Regional Training Workshop on Geographical Information System for Energy Planning - Lessons learnt from the WAPP experience in relation to Collecting and Updating Data for Energy Planning

August 11-12, 2014
Dakar, Senegal

Presented by: Jeremiah OYEWOLE
(M&E Specialist, WAPP),
Overview

- Vision and Mission of WAPP
- Updated Revised Master Plan 2012 -2025 / Implementation Strategy
- WAPP Monitoring & Evaluation Program
- WAPP GIS Database Development
Vision of WAPP: To integrate the national power systems into an unified regional electricity market – with the expectation that such mechanism would over the medium to long term, ensure the citizens of ECOWAS Member States with a stable and reliable electricity supply at competitive costs.

Mission of WAPP: To promote and develop infrastructure for power generation and transmission, as well as, to assure the coordination of electric power exchanges between ECOWAS Member States.
**Updated ECOWAS Revised Master Plan**

- Adopted by ECOWAS Heads of State and Government in February 2012 through Supplementary Act A/SA. 12/02/12
- Outcomes (2012-2025):

<table>
<thead>
<tr>
<th>Project Description</th>
<th>No.</th>
<th>Cost (US$ million)</th>
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</thead>
<tbody>
<tr>
<td>Hydropower Projects (7,092 MW)</td>
<td>24</td>
<td>13,803</td>
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<tr>
<td>Thermal Power Projects (2,375 MW)</td>
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<td>Renewable Energy Projects (800 MW)</td>
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<tr>
<td>Transmission Line Projects (16,000 km)</td>
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- Total Investment Requirement = US$26.416 billion
Implementation Strategy

- Coastal Backbone
- Inter Zonal Hub
- North-Core

Countries:
- Senegal
- Gambie
- Guinee Bissau
- Guinee
- Sierra Leone
- Liberia
- Benin
- Côte d'Ivoire
- Ghana
- Togo
- Burkina Faso
- Nigéria
- Niger
- OMVG-OMVS
- CLSG

Locations:
- OMVG
- OMVS
WAPP M&E Program
WAPP M&E/MIS - Objective

- The Monitoring and Evaluation and Management Information System Sub-program of the WAPP is to improve the method of data collection, storage, reporting of data and support tools for decision-making.

- WAPP M&E System:
  - Provides Feedback on Project implementation and performance and access to benefits;
  - Identifies problems early and propose solutions;
  - Evaluates achievement of project objectives;
  - Promotes participation, ownership and accountability;
  - Informs the regional Power sector
WAPP M&E/MIS Program

An IDF Grant was provided by The World Bank to strengthening M&E capacity for WAPP Secretariat and all WAPP Member Utilities:

- A harmonized M&E Framework was established for WAPP And Utilities
- WAPP M&E Manual and Training Plan
- M&E Unit established in each Utilities, and WAPP Secretariat
- Twenty (20) Computers and M&E Software were acquired to equip M&E Units at the Utilities and the WAPP Secretariat
- On-site M&E software training of WAPP Engineers all WAPP member utilities.
- A quarterly WAPP M&E Operations and Project Implementation Report is published by WAPP Secretariat;
M&E/MIS Activities

Step 1
Baseline Assessment

Step 2
Logic Model & Indicator Creation

Step 3
Validate indicators with stakeholders

Step 4
Develop M&E Framework

Step 6
Produce WAPP MIS Design

Step 5
Produce M&E Manual

Step 7
Capacity Building

Step 8
Evaluate Project impacts

Step 9
Produce reports
Setup Profile (Data Linkage) (Input, Activity, Output)

- Program/Subprogram
- Location (Control Area, Utilities)
- Indicators (Input, Activity, Output)
- Organization (Responsible, Program, Project, Component)
- Time
- Stakeholders
M&E/MIS System Data Flow

WAPP ICC Setup and Maintain all Data structure and Data Coding

Utilities/Projects progress data entered to MIS and Self-Monitoring and Evaluation

Setup Baseline/Target

Program, Control Area, Utilities (Project Report)

Project Progress Report
Data gathering

WAPP ICC

Satellite

WAPP MEMBER UTILITIES
Data gathering

Utilities

ICC

Operational Data

- Energy Traded on Interconnections
- Transmission line Status
- Peak Load
- Energy Production/ Consumption

Project Data

- Status of Project
- Funds Committed
- Expected Commissioning
Self-Monitoring and Evaluation Process

- Baseline/Target Information
- Physical Progress
- Financial Disbursement
- Statistical Operational Data

WAPP

Utilities/Projects

Self-monitoring and Evaluation
Development of WAPP GIS database
Introduction

- GIS: Geographic Information System
- Basic technical data + geo-location
- Vector or raster data (raster)
- Tools specific analysis
- Easy development with GPS and Google Earth
- Availability of data and tools "open-source"
Applications

• Data Validation: facilitates and enhances updates and information exchanges.

• coordination tool: use for studies and development projects.

• Assistance with the decision for the development and operation of the system.

• Preparation and updating of system boards, used for purposes of communication, presentation, reports. Maps WAPP system prepared and updated regularly on the basis
• common standards (symbology)
Map standards - symbology

International references (existing standards, other power pools)
Colour code possibly used in national standards
Substations and power plants

- Hydro Power Plant
- Thermal Power Plant
- Substation

- 750 kV transmission line
- 500 kV transmission line
- 380-400 kV transmission line
- 300-330 kV transmission line
- 220 kV transmission line
- 132-150 kV transmission line
### Colour Code

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<th>225</th>
<th>161</th>
<th>150</th>
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<td>Proposed WAPP standard</td>
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Map standards - symbology

- Others (multi circuits lines, lines not operated at nominal voltage,..)

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<tr>
<th>Voltage</th>
<th>Temporary voltage</th>
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<tr>
<td>In operation (diff. colours)</td>
<td>Under construction (diff colours)</td>
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<td>Double line system (diff colours)</td>
<td>&gt;= 3 lines (diff colours)</td>
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</table>
Technical data

- Transmission lines: design voltage, operating voltage, cable type and section, circuits (design/installed), length, commissioning date, transmission capacity, series compensation, shunt compensation telecommunication facilities (optic fibre, PLC),....

- Substations: voltage levels, substation type, transformers characteristics, reactive compensation, short-circuit capacity

- Power plants: characteristics of each generation unit, including installed and available capacity, fuel type, electrical characteristics including transformers
Implementation

- Draft map and GIS preliminary data tables prepared by WAPP on basis of data available
- Monitoring and Evaluation (M&E) focal points in charge of providing the missing or correcting information for each utility member
- Map and corresponding excel tables to be verified and validated by M&E focal points
WAPP M&E/GIS Program – Lessons learnt

- In-balace in level of capacity building amongst members utilities » Data Environment, M&E/MIS Capacity, M&E/MIS Data Collection-Analysis-Dissemination, MIS Infrastructure/Data Connectivity, and Staff Capacity
- Populating the GIS Database
- Data duplication and lack of understanding of measurable inputs.
- Criterion for selecting GIS Software
- Definition and availability of data requirements.
- Integration with web SCADA and security
- Ownership and access (centralized/distributed database)
- Role of GIS in integration with other applications.
- Database documentation/representation.
THANK YOU

MERCi

OBRiGADO

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