DEMOCRATIC REPUBLIC OF CONGO

MINISTRY OF HYDRAULIC RESOURCES AND ELECTRICITY

DRC EXPRESSION OF INTEREST TO PARTICIPATE IN SREP

May 2014

Abbreviations and Acronyms

1 ANSER: National Agency of energy Rural Service
2 BAD: African Development Bank
3 EIB: European Investment Bank
4 BM: World Bank
5 CATE: Technical support to the energy cell
6 CATEB: Adaptation Centre of Wood-Eenergy Technology
7 CIF: Investment Climate Fund
8 CNE: National Energy Board
9 DGF: Direction of forest management
10 DSCRP: Document strategy and growth for Poverty Reduction
11 FIP: Forest investment program
12 FTP: Clean Technology Fund
13 HDI: Human development index
14 MECNT: Ministry of environment, Nature Conservation and Tourism
15. HRE: Ministry of hydraulic resources and electricity
16 MW: Megawatt
17 GDP: Gross domestic product
18 PMEDE: Proposed procurement of electricity and export
19 PMURR: Multisectoral Emergency Reconstruction and Rehabilitation Program
20 HIPC: Heavily indebted poor countries
21 DRC: Democratic Republic of the Congo
22 REDD: Reducing effects due to Deforestation and Forest Degradation
23 SAPMP: Project of the electricity markets of southern Africa
24 SNEL: National Electricity Company
25 SENEN: National Energy News Service
26 SREP: Scaling of renewable energy program in low-income countries
27 EU: European Union

Table of contents

1. Country and Government Agency Submitting Expression of Interest

- The Democratic Republic of Congo
- The MinistrY of Hydraulic Resources and Electricity

2. Description of the Country and Energy Sector Context

2.1. Summary on the country and the energy context

2.1.1. General Context

In the heart of the African continent, the Democratic Republic of the Congo (DRC) covers an area of 345 2,410 km2 and an estimated population to around 75 million inhabitants (2011). With its unique and strategic location in the heart of Africa, in DRC of a climate variety, with mainly a rainy season more of 8 months of hand and side of Ecuador and a season dry the rest of the months of the year and a dense drainage network. It has abundant resources both human and natural, including a tropical forest that is second in the world by area (150 million hectares), a significant rainfall, fertile soils and varied mineral resources. But despite the abundance of raw materials, the formal economy has collapsed in recent decades under the combined effect of poor management and a socio-political instability. Administratively, the country currently has eleven provinces.

Since 2001, the country is recovering from a series of conflicts that erupted in the 1990s and the return to peace in most parts of the country in 2003 allowed the adoption of political and economic reforms. The implementation of prudent macroeconomic policies aimed at controlling inflation, and build the foundations for a high growth. After a downturn of a decade, economic growth has restarted in 2002 (with a positive rate of 3%) and increased since that date at a steady rate to 8% in 2013. GDP growth accelerated between 2011 and 2012, from 6.9% to 7.2% despite a difficult international situation. The gross domestic product (GDP) per capita was 272 US dollars in 2012.

Since 1990, the economy has not experienced a significant structural changes and extractive industries and agriculture are the main pillars of economic activity. Since July 2010, the DRC has irrevocable debt relief, in respect of the enhanced heavily indebted poor countries (HIPC) Initiative. Although the political and security context remains fragile in the DRC, the Economic Outlook in the medium term remains positive.

Despite the progress made, the DRC has a precarious social, contrasting situation marked by an important poverty that prevails over the whole of its territory with the huge natural potential of the country. The DRC will not be able to achieve the MDGs by 2015. In the index of human development (IDH) in 2012, the country ranks last (186th). Social problems are many: i) to health: unsanitary, important nutritional deficiency and difficult access to drinking water, ii) economic: low wages, conditions of access to labour and markets, iii) humanitarian: refugees and large displaced population, problems of access to public services and high rates of sexual violence.

Since 2009, the DRC is committed to the REDD process and is counted among the eight pilot countries of the investment program for the forest (FIP) from 2012.

By the end of 2012, it has been implementing the framework REDD + strategy which is based on a national consensus that the main causes of deforestation and forest degradation. For its implementation, it is based on seven (7) pillars including the energy pillar.

The main objective of SREP is to demonstrate the economic, social and environmental viability of the low carbon development in the energy sector by the creation of new economic opportunities and increase access to energy through the use of renewable energy, DRC has its interest in the SREP for deployment of these energies. SREP resources will bring additionality through the removal of risks and barriers and the establishment of an enabling environment for private sector participation and the development of renewable energy of DRC.

2.1.2. Political Situation and International Cooperation

DRC is today at a crossroads of its history. Indeed, after a decade of instability and conflict which have claimed the lives of more than 3 million Congolese, progress of the last decade helped to regain a degree of political stability and reconnect with the international community for the implementation of a program for economic growth and poverty reduction that will accelerate through the resolution of the conflict in the East of the country.

The situation remains fragile when well even clues suggest that it is possible to continue with energy and determination, the efforts already initiated with support from the development partners in order to consolidate the success of the last years of standardization and ensuring sustainability - in order to achieve peace for the 75 million Congolese, but also for the whole of Central Africa.

2.1.3. Energy Sector

The Democratic Republic of Congo has abundant and diverse energy resources:
- Renewable (biomass, hydraulic, solar, wind, geothermal, biofuel, biogas...)
- Non-renewable (oil, natural gas, mineral coal, uranium, oil shale, tar sands,...)

Despite enormous hydropower potential estimated at 100,000 MW, the access of the population to electricity rate is 9%. This access rate is unevenly distributed between urban areas (8.5%) and rural (0.5%) as well as between the provinces. Wood energy still represents 93% of the domestic consumption of energy, usually in the form of charcoal in the cities and firewood in rural areas.

The population uses usually (more than 90% of households) wood fuels for its domestic needs for cooking meals and heating, causing deforestation and degradation of the forest with all the negative impacts on the environment, health, forest, biodiversity and socio-economic conditions.

One of the ways to achieve a sustainable energy development of our communities both urban and rural as the use of renewable energy sources available to the country in general and each rural areas in particular, to facilitate energy supply and thus help curb rural-urban migration.

2.2 Potential Resources for the Deployment of Renewable Energy

- **Hydraulic resources**

Hydropower potential is important and is rated at 100,000 MW of which 44% are concentrated in the only site of Inga. Today, the total installed capacity is 2589 MW with an exploitation rate of the order of 50%. It should be noted that the generation, transmission and distribution accuses many difficulties (overload, obsolescence of certain equipment, vandalism, low efficiency, low purchasing power of consumers,...). Two hundred eighteen (218) hydroelectric sites have been identified across the country for the following power ranges:

a) Sites for from 10 kW to 500 kW
b) Sites for capacities lower than 1 MW
c) Sites for powers ranging from 1 to 9 MW
d) Sites for powers greater than or equal to 10 MW

❖ Solar Ressource

The DRC, located in a high Sunshine Band which different values included between 3.500 and 6,750 Wh/m2/day, is therefore naturally favoured to exploit this form of energy that is currently underutilized.

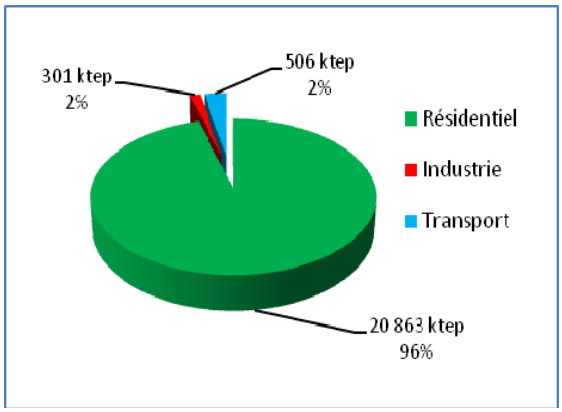
❖ Wind Ressource

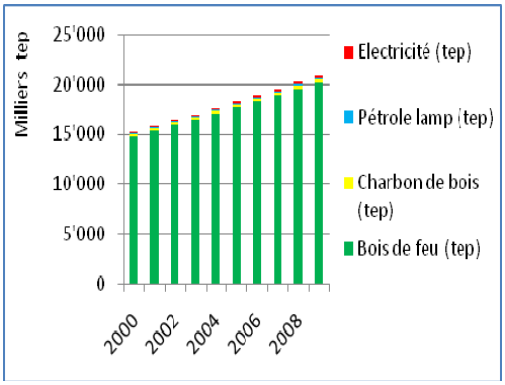
There is in the Democratic Republic of the Congo a limited wind potential. Several completed or ongoing studies designed to determine the wind direction of the targeted sites. These studies indicated by low annual average wind speeds ranging from 2.5 m/s to 5.5 m/s.

❖ Biomass Ressource

The country is highly dependent on woodfuel that currently meet the bulk of wondered energy (95%) 45 million m3 per year and is responsible for the annual destruction of 400000 hectares of natural forest.

Wood energy is mainly used for cooking food in households.
The two graphs below well attest to the need to find other fuels less energy for cooking the food.





Source : Présentations d'évolution des consommations finales totales de 2000 à 2009, CNE, SIE-RDC[43]

The use of biomass can be done without damage when it uses the wood to sustainable production (agroforestry, reforestation, natural regeneration assisted, etc.) and the use of technology for high efficiency of transformation (improved carbonization and cookstoves). Currently, DTL program, in collaboration with access is in phase to stimulate the dissemination of the improved stoves in the basin of the city of Kinshasa with a commercial approach to supply.

❖ Biogas Ressource

The population of Kinshasa, alone produces per day more than 6000 m^3 of solid waste containing at least 65% of the organic matter which half is only likely to be evacuated by a classic collective system.

These wastes can favour the construction of digesters with a capacity of 20 million m3 capable of producing not less than one billion m3 of biogas per year.
Lake Kivu which stores 50 billion Nm3 of methane is an important potential source of gas for household use in wood energy substitution.

- **Biofuel Ressource**

The potential in bio fuel in DR Congo are huge and varied. Depending on the technology used, it is possible to produce, among other things:

- pure vegetable oil from seeds or fruits of crops such as rapeseed, palm oil, Jatropha curcas, etc. to replace conventional fuels;
- biodiesel, obtained from oils processed by a chemical process used without any damage to the motor;
- bioethanol by the fermentation of sugar or starch;
- the biofuel in the second generation based on the waste, residues, cellulose and non food ligno-cellulosic

In this regard, it has noted that the DRC has vast areas of unexploited savannas that could be used to produce these fuels.

The opportunities offered by biofuels in RD Congo include:

- access to modern energy services, especially in rural areas;
- the decrease in the petroleum import bills;
- increased productivity of agriculture and the income from the use of residues and waste in production processes;
- the growth of opportunities for jobs in associated industries;
- the reduction of polluting emissions, including greenhouse gas, etc.

- **Geothermal Ressource**

DRC has not yet evaluated geothermal potential. However, several geothermal sites have been identified in the part East of the country especially in the Western branch of the rift is African. The exploitation of this resource can be used in the production of heat or electricity from riparian communities.

In conclusion, the hydroelectric potential appears predominant in the majority of provinces. Solar energy can play an important role in several of them with the implementation of individual solar systems or the erection of photovoltaic solar power plants. Biomass is probably essential to the Province of Ecuador, but can also complement the two energies above mentioned in the other provinces.

2.3. Status of access to energy

The people's access to energy is very low. With regard to electricity, it is less than 1% in rural areas, 27% for urban areas and **9% nationally**, or about 6,750,000 people have access to electricity.

2.4. Policies on renewables and implementation measures

The DRC does not strictly speaking a specific policy on renewable energy. However over the past years the question was systematically addressed in the as sectoral national strategy documents listed below:
- Document of policy in the sector of electrical energy, Department of energy, May 2009.

- DSCRP DRC I and II, Ministry of planning, July 2006 and 2011.
- Document of Strategies for national rural electrification of the DRC, Ministry of energy, May 2009.

In its vision and objectives of electricity and renewable energy sector, the Government of the DR Congo would improve populations access to electricity by reliable, non-polluting sources, by exploiting all available resources including; renewable energy (hydro power, solar, biomass, biogas, bio fuel, wind, geothermal, etc), while focusing on hydroelectricity.

By the manifestation of this political will, the DRC can overcome the major challenges of this sector, the rehabilitation of electricity parks which are in the most part cases in judgment, the construction of new infrastructures and plants of electrical production, and the use of all forms of renewable energy.

For the implementation, the Department in its licensing energy, in the same order of idea must implement the reforms key for the Coordination, implementation, financing and control of activities reducing or sequestering carbon emissions, while supporting the activities or projects of the Government and the private sector in this direction. This is consistent with the national REDD strategy, adopted by the Government of the DRC in December 2012.

The Government's strategic objective is to increase the rate of access for electricity of ± 9% to ± 60% by 2025 for its sustainable development and especially to fight against climate change. In paper (PRSPs) of 2006 reduction strategy, the Government of DRC States that "energy being one of the main keys to development, the Government's objective in this area is to ensure availability of all social strata and national communities basis for reliable electric power, to raise 60% rate the service and term to the whole of the national territory in the horizon 2025"

A number of actions envisaged relate to the promotion of renewable energy sources in particular: the development of the use of alternative forms of primary energy for the production of electricity (new and renewable energy, solar, wind, biogas).

The Government has also adopted in 2006, a Master Plan by 2015 which focuses on the need for electrical energy within the reach of all Congolese to vitality, particularly rural populations. The specific objectives of the Management Plan are to: i) reduce the imbalance of energy development between provinces; (ii) increase the rate of electrification at the national level from 121 electrified centres (urban and rural) 775 centres to electrify; (iii) to promote the electrification of rural centres through the use of new technologies for the power supply of the rural centres; (iv) retraining in hydroelectricity from the centers fed by thermal power stations; (v) promote exports.

In 2009, the electricity sector policy document proposes to respond to specific objectives including the promotion of all renewable energy sources other that hydropower, with notably the rational and sustainable use of wood fuels in substitution of diesel in the independent centres for thermal generation.

3. Purpose of the SREP financing

3.1. Identification of barriers to the deployment of renewable energies

Under the climate investment fund, it was set up the SREP financing to help countries develop renewable energy sector to contribute to the collective fight against climate change.

The various obstacles faced are:

- The lack of investments in the sector
- The poverty rate of the population
- The territory to cover very large with often dispersed habitats
- The absence of legal and regulatory framework clean renewable energy, suitable and attractive for private operators
- The absence of standards (quality control)
- Embryonic rural electrification
- The lack of a national rural electrification strategy
- The inadequacy of the resources allocated to the promotion of renewable energy over the past decades
- The slow mobilization of public and/or private funding
- The lack of viable projects in renewable energy
- The low capacity of the actors in the sector of renewable energies

3.2. Identification of potential sub-sectors and technologies for funding possible SREP

Potential sub-sectors eligible for possible SREP financing are:
Hydraulic energy, solar energy, wind power, biomass, geothermal energy.

The technologies covered by these different subsectors are:
- For hydroelectricity: small hydropower
- For solar energy: solar photovoltaic and solar thermal
- For wind power: wind turbines
- For biomass:
    - o technology for biogas (digester)
    - o biofuel technology
    - o wood energy (improved stoves, improved carbonization, agroforestry, reforestation)

-For geothermal energy: thermal power plant

3.3. Rationale for their prioritization in the SREP interventions

This prioritization in the SREP interventions justified for:

• hydro-electricity by:
- the availability of the resource;
- the lower cost of kWh;
- performance high compared to other technologies.

• Solar photovoltaic by:
- individual domestic solar kits;
- micro PV for collective equipment;
- application for isolated sites;
- energy, economic and environmental obvious (development of a local market, development of the industrial sectors with entrepreneurship, creation of jobs direct and indirect contribution to energy saving,...).

• wood energy by:
- sound management of the resource;
- energy cost is competitive and the price varies very little.
- energy which create jobs.

• biofuel by:
  - potential huge and varied;
  - certain species such as Jatropha curcas enhances the Savannah and marginal ecosystems.

- biogas by:
  - environmental sanitation;
  - production of organic fertilizers;
  - recycling of waste, public health and hygiene;
  - combating pollution and rural ecology.

4. Policy and Regulatory framework

4.1. Existing policies, legal framework, market and regulatory structure for the development of renewable energy

The Document of Electricity Policy from 2009 that is actually being updated deals with:
- the reform of the legal, regulatory and institutional framework;
- reform of the SNEL;
- the management of energy resources;
- participation in the regional integration projects (interconnection).

Within the institutional framework in the DRC, the entities in the energy sector are:

- The Ministry of Hydraulic Resources and Electricity (MHRE) plays a central role in the design of the electric sector policy.
- The National Commission of Energy (CNE) and its Department of Electricity and Renewable Energy, is a body for advice and studies under the supervision of the ministries responsible energy.
- The Cell of Technical Support to Energy (CATE), his main mission is to provide institutional support to departments in charge of energy and ensure the strengthening of the capacity of administrations and public enterprises of the energy sector.

- The Directorate of electricity and renewable energy of the General Secretariat from MHRE, the General Secretariat of Energy is a parent administrative entity. It assumes a role of police policy and is also responsible for enforcing the terms of the sector.

- The National Service of energy news (SENEN) within the Ministry of Rural Development: rural electrification under the Ministry of Rural development in collaboration with the Ministry of water resources and electricity and public works.

- The Ministry of the environment, Conservation of Nature and tourism (MECNT) identifies a national strategy in order to better develop the country's green growth. For this purpose, it has also set up the Centre of Adaptation and technical energy wood (CATEB) Directorate management forestry (DGF), as well as the Division: climate change and energy in the Direction of sustainable development.

- The Ministry of hydrocarbons: energy renewable, this Department has within its Directorate project oil an gas Division and support biofuel projects biofuels in the DRC.

- The National Agency of Rural Energy Service (ANSER): its role is to encompass all stakeholders active in rural electrification, public and private, and to become the leader in order to better focus the efforts of all everyone.

The analysis of these various institutions established statement of political, technical and strategic entities. Unfortunately, in practice, they result in overlapping, low coordination and the absence of a joint strategic planning.

A law on the liberalization of the electricity sector is pending enactment. It is designed to make high-performance sector, attracting private investors to the sector and promote a national energy development by recourse to the public-private partnership.

4.2. Potential impacts of public and private interventions in the fight against the obstacles.

Potential impacts may be counted among the following actions:

- Facilitation for the implementation of projects on renewable energy;
- Taxes, subsidies, exemptions and intermediation;
- The legal and regulatory framework facilitating investments private;
- Reduction of costs through the relief or the Elimination of taxes on importation of equipment and materials on renewable energies;
- Stimulation of new activities of the private sector in the deployment of renewable energies;
- The strengthening of the capacity of experts and technicians in the design, implementation and operation of renewable energy technologies.

4.3. Existing regulatory environment

The major constraint to up to solve the problem of development of production capacity and meet the needs of the populations on energy, remains indispensable way solving the funding equation. This will of course by a consolidation of the legislative and regulatory framework and the easing of investment codes to attract private capital.

It is among others;

- Liberalize the (current) energy sector;
- Conduct institutional reform (in progress also).
- Have the policy document of the energy sector electrical, valid in May 2009 and adopted at the level of the Government (ongoing process);
- Have a law of electricity that was adopted by the Parliament and pending its promulgation;
- Dispose of the renewable energy sector policy document;

Also have a code of renewable energy, in order to attract private investors and secure consumers, because it will define among others the tariff rules, standards and norms (initiative and ongoing attempt);

- To promote public-private or private-private partnerships and the transfer of technologies in the sector of renewable energies;
- Implement certain plans of actions or programmes to short, medium and long term to develop this sector.

- Facilitating the access of private sector funding for certain projects in the field of renewable energies, etc.
- Mobilize and involve all stakeholders (institutions, private partners, population, etc.) and encourage the formation of networks.

By the manifestation of this political will, the DR Congo can overcome these challenges in this sector, by the rehabilitation of electricity parks that are in most cases stop, by building new infrastructure and electric production plants, and by using all forms of renewable energy.

5. Institutional and Technical Capacities

5.1. Analysis of Institutional and Technical Capacity for Implementation

The liberalization of the electricity sector Act establishes a regulatory authority, national rural energy service agency equipped with a rural electrification Fund, promotes the entry of public and private operators, and encourages the public-private partnership for the development of the sector without forgetting the apportionment of responsibilities with respect to production, transport, use and operation of electric power from the central power the provinces and the decentralized territorial entities.

Regarding technical capacity, the electricity sector is occupied by the public operator (SNEL), a few private operators and independent auto-producteurs (mainly mining companies, religious groups, NGOs and community associations) without forgetting taking account of the training of local experts.

The National Commission of Energy which is a Body of Studies and Council of the Government in matters of energy has in charge the promotion and the dissemination of technologies on renewable energy information. It has a Demonstrating Center of new and renewable energy centre and running pilot projects such as:

• Implementation of the hydrauliennes to 5.5 kW-11 kW to Kikimi and Mahajan;
• The establishment of public lighting by solar panels in Dimbelenge, Munkamba and Bana Bantumba;
• The realization of Inongo and Lukalaba anemometric campaigns as part of a project for the electrification of these localities by the wind energy.

Directorate of Rural Electrification of the SNEL realizes the electrification of certain regions of the country by the extension of the network.

The National Service of news (SENEN) of the Ministry of Agriculture and Rural Development energy electrified some community centres by solar photovoltaics.

The Ministry of the environment, Conservation of Nature and tourism (MECNT) identifies a national strategy in order to better develop the country's green growth. For this purpose, it has also set up the Centre of Adaptation and technical energy wood (CATEB) Directorate management forestry (DGF), as well as the Division: climate change and energy in the Direction of sustainable development.

Horticulture and afforestation Directorate carries out several projects of reforestation and agroforestry with indigenous peoples.

There are also many private operators operating in the field of solar photovoltaic (Congo web, Sattel..), and artisan manufacturer of turbine for Microhydro (Goma).

About the ability of the Government to effectively absorb the additional funds, this will be facilitated through the establishment of overall energy planning capabilities and control of supply and demand for energy without forgetting the development of clear and precise deployment of renewable energy programs.

5.2. Preliminary Assessment of the Risk of Implementation.

Risks and challenges for the development of renewable energy are huge in DR Congo.
They follow the absence including:

- of an institutional and regulatory framework attractive to attract investors in this field;
- of a plan or a programme in this sub-sector in prospecting, survey, in order to identify and exploit favourable sites;
- of financing and mobilization of funds for feasibility studies and the implementation of many projects identified and non-identified;
- of local expertise to the technology transfer and appropriation of this sector;
- of exploitation and the adoption of other forms of renewable energy;
- taking into account environmental aspects;
- the security and governance.

6. Programs of Banks Multilateral Development and Development Partners

6.1. Brief Description of Ongoing and Planned Program

Investment funds climate (CIF) established by the multilateral banks for development with trust funds, i.e. funds of technology own (FTP), the strategic Fund for the climate (FSC) with its three programs:

- Investment program for the forest (FIP)
- Pilot program for climate Resilience (PPRC)
- Program to increase the scale of renewable Energies in countries with low income (SREP)

Since 2010, the DRC has been already pilot country of the investment program for the forest (FIP).

At the level of the Ministry of water resources and electricity, this is more intervention projects of bilateral and multilateral cooperation (donations and Credits) from the World Bank, ADB, EIB,...).

On open indicatively, the financing by the ADB, the World Bank, the EIB's studies of the site of Grand Inga (Inga 3 being the 1st phase), the interventions of the WB, ADB, EIB on the PMEDE, SAPMP, PMURR, etc...

Currently, with the initiative of the European Union for the energy facility of dialogue and partnership, the EU will attend the Ministry the creation of the national agency of Service energy Rural as well as in the implementation of the rural electrification projects.

6.2. How The Interventions Proposed for SREP would have a link to and would be based on these programs

A part of the proposed interventions, including in the field of production of plant fuels and hydraulic micro could rely on forestry investment projects to finance targeted calls for proposals and monitoring of projects in this area.

These interventions may also rely on Agriculture and rural development sector-based projects (ADB, WB, EU) in particular in the eastern provinces, where the micro-hydro potential is very important.

It will promote international cooperation on climate change, and will also develop the use of renewable energy to support, mobilize policies of the energy sector by additional funding by way of facilitate the REDD in the sustainable management of the forests of the three basins of the DRC, and thus contribute to the promotion of a low-carbon development which is the overall objective of the investment climate (FIC).