

**PROJECT INFORMATION DOCUMENT (PID)
APPRAISAL STAGE**

Report No.: 66957

Project Name	CM - Lom Pangar Hydropower Project (FY12)
Region	AFRICA
Country	REPUBLIC OF CAMEROON
Sector	Power (100%)
Lending Instrument	SIL
Project ID	P114077
Borrower(s)	Government of Cameroon
Implementing Agency	The Electricity Development Corporation (EDC) Yaoundé, Cameroon Tel: (237-22) 231-103 Fax: (237-22) 231-113
Environmental Screening Category	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> FI <input type="checkbox"/> TBD (to be determined)
Date PID Prepared	February 17, 2012
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Country Context

1. Cameroon is a resource rich country in Central Africa with a population of nearly 19.5 million and a land area of 475,650 square kilometers. Cameroon is characterized by a strong diversity between the regions of the Sahelian North and the tropical forests of the South. Cameroon is urbanizing, with half of the population living in cities. In 2010, Cameroon's per capita income was US\$678 and about 40 percent of the country's population lives below the poverty threshold of US\$1.25 per day. Cameroon lags behind other countries in Africa on many social indicators and is off-track in meeting most of the Millennium Development Goals (MDGs).

2. Cameroon's natural wealth is vast and includes oil, natural gas, minerals and forest resources. Extractive industries account for about seven percent of Cameroon's GDP. Oil production is declining, currently at around 24.5 million barrels per year. Cameroon is accelerating the development of its gas reserves, which are estimated at 157 billion cubic meters, with a potential of up to 570 billion cubic meters. The country also has significant undeveloped mineral reserves and major forestry reserves. 8.72 million hectares—representing 19 percent of total land area—are classified as permanent forest.

3. Cameroon has shown relatively strong macroeconomic performance in the past few years. An International Monetary Fund (IMF) Poverty Reduction and Growth Facility was

completed in 2009, and debt relief under the Heavily Indebted Poor Countries (HIPC) Initiative and the Multilateral Debt Relief Initiative (MDRI) helped firm up debt sustainability. Average annual inflation was contained at 1.3 percent in 2010, compared with three percent in 2009.

4. Despite strong macroeconomic performance and considerable natural resources, Cameroon's economic growth has remained disappointing over the last decade, averaging 2.7 percent over the 2005-2009 period. In 2010, however, growth reached 3.2 percent, and in 2011 overall GDP growth was estimated at 4.1 percent.

5. Corruption is prevalent at all levels of society and governance is a key impediment to economic growth and attracting investments in Cameroon. Cameroon ranks 161st out of 183 countries in the World Bank Group Doing Business Index (2011), in the bottom quartile for all criteria of the Kaufmann-Kraay Governance indicators, and 134 out of 183 countries in Transparency International's 2011 Corruption Perception Index.

6. Deficient power supply and reliability is a major constraint to increasing economic growth in Cameroon. Estimates suggest that addressing Cameroon's power deficiencies could boost annual per capita economic growth by 1.3 percentage points.

7. In its development strategy, *Vision 2035*, the Government of Cameroon (GOC) aims to transform the country into an industrial economy. The associated *Strategy for Growth and Employment 2010-2019* (DSCE) aims to increase non-oil growth by investing in key infrastructure, improving productivity and the business climate, and strengthening human development and regional integration.

Sector and Institutional Context

8. Cameroon's hydropower potential is the third largest in Sub-Saharan Africa, estimated at over 12,000 MW - nearly half of that in the Sanaga River basin. However, the total installed electricity generation capacity from all sources is currently only 933 MW, 77 percent of which is hydro capacity and the remainder relatively costly and polluting thermal capacity (e.g., diesel and heavy fuel oil). Electricity demand currently exceeds supply, and this gap will widen if new supply is not added, with domestic demand growing at about five percent per year.

9. Against this background, the GOC's DSCE targets a total installed generation capacity of 3,000 MW by 2020. Hydropower represents the cleanest and most cost-effective source of energy for Cameroon. The marginal costs for hydropower development are US\$0.04-0.05/ kWh, compared with US\$0.08-0.09 per kWh for gas-fired capacity. Fuel oil plants, currently in use as part of back-up capacity produce electricity at the cost of US\$0.280 per kWh.

10. To date, less than 10 percent of Cameroon's estimated hydropower potential has been developed. This low level of development is due to the economic and financial challenges involved. An important step in developing Cameroon's largely unexploited hydropower potential is the construction of a regulating dam at the Lom Pangar site in the Sanaga river basin.

11. Without the Lom Pangar Hydropower Project (LPHP), most of the downstream hydropower sites on the Sanaga cannot operate year round and the cost of electricity generation

is therefore too high to attract developers. The LPHP is thus a classic public good: while it generates relatively little direct energy, it will increase the level of firm (all season) energy of existing downstream hydropower projects and unlock the hydropower potential of the Sanaga River basin.

12. The economic analysis of the LPHP shows that the development of Sanaga's hydropower potential depends on the presence of industrial anchor customers: developing hydropower sites for public supply only would lead to much higher unit costs. Historically, Alucam has been the anchor customer in Cameroon supporting the development of hydropower sites. The GOC has designated certain hydroelectric sites for development by the aluminum industry, notably Rio Tinto Alcan/Alucam, while a number of other sites are available for development by independent hydropower producers. RTA's role as an anchor customer and ability to mobilize capital will facilitate the development of such large-scale hydropower sites. However, the benefits of industrial auto-production should be balanced with the risk that industrial customers receive preferential treatment compared with household users. For this reason, the 2011 Electricity Law stipulates that downstream hydropower sites must be optimized and includes provisions for auto-producers to supply electricity to the national grid.

13. Over the long-term, the hydropower potential in Cameroon is sufficient to meet domestic electricity demand, support large industrial development, and also provide power for export. Power export is at least a decade away as it would require Cameroon and neighboring countries to make large investments in their respective power grids, to establish complex regulatory agreements, and to interconnect their grids.

Power sector reforms

14. Since 1998, the GOC has implemented a first phase of policy and structural reforms to in the power sector. The GOC adopted an Electricity Law in 1998 and a complementary Electricity Decree in 2000. A sector regulator (ARSEL) and a rural electrification agency (AER) were established in 1999. In 2001, the GOC entered into a twenty-year concession with AES Corporation to operate and invest in the state-owned, vertically integrated, power utility Sonel. In November 2006, the GOC established the Electricity Development Corporation (EDC), with the mandate to develop, own, and operate hydropower assets, including the LPHP. The Rural Energy Fund (REF) was established in December 2009.

15. A new Electricity Law was promulgated on 14 December, 2011, marking the start of a second phase of reforms in the sector. The 2011 Law intends to attract additional private investment by opening up for the development of hydropower projects by auto-producers and further unbundling the sector by the establishment of a transmission company. At the same time, the GOC is finalizing a draft master plan for the electricity sector. The plan will be the point of reference for the optimization of future hydropower projects for industrial and public use.

16. The 2011 Electricity Law makes provisions to allocate hydropower sites for development by industrial producers, adopting a model whereby the development of such hydropower sites is allocated to large industrial customers with significant consumption needs. The law obliges concessionaires to optimize the size of their developments and to provide a firm allocation of generation capacity to the national grid. The law stipulates sites must be competitively bid out,

but allows for the awarding of hydroelectric concessions for integrated industrial projects on a contractual (i.e., sole-source) basis on an exceptional basis. Starting with the LPHP, and as stated in the 2011 Electricity Law, the GOC will introduce water tariffs to recover the investment and operational cost of regulating dams from hydropower producers in the Sanaga River.

17. The GOC has started to develop the secondary legislation in the form of application decrees to clarify implementation of the principles stated in the December 2011 Electricity Law. This is a complex undertaking that will necessitate time and resources.

18. Cameroon's public electricity tariffs are comparatively high due to expensive thermal back-up generation and above average distribution losses (31 percent in 2010). LV and MV power tariffs are subject to regulation using revenue control formula. Present LV and MV power tariffs (US\$0.16/kWh) are significantly above the regional average for countries with hydro-based power systems. Cross-subsidies from LV and MV customers to the aluminum smelter Alucam have been phased out. The 2010 PPA between AES SONEL and Alucam included an electricity tariff increase by more than 80 percent from historic levels to US\$0.028/kWh (slightly above the average global electricity tariff to aluminum companies of US\$0.025/kWh). Under these new arrangements, Alucam does not receive any cross-subsidies from household and other industrial users.

Objectives

19. The project development objective of the proposed LPHP is to increase hydropower generation capacity and reduce seasonal variability of water flow in the Sanaga River and to increase access to electricity.

20. The proposed operation will be a Specific Investment Loan (SIL), to be implemented over a six year period.

21. Lom Pangar will increase the guaranteed all-season hydropower capacity on the Sanaga River by approximately 40 percent, which will immediately translate into the addition of 120MW at existing downstream hydropower plants, Edea and Song Loulou, as they will also generate electricity in the dry season. This will mean more reliable power during the dry season for AES Sonel's 625,000 existing customers in the Southern Integrated Grid. The Lom Pangar project itself will generate 30 MW, which will provide electricity for 2,400 new households in the Eastern Province and also contributes to improving electricity services to the existing 22,000 consumers in the Eastern Grid. Furthermore, it will replace 12 MW of expensive thermal capacity and increase generation capacity in the Eastern Grid by 18 MW. In the medium- to long-term term, the LPHP will unlock close to 6,000MW of downstream generation capacity.

Rationale for Bank Involvement

22. The LPHP is a unique opportunity to unlock hydropower potential, decrease power cost, and attract new investors into the electricity sector. The need for increased supply and lower cost of electricity in Cameroon is high. This is evidenced by the 933 MW of installed electricity

generation capacity, demand that already exceeds supply, a rural electrification rate of 14 percent—high costs making power unaffordable for many households—and high electricity tariffs compared to comparable countries.

23. LPHP is a high-risk, high-reward project, where successful implementation and realization of the project's development objective will require intensive supervision. The World Bank is well positioned to support the GOC in developing this strategic project in an environmentally sustainable and socially equitable manner by not only providing financing but also expertise and access to international good practice. In doing so, the World Bank can build on its strong partnership with the GOC in energy sector. The GOC has expressed strong demand for continued policy advice from the Bank.

24. LPHP is economically attractive as a standalone project as well as under the scenarios that include other downstream hydro developments. The economic rate of return of the stand alone LPHP project is estimated at an attractive 19.2 percent. The hydro-sites downstream of Lom Pangar are among the most attractive power assets in Cameroon, with the potential to produce electricity at low cost. The rate of return for Lom Pangar and further hydropower schemes is 21.0 percent with power exports, and 16.5 percent for a scenario including a greenfield aluminum smelter. The returns generated in all the scenarios are well above the Bank's threshold rate of 10 percent. The benefit-cost ratio is above 1 for all scenarios. The Net Present Value is positive for all four scenarios.

25. The LPHP is financially viable. The new power generated directly by the LPHP will be sold to existing and newly connected customers of the Eastern Grid. The introduction of water tariffs will ensure the GOC recovers the investment and recurrent costs of the regulating dam from all hydropower producers in the basin. The existing electricity tariffs in combination with the establishment of water tariffs will allow EDC to service the debt that will be on-lent by the GOC for financing of the LPHP.

Project Description

26. The proposed LPHP consists of a regulating dam, a hydroelectric power plant at the foot of the dam, a transmission line between the power plant and the Eastern Grid, a rural electrification scheme, environmental and social measures and technical assistance, and project management. Associated investments include the adaptation of the Chad-Cameroon Pipeline. The Lom Pangar regulating dam will be located on the River Lom in Cameroon's Eastern Region, about four kilometers before the confluence with the Pangar River and 13 kilometers before the confluence with the Sanaga River.

27. The LPHP will finance four components: (i) Lom Pangar regulating dam; (ii) Lom Pangar power plant and transmission line, (iii) Environmental and Social Measures, and (iv) Technical assistance and project management. The adaptation of the Chad-Cameroon pipeline is an associated infrastructure to the project.

28. *Component 1: Lom Pangar regulating dam.* This component will co-finance the construction of the Lom Pangar regulating dam on the Lom River. Based on the engineering

design, the dam will be 46 meters high and 7 meters wide at the crest and be composed of a central overflow section with embankment wings and a saddle dam. The dam will create a reservoir with a useful capacity of about 6 billion m³. The contractor and the owner's engineer for the dam construction have been selected according to Bank procurement rules and the contracts signed. A 25 kilometer access road has been constructed from the village of Deng Deng to the site of the dam. This road will be extended by 57 kilometers from Deng Deng to Belabo.

29. *Component 2: Lom Pangar power plant and transmission line.* A 30 MW hydropower plant consisting of four Francis turbines will be constructed at the foot of the dam. The power plant will be connected through a 90 kV transmission line to the existing Eastern Network at Bertoua. This component will include electrification of 13 localities in the East Region including the construction of MV and LV lines and the electrification of approximately 2,400 households. This component will also include environmental and social mitigation measures related to the power plant and transmission line.

30. *Component 3: Environmental and Social Measures.* This component is comprised of eight sub-components: six sub-components linked to the Environmental and Social Management Plan (ESMP), a sub-component on the Resettlement Action Plans (RAPs) and a local development sub-component.

31. The ESMP sub-components comprehensively finances the following environmental and social management measures: (i) management of construction sites, including preventive archeological inventories and digs; (ii) management of reservoir and cumulative downstream mitigation measures, including monitoring of water quality, monitoring of greenhouse gases, and the monitoring of induced impacts downstream; (iii) social mitigation, including public health activities, livelihood restoration, rural electrification and the construction of Touraké bridge; (iv) management of the Deng Deng forest, including salvage logging for the reservoir area, the adaptation of forest zoning of Deng Deng forest, management of the Deng Deng National Park; game management and control of illegal activities (v) Technical audits of environmental and social measures, and (vi) ESMP management including capacity building, monitoring, and evaluation.

32. The ESMP management sub-component will finance certain positions to support the EDC Project Implementation Unit (PIU). This sub-component will also finance the two independent expert panels: the environmental and social panel and the dam safety panel.

33. The RAP sub-component finances resettlement and compensation for the persons affected by the dam and associated reservoir.

34. The local development sub-component will support the design and implement a Local Development Program that will address immediate social and development needs of affected local communities.

35. *Component 4: Technical assistance and project management.* This component is composed of three sub-components: i) technical assistance, ii) communications, and iii) project management.

36. The technical assistance sub-component will finance studies on filling of the reservoir and operation of the dam. Studies will also be undertaken on integrated water management in the Sanaga River basin. In addition, optimization studies for the selected hydropower sites will provide the GOC with the means to enforce the obligation of concessionaires in the basin to optimize the development of these resources and to provide electricity into the grid.

37. The strategic communication and outreach subcomponent will include a comprehensive communication and consultation program that will include support for major interventions such as consultations with stakeholders and project-affected people; improved stakeholder engagement; awareness and public education communication campaigns; building ownership and promoting transparency and accountability to help achieve the development objectives of LPHP. The sub-component also supports the establishment and maintenance of a grievance redress and conflict resolution mechanism.

38. The project management sub-component will finance certain positions to support the EDC Project Implementation Unit (PIU). This sub-component will also finance equipment, trainings and monitoring and evaluation activities of the project.

39. *Associated Infrastructure: Adaptation of the Chad-Cameroon pipeline.* The reservoir created by the LPHP will require the adaptation of two 12.5 kilometer stretches of the Chad-Cameroon pipeline (CCP) at two crossings of the Pangar River that will be submerged once the reservoir is filled.

Financing

40. The proposed operation leverages IDA resources through co-financing/parallel financing resources made available by a gamut of development partners, including the French Development Agency (AFD), the European Investment Bank (EIB), the African Development Bank (AfDB), and the Central African States Development Bank (BDEAC).

Project Cost	Total US\$million
BORROWER/RECIPIENT	98.00
BORROWER/RECIPIENT Pre-financing for associated infrastructure*	101.00
International Development Association (IDA)	132.00
African Development Bank	29.00
Central African States Development Bank	15.00
EC: European Investment Bank	40.00
FRANCE: French Agency for Development	79.00
Total Financing required	494.00

*The GOC will pre-finance the works for the adaptation of the Chad Cameroon pipeline.

41. BDEAC and AfDB financing were approved in September 2011 and November 2011 respectively and the financing agreements were signed in January 2012. Effectiveness is cross-conditioned to approval of other donor financing. AFD and EIB have expected Board dates in May and June 2012, respectively. Effectiveness conditions will be harmonized to ensure effectiveness in the summer of 2012.

Implementation

42. A Project Steering (*Comité de pilotage*, CdP) provides a platform for exchange which will monitor project progress and ensure proper project implementation. The CdP is placed under the authority of the Prime Minister and chaired by the Secretary General of the Prime Minister's office. The CdP includes representatives from the presidency, line ministries involved in the project, and EDC¹.

43. Project activities will be coordinated by the EDC, the GOC's asset holding company in the electricity sector and the sole implementing entity for donor-financed activities. The existing PIU in EDC for the ESDP project is being reinforced to also manage the LPHP. The PIU will: (i) coordinate project activities; (ii) carry out financial management and procurement; (iii) prepare annual work plans and budgets for submission to the CdP and IDA; (iv) liaise with various government departments and donors, (v) ensure monitoring and evaluation (M&E) and reporting, and (vi) monitor and ensure safeguards compliance.

44. Multiple ministries play a regulatory, supervisory, or supporting role for the project. These include the Ministry of Water and Energy (MINEE), the Ministry of Land Administration (MINDAF), the Ministry of Finance (MINFI), the Ministry of Economy, Planning and Regional Development (MINEPAT), the Ministry of Territorial Administration and Decentralization (MINATD), and the Ministry of Environment, Nature Protection and Sustainable Development, (MINEP).

45. Several ministries play important roles in the implementation of the LPHP project, though they will not have fiduciary responsibilities. These include the Ministry of Forests and Wildlife (MINFOF), the Ministry of Public Works (MINTP), the Ministry of Livestock, Fisheries and Animal Industries (MINEPIA), the Ministry of Arts and Culture, the Ministry of Public Health (MINSANTE) and the Ministry of Agriculture and Rural Development (MINADER).

46. EDC has recruited and mobilized an owner's engineer to supervise preparatory works and construction of the regulating dam. Two independent panels (environmental and social panel and dam safety panel) are in place and have provided guidance to EDC during project preparation. The panels will continue to do so during the implementation phase.

47. The existing ESDP Project Implementation Manual (PIM) is being updated and extended into an LPHP Project Implementation Manual.

Sustainability

¹ Decree 233 CAB/PM dated December 29, 2011 establishing the Steering Committee of LPHP.

48. Water tariffs will create a net positive cashflow for EDC for the LPHP. The new revenues from the water tariff will help ensure that EDC's O&M budget is adequate and thus the sustainability of investment projects beyond LPHP's completion. In parallel, the water tariff will finance the operating costs of the Deng Deng National Park. The private concessionaire AES Sonel is able to recover its costs and make a profit under the existing tariff regulation. AES Sonel's financial situation is sound and financial projections show that AES Sonel will be able to pay cost recovery level water tariffs.

49. The reservoir associated with the Lom Pangar regulating dam will cover approximately 570 square kilometers which represents a significant environmental footprint in a tropical forest environment. Though relatively sparsely populated, the project's social impacts are also considerable. Extensive due diligence has been performed by the Government during project preparation. Through the ongoing ESDP, the Bank has provided comprehensive technical assistance to EDC to support project preparation. This has resulted in a sophisticated set of environmental and social safeguards instruments as well as heightened stakeholder awareness for the need to be proactive in ensuring compliance with these instruments. Nevertheless, the GOC has a limited track record and capacity to implement sophisticated safeguards instruments. Project design recognizes these capacity limitations and the project therefore includes significant support (technical assistance) to ensure safeguard measures are implemented satisfactorily. A regular third party technical audit of safeguards measures will also ensure compliance with safeguard policies. These audits will enable oversight of the project by the steering committee in addition to donor supervision. The GOC has committed itself to the financing and implementation of ongoing environmental and social measures beyond the project's six year duration of the LPHP. This will be facilitated by the revenues of the water tariffs.

50. The project contributes to a longer term sustainable development of hydropower potential in the Sanaga River basin, which is determined by the allocation, financing, and benefit sharing of future investment. The 2011 Electricity Law stipulates that downstream hydropower sites must be optimized and establishes public service provisions for electricity producers to the national grid to ensure that the needs of domestic consumers are met. However, optimized capacity of downstream plants can only be determined for each individual site after technical studies have been undertaken. LPHP will finance optimization studies for various hydropower sites to enable the GOC to enforce the law's optimization and public service requirements. The LPHP also provides technical assistance on integrated water management in the Sanaga River basin and studies on optimization of dam operations to benefit all downstream users (e.g. hydropower producers, agriculture, urban water supply, and environment).

51. There is strong engagement from the GOC and other involved stakeholders in the preparation of the project and ownership and commitment to the project is expressed all the way from the Head of State. World Bank engagement in the project as well as in the sector has been strongly called for by the GOC. This level of commitment will facilitate project implementation and reduce the risks associated with the project.

Lessons learned and reflected in the project design

52. The design and development of this project has benefited from a rich menu of lessons learned from similar large infrastructure operations in Africa and beyond, as well as other completed and ongoing Bank-financed projects in Cameroon. Lessons from analytical work on hydropower development carried out by the Bank, other donors, NGOs, and the private sector are also relevant and have been taken into account. The following is a summary of these key lessons reflected in the project design:

- The LPHP is part of a broader suite of support that combines IDA-financed projects and technical assistance. The World Bank’s long term strategic engagement in Cameroon’s energy sector has contributed to the introduction of private sector participation, a renegotiated Power Purchase Agreement (PPA) with the aluminum industry that introduced cost-reflective tariffs, and the drafting of a new electricity law.
- Limited management capacity has hindered implementation of complex infrastructure projects in Cameroon in the past. To address this, an extensive capacity building program on sustainable development of large-scale infrastructure projects was started during project preparation and will continue into the future.
- Adequate coordination among stakeholders is a central building block of multisectoral projects involving many state and non-state actors. The project assures strong intersectoral linkages, with a national Steering Committee chaired by the Prime Minister.
- Strategic communications supports an informed discussion of the Lom Pangar Hydropower Project. Regular consultations and information meetings have been held with various national stakeholders, including civil society. This will continue during project implementation.
- Adequate resources and staffing are necessary to assure project results. A high level of human resources will be made available to ensure Bank supervision of the project. The team will be multi-sectoral and receive support from country and sector management.

Safeguard Policies (including public consultation)

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

Contact points at the World Bank and with the Borrower

World Bank

Contact: Meike van Ginneken

Title: Sector Leader

Tel: 237-2250 8030/5330 + 8030

Email: mvanginneken@worldbank.org

Borrower/Client/Recipient

Contact: Government of Cameroon

Title: Emmanuel NGANOU DJOUMESSI,

Minister of Economy, Planning and Regional Development

Tel: +(237) 22 23 26 27

Fax: +(237) 22 22 15 09

Implementing Agency

Contact: Electricity Development Corporation (EDC)

Title: Dr. Théodore NSANGOU, Director General

Tel: +(237) 22 23 19 30 / 22 23 10 89

Fax: +(237) 22 23 11 13

Email: info@edc-cameroon.com

For more information contact:

The InfoShop

The World Bank

1818 H Street, NW

Washington, D.C. 20433

Telephone: (202) 458-4500

Fax: (202) 522-1500

Web: <http://www.worldbank.org/infoshop>