



**WEST AFRICAN POWER POOL**  
**SYSTEME D'ECHANGES D'ENERGIE ELECTRIQUE OUEST AFRICAIN**

*General Secretariat / Secrétariat Général*

**SIXTH SESSION OF THE GENERAL ASSEMBLY OF  
THE WEST AFRICAN POWER POOL ORGANISATION**

**DECISION WAPP/40/DEC.28/10/11 RELATING TO THE ADOPTION OF THE  
UPDATED ECOWAS REVISED MASTER PLAN FOR THE GENERATION AND  
TRANSMISSION OF ELECTRICAL ENERGY**

**The General Assembly**

**CONSIDERING** the Decision A/DEC.5/12/99 of the twenty-second summit of the Authority of the Heads of State and Government of ECOWAS held in Lomé on December 10<sup>th</sup>, 1999, relating to the establishment of the West African Power Pool (WAPP);

**CONSIDERING** the Decision A/DEC.7/01/05 of the twenty-eight summit of the Authority of Heads of State and Government in Accra on January 19, 2005, relating to the ECOWAS revised Master Plan for the Generation and Transmission of Electrical Energy;

**CONSIDERING** the Decision A/DEC. 18/01/06 of the twenty-ninth summit of the Authority of Heads of State and Government in Niamey on January 12<sup>th</sup>, 2006, relating to the adoption of Articles of Agreement for the establishment and functioning of the WAPP;

**CONSIDERING** the Decision A/DEC. 20/01/06 of the twenty-ninth summit of the Authority of Heads of State and Government in Niamey on January 12<sup>th</sup>, 2006, relating to the establishment of the WAPP General Secretariat as a specialized institution of ECOWAS;

**CONSIDERING** the Headquarters Agreement signed between the Republic of Benin and the WAPP;

**CONSIDERING** the stipulations in the Articles of Agreement relating to the organisation and functions of the WAPP dated July 6<sup>th</sup>, 2006, in particular Articles 1, 4, 5, 7 and 26;

**CONSIDERING** the Decision WAPP/03/DEC.06/07/06 of the First Session of the General Assembly of the WAPP held in Cotonou, July 6<sup>th</sup>, 2006, adopting the 2006-2009 Business Plan for the WAPP Organization and corresponding Budget for the WAPP Secretariat;

**CONSIDERING** the Resolution WAPP/52/RES.20/04/09 of the Eighth meeting of the WAPP Executive Board in Cotonou on April 20<sup>th</sup>, 2009 relating to the update of the ECOWAS Revised Master Plan for the Generation and Transmission of Electrical Energy;

**CONSIDERING** the Resolution WAPP/62/DEC.05/10/09 of the Ninth meeting of the WAPP Executive Board in Cotonou on October 29<sup>th</sup>, 2009 adopting the 2009-2012 WAPP Business Plan;

**CONSIDERING** the Resolution WAPP/69/RES.05/10/09 of the Ninth meeting of the WAPP Executive Board in Cotonou on October 29<sup>th</sup>, 2009 authorising the Secretary General to finalize and sign a Technical Assistance Grant Agreement with the European Investment Bank for update of the ECOWAS Revised Master Plan for the Generation and Transmission of Electrical Energy;

**CONSIDERING** the Resolution WAPP/104/ RES.27/10/11 of the Sixteenth meeting of the WAPP Executive Board in Lome on October 27<sup>th</sup>, 2011 relating to the adoption of the updated ECOWAS revised master plan for the generation and transmission of electrical energy.

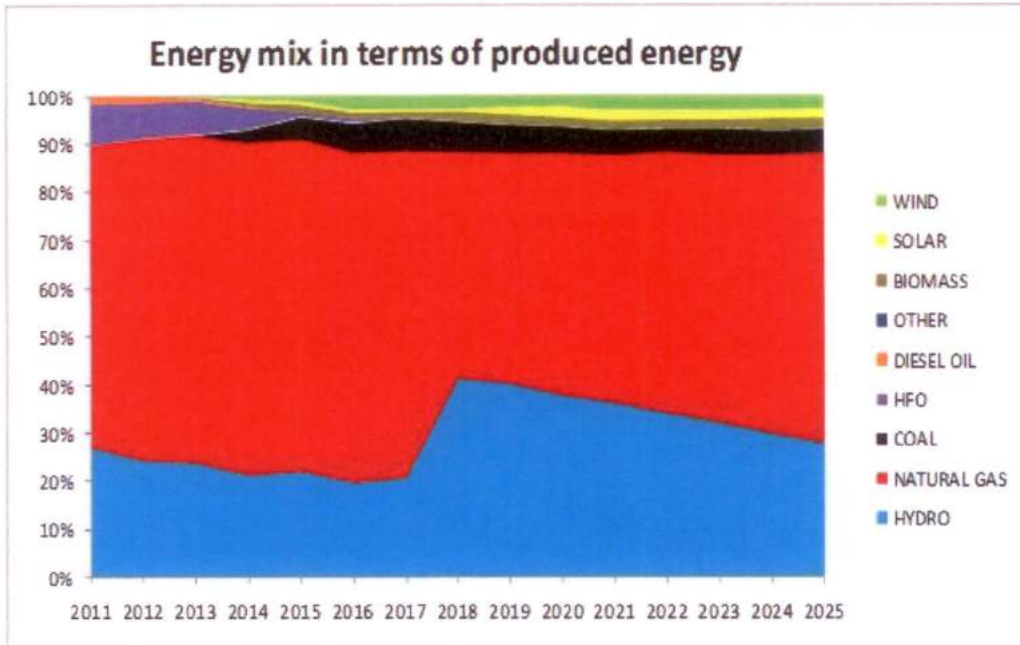
Accordingly and in view of the need to establish a coherent framework and optimal planning that would guide investments within the electricity sector of ECOWAS, Tractebel Engineering was engaged on November 10, 2010 to update the ECOWAS revised Master Plan for the Generation and Transmission of Electrical Energy and propose an appropriate Implementation Strategy for its realization.

Tractebel Engineering, having:

1. Visited all ECOWAS Member States to collect data and hold discussions with key stakeholders within national energy sectors;
2. Assumed as criteria that WAPP regional generation projects should have a:
  - Minimum size of 150 MW
  - Regional orientation in terms of factors that include location and energy sharing between neighbouring countries,
3. Performed an economic study to identify the necessary investments in generation and transmission and sensitivity analyses on key parameters such as load demand, fuel prices, and increased renewable energy assets;
4. Verified through a technical study that the proposed generation and transmission investments shall lead to stable and reliable operation conditions;
5. Evaluated the environmental and social impact assessments of the proposed investments to integrate environmental considerations and associated costs;
6. Carried out financial analyses of WAPP Members to evaluate among others, their capacity to support the required investments;

Concluded among others that:

1. A strong need existed to develop the clean energy hydropower resources within the ECOWAS sub-region on a large-scale;
2. It was vital to maintain a balanced energy mix between the different energy resources in order to achieve the technical and financial viability of the Master Plan;
3. An objective of developing 10% renewable energy assets as part of the Master Plan was achievable;
4. The mix of the energy that shall be produced is:



5. Preliminary calculations of CO<sub>2</sub> emission credits due to the proposed renewable energy projects indicate a cumulative gain of approximately 19 million tons CO<sub>2</sub>.
6. The projects indicated on the attached and summarized below shall lead to a comprehensive integration of the national power systems in West Africa and should be prioritized:

	No.	Cost (US\$ million)
Hydropower Projects (7,092 MW)	21	11,808
Thermal Power Projects (2,375 MW)	5	4,263
Renewable Energy Projects (800 MW)	4	1,893
Transmission Line Projects (16,000 km)	26	6,457

7. The realization of the proposed regional priority projects shall result in an economic benefit with Net Present Value (NPV) of US\$12,176 million for the entire ECOWAS region during the period 2012 to 2025;
8. Due to the progressive nature that the interconnection of the national power systems shall be achieved, the installation of Power System Stabilizers (PSS) on existing large generation units and on all new units shall be required, special protection schemes and defense mechanisms such as Under Frequency and Under Voltage Load Shedding (UFLS, UVLS) will have to be adopted and harmonized among countries, and Static Var Compensation (SVC) equipment shall be needed at strategic locations.
9. An accelerated realization of the WAPP Information and Coordination Centre (ICC) with a comprehensive communication system is fundamental in order to among others, ensure coordinated, efficient and stable power exchanges and among WAPP Members.
10. The major factors affecting the pace of implementation of the previous Master Plan include:
  - Inability to match commissioning of transmission projects with commissioning of adequate generation, which led to deficits in supply still persisting even after some interconnection projects have been completed. This situation has compelled some countries to continue to pursue their own initiatives and programs to secure power supply;
  - The approach adopted for implementation of cross-border transmission projects has led to delays due to lack of convergence in priorities between different countries, differences in economic conditions and differences in project management capabilities;
  - Non availability of gas in sufficient quantities for power generation in the region is likely to cause further delays in the commissioning of the strategic generation facilities such as the 450 MW WAPP Maria Gleta in Benin and 400 MW Aboadze/Domuli in Ghana.
  - The poor financial state of the utilities has been a major obstacle to mobilization of funding for the projects.
  - Inadequate human and financial resources to meet the requirements of the WAPP Organization in project conception, development and implementation
11. The Implementation Strategy for the Master Plan should be based on approaches that include the following:
  - Closer collaboration between WAPP Member Utilities and sub-regional organizations to ensure a harmonized and coordinated evolution of the regional interconnected system;

- Deployment of the Special Purpose Company approach as an effective project implementation mechanism that can eliminate the weaknesses associated with the slow pace of implementation;
- Strong advocacy and support for among others, individual country initiatives towards greater private sector involvement in the management of public utilities, pre-paid metering, investments in distribution loss reduction and efficiency in energy use as a means of improving the viability of the utilities;
- Pursuance of funding mechanisms for renewable energy projects such as special concessionary funds and financing instruments such as Carbon Credits;
- Establishment of a dedicated fund for WAPP project development activities similar to the one already created by the West African Monetary Union (WAEMU/UEMOA) that could be leveraged with resources from multilateral institutions such as World Bank, African Development Bank, ECOWAS Bank for Investment and Development, Banque Ouest Africaine de Developpement, and ECOWAS Commission.

The Consultant thereafter submitted a report that was examined in Cotonou from September 21 – 23, 2011, by the WAPP Strategic Planning and Environmental Committee together with experts from ECOWAS Ministries in charge of energy and national utilities with UEMOA and sub-regional organizations. Upon examination of the report, the meeting made the following recommendations to the WAPP Executive Board:

- i. Adoption of the proposed priority investment program and implementation strategy;
- ii. Diversification of funding sources to include the private sector and bilateral cooperation in the development of WAPP Priority Projects, in view of the large investment needs;
- iii. ECOWAS Member States establish appropriate institutional frameworks that would facilitate fast track implementation of WAPP Priority Projects and ensure necessary conditions to attract private sector participation including the application of cost reflective tariffs;
- iv. WAPP Member Utilities put in place measures to improve on their technical, financial and commercial performance and also be proactive in addressing the requirements of multilateral funding agencies in order to reduce delays.

The General Assembly in light of the foregoing

**DECIDE:**

- Article 1:** The adoption of the conclusions of the updated Master Plan and attached priority investment program in generation and transmission and the submission of a recommendation to the Committee of ECOWAS Ministers of Energy to consider and adopt the same and submit to the Conference of ECOWAS Heads of State and Government for approval.
- Article 2:** The submission of a recommendation to the Committee of ECOWAS Ministers of Energy to adopt and submit a recommendation to the Conference of ECOWAS Heads of State and Government to authorize the establishment of a dedicated fund for WAPP project development activities.
- Article 3:** The submission of a recommendation to the Committee of ECOWAS Ministers of Energy to adopt and submit a recommendation to the Conference of ECOWAS Heads of State and Government for ECOWAS Member States to establish appropriate institutional frameworks that would facilitate fast track implementation of WAPP Priority Projects and ensure necessary conditions to attract private sector participation including the application of cost reflective tariffs.
- Article 4:** The submission of a recommendation to the Committee of ECOWAS Ministers of Energy to adopt and submit a recommendation to the Conference of ECOWAS Heads of State and Government for ECOWAS Member States and WAPP Member Utilities to put in place measures to improve on their technical, financial and commercial performance and also be proactive in addressing the requirements of multilateral funding agencies in order to reduce delays in the implementation of projects.
- Article 5:** The present Decision comes into effect upon its signature.
- Article 6:** The Secretary General shall take all necessary measures to ensure the implementation of this Decision.

**Done in Lome on this day of October 28<sup>th</sup>, 2011**



**Chairman**  
**Engr. (Dr.) J.O. Makoju**

### PRIORITY GENERATION PROJECTS

	PROJETS		MISE EN SERVICE	COUTS
1	Centrale hydroélectrique de Felou 60 MW 350 GWh	OMVS	2013	170
2	PUSAE - Centrale Thermique Aboadze 400 MW	WAPP	2014	356
3	PUSAE - Centrale Thermique Maria Gleta 450 MW	WAPP	2014	401
4	Centrale hydroélectrique de Kaleta 240 MW - 946 GWh	Guinée	2015	267
5	Centrale hydroélectrique de Mount Coffee 66 MW 435 GWh	WAPP	2015	383
6	Centrale Charbon Sendou 875 MW	Sénégal	2016	2 532
7	Centrale hydroélectrique de Gouina 140 MW - 565 GWh	OMVS	2017	329
8	Projet Energie OMVG - Sambangalou 128 MW - 402 GWh	OMVG	2017	433
9	Centrale hydroélectrique Adjaralla 147 MW 366 GWh	WAPP	2018	333
10	Centrale hydroélectrique de Balassa 181 MW - 401 GWh	OMVS	2017 - 2019	171
11	Centrale hydroélectrique de Badoumbé 70 MW - 410 GWh	OMVS	2017 - 2019	197
12	Centrale hydroélectrique de Souapiti 515 MW 2518 GWh	WAPP	2017 - 2019	796
13	Centrale hydroélectrique de Bumbuna 400 MW 1 560 GWh	WAPP	2017 - 2019	520
14	Centrale hydroélectrique de Fomi 90 MW 374 GWh	ABN	2017 - 2019	156
15	Centrale hydroélectrique de Soubré 270 MW 1 120 GWh	Côte d'Ivoire	2017 - 2019	620
16	Centrale Solaire Burkina Faso 150 MW	WAPP	2017 - 2019	549
17	Centrale hydroélectrique de Koukoutamba 281 MW - 455 GWh	OMVS	2017 - 2021	404
18	Parc éolien Sénégal et Gambie - 200 MW	WAPP	2017 - 2021	318
19	Centrale hydroélectrique de Kassa B 135 MW 528 GWh	WAPP	2019-2021	214
20	Centrale hydroélectrique de Amaria 300 MW 1 435 GWh	WAPP	2019-2021	377
21	Centrale hydroélectrique de Tiboto 225 MW 912 GWh	WAPP	2019-2021	578
22	Centrale hydroélectrique de Zungeru 700 MW 3 019 GWh	WAPP	2019-2021	1 077
23	Centrale Thermique Charbon de Salkadamna (Niger) 200 MW	Niger	2019-2021	573
24	Centrale Solaire Mali 150 MW	WAPP	2019-2021	549
25	Centrale hydroélectrique de Boureya 160 MW - 455 GWh	OMVS	Après 2021	373
26	Centrale hydroélectrique de DIGAN 93,3 MW 243 GWh	OMVG	Après 2021	112
27	Centrale hydroélectrique de Grand Kinkon 291 MW 720 GWh	WAPP	Après 2021	298
28	Centrale Thermique CC Lomé 450 MW	WAPP	Après 2021	401
29	Centrale hydroélectrique de Mambilla 2 600 MW 11 214 GWh	WAPP	Après 2021	4 000
30	Parc éolien Nord Nigeria 300 MW	WAPP	Après 2021	477

### PRIORITY TRANSMISSION PROJECTS

	PROJETS		MISE EN SERVICE	COUTS
1	Ligne 225 kV Ferkessédougou (Côte d'Ivoire) - Ségou (Mali) 370 km	WAPP	2012	175
2	Renforcement Laboa– Boundiali- Ferkessédougou 285 km	Côte d'Ivoire	2013	100
3	Ligne 330 kV Dorsale Côtière - Volta (Ghana) - Lomé C (Togo) - Sakete (Bénin)	WAPP	2013	84
4	Ligne 225 kV Bolgatanga (Ghana) - Ouagadougou (Burkina) 206 km	WAPP	2013	74
5	Ligne 225 kV Han (Ghana) - BoboDioulasso (Burkina) - Sikasso - Bamako (Mali)	WAPP	2015	230
6	Ligne CLSG 115 kV double terre 1060 km	WAPP	2015	430
7	Ligne 330 kV Dorsale Côtière - Aboadze (Ghana) - Riviera (Côte d'Ivoire)	WAPP	2017	57
8	Projet Energie OMVG - Boucle 225 kV 1677 km	OMVG	2015-2017	577
9	Ligne 225 kV Kayes (Mali) - Tambacounda (Sénégal) 280 km	OMVS	2017 - 2019	65
10	Ligne 330 kV - Dorsale interne entre Prestea et Bolgatanga 640 km	WAPP	2017 - 2019	240
11	Ligne 330 kV Corridor Nord 832 km entre BirninKebi (Nigeria) - Niamey (Niger) – Malanville (Benin) –Ouaga Burkina	WAPP	2017 - 2019	540
12	Ligne 760 kV Super Grid à travers le Nigeria 2 700 km	WAPP	2017 - 2019	2 000
13	Renforcement CLSG Second Terre 225 kV 1060 km	WAPP	2018 - 2019	69
14	Ligne 225 kV Linsan (Guinée) - Fomi (Guinée) - Bamako (Mali) et Fomi - N'Zerekore 1350 km	WAPP	2018 - 2019	550
15	Renforcement de la ligne 225 kV Soubré - Taabo 196 km	Côte d'Ivoire	2018 - 2019	69
16	Ligne 225 kV double terre Linsan (Guinée) - Manantali (Mali) -	OMVS	2017 - 2021	131
17	Renforcement du tronçon Manantali - Bamako - Sikasso	Mali/OMVS	2017 - 2021	151
18	Ligne 225 kV San Pedro (Côte d'Ivoire) - Buchanan 400 km	WAPP	2019-2021	100
19	Ligne 225 kV double terre Fomi (Guinée) - Boundiali( Côte d'Ivoire) 380 km	WAPP	2019-2021	111
20	Renforcement Linsan - Fomi 430 km	WAPP	2019-2021	65
21	Renforcement Boundiali - Ferkessédougou - Bobo Dioulasso - Ouagadougou 716 km	WAPP	2019-2021	103
22	Ligne 330 kV Dorsale Médiane 713 km	WAPP	2019-2021	238
23	Ligne 225 kV Salkadamna - Niamey 190 km	Niger	2019-2021	72
24	Renforcement du tronçon Ouest de l'OMVG	OMVG	Après 2021	141
25	Renforcement dorsale côtière tronçon Lomé C - Sakete	WAPP	Après 2021	46
26	Renforcement Bénin - Nigeria 330 kV double terre - Sakete et Omotosho 120 km	WAPP	Après 2021	39