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Rehabilitation and Connectivity of INGA Dam

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# **REHABILITATION AND CONNECTIVITY OF INGA DAM**

## **Preamble**

One of the vital factors, which drives economic growth is a functional infrastructure. This fact explains the commitment made by the Heads of State and Governments in their Dar-es-Salaam Declaration adopted in the United Republic of Tanzania on 20 November 2004, to promote economic growth through regional cooperation to reconstruct the infrastructure within the countries of the Great Lakes Region (GLR). In addition, it was recognized in the Declaration that there is a need for cooperation in the utilization of the region's common infrastructure including that related to energy, transportation and telecommunications. Implementation of the proposed Rehabilitation and Connectivity of Inga Dam Project will go a long way in providing a vital infrastructure essential for resuscitation of the economies of these countries, recognized as essential if peace and stability are to prevail in the GLR. Undertaking the project will call for close collaboration and cooperation, as well as commitment of financial resources, as was foreseen and highlighted in the said Dar es Salaam Declaration.

## **Executive Summary**

The potential for hydropower generation of Inga site on the Congo River was recognized many years ago, in the fifties. It is estimated that this site alone could produce approximately 40,000 MW of electricity when fully developed. Inga on its own could therefore provide the total electricity requirement for Sub-Sahara Africa and still leave some for export outside the sub-continent.

But despite such a huge power potential, only a small portion of this has been developed to date. Inga 1 and Inga 2 were respectively developed in the seventies and eighties, to produce a combined total of 1775 MW. One would have expected plans for further development of Inga site, to follow soon after the construction of these two initial stages. However, so many years of endemic fighting in the region hampered further significant development to take place in this regard. Worse still, the installed facilities have not been well maintained over the years and can now only produce much less than their optimum capacity. In the meantime, demand for power in the surrounding regions has increased thus putting more pressure for the full development of Inga.

As the global demand and cost of energy keep rising, Inga continues to attract a lot of international attention. Pressure to embark on further expansion of the hydropower generation is also growing. However, considering the huge financial resources required for such expansion on one hand, and the fact that the existing power system requires a lot of rehabilitation work on the other, it is evident that the work on Inga can only be done in stages. Rehabilitation works are a priority as the existing system needs to function properly so that it can provide the

necessary platform for further expansion. The rehabilitation works are considered in this report, as the stage I works of the Rehabilitation and Connectivity of Inga Dam project. These works mainly involve rehabilitation of the existing generation and transmission facilities to enable the existing system to cope with internal demand and increased export particularly the Southern Africa Region. This initial stage of the project will also involve institutional reforms necessary to manage the follow-up expansion stages of the project.

But while feasibility studies have been carried out, detailed designs for the rehabilitation works and preparation of bid documents still need to be done before any works can start. This project document covers the Terms of Reference (TOR) of the detailed designs and bid documents preparation, as well as institutional and socio-environmental studies, which need to be carried out to prepare the Stage I works of the proposed project. The cost of these services is estimated as US\$ 1,602,750, and will take approximately five months to finalize. Since most of the power from Inga will eventually have to be exported, it requires collaborative efforts to carry out the study and implement the subsequent project. A Steering Committee will be constituted with representatives from the concerned countries and their Regional Economic Communities (RECs).

## **1. Introduction**

Among its many resources, the Democratic Republic of Congo (DRC) is endowed with abundant energy in the form of hydropower. It is estimated that the country's total hydropower potential is 100,000 MW, 40% of which is found at the Inga site on the Congo River. When fully developed, Inga site alone would produce approximately 40,000 MW, an amount which would far exceed the demand of the region leave alone that of the country. It has been estimated that such power output would be adequate to meet the power demand for most Sub-Saharan Africa, and possibly export the surplus to the Middle East and Europe. The hydropower potential of Inga site has for many years attracted a lot of interest from all corners of the world and particularly from the regional organizations including the ECCAS, ECOWAS and SADC, and financiers like the AfDB, World Bank, EU and individual countries. Inga hydropower is also one of the major regional projects identified as a priority by NEPAD. However, despite this big potential, only a small portion (approximately 1775 MW) has been developed to date.

Currently, a total of 2475 MW of generation capacity (including the 1775 MW from Inga) has been installed in the DRC. However, due to the many years of instability in the GLR, and due to neglect including lack of adequate and regular maintenance, the actual current output from existing capacity is much less than this figure. At the same time, the pressure to further develop the generation capacity has increased due to ever growing demand for cheap energy within and outside the region. DRC is also eager to exploit its enormous power export potential.

Development of the total capacity of Inga will take time and a lot of financial resources. As such a staged development programme is proposed. The Stage I of the proposed project is meant to rehabilitate existing system, including restoration of the total installed output from Inga, as well as institutional reforms to prepare for the next development phases of the same site.

## **2. Background**

Inga site is located approximately 80 km upstream of the Port of Matadi on the Congo River. The power potential for Inga was recognized many years ago with the first studies having been carried out in the fifties. It was foreseen at the time that the development of hydropower would be carried out in two phases. The Phase I would include Inga 1, Inga 2 and Inga 3 to generate between 3,000 MW and 4,500 MW of electricity. Phase II, referred to as Inga 4 (or Grand Inga), would realize the whole power potential for the site of approximately 40,000 MW. This would involve staged construction of Inga 4 executed over a long period of time. Already, a total of 1775 MW generation capacity has been installed. Inga 1 was constructed in 1972 with an output capacity of approximately 351 MW. Inga

2 was constructed ten years later (1982) with an installed capacity of 1424 MW. Inga 3 has still to be installed to complete the development of the Phase I of Inga with approximately 4,000 MW. These initial three stages would entail diversion of some of the Congo River water and generating electricity as it falls into the Nkololo valley, on its right hand side. The main development would come during Phase II, when Inga 4 (Grand Inga) would be constructed in several stages and over an extended time frame, to develop a total of approximately 40,000 MW.

However, as indicated above, the current electricity production within the DRC is much lower than the total installed capacity of approximately 2,487 MW, including production from Inga 1 and Inga 2. This is due to several reasons. For one, most of the existing infrastructure ranging from production, transmission and distribution throughout the country is in an advanced state of deterioration due to lack of resources, inadequate operation and lack of regular maintenance. At the same time, the main consumers of electric power within the DRC, was for many years the mining industry. However, this has for a long time, suffered serious setbacks due to instability, and also due to adverse international market conditions for minerals. This fall in internal consumption of electricity has been reflected in reduced production. Due to these constraints, the actual power production is known to be much less than the present installed capacity indicated above. In addition, the total length of high voltage (HV) transmission lines of approximately 5,548 km and the total number of 66 HV sub-stations, all require rehabilitation, not to mention the distribution system itself.

Nevertheless, despite the reduction in production as well as transmission capacity, DRC has maintained its power exports to the neighbouring countries and also to the Southern Africa Region. Approximately 65MW is exported to Congo, 100 MW to South Africa, and 110 MW to Zimbabwe. The demand for exported power from the DRC is huge in most regions of Africa and is only limited by lack of capacity to produce and deliver.

Over the years, the huge hydropower potential has attracted a lot of studies on one aspect of power or other within the DRC. Many more are likely to be carried out as demand for power to drive industries continue to rise in many parts of the African Continent and beyond. Some of the recent studies carried out or proposed include:

- i) A feasibility study on the rehabilitation works required to restore the full capacity of existing production and transmission facilities within DRC. The study identified the rehabilitation works to be carried out as follows:

	Rehabilitation works	Cost in US\$ *1000
1.	Rehabilitation of the Zongo, Mpozo, Nzilo, Nseke, Mwadingusha, Inga 1 and Inga 2	156

2.	Rehabilitation of Kinshasa City Network + Condenser Batteries	23.90
3.	Rehabilitation of Inga-Kolwezi HV Line	23.70
4.	Rehabilitation of Inga-Kinshasa Line	2.50
5.	Rehab of Kisangani & Kananga distribution network	4.70
	<b>Total Cost</b>	US\$211 million

- ii) Similarly, the AfDB financed in 1997, DRC/Egypt Interconnection Study to assess the feasibility of tapping Inga to provide power to Egypt and also tapping the transmission to supply the countries along the way. During this study, investigation on the generation capacity of Inga was carried out to prefeasibility study level. This was in addition to preliminary investigations earlier carried out in 1974 by EDF (France) on the development of Inga. From these studies, indicative costs of the various components are given in the table below:

	<b>Component</b>	<b>Cost (US\$*1000)</b>
1.	Construction of 2 <sup>nd</sup> Inga - Kinshasa line	83.00
2.	Inga North (Inga-Cairo) Highway	5,753
3.	Southern Highway (Eastern Corridor+Western Corridor)	1,050
4.	Western Highway (Western Corridor)	600
5.	Construction of Inga III Power Station	3,500
6.	Construction of Great Inga	8,115
	Total	19.10 billion

- iii) In connection with Inga and as part of the power master plan of the Central Africa region, the African Development Bank (AfDB) is financing a study on Interconnectivity of Electricity Networks within the Economic Community of Central African States (ECCAS). The study whose funding is already in place, is expected to start soon. It is aimed at preparing an interconnectivity programme, which will facilitate increased access to electricity in most parts of the region, reduce costs and preserve the environment. ECCAS has formed a power pool for the region, PEAC, (Pool Energetique de l'Afrique Centrale) to facilitate and ensure proper management of power distribution and pricing within the region;
- iv) There are several other studies in the pipeline including (i) The Grand Inga Integrator Study considered a priority under the NEPAD's list of regional projects and proposed for financing by AfDB. The study would look into the feasibility of developing the Inga hydropower potential for the African sub-regions and for export outside the continent. It would also investigate the viability of integrating the regional power systems (ii) The feasibility Study of Inga 3, proposed by Westcor, a company

formed by a number of southern Africa countries in agreement with the DRC, to develop this last stage of Phase I development of Inga, for supply to the southern Africa region.

As the above studies show, further development of Inga will mainly be to satisfy the main power markets of southern, western and northern Africa regions. It is also expected that ultimately, Inga power could find its way to the Middle East and Europe.

### **3. Problems to be Resolved**

The main problems to be resolved to enable the project to proceed include:

- i) The apparent lack of coordination – while DRC is the main project promoter, there is a need for coordinated efforts among the regional organizations including SADC, ECCAS (PEAC), and ECOWAS, to ensure synergy and simultaneous development of power and its transmission to identified markets;
- ii) While a lot has been discussed about the huge power potential of Inga and how it would benefit many regions of the continent, and studies on the same carried out, the long period of political instability in the Central African region including that of the Great Lakes, has damped the international enthusiasm and interest shown in tapping the great power potential of Inga. This would explain the fact that there has not been any further expansion of generating capacity at Inga since 1982 when Inga 2 was completed. Such massive development cannot be undertaken in an atmosphere of instability and the problem has to be addressed to ensure sustainability of such developments;
- iii) The national Electricity Authority of DRC (SNEL) is now an all purpose company and undertakes generation, transmission and distribution. In order for the company to cope with the demands of the modern times and also conform to the current management practice in the power sector, there is a need to reorganize and restructure this institution. There has been proposals to separate the company's various major areas of operation i.e. production, transmission and then distribution.

### **4. The Main Constraints to be Overcome**

Some of the main constraints which need to be addressed when considering further hydropower development at Inga site include:

- i) As shown above, there is a need to urgently strengthen the institutional capacity of SNEL, ECCAS (the regional REC), so that they can cope

- with the manpower and expertise demanded by future developments of Inga;
- ii) It has also been pointed out that the level of investment required to undertake further development of the Inga site is very high indeed. This therefore calls for close cooperation among all the stakeholders, collaboration and coordination in order to raise this level of funding. The funding would have to be sourced from both the private and public sectors, taking into consideration the wide interests generated by the huge power potential of the Inga site;
  - iii) All the same, some factors including the level of funding required for the project, the status of existing infrastructure and the general conditions on the ground, dictate that the resumed development of Inga site including rehabilitation of the existing power infrastructure be carried out in stages. Rehabilitation of installed facilities including Inga 1 and Inga 2 are a priority and should be considered as the Stage I development works. Construction of Inga 3 should then follow and lastly that of Inga 4;
  - iv) The very sheer scale of development of Inga, coupled by its very wide range of stakeholders, makes project implementation a complicated process. This makes the project vulnerable to competition from other much smaller, less expensive and easier to manage hydropower development in the surrounding regions;
  - iv) Transmission of the huge amounts of power (high voltages exceeding 500 kV) over long distances is also a novelty in the region and poses serious though surmountable technical challenges.

## **5. The Inga Stage I Project**

### **5.1 General**

As pointed out above, the sheer magnitude of the rehabilitation works that has to be done to put the existing electricity system within the DRC in an optimum state of operation, and that of the further development of the Inga site including generation and distance transmission, means that the project will have to be done in stages. Logically, the Stage I will comprise the rehabilitation of the existing generation and transmission facilities, and institutional development and support, in order to prepare for the next stage of development of the huge Inga hydropower potential. The Stage I works are referred to as the project, and are the subject of the rest of this report.

### **5.2 Project Objectives**

The overall objective of the project is to reinforce regional integration and promote economic development by tapping the abundantly available hydropower potential within the DRC, for common use by the people within Central Region

including those of the Great Lakes, and exporting the surplus to other regions including southern, western and even northern regions of Africa. The specific objective of the project is to restore the full electricity generating capacity of Inga 1 and Inga 2, including the transmission lines, and also improve the management of the services, in order to prepare for further development of the power sector in DRC including the Inga site.

### 5.3 Project Description

The project will comprise the rehabilitation of the existing power infrastructure including transmission lines to Kinshasa, Congo, Kisangani and to Kolwezi, substations, the existing system in Kinshasa, and other ancillary works. The existing power generation plant and equipment at Inga 1 and Inga 2 shall be rehabilitated and refurbished, as well as any civil works on the inlet and outlet systems. The project shall also involve institutional support to ECCAS and SNEL, including the restructuring of the latter in order to improve its effectiveness and efficiency in the delivery of electricity to its customers.

As pointed out elsewhere above, feasibility studies have been undertaken for the rehabilitation works on the existing system. The various components of the Stage I project will include the following:

- A. Rehabilitation of existing system
  - i) Rehabilitation of Inga 1 and Inga 2 (restore power production to 1775 MW);
  - ii) Rehabilitation of the existing transmission network of HV lines (5548 km);
  - iii) Rehabilitation of the existing substations (66 No.);
  - iv) Rehabilitation of the existing Kinshasa electric power system;

In order to facilitate implementation of Stage I, detailed designs and bid documents for the above rehabilitation works need to be prepared including setting up institutional organs to foresee the development of power at Inga. Consultancy services will therefore be required to prepare these works for implementation. The consultancy services are briefly described in the following sections.

## **6. Consultancy Services**

The objective of these services is to prepare the Stage I works of the Inga Dam project for implementation. These services shall comprise detailed engineering designs of the rehabilitation works, socio-environmental studies to assess the impacts of the proposed works, and studies to recommend the appropriate institutional framework required to meet the demands of future development of

electricity within the DRC and for Inga in particular. These studies are described in more details below.

### 6.1 Detailed Designs and Preparation of Draft Bid Documents

A firm of consultants shall be engaged to undertake the following services. The existing feasibility studies shall form the basis of the detailed designs by the consultant. Briefly the work of the consultant shall include but not limited to the following:

#### i) **Detailed Designs and Preparation of Bid Documents:**

This work will be carried out by a consultant in order to prepare the Stage I of the project for implementation. Feasibility studies for the rehabilitation works have been carried out and the consultant shall use these as the basis for the preparation of the detailed designs. Briefly, the consultant shall:

- Review all available documents on previous studies on the rehabilitation of the existing electricity system within DRC including generation facilities (Inga I & II), transmission and distribution;
- Carry out field investigations on the rehabilitation works to be done on these installations including necessary surveys and testing;
- Prepare detailed designs of the necessary works to restore the operation of all equipment and plant to their optimum capacity, including schedule of materials for use during operation and maintenance by the utilities;
- Carry out estimates of the cost of the works clearly broken down to logical components;
- Prepare the most appropriate contract strategy for implementing the works, which should as far as possible encourage private sector participation in the project implementation;
- Accordingly, prepare details and specifications of the goods to be supplied, performance of equipment and the quality of work to be undertaken during rehabilitation works;
- Decide on the number of contract packages for the various categories of work and prepare draft bid documents for each of the recommended packages;
- Prepare a detailed implementation programme clearly showing the critical milestones for each works contract and how they relate to each another.

#### ii) **Social and Environmental Impacts Study**

The same consultant providing the above technical studies (i) shall undertake the socio-environmental studies regarding the proposed Stage I project. In brief the consultant shall:

- Study the condition of the existing power facilities and collect data to establish the prevailing environmental and social conditions, biodata, social and economic activities including public health data, demographic information, etc.
- Identify all the significant potential impacts arising from the execution of works or during post construction operation and maintenance; including negative impacts during works construction, delivery of materials, plant and equipment, and from increased traffic during construction;
- Identify potentially significant socio-economic impacts arising from the projects including positive; like job creation during construction and later during maintenance, jobs creation through increased economic activities and improved social services spurred by increased availability of reliable electricity supply, and negative impacts; displacement of people, destruction of property including use of land. Socially, the potential impacts from the health point of view would include risks from the influx of new people including laborers into the project areas, and therefore increase the risk of transmission of diseases like TB, HIV/AIDS and other STDs;
- All potential impacts shall be analysed in order to identify the significant ones for more detailed analysis including mitigation measures, the costs involved and the programming of such work. Specific components shall be prepared to address all potentially significant social and environmental impacts;

### iii). **Institutional Building and Support Services**

The same firm of consultants undertaking the above two sets of studies, shall study the current institutional arrangements and recommend the best way of restructuring SNEL, taking into account experiences with similar exercises carried out within other neighbouring regions. It is expected that like most other big former power utilities in other regions, SNEL will be unbundled into three utilities including one for generation, another for transmission, and finally one for distribution. Briefly the consultant shall:

- Study of the current operations of SNEL including levels and categories of staffing, institutional structure, financial performance;
- Prepare current inventory of the utility's assets and liabilities;
- Taking examples of recent similar utility restructuring, prepare business plans for each of the areas of operation including generation, transmission and distribution, clearly indicating what would be required to make each of these operate as independent and economically viable entities;
- Prepare an organizational structure for each of the three entities clearly showing the human resource requirements of each, including numbers, qualifications and experience, as well as technical assistance. Criteria to be used in deciding the present staff of SNEL to be absorbed into the new utilities shall be established;

- Estimate the resources required in terms of equity, office accommodation, supplies, plant and equipment, etc, to make these entities functional;
- The consultant shall clearly demonstrate what needs to be done to bring the private sector to participate fully in the operations of all the three entities including investment in the sector development;
- Prepare estimates clearly broken down, of costs involved in putting these institutions in place including an implementation programme, as well as any technical assistance required;
- Propose the most appropriate mix of funding for the propose Stage I works;
- Examine the staffing requirements of ECCAS, and economic community for the region (REC), to enable it to play its full role in the proposed and future developments of electricity within DRC and the region;
- Carry out economic and financial analysis of the Stage I works in order to justify the investments of the proposed initial stage of the works.

## 6.2 Cost Estimates for the Consultancy Services

**Table 4.1 Consultancy Services Cost Breakdown (in US\$)**

No	DESIGNATION	NUMBER		Unit Price \$	Total Amount \$
		In the field	Home Office		
1	HONORARIUM				
1.1	Key Consultant's Staff				
	Project Director (Consultant's Head office)	1 mm	0.5mm	10,500	15,750
	Study Manager (Electrical Engineer)	4	1	10,500	52,500
	Generation Engineer	4	1	10,500	52,500
	Electrical Engineer	4	1	10,500	52,500
	Mechanical Engineer	3	1	10,500	42,000
	Civil Engineer	4	1	10,500	52,500
	Structural Engineer	2	1	10,500	31,500
	Instrumentation Engineer	2	1	10,500	31,500
	Surveyor	4	1	10,500	52,500
	Procurement Specialist	2	1	10,500	31,500
	Financial Management Specialist	4	1	10,500	52,500
	Utility Economist	3	1	10,500	42,000
	Socio-Economist	4	1	10,500	52,500
	Institutional Building Specialist	3	1	10,500	42,000
	Human Resources Dev/Training Specialist	4	1	10,500	52,500
	Environmentalist	4	1	10,500	52,500

	Legal Specialist	3	1	10,500	42,000
1.2	Support Personnel				
	Secretary (2 No.)	10	-	1,500	15,000
	Assistant Surveyor (2 No.)	8	-	2,000	16,000
	Technician (2 No.)	8	-	2,000	16,000
	Drivers (2 No.)	10	-	1,200	12,000
	Messenger	5	-	1,000	5,000
	<b>SUB TOTAL HONORARIUM</b>				<b>814,750</b>
2	ACTIVITIES AND FIELD WORKS				
	Surveying and Mapping				60,000
	Field and Laboratory Tests				40,000
	Miscellaneous				30,000
	<b>SUB TOTAL FIELD WORKS</b>				<b>130,000</b>
3	PER DIEM, LOGISTICS AND TRAVELS				
	Per Diem	1720days	250		430,000
	Air Transport	23 trips	2000		46,000
	Surface Transport				50,000
	Computers and related office work	6 units	2000		12,000
	Reproduction and Documentation				35,000
	Office accommodation				15,000
	Communications				10,000
	<b>SUB TOTAL ITEM 3</b>				<b>598,000</b>
4	STAKEHOLDERS SEMINAR				30,000
5	COORDINATION AND MANAGEMENT (Study Coordination and Steering Committee)				20,000
	Miscellaneous				10,000
	<b>SUB TOTAL ITEMS 4 &amp; 5</b>				<b>60,000</b>
	<b>TOTAL COST (1+2+3+4+5)</b>				<b>1,602,750</b>

### 6.3 Studies and Project Financing

In line with the trend in the developments in the power sector, the private sector is expected to eventually play an increasing role in all aspects of service delivery in the DRC. However, with the run down state of the electricity power supply

within the country, it is unlikely that the proposed consultancy services could attract any private sector funding. Therefore, it is expected that the cost of these preparatory services (including technical, institutional, and the socio-environmental studies) will have to be financed by both donors and public funding.

One of the objectives of the study is to come up with a plan on the best way to disbundle and restructure the existing National Electricity Utility (SNEL) in order to usher in efficiency and effectiveness in the management of the electricity supply within DRC and in other regions as described in the sections above. The resultant improved management and performance of the sector would in turn attract private sector funding for implementation of some aspects of the Stage I project, and also the foreseen future developments. Furthermore, with peace prevailing in the country, it is expected that power generation, transmission and distribution would attract a lot of competition from the private sector. Similarly, developing the full potential of Inga site will be a challenging and difficult task and would be best done by the private sector.

In connection with the above, the consultant is expected to recommend the most appropriate mix of finances for the implementation of the project and also for the management of the services.

## **7. Implementation of the Consultancy Services**

As pointed out above, a firm of consultants will provide these services. It is estimated that the studies involved will be carried out within a short period of five months. The services are complex and varied, as they include both technical, institutional as well as socio-environmental aspects. The last aspect of the study will call for a lot of consultations with all the stakeholders including local communities through workshops conducted for this purpose, in order to generate interest and promote project ownership by the local people. In view of this, the consulting firm will be expected to deploy within short period of time, a lot of staff in order to cover all aspects of these services.

But even before a study can start, there will have to be general agreement on the way forward by all stakeholders, especially those who have shown persistent interest in the development of the great hydropower potential of Inga site in the DRC. It is therefore imperative to call for a meeting of donors, regional RECs and NEPAD, together with the power utilities in the GLR, in order to launch this first stage of what would be a long term development programme for electricity within the Central Africa Region.

The following are key milestones on the way forward:

Table 7.1 – Feasibility Study - Implementation Schedule – Key Landmarks

	<b>Activity or Event</b>	<b>Responsible Party (ies)</b>	<b>Target Date</b>
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1.	Project Sponsors/Donors Meeting	DRC/ECCAS/SADC/NEPAD/Donors	May 2007
2.	Fund raising for the Study	DRC/ECCAS/SADC/NEPAD/Donors	July 2007
3.	Recruitment of the Consultant	SNEL/ECCAS	October 2007
4.	Commencement of Study	Consultant	November 2007
5.	Stakeholders Workshops	Consultant & Stakeholders	February 2008
6.	Completion of Study	Consultant	April 2008

## 7.2 Institutional Arrangements

SNEL as the Power Utility for DRC will have the overall responsibility of implementing the project preparation services and in its implementation thereafter. Due to its regional nature, a Project Steering Committee will be constituted to provide advice, guidance and political leadership, in order to build and maintain consensus, necessary to move the project forward. The Steering Committee will comprise representatives from the RECs from the surrounding regions including ECCAS, SADC, COMESA and from the DRC. NEPAD should also be closely involved and provide support particularly in connection with the organisation of funding of both the services and development works.

## 8. **Project and Study Justification**

The great power potential within the DRC and especially Inga site, has for many years, attracted a lot of international attention and interest. With the ever-increasing international demand for cheap and clean energy, the interest on the development of Inga is only bound to increase with time. However, while the interest has mainly been focused on developing power for export, DRC itself is very poorly serviced due to the many years of unrest and inadequate management of resources. The existing system, which should form the basic core for future power development for use within or outside the country, requires urgent attention to restore its former degree of performance. Without the internal power system being put back into some semblance of normal operation, it will be difficult to develop power for export. It is therefore necessary that the rehabilitation of the existing systems be undertaken urgently so as to establish a platform from which to build the rest of the development stages of power in the Central Africa Region.

One of the reasons for the current sorry state of the power infrastructure in the DRC, is due to weaknesses of the responsible institutions. Experience

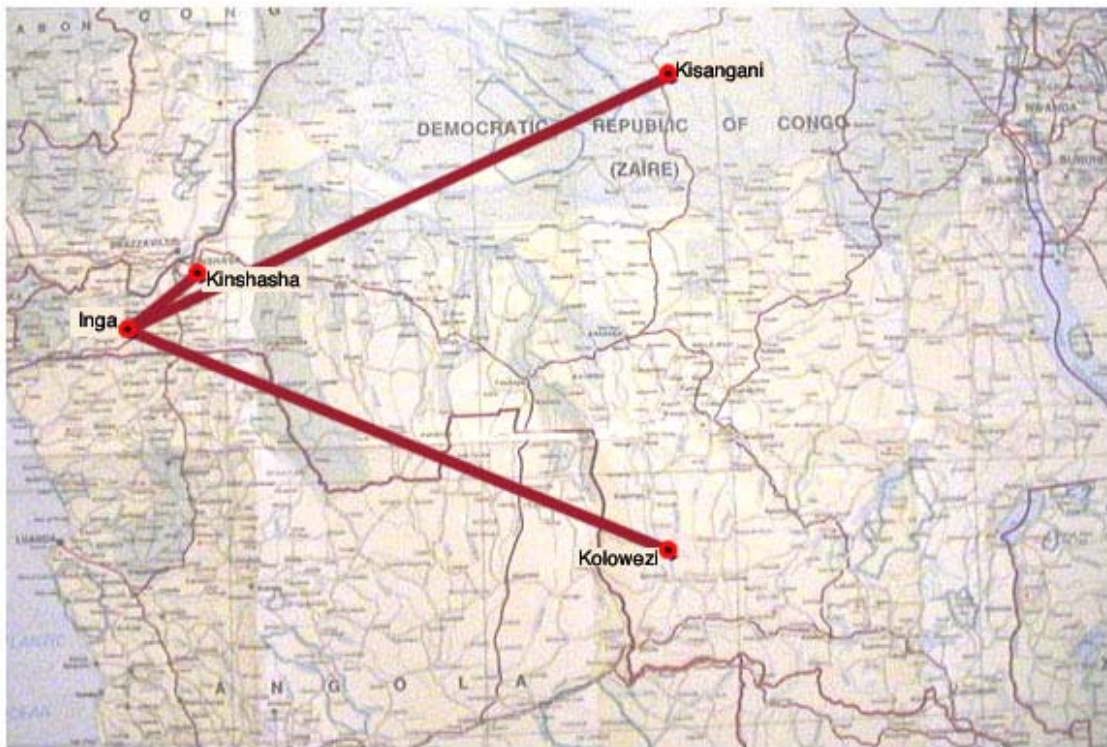
everywhere is showing that traditional national power utilities can no longer cope with the modern demands for the sector. Even the implementation of Stage I developments as discussed in this paper will be very demanding institutionally. It is therefore necessary to put in place more focused institutions capable of coping with the more demanding future developments of the sector. As such, the proposed study on institutional restructuring will go a long way in meeting the future challenges of both human and financial resources.

## **9. Risk Assessment and Mitigation**

The sheer magnitude of the power resources when Inga is fully developed is perhaps its greatest attraction. But this could also be its inherent weakness. The huge resources required to rehabilitate the existing systems and the to develop the future stages on one hand, and the fact that this power will mainly be for export, bring a lot of factors into play. International cooperation to raise the resources required to exploit these resources and their subsequent management very challenging. The project could therefore experience challenges from other smaller power developments in the surrounding regions including the potential on the Zambezi and other major rivers in the southern Africa.

Unless completely eradicated, insecurity in the GLR is bound to have negative impacts on developments in the scale of Inga. Without lasting peace, financiers and even potential long distance customers for electricity from the region, could be discouraged from participating in its developments. In particular, the private sector would find it difficult to invest in an unstable region. In addition, development of full power potential of Inga, would require close cooperation between all stakeholders. The current climate where there is very little cooperation between the different RECs, would have to change in order to make the proposed power development possible.

## REHABILITATION & CONNECTIVITY OF INGA DAM PROJECT



## REHABILITATION AND CONNECTIVITY OF INGA DAM PROJECT PREPARATION STUDIES - MATRIX

<b>Narrative Summary (NS)</b>	<b>Verifiable Indicators (OVI)</b>	<b>Means of Verification (MOV)</b>	<b>Important Assumptions</b>
<p>Project Sector Goal:</p> <p>1. The overall objective of the project is to reinforce regional integration and promote economic development by tapping the abundantly available hydropower potential within the DRC, for common use by the people of Central Region including those of the Great Lakes, and exporting the surplus to other regions including southern, western and even northern regions of Africa.</p>	<p>1. Adequate hydropower is produced at Inga site to meet the power demand for the Central Africa Region including Great Lakes Region, and excess exported to other regions of Africa;</p>	<p>1. Statistics from the Governments of the Great Lakes Region</p>	<p>(Goal to Supergoal)</p>
<p>Study Objectives:</p> <p>1. To prepare for implementation works of the Inga hydropower project.</p> <p>2. To restructure and reorganize the sector institutions including that of SNEL</p>	<p>1.1 Bid documents used as the basis of procurements of the Stage I rehabilitation works and services;</p> <p>1.2 Recommendations of the institutional study reports</p>	<p>1. Study Progress Reports</p> <p>2. Supervision and audit reports</p>	<p>(Project Objective to Goal)</p> <p>1. Continued peace continues to prevail in the GLR;</p> <p>2. Financing of the rehabilitation works is put in place and the works are implemented without delays;</p> <p>3. SNEL is successfully restructured.</p>

	adopted and SNEL disbundled.		
<p>Outputs:</p> <ol style="list-style-type: none"> <li>1. Details designs and cost estimate of the rehabilitation works of the Stage I;</li> <li>2. Socio-environmental assessment and identification of all issues and significant impacts, mitigation measures and related costs;</li> <li>3. Recommendations of the most appropriate project financing and implementation strategies;</li> <li>4. Recommendation on the most suitable institutional arrangements for project implementation and management of the pipeline.</li> </ol>	<ol style="list-style-type: none"> <li>1.1 Detailed design reports accepted and recommendations adopted.</li> <li>1.2 The Socio-environmental analysis report accepted after successful consultations with stakeholders;</li> <li>2.1 The recommendations accepted and adopted, and project funding secured;</li> <li>2.2 The recommendations accepted and adopted;</li> </ol>	<ol style="list-style-type: none"> <li>1. Study progress reports</li> <li>2. National statistical reports</li> <li>3. Audit reports</li> </ol>	<p>(Output to Project Obj.)</p> <ol style="list-style-type: none"> <li>1. Adequate commitments by the concerned governments, RECs and demonstration of strong political will;</li> <li>2. Timely adoption of the study recommendations;</li> <li>3. Keen participation in the stakeholders' seminars and adequate consultations during study duration.</li> </ol>

<p>Activities:</p> <ol style="list-style-type: none"> <li>1. Sourcing of Funding for the study.</li> <li>2. Recruitment of Consulting Firm.</li> <li>3. Execution of the study;</li> <li>4. Stakeholders seminars;</li> <li>5. Donors/Financiers conference on project financing.</li> </ol>	<p>Inputs:</p> <p>Total study costs: US\$ 1,603 million</p> <p>Resources: TBD</p> <p>Financing Plan: TBD</p>		<p>(Activity to Output):</p> <ol style="list-style-type: none"> <li>1. Timely sourcing of funding and commencement of the study.</li> </ol>
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