15. Implementation Schedule

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15.3 Coordination requirements between the interconnected systems

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15.5 Further Project Activities
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15. Implementation Schedule

15.1 Contract packaging

The following contract packages are proposed:

Project package 1 (220 kV lines)

- Lot 1/1: 220 kV double circuit line between future Rusumo Falls substation site and the Birembo substation
- Lot 1/2: 220 kV double circuit line between future Rusumo Falls substation site and the Nyakanazi substation
- Lot 1/3: 220 kV single circuit line between future Rusumo Falls substation site and the Gitega substation

Project package 2 (220/110 kV substation)

- Lot 2/1: Birembo and Kigali Airport substation
- Lot 2/2: Nyakanazi substation
- Lot 2/3: Gitega and Muyinga substation

The following principles have been adopted to determine the lots:

- Similar type of equipment is put together to allow the manufacturers to tender all items within a package and to ensure compatibility.
- Lots shall be large enough in value to attract reputable manufacturers.

We propose tendering procedure for an EPC contract (engineering, procurement and construction).

15.2 Project implementation schedule

15.2.1 General

The detailed project implementation schedules for lines and substation are shown in Annex 15-1 and Annex 15-2.

The allocation of costs can be assumed to be as follows:

| Construction year one (2013) | 40% |
| Construction year two (2014) | 60% |
Based on the assumed commissioning dates for the first unit of the hydroelectric projects:

- Rusumo Falls: 01.12.2014

the key dates for the project are as follows:

- Approval of feasibility/solicitation reports on the project: 30. November 2009
- Appointment of developer: 30. September 2010
- Award of EPC contract for Lines: 31. December 2010
- Completion date for lines: 31. March 2013
- Award of EPC contract for Substations: 01. December 2010
- Completion date for Phase 2: 31. March 2013

According to the above schedule, commissioning of the overhead lines and the substations will take place twelve months before commissioning of the first unit of Rusumo Falls hydroelectric project in order to allow electrical tests on switchgear, transformer, generator and turbine.

15.2.2 Transmission lines

Annex 15-1 shows the implementation schedule of the overhead lines. This project phase comprises all overhead lines. The total project time, starting with the conceptual design and ending with the preliminary taking over is some 39 months. Some 12 months are estimated for the project development including preparation of conceptual design, tender documents up to award of EPC contract. The project implementation requires some 27 months.

The implementation schedule of the line project shall be coordinated with the substation project.

15.2.3 Substation

Annex 15-2 shows the implementation schedule of the substations.

The total project time, starting with the conceptual design and ending with the preliminary taking over is some 39 months. Some 12 months are estimated for the project development including preparation of conceptual design, tender documents up to award of EPC contract. The project implementation requires some 27 months.
15.3 Coordination requirements between the interconnected systems

This project represents one part of the Nile basin power transmission scheme and will be interconnected with three other networks as shown in the following figure:

**Figure 15-1**: Structure of interconnected transmission systems

The 220 kV project will be jointly built, owned and operated by TANESCO, ELECTROGAZ and REGIDESO and EGL/SINELAC.

Coordination requirements between the four companies are typical for interconnected systems during the

- planning phase
- implementation phase
- commissioning phase
- operation phase

for the technical, operational, organizational and security aspects.

Major issues to be dealt with are:
Planning phase
- technical standards and specifications for the high voltage equipment
- system configuration
- harmonization of planning and operation criteria (grid code)
- protection and PLC/Fibre optic schemes
- SCADA and telecommunication schemes
- agreements on commissioning date for the whole scheme
- interconnection agreement
- scheme of control agreements
- signing of power purchase agreements,
- agreement on wheeling charges.

Implementation phase
- implementation schedules of projects and sub-systems,
- coordination of different lots and contractors,
- determination of boundary limits and responsibilities,
- setting-up of a regulatory body.

Commissioning phase
- joint tests on interconnecting lines and systems
- joint commissioning and tests of the whole transmission scheme
- metering and billing of energy supplied during trial runs and tests.

Operation phase
- mutual agreements on operation schedules
- mutually agreed system operation, maintenance and repair schedules
- information on interactions
- mutual defense plan and system security.

15.4 Monitoring of project performance

The basic objectives of the monitoring process of a project are to ensure that the project can be implemented successfully and that the output of the project and the impacts resulting from it are in line with the expectations, both in the short term and in the long term. In this way the project should contribute to achieving the ultimate goals of the specific sector in which it is implemented and of the economy and the nation as a whole.

The monitoring process will furthermore provide the necessary information for formulating corrective and mitigating measures, should this be required in the course of the project life, and it will come up with the necessary conclusions for further improving future projects.
15.5  Further Project Activities

15.5.1  List of activities

The following project activities have to be considered in future project phases:

- Information and discussions with local authorities at substation site,
- further investigations at the substation site,
- final survey and alignment of substation plot,
- purchase of substation plot,
- change of landuse at the substation site,
- final alignment of 220 kV line route
- final clarification of right-of-way
- soil tests at substation site and along the line route
- updating of feasibility study based on new assumptions or information, etc.,
- provide or review of grid code and harmonization with EEAP grid code as a legal basis for international cooperation
- set-up of design standards and recommendations for 220 kV equipment and 220 kV transmission lines
- intensified coordination with EGL, NELSAP, REGIDESO, TANESCO and ELECTROGAZ on system studies, system expansion planning and system operation,
- more detailed system simulations on the interconnected 400/220/132/110 kV , NELSAP, EAPP, REGIDESO, TANESCO and ELECTROGAZ system in cooperation with , NELSAP, EAPP, REGIDESO, TANESCO and ELECTROGAZ system planning department,
- additional studies on the 220 kV interconnection with future substation in respect to load demand, system expansions, compensation of reactive power, etc.,
- studies on further 220 kV system expansion adjacent to the present project, e.g. RUSIZI 3, Kibuye, Gyseni, etc.,
- set-up of standards for system operation, maintenance and repair
- environmental impact assessment including mitigation measures
- preparation of final tender documents
Annex 15-1

### Implementation Schedule of the Transmission Line and Substation Lots

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### Notes:
- Activities are listed in the order of 1.Qtl to 4.Qtl for each year (2008-2013).
- Substations activities are indicated with a solid blue fill in the corresponding cells.
- Other activities are marked similarly with appropriate fill colors.