their responsibilities.

14. The Project Operational Manual would document Project processes and serve as an important source for processing steps to be followed during project implementation. It would contain the organizational structure of the project, as well outlined job descriptions with clearly defined responsibilities and duties, detailed procedures and guidelines for disbursements, payments, approvals, commitments, payments and reporting.

2. Disbursement Arrangements and Flow of Funds

15. Loan proceeds would be disbursed against the following expenditure categories:

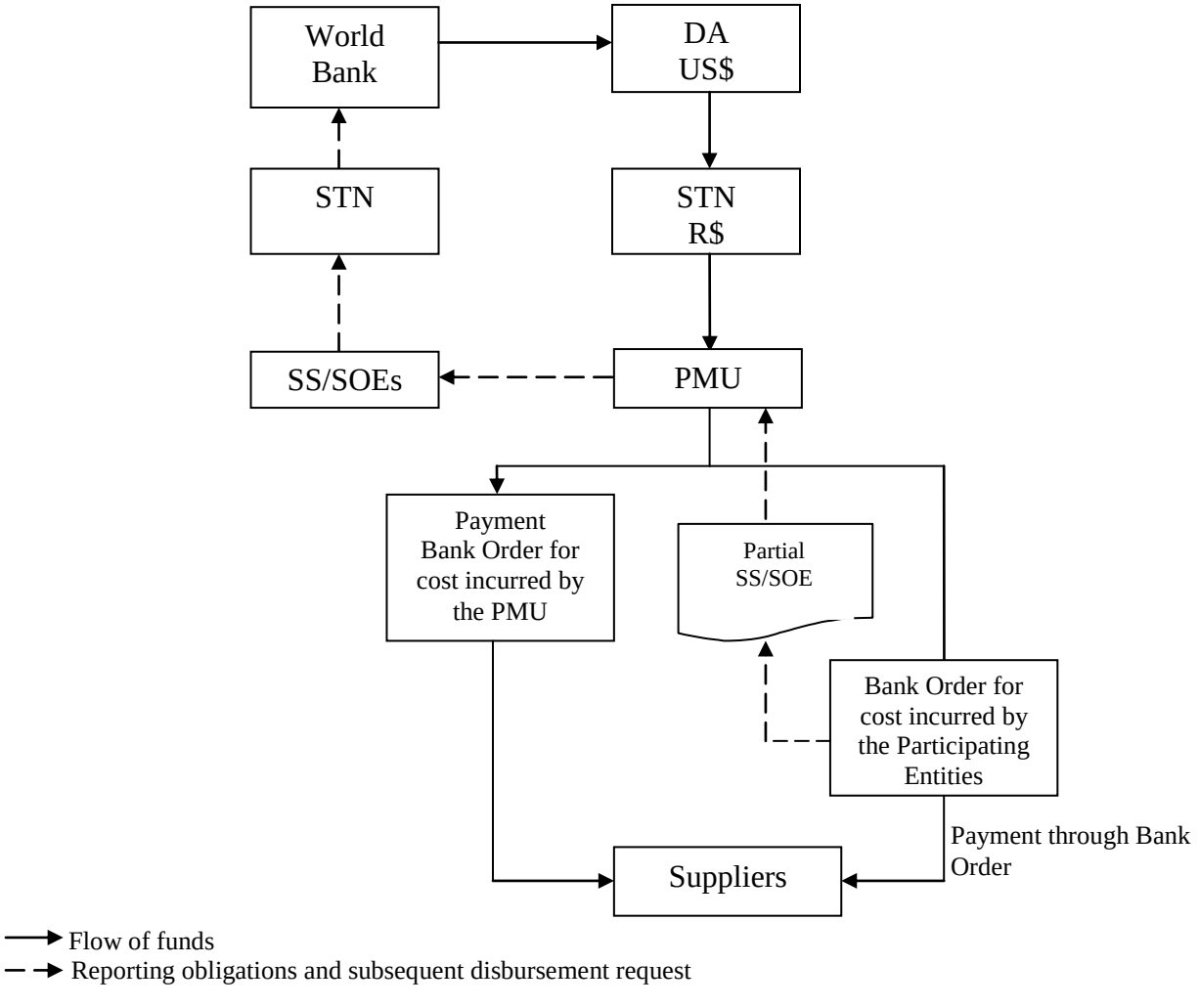
Category	Amount of the Loan Allocated (expressed in Dollars)	Percentage of Expenditures to be financed (inclusive of Taxes)
(1) Goods, works and Non-Consulting Services	35,407,300	100%
(2) Consultants' services	12,664,300	100%
(3) Training	542,900	100%
(4) Operating Costs	865,616	100%
(5) Front-end Fee	124,011	Amount payable pursuant to Section 2.03 of this Agreement in accordance with Section 2.07 (b) of the General Conditions
(6) Premium for Interest Rate Caps and Interest Rate Collars	0	Amount payable pursuant to Section 2.07 (c) of the Loan Agreement
TOTAL AMOUNT	**49,604,127**	

" Operating Costs" means reasonable cost of eligible expenditures incurred by the Borrower in connection with the daily operation of the Project, including, inter alia, travel costs and per diem, maintenance of equipment, office supplies and materials and costs related to strengthening communication and disseminating results (events, communication plans, publications), which expenditures would not have been incurred absent the Project and would be procured following administrative procedures of the implementing agency, which have been reviewed and found acceptable to the Bank."

(1) The national contribution will amount to US$4,039,214 and will be devoted to managing and monitoring the Project.
(2) The total value of the first phase operation is US$53,643,726.
(3) Capacity building of the civil servants of MME and Participating Entities.
(4) "Training" means reasonable cost of eligible expenditures incurred by the Recipient in connection with the carrying out workshops and training preparation and administration under the Project, including travel costs, and *per diem* of trainees, trainers and coordinators, rental of training facilities and purchase of training material.
(5) "Non-consulting Services" means the costs of services which are of non-intellectual nature and that can be procured on the basis of performance of measurable physical outputs, including, inter alia, transport and service sectors energy consumption and natural gas potential market surveys.

16. The flow of funds and disbursements will be executed by the National Treasury Secretariat (*Secretaria do Tesouro Nacional - STN*) following Federal Government procedures. As disbursements will be based on Summary Sheets (SS) with Records and Statement of Expenditures (SOEs), the PMU will be responsible for monitoring the co–executing entities' implementation needs and consolidate the cash-flow programming for the loan. Options to use direct payments will not be available (according to Decree nr. 7445, of March 1st, 2011).

17. The PMU reporting obligations and the Project funds flow will be according to the following chart:



18. The principal disbursement method will be Advances. The Bank will disburse the proceeds of the Segregated Project Designated Account (DA), in US$ (at the Central Bank of Brazil), which in turn will transfer the funds to the STN's single account in the Brazilian Central Bank, in Brazilian Reais. The use of the funds from the US$ denominated DA, will be reported in US$ to the Bank.

19. The STN provides a budgetary line to the MME, in Brazilian Reais, which will be appropriated by the Budgetary Unit (*Unidade Gestora – UG)* specifically designated for this

Project in the Integrated System for Financial Management (*Sistema Integrado de Administração Financeira – SIAFI).*

20. The PMU will make payments for the cost of activities carried out by the MME only. The Participating Entities will make payments for the cost of activities carried out by them, using resources transferred to them. All costs should be included in the IFRs and forwarded to STN for submission to the World Bank office in Brasilia for FM purposes.

21. Resources will be transferred to the Participating Entities in two ways:

I – For the Participating Entities that utilize the SIAFI (ANEEL, CPRM, DNPM and EPE): The resources will be transferred through the "Credit Decentralization (*Destaque*)." For these entities there will be a budget credit decentralizing operation in which the MME will give to the Participating Entities the responsibility for the use of the resources that have been allocated within the budget. This operation will be supported by a Cooperation Agreement that will be signed by the MME and the Participating Entity.

The *Destaque* will be as follows:

a) A resources transfers schedule must be detailed in the Cooperation Agreement based on its Procurement Plan that was previously approved by the World Bank;

b) The *Destaque de Crédito* for the Participating Entities will be executed by the PMU/MME by processing the transfer through the SIAFI system, on the scheduled dates for the ongoing transfers of the Cooperation Agreement Schedule, after the appropriated documentation of the previous transfers (*Prestações de Contas)*.

c) The Participating Entities will process the payment of the expenses that were approved in the Procurement Plan and will submit to the PMU/MME a copy of the supporting documentation of all expenses. All the documentation and records generated by the SIAFI system related to this transaction will be monitored and utilized by the PMU/MME, and will be included in the SIGMA project monitoring and reporting system for the preparation of the SS/SOEs and the IFRs.

II – For the Participating Entities who do not utilize SIAFI (CEPEL and ONS): The resources transfer will be processed through a bank order to a Participating Entity bank account exclusively created to receive these funds transferred by the MME. This operation will be supported by the signing of an Agreement between the parties.

The bank transfer will be as follows:

a) The Cooperation Agreement must detail the resources transfers schedule based on its Procurement Plan approved by the World Bank;

b) The issuing of a bank order for the Participating Entities will be done by the PMU/MME by utilizing the SIAFI system on the scheduled dates specified for the ongoing transfers of the Cooperation Agreement Schedule, after the appropriated documentation of the previous transfers;

c) The Participating Entities will process the payment of the expenses that were approved in the Procurement Plan and will submit to the PMU/MME a copy of the supporting documentation of all expenses, as well as a copy of the bank statement. All the documentation and records generated by the Participating Entities related to these transactions will be monitored and utilized by the PMU/MME, and will be included in the SIGMA system and in the preparation of the SS/SOEs and the IFRs.

22. The proposed ceiling for the Designated Account will be based on the forecast for 2 quarters as provided for in the quarterly IFR's. The maximum frequency for reporting eligible expenditures paid from the DA will be quarterly. The Minimum Application Size for Reimbursement applications is US$1,5m equivalent. A four month Grace Period will be available for the Project.

23. Detailed fund flow charts and Participating Entities work plans are included in the Project's OM.

3. Accounting Policies and Procedures, FM system, and Internal controls

24. The project's budgeting and accounting arrangements are part of the overall Federal FM system and therefore all transactions will run through the Federal accounting system – SIAFI. All payments will be made in accordance with existing procedures for commitment and disbursement cycle (*empenho, liquidação e pagamento).* These functions will be undertaken by the PMU FM team**.** Individual Planned project transactions will be documented in a Work Plan (*Programa de Trabalho - PT*) within the SIAFI, which is a PMU Budgetary Unit (*Unidade Gestora – UG)* specifically designated for a given Project. Once incurred, all Project costs will be recorded according to the Federal Chart of Accounts which will be customized for the project using a PI (*Plano Interno - customized chart of accounts).*

25. The project's accounts will be maintained on a cash basis, and the same basis will be used for the preparation of the financial reports and statements.

26. MME will use the Federal Integrated Financial Administration System – SIAFI and Ministry of Environment's Information Management System – SIGMA to control, monitor, account and prepare financial reporting for all its Projects. Besides all these functions, SIGMA is able to issue all required reports in IFR format. SIGMA is also accessible by the web, which facilitates data input from the various Project's participating entities.

27. The Project will be subject to existing MME's internal control arrangements as provided for under the State laws. This function will be undertaken by MME's Sub-Secretariat of Planning, Budget, and Management (*Subsecretaria de Planejamento, Orçamento e Administração* – SPOA), which is independent of the PMU and is considered to have reasonable controls and capabilities.

28. Detailed budgeting and accounting policies and procedures, and processes, FM system, and internal controls should be included in the Project's OM.

4. Reporting and Monitoring

29. All ANEEL, CPRM, DNPM and EPE transactions will be done through SIAFI. CEPEL and ONS will report the figures resulting from their transactions in the partial SS/SOE. This partial SS/SOE will be submitted to the PMU/MME with a copy of the supporting documentation of all expenses, as well as a copy of the bank statement, and will be included in the SIGMA system for preparation of the Project SS/SOEs and the IFRs.

30. The PMU will prepare the financial statements (IFRs) for the Loan using information provided by the SIAFI and SIGMA. A Project chart of accounts will be developed and used, taking care of the codification of sources and uses of funds, according to the Loan agreement.

31. The following quarterly IFRs will be issued for management and reporting purposes:

1. IFR 1 – Source and application of funds by cost category as per Loan Agreement,
2. IFR 2 – Application of Funds by components and subcomponents,
3. IFR 3 – Disbursements reconciliation with the Bank's Client Connection site (attached with latest Bank Statement),
4. IFR 4 – Disbursement Forecast;
5. Contract above Thresholds (attached with copy of the invoices); and
6. Notes to the Financial Statements (only for the last year – end quarterly IFR).

32. The financial statements will include all sources of funds. They should be prepared in Brazilian Reais and dollars (US$), in accordance with the accounting principles used in Brazil and with the IFAC accounting standards. The financial statements should include notes to the financial statements to disclose additional information.

33. The project's financial statements to be audited correspond to the last IFRs issued for a given calendar year.

34. All IFRs will be prepared in Brazilian Reais (R$) and dollars (US$), and expenditures figures will be stated by quarter and accumulated for the year and for the Project's life. IFRs will be submitted to the Bank up to 45 days after the closing of each quarter. Year-end IFRs could be used for external auditing purposes.

35. The Project Operational Manual contains the detailed procedures and guidelines for disbursements, payments, approvals, commitments and payments, accounting, IFRs and it will be prepared by the PMU.

5. Safeguard over Assets

36. Based on the project's design, it is expected that there will be investments in fixed assets. During implementation, all the assets will be property of the Project. Each implementing entity will be responsible for the management of its assets. All fixed assets to be acquired under the Project should be registered in each implementing entity's fixed assets inventory system and consolidated in the PMU's system, while the PMU will monitor all the project assets. The fixed asset management procedures will be based on national norms. These procedures will be documented in the Project OM and their implementation will be monitored by the project management team.

37. Subsidiary records of fixed assets and stocks should be kept up to date and reconciled with control accounts and periodic physical inventories.

6. External Audit

38. External audit will be performed by the Federal Internal Control Secretariat (*Secretaria Federal de Controle Interno* – SFC) of the Office of the Comptroller General (*Controladoria-Geral da União* – CGU), as part of their regular yearly audit of all Federal Projects.

39. For the purposes of the loan's external audit requirement, SFC will be responsible for auditing the project and delivering the audit report within six months after closing of the calendar year, which will include: a single opinion on the project's financial statements and the designated account, in addition to the Management Letter (report on internal controls and other important issues that may come to the auditor's attention during the audit). The annual audit will be carried out in accordance with the Terms of Reference accepted by the Bank. Additionally, the scope o f the SFC's audit report will include a full review of the fourth IFR (for each calendar year), and of the PMU's transactions in SIAFI and SIGMA. The auditors should have access to all supporting records and be able to make on-site examinations.

40. All records and documentation relating to the project should be maintained in the project files for at least a year after the submission of the audit report to the Bank or two years after the Closing Date whichever is later. The financial statements, as audited by an independent entity acceptable to the Bank, should be audited in accordance with international auditing standards, either International Standards on Auditing (ISA) issued by the International Federation of Accountants (IFAC)) or the International Standards of Supreme Audit Institutions (ISSAIs), level three or four, issued by INTOSAI, or generally accepted audit standards of Brazil that are consistent with international audit standards.

7. Financial Management Supervision during implementation

41. Financial management supervision will take place at least twice a year and will include, among others, the (i) review of the IFRs; (ii) review of the auditors' reports and follow-up of

issues raised by auditors in the management letter, as appropriate; (iii) follow up on any financial reporting and disbursement issues; (iv) responses to the project team's questions and (v) update of the financial management rating in the Implementation Status and Results Report (ISR).

B. Procurement Arrangements

1. General

42. Procurement for the proposed Project would be carried out in accordance with the World Bank's "Guidelines: Procurement of Goods, Works, and Non-consulting Services under IBRD Loans and IDA Credits by World Bank Borrowers" dated January 2011 and "Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits by World Bank Borrowers" dated January 2011, and the provisions stipulated in the Legal Agreement. The general description of various items under different expenditure category is described below. For each contract to be financed by the Loan, the different procurement methods or consultant selection methods, the need for prequalification, estimated costs, prior review requirements, and time frame are agreed upon between the Borrower and the Bank in the Procurement Plan. The Procurement Plan will be updated at least annually or as required to reflect the actual Project implementation needs and improvements in institutional capacity.

43. **Procurement of Works**: Works procured under this Project, would include: (i) infrastructure for experimental research, ultra high tension long distance transmission technology for the LongDist Project at CEPEL; (ii) complementary infrastructure for the ultra high tension laboratory (LabUAT) at CEPEL; and (iii) 138kV CEPEL's substation expansion. The procurement will be done using the Bank's Standard Bidding Documents (SBD) for all ICB and SBD agreed with (or satisfactory to) the Bank for NCBs. Small value works, costing less than US$200,000 equivalent, may be procured following Shopping procedures.

44. **Procurement of Goods**: Goods procured under this Project would include: phasor data concentrators, record management software, test transformers in cascading setup, corona cage fonts, yokes for High Surge Impedance Loading, phasor measure unit laboratory equipment, DC coupling capacitors, electrodes, IT equipment. The procurement will be done using Bank's SBD for all ICB and SBD agreed with (or satisfactory to) the Bank for NCBs. Direct contracting of HAEFELY replacement equipment for CEPEL is expected, as detailed further below. Small value goods, costing less than US$100,000 equivalent, may be procured following Shopping procedures.

45. **Procurement of non-consulting services**: Non-consulting services procured under this Project would include: transport and service sectors energy consumption survey, natural gas potential market assessment, abandoned and orphan mines cadastre, event planner, PMU certification re-testing. The procurement will be done using SBD agreed with (or satisfactory to) the Bank. Small value services, costing less than US$100,000 equivalent, may be procured following Shopping procedures.

46. **Selection of Consultants**: Consulting services procured from firms and individuals under this Project would include: smart-grid laboratory detailed engineering design preparation, climate change studies, selected industrial sector energy efficiency assessments, wind farm

project environmental assessment, environmental licensing monitoring system development, a sustainable regional development study for hydroelectric plant policy implementation, project social and environmental assessments, environment concept framework for South American energy integration, technical assistance for phasor data network project, a organization restructuring study, a greenhouse gas emission inventory, a photovoltaic energy feasibility study, agribusiness energy efficiency classification, preparation of a plant platform development methodology, a wind power technical and regulatory study, hydroelectric enterprises positive impact study. While most services would be procured following Quality and Cost Based Selection (QCBS) procedures, depending on the complexity and standardization, the services may also be procured following Least Cost Selection (LCS), Fixed Budget-based Selection (FBS), and Consultants' Qualification-based Selection (CQS) procedures. In exceptional cases, Single Source Selection (SSS) may be appropriate, if properly justified. Short lists of consultants for services estimated to cost less than US$500,000 equivalent per contract may be composed entirely of national consultants in accordance with the provisions of paragraph 2.7 of the Consultant Guidelines. Individual consultants would be selected in accordance to the procedures described in section 5 of the guidelines.

2. Assessment of the agency's capacity to implement procurement

47. Procurement activities will be carried out by seven Participating Entities: (i) the PMU at the Secretaria Executiva do Ministerio de Minas e Energia (Mines and Energy Ministry's Executive Secretariat), (ii) National Center for Research in Electricity (CEPEL), (iii) National Operator of the Transmission System (ONS), (iv) Company for Mineral Resources Research and Geological Survey (CPRM), (v) National Department of Mineral Production (DNPM), (vi) National Electricity Regulatory Agency (ANEEL), and (vii) Energy Research Company (EPE). An assessment of the capacity of the Participating Entities to implement procurement actions for the Project was carried out by Luciano Wuerzius on May 26, 2011 and October 20-27, 2011. The assessment reviewed the organizational structures for implementing the Project and verified that the initial procurement packages will be ready very early on during project implementation, which is considered positive. For risk factors, it identified (i) that the PMU's procurement function is currently understaffed and (ii) except for the PMU, the other six Participating Entities are not familiar with the Bank's Guidelines. For ONS, it was additionally identified that it does not have a dedicated procurement team and that it does not have a procurement decision complaint review system in place.

48. To mitigate those risks, the action plan recommends that (i) the PMU should acquire additional procurement expertise through hiring consultants or staff, making sure there is a training program in place, and (ii) training should be delivered to procurement and technical teams from all co-executing units to ensure consistency and quality of technical specifications/TOR and procurement processes. For ONS, it should nominate a permanent procurement team to do all procurement required for the project and to establish a system to review and manage procurement complaints. The Bank will contribute to the program by offering procurement training to the PMU and co-executing units' staff. The residual Project risk for procurement is Moderate.

3. Procurement Plan

49. The Borrower developed a Procurement Plan for Project implementation which provides the basis for the procurement methods. This plan has been agreed upon with the Borrower and the Bank on September 2, 2011 and is available at the Secretaria Executiva do Ministerio de Minas e Energia (Mines and Energy Ministry's Executive Secretariat) in Brasilia. It will also be available in the Project's database and in the Bank's external website. The Procurement Plan will be updated in agreement with the Bank annually or as required to reflect the actual Project implementation needs and improvements in institutional capacity.

4. Frequency of Procurement Supervision

50. In addition to the prior review supervision to be carried out from Bank offices, the capacity assessment of the PMU has recommended one supervision mission every 18 months to visit the field to carry out post review of procurement actions.

51. The recommended prior review thresholds are:

Goods and services	US$1 million;
Works	US$10 million;
Consulting services	US$0.5 million.

5. Details of the procurement packages involving ICB, Direct Contracting, and international short lists.

Goods, Works and Non-consulting services:
(a) List of contract packages which will be procured following ICB and Direct Contracting:

Contract (Description)	Estimated Cost	Procurement Method	P-Q	Domestic Preference (yes/no)	Review by Bank (Prior / Post)	Expected Bid-Opening Date
Test transformers for 1200kV cascading	4,114,285.72	ICB	No	No	Prior	Jun 2012
Projeto LongDist – corona Cage font – HAEFELY	1,428,571.43	DC		No	Prior	Feb 2012
Coupling Capacitor DC – HAEFELY	857,142.86	DC		No	Prior	Feb 2012
Projeto LongDist - Electrodes HAEFELY - CA e CC	3,314,285.72	DC		No	Prior	Feb 2012
PMU certification re-testing	400,000.00	DC		No	Prior	Feb 2012

(b) ICB goods and non-consulting service contracts, estimated to cost above US$1 million, and ICB works contracts, estimated to cost above US$10 million, per contract, and all Direct Contracting will be subject to prior review by the Bank.

Consulting Services:
(a) List of consulting assignments with short-lists of international firms.

Description of Assignment	Estimated Cost	Selection Method	Review by Bank (Prior / Post)	Expected Proposals Submission Date
Desenvolvimento de ações visando à Cooperação Sul/Sul	1,000,000.00	QCBS	Prior	Jun-12
Contratação de consultoria para elaboração de projeto executivo para o laboratório smart-grid – CEPEL	914,285.72	QCBS	Prior	Jun-12
Consultoria em mudanças climáticas - CEPEL	571,428.57	SSS	Prior	Jun-12
Consultoria de análise da eficiência energética em segmentos industriais selecionados - EPE	857,142.86	QCBS	Prior	Jun-12
Potencial brasileiro de PCH'S - EPE	685,714.29	QCBS	Prior	Jun-12
Revisão Organizacional e Reestruturação da Secretaria de Geologia, Mineração e Transformação Mineral - SGM	1,150,000.00	QCBS	Prior	Jun-12
Estruturação técnica para elaboração anual de inventário de emissões de gases de efeito estufa do setor energético - SPE/DDE	755,725.21	QCBS	Prior	Jun-12
Metodologia para desenvolvimento das Usinas Plataformas em áreas de relevante sensibilidade ambiental - SPE/DPE	571,428.57	QCBS	Prior	Jun-12

(b) Consultancy services estimated to cost above US$0.5 million per contract and Single Source Selection of consultants (firms) for assignments estimated to cost above US$100,000 will be subject to prior review by the Bank.

(c) Short lists of consultants for services estimated to cost less than US$500,000 equivalent per contract, may be composed entirely of national consultants in accordance with the provisions of paragraph 2.7 of the Consultant Guidelines.

C. Environmental and Social (including safeguards)

52. The Project has nationwide relevance addressing energy and mineral resources regulatory and planning activities, with activities such as the preparation of guidelines to conduct a national GHG inventory, studies related to national energy policy, electricity regulation studies, and technology development through the acquisition of equipments for the mineral and electricity research centers, located in Rio de Janeiro urban areas. Given such, a comprehensive social and environmental assessment was conducted by the Bank.

53. The Borrower's institutional capacity for safeguard policies is considered adequate. Within the MME, there is an Environmental Sustainability Study Center (NESA) responsible for articulating and promoting socio-environmental sustainability in all activities developed by the Ministry and its subordinated agencies. NESA is also responsible for monitoring the implementation of the environmental guidelines defined by the Power Sector Committee, and environment-related activities of all programs and policies under the Ministry jurisdiction.

54. ELETROBRAS and its research division, CEPEL, also have adequate capability to implement the Project safeguards requirements. CEPEL has a comprehensive and suitable environmental management plan, and follows the ELETROBRAS Sustainability Policy.

55. The META Project is expected to have positive environmental impacts, and no major negative impacts. For this reason, the Project has been rated category "B" and safeguard policies have been triggered for Environmental Assessment (OP/BP 4.01). The approach to identifying and managing environmental and social impacts and risks under the Project will be twofold. The Environmental Assessment Safeguard is mandatory to all sub-projects that may potentially have an environmental or social impact. The other safeguards are triggered on a precautionary basis: The Natural Habitats (OP/BP 4.04), Forest (OP/BP 4.36) and Physical Cultural Resources (OP/BP 4.11).

56. The environmental management plan carried out by the Borrower assesses all sub-projects potential environmental and/or social impacts. It has sub-projects screening and eligibility criteria to make sure that no sub-projects with high potential impacts can be eligible.

57. The sub-projects can be separated, according to the potential social and environmental impacts, into five different types: (i) Institutional strengthening measures, with no direct or indirect environmental implications; (ii) Investments in research centers (activities that do not cause adverse environmental impacts); (iii) Interventions with small magnitude impacts. Sub-projects related research centers (Eletrobras - CEPEL); (iv) Conceptual studies without indirect environmental implications, and (v) Conceptual studies that may have indirect environmental implications. The ESMF defines mitigation, supervision, monitoring and evaluation procedures applicable to all types of sub-projects described above, to ensure the effective and timely implementation of environmental and social safeguards during the Project implementation. Two types of sub-projects deserve additional directions, interventions with small magnitude impacts and conceptual studies that may have indirect environmental implications.

58. Of the activities, only the proposed investments at the ELETROBRAS Research Center CEPEL, Adrianópolis Unit may cause minor environmental impacts and require demand site specific environmental assessment. The CEPEL Unit is located in the Nova Iguaçu County, Rio de Janeiro Metropolitan Region. It is located in the upstream portion of the Nova Iguaçu River, NW portion of the Baixada (lowlands) area, approximately 45 km from the Rio de Janeiro downtown area. The Unit is placed in a low-density, largely agricultural area, at the foot slope of the "Serra do Mar" mountains. Natural vegetation (Atlantic Forest) remains in the steep terrains, but the original vegetation in most flat areas has already been removed to form plantations and pastures. No significant impact on natural habitats is foreseen.

59. The CEPEL facilities were visited by the Bank during the Project identification phase to evaluate the proposed activities potential impacts. The Bank concluded that the CEPEL sub-project potential impacts are site-specific and can be adequately mitigated. The Borrower prepared a specific Environmental Management Plan (EMP) for the CEPEL Laboratory interventions, including the sub- project characterization, legal framework, impacts assessment,

management plan (mitigation plan, monitoring plan, implementation measures and institutional arrangement), and a brief construction manual for the new facilities construction.

60. The conceptual studies that may have indirect environmental implications are also the subject of specific analysis and implementation criteria. The ESMF includes screening procedures for sub-project eligibility and a social and environmental conceptual framework to be observed by all sub-projects, including the conceptual studies related to hydropower.

61. Additionally, the Borrower includes clear mechanisms for integration of the social and environmental dimensions into the conceptual studies with potential environmental implications. These studies will include social and environmental assessment sections, with appropriate impact assessment methodologies and instruments to evaluate eventual policy proposals outcomes environmental implications. These studies will be also object of broad participatory process with stakeholders.

62. The Project does not include conversion or degradation of critical natural habitats, and no significant impact on natural habitats is foreseen. However, the Project includes energy and mining related conceptual studies that may have implications on natural habitats nationwide.

63. The Natural Habitats Safeguards is triggered on a precautionary basis, and must be applied if impacts on natural habitats are identified, or anticipated, during Project preparation, or arise during the Project implementation. The ESMF environmental aspects conceptual framework addresses the Natural Habitats Safeguard requirements to be considered in all conceptual studies that may have indirect environmental implications, such as the conceptual studies related to hydroelectricity.

64. The Project does not include forest restoration, neither plantation development. However, the planned conceptual studies, and eventual policy guidelines, may have consequences on health and quality of forests, or may generate changes in the management, protection, or utilization of natural forests or plantations. Some sub-projects, such as the country wood and charcoal demand, and conceptual studies related to hydroelectricity , among others, may have indirect implications on natural forests.

65. Due that, the Forest Safeguard is triggered, also, on a precautionary basis, and must be applied if impacts on natural forests and plantations are identified, or anticipated, during Project preparation, or arise during the Project implementation. Analogous to Natural Habitats, the ESMF environmental aspects conceptual framework addresses the Forest Safeguard requirements to be considered in all conceptual studies that may have indirect environmental implications, such as the conceptual studies related to hydroelectricity.

66. The META Project does not involve excavations, earth movement, flooding or other major environmental changes. It is not expected that Project implementation would have any negative impact on physical cultural resources. However, the planned conceptual studies and derived policy guidelines may have implication on physical cultural resources. Brazil has a well-developed legislative and normative framework for protection of historical and archeological sites. The Physical Cultural Resources safeguard is triggered on a precautions base, and its

principles must be incorporated into the environmental screening section of the environmental management plan.

67. The Physical Cultural Resources Safeguard requirements should be considered, in all conceptual studies that may have indirect environmental implications, such as the mining and energy related studies.

68. The Project focuses mostly on regulatory and institutional reforms of the mining and power sectors and no direct negative social impacts for Indigenous Peoples and other traditional and vulnerable communities are anticipated. On the contrary, the overall expectation is that the Project will contribute to overcoming key deficiencies of the Brazilian legal, political and institutional regulatory frameworks related with the mining and power sectors, and promote communication between different stakeholders –representatives of the mineral/power sector and representatives of traditional and vulnerable populations.

69. In the social development area, social assessments on the expansion of the mining and power sectors (hydroelectric dams and transmission lines) in Brazil, and their interaction with vulnerable and traditional communities, have often identified a number of potential negative social, cultural and economic impacts upon traditional communities. These social assessments have emphasized that potential conflicts can arise in these areas particularly when regulatory frameworks are not fully defined. These impacts include illegal land grabbing and land conflicts that make the regularization of land rights of vulnerable communities more difficult; poor working conditions, income concentration and the emergence of poverty pockets; involuntary resettlement, influx migration in previously pristine areas and the emergence of urban and sanitation problems. This picture is particularly emphasized with regard to the Brazilian Amazon, in which the expansion of the mining and power sectors is taking place.

70. Activities to be supported by the Project will be screened to avoid activities with direct impacts on traditional communities and no direct social impact for Indigenous Peoples are anticipated. Additionally, the proposed Project does not require land acquisition and will not cause physical resettlement or economic displacement.

71. The client has prepared a Environmental and Social Management Framework (ESMF) that sets clear criteria through which activities to be supported by the Project will be screened to avoid activities which (a) may have direct impacts on traditional communities, (b) may require land acquisition, and (c) my cause involuntary resettlement issues. Compliance with these principles will be monitored by the executors, the client, and the Bank throughout Project's implementation. The ESMF and the CEPEL's EMP were formally submitted to the Bank, publicly disseminated and consulted on-line prior to Project appraisal. Project appraisal took place only following the release in-country and the filing in the Bank's Infoshop of acceptable ESMF and EMP and the filing of the ISDS.

D. Monitoring & Evaluation

72. The PMU will be responsible for implementing and executing all M&E activities, providing annual reports on the PDO level and intermediate results indicators. The indicators

will be collected, distilled and agreed upon with the Participating Entities, before being submitted to the Bank. They should also be used as an instrument of Project performance to be examined by the high-level steering community (PSC). No major difficulties are envisioned in collecting and processing this information. The PMU has gained significant experience working with the Bank. Furthermore, the Participating Entities are well established, competent organizations in the energy and mining sectors. Those organizations are capable of specifying new pieces of equipment and technology, as well as attesting to when the equipment is installed and meets desired specifications. The incremental cost of M&E for META should be relatively modest. The data collection for the PDO level and intermediate results indicators can be carried out by the PMU, with support from Participating Entities.

Annex 4 Operational Risk Assessment Framework (ORAF)

Appraisal and Post Appraisal Package Version[5]

Project Development Objective(s)

The Project Development Objective is "*to strengthen the capacity of key public sector institutions to improve the contribution of energy and mining resources to accelerated national economic growth and increased social and environmental sustainability in a context of globalization and technological change".*

PDO Level Results Indicators:	1. The capacity of key government institutions in charge of supporting the development of both the energy and the mineral sectors has been strengthened
	2. Sectoral Applied R&D laboratories for providing emerging and state of the art technologies to the energy and mining sectors have been enhanced

Risk Category	Risk Rating	Risk Description	Proposed Mitigation Measure
1. Project Stakeholder Risks			
1.1 Stakeholder	Low	The project will rely on the active participation of many Participating Entities. As a consequence, there is a risk that one or several of these entities is not able to contribute as expected, thus delaying or preventing certain activities to be implemented	1. Creation of a High level Project Steering Committee, consisting of high-level representatives of all entities involved in the Project implementation to early detect and address issues 2. Specific subsidiary agreements will be celebrated between Participating Entities and the MME; a copy of these agreements will be provided to the Bank.
3. Implementing Agency Risks (including FM & PR Risks)			
		Delays in implementation triggered by accumulation of bureaucratic steps if every procurement process is subject to pre-review.	Set post-review thresholds at high level.
		Delays in implementation triggered by lack of adequate human resource allocation in other entities involved in	Formal creation of a high level steering committee to address issues related to lack of proper means and

[5] This is the version that should be used for Appraisal stage for Track 2 as well as for seeking clearance by management for Track 1 to move forward with negotiations.

Risk Category	Risk Rating	Risk Description	Proposed Mitigation Measure
		the Project execution (Participating Entities)	coordination
3.1 Capacity	Substantial	1. Adequate staffing of the procurement function in the PMU and consistency in preparation of technical specifications/TORs and consistency in carrying out procurement processes. ONS lacks a permanent procurement team and a procurement decision review system. 2. Changes in composition of the management unit, with bureaucratic delays in assigning adequate human resources to fill empty positions 3. Delays in implementation triggered by lack of adequate human resource allocation in other entities involved in the Project execution (Participating Entities)	1. To acquire additional procurement expertise through hiring consultants or staff, and making sure there is a training program for all Participating Entities' procurement and technical staff. To set up a monitoring and quality control protocol and install advice capacity in the PMU to oversee the procurement by the other Participating Entities. ONS should nominate a permanent procurement team to do all procurement required for the project and to establish a system to review and manage procurement complaints. 2 and 3. Formalization ex-ante of the creation of the management unit within a strong secretary (Secretaria Executiva do MME); Formal creation of a high level steering committee to address issues related to lack of proper means and coordination 3. Formal appointment of co-executing units in every entity participating to the execution of the Project (Participating Entities)
	Low	Changes in composition of the management unit, with bureaucratic delays in assigning adequate human resources to fill empty positions.	The PMU has to be formally established and adequately staffed by a Regulation (*Portaria)* of the Minister of Mines and Energy. Formal creation of a high level steering committee to address issues related to lack of proper means and coordination.
3.2 Governance	Low	Lack of budgetary allocation to transfer IBRD resources to the Project (contigenciamento)	
		Delays in assigning adequate human resources to fill empty positions in management unit	Formal creation of properly staffed PMU within the Executive Secretariat of MME, committed in the Carta Consulta, ensuring leadership and access to adequate decision making power, in particular regarding allocation of adequate and timely human resources; Formal creation of a high level steering committee to address issues related to lack of proper means.
4. Project Risks			
4.1 Design	Low	1. Lack of timely human resources or bureaucratic burden reducing speed of implementation 2. Lack of coordination between the different Participating Entities 3. Lack of human resources allocated in the Participating Entities to manage the activities they	1. Formalized appointment of a strongly staffed PMU located directly in the Executive Secretary of the MME 2. Creation of a High level Project Steering Committee, consisting of representatives of all entities involved in the Project implementation to early detect and address issues 3. Formalized appointment of specific supervision units in

Risk Category	Risk Rating	Risk Description	Proposed Mitigation Measure
		requested 4. Data bases of energy and mining are created, baseline data collected, such as for the mineral sector, is created but not fully used to provide inputs for the sector action plan 5. New studies and methodologies, such as demand response, are delivered but never implemented, even in the case that there it is shown that there are mechanisms for demand response to price in the Trading Rules.. Implementation delays of demand response mechanisms due to needed adjustments in the Accounting and Settlement system of CCEE 6. Since these are state-of-the art technologies there is the risk that the technologies to be produced will have inadequate technical specifications for procurement that the supplier will be unable to produce them.	the MME secretaries and Participating Entities originating the demands for TA activities 4. This is a priority for the Government – the Government has adopted a plan for the mineral sector 5. ANEEL can determine the priority of the implementation of mechanisms in the Trading Rules of CCEE. In addition, the new SCL (beginning in 2012) will allow for more flexibility in modifying and improving CCEE's processes. 6. The sum of experience of CEPEL and the producer will help reduce the risk. From the early stages, CEPEL researchers will interact with the supplier so as to produce specifications that meet CEPEL's needs and are compatible with the technical capacity of the suppliers, and each piece of equipment produced will be tested and shipped only after it is determined to meet all the agreed upon specifications.
4.2 Social & Environmental	Low	The environmental management plan implementation could be deficient, compromising the proposed mitigation measures effectiveness.	The Project has a comprehensive environmental assessment, including sub-projects eligibility criteria, social and environmental guidelines for conceptual studies that may have indirect social and environmental effects, and environmental management plan for the sub-projects that may cause environmental impacts. The EA was prepared to ensure the effective and timely implementation of environmental and social safeguards during the Project development.
4.3 Program & Donor	Low		
4.4 Delivery Quality	Low	Delays in the process of preparation of TOR, specifications, Requests for Proposals and other key processes Some leading edge technologies and labs are not	A new, stronger PMU is in place and contrary to ESTAL, most of the TORs and specs have already been prepared jointly with the beneficiaries, therefore expediting the implementation process 1) Labs will be specified in conjunction with leading

Risk Category	Risk Rating	Risk Description	Proposed Mitigation Measure
		properly utilized or do not provide tangible results in the field. For example, (i) changes in the Newvave system are not incorporated by ONS to dispatch the system or (ii) phasor measurement system does not scale up (iii) lab for very high voltage is equipped to design lines to transport large blocks of energy, but those are not used in real applications	organizations in the world, with expertise and experience in the new technologies and equipments 2) Sector R&D institutions are competent organizations, which are familiar with the new technologies to be developed. Technical capacity of those organization will be further enhanced 3) End-user and sector R&D will work hand in hand in to steadfast move R&D to direct applications, such as the case between CEPEL and ONS to develop a suite of models to dispatch the power system and to implement smart grid 4) To facilitate utilization in the field CEPEL will develop a marketing strategy to present the work being developed among existing and potential transmission concessionaires.

Overall Risk Risk Rating at Preparation	Overall Risk Rating during Implementation	Comments
Low	Low	

Annex 5: Implementation Support Plan

Strategy and approach for Implementation Support

1. The strategy for Project Implementation Support (IS) by the Bank reflects the nature of the Project and its risk profile. The strategy aims at making IS to the client more efficient while remaining focused on implementation of the risk mitigation measures delineated in the ORAF assessment. The risks are related to technical specifications, procurements, safeguards, financial management, and overall project management.

2. The main focus of implementation support is summarized below.

- **Technical support.** Technical inputs to the Participating Entities and PMU will be required to review the TORs and bidding documents to ensure adequate technical specifications, proper assessments of the bids, and commercial aspects.

- **Procurement.** Implementation support will include: (a) providing training to members of the PMU and co-executing units; (b) reviewing procurement documents and providing timely feedback; and (c) providing detailed guidance on the Bank's Procurement Guidelines to the Procurement Committee; and (d) monitoring procurement progress against the detailed Procurement Plan. The procurement specialist is based in-country, facilitating project oversight.

- **Safeguards.** The Bank will closely supervise the Environmental Management Plans and will provide timely guidance on deviations from the planned investments, activities, or agreements. Both the environmental and social specialists will be based in-country, aiding in project oversight.

- **Financial management.** Support will include the provision of training to the concerned financial management staff in the PMU and the Participating Entities, and reviewing the project financial management system (on a semi-annual basis), including accounting, reporting, and internal controls. The financial specialist is based in-country, facilitating project oversight.

- **Overall project management.** The TTL, energy and mining specialists will provide regular supervision of all operational aspects, as well as coordination with the client and among Bank team members. Task team leadership will be managed from the Bank's Headquarters.

3. Formal supervision and field visits will be carried out semi-annually or as needed for satisfactory Project implementation.

Time	Focus	Skills Needed	Resource Estimate	Partner Role
First 12 months (SWs/year)	Procurement training (two sessions) Technical and procurement review of the bidding documents	Procurement specialist Technical specialist Procurement specialist	2 SWs 6 SWs 4 SWs	NA
	FM training and supervision	FM specialists	4 SWs	
	Social Safeguards – Supervision and Training	Social specialist	4 SWs	
	Environmental Safeguards - Supervision and Training	Environmental specialist	2 SWs	
	Project Management and Project supervision coordination Communication/Information	Task Team Leader Communication specialist	8 SWs 4 SWs	
Months 13-48 (SWs/year)	Environment and social monitoring & reporting	Environmental specialist Social specialist	4 SWs 4 SWs	NA
	Financial management disbursement and reporting	FM specialist Operations officer	4 SWs 10 SWs	
	Task Leadership	TTL	6 SWs	

Note: SW – Staff-Week

4. Staff skill mix required is summarized below.

Skills Needed	Number of Staff Weeks	Number of Trips	Comments
Environment specialist	2 SWs annually	Field trips as required.	Country office-based
Social specialist	2 SWs annually	Field trips as required.	Country office-based
Procurement	3 SWs annually	Field trips as required.	Country office-based
Mining specialist	4 SWs annually	Field trips as required.	
Energy specialist	4 SWs annually	Field trips as required.	
Financial management specialist	2 SWs annually	Field trips as required.	Country office-based
Task Team Leader	8 SWs annually	Minimum two field trips	

Annex 6: Team Composition

World Bank staff and consultants who worked on the Project:

Name	Title	Unit
Alberto Costa	*Sr. Social Specialist*	*LCSSO*
Alfredo Idiarte	*ST Consultant*	*LCSEG*
Augusto Jucá	*ET Consultant*	*LCSEG*
Augusto Mendonça	*Sr. Environmental Specialist*	*LCSEN*
Catarina Portelo	*Senior Counsel*	*LEGLA*
Christophe de Gouvello	*Sr. Energy Specialist, TTL*	*LCSEG*
Fernanda Pacheco	*Program Assistant*	*LCSEG*
Jessica Poppele	*Program Leader South-South Knowledge Exchange*	*WBIKE- World Bank Institute*
João Vicente	*Financial Management Specialist*	*LCSFM*
Luciano Wuerzius	*Procurement Specialist*	*LCSPT*
Luiz Maurer	*Sr. Energy Specialist*	*AFTEG*
Megan Hansen	*Junior Professional Associate*	*LCSEG*
Miguel Navarro-Martins	*Lead Finance Officer*	*BDM*
Miguel Santiago	Senior Finance Officer	CTRFC
Paulo de Sa	*Sector Manager*	*SEGOM*
Susana Carrillo	*Senior Specialist Capacity Development and Partnerships Unit*	*AFRCP*