1. Key development issues and rationale for Bank involvement

1.1 Energy Sector at Cross-Roads: The year 2007 marks an important point in the development of Benin's energy sector with the arrival of the interconnection of the electric grids of Nigeria and Benin in February 2007 as first step towards the West African Power Pool (WAPP), and the West African Gas Pipeline (WAGP) in November 2007. These developments lead to the need to redefine the place that energy will play in Benin's future. It provides for both the need and the opportunity to rethink Benin's energy sector planning, especially in the context of power generation. Questions such as "what opportunities do WAPP and WAGP provide for Benin?", "can overall costs be reduced across the region?", and "should regional or domestic resources be used?" need to be answered. Moreover, the arrival of gas necessitates the development of a framework for Benin's gas market. Finally, the possibility to generate more power requires demand-side planning with a focus on rendering energy services financially sustainable.

1.2 Benin's Energy Sector: Like for most countries in Sub-Saharan Africa, Benin's energy sector is dominated by the use of biomass-based energy sources. The use of electricity is limited to 1.8 million people equivalent to 22% of the population, and less than 2% for rural areas. In the industrial sector, the use of electricity is limited to few industries (agricultural foodstuffs, cotton, textiles, pharmaceuticals, and cement). In early 2007, industrial consumption remains well below 5% of the total demand for electricity. Limited access to electricity inter alia contributes to
Benin’s steadily increasing trade deficit.\(^1\) Energy policy and regulation are conducted through the Ministry of Mines, Energy and Hydropower. The Communauté Electrique du Bénin (CEB) is the generation and transmission company of both Togo and Benin, with headquarters in Togo.\(^2\) CEB is responsible for planning and procurement of generation and transmission resources needed to meet Benin’s demand, including through IPPs. La Société Béninoise d’Energie Electrique (SBEE) is the electricity distribution company for Benin. Benin is highly dependent on electricity imports (84% of total consumption in 2005).\(^3\)

1.3 Gas for Benin: Benin is one of the shareholders of the WAGP, which is scheduled to make Nigerian gas available to Benin from November 2007. The WAGP is estimated to reduce fuel costs for existing power generating facilities in Ghana, Togo and Benin by between 30 - 60% while providing opportunities to diversifying energy supply. A take-or-pay contract\(^4\) exists valid from 1 January 2008, with CEB committed to 5,200 MMBTU off-take per day for each of its 25 MW gas turbines. Use by other parties in Benin needs to be contracted separately. Commercial and industrial demand has been estimated to remain zero until 2012. From 2013 commercial and industrial demand would be 14,900 MMBTU/day, and would increase to 21,900 MMBTU/day by 2025.\(^5\) A comprehensive set of rules and regulations with respect to the WAGP has been adopted. However, no rules and regulations are in place at the level of Benin. Nevertheless, one company (Bengaz), which is also a shareholder of the WAGP, is attempting to develop the secondary gas market in Benin and has proposed a secondary service gas pipeline for Cotonou.

1.4 The Challenge Ahead in the Power Sector: Looking forward, the challenge will be to improve the supply characteristics and efficiency of the power sector, to reduce energy dependence and increase the reach of energy services. These accomplishments will enable the country to (i) serve existing customers better, (ii) ensure financial viability, and (iii) generate the opportunity and means to bring more power to more people. The proposed Technical Assistance Loan is aimed at strategically complementing a large investment program, to be financed by Government and donor development partners, which over the next 5 years aims at upgrading generation, transmission and distribution infrastructure, and to expand access to modern energy services, especially to the rural population. In order to achieve these goals, policymakers have to

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1 This follows, because rather than producing goods in country is cheaper to import them. The trade deficit for 2006 is projected to be at 10.2% of GDP.
2 The Government of Benin jointly holds ownership of CEB with the Government of Togo.
3 The main source of imported electricity is from Ghana with annual imports of 296 GWh in 2005, corresponding to 47% of Benin’s supply. Other imports came from Côte d’Ivoire with 193 GWh in 2005 or 30% of Benin’s supply, and Togo with 46 GWh or 7% of Benin’s supply. Only 16% were produced domestically through diesel-fired power plant operated or leased by SBEE and a 25 MW gas turbine that is operated and owned by CEB. Until the arrival of the WAGP, this turbine will continue to run on jet kerosene (JET A1). An additional agreement for the supply of electricity has been signed with Nigeria for 100 MW. The interconnection of the Benin-Nigerian grid was inaugurated on 13 February 2007. In Togo, domestic supply relies on the 66 MW Nangbeto hydroelectric power plant, and a 25 MW gas turbine, also run on jet kerosene (JET A1). Both are operated by CEB.
4 In order to “reserve” a certain amount of capacity, CEB (Benin’s main off-taker) is subject to a take or pay contract clause, as this is customary in this type of contracts. This means that the CEB has to pay for the reserved capacity, whether it is able to use it or not.
create the right conditions to execute these investments efficiently, and to ensure economic operation of assets to achieve sustained financial viability in all segments of the energy sector, and to realize socio-economic development goals.

1.5 Sector Issues: The major challenges before policymakers in Benin’s energy sector are in the areas of (i) shortage of generation capacity to meet increasing electricity demand; (ii) high operating costs and the poor quality of service, especially in the northern region; (iii) energy security; (iv) the low level of electricity penetration in urban and rural areas; (v) the high reliance of households and SMEs on traditional biomass fuels and the high rate of annual deforestation. Underlying these challenges have been weak sector governance and weak institutions. The proposed project inscribes itself in developing a transparent institutional framework in which responsibilities are clearly assigned, and a regulatory framework is in place that provides all actors with the right incentives to

- **Increasing generating capacity:** Availability of gas from Nigeria will allow for construction of gas-fired power plants in Benin, which in turn will alleviate generation shortages. However, the right framework is needed for the availability of gas to translate into the construction and operation of cost effective power plants within a reasonable timeframe.

- **Increasing sector efficiency:** With existing "take or pay" capacity costs for private power purchases and similar payments required for WAGP from 2007, there is a compelling urgency to improve the technical, commercial and financial efficiencies of the sector. Robust and transparent initiatives need to be taken, accompanied by measurable performance indicators and clear accountabilities to deliver higher efficiencies.

- **Enhancing energy security:** As illustrated above, Benin is highly dependent on its neighboring countries for electricity and fuel supplies. This has inherent risks, as was illustrated by the severe 1998 crisis, which was due to low Lake Volta (Ghana) levels. Benin needs a strategy for the sector that can respond to questions such as "what level of energy dependence is acceptable?"

- **Commercialization:** To enable a more transparent and efficient power market, it is important to reflect the regional dimensions of power trading within the country. CEB and SBEE should execute commercial contracts to ensure transparency in the overall costs and to clearly identify rights and obligations of each entity. This measure would compel investment decisions to be diligent and enable the regulator to pass-through “real” costs to consumers.

- **Expanding energy access:** Expanding access requires a stringent institutional framework with clear responsibilities assigned to each entity. While in 2004 Benin's rural electrification agency (ABERME) was established to implement the Government's rural electrification strategy, the agency still needs to be fully operationalized in order to fulfill its mission. This includes a clarification of the agency's mandate, project implementation and management procedures, and the setting up of the rural electrification fund, that has been adopted in October 2005. Identification and prioritization of rural electrification projects on the basis of financial recoverability is equally important.
1.6 **Government strategy to address key issues.** The elections in March 2006 brought about a change in Government through the election of the former Director of the West African Development Bank, Mr. Yayi Boni. The new government seeks to strengthen the sector’s governance and to redress the financial viability of the sector as a matter of urgency. First results are already felt at both CEB and SBEE. While the immediate strategy has focused on the changing of personnel, strategic changes have also taken place. For example, recognizing that SBEE is in early 2007 unable to attract the private sector, the Government has defined an interim period for redressing the company’s situation. Overall the Government follows a pragmatic approach to solving problems in the energy sector with an emphasis on transparency and financial viability. A wider strategy for the sector is currently actively being sought by Government. This provides a window of opportunity for the World Bank to engage in Benin’s energy sector.

1.7 **CAS and PRSP links:** The development of the project is closely linked with and in close support of the principles of the new Country Assistance Strategy (CAS). The new CAS supports the implementation of the Government’s Poverty Reduction Support Paper (PRSP) by utilizing a mix of budget support and investment lending. The PRSP is being prepared in parallel with Board date for June 2007. The new PRSP emphasizes the need for energy sector development in order to create a good environment for private sector investment and growth, which in turn leads to poverty alleviation. In the context of the energy sector it highlights (i) the need for the creation of an adequate institutional, legal, and regulatory framework for the sector; (ii) a consolidated framework strategy (Masterplan) and inscribed investment activities; (iii) the cost efficient use of energy resources; (iv) the diversification of energy resources, including gas; (v) the valorization of domestic energy resources; (vi) the improvement of the tariffs system; and (vi) the reduction of the time required to connect households to the electric grid. The proposed project particularly inscribes itself in (i), (ii), and (iv). The remaining issues will be taken up by the ongoing Energy Services Development project (ESDP), which is scheduled for restructuring, and by the second phase of the ESDP credit. The proposed project is also in support of the ongoing Poverty Reduction Support Credit (PRSC) III, and the PRSC IV, which will go to the Board in June 2007.

1.8 **Activities of other partners:** Few actors are active in Benin’s energy sector. The German Gesellschafter fuer Technische Zusammenarbeit (GTZ) is supporting rural electrification through an SBEE-based program of grid extensions. The Islamic Development and the African Development Bank are active in providing assistance for transmission, distribution and grid extension in the northern part of Benin. The proposed project is being fully coordinated with the donors in Benin’s energy sector.

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6 The CAS dated 07/16/2003 (document number 26054-BEN) has expired.
7 Limitations imposed by the energy sector on private industry are illustrated by the fact that it takes about 104 days for a company in Benin to receive a grid connection, compared to 12 days in Senegal, 32 days in Mali, and 18 days in China. Unplanned power outages lead to production losses of about 7.4% in Benin compared with 2.6% in Mali and 1.8% in China. Customers in Benin suffer on average 44 days of power outages compared to 14 days in Mali.
8 The last Masterplan dates back to 2003, but only captures the electricity supply. In 2003, the development of the WAGP and WAPP were not foreseen. Thus an update is required [SOGREAH (2003). Etude de l’Approvisionnement de la CEB en Electricité. August].
1.9 **Rationale for Bank involvement.** A long history of partnership in the energy sector places the Bank in a unique position to continue to assist Benin at this important juncture of the country’s energy sector development. While the existing ESDP project and the recent WAPP APL 1, Phase 2 project are strategically complementing investment financing, in this project the Bank is assisting the sector through knowledge transfer and technical assistance. The proposed project is guided by findings from completed and ongoing analytical work on gas market development and energy policy issues. The Bank’s involvement with ECOWAS countries to expand regional energy and gas trade provides an additional dimension to its partnership with Benin.

2. **Proposed objective(s)**

2.1 The project's objectives are (i) to develop a feasible and sustainable strategic framework for the development of Benin's energy sector and (ii) to create the institutional capacity to fully realize this new framework, against the background of the energy sector's new opportunities for increased and efficient power generation and access to this power.

3. **Preliminary description**

3.1 The project as envisaged has four major components that target the development of an overarching energy sector strategy and the required institutional capacity to implement it. The project overall financing envelope is US$8 million.

**Component 1:** *Electricity Sector Development* (US$2-3 million)

The component will assist in (i) developing a comprehensive strategy and plan for the electricity sector;\(^9\) (ii) providing technical assistance for the development of concrete generation additions as identified under the strategy, including for independent power producers (IPPs); and (iii) institutional development to ensure the efficient planning, procurement and implementation of additional power plant. Under this component, at least one identified generation option will be prepared further.

**Component 2:** *Gas Sector Development* (US$1-2 million)

The component aims at the development of an overarching gas market framework (GMF), which assigns clear responsibilities to all market actors. The GMF will include the formulation of social, environmental and safety monitoring and audit mechanisms. It will focus on gas use for electricity and industrial processes.\(^10\) The purpose of this framework is to clarify responsibilities among those actors already present in Benin's emerging gas market, and to establish sufficient confidence for future (private) actors to enter into the market. Information dissemination and stakeholder and public participation are at the core of this component.

**Component 3:** *Sustainable Energy Services* (US$ 3 million).

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\(^9\) This plan will be based both on the traditional least costing methodologies and portfolio management approaches, which are capable of integrating energy security concerns. All possible generation option will be assessed, including gas-fired power and hydroelectric power (Adjarala).

\(^10\) The gas delivered by the WAGP does not have a sufficiently high share of butane for it to be used for the bottling of gas for cooking.
This component will focus on rendering energy services to consumers more sustainable by focusing on (i) improved financial autonomy and performance of key sector institutions; and (ii) development of a cost-based framework for access to energy services. Based on the elements produced under component 1, this component would *inter alia* develop a business plan for the energy sector, which would set out the revenue profiles for key sector institutions to allow for assessment of investment and operation decisions’ impact on financial viability. This component will also build the institutional capacity of the newly created rural electrification agency in Benin (ABERME),¹¹ and establish a clear and transparent environment of intervention of the various actors working at the crossroads of rural electrification (including the SBEE).

**Component 4: Environmental and Social Framework for Energy (US$ 1 million).** Under this component, a comprehensive review of Benin’s environmental and policy frameworks, including for existing projects, will be undertaken. Relevant environmental and social management issues will be identified, and as appropriate remedied under the credit, including through changes in legislation and management practices. Specific attention would be paid to environmental, social and safety issues relating to gas.

3.2 The project will have two implementing agencies: the Ministry of Energy and the CEB. Both agencies are already implementing agencies under the existing ESDP project. The identification and preparatory mission in January 2007 has already confirmed that with the changes currently underway at the CEB, it will satisfy the World Bank’s financial management and procurement standards. The capacity of the Ministry will be assessed during the next mission. It is intended to link implementation to the project management unit of the ESDP project, which is housed in the Ministry. This would ensure easy compliance with financial management and procurement standards. The above arrangement has been proven under the current ongoing ESDP project.

4. **Safeguard policies that might apply**

This project is a Technical Assistance Credit, which will not entail any investments. At most office equipment and vehicles might be provided as an element of an overarching institution building strategy.

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**Environmental Category:** C (to be confirmed)

¹¹ The ABERME was established on 4 August 2004 by Decret Numbrerr 2004-424, issued by the President of Benin. The mission of the ABERME is the implementation of Government policy in the context of energy efficiency and rural electrification.
5. Tentative financing
Source: ($m.)
BORROWER/RECIPIENT 0
International Development Association (IDA) 8
Total 8

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