

MINISTRY OF MINES, ENERGY AND
HYDRAULICS

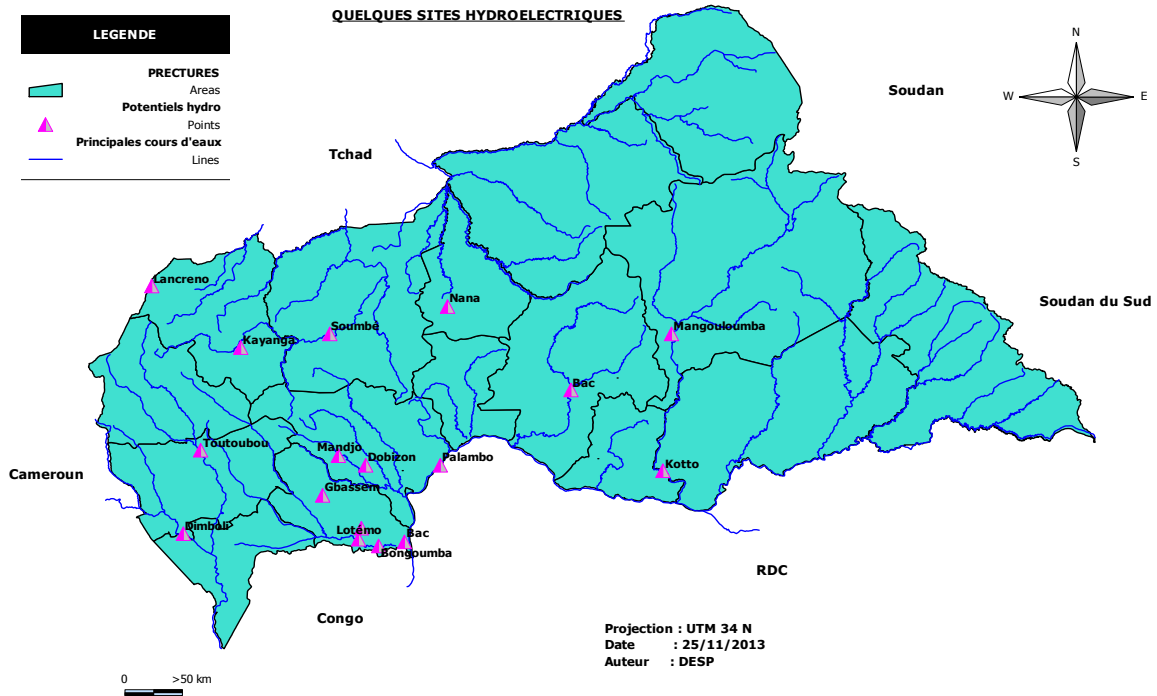
DIRECTORATE OF CABINET

DIRECTORATE GENERAL FOR ENERGY



CENTRAL AFRICAN REPUBLIC
Unity – Dignity - Work

EXPRESSION OF INTEREST BY THE CENTRAL AFRICAN REPUBLIC TO CIF/SREP PROGRAM



I- COUNTRY AND GOVERNMENT AGENCY SUBMITTING THE EXPRESSION OF INTEREST

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II- COUNTRY BACKGROUND AND CONTEXT OF THE ENERGY SECTOR

2.1: Country data

2.1.1 Geography and population

The Central African Republic is a vast, landlocked country with a total land mass of 623,000 square km, located in the heart of Africa. It shares borders with Cameroon to the West, Congo to the South-West, the Democratic Congo to the South, Sudan to the South East, Sudan to the North-East and Tchad to the North. The country is home to an estimated 4.8 million people. Sparsely populated and unevenly distributed, the average national population density is 7.7 people inhabitants per km², ranging from 1 inhabitant per km² in the North (Prefectures of Vakaga, Bamingui Bangoran and Haute Kotto) to 9,300 inhabitants per km² in Bangui. According to the 2003 Housing and Population Census, the country boasts a very young population, with 49.4% under 18 and those over 60 accounting for less than 4.2% of the general population. The gender distribution is : 50.2% of women and 49.8% of men. Life expectancy is barely 45 years.

2.1.2 Economic Data

Endowed with significant natural potential (a dense hydrographical network, large forested areas and huge mineral resources), CAR shows alarming socioeconomic indicators. The 2011 GDP per capita was 462,52 US dollars and according to the 2013 Human Development Report by UNDP, CAR has an index of 0.352 and was ranked 180th out of 186 countries.

However, from the economic standpoint, CAR has important assets, which include the following:

- a total potential cropland estimated at 15 million hectares, of which 0.7 million only are used for agriculture ;
- a total rangeland and pasture potential estimated at 16 million hectares;
- a forestry potential of 8.8 million hectares of useful forest expanses;
- good levels of rainfall; and
- a dense river system.

The economy of RCA is still dominated by the primary sector, which employs 80% of the active population and provides close to 50% of the GDP. The bulk of export revenue comes from three products: diamonds, timber and cotton. Yet, despite the existence of significant potentials, the Central African economy continues to face multiple challenges, some of the most serious of which are:

- the significant shortcomings in the education and health systems, and;
- the isolation of the country - both within and outside; the burden of the debt;
- the weak budget revenues, making it impossible for the State to properly meet its sovereign obligations on expenditure; and
- the insecurity in the country's hinterland areas.

It is against this backdrop that the Government has engaged in the process of the HIPC initiative, which allowed CAR to benefit from debt reduction (by about 578.3 M US \$) after reaching the completion point under the initiative in 2009.

Recognizing some of the efforts made by CAR, IMF granted an Extended Credit Facility for 63 M USD on 25 June 2012, of which 10.5 M USD are immediately available for disbursement, thereby enabling CAR to get budget support from other partners (IMF, African Development Bank, European Union, etc.).

The commitment of the international community in CAR also emerges from the European Regional Development Fund project, which draws a significant share of the 10th UDF (2008-2013). However, the recurring crises raging in the country since 2012 only worsened the economic situation with a dramatic drop in government revenues, coupled with an escalation of insecurity and poverty.

2.2: Data on the energy sector

According to the preliminary annual energy balance of 2011, the final energy consumption is 1,119 ktep. This consumption is met up to 93% by biomass (firewood, charcoal and agricultural residues), 6% of oil product and 1% of electricity.

Concerning the breakdown of this consumption per industry sector, the households use up to 91% of shares. Transport, Trade and public services rank second with a 4% of consumption each. The industrial sector accounted only for 1% of the final energy consumption in 2011.

2.2.1: The electricity sub-sector

Since its independence, and apart from private generation and independent production, electricity service provision has been monopolized by the Central African Energy Public Company (ENERCA), which produces, transports, distributes and markets electricity throughout the country. Furthermore, the quality of service provided by this Company is low (at least 10 hours of load-shedding per day).

In response to these problems, the Government issued in 2005 an Ordinance establishing the Code of electricity in CAR. This reform aims to improve private investments while maintaining the interests of the State, the balance of the electrical system between producers, distributors and consumers, and the establishment of real power price structure. However, the situation has barely changed. In 2011, the rate of access of the population to electricity was 2.5 % nationally, 19 % in Bangui, 1 % in second-tier centers and a rate close to zero in rural areas, where the majority of poor people live.

The total installed electrical power in CAR is 39.41 MW, of which 34.15 MW on the interconnected Boali-Bangui grid, the remaining power is scattered across some provinces of the country. The total electricity produced in 2011 was 139 GWh, including 99% of hydroelectricity. The existing power generation facilities are made up of:

- the hydroelectric power plants of Boali 1 (8.4 MW) and Boali 2 (10 MW), created respectively in 1954 and 1976. Since then, these plants have undergone some partial revisions. They are today in a state of advanced dilapidation.
- the Bangui thermal power plant designed to complement the Boali 1 and Boali 2 plants. Of the six (6) sets available in the plant, one only developing a power of 2.5 MW, is currently in use;
- a flow regulation dam of the hydroelectric power plants downstream Boali 1 and 2 ; and
- about sixteen (16) provincial centers supplied overall by diesel generators, operating only four hours a day (6 to 10 p.m.)

In the face of the overall inadequacy of supply, in the provincial towns, a growing proportion of the population, including several private businesses (religious missions, agrobased industries, woodworking industries, growers) are getting individually equipped with gasoline or diesel power generation groups. Unit capacity ranges from 2 to 650 KVA, and their total output in each provincial town is at least the same order of magnitude as the installed capacity of ENERCA. Self-generators also meet their demand in power through such solutions as solar kits and pico hydro power plants (e.g. by the Swedish missionaries in Gamboula in the West and Bakouma in the East). This fact underlines the existence of an effective demand, ready and willing to pay the price for a quality electricity service.

The overwhelming majority of the Central African population not benefitting from access to modern energy services (electricity and hydrocarbons) lives in rural areas. This situation is not conducive to a balanced and fair development against poverty and is even one of the factors leading to rural-to-urban migration. Rural electrification in the Central African Republic remains embryonic, with an electricity coverage rate of almost zero.

2.2.2: Energy sector potentials

The Central African Republic produces neither oil nor by-products of oil. To meet its needs, the country imports oil products from neighbouring countries. CAR has significant untapped oil fields and is rich in renewable forms of energy such as biomass, hydroelectricity and solar.

2.2.2.1 The hydroelectrical potential

CAR has a dense hydrographical network. A study conducted by ELECTROWATT engineering firm in 1972 concluded that the hydroelectrical potential is estimated at 2,000 MW. This potential, which is not exhaustive, is distributed over several potentially practical hydroelectric sites throughout the country. The partial inventories conducted reflected the existence of some thirty sites with installed powers ranging between 0.5 and 180 MW to date, and only a couple of sites have been tapped. This is the case with Boali, with an installed power of 18.4 MW, likely to be extended to 40 MW, intended to supply the capital Bangui, Gamboula, Bakouma and Mobaye, as run-of-river.

2.2.2.2: Renewable energy potential

On top of the hydroelectricity potential referred to above, CAR boasts significant new and renewable sources of energy, which are spread out pretty evenly across the entire territory.

SOLAR ENERGY

The annual overall solar radiation in the Central African Republic is somewhere in the neighbourhood of 6.6 GJ m²/p.a. (5 KWh/m²/day), corresponding approximately to a mean sunshine duration of 2,600 hours per year, that is 7.1 hours per day.

The average monthly values of the sunshine duration show that average solar insolation is lower in the south of the country (Bangassou, Bangui and Berberati), moderate in the center (Bambari, Bossangoa) and high in the north (Ndele and Birao).

Solar energy is a valuable energy resource, particularly in the north of the country. Its use may also be contemplated in the other regions of the country for low power applications, in further areas with other sources of energy.

The use of solar energy for thermal or power generation purposes goes back to the '90s with the installation of solar panels for the supply of telecommunication relay stations (Gendarmerie, Police, Army), the supply of power and the installation of solar water heaters in missionaries' houses in the provincial areas as well as for the setup of pumps in some rural communities.

BIOMASS

The use of the forestry potential, various agricultural waste and household refuse can turn CAR into a vast laboratory for biomass-based NREs. The energy recovery from these will enable it to raise the rate of access to electricity through the generation of electrical energy, thereby reducing its dependency on oil-based products through the production of bio fuels.

WIND ENERGY

The potential for wind energy applications is very limited due to generally weaker and stable wind speeds and frequent calm wind periods.

Geothermal energy

No study has been carried in this field. Nevertheless, a couple of sites were identified in the areas of Dissikou (Dekoa) and Ambilo (Nzako, Bakouma).

2.2.3: Renewable energy policy and enforcement actions

In its National Energy Policy paper, the Government affirms its commitment to implement the energy resources of the country to facilitate its access to the rural and urban areas while underscoring the promotion of renewable energies, the introduction of innovative approaches in the use of conventional energies and providing service to remote communities. These choices should, over the medium and long terms, lead to the reduction of the energy bill, enhance the country's energy independence and enable it to take an active part in the development of the subsector on sub-regional, regional and international levels.

It is in this perspective that CAR has:

- ratified the Kyoto protocol paving the way for the country's accession to the Clean Development Mechanism, enabling it to avail of the revenues generated through the sale of carbon units collected through the exploitation of hydroelectricity and biofuels ;
- adopted the statute establishing the International Renewable Energy Agency (IRENA) in 2009 ;
- adopted Act N°08.018 on bio-fuels;
- established the Autonomous Rural Electrification Agency of the Central African Republic which regulates, among others, the development of renewable energies.

However, there are still shortcomings relating to the regulatory framework, the need for an information and planning system and the lack of incentive measures for the promotion of investments in the sector of renewable energies.

III- REASON FOR THE FINANCING OF SOME SECTORS BY SREP

3.1 Energy security

The situation in the Central African Republic is marked by structural power supply deficits, mainly due to the lack of investments and especially political instability. This leads to a situation where the « true » demand for electricity and its growth potential cannot be accurately estimated.

It is clear that an important part of the demand of these past years has not been met. Because, the frequent practice of load shedding has reduced the number of connections by new consumers following the lack of generation supply, transport and distribution. This has also contributed to the occurrence of significant non technical losses as mentioned earlier.

Considering the demand analysis conducted by RSWI/SOGREAH in 2009, taking into account for the

average scenario, a 4% GDP growth, a 9.3% rural electrification average growth rate, would make it possible to reach in 2030 a 60% electrification rate in urban areas and a 5% rate in rural areas. These rates would correspond to a peak of 489 MW, i.e. a value tenfold that current installed.

To meet this demand and to allow poor households to have access to energy sustainably and affordably, the Government made the choice of diversifying its energy supplies, with an energy mix ensuring greater security through the promotion of renewable energies.

3.2 Obstacles to the development of renewable energies

The development of renewable energies in CAR is hindered by several factors, among which the existence of an inappropriate institutional framework, an inadequate planning, no coordination between the relevant players, the high initial capital costs, the lack of trained and skilled labor... to name just a few.

Politically, unlike the conventional energy sector, renewable energies are not either supported by a well defined legal/regulatory framework.

Financially, an important impediment to the implementation of renewable energy projects is the lack of affordable long-term finance options. This is aggravated still further by the competition between projects in accessing funds that are already limited, and exacerbated further by adverse macroeconomic conditions.

From a technical perspective, the promotion of renewable energies involves the development of technical skills (knowhow) necessary to support all aspects of development of renewable energies technologies.

3.3: Proposed fields of intervention to the SREP Program

The investment projects identified and proposed under the current program are as follows:

3.3.1 Projects of mini and micro hydro plants

In its National Energy Policy Paper, the Central African Republic plans to promote all initiatives fostering access to energy services aimed to fight poverty in both rural and urban areas.

To that end, the use of mini and micro hydroelectric power plants is « desired ». The following sites, with an estimated capacity of 31 MW, distributed over the two main Chari and Congo rivers, are part of this program. These are:

- the sites that have been the subject of feasibility studies and which need updating, (i) Toutoubou 750 kW ; (ii) Baïdou 600 kW ; (iii) Mbecko 840 kW ; Gbassem 400 kW
- the sites that have been the subject of prefeasibility or identification studies, (iii) Nana 1929 kW ; (iv) Mongoulouma 250 kW ; (v) Soumbe 1670 kW ; (vi) M'poko 7500 kW ; (vii) mbi 6500 kW and (viii) Mandjo 12.000 kW.

The SREP Program will further be requested for the update of the list of potential hydroelectric sites on the national territory.

3.3.2 Solar projects

The program will enable feasibility studies to be conducted for the creation of hybrid solar power plants for communities that are not located close to rivers and streams and enjoying adequate

insolation level. This is the case for the following cities: (i) Birao 1 MW ; Ndele 1 MW ; Bouar 2 MW ; Bangassou 1 MW ; Bozoum 1 MW and Paoua 1 MW. These studies will allow the mobilization of finances necessary to improve access of the dwellers of these communities to electricity.

3.3.3 Institutional Support Project

This aspect will involve (i) the capacity building of the various institutional players, civil society organizations, the mobilization of which will speed up the implementation of renewable energy projects, (ii) support to the Government to update the regulatory and legislative instruments indispensable for support, promotion and broader dissemination of this new technology, (iii) the provision of an environment conducive to the sustainable development of renewable energies in the Central African Republic.

3.4: The reasons for solicitation of the CIF funds

Investments in the renewable energy sector in CAR are belated not only because of the difficulty to raise resources for the financing of studies but mainly owing to the lack of national skills to conduct this type of studies. The action of the Fund under this program will provide elements of a response to these two concerns, thereby setting an adequate framework for the sustainable development of this sector in the Central African Republic.

Finally, in the Human Development Index report, the existence of a positive correlation between public investments in social and physical infrastructures and progress in HDI has been recognized. The support provided by the Fund will help speed up investments in the sector of infrastructures, which will eventually impact positively the quality of life of beneficiary populations.

IV- AN ENABLING POLITICAL AND REGULATORY ENVIRONMENT

4.1 Energy Policy

The preparation and the adoption by the Government of the National Energy Policy Paper, subject-matter of the Decree N° 10.092, identifying the energy sector as an important factor without which there can be no socioeconomic development, is proof of this importance. Among the objectives pursued, mention can be made of the increase in the rate of access to electricity from 4 to 25% by 2025 and securing the supply of energy. To help with this process, the specific objectives are (i) enhance the institutional capacities of the strategic management of the energy sector; (ii) guarantee the continuing provision of energy for the entire country at a competitive cost; (iii) ensure the independence and the secure energy supply of the country; (iv) ensure the protection of people, goods and the supplies against energy-related risks and; (v) strengthen sub regional, regional and international energy integration.

Furthermore, as part of its decentralization and regionalization program, the Government is keen to provide the populations, through local authorities, with the possibility to participate more directly in the implementation of the rural electrification policy under conditions to be laid down in the regulations, pursuant to the provisions contained in article 17 of the Electricity Code, to contribute to improving the quality of public services and to facilitate their access by poor populations.

Finally, the DPEN chose 10 guiding principles, including Liberalization, Public-Private-Partnership and Participatory Approach.

4.2 Institutional and legal framework

In 2004, the Government adopted the document called « National Energy Policy Framework with a view to reducing poverty over the 2005-2015 period». This strategic document sets out the framework for action of the rural electrification sector through the scaling-up of renewable energies. In 2005, the Government initiated the overhaul of the sub-sector by adopting Ordinance N°05.001 on 1st January, establishing the Electricity Code of the Central African Republic; as well as the establishment by Ordinance of the Central African Power Regulatory Agency (ARSEC) and the Autonomous Rural Electrification Agency in the Central African Republic (ACER), tasked - on the one hand - with regulating the sector and - on the other hand - implementing the Government's policy regarding rural electrification, thus fostering - through simple procedures - all initiatives aimed at promoting and developing electrification in rural areas.

This Code lays down common rules for the generation, transport, distribution, import, export and sale of electrical power. It further sets out the organizational arrangements and operation of the electricity subsector, market access, criteria and procedures applicable to calls for tenders, licensing and use of grids. Furthermore, the Electricity Code regulates the power subsector by securing access to electricity for all, the balanced development of electrification throughout the national territory and in accordance with environmental regulations. The Code further states that the activities of generation, transport, import, export, distribution and sale of electricity on the Central African territory are open without any discrimination to all natural or legal persons, governed by public or private law, of Central African or foreign nationality, in accordance with the provisions laid down in this Code and its implementing legislation.

To date, the generation, transport, distribution and transmission of electricity in the Central African Republic is made by ENERCA, which is a State-Owned industrial establishment.

Even if the new structures created by the Electricity Code (ARSEC and ACER) are not yet in operation, they have nevertheless started to lay the new foundations for the operation of the electricity market.

4.3 Partnering with the University

The existence, within the department of physics of the University of Bangui, of a Masters of Energy program and of a research laboratory on solar energy provides some interesting perspectives as to the availability of skilled professionals capable of supporting the development of the sector in the Central African Republic.

4.4 Procurement

The passing of Law n°08.17 of 6 June 2008 establishing the bill on public procurement and public service delegations of the Central African Republic and of several other legislations have enabled the creation and organization of the Directorate for Private Procurement and the energy market regulatory authority. These two bodies, along with the procurement departments of four (04) Ministries are supporting the public authorities and businesses in implementing the purchase of goods and services.

4.5 Pricing Policy

With the reform of the power sector initiated in 2005 and the creation of ARSEC, the determination of prices should be the responsibility of the latter. But, so far all requests for price changes have remained inoperative owing to the inconveniences incurred by consumers because of frequent cut-offs. The average tariff is 68 CFA francs for low voltage and 45 CFA francs for medium voltage.

V- TECHNICAL AND INSTITUTIONAL CAPACITIES

5.1 Implementation capacity

The Ministry in charge of Energy and the General Directorate of ENERCA have previously initiated several projects, some of the most recent of which are:

- The project of the dam on the Mbali, with a total cost of 32.5 million accounting units;
- The peri-urban intensive electrification project of CEMAC ;
- The emergency rehabilitation program of the Boali plants with funding from French Development Agency;
- The emergency plan in response to the energy crisis with funding from IDA and SPF;
- The completion of several studies jointly with the United Nations Development Program

Having worked with these partners enabled the different stakeholders to gain knowhow and develop skills, which are useful for this program.

5.2 Performances

Regarding the **subsector of electricity**, the performance did not live up to the demand. In 2011, the electricity access rate by the population was 2.5 % over the entire country, 19 % in Bangui, 1 % in the secondary communities and a rate close to zero in rural areas, where the majority of poor people live. Since independence, with the exception of self generations and independent productions, the supply of electricity services was the monopoly of the State-owned Central African Energy corporation "ENERCA", which ensures the generation, transport, distribution and marketing of electricity throughout the national territory. The services provided by ENERCA are of poor quality and have been characterized in 2012 by: (i) an annual production of 135 GWh; (ii) a turnover of 5.7 billion of CFA Francs; (iii) a billing rate of 95%; (iv) a recovery rate of 40% ; (v) interim results of 500 Million CFA Francs.

These indicators, coupled with the prices remained unchanged since 1994, are making the financial position of ENERCA even worse.

5.3 The Risks

Key risks identified include among others:

- The country's political and socioeconomic instability;
- The difficulty to mobilize national financial resources for funding counterparties;
- The bad perception of the country, making it more difficult to recruit foreign consultancy firms.

5.4 Absorption capacities

As a result of several decades of crises and isolation, the Central African Republic has seen its indicators in project management, such as the management of the absorption capacity of aid, deteriorate owing to the suspension of the technical or financial activities of projects. This level also varies according to donors and to the complexity of their procedures. The review of AfDB portfolio on November 2013 concluded to the low level of absorption. This rate is also affected by the delays induced by difficulties to mobilize national counterparties for fundings.

VI- PROGRAMS BY MULTILATERAL DEVELOPPEMENT BANKS AND DEVELOPMENT PARTNERS

Among the main bilateral and multilateral donors active in the energy sector: the French Development Agency (AFD), the World Bank (WB), the African Development Bank (AfDB), the European Investment Bank (EIB), the German Development Bank (KfW), the European Union (Eu),

UNDP, the Global Environment Fund (GEF), the Chinese Cooperation Agency, the Indian Cooperation Agency and the Francophonie Institute for Sustainable Development (IFDD). The work of these institutions had contributed to the creation in the CAR of: i) the Autonomous Rural Electrification Agency (ACER), the Power Regulatory Agency (ARSEC) and ii) the building of infrastructures for the generation, transport and distribution of electricity and the initiation of programs for the electrification and support of the energy sector ;

In the CAR, the recent past years have seen the coordination of works by donors center around the creation of an institutional framework for the implementation of the Poverty Reduction Strategy Paper (PRSP). However, because of weak public administration, lack of sufficient coordination between the Government and partners and between partners themselves, this system does not work satisfactorily. There have been some initiatives to palliate this lack of coordination. This concerns in particular the area of public finance where the Bank, the World Bank, the IMF, the European Union and UNDP have in 2009 designed a General Framework for the Organization of Budget Support which led to the development of a common approach by partners aimed to harmonize their budget support operations. Their work in the energy sector enabled the i) partial rehabilitation of the electrical distribution networks of Bangui in 2000 (AFD), ii) the peri-urban connections (2008 to 2011) (U.E) , iii) the preparation of the Electricity Code and the analysis of access to energy services by the poor (2004) (UNDP) , iv) the human capacity building of the energy sector (current IFDD, China, Japan) ,v) the creation of the Autonomous Rural Electrification Agency (ACER) and the Power Regulatory Agency (ARSEC) by Decree N°05.273 of 11 Septembre 2011, and ii) building of infrastructures for the generation, transport and distribution of electricity and the initiation of programs for the electrification and support of the energy sector.

The World Bank and AFD are currently implementing the emergency plan for the rehabilitation of Boali. In the energy sector, the African Development Bank Group had financed the study for the rehabilitation and extension of the Bangui electricity distribution network in May 1984 and the M'Bali dam project (Boali 3) in 1988. According to the report on the completion of the project of 1996, the performance under the project was satisfactory. This dam is intended to regulate the waters from the river and ensure the conditions for the proper and optimal operation of the Boali 2 and the Boali 1 power plants located downstream. On a sub-regional level, the CAR and the DRC are primarily concerned with the power grid interconnection studies of the member countries of the Economic Community of Central African States (ECCAS) based on a financing by FAD, as well as by the studies on cross-border electrification projects in Central Africa funded by IPPF/NEPAD. Finally, the project for the interconnection of electric networks of the CAR and the DRC from the Boali hydroelectric system, of an amount of 29.7 million unit accounts has been approved by the Bank in 2012 and has been identified and work is soon to start.