



WEST AFRICAN POWER POOL
SYSTEME D'ECHANGES D'ENERGIE ELECTRIQUE OUEST AFRICAIN
General Secretariat / Secrétariat Général

WAPP INTEGRATION AND TECHNICAL ASSISTANCE PROJECT

**TRAINING AND CERTIFICATION PROGRAMME FOR WAPP SYSTEM
OPERATOR**

**TERMS OF REFERENCE FOR THE RECRUITMENT OF A
CONSULTANT FOR THE DEVELOPMENT OF A WAPP TRAINING
AND CERTIFICATION PROGRAMME FOR SYSTEM OPERATORS
OF THE WAPP ICC, CAC**

(final: NO 26-4-2018)

1. Background

The West African Power Pool (WAPP) is a specialized institution of Economic Community of West African States (ECOWAS) covering 14 out of the 15 Member States of this regional economic community (Benin, Côte d'Ivoire, Burkina Faso, Ghana, Gambia, Guinea, Guinea Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo).

WAPP is an international organization operating in the general interest of the regional power network system with a view to ensuring reliable power supply throughout the region. WAPP Members (summing up to 29) comprise public and private power generation, transmission and distribution entities involved in the operations of the power network system in West Africa.

The objectives of the WAPP include the following:

1. Formalize an official and extended collaboration in the region in order to develop power generation and transmission facilities, thus enhancing power supply and strengthening power security within the sub-region;
2. Improve the reliability of power system and quality of power supply in the region as a whole;
3. Minimize operating cost of networks;
4. Create a common operating standards and rules in the sector;
5. Create a transparent and reliable mechanism for the swift settlement of power trade transactions;

The WAPP Information and Coordination Centre (ICC) is an organ of the WAPP Secretariat that promotes operational coordination between Transmission Owning/Operating Members

through the day-to-day information sharing / exchange between WAPP Operational Coordination Centres.

WAPP is pursuing the development of the Regional Electricity Market in three (3) phases: (i) the Market Phase 1 is planned to start by end of this year 2018. (ii) the Phase 2, consist of the mutation of present ICC into Regional System Market Operator (RSMO) (iii) the Phase 3 is a long term plan to be realized when the financial liquidity in the market could be able to support a spot market.

The responsibilities of the Regional System Market Operator are as follows:

- Monitor and evaluate the network reliability;
- Undertake day-to-day management of the different markets (bilateral market, day – ahead market);
- Coordinate with Control Areas for the use of interconnectors and to optimise its use;
- Undertake Billing and Settlement of the market;
- Undertake Market monitoring and surveillance.

The detail responsibilities of the Regional System Market Operator are defined in the Regional Market Rules.

2. Objective of the TOR

The WAPP ICC currently acts as the coordinator of the WAPP Interconnected System. This coordination role is to be enhanced with the delivery of a WAPP Coordination Centre at Calavi, Republic of Benin. The WAPP will own and operate the control centre (but will not operate any physical network asset) in the region. As part of his mandate, the WAPP ICC will ensure uniformity of training and certification requirements across the region including that of WAPP ICC co-ordination and control centre operators.

The objective of this TOR is to broadly conceptualise the desired Training and Certification (T&C) environment, list of expected scope of T&C activities and the Terms of Reference for the consultant firm to be engaged to guide and advise on the design and implementation of the T&C Programme.

3. WAPP Power Systems Operation

In general, the Transmission System Operators (TSOs) have the responsibility and authority to conduct system operations, implement real time and coordinated actions to ensure the stable and reliable operation of their specific national power systems. Each Control Area Centre (CAC) is responsible for the coordination and control of the synchronized area network at the operational level and the WAPP ICC provides the overall operational coordination for the region.

The WAPP interconnected power system is composed of 5 Control Areas with Operators as follows:

- CA – 1: Côte d’Ivoire-Burkina-Faso, Côte d’Ivoire is the operator
- CA – 2: Ghana-Togo-Benin, Ghana is the operator,

- CA – 3: Nigeria-Niger, Nigeria is the operator,
- CA – 4: Guinea – Liberia – Sierra Leone, Guinea is the operator,
- CA – 5 : Sénégal – Mali – Gambie – Guinée Bissau. Senegal is the operator.

However, the WAPP power system is as present composed of three (3) physically separate power systems, corresponding to the following geographical areas:

1. Guinea – Liberia – Sierra Leone;
2. Gambia – Guinée Bissau;
3. Senegal – Mali – Côte d'Ivoire – Burkina Faso – Ghana – Togo – Benin – Nigeria – Niger. This system is an interconnected power system operated in three (3) separate synchronous zones due to stability issues (Figure 1): See WAPP Operational Manual [2] for details

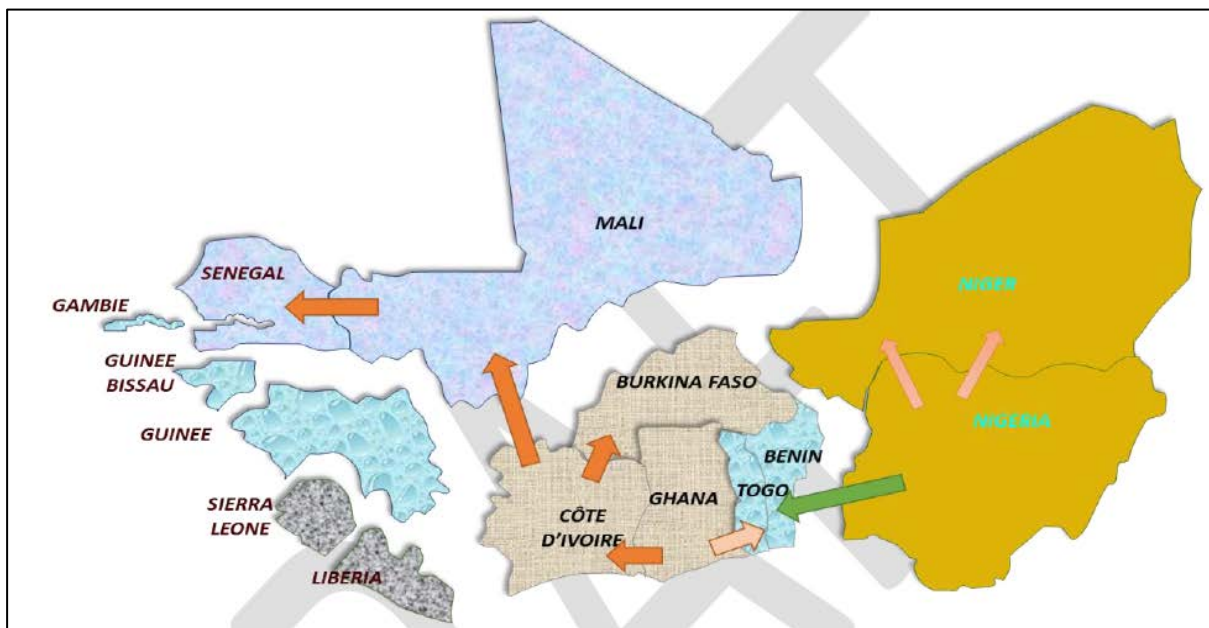


Figure 1 WAPP Synchronous Zones

4. WAPP Certification Programme – Global Concept

The WAPP intends to develop a Regional System Operator Certification Programme to complement existing training and certification Programme, and promote skilled, qualified and regionally certified System Operators to ensure a reliable operation of the WAPP Interconnected Power System.

The Certification Programme also seeks to improve the operator's ability to take effective action—either preventive or corrective for safe and reliable operation of the WAPP Interconnected Network.

It is envisaged that the System Operator Training and Certification Programme would provide the overall framework for training and certifying operators based on their designations and credentials (according to specific functional areas of system operations) in operating individual TSO's as well as collaborating with Control Area Centers, other TSO's and the WAPP

Information and Coordination Center (WAPP ICC) in ensuring overall reliability of the WAPP Interconnected Power System.

5. WAPP Certification Programme – Training Service Provider

Within the framework of Training and Certification Programme, it is envisaged that the identified WAPP Centres of Excellence will be the mandated Training Service Providers to deliver training for the System Operator's Certification.

The Training Service Providers shall be required to employ effective training methods (live instructor-led training, online training, or a combination of live-instructor-led/online training etc.) according to the training modules to be developed by the Consultant.

6. Scope of Work for the Consultant

The Consultant shall carry out the assignment based on the under listed scope of works:

Tasks 1:

- Review existing System Operator training and certification Programme (if any) being implemented by WAPP Member Utilities. The Consultant shall review
 - Categories, designations or credentials of Operators (according to specific functional areas of System Operations), for example, (i) transmission operator, (ii) reliability operator, (iii) balancing, interchange and transmission operator etc.
 - Minimum requirements for training and certification
 - Requirements for maintaining and renewing certification (if any)
 - Requirements/need for obtaining Continuing education credits etc.
 - Training Modules and contents

Deliverable 1:

- WAPP System Operator Training and Certification Framework. The Framework shall include but not limited to the following:
 - Guidelines for establishing System Operator Training and Certification Governance Committee (if necessary). This shall include membership of the System Operator Training and Certification Governance Committee. The role of the committee shall include the provision of overall policies for training and certification, provide input to training module updates (if necessary), monitor quality of delivery of training and certification by identified training centres (Centres of Excellence) etc.
 - Set of System Operator certification credentials or designations (according to specific functional areas of System Operations), for example, (i) transmission

operator, (ii) reliability operator, (iii) balancing, interchange and transmission operator etc.

- Guidelines and processes to request and obtain certification for the various System Operator Credentials
- Guidelines for examination development process. This shall include but not limited to an assessment of the need for an Examination Board or Examination Working Group, method of delivery of examination (e.g. Computer based), how examination questions are developed, grading, etc.
- Minimum requirements for training and certification such as Training modules to be completed for each defined credential or designation.

Task 2:

- Within the framework of reviewing the training modules and contents, the Consultant shall carry out an assessment of training simulators and equipment in training centers used for practical demonstrations and hands-on exercises etc.in the training and certification of System Operators.

Deliverable 2:

- List of tools, simulators, equipment etc. to be purchased and put in place in the selected Centers of Excellence to be used in delivering training to System Operators.

Task 3:

- The Consultant shall develop comprehensive training modules to be delivered by Training Centers for certification of System Operators. The Training modules shall cover important power system, system operations knowledge areas and WAPP Operation Manual

Deliverable 3:

- Comprehensive training modules covering important power system and system operation knowledge areas. Modules will also cover contents of the WAPP Operation Manual

Task 4:

- The Consultant shall carry out an assessment of the competencies of Trainers and identify gaps where they may need some additional trainings or refresher courses in order to be better prepared to deliver trainings to System Operators. The Consultant following this shall develop a Train the Trainer manual. In addition, the Consultant shall deliver trainings to selected Trainers.

Deliverable 4:

- Prepare a Train the Trainer Manual for System Operator Training and Certification. The Consultant shall further train a selected number of Trainers from the identified Centers of Excellence who will then be required to deliver trainings to System Operators.

The Consultant shall not limit himself to scope of works defined above. He shall draw from his experiences, international best practices as well as other certification Programme such as the NERC Certification for System Operators among others.

7. Duration of Assignment

The assignment is a One (1) year fixed term contract from the date of signature of contract with the possibility of an additional year extension subject to additional needs by WAPP within the framework of Training and Certification.

8. Deliverables

The Consultant shall deliver the following:

- 1 Inception Report within one month of signing the Contract, detailing but not limited to:
 - a. Understanding of the scope and duration of the assignment,
 - b. Work plan with detailed monthly progress milestones with associated deliverables.
- 2 Interim Report, three (3) months from the date of signing of the Contract. The Interim Report will cover the outcomes of Task 1 and Task 2.
- 3 The Consultant shall deliver different documentation on developed detailed training modules as defined in Task 3 and train the Trainer Manual as defined in Task 4.
- 4 Draft Final Report: The consultant shall present a Draft Final Report which shall cover all aspects of Task 1 to 4.
- 5 Final Report: The Final Report including an Executive Summary shall incorporate comments by WAPP Utility Members, other stakeholders and WAPP Secretariat in both French and English. The report shall be submitted in soft copy and five (5) hard copies to the WAPP Secretariat within (1) months of submission of draft final report.

9. Training & Certification Consultant Requirements

The interest Consultant candidate to perform this assignment must have the following minimum competences:

1. Bachelor's Degree in Electrical Engineering (Power Systems specialisation preferred) or a relevant Engineering related area from an accredited College or University and with at least 10 years of practice in Power Systems Operations;
2. Experience in developing, implementing, and maintaining comprehensive training Programmes for System Operators and Dispatchers;
3. Knowledge or familiar with reliability standards, System operation training standards, policies, guidelines etc.;
4. Good understanding of Power System Operations, Reliability Coordination, Power System Switching etc.;

5. Progressive and sustained technical competency in Training & Certification relating to Power System Operations;
6. Be familiar with the West African region and its electricity network operation;
7. Fluent (speaking and writing) in both English and French.

10. Applicable standards and Guidelines

1. WAPP Market Rules
2. WAPP Operational Manual
3. WAPP Draft Training and Certification Manual
4. Training Recommendations & Training Manual Mercados
5. ENSTOE Training Programme P8 – Policy 8: Operational Training
6. NERC System Operator Certification Programme Manual Dec 2014
7. Liaise with various WAPP Technical Working Groups

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