

Section 5

**Terms of Reference for
Comprehensive Basin-Wide Study of Power
Development Options and Trade Opportunities**

Revisions	Date	Description of Changes Made
Rev 1	07-8-2009	Word "Draft" deleted on page
		Section 6.9.1.2 reference to section 3.6.1 has been corrected to 6.9.1.1
		Section 6.15.1, a third bullet has been inserted in second paragraph.

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Regional Power Trade Project

Terms of Reference for

Comprehensive Basin-Wide Analysis of

Long-term Power Supply, Demand and Power Trade Opportunities

1 BACKGROUND

The Nile Basin Initiative. The Nile Basin Initiative (NBI) is a partnership of the riparian states of the Nile¹ and seeks to develop the river in a cooperative manner, share substantial socioeconomic benefits, and promote regional peace and security. The NBI began with a participatory process of dialogue among the riparian states that resulted in the agreement on a shared vision: to “achieve substantial socioeconomic development through the equitable utilization of, and benefit from, the common Nile basin water resources,” and a Strategic Action Program to translate this vision into concrete activities and projects².

The Strategic Action Program. The NBI’s Strategic Action Program is made up of two complementary programs: the basin-wide *Shared Vision Program* (SVP) to build confidence and capacity across the basin and *Subsidiary Action Programs* (SAP) to initiate concrete investments and action on the ground at sub-basin levels. The programs are reinforcing in nature. The SVP, which focuses on building regional institutions, capacity and trust, lays the foundation for unlocking the development potential of the Nile, which can be realized through the SAP. These investment-oriented programs are currently under preparation in the Eastern Nile and the Nile Equatorial Lakes Regions (ENSAP and NELSAP). The SVP includes seven thematic projects related to environment, power trade, agriculture, water resources planning and management, applied training, communications and stakeholder involvement, and macro-economics. An eighth project, the SVP Coordination Project, aims at building capacity at the NBI secretariat for program execution and coordination. The SVP is being executed by the Secretariat of the Nile Basin (Nile-SEC) on behalf of the Nile Council of Ministers³ (Nile-COM). In executing the program, the NBI is supported by a Technical Advisory Committee drawn from participating member countries.

The Nile Basin **Regional Power Trade Project** (RPTP) is one of eight projects being implemented under the SVP of the NBI. The project aims to facilitate the development of regional power markets among the ten Nile Basin countries (Burundi, DRC, Egypt, Eritrea, Ethiopia, Kenya, Rwanda, Sudan, Tanzania and Uganda) and build analytical capacity to manage the Nile Basin Resources in keeping with the Vision articulated by the Nile riparian states.

Cheap and reliable supply of electricity is a critical input for economic growth, employment generation and poverty alleviation. As such, the long-term objective of the Nile basin RPTP is to improve access to reliable and low cost power in the Nile Basin in an environmentally sustainable manner. An important element in achieving this goal is to create an institutional, regulatory and cooperative framework to promote and develop power trade opportunities among the countries participating in the Nile Basin Initiative. The creation of a regional electricity market can play a key role in furthering co-operation among the Nile basin states

¹. The Nile riparian countries include Burundi, Democratic Republic of Congo, Egypt, Ethiopia, Kenya, Rwanda, Sudan, Tanzania, and Uganda. Eritrea is currently participating in the NBI as an observer.

². Nile Council of Ministers, Policy Guidelines for the Nile River Basin Strategic Action Program, February 1999.

³. Ministers in charge of water affairs in the Nile Basin member states

and in ensuring that the hydropower resources of the Nile Basin are developed and managed in an integrated and sustainable manner.

The RPTP intends to achieve its objectives through two key project components:

- The establishment of a conducive environment to support continued discourse and promote power trade among Nile Basin countries. This will enable stakeholders from the Nile Basin countries to work together to promote basin-wide cooperation and awareness, enhance understanding and build capacity on power trade and water resources management skills. During the initial stages of the power market development, it is expected to promote the following three objectives: (i) formation of an institutional infrastructure for power market development; (ii) a learning environment for understanding the nuances of legal, regulatory and pricing regimes for regional power trade; (iii) identification of power generation and transmission projects that will benefit power trade among the Nile Basin countries.
- Comprehensive basin-wide analysis of long-term power supply, demand and trade opportunities in order to inform the planning and management of multi-purpose river basin projects in the Subsidiary Action Programs of the NBI.

2 OBJECTIVE

The objective of this study is to undertake an inclusive and participatory comprehensive basin-wide study of power development options (including backbone transmission and interconnection corridors) in the Nile Basin (Burundi, Democratic Republic of Congo, Egypt, Eritrea, Ethiopia, Kenya, Rwanda, Sudan, Tanzania and Uganda) and Djibouti. The study will analyze the status of power supply, interconnectivity, demand and trade opportunities in the region in the context of multipurpose water resource development and shall include proposals on investment and funding arrangements and a detailed implementation plan covering a 35 year time horizon to translate the study into concrete actions at sub-basin and basin levels.

The Eastern Africa Power Pool (EAPP) is currently undertaking a Regional Power System Master Plan which focuses on the 20-year time horizon, to 2030. The Consultant will be expected to review the final report of this study and to incorporate into the Comprehensive Basin-wide Study any pertinent recommendations in it.

An important element of the comprehensive basin wide study will be to identify and assess options for development of major regional generation and transmission projects. This recognizes that implementation of major regional projects may provide the best opportunity for stabilizing or even reducing long term future cost of electricity, and improving supply.

The outcome of the process is anticipated to be a power development strategy that will put forth different power development options, including an assessment of their economic and engineering feasibility as well as environmental and social impacts, to allow for informed and transparent decision-making in the selection of power investments. A further outcome is expected to be the definition of a “transmission backbone” which will form the major link between the respective country grids as part of a long-term interconnection strategy.

The assessment will be developed to define the best options to meet the expected electricity demand in the region, taking into account economic, financial, technical, environmental, social and political considerations. The study will take full cognizance of the proposed regional power trade and power market. The assessment will be performed in close consultation with key stakeholders in the region.

3 RATIONALE FOR THE PROJECT

There are two key studies related to the review of relevant power studies and power-related water management studies. These are:

- Strategic/Sectoral Social and Environmental Assessment (SSEA) whose objective was to provide an analysis of the social and environmental issues surrounding possible power development options in the Nile Equatorial Lakes Region of Africa and to rank the various options based on a combination of cost, social, environmental and risk considerations.
- The Eastern Nile Power Trade Program study, whose objectives were to provide a market and power trade assessment for the countries of the eastern Nile, to provide an energy sector profile and projections in the three countries, a ranking of hydro sites and pre-feasibility studies on three sites. The work will include an investment plan and a legal framework.

The Eastern Nile Technical Regional Office commissioned the Eastern Nile Power Trade Program Study, which was completed in 2007 (various modules at various times) and covered the countries of Egypt, Ethiopia and Sudan. The Nile Equatorial Lakes Strategic Action Program commissioned the Strategic/Sectoral Social and Environmental Assessment (SSEA) which was completed in early 2007 and covered the countries of Burundi, Kenya, Rwanda, Tanzania and Uganda as well as the Eastern part of the DRC.

Both studies provide similar results for their respective geographic areas and these include:

- regional generation planning, assessment, evaluation and selection,
- comprehensive power sector master planning,
- load forecasting and growth pattern modelling,
- regional power sector policy development and regulation,
- regional power market and power trade analysis
- economic and financial assessment of power projects,
- power project EIA and Socioeconomic evaluation,
- project Risk assessment, evaluation and mitigation planning,
- interactions with stakeholders

These two studies include all the riparian states except Eritrea, although only the Eastern part of the Democratic Republic of Congo is included

Thus the reports for both ENSAP and NELSAP are recent, comprehensive and provide similar information for all the countries in the basin.

There is, however a significant gap in the database in that most of the hydro resources of the DRC (which could amount to 100,000 MW) were not included in either study. Eng. Male⁴ has prepared an excellent compendium of hydro resources of the DRC. The compendium lists all the identified hydro sites in the country. A review of that document indicates that there appear to be many hydro projects of reasonable size that could make a significant contribution to the power needs of the region.

⁴ Cifarha, Male, Les ressources hydro-électriques du Zaïre, Kinshasa, Février 1994

The need to expeditiously commence and complete a comprehensive basin-wide study is backed by the following reasons:

- As mentioned above, the NELSAP studies included only a small part of the DRC and the part that was covered did not include most of the hydro potential of that country, which is located outside the area covered by the NELSAP studies. This is particularly important given the size of the resources identified (the DRC has an estimated hydro potential of 100,000 MW of which 44,000 is located at a single (Inga) site in the southwest of the country and 56,000 MW spread throughout the country) and the apparent attractiveness of some of them (for instance, a recent feasibility study carried out for Inga III indicates that 4,400 MW of power could be made available from a single plant. Because that plant would be of the run-of-river type, its unit cost is expected to be very low compared to most other resources studied. Ignoring this (and other similar resources) risks to significantly flaw any conclusions drawn for the Nile Basin from existing “partial” studies.
- The results of both studies are not able to take into account options that have been identified but which have not been studied in adequate detail to permit their inclusion in the analysis. The comprehensive analysis can focus on carrying out field studies on a selection of options that appear attractive but for which the data available do not permit a proper assessment.
- The results of both studies do not take account of the results of the other. Thus a set of priority projects has been identified for the NELSAP region and a separate set of priority projects have been identified for the ENSAP region. There are probably significant synergies that can be obtained from combining the two studies.
- The results of the two studies would be affected by each other. The projects in the Eastern Nile are north of the equator and are affected by seasonal variations in flows applicable to that zone. Much of the Nile Equatorial Lakes region is located south of the equator and seasonal variations in flows would tend to be displaced by six months from the variations found north of the equator (i.e. the dry period south of the equator would tend to occur at the same time as the wet period north of the equator and vice versa). For the DRC, the Zaire River, with a potential of 44,000 MW, straddles the equator with the result that the wet-season and dry-season flows do not show anywhere near the variation that most other rivers do.
- When completed the Comprehensive Basin-wide Study will recommend development projects/activities (including generation and transmission projects) for the whole Nile basin. The “two-portfolio” of development projects resulting from the sub-regional respective studies, even when combined, is expected to be different from the Comprehensive Plan in aspects such as sequencing (timing and magnitude).
- The objectives of the two studies were slightly different which has led to a different focus for the two studies.

Apart from the above concrete reasons the importance of the Nile River to all its riparian countries virtually requires that the water resources of the Nile Basin be developed in a coherent manner taking account of the needs of all the countries in the region.

The RPTP concluded that (a) a comprehensive basin-wide study is required and (b) that care needs to be taken to ensure that maximum use is made of the existing databank resulting from these two studies.

The following scope of work is predicated upon the Consultant making the maximum use of these existing studies but allowing for additional site visits and data/information gathering.

4 SCHEDULE AND LEVEL OF EFFORT

The elapsed time allowed for this work is 18 months. A tentative study implementation schedule is shown at the end of these terms of reference. The Consultant may rearrange the schedule, within the overall time frame to suit its detailed approach. The estimated level of effort is 54 person months of international consultant's services plus about 12 person months for local consultants.

5 GENERAL APPROACH

The Consultant will take the following general approach to the assignment:

- The consultant shall review the information contained in the VPAR to assess its completeness and to obtain an understanding of the extent of the work required. This review shall also include an assessment of the additional fieldwork required to obtain a clear understanding of the current conditions in the region and an understanding of the shortcomings in the data available for each project.
- The Consultant shall make an Inception visit to the offices of the RPTP in order to discuss in detail its proposed methodology (and revisions thereto as a result of the reviews of data in the VPAR) and schedule.
- The Consultant, through the use of local consultants, shall update the information on the legal and regulatory framework in each country as well as the current environmental and socio-economic conditions in each country.
- The Consultant, along with its local consultants, shall visit the sites of a selection of power development options in order to obtain, first hand, an appreciation of the technical, environmental and social issues that affect the options (detailed field-work is NOT expected). The number of sites to be visited as well as which ones to visit will be the responsibility of the Consultant (selected sites will generally not include any sites that are already well documented, except where a better appreciation of institutional issues is required) but these shall be clearly highlighted in the proposal.
- The RPTP will arrange for the appropriate workshops/Working Group meetings. It will select the venues (ensuring that they are convenient and geographically representative), arrange for simultaneous translation (French and English) if necessary and pay the expenses (including a per diem) of the delegates. The Consultant shall attend these workshops and meetings at his own cost as the RPTP's experts and will make appropriate presentations and prepare the minutes of the deliberations. Although the language of the Workshops/meetings shall be English, at least one of the consultants attending the Workshop/meeting shall have the ability to take and respond to questions in the French language.
- The Consultant shall provide copies of all files, electronic and hard copies and will provide training in the use of all models used during the mandate. The Consultant will NOT be expected to provide such software as part of the mandate.

6 SCOPE OF WORK

The scope of work of the comprehensive basin-wide study of power development options will include, but not be limited to the following key steps:

6.1 *Data Review*

6.1.1 Scope

Review carefully the studies referred to in Section 3 as well as such other relevant reports and data the Consultant considers appropriate, including any relevant study reports available from the Eastern Africa Power Pool and the East African Community secretariats.

It is emphasized that the geographic area of the study shall cover the entire countries of Burundi, the DRC⁵, Egypt, Ethiopia, Kenya, Rwanda, Sudan, Tanzania, Uganda and Djibouti.

6.1.2 Suggested Approach

The Regional Power Trade Project has a Virtual Project Activity Room containing most of the documentation used for the above two studies as well as other relevant data. The RPTP will provide access to the VPAR and all its contents as well a registry of all documents in the room and make this room available to the Consultant.

In addition to the data contained in the VPAR, there are several on-going or recently completed consultancies that may have an impact on the work and the Consultant is expected to be aware of them and to take them into accounts. These include the following:

Consultancy	Objectives
Strategic/Sectoral Social and Environmental Assessment (SSEA)	To provide an analysis of the social and environmental issues surrounding possible power development options in the Nile Equatorial Lakes Region of Africa and to rank the various options based on a combination of cost, social, environmental and risk considerations
The Eastern Nile Power Trade Program study	To provide a market and power trade assessment for the countries of the eastern Nile, to provide an energy sector profile and projections in the three countries, a ranking of hydro sites and pre-feasibility studies on three sites. The work will include an investment plan and a legal framework
Institutional, regulatory and cooperative framework model for the Nile basin power trade	To assist the RPTP of the NBI to review and develop models for the regulatory and institutional frameworks needed to establish and support Regional Power Trade at the Nile sub-basin and basin levels, and develop a strategic roadmap towards the establishment of power markets including identification of key activities needed to facilitate that process.
Best practices in multi-purpose co-ordination regimes	To assist the Project Management Unit (PMU) and Power Technical Committee (PTC) in the review of case studies relevant to hydropower development and water resources management, and prepare a compendium of best practices in multi-purpose coordination regimes that will serve as a comprehensive reference document.
Preliminary basin-	To assist the RPTP and PTC of the NBI to identify and

⁵ Note that the previous studies included only the Eastern part of the DRC and the contents of the VPAR reflect this. Additional work is required to extend the database to cover the entire country.

wide study	review past power and water management studies basin-wide to establish existence of pertinent data and information, and to harmonize these into a form suitable for an integrated multi-objective, multi-sector, comprehensive basin wide study for the Regional Power Trade Project; and to prepare Terms of Reference (TOR) for the comprehensive basin wide study.
Private- public partnership financing and project implementation models	To assist the Project Management Unit (PMU) and the PTC of the NBI in conducting a “blue chip” study on the review of Private-Public Partnership models for financing and implementing Hydropower and Transmission Line projects in the Nile basin countries.
Environmental impact assessment frameworks and procedures in regional power investment projects	To assist the PMU and the PTC of the NBI in conducting a review of the frameworks and procedures for Environmental Impact Assessment on Power Projects in the Nile Basin Countries.
Establish a regional power sector data bank	To assist the PMU and the PTC of the NBI to develop and establish a Power Sector data bank, and provide guidelines for data mining and management.
Stakeholder analysis	To assist the PMU and the PTC in the identification of stakeholders for the RPTP, mapping them to their specific interests and drawing up a basin-wide stakeholder participation plan. It is envisaged that a Stakeholder Consultative Workshop will be held in each of the nine riparian countries and two or more may be held at sub-basin and basin level.

6.1.3 Timing and Effort

Time required: one month

Level of effort envisaged: two person-months by the international consultant.

6.2 *Inception Mission*

6.2.1 Scope

The Consultant will carry out an inception mission to clarify the terms of reference and work plan and to collect missing data. An Inception Report will be prepared that includes the detailed methodology that will be adopted to carry out the comprehensive basin-wide study of power development options in the region.

6.2.2 Suggested Approach

Appropriate representatives of the International Consultant will visit the PTC and the PMU of the RPTP in Dar es Salaam to clarify the terms of reference and to discuss and agree on the work plan for the complete assignment and especially the plan for collection of additional information.

The Consultant shall identify the more promising new sites for which no detailed studies have been carried out to date needed to meet the forecast demands for the 35-year time horizon, allowing a margin in case some sites are rejected on technical, environmental or social grounds. The anticipated capacity of the regional development project sites to be visited shall comply with the overall limit of greater than 50MW for Rwanda, Burundi and DRC and greater than 200MW elsewhere.

The international consultant will then arrange with his local sub-consultants for the appropriate site visits. It is envisaged that these visits will include up to ten sites probably located in DRC, Western Tanzania and Southern Sudan.

The international and local consultant will visit the area of the projects (including as far as possible necessarily the specific site) as well as the relevant government offices in the administrative capital in which the project is located. As a result of his visit, he will provide an overview of the expected environmental and socio-economic impacts that the project could be expected to have. The consultant will then provide a short report on his activities and the results of those activities.

In addition to the site visits, the consultant for the DRC will need to obtain from the Société National de l'Électricité (SNEL) (a) its most recent load forecast report and (b) copies of all relevant studies of projects. With this information, the Consultant will update the data sheets for these projects. He will then prepare and issue an inception report.

The program for site visits and data/information gathering plan, and the work plan for the complete assignment (preferably in MS Project) shall be adequately detailed in the technical proposal.

6.2.3 Timing and Effort

The time required to carry out the work covered by this section of the terms of reference is estimated at 10 weeks split as follows:

- Visit to RPTP offices: 2 weeks
- Site visits; 4 weeks (2 teams)

- Site reports: 2 weeks
- Inception report: 2 weeks

Level of effort envisaged: five person-months by the international consultant and 8 person-months by three local consultants (one for each country)

6.3 *Assessment of the Energy Policy, Institutional, Legal and Regulatory Framework in the region*

6.3.1 Scope

Analyze (i) legal, regulatory and institutional framework in each of the countries in the region as it relates to power development, and (ii) energy sector policies, regulations and institutions. The assessment should assess whether environmental and social issues are adequately covered by current practice in the energy sector. The process requires a review of these policies to identify and address elements that may hinder implementation. This work needs to include a review of the international and regional environmental conventions (World Heritage Convention, Ramsar Convention, etc.) that the cooperating countries are party to in order to meet the requirements of the World Bank.

6.3.2 Suggested Approach

Virtually all the required data are in the two reports mentioned in Section 3. The main effort by the Consultant will be to carry out a desk study to merge the relevant data in the two reports. The Consultant will be responsible for filling any gaps identified.

6.3.3 Timing and Effort

Time required: 4 weeks

Level of effort envisaged: one and a half person-months by the international consultant.

6.4 *Assessment of the Current Environmental and Socio-economic Conditions in the Region*

6.4.1 Scope

Analyze the current environmental and socio-economic conditions and issues in the region so as to form a basis for the assessment of cumulative impacts of power development options in the region. The environmental conditions and issues should be treated on the basis of river basins and should include consideration of issues such as:

- Impact of droughts,
- Changes in flow regime
- Sedimentation, soil erosion and water quality
- Proliferation of invasive aquatic vegetation
- Aesthetics and tourism
- Greenhouse gas emission; acid rain emissions,
- Health issues related to reservoirs
- Health issues related to air pollutant emissions

The socio-economic conditions and issues should be treated on the basis of countries or sub-regions and should include consideration of such issues as:

- Economic development
- Rural electrification
- Resettlement
- Impact on tourism
- Impact on river navigation
- Cultural resources
- Livelihoods and urbanization
- Population pressures
- Water-related conflicts

6.4.2 Suggested Approach

Virtually all the required data are in the two reports mentioned in Section 3. The Consultant need only carry out a desk study to merge the relevant data in the two reports. There may be some updating required from the data collected by the local consultants in their site visits.

6.4.3 Timing and Effort

Time required: 4 weeks

Level of effort envisaged: one person-month by the international consultant plus two person-months by the local consultant.

6.5 *Assessment of the Electric Power Needs*

6.5.1 Scope

An assessment of electric energy needs for the next 35 years in the region will be carried out based on a review and compilation of forecasts for each country in the region as provided by the utilities in each country⁶ and their extrapolation for the full period of the analysis. These forecasts will be adjusted to take account of a consistent set of assumptions regarding:

- Millennium Development Goals
- Poverty reduction strategies by each country
- Elimination of suppressed demand;
- Rural electrification;
- Demand-side management and
- Regional growth

All electricity needs at the national level will be considered during this assessment in order to identify and extract the grid-based electricity needs that will be further analyzed in this study.

The forecast will be split into two periods: short to medium-term (up to 20 years) and medium to long-term (up to 35 years).

Two scenarios need to be considered:

- A base case representing a projection of historical trends

⁶ It is expected that each forecast will cover periods of 20 to 30 years.

- An enhanced scenario projection of what would be needed in terms of electric power in order to improve the standard of living in the region to a target level to be agreed to with the Project Working Group and in line with the Millennium Development Goals of each member countries.

It is expected that the first scenario will be based on forecasts provided by the member countries. The definition and method of derivation of the second scenario will be discussed with and approved by the Project Steering Committee members.

6.5.2 Suggested Approach

Forecasts and relevant back-up data for each of the countries, except the DRC are in the two reports mentioned in Section 3. The Consultant need mainly carry out a desk study to merge the relevant data in the two reports and update them to take account of actual growth since the forecasts were prepared and to take account of any new forecasts prepared by the countries for the first scenario.

There will be some work required to carry out the forecast for the DRC to complete the work on the first scenario. SNEL has a forecast, a copy of which is in the VPAR, which may need updating. The local consultant will already have provided that information as a result of the work described in section 6.2.2.

The second scenario can propose a level of consumption that would result in the region having comparable level to a group of representative African Countries.

6.5.3 Timing and Effort

Time required: 4 weeks

Level of effort envisaged: one person-month by the international consultant plus two person-months by the local consultant.

6.6 *Identification and Upgrading of New Power Options*

6.6.1 Scope

The first step in meeting the needs described above is to obtain an inventory of options within the region. The power options will include hydropower, geothermal, other forms of renewable energy, gas, oil, coal, etc. Import options and connection to foreign grids (backbone transmission lines) should also be considered. The consultant should for comparison purposes, include some “virtual projects” for thermal (combined cycle), wind, solar, and diesel options. The Consultant may draw inputs from relevant reports from other ongoing studies in the region but he shall bear the responsibility for adequacy and quality of input data/information required to accomplish the study.

In order to determine those hydropower generation projects which are considered to be of a regional nature in the long-term plan, the Consultant shall limit the hydropower projects to be considered to those exceeding 50MW capacity in Rwanda, Burundi and DRC. In all other countries a lower limit of 200MW shall apply.

In carrying out assessment of the backbone transmission and cross-border interconnection needs, consultant shall perform at regional level the detailed studies including but not limited to the following:

- Load flow analysis
- Transient, sub-transient and dynamic analysis
- Voltage dynamics and stability assessment

- Contingency and security analysis
- Fault currents
- Sub-synchronous resonance and modal analysis of the whole interconnected grid during the various stages of the regional grid development.
- Interconnected system restoration assessment
- Impact of different transmission line types (Alternating Current or Direct Current) and generation types (must include Wind turbine generation) to the stability of the interconnected grid at the various stages of regional interconnectivity of the power network
- Need and optimal timing and location of the regional coordination, control and dispatch centres.

The voltage level for modeling of the transmission system shall as far as possible be limited to a voltage of 132kV or greater. The Consultant may make reference to results of related studies being undertaken by the EAPP where these are relevant to this assignment.

This inventory of power development options (including the necessary backbone transmission and interconnection corridors) can begin with the inventory collected during the preliminary basin-wide study and which is contained in the Virtual Project Activity Room of the Regional Power Trade Project. To this data bank should be added power development options identified from the consultant's own files, from his research on the Internet and from any other source to which he has access.

6.6.2 Suggested Approach

Inventories are already available for the region from two studies referred to in section 3. This should be complete except for DRC, for which only projects in the Eastern provinces were included in the above mentioned studies. The local consultant for the DRC will have collected the information available during his site visit.

During the preliminary basin wide study, the consultant for that work completed data sheets for all the identified projects, indicating the deficiencies in the database. On each datasheet, the various uses of each water resource were also identified. The Consultant will update these datasheets with the results of the fieldwork of his local consultants using the reports referred to in section 6.2.2.

The database prepared during the preliminary basin-wide study, contains several options for which insufficient information was available to permit an adequate assessment of their attractiveness. The local consultants, in their fieldwork will have collected data on the larger and more attractive of those options that will permit them to be assessed.

The Consultant will prepare a table that presents all options identified and summarizes their characteristics including name, country, river, nominal capacity, average energy available, firm energy available, capital cost at mid-2007 price levels, level of study, date last studied, other uses, level of environmental and socio-economic data/studies available, capital cost attributed to other uses and unit cost of firm energy. A geographic map of Nile Basin countries showing the location of the identified power resources and the regional transmission grid (above 60kV) with summarised resource descriptions shall accompany the results.

For any major regional project, that would depend on exports to other countries, this inventory of options will include any such required transmission, so delivery costs may be used in the screening of options (Section 6.7 below)

A key element in the updating and harmonization of information on new power options will be an accurate assessment of the level of preparedness, and thus earliest on-power lead times.

6.6.3 Timing and Effort

Time required: 12 weeks

Level of effort envisaged: six person-months by the international consultant plus one person-month by the local consultant.

6.7 Screening of New Power Options

6.7.1 Scope

6.7.1.1 Multi-purpose Options

The water resources can have many uses and options may be defined in the various studies as serving two or more purposes. Where an option is designed for such multiple-use, the costs and benefits of such options are to be reviewed to segregate the costs and the benefits associated with each use. Each component of these options will be analyzed to assign their respective costs.

6.7.1.2 Technical screening

So as to carry out the study in an effective and efficient manner, the inventory needs to be screened to remove from further consideration options that are not suitable for the accomplishment of the objectives of this study. The screening criteria to be used should include the following:

- The options should be regional in character, implying that they need to be sufficiently large that they can meet increases in demand in more than one of the countries in the region. To respond to this criterion, options larger than 50 MW if located in Burundi, Rwanda and the Eastern DRC and 200 MW in all other countries would be retained (**smaller-sized projects may also be retained if they are clearly regional in character i.e. straddling the border between countries**)
- The options should not have associated with it severe environmental or socio-economic issues that cannot be mitigated (the elimination of options under this criterion needs to be fully justified and accepted by the Project Working Group on a case by case basis)
- The unit cost of the power output of the options must be competitive with generic generation available in the region. For options with multi-purpose benefits, an estimate is required of the share of the cost of the option that is related to power production. The model used for this analysis shall be discussed in details. A cut-off of US 10 cent per kilowatt-hour of firm energy is used.
- In the case of major projects that would only be viable for regional supply, transmission costs should be included in the cost comparisons.

Although the fieldwork will have rectified many of the data deficiencies identified during the preliminary basin-wide study, there will still be some options that need to be eliminated from consideration project options as they have not reached the pre-feasibility level of study. For each of these options, the Consultant will provide a short analysis of the studies required to have them seriously considered in a future Indicative Power Master Plan, both in terms of their feasibility (hydrological, engineering, financial, etc.), and of their potential environmental and social impacts.

6.7.2 Suggested Approach

The consultant will take the table prepared for the section 6.6.2 and add a column in which the results of the screening are added.

6.7.3 Timing and Effort

Time required: 2 weeks

Level of effort envisaged: one person-month by the international consultant.

6.8 *First Draft Report*

6.8.1 Scope

The First Draft Report will include (1) the assessment of the policy, institutional, legal and regulatory framework, (2) the current environmental and socio-economic conditions in the region, (3) energy and transmission infrastructure needs assessment, (4) power options identification, (5) the identification of multi-use benefits of these options and (6) the screening of these options. The report should also include a proposed methodology to undertake the comparative analysis of power options, the criteria and indicators to be used and the relative weighting of each criterion within its category (see section 6.9).

The Consultant will present these results to the Working Group and receive direction on the continuation of the study.

6.8.2 Suggested Approach

The consultant will incorporate the results of the work described in sections 6.1 to 6.7 above into a report structured and written in such a way as to be readily understandable by laymen.

For the workshop, the Consultant will prepare media that help get the results across in a clear and simple manner. The media shall include several of the following:

- PowerPoint presentations
- Flipcharts
- Maps with overlays
- Synopsis of the report, perhaps in bullet points, in both the English and the French languages.

The RPTP will be responsible for the venue and logistics related to the invitees. The Consultant will be responsible for the preparation of all presentation material, his own logistics and for participating fully in the workshop as presenter/facilitator/ expert resource, and prepare the minutes of the deliberations. He will also participate in the Working Group meetings as observer, secretary and expert resource.

6.8.3 Transfer of Technology

During the workshop, the consultant will provide to the PTC and working group members copies of relevant working files, including:

- Trip reports by the Consultant for all his site visits
- A bibliography of material consulted for the assessment of policy, frameworks and socio-economic and environmental conditions
- Spreadsheet models of the load forecasts, particularly for the aggregation of the national loads into a comprehensive regional load forecast

- Spreadsheet models used for the screening of new options
- Spreadsheet models used for cost allocation in Hydropower Multipurpose projects

6.8.4 Timing and Effort

Time required:

- Report preparation: 4 weeks
- Report editing and preparation of presentation material: 4 weeks
- Participation in the workshop and Working Group meeting: 10 Days (includes travel)

Level of effort envisaged:

- Home office: four person-month by the international consultant.
- Workshop: one and a half person months (three specialists for two weeks)

6.9 *Comparative Analysis of Power Options*

6.9.1 Scope

6.9.1.1 Multi-criterion analysis

The Consultant will propose a systematic approach to compare the different options with regard to various categories of assessment criteria - political, economic, environment, social or technical. The comparative methodology will involve a multi-criterion analysis, which may involve the application of scaling, rating or ranking techniques. Such an analysis is carried out in five steps:

- Identification of evaluation criteria and indicators
- Assignment of the relative importance to the criteria
- Ranking of options for each criterion
- Ranking of options within each category of criteria and
- Selection of options

Key criteria to be discussed during consultations with the Working Group could include:

a) Political criteria:

- Trans-boundary benefits and cooperation;
- Poverty reduction;
- Sub-regional integration;
- Conflict resolution;
- Trust building potential.

b) Economic criteria:

- Cost/kWh, including construction cost, operation cost, cost of transportation, cost of environmental and social mitigation measures, cost of compensation measures and resettlement cost;

- Contribution of project to poverty reduction in the area in proximity to project;
- Gestation period in delivering benefits;
- Macro-economic considerations;
- Micro-economic considerations; including proper economic analysis for selected prospective regional projects.
- Life cycle assessments.

c) Financial criteria

- Identified risks and possibility of mitigation
- Availability of financing

c) Environmental criteria:

- Energy efficiency of the project (energy payback ratio)
- Impacts due to land required by the presence of the generation facilities, reservoirs and any other facility used to extract and transport the fuel;
- Impacts related to changes in river flows (e.g. due to climatic variability, hydrological complementarities and hydraulic infrastructure);
- Impacts on designated natural sites;
- Impacts on the transmission line routes;
- Impacts on known, rare, threatened or vulnerable species and their habitats;
- Impacts on high quality habitat;
- Competing water uses;
- Up- and downstream impacts;
- Impacts due to greenhouse gas emissions and other pollutant emissions.

d) Social criteria:

- Impacts due to population displacement;
- Public health risks in the short and long term;
- Ability of projects to provide services other than energy, such as irrigation, flood control, navigation or fisheries;
- Impacts on cultural and/or spiritual sites;
- Impacts on local and regional livelihoods;
- Gender implications

e) Technical criteria:

- Level of preparedness of project;
- Technology maturity and risks
- Quality of power production (suitability to provide base load, suitability for seasonal peak load, suitability for daily peak load);

- Significance of power supply from the project in a regional context including interconnections;
- Multipurpose use projects.

The multi-criterion analysis will be carried out using criteria for which quantifiable indicators can be identified (for instance the criterion of efficiency of a project can be measured using the indicator of energy payback ratio – the amount of energy produced by the project over its life divided by the amount of energy the project requires during its construction and operation).

The methodology to be used, the criteria selected and the relative weighting of the criteria will be submitted to the Working Group for comments and approval.

6.9.1.2 Risk Analysis

A general analysis of financial, economic, environmental and social risks should be undertaken for the power options because of the high levels of uncertainty and the potentially large impact of a low probability event (particularly drought). In addition, some of the criteria identified under section 6.9.1.1 are not readily quantifiable but are still considered important in the comparison of options. In this case, judgment is to be used to develop a ranking of the options under each of these criteria.

The risk analysis will be carried out in a similar manner to the multi-criterion analysis but will be considered separately as the level of uncertainty of such analyses is higher than for the analysis of quantified indicators.

6.9.1.3 Comparison of Options

Comparisons across categories of assessment criteria will involve normative judgements and are beyond the scope of this study. However, The Consultant will prepare a tabulation of the options in which each option is ranked on unit cost and the dilemmas identified are described. These dilemmas can be political, environmental, social or due to perceived risks. Based on this analysis, the Consultant will separate, using his judgment, the options into three or more groups, such as:

- Group 1: Options with no significant dilemmas (i.e. the options have no significant environmental, social, political adverse impacts)
- Group 2: Options with some significant dilemmas
- Group 3: Options with some major dilemmas

6.9.2 **Suggested Approach**

Two different approaches are used in the reports cited in section 3 of this TOR. The Consultant will compare the advantages and disadvantages of each, present the material along with its recommendations to the Working Group.

Once the method has been selected, the steps to be followed will be clearly defined from the appropriate previous work. All required data should also be available from the First Draft Report.

6.9.3 **Timing and Effort**

Time required: 4 weeks

Level of effort envisaged: four person-month by the international consultant.

6.10 *Climate change analysis*

6.10.1 **Scope**

An issue is the evaluation of potential management and investment actions in the Region, in the short, medium and long term will be the implications of climate change and/or variability. This is a critical emerging issue in water resources management and should be integrated into the analytical work of the comprehensive basin-wide study. Priority should be given to assessment of risk to existing and proposed infrastructure, land and water management issues and actions to be considered to support “adaptation” that should be included as an element of the proposed priority investment program or change that should be made to the investment program.

The following steps should be included in the analysis:

- An overall scientific, technical and socio- economic assessment of key climate change models with a focus on information relevant for the understanding of climate change, its potential impacts and options for adaptation and mitigation in the region. Deficiencies in current key models (poor performance at spatial and temporal resolutions applicable to the regional water cycle) should be discussed.
- Draw conclusions on possible impacts of climate change focusing on the impacts on runoff in the region.
- Apply the findings on climate change to the cumulative impacts work so that conclusions can be drawn on potential impacts of climate change and possible mitigation measures on the base case scenario.
- The information should be adapted to the other strategies in the Indicative Regional Power development Master Plan.
- The impact and benefits of the variation of seasonal patterns north and south of the equator shall be analyzed and discussed, and shall inform the evaluation of power development options proposed.

This analysis should be considered as a risk analysis to ensure outcomes are "robust".

6.10.2 **Suggested Approach**

An approach is used in the SSEA report cited in section 3 of this TOR. The results of that work can be expanded to cover the additional territory.

6.10.3 **Timing and Effort**

Time required: 8 weeks

Level of effort envisaged: three person-month by the international consultant.

6.11 *Second Draft Report*

6.11.1 **Scope**

The Second Draft Report will include the comparative analysis of power options, the risk analysis, and the estimated impact of climate change on runoff. It will also present the results of these analyses and support/justify the grouping of options. The report will also present the proposed strategies to be studied as well as their definition.

The Consultant will present these results to the Working Group and receive direction on the continuation of the study.

The Consultant will also suggest to the Working Group that it invite a wider audience to the next meeting as that one is intended for presentation of the overall results of the comprehensive basin-wide study. This additional representation could include such sectors and activities are:

- Agriculture
- Environment
- Industry
- Natural resources
- Planning and economics
- Social impacts and water resources

6.11.2 Suggested Approach

The consultant will incorporate the results of the work described in sections 6.9 and 6.10 above into a report structured and written in such a way as to be readily understandable by laymen. The report will also include all the material covered in the First Draft Report, corrected to take account of the changes required by the Working Group.

For the workshop, the Consultant will prepare media that help get the results across in a clear and simple manner. The media can include (and should include several of) the following:

- PowerPoint presentations
- Flipcharts
- Maps with overlays
- Synopsis of the report, perhaps in bullet points, in both the English and the French languages.

The RPTP will be responsible for the venue and logistics related to the invitees. The Consultant will be responsible for the preparation of all presentation material, his own logistics and for participating fully in the workshop as presenter/facilitator/ expert resource, and prepare the minutes of the deliberations. He will also participate in the Working Group meeting as observer, secretary and expert resource.

6.11.3 Transfer of Technology

During the workshop, the consultant will provide to the working group members copies of relevant working files, including:

- A bibliography of material consulted for the climate change analysis
- Spreadsheet models for the multi-criterion analysis.

The Consultant will also train the working group members in the use of these models. It is expected that all of the above will be simple spreadsheets on software such as Microsoft Excel. The Consultant is NOT expected to furnish licenses for any of these models.

6.11.4 Timing and Effort

Time required:

- Report preparation: 4 weeks
- Report editing and preparation of presentation material: 4 weeks

- Participation in the workshop and Working Group meeting: 10 Days (includes travel)

Level of effort envisaged:

- Home office: four person-month by the international consultant.
- Workshop: one person months (two specialists for two weeks)

6.12 *Development of Portfolios of Power Options*

6.12.1 *Scope*

A series of portfolios of power development options (generation and transmission lines and interconnection corridors) and a tentative investment plan will be proposed that takes into account various development strategies that the region may wish to follow and the evolution of the regional power market. Such strategies could include the following:

- Each country continues to develop its power sector in isolation of its neighbours and only interconnects on an ad hoc basis
- Each country continues to develop its power sector in isolation of its neighbours and engages in power trade with its neighbours on a structured but bilateral basis
- All the power resources are developed in the region in the most efficient manner to provide the optimum development of the region as a whole (unrestricted open access)
- All the power resources are developed in the region in such a way that no one nation is overly reliant on its neighbours (open access with some import restrictions)
- All the power resources are developed in the region in such a way that there is a balance of technologies used (i.e. avoiding over-reliance on hydro with its attendant risks of power shortages during droughts) (open access with some technical restrictions)

After discussions with the Working Group, variations on these strategies or other strategies may be selected.

6.12.1.1 *National Development Approach*

A baseline power development scenario for the analysis will reflect the strategy of each country pursuing its power sector development in isolation of its neighbours. The Consultant will propose a set of power development portfolios, one for each country in the region. This set will be developed by following the same strategy as the country seems to be following by the evidence of its most recent expansion plans. In doing so, it may be appropriate to use resources identified in Section 6.6 of this TOR but screened out in section 6.7 because of either small size or high cost. It will not be necessary to cost this alternative, as it is not being considered as an appropriate one under the objectives of this assignment. It is to be used as a baseline for the derivation of the cumulative environmental and social impacts of the integrated strategies.

To that end, the Consultant will present a detailed assessment of the environmental and social impacts of this selected portfolio by river basin or by sub-region or country. This will give the current situation and an assessment of the future impacts of the development of the options in the set of power development portfolios.

6.12.1.2 Development of Portfolios Reflecting Selected Strategies

The Consultant will propose a portfolio of power development options and an investment plan for each of the selected strategies. For each portfolio, power development options will be selected bearing in mind the following conditions:

- First: the availability of an option based on its gestation period
- Second: the options from Group 1 (as defined in Section 6.9 of this TOR) will be selected first, then Group 2, etc.
- Third: within the group, the options will be selected on the basis of lowest cost of firm energy (including transmission costs)
- Fourth: the selection of options may be changed in the second and third steps if required to meet the needs of the strategy being followed
- All options shall identify the proposed transmission lines and interconnection corridors and reflect the evolution stage of the regional power market regimes.

Using simulation or optimizations software for both generation and transmission, the Consultant will provide, for each portfolio:

- A tabulation showing, for each year, the power needs, the power development additions in the year, the amount of energy available and the level of the reserve margin that results, and the proposed investment arrangement (private, public, joint ventures and partnerships);
- A listing of the transmission facilities⁷ (and an estimate of their capital costs) required to ensure that the power being provided by each of the options proposed above can be evacuated to the grids of each of the member countries (transmission facilities within each country for internal use are not part of the study unless they form part of the transmission corridors or regional transmission backbone network);
- The present value of the capital and operating costs of each power development options and of the transmission facilities required;
- A tabulation of the percentage of newly installed capacity by technology and
- A tabulation of the percentage of newly installed capacity by country in which they are located.

In addition, several sensitivity studies will be carried out to take account of the variables with the highest uncertainties associated with them or those expected to have the largest impact on decisions. For the purpose investment mobilisation conferences, and as part of the Draft Final and Final Reports of the study, the consultant shall deliver a brochure summarising in sufficient details the selected power development options and strategies, the proposed investment arrangements for the various identified projects and an the investment plan. The brochure shall be accompanied by a 5 – 7 minutes promotion video clip on the same. High quality graphics, tables, charts and photographs shall be used to make the brochure and the video clip self explanatory and appealing to prospective investors and development partners.

6.12.2 **Suggested Approach**

The Consultant is expected to carry out simulations of the power systems and will provide to the working group of the RPTP adequate training on the software packages/applications used to be able to use it effectively.

⁷ It is expected that this will require that the proposal, at some stage during the period of the study, of a transmission corridor (or backbone or superhighway) at voltages higher than currently in use by most of the countries in the region.

The software must be able to assist in providing for an integrated approach to generation resources planning including the management of the water resources in the basin from a multipurpose use point of view.

In considering power trade and market issues, software used needs to take account of power flows between systems and any constraints/bottlenecks in the transmissions systems, and also carryout transient, sub-transient, dynamic, modal, security and sub-synchronous analysis for a selected prospective lines. During workshops the Consultant will provide to the working group of the RPTP a copy of all transmission software and the training required to be able to use it effectively.

The reports cited in section 3 of this TOR provide an indication of the approach that can be taken to accomplish the assignment. The results of that work shall be expanded as necessary to cover the additional territory.

6.12.3 Timing and Effort

Time required: 12 weeks

Level of effort envisaged: six person-month by the international consultant.

6.13 *Cumulative Impacts Assessment*

6.13.1 Scope

The cumulative impact assessment will estimate (or forecast) the potential cumulative impacts of the power options (bundles of projects or individual projects) identified on the region's environment, natural resource base, and socio-economic conditions, taking into account the baseline situation, and activities included in the power master plans of the countries, as well as expected spontaneous developments. The first step will be to undertake limited, preliminary impact assessments of the major individual investments under consideration. The second step is to look at the sum total of the individual activities and estimate their cumulative effects (positive and negative, direct and indirect, short-term and long-term).

The aim of this work is to have a clear assessment of the cumulative impacts at the regional, basin, sub-basin levels as well as to identify alternative actions and formulate appropriate mitigation measures and monitoring. Programmatic mitigation and monitoring measures need to be developed.

The cumulative impacts will concentrate on a single selected development portfolio. For the other portfolios, the differences in impacts and consequent mitigation measures from the first one will be noted. The process and rationale for this approach will be clearly described.

The types of cumulative impacts that need to be explored include:

- Define the environmental and social baseline for comparative analysis
- Additive impacts of projects that individually have an insignificant impact but in total have a significant impact
- Synergistic impacts where several projects' total impacts exceed the sum of their individual impacts
- Threshold/saturation impacts where the environment may be resilient up to a certain level and then become rapidly degraded

- Induced impacts where one project may trigger secondary development and its impacts
- Time or space-crowded impacts where the environment does not have time to recover from one impact before it is subject to the next one
- Direct and indirect impacts where an impact (e.g. changed downstream flow regime) causes another impact (e.g. reduced fish numbers) and perhaps another (e.g. reduced fisheries).
- Include an analysis in each major transmission corridor of the cumulative impacts of investments in transmission given the access that is created by these activities.
- Time or space-delayed impacts (direct or indirect) where the impact is triggered at some time or distance away from the initiating change.

The following principles should be followed in the identification of cumulative impacts:

- Include past, present and reasonably future “other actions”.
- Identify cumulative impacts that are short, medium and long-term in their nature.
- Focus on vulnerable resources, ecosystems and human communities.
- Focus on impacts likely to be significant and/or irreversible.

6.13.2 Suggested Approach

Most of the material required for this work is available in the reports cited in section 3 of this TOR. The Consultant will need to restructure it to suit the new expansion plans resulting from the work described in the previous section. There can, however, be substantial additional work to ensure that the issues likely to be raised by groups concerned with environmental and social issues are adequately covered.

6.13.3 Timing and Effort

Time required: 8 weeks

Level of effort envisaged: four person-month by the international consultant.

6.14 *Mitigation Plan for Selected Power Option Alternatives*

6.14.1 Scope

Determine what can be done to mitigate, reduce or eliminate negative effects and enhance positive effects of selected power option alternatives (stand alone projects or bundles of projects). The analysis will be carried out at two levels:

- The characteristics of each power development option will include all reasonable mitigation measures to reduce to a reasonable minimum the negative impacts of the option and sufficient allowance for the cost of such measures will be included in the capital cost estimate for the option; and
- Broad strategic plans for eliminating, reducing to acceptable levels, or mitigating environmental and social impacts will be proposed on a basin-wide or sub-regional basis (for instance, if a hydro option with a reservoir is proposed and that reservoir is deemed to increase the risk of malaria, a broad mitigation measure to be recommended might include the construction and operation of medical clinics as part of the cost of the option).

6.14.2 Suggested Approach

Most of the material required for this work is available in the reports cited in section 3 of this TOR, particularly that of the SSEA study. That work can form the starting point and be expanded as necessary.

6.14.3 Timing and Effort

Time required: 4 weeks

Level of effort envisaged: one person-month by the international consultant

6.15 *Proposal of a Regional Power Development Strategy*

6.15.1 Scope

Based on the results of the above analyses, the Consultant will propose a regional power development strategy. This will include:

- In the short term, a list of development options that are already committed or under construction and for which not much can be done (included for completeness). This is expected to correspond closely with the results of the EAPP study running concurrently with the CBWS.
- In the long term, a list of options and their required dates of commissioning in order to meet the power needs of the region with a reasonable reserve margin and shall include the necessary transmission lines and interconnection corridors.
- In the long term, an identification and analysis of the environmental and social issues likely to arise from implementation of the strategy, key assumptions and risks, and suggested mitigation measures.

For the long term (35 years) an implementation plan will be prepared with a schedule of major inputs required on a country-by-country basis. The regional power development strategy shall reflect the projected evolution stage of the power trade and market regimes among the NBI member states.

6.15.2 Suggested Approach

The structure and type of contents of such a strategy can be taken from the SSEA report cited in section 3 of this TOR, particularly that of the SSEA study. That work can form the starting point and be expanded as necessary.

6.15.3 Timing and Effort

Time required: 4 weeks

Level of effort envisaged: two person-months by the international consultant

6.16 *Draft Final Report*

6.16.1 Scope

The Draft Final Report will include all of the material covered in this assignment in a clear, logical and simple manner. It will take account of the changes required by the Working Group as a result of the Consultant's presentation of the Second Draft Report

6.16.2 Suggested Approach

The Consultant will present its results and receive direction from the Working Group as to the changes required to the Draft Final Report in order for the Final Report to be prepared and accepted.

For the meeting, the Consultant will prepare media that help get the results across in a clear and simple manner. The media can include (and should include several of) the following:

- PowerPoint presentations
- Flipcharts
- Video Clips
- Maps with overlays
- Synopsis of the report, perhaps in bullet points, in both the English and the French languages.

The RPTP will be responsible for the venue and logistics related to the invitees. The Consultant will be responsible for the preparation of all presentation material, his own logistics and for participating fully in the workshop as presenter/facilitator/ expert resource, and prepare the minutes of deliberations. He will also participate in the Working Group meeting as observer, secretary and expert resource.

6.16.3 Transfer of Technology

During the workshop, the consultant will provide to the working group members copies of relevant working files, including:

- A bibliography of material consulted in the preparation of the cumulative impacts assessment
- Generation Simulation and planning package
- Power System simulation and planning package
- Project Management tools such as Primavera or Microsoft Project

The Consultant will also train the working group members in the use of these models. It is expected that all of the above will proprietary software packages. The Consultant is NOT expected to furnish licenses for any of these models nor to furnish copies. However, if any of the packages are the Consultant's property, the consultant must warrant that training manuals are available and that the Consultant is prepared to provide licenses for the software use.

6.16.4 Timing and Effort

Time required:

- Report preparation: 4 weeks
- Report editing and preparation of presentation material: 4 weeks
- Participation in the Working Group meeting: 10 Days (includes travel)

Level of effort envisaged:

- Home office: four person-month by the international consultant.
- Meeting: one person months (two specialists for two weeks)

6.17 ***Final Report***

6.17.1 **Scope**

The Final Report will include all of the material covered in this assignment in a clear, logical and simple manner. It will take account of the changes required by the Working Group as a result of the Consultant's presentation of the Draft Final Report.

6.17.2 **Suggested Approach**

The Consultant revises the report to take account of the changes required by the Working Group. In any chapters where significant changes were required (whether because they were extensive or because they were sensitive) the consultant will send his proposed modification to the Working Group for its comments.

Once the final report is issued, the Consultant will post it in the VPAR.

6.17.3 **Timing and Effort**

Time required: 4 weeks

Level of effort envisaged: one person-month by the international consultant

6.18 ***On-going Support to the Project***

6.18.1 **Scope**

It is expected that the RTPP may need to present this work to various decision-makers. The Consultant will provide support to these efforts for a period of one year after completion of the final report.

6.18.2 **Suggested Approach**

The Consultant will undertake to provide the services of its Project Manager for presentations of the Final Report to three groups of senior officials; one in Dar es Salaam and one in Addis Ababa. It should be recognized that the venues may change but the destinations are included to allow the Consultant to properly cost his proposal.

6.18.3 **Timing and Effort**

Time required: 4 weeks (one week of preparation and two one-week missions)

Level of effort envisaged: one person-month by the international consultant

7 **STUDY ORGANISATION**

7.1 ***Control and Supervision***

The consultant will be hired by NILE-SEC but will be supervised by a Study Working Group composed of power and non-power experts drawn from the region including staff of the East African Community Secretariat, the East African Power Pool, and will be assisted by staff from the Regional Power Trade Project. In additions to the various required reports indicated in this TOR, the consultant shall submit a Monthly progress brief (at least three pages). The Monthly progress brief shall give an outline of the work accomplished in the preceding month, and an outline of the work expected to be completed during the next progress reporting and if appropriate comments or recommendations relating to any unforeseen conditions which may affect the progress or the quality of work. The quarterly progress report shall contain detailed accomplishments, challenges and the level of efforts expended during the three month period, and a projection for the next three months reporting period. Within two months of the contract award, the consultant shall set up for this study, a virtual

project activity room to support seamless consultations, report reviews, and discussion for the efficient functioning of the supervision team.

7.2 *Improvement of the TOR by the Consultant*

The consultant may offer suggestions and improvements to the Terms of Reference where he/she considers it would result in better implementation of this assignment. Such suggestions if accepted will form part of the Description of the Services of the assignment.

7.3 *The Consultant*

The consultant team will comprise power and non-power experts in at least the following specialties: generation planning, power system planning, load/demand forecasting, hydrology, water resources management, hydropower engineering, renewable power generation (other than hydro), thermal generation, transmission planning, power sector policies, power economics & finance (including project finance, transactions & implementation arrangements), power trade & power markets, project cost estimation, environment (ecosystems, greenhouse gas and other pollutant emissions, strategic environmental assessment), clean development mechanism, socio-economic/social, risk assessment, options analysis, consultation specialist, and other experts as needed. In its Study Organisation structure and work flow chart, the consultant shall show how the key personnel are supported by this spectrum of power and non-power specialists.

7.4 *Public consultation*

Public consultation is an integral part of the assessment. A consultation plan should be developed taking account of the results of the consultation plan on stakeholder analysis carried out by the NBI. These terms of reference are based on the assumption that the public, in this case is defined as representatives of sectors affected by the proposed power development and international trade in electric power, not necessarily by civil society in general. The Consultant will be expected to comment on this approach and recommend any changes that it deems relevant.

7.5 *Participation in PTC/PSC Meetings/Workshops*

Besides the workshops for presentation of the First Draft, Second draft and the Final Draft Reports, the consultant will be required to attend two PTC/PSC meetings/workshops and make presentations on the status and progress of the CBWS. The suggested approach to this task is same as described in 6.8.2, 6.11.2 and 6.16.2 above but the consultant will be allocated not more than one and half ($1\frac{1}{2}$) days per Meeting/Workshop. Tentative dates for these Meetings/Workshops shall be agreed on during the Inception Meeting.

7.6 *Estimates of Activity/Task Efforts/Testimonials*

The consultant is advised that the activity/task level of effort given in the TOR is meant for guidance only. Proper and efficient allocation of the level of efforts for each and every activity/task for this assignment is the responsibility of the consultant. However, significant divergent of activity/task person-months/weeks from those in the TOR shall be clearly justified. The technical approach, methodology and work plan submitted in RFP shall be adequately detailed and substantial for this large and complex assignment. Annual reports of the lead consultant/consortium, and reference testimonials from previous clients shall be submitted with the technical proposal.

COMPREHENSIVE BASIN-WIDE STUDY : PROPOSED IMPLEMENTATION SCHEDULE

