Economic Community
Of West African States

Communauté Economique
Des Etats de l'Afrique de l'Ouest

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

General Secretariat / Secrétariat Général

2020 – 2023 WAPP BUSINESS PLAN

MISSION: "To promote and develop infrastructure, for power generation and transmission, as well as, to assure the coordination of electric power exchanges among ECOWAS Member States"

VISION: "To integrate the national power systems into a unified regional electricity market"

TABLE OF CONTENTS

GLOSSARY OF TERMS

A&F	Administration and Finance
AFD	Agence Française de Développement
AfDB	African Development Bank
ALSF	African Legal Support Facility
bcm	Billion Cubic Meter
BOAD	Banque Ouest Africaine de Developpement
CAC	Control Area Center
CEB	Communauté Électrique du Bénin
CEET	Compagnie Energie Electrique de Togo
CIE	Compagnie Ivoirienne d'Electricité
CI-ENERGIES	Côte d'Ivoire Energies
CLSG	Côte d'Ivoire - Liberia - Sierra Leone - Guinea
CME	Centre des Métiers de l'Electricité
CPD	Continuous Professional Development
DCC	Distribution and Commercialisation Committee
DFI	Development Finance Institution
EBID	ECOWAS Bank for Investment and Development
ECG	Electricity Company of Ghana
ECOWAS	Economic Community of West African States
ECREEE	ECOWAS Center for Renewable Energy and Energy Efficiency
EDF	European Development Fund
EDG	Electricité de Guinée S.A.
EDM-SA	Energie du Mali-SA
EDSA	Electricity Distribution and Supply Authority
EGTC	Electricity Generation and Transmission Company
EIB	European Investment Bank
EMS	Energy Management System
EOC	Engineering and Operations Committee
EPA	Environmental Protection Agency
ERERA	ECOWAS Regional Electricity Regulatory Authority
ERP	Enterprise Resource Planning
ESIA	Environmental and Social Impact Assessment
EU	European Union
FAT	Factory Acceptance Test
FC	Finance Committee
FDI	Foreign Direct Investment
FODETE	Fund for the Development and Financing of the ECOWAS Transport and Energy Sectors
GIS	Geographical Information System
GIZ	Gesellschaft für Internationale Zusammenarbeit
GPS	Geographical Positioning System
GRIDCo	Ghana Grid Company
HRGC	Human Resources and Governance Committee
ICC	Information and Coordination Centre
IPSAS	International Public Sector Accounting Standards
IsDB	Islamic Development Bank

KPI	Key Performance Indicator
kWh	Kilowatt hour
LEC	Liberia Electricity Corporation
LiDAR	Light Detection And Ranging
M&E	Monitoring and Evaluation
MCC	Millennium Challenge Corporation
MIS	Management Information System
MMS	Market Monitoring System
MRU	Mano River Union
MST	Million Short Tons
MV	Medium Voltage
MW	Megawatt
NAPTIN	National Power Training Institute of Nigeria
NBA	Niger Basin Authority
NEPAD-IPPF	New Partnership for Africa's Development - Infrastructure Project Preparation Facility
NIGELEC	Société Nigérienne d'Electricité
OMVG	Organisation pour la Mise en Valeur du fleuve Gambie
OMVS	Organisation pour la Mise en Valeur du fleuve Senegal
ONE	Office National de l'Electricité du Maroc
PhMU	Phasor Measurement Unit
PIPES	Planning, Investment Programming and Environmental Safeguards
PMU	Project Management Unit
PPA	Power Purchase Agreement
PPP	Public Private Partnership
PSS	Power System Stabilizer
RAS	Remedial Action Scheme
RCE	Regional Center of Excellence
SAT	Site Acceptance Test
SBEE	Société Béninoise d'Energie Electrique
SCADA	Supervisory Control and Data Acquisition
Senelec	Société Nationale d'Electricité du Sénégal
SMO	System Market Operator
SOGEM	Société de Gestion de l'Energie de Manantali
SONABEL	Société Nationale d'Electricité du Burkina
SPEC	Strategic Planning and Environmental Committee
SPS	Special Protection Scheme
SUCCESS-KE	Strengthening Utility Capabilities by Capacity-building, Education and South-South Knowledge Exchange
SVC	Static Var Compensator
Tcf	Trillion cubic feet
TCN	Transmission Company of Nigeria
TRANSCO CLSG	CLSG Regional Transmission Company
TRM	Transmission Reserve Margin
TSA	Transmission Service Agreement
TSO	Transmission System Operator
TTC	Total Transfer Capability

UA	Unit of Account
USA	United States of America
USAID	United States Agency for International Development
VRA	Volta River Authority
WAMS	Wide Area Monitoring System
WAGP	West African Gas Pipeline
WAPP	West African Power Pool
WB	World Bank
WTSAUP	WAPP Transmission Service Access and Use Procedures

1 EXECUTIVE SUMMARY

The WAPP Organization is steadily becoming an institution to be reckoned with given the steadfast growth that it has registered since its inception. In July 2006, fifteen (15#) utilities executed the WAPP Articles of Agreement to become the pioneering Members of the Organization. The Membership was twenty-six (26#) in October 2015 and subsequently was thirty-five (35#) utilities in October 2019, all of these a testimony to the increasing confidence that the WAPP radiates.

The implementation of the 2016 – 2019 WAPP Business Plan delivered further progress for the Organization and enabled the attainment of a pivotal milestone being the formal launch of the regional electricity market in June 2018. This signified the conviction of the ECOWAS sub-region and the WAPP Member Utilities that cross-border electricity trade was no longer a variable in the quest to resolve the supply demand imbalance. The 2016 – 2019 period also saw the Region advance in its infrastructure program and this was characterized by the commissioning of the 225 kV Bolgatanga (Ghana) – Ouagadougou (Burkina) Interconnection Project as well as the 330 kV Ghana – Togo component of the WAPP Coastal Transmission Backbone in addition to the 275 MW Soubre Hydropower Project in Côte d'Ivoire and the 88 MW Mount Coffee Hydropower Project in Liberia. The period also saw the WAPP come closer to attaining another key milestone being the complete integration of the power systems of mainland ECOWAS Member States as well as achieve complete synchronism of the interconnected system given the significant advancement of works on the 225 kV Côte d'Ivoire – Liberia – Sierra Leone – Guinea Interconnection Project and the 225 kV OMVG Interconnection Project involving Senegal, The Gambia, Guinea Bissau and Guinea, together with the WAPP Synchronization Project. Furthermore, the adoption of the ECOWAS Master Plan for the Development of Regional Power Generation and Transmission Infrastructure 2019 – 2033 by the ECOWAS Heads of State and Government in December 2018 dictated the new priority investments that the Region needed to pursue to achieve its ambitious electricity integration agenda. In addition the strategy to better structure the mode of capacity building deployment through the development of WAPP regional Centers of Excellence also advanced given that Business Plans for some of these Centers were developed.

In a bid to ensure that the next Business Plan consolidates further the progress made and in cognizance of the environment of the WAPP through a strategic evaluation of the internal situation as well as the external surroundings of the WAPP, the 2020 – 2023 WAPP Business Plan shall be predicated on five (5#) Objectives as follows:

- *OBJECTIVE 1 : Develop WAPP Priority Projects*
- *OBJECTIVE 2 : Operationalize Regional Electricity Market*
- *OBJECTIVE 3 : Restructure WAPP Secretariat*
- *OBJECTIVE 4 : Implement WAPP Dark Fiber Project*
- *OBJECTIVE 5 : Reinforce Capacity of WAPP*

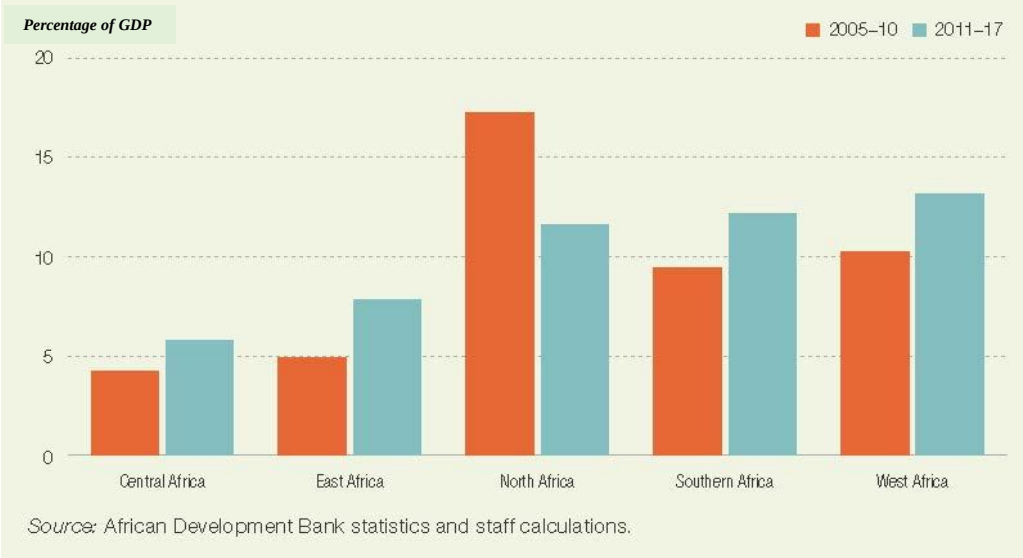
These Objectives are in recognition of among others, the need for the Region to further advance its energy transition efforts by significantly augmenting the component of renewable energy generation in the region's energy mix as guided by the ECOWAS Master Plan for the Development of Regional Power Generation and Transmission Infrastructure 2019 – 2033, as well as secure the integration of the power systems of all mainland ECOWAS Member States. Also, the Plan takes into account the formal assumption by the WAPP Information and Coordination Center (ICC) of its role of regional System and Market Operator that shall be catalyzed by the envisaged completion of the WAPP ICC Project within the period. This Business Plan shall also aim to maximize benefits that can be derived from the utilization of WAPP assets by moving forward with the deployment of an appropriate contractual framework to leverage the dark fiber on the transmission lines. Furthermore, the realization of the Business Plan shall ensure that the structure of the WAPP Secretariat that shall be in place shall have taken into consideration among others, the existence of a more mature regional electricity market. In addition, the capacities of WAPP Member Utilities shall continue to be reinforced to ensure their effective participation in the market, in particular women and youth. A key element to facilitate the capacity building is the development of WAPP Centers of Excellence within the region to leverage existing experiences.

The total Budget for the 2020 – 2023 WAPP Business Plan is estimated at US$18,813,022,445 comprising US$18,695,626,000 to cover the development of the Priority Projects, US$26,980,000 for the operationalization of the regional electricity market, US$59,215,400 to implement the Capacity Building Program as well as develop the WAPP Centers of Excellence, and US$31,201,045 for the Operating Budget of the WAPP Secretariat. A 5% Contingency provision on the total estimated Budget implies that the financial resources required is US$19,753,673,567.

The key outcomes of the 2020 – 2023 WAPP Business Plan shall include completion of the interconnection of all mainland ECOWAS Member States as well as the completion of the WAPP ICC together with the linkages to the designated Control Area Centers. Also, it is expected that about 4,800 km of high voltage transmission lines and 1,290 MW of generation capacity, all renewable, shall have been commissioned. In addition, approximately 3,961 km of transmission lines as well as 4,512 MW of generation capacity (all renewable) shall be under implementation/construction and that 4,569 km as well as 970 MW of generation (of which 520 MW shall be renewable) shall be under preparation. Furthermore, the structure of the WAPP Secretariat that shall be in place shall have taken into consideration the existence of a more mature regional electricity market. Also, a Consortium Agreement as well as a Management Company would have been established in relation to leveraging the dark fiber on the interconnected system. In addition, more than 1,600 participants, predominantly from the WAPP Member Utilities with a focus on women and youth, shall have their capacities reinforced in various subjects.

2 CONTEXT

Being largely affirmed as one of the fastest growing regions on the African continent, the Economic Community of West African States (ECOWAS) with its estimated population in 2017 of [1]367 million and home to 37% of the continent's peoples, continues to make strides in the face of challenges of diverse nature. [2]Economic growth on the continent continued to strengthen, reaching an estimated 3.5 % in 2018, about the same as in 2017 and up 1.4 percentage points from the 2.1 % in 2016. East Africa led with GDP growth estimated at 5.7 % in 2018, followed by North Africa at 4.9 %, West Africa at 3.3 %, Central Africa at 2.2 %, and Southern Africa at 1.2 %. The drivers of Africa's economic growth have been gradually rebalancing in recent years. Consumption's contribution to real GDP growth declined from 55 percent in 2015 to 48 percent in 2018, while investment's contribution increased from 14 percent to 48 percent. Despite a challenging environment, West Africa attracted the most FDI among African regions in 2011–17 even though in the latter year, it fell by 11% when compared to 2016 levels primarily due to among others, higher perceptions regarding security.

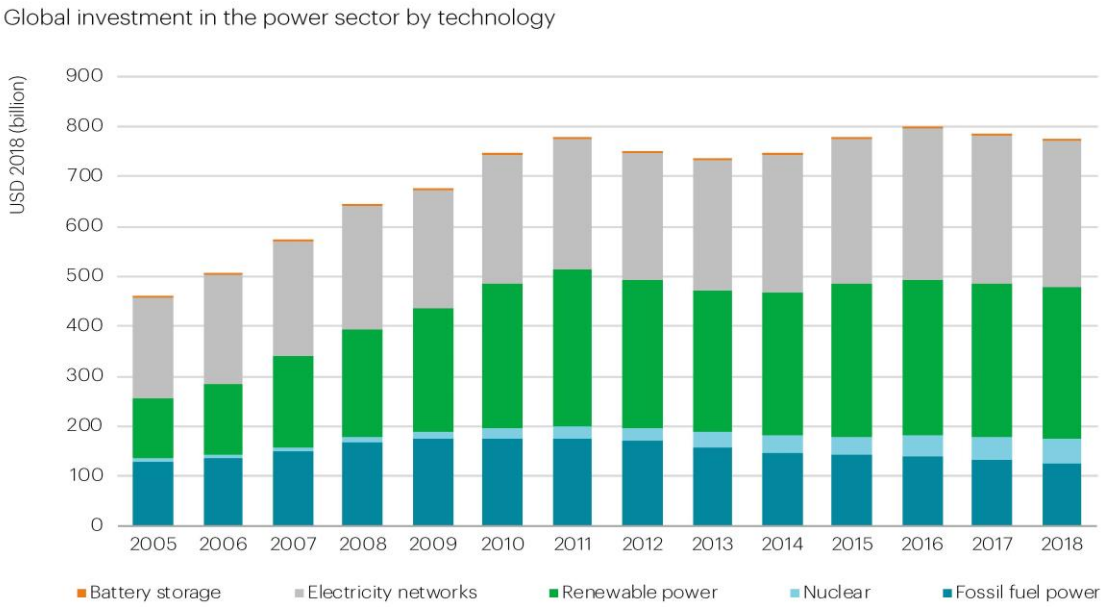


[Africa Economic Outlook 2019: Average annual foreign direct investment inflows to Africa, by region, 2005–10 and 2011–17]

By some estimates, an investment of about [3]US$43-55 billion per year is needed on the African continent until 2030-2040 to meet demand and provide universal access to electricity, whereas currently, investment in the energy sector is about US$8-9.2 billion. Globally, investment in power has been on the rise in the last decade and even though a 1% decline was observed in 2018 when compared to 2017 levels, power investment is shifting towards emerging and developing economies with renewable power occupying the largest space. This represents an opportunity for regions such as ECOWAS to scale up private sector participation in its electricity sub-sector.

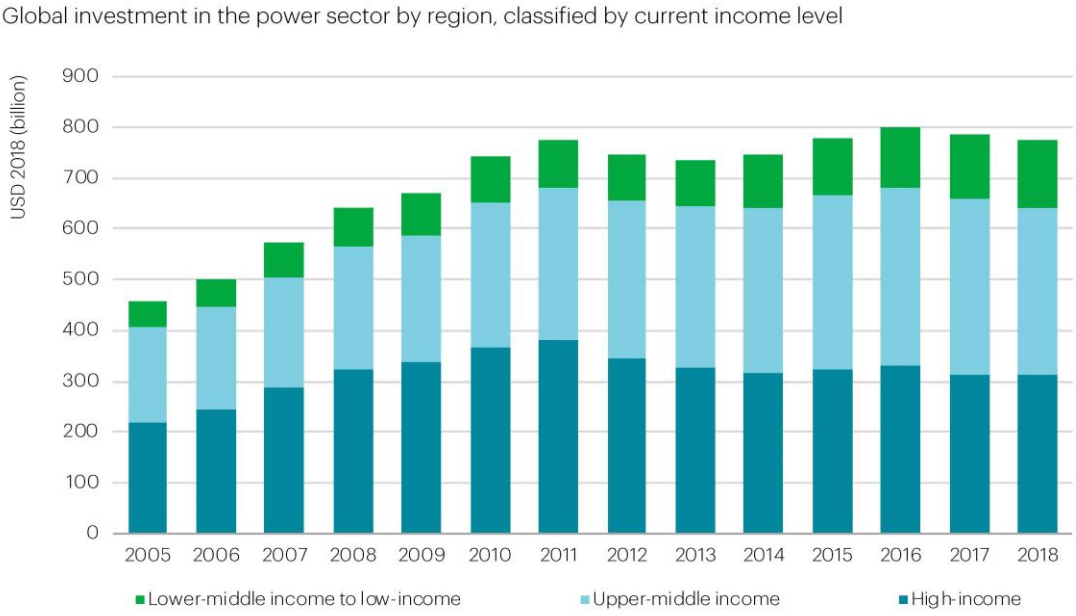
[1] *2018 Annual Report of ECOWAS*
[2] *2019 African Economic Outlook*
[3] *Atlas of Africa Energy Resources 2017*

Global electricity investment declined by 1% in 2018...



[World Energy Investment 2019: Global investment in the power sector by technology]

Power investment is shifting towards emerging & developing economies...

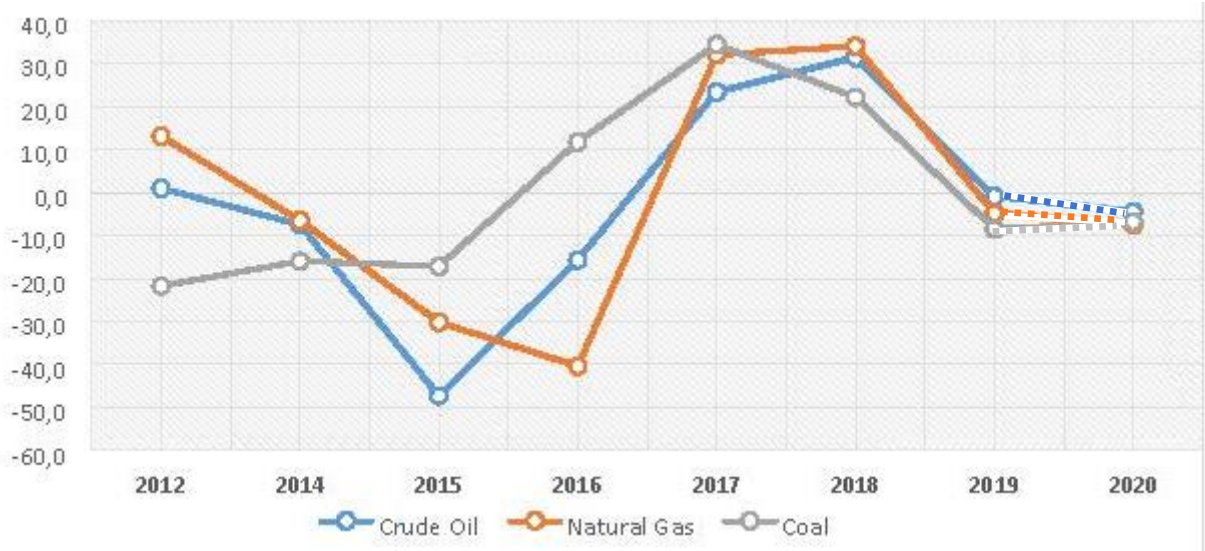


[World Energy Investment 2019: Global investment in the power sector by region, classified by current income level]

3 RESOURCES

The ECOWAS region continues to be a large province of energy resources and potential. By end 2015, Nigeria, with its estimated [4]180 trillion cubic feet (Tcf), continued to be the largest holder of proven natural gas reserves in Africa and the ninth-largest holder in the world. The proven recoverable reserves in Côte d'Ivoire have been estimated to be [5]61.3 billion cubic meter (bcm) and in Ghana, [6]22.7 bcm (approximately 0.8 Tcf). The more recent gas discovery in Senegal, estimated to be [7]910 bcm, has acutely boosted the energy transformation potential of the ECOWAS region. With respect to crude oil, Nigeria continued to have the largest proven reserves in West Africa, estimated at 372 billion barrels. In Ghana, the proven crude oil reserves have been estimated to be 0.660 billion barrels and in Côte d'Ivoire, [8]0.460 billion barrels. In Senegal, the resource has been estimated at [9]1.03 billion barrels. Solar and Wind offer the most potential among the variable renewable energy technologies with irradiation ranging from [10]3-4 kWh/m²/day in Cotonou (Benin) to 6.2 kWh/m²/day in Agadez (Niger) as well as between [11]5.0 to 6.4 m/s wind speed in the northern belt of the ECOWAS region. The reserves of Total Recoverable Coal are estimated to be 287 Million Short Tons (MST) with the highest concentration in Nigeria with 210.

The [12]figure below gives an indication of the percentage changes in the price of key energy resources between 2012 and 2020 on the global front:

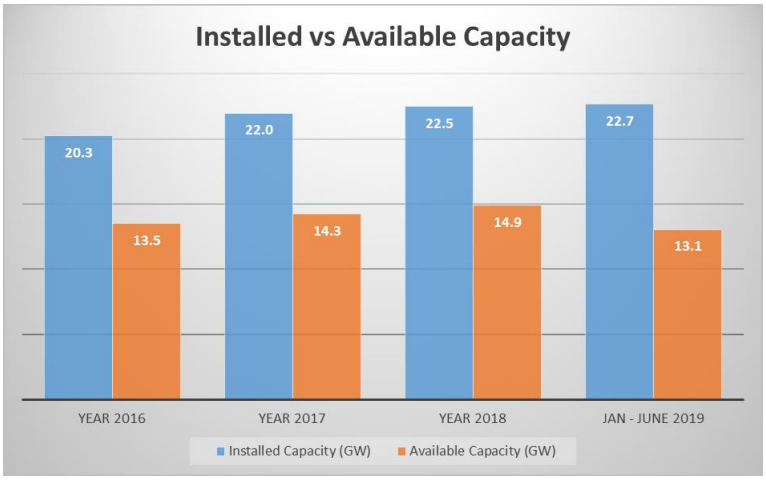


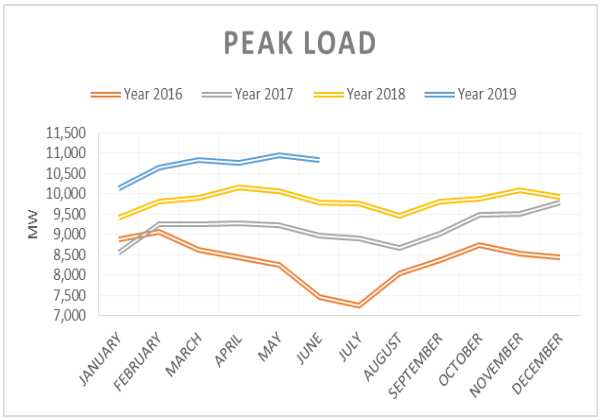
[2018 ECOWAS Annual Report: Percentage change in the Price of Energy (2012 -2020)]

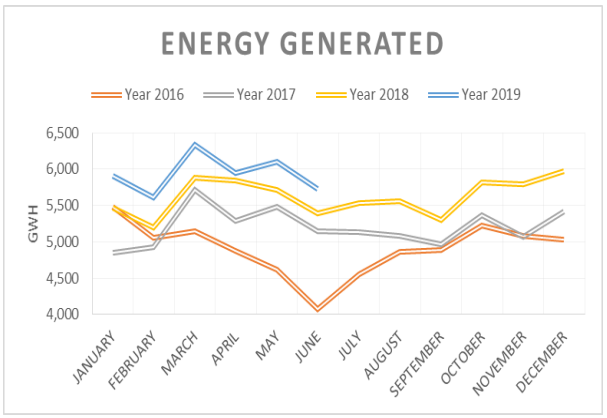
[4] *US Energy Information Administration*
[5] *Côte d'Ivoire Energies, September 2019*
[6] *World Energy Resources, 2016*
[7] *Senelec : September 2019*
[8] *Côte d'Ivoire Energies, September 2019*
[9] *Senelec: September 2019*
[10] *Atlas of Africa Energy Resources 2017*
[11] *Atlas of Africa Energy Resources 2017*
[12] *2018 Annual Report of ECOWAS*

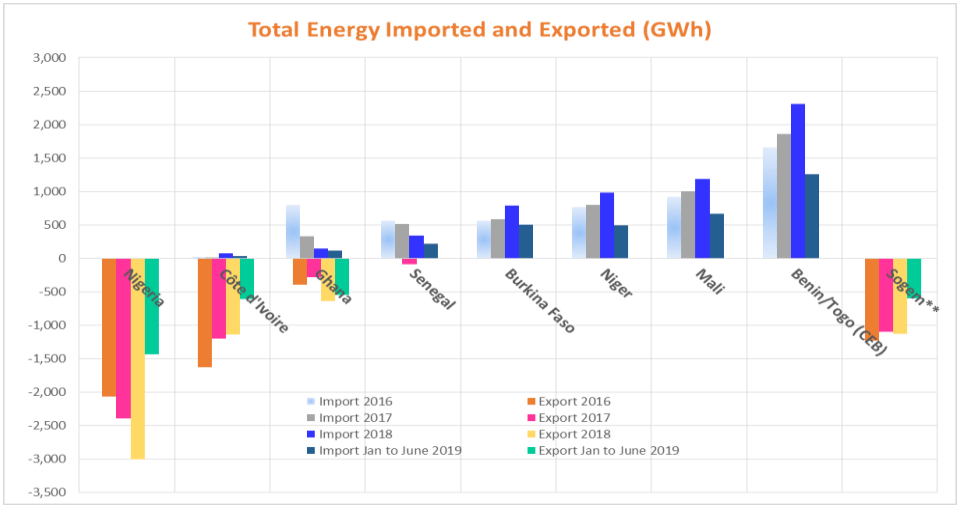
4 ELECTRICITY SUPPLY

The aspirations of the ECOWAS region in terms of socio-economic development shall assume that a pre-requisite dynamic and vibrant electricity system exists to fuel the future economic growth of the region. The quality of electricity supply over the years however can be characterized as [13]follows:









[13] *WAPP Information and Coordination Center*

In order to guide investments, a regional Master Plan is periodically developed to ensure that mainland ECOWAS Member States converge on a common infrastructure program that serves to contribute to their respective endeavors to meet their national electricity needs. The ECOWAS Master Plan for the Development of Regional Power Generation and Transmission Infrastructure 2019 – 2033, [14]adopted by the ECOWAS Heads of State and Government in December 2018, prescribes an investment requirement of US$36.39 billion to develop among others, 15.49 GW of generation capacity at an estimated cost of US$25.91 billion and 22,932 km of high voltage transmission lines at an estimated cost of US$10.48 billion.

This latest Master Plan already postulates that the 2018 peak load of 15,348 MW of mainland ECOWAS Member States is expected to reach 50,800 MW by 2033. This appreciable growth shall be driven by among others, industry development and increased Gross Domestic Product as well as residential consumption. With the expected completion of the integration of the national power systems of mainland ECOWAS Member States as well as the commissioning of the infrastructure that would manage the regional electricity market, both envisaged in 2020, electricity trading at the regional level is poised to take a more prominent role in addressing the supply – demand disequilibrium. The following gives an indication of [15]power exchanges over the interconnected system within the ECOWAS region:

	WAPP Transmission Line Segment	Year 2016 (GWh)	Year 2017 (GWh)	Year 2018 (GWh)	Jan - July 2019 (GWh)
1	Ikeja West (Nigeria) - Sakete (Benin) / 330 kV	1,272.48	1,606.26	1,957.01	1,036.98
2	Birnin Kebbi (Nigeria.) - Niamey (Niger) / 132 kV	559.56	565.16	747.49	428.03
3	Katsina (Nigeria) - Maradi (Niger) / 132 kV	210.22	236.09	236.67	157.89
4	Akosombo (Ghana) - Lomé (Togo) / 161 kV (X2)	392.86	249.02	350.34	270.84
5	Prestea (Ghana) - Riviera (Côte d'Ivoire) / 225 kV	796.41	242.20	140.83	80.82
6	*Davié (Togo) - Dawa (Ghana) / 330 kV*	*Energised on March 20, 2019*			*125.81*
7	***Bolgatanga (Ghana) - Zagtouli (Burkina) / 225 kV***	***Energised on June 28, 2018***		*222.39*	283.27
8	Ferké (Côte d'Ivoire) - Kodeni (Burkina) / 225 kV	570.82	583.26	560.92	312.66
9	Ferké (Côte d'Ivoire) - Sikasso (Mali) / 225 kV	281.00	339.48	443.49	323.83
10	Kodialani (Mali) - Manantali (Mali) / 225 kV	639.80	668.11	749.25	455.78
11	Manantali (Mali) - Matam (Senegal) / 225 kV	545.04	507.49	332.41	263.99
	WAPP Total	**5,268.19**	**4,997.07**	**5,740.79**	**3,739.89**

[14] *Supplementary Act A/SA.4/12/18 of the 54th Summit of the Authority of ECOWAS Heads of State and Government*
[15] *WAPP Information and Coordination Center*

5 WEST AFRICAN POWER POOL

The West African Power Pool (WAPP) was created in 1999 by the [16]Authority of the ECOWAS Heads of State and Government with the recognition that the vast energy resources within the ECOWAS region, even though unevenly geographically distributed, could be harnessed for the mutual benefit of all Member States that could result in augmented access to quality and reliable electricity at competitive costs for socio-economic development. In 2006, the Authority of ECOWAS Heads of State and Government [17]established the WAPP with a mission 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. Due to its critical role to enhance regional integration in energy, the WAPP was accorded the status of a [18]Specialized Institution of ECOWAS.

Under the coordination of the ECOWAS Department in charge of energy, the WAPP works in collaboration with other entities of ECOWAS such as the ECOWAS Regional Electricity Regulatory Authority (ERERA), the ECOWAS Center for Renewable Energy and Energy Efficiency (ECREEE) as well as the West African Gas Pipeline (WAGP) Company.

The WAPP is an Organization with Membership open to any entity, public or private, which: (a) owns and operates generation facilities of 20 MW or more, and /or distributes and retails electricity (the "Transmission Using Members"); and/or (b) owns/operates "major transmission facilities in the region", if such facilities are physically interconnected and have an impact on coordination of system operations in the West Africa region (the "Transmission Owning/Operating Members"), or (c) has an interest in the electricity sector in the West Africa region but does not fit the definition of either the "Transmission Using Members" or "Transmission Owning/Operating Members".

[16] *Decision A/DEC.5/12/99 of the 22nd Summit of the Authority of ECOWAS Heads of State and Government*
[17] *Decision A/DEC.18/01/06 of the 29th Summit of the Authority of ECOWAS Heads of State and Government*
[18] *Decision A/DEC.20/01/06 of the 29th Summit of the Authority of ECOWAS Heads of State and Government*

At end October 2019, the Members of WAPP were thirty-five (35#) as depicted as follows:

WAPP Member Utilities at end October 2019					
1		Aksa Energy Company Ghana Ltd (Ghana)	19		Mainstream Energy Solutions Limited (Nigeria)
2		CENIT Energy Limited (Ghana)	20		National Water and Electricity Company Limited (The Gambia)
3		CenPOWER Generation Company Limited (Ghana)	21		Nigerian Bulk Electricity Trading Plc. (Nigeria)
4		Communauté Électrique du Bénin (Togo, Benin)	22		North South Power Company Ltd (Nigeria)
5		Compagnie Energie Electrique de Togo (Togo)	23		Northern Electricity Distribution Company Ltd (Ghana)
6		Compagnie Ivoirienne d'Electricité (Côte d'Ivoire)	24		Office National de l'Electricité du Maroc (Morocco)
7		Contour Global (Togo)	25		Pacific Energy Company Limited (Nigeria)
8		Côte d'Ivoire Energies (Côte d'Ivoire)	26		Paras Energy and Natural Resources Development Ltd (Nigeria)
9		Empressa Publica de Electricidade e Agua de Guine-Bissau (Guinea Bissau)	27		Sahara Power Group Ltd (Nigeria)
10		Electricité de Guinée (Guinea)	28		Société Béninoise d'Energie Electrique (Benin)
11		Electricity Company of Ghana (Ghana)	29		Société de Gestion de l'Energie de Manantali (Mali, Senegal, Mauritania, Guinea)
12		Electricity Distribution and Supply Company (Sierra Leone)	30		Société Nationale d'Electricité du Burkina (Burkina)
13		Energie du Mali-SA (Mali)	31		Société Nationale d'Electricité du Sénégal (Senegal)
14		Ghana Grid Company (Ghana)	32		Société Nigérienne d'Electricité (Niger)
15	GTG	GTG Energy Limited (Ghana)	33		Sunon Asogli Power (Ghana) Ltd. (Ghana)
16		GTS Engineering Services (Ghana)	34		Transmission Company of Nigeria (Nigeria)
17		Karpowership Ghana Company Ltd (Ghana)	35		Volta River Authority Ghana)
18		Liberia Electricity Corporation (Liberia)			

The Vision of the WAPP is:

> ***"To integrate the national power systems into a unified regional electricity market with the expectation that such mechanism would over the medium to long term ensure citizens of ECOWAS Member States with a stable and reliable electricity supply at competitive costs"***

with a Mission:

> ***"To promote and develop infrastructure, for power generation and transmission, as well as, to assure the coordination of electric power exchanges among ECOWAS Member States"***

The current structure of WAPP, as indicated in Annex 1 reflects the following governance structure as prescribed in the WAPP Articles of Agreement:

5.1 WAPP General Assembly

The General Assembly is the highest decision making body of WAPP and comprises Representatives of all Member utilities of WAPP. The General Assembly is charged to among others:

- To observe the provisions assigned to it in accordance with the WAPP Articles of Agreement and the Membership Agreement;
- To facilitate in accordance with the provisions of the WAPP Articles of Agreement and the Membership Agreement, the co-ordination of appropriate measures towards the implementation of the principles of the WAPP Articles of Agreement;
- To engage the Members in accordance with the prescribed provisions in order to facilitate the implementation of programs and projects in the implementation framework of the Articles of Agreement;
- To approve the new applications for membership to the WAPP Articles of Agreement and any removal or re-instatement of a Member;
- To elect the members of the Executive Board;
- To examine and adopt the annual reports of the Executive Board.

5.2 WAPP Executive Board

The Executive Board is responsible for defining policies and monitoring the operations of the WAPP as well as the planning of its future development. The Board consists of fifteen (15#) Members, including the Secretary General. The elected representatives who serve on the Executive Board comprise Chief Executive Officers of the WAPP Member utilities. The Executive Board is charged to among others:

- Direct activities of all Organizational Committees;
- Examine and recommend to the General Assembly, the entry, exit and re-entry of Members to the WAPP Organization;
- Authorize all major contracts and [finance/debt] instruments;
- Select and review the performance of Officers, who shall serve at the pleasure of the Executive Board;
- Determine positions, duties, qualifications, salaries, benefits and other matters pertaining to the Officers and Staff;
- Review, approve, disapprove or recommend revision to the actions of any Organizational Committee;
- Approve or revise the operating and capital budgets and any additional expenditures of the WAPP structure;
- Convene the General Assembly at least annually;
- Recommend amendments to the Articles of Agreement for the Approval of the General Assembly;
- Recommend amendments to the Membership Agreement for the Approval of the General Assembly;
- Approve Guidelines pertaining to standards and policies of the WAPP Organization and penalties for non-compliance with such Guidelines; and
- Authorize filings with relevant regulatory bodies.

5.3 WAPP Organizational Committees

The WAPP Organizational Committees, comprising the Engineering and Operations Committee (EOC), the Strategic Planning and Environmental Committee (SPEC), the Finance Committee, (FC) Human Resources and Governance Committee (HRGC) and the Distribution and Commercialization Committee (DCC), provide support and advice to the Executive Board on all matters concerning collective policy formulation functions for developing, maintaining and updating common "rules of practice" on technical, planning, operational and environmental aspects of WAPP. The Organizational Committees are composed of technical experts drawn from the WAPP Member Utilities. The Chairperson of any Organizational Committee may appoint Task Forces as necessary to carry out its mission. Task Force appointments under the auspices of any Organizational Committee is made with due consideration to the competence and expertise of the Members and their geographical location.

5.4 WAPP Secretariat

The WAPP Secretariat is the administrative organ to support the Executive Board in the accomplishment of the duties, and is also responsible for the day-to-day management of WAPP. The Secretariat has responsibility for the management and coordination of a team of independent professionals and a restricted number of permanent core staff responsible for implementing the day-to-day tasks required to accomplish the mission of WAPP. The staff of the WAPP Secretariat perform the secretarial function for all meetings of the permanent WAPP Committees and any ad hoc task force. Consultants are also recruited on a short term basis to strengthen the organizational capacities of the WAPP. The Secretariat is empowered to among others:

(a) Employ qualified technical and administrative employees;

(b) Engage office space;

(c) Employ outside technical and professional service organizations;

(d) Execute contracts;

(e) Serve as the representative of the WAPP Organization to the Regional Power Regulatory Authorities other regulatory bodies of ECOWAS member states and in other public forums;

(f) Incur reasonable expenses;

(g) Make Staff resources available to individual Members or groups of Members on a non-discriminatory, timely and based on the principle of first-come-first-serve basis so as not to interfere with current or future needs and priorities established by the WAPP Organization. Staff members are required to make a declaration to adhere to the Code of Conduct upon employment, and annually thereafter. The Code of Conduct outlines the independence required of employees of the WAPP Organization.

The main Departments within the WAPP Secretariat are:

5.4.1 Information & Coordination Center (ICC)

The ICC is responsible for promoting operational coordination between Transmission Owning/Operating Members through actual day-to-day information sharing/exchange between the operational coordination centers of WAPP Members. Its responsibilities include:

- Collect, analyze and disseminate information portraying overview of the state and evolution of the WAPP;
- Monitor the evolution of the electricity situation in ECOWAS Member States with special focus on national power systems faced with emergency situations (in order to forewarn the risks of performance deficiencies and to provide them with corrective measures);

- Periodically analyze the economic and technical potentials and feasibility of the electricity trading arrangements among Member State Utilities;
- Facilitate the development of technical norms and standards for the efficient operation of the national and interconnected power networks;
- Provide support for monitoring of the technical performances of power utilities;
- Organization of periodic meetings of the EOC and the DCC.

The 7th Session of the WAPP General Assembly held in Abuja on November 2, 2012 approved, through Decision WAPP/45/DEC.02/11/12, the transitioning of the WAPP ICC to the regional System Market Operator.

5.4.2 Administration & Finance (A&F) Department

The role of the Administration & Finance Department is to strengthen the organizational structure of the WAPP and to manage the financial and accounting system of the WAPP Secretariat. Its activities focus on among others:

- Management of human resources at the WAPP Secretariat, from recruitment, integration, development of performance appraisal systems, training, right through to separation;
- Compilation of annual work programs of the various departments and the Office of the Secretary General and preparation of the annual budget of the Secretariat;
- Preparation of periodic management accounts to monitor the performance of the various departments and office of Secretary General against their work programs and budgets;
- Publication of financial information in accordance with the provisions of the WAPP Financial and Accounting Manual and Financial Regulations;
- Preparation of year-end financial statements of the WAPP Secretariat and the projects, where such financing is controlled and managed by the WAPP Secretariat. These statements are audited by an independent external audit firm appointed by the WAPP Executive Board;
- Organize the external audit of the WAPP Secretariat by an External Auditor recruited through a competitive bidding process;
- Manage an integrated accounting and human resources management system;
- Development and implementation of capacity building programs for the staff of the WAPP Secretariat as well as Member Utilities;
- Organization of periodic meetings of the FC and the HRGC.

5.4.3 Planning, Investment Programming & Environmental Safeguards (PIPES) Department

The implementation of priority investment programs is coordinated by the WAPP Secretariat through the PIPES Department that ensures that the WAPP Priority Projects as defined in the approved ECOWAS Master Plans are developed. The responsibilities of the Department include:

- Prepare Terms of Reference, in conjunction with project teams from concerned countries, for project pre-investment studies and supervise the consultant selection process;
- Conduct, coordinate and monitor feasibility, technical, economic, financial and environmental/social impact studies of regional project interconnection lines and generation facilities ;
- Supervise the selection process for the Contractor to undertake the implementation of projects;
- Coordinate, supervise and review periodically the implementation of regional project interconnection lines and generation facilities;
- Conduct periodic reviews/updates of the ECOWAS Master Plan for the Generation and Transmission of Electrical Energy to preserve its coherence and relevance;
- Formulate periodic Business Plans to guide the outlook of the WAPP Organization;
- Solicit and mobilize financing for projects and organize coordination meetings with relevant donors;
- Organize meetings of the Strategic Planning and Environmental Committee for the adoption of programs and recommendations based on studies undertaken and provide support to the Committee in the accomplishment of its mission.

6 THE 2016 – 2019 WAPP BUSINESS PLAN : *REVIEW ON THE IMPLEMENTATION*

The 2016 – 2019 WAPP Business Plan had the following Objectives:

- Objective 1: Update ECOWAS Revised Master Plan for the Generation and Transmission of Electrical Energy
- Objective 2: Implement WAPP Priority Projects
- Objective 3: Establish a Regional Electricity Market
- Objective 4: Implement the WAPP Dark Fiber Project
- Objective 5: Reinforce the Capacity of WAPP

Despite the challenging context in which this Business Plan was implemented such as augmented security concerns in the sub-region as well as pressures on the major economies of the sub-region due to falling commodity prices, some progress was registered in meeting the prescribed Objectives as indicated below:

6.1 Realizations on Objective N^0 1: "Update ECOWAS Revised Master Plan for the Generation and Transmission of Electrical Energy"

6.1.1 Progress Made

The update of the ECOWAS Master Plan for the Development of Regional Power Generation and Transmission Infrastructure was launched in January 2018 with funding from the European Union within the framework of the 11th EDF. The Objective of the study was to among others, elaborate an optimal regional development plan for the period 2019 – 2033 that would be based on least cost planning and would take into consideration among others:

- Ongoing investments within ECOWAS Member States, including the updates of national power generation and transmission Master Plans;
- Renewed drive of the sub-region to better integrate renewable energy resources into the energy mix especially in light of economics with Solar;
- The forthcoming interconnection of the national power systems of all ECOWAS mainland countries;
- The near-term commissioning of the WAPP Information and Coordination Center and operationalization of the regional electricity market within the ECOWAS region.

Within the framework of the Study, (i) all mainland ECOWAS Member States were visited to collect data and hold discussions with key stakeholders of national energy sectors; (ii) an economic study was performed to identify the necessary investments in generation and

transmission and (iii) technical studies verified that the proposed generation and transmission investments shall lead to stable and reliable operation conditions for the WAPP interconnected system.

In summary, for the period 2019 to 2033, a list of seventy-five (75#) regional priority projects are proposed, with an estimated total investment cost of US$36.39 billion, of which are:

- ✓ Twenty-eight (28#) transmission line projects of approximately 22,932 km of high voltage transmission lines at an estimated cost of US$10.48 billion;
- ✓ Forty-seven (47#) generation projects with a total capacity of approximately 15.49 GW at an estimated cost of US$25.91 billion.

The generation projects comprise:

- 31.1% of thermal generation projects (4.82 GW) operating mainly with natural gas and;
- 68.9% renewable energy projects (10.67 GW) of which 29.5% involve intermittent solar and wind renewable energy projects (3.15 GW).

The variable renewable energy projects make up 20.33% of total generation in the list of priority projects.

Given that WAPP, in the short term, shall complete the integration of the mainland ECOWAS Member States and, in order to better diversify the regional energy mix and take advantage of all available opportunities, the list of proposed regional priority projects contains interconnection projects with generation sources beyond the West African sub-region.

In addition to the list of regional priority projects, it was recommended that WAPP, among others:

- monitor very closely the infrastructure programs of other sub-regional organizations involved in the electricity sub-sector such as OMVG, OMVS, NBA, CEB, and MRU;
- support ECOWAS Member States realize at national levels and if deemed viable, an additional potential of variable renewable energy projects that were identified by the Consultant;
- pursue other opportunities related to renewable energy deployment such as the hybridization of hydropower and thermal power plants, the development of floating photovoltaic technologies, the deployment of storage technologies (including battery), and implement related projects should they be proven beneficial;
- deploy supplementary measures aimed at further consolidating the synchronism and stability of the WAPP interconnected system in order to achieve its optimal operation that shall, in turn, facilitate the functioning of the regional electricity market;
- continue to engage WAPP Technical and Financial Partners to provide support for the rapid development of the backup facility for the WAPP Information and Coordination Center;
- support WAPP Member Utilities prepare and implement Action Plans aimed at improving their efficiency and performance;

- develop a regional approach to address some of the challenges faced by WAPP Distribution Utilities, in particular, loss reduction and revenue collection;
- continue the capacity building of WAPP Member Utilities and accelerate the development of WAPP Centers of Excellence.

In order to achieve a diligent and efficient realization of the new Master Plan, the stakeholders shall promote the:

- Further deployment of institutional frameworks that reflect the common implementation of regional projects such as the creation of Special Purpose Companies (e.g. TRANSCO CLSG) or Joint Project Management Units (e.g. Northcore, OMVG Loop);
- Granting of land with free-zone status at appropriate target locations by countries that have been identified to host the regional solar and/or wind power parks;
- Scaling-up of private sector participation in the development of regional variable renewable energy projects, which could include, among others, the development of large renewable energy (solar and wind) priority projects through auctions involving the "Plug-and-Play"- type schemes;
- Diversification of financing resources for the realization of the priority projects that could include Green Climate Fund and enhanced private sector participation;
- Reinforcement of the WAPP to ensure coordination between national planning and the Regional Master Plan, in particular by developing a reference software for the planning and monitoring of the implementation of regional projects;
- Increased coordination among Development Finance Institutions (DFIs) supporting regional projects, in particular regarding the harmonization of procurement guidelines for regional projects, the harmonization of disbursement conditions between DFIs involved in the same project and the coordination with export-import banks active in the countries involved by the projects;
- Enhancing of funding for project pre-investment studies including the rapid operationalization of the Fund for the Development and Financing of the ECOWAS Transport and Energy Sectors (FODETE) to fund project preparation activities;
- Reinforcement of the WAPP to extend its coordination and information sharing activities beyond the Member utilities and the WAPP Technical and Financial Partners to reach other Actors within the electricity sub-sector such as National Regulators, other high-level government entities involved in the electricity sub-sector, Manufacturing and Industry, and other financing institutions (national export-import banks, investment funds, etc);
- Setting-up of rewarding and strategic partnerships that are fully aligned with the priorities of the Region and shall, among others, facilitate the implementation of the Master Plan.

The outcomes of the Study were, in turn, examined and adopted by Experts from WAPP Member Utilities as well as Ministries in charge of energy of ECOWAS Member States, ECOWAS Commission, UEMOA Commission, sub-regional organizations involved in the energy sector, WAPP Technical and Financial Partners, WAPP Executive Board, WAPP

General Assembly, ECOWAS Ministers in charge of Energy, ECOWAS Parliament, and the ECOWAS Council of Ministers. The ECOWAS Master Plan for the Development of Regional Power Generation and Transmission Infrastructure 2019-2033 was then approved by the Authority of ECOWAS Heads of State and Government through Supplementary Act A/SA.4/12/18.

6.1.2 Percentage Achievement Objective N^0 1

In light of the progress made, the Objective was achieved 100% as elaborated in Annex 2.

6.2 Realizations on Objective N^0 2: "Implement WAPP Priority Projects"

6.2.1 Progress Made

The priority projects that had been stipulated in the 2016 – 2019 WAPP Business Plan and the progress made within the period is as follows:

6.2.1.1. Preparation of Projects and Mobilization of Financing

(a) 330 kV Côte d'Ivoire – Ghana Interconnection Reinforcement Project:

The Feasibility Study and Preparation of Bidding Documents as well as the Line Route and Environmental and Social Impact Assessment Study on the project were completed with funding from the EU-Africa Infrastructure Trust Fund through European Investment Bank (EIB) and KfW. The estimated cost to implement the project was determined to be EUR 180.4 million and the complete financing was identified from KfW and EIB. Despite having identified the complete financing from the project from EIB and KfW, the implementation of the project had to be deferred though due to a change in its prioritization in Ghana and as such, the new commissioning date as proposed in the 2019 -2033 Master Plan is 2029.

(b) 330 kV Ghana – Burkina – Mali Interconnection Project:

Complementary pre-investment studies funded by the EU-Africa Infrastructure Trust Fund through Agence Française de Développement (AFD) and EIB were concluded with the previously adopted voltage for the project of 225 kV. However, the outcomes of the 2019 – 2033 Master Plan prescribed that the voltage of the project should now be a minimum of 330 kV as among others, the project shall now be part of a transversal transmission backbone spanning from Senegal to Nigeria. In addition, the legislation relating to environmental protection in some of the beneficiary countries had changed. In light of these, a complete update of the pre-investment studies is required and discussions were ongoing with WB, AFD and the Millennium Challenge Corporation (MCC) to mobilize the required funding.

(c) 330 kV WAPP Northcore Nigeria – Niger – Togo/Benin – Burkina Interconnection Project:

With funding from NEPAD-IPPF of the African Development Bank (AfDB), the Feasibility Study and Preparation of Bidding Documents as well as the Line Route and Environmental and Social Impact Assessment Study were completed and Environmental Permits issued in all of the beneficiary countries. The estimated cost of the project is US$624.2 million and the required financing was completely mobilized from the AfDB, AFD, European Union (EU) and World Bank (WB).

(d) 225 kV Guinea – Mali Interconnection Project:

With funding from the AfDB, a Feasibility Study and Preparation of Bidding Documents as well as a Line Route and Environmental and Social Impact Assessment Study were completed and Environmental Permits issued in the two beneficiary countries. The estimated cost of the project is EUR 361.32 million and the required financing was completely mobilized from the AfDB, Banque Ouest Africaine de Développement (BOAD), EIB, ECOWAS Bank for Investment and Development (EBID), EU, WB, and the beneficiary countries.

(e) 450 MW Souapiti Hydropower Project in Guinea:

A Feasibility Study for the project was prepared with support from the World Bank that demonstrated the techno-economic viability of the project. On the basis of this study, financing was secured by the Government of Guinea from the China Exim Bank to implement the project at an approximate cost of US$1.35 billion.

(f) 330 kV Nigeria – Benin Interconnection Reinforcement Project:

The preparation of the Feasibility Study and Preparation of Bidding Documents as well as a Line Route and Environmental Study was in progress with the support of the NEPAD-IPPF, USAID and GIZ. The preliminary cost for the project was estimated at EUR 87.6 million and plans were ongoing to organize a Donor Roundtable Conference to mobilize the financing to implement the project.

(g) 150 MW WAPP Regional Solar Power Park in Burkina:

The preparation of the pre-investment studies was being done with funding from WB under their initiative "Solar Development in Sub-Saharan Africa Project – Series of Projects". As part of the Feasibility Study, it was proposed that a multi-phase and multi-site approach be adopted for the deployment of the project and as such, 2 sites were identified. The procurement of Consultants to conduct environmental and social impact assessments to validate the appropriateness of the identified sites was being concluded. The development framework envisaged for the project is the “Plug-and-Play” scheme where the enabling infrastructure to evacuate the power is prepared with public financing whilst the development of the Park is done by the private sector through auctions. To this end, the recruitment of a Transaction Advisor to support the process was ongoing.

(h) Master Plan for Medium Voltage Cross Border Projects:

This activity was subsumed under the preparation of a Rural Electrification Master Plan by the ECOWAS Commission.

(i) 300 MW Amaria Hydropower Project in Guinea:

Funding was secured from the WB to prepare pre-investment studies for the project and the process to recruit the required Consultants was launched. The Government of Guinea however subsequently adopted a different implementation strategy for the project and as such, the procurement process was not completed.

(j) 225 kV Côte d'Ivoire – Liberia Interconnection Reinforcement Project:

Terms of Reference for the pre-investment studies were prepared and the process launched to mobilize funding. The NEPAD-IPPF has given approval to partially fund the pre-investment studies and other Partners were being solicited to cover the remaining gap in funding.

(k) 291 MW Grand Kinkon Hydropower Project in Guinea:

The Government of Guinea was pursuing the development of the project as a national project.

(l) 330 kV WAPP Median Nigeria – Benin - Togo - Ghana – Côte d'Ivoire Interconnection Project:

Terms of Reference for the pre-investment studies were prepared and the process launched to mobilize funding. Funding was secured from the WB to prepare the project and the process was ongoing to recruit the required Consultants.

6.2.1.2. Coordination and Monitoring of Projects under Implementation

6.2.1.2.1 Transmission Line Projects

(a) 330 kV Volta (Ghana) – Lome C (Togo) – Sakete (Benin) Interconnection Project:

The project of cost of US$120 million and approximate length of 350 km with three (3#) substations, is being implemented with financing from AfDB, BOAD, KfW, WB as well as the beneficiary utilities. The segment of the project between Ghana and Togo was energized on March 20, 2019 and works on the remaining segment between Togo and Benin are expected to be completed in Quarter 1, 2020.

(b) 225 kV Bolgatanga (Ghana) – Ouagadougou (Burkina) Interconnection Project:

The project, of cost US$156 million and approximate length 188 km with two (2#) substations, was financed by AFD, EIB, WB and the beneficiary utilities. The project was completed and energized on June 28, 2018 and the formal inauguration was held on October 5, 2018.

(c) 330 kV Aboadze – Prestea - Bolgatanga Transmission Line Project in Ghana:

The project was financed by AFD (Kumasi – Bolgatanga, 535 km, US$164.7 million), Korea Exim Bank (Prestea – Kumasi, 185 km, US$67 million), and Amandi Energy (Aboadze –

Prestea, 60 km, US$27 million). The line segment between Kintampo and Bolgatanga was energized in April 2019 whilst the segment Aboadze – Prestea in June 2019 and Prestea – Kumasi in December 2018. The segment Kintampo and Kumasi is expected to be commissioned in Quarter 2, 2020.

(d) 225 kV Côte d'Ivoire – Liberia – Sierra Leone - Guinea Interconnection Project:

The project of approximate length 1,303 km with twelve (12#) substations is being financed by AfDB, EIB, KfW and WB at an estimated cost of US$498.2 million. Construction works were ongoing and completion of the commissioning is expected in Quarter 2 of 2020.

(e) 225 kV OMVG Interconnection Line involving (Senegal, The Gambia, Guinea Bissau, Guinea):

The transmission line project of approximate length 1,677 km with fifteen (15#) substations is being financed by AFD, AfDB, BOAD, EIB, IsDB, KfW, Kuwaiti Fund and WB at an estimated cost of US$784 million. Construction works were ongoing and completion of the commissioning is expected in Quarter 4 of 2020.

(f) 330 kV Côte d'Ivoire – Ghana Interconnection Reinforcement Project:

The implementation of the project has been deferred due to a change in its prioritization in Ghana and as such, the new commissioning date as proposed in the 2019 -2033 Master Plan is 2029.

(g) 330 kV Ghana – Burkina – Mali Interconnection Project:

Additional pre-investment work was required due to among others, a change in the voltage of the project and as such, construction works did not commence within the period.

(h) 225 kV Guinea – Mali Interconnection Project:

The Project Implementation Units in both countries were established and the Owners' Engineer was recruited to implement this approximate 714 km long project and involving seven (7#) substations. By the end of the period, the review of the Bidding Documents was ongoing with a view to launching the process to procure the Contractors to do the works. The expected commissioning of the project is 2023.

(i) 330 kV WAPP Northcore Nigeria – Niger – Togo/Benin – Burkina Interconnection Project:

The entire 875 km long project involving five (5#) substations is being implemented by a single Project Management Unit (PMU) on behalf of the beneficiary countries. All the key staff of the PMU were hired through a Recruitment Agency and their office established in Abuja. The Owners' Engineer was also recruited and the Bidding Documents reviewed. By the end of the period, the process was ongoing to launch the tenders for the procurement of the Contractors to realize the works. The commissioning of the project is envisaged in 2023.

(j) 330 kV Nigeria – Benin Interconnection Reinforcement Project:

The implementation of the project did not commence within the period due to delays in mobilizing funding to prepare the pre-investment studies. The project is foreseen to be commissioned in 2022.

(k) 225 kV Côte d'Ivoire – Liberia Interconnection Reinforcement Project:

The implementation of the project did not commence within the period due to the lack of funding to prepare the pre-investment studies. The project is foreseen to be commissioned in 2024.

(l) 225 kV OMVS Manantali – Kita – Bamako Transmission Line Project in Mali:

The preparation of the project was completed by OMVS and financing mobilized from AFD, EU and SOGEM to implement this 317 km long project and involving three (3#) substations. The Owners' Engineer was recruited and the procurement of the Contractors to implement the works is expected to be launched by the end of the period. The project is foreseen to be commissioned in 2021.

6.2.1.2.2 Generation Projects

(a) 3,050 MW Mambilla Hydropower Project in Nigeria:

The project of approximate cost of US$5.8 billion is being implemented by the Federal Government of Nigeria with co-financing from the China Exim Bank. Construction works were ongoing and the project is expected to be commissioned in 2024.

(b) 700 MW Zungeru Hydropower Project in Nigeria:

The project of approximate cost of US$1.2 billion is being implemented by the Federal Government of Nigeria with co-financing from the China Exim Bank. Construction works were ongoing and the project is expected to be commissioned in 2021.

(c) 450 MW Souapiti Hydropower Project in Guinea:

The project of approximate cost of US$1.35 billion is being implemented by the Government of Guinea with co-financing from the China Exim Bank. Construction works were ongoing and the first turbine of the project is expected to be operational in 2020.

(d) 450 MW WAPP Maria Gleta Regional Power Generation Facility in Benin:

The project is being implemented within the framework of a Public-Private Partnership with an estimated cost of US$585 million. The update of the Feasibility Study was completed and discussions commenced on the commercial arrangements that shall govern the project. The WAPP obtained support from the African Legal Support Facility (ALSF) of the AfDB to support the participating utilities finalize the commercial agreements with the project developer. By the end of the period, preparations were ongoing to finalize the Terms Sheet of the commercial agreements. The commissioning of the project is envisaged in 2024.

(e) 450 MW WAPP Aboadze Regional Power Generation Facility in Ghana:

The project is envisaged to be implemented within the framework of a Public-Private Partnership. The location of the site on which the project shall be developed was still being validated by the Government of Ghana. The commissioning of the project is envisaged in 2029.

(f) 300 MW Amaria Hydropower Project in Guinea:

The development of this project with an estimated cost of US$600 million was being pursued by the Government of Guinea. The commissioning of the project is envisaged in 2024.

(g) 281 MW Koukoutamba Hydropower Project under OMVS (Senegal, Mali, Mauritania, Guinea):

The preparation of the project was completed by OMVS and the process to secure financing for implementation was ongoing. The commissioning of the project is envisaged in 2024.

(h) 220 MW Tiboto Hydropower Project (Côte d'Ivoire, Liberia):

In order to meet national demand and to fulfil its electricity export commitments, a memorandum of understanding was signed on March 14, 2014 between the Government of Côte d'Ivoire and a Developer to carry out feasibility studies for the Tiboto and Tahibli hydropower projects. Pre-feasibility studies were delayed due to the security situation, heavy rains in the project area, health problems in Liberia (Ebola), difficulties in obtaining license for Light Detection and Ranging (LiDAR) topographic surveys and the lack of a joint framework between the Liberian and Ivorian authorities to govern the development of the project. As at August 2019, a Preliminary Engineering Report has been prepared as well as the Requests For Proposals for the ESIA that shall include frameworks for assessing the environmental and social impacts.

(i) 181 MW Balassa Hydropower Project under OMVS (Senegal, Mali, Mauritania, Guinea):

The preparation of the project was completed by OMVS and the process was ongoing to secure financing for implementation. The commissioning of the project is envisaged in 2025.

(j) 160 MW Boureya Hydropower Project under OMVS (Senegal, Mali, Mauritania, Guinea):

The preparation of the project was completed by OMVS and the process was ongoing to secure financing for implementation. The commissioning of the project is envisaged in 2025.

(k) 147 MW Adjarala Hydropower Project (Togo, Benin):

Financing was mobilized by the beneficiary countries from the China Exim Bank but due to challenges in achieving effectiveness of the Agreements, the project implementation strategy is being revisited by the involved countries. The estimated cost of the project was US$333 million and commissioning is envisaged in 2026.

(l) 140 MW Gouina Hydropower Project under OMVS (Senegal, Mali, Mauritania, Guinea):

The preparation of the project, with an approximate cost of US$415 million, was completed by OMVS and co-financing secured from China Exim Bank. Construction works were ongoing and the commissioning of the project is expected in 2020.

(m) 128 MW Sambangalou Hydropower Project under OMVG (Senegal, The Gambia, Guinea Bissau, Guinea):

The implementation of the project was ongoing under a multi-phase contract facilitated through export finance. The commissioning of the project is expected in 2023.

(n) 88 MW Mount Coffee Hydropower Project in Liberia:

The project, of approximate cost US$372 million, was commissioned in 2017 with support from Government of Norway, KfW, EIB and MCC.

6.2.1.2.3 Medium Voltage (MV) Cross Border

(a) Côte d'Ivoire – Liberia MV Cross-Border Project:

The implementation of the project, of approximate cost EUR 9.6 million, was funded by the ACP-EU 2nd Energy Facility with counterpart funding from the beneficiary utilities. Construction on the project was completed and the final take-over was done in June 2018.

(b) Ghana – Togo South MV Cross-Border Project:

The implementation of the project, of approximate cost EUR 2.3 million, was funded by the ACP-EU 2nd Energy Facility with counterpart funding from the beneficiary utilities. Construction on the project was completed and the final take-over was done in March 2016.

(c) Benin – Togo North MV Cross-Border Project:

The implementation of the project, of approximate cost EUR 2.1 million, was funded by the ACP-EU 2nd Energy Facility with counterpart funding from the beneficiary utilities. Construction on the project was completed and the final take-over was done in March 2016.

(d) 3rd Generation MV Cross-Border Projects:

This activity was subsumed under the preparation of a Rural Electrification Master Plan by the ECOWAS Commission.

6.2.1.3. Additional Projects Pursued During the Period

(a) 150 MW WAPP Regional Solar Power Park in Mali:

The preparation of the pre-investment studies was being done with funding from WB under their initiative "Solar Development in Sub-Saharan Africa Project – Series of Projects". As part of the Feasibility Study, it was proposed that a multi-phase and multi-site approach be adopted for the deployment of the project and as such, three (3#) sites

were identified. The procurement of Consultants to conduct environmental and social impact assessments to validate the appropriateness of the identified sites was being concluded. The development framework envisaged for the project is also the "Plug-and-Play" scheme. As such, the recruitment of a Transaction Advisor to support the process was ongoing.

(b) 150 MW WAPP Regional Solar Power Park in The Gambia:

Terms of Reference for a Feasibility Study were prepared and the process was ongoing to launch the recruitment process for the required Consultant with support from the WB under their initiative "Solar Development in Sub-Saharan Africa Project – Series of Projects". The development framework envisaged for the project is also the "Plug-and-Play" scheme.

(c) Solar Radiation Measurements Campaign within mainland ECOWAS Member States:

Terms of Reference to recruit a Consultant to conduct a measurements campaign that would better precise the solar power potential within mainland ECOWAS Member States were prepared. The process was ongoing to launch the recruitment process for the required Consultant with support from the WB under their initiative "Solar Development in Sub-Saharan Africa Project – Series of Projects".

(d) St. Paul River Hydropower Development in Liberia:

With support from the WB and among other activities, the determination of an optimal plan to sequentially develop the hydropower potential of the river was done. Terms of Reference were prepared to implement pre-investment studies to establish the viability of the initial investments to be done and the process was ongoing to recruit the required Consultants. The goal is to have the first investment commissioned by 2025.

(e) 225 kV Côte d'Ivoire – Guinea Interconnection Project:

Terms of Reference for the preparation of a Feasibility Study as well as a Line Route and ESIA Study were prepared and the process was ongoing to secure the required funding to recruit the required Consultants.

6.2.2 Percentage Achievement on Objective N^0 2

The percentage achievement on the development of the WAPP Priority Projects that were indicated in the 2016 – 2019 Business Plan is estimated at 65% as elaborated in Annex 3.

Also, the following recapitulates the outcomes on the related planned targets that were prescribed in the 2016 – 2019 WAPP Business Plan:

	Factor	Target as per 2016-2019 WAPP Business Plan	Attained as at August 2019	Still in progress as at August 2019
1	Augmentation of Generation Capacity (MW)	1,179	363	840
2	Generation whose construction was launched (MW)	5,000	3,565	
3	HV Interconnection Lines Constructed (km)	6,109	1,105	3,340
4	HV Interconnection Lines with preparation completed and financing mobilized (km)	1,746	1,226	
5	Financing required for implementation of priority projects (US$)	6,140,015,000	1,934,284,000	

6.3 Realizations on Objective N^0 3: "Establish a Regional Electricity Market"

6.3.1 Progress Made

During the period under review, the following was done by the ICC with regards to the Objective of establishing a regional electricity market:

6.3.1.1. Influencing Political/Regulatory Decision Making

The following market governance documents were developed by the ICC and approved by ERERA:

- ✓ Regional Market Rules;
- ✓ Market Procedures;
- ✓ Operation Manual;
- ✓ Market Participant Application Procedures;
- ✓ Market Participant Agreement;
- ✓ Transmission Tariff Methodology;
- ✓ Short, Medium- and Long-Term Model Bilateral Contract.

The following market documents were developed and yet to be approved by ERERA:

- WAPP Transmission Service Access and Use Procedures (WTSAUP);
- Minimum Regional Operating Standards;
- Market monitoring Procedures;
- Contract administration procedures (registering and approval);
- Transmission Pricing model;
- Review of the Regional Market Rules for Phase 2.

All conditions precedent for Market Phase 1 were met and Phase 1 of the market was formally launched in June 2019.

6.3.1.2. Develop the Market

6.3.1.2.1 Implementation of the WAPP ICC

The following were achieved within the framework of implementing the WAPP ICC Project:

- Statement of Works (SOW) and designs for SCADA/EMS/MMS and WAMS Systems were finalized and approved;
- SCADA/EMS/MMS/WAMS Systems have been developed at the Contractor office with the involvement of WAPP ICC Staff;
- Factory Acceptance Testing (FAT) for SCADA/EMS/MMS/WAMS were completed;
- Phasor Measurement Units (PhMU) were installed in selected locations with site acceptance tests completed;
- Installation of telecommunication equipment in WAPP countries is ongoing;
- Construction of the ICC Building in Calavi, Benin is ongoing and the following are key project dates:
    - The WAPP ICC Building "A" (Technical Building) is expected to be completed by January 2020;
    - The WAPP ICC Building "B" (Administrative Building) is expected to be completed by June 2020;
    - SCADA/EMS/MMS/WAMS installations are expected to be completed by October 2020;
    - Site Acceptance Tests (SAT) are expected to be completed by December 2020;
    - Go-live expected by February 2021.
- The percentage completion of the ICC Building is estimated at 75% and equipment installation at Calavi estimated at 59%.

6.3.1.2.2 Implementation of the Operations Manual

The following were undertaken as part of the process of implementing the WAPP Operations Manual:

- ✓ Organized dissemination workshops on the key policies of the WAPP Operations Manual in the nine (9#) interconnected countries;
- ✓ Reviewed the WAPP Operations Manual to assess gaps and recommend necessary revisions/additions;
- ✓ Performed periodic statistical analysis of frequency performance of WAPP Interconnected Systems to assess conformance to Load Frequency Control Policy of the WAPP Operations Manual;
- ✓ Undertook a survey to assess compliance of Utility operational practice to the requirements of the WAPP Operations Manual;
- ✓ As required by the WAPP Operations Manual, developed draft Monthly System Operations Report of the WAPP Power System based on data received from Utilities;
- ✓ Updated WAPP Interconnected Power System Network Model.

6.3.1.2.3 Interconnected Priority Projects Synchronization

The following were achieved under the Synchronization of WAPP Interconnected Power System Project:

- ✓ A Synchronization Study was undertaken by a Consulting Firm recruited with the support of the World Bank. The following subtasks were undertaken within the framework of the study:
  - Assessment of the WAPP Interconnected Power System using static and dynamic simulations;
  - Field Test Measurements of selected power plants to assess requirements for primary frequency control provisions;
  - Review of WAPP Operation Manual.
- ✓ An Ancillary Services Study was undertaken to support the development of ancillary services market within the uniformed regional electricity market. The study reviewed existing technical and regulatory framework for ancillary services, assessed various categories of ancillary services, proposed procurement methods of ancillary services and proposed a road map for the implementation of ancillary service mechanisms;
- ✓ Established and coordinated Technical Working Group meetings to oversee the implementation recommendations of the Synchronization Study aimed at ensuring conditions required for a possible successful synchronization are met;
- ✓ A Power Pool Advisor has been recruited under the WAPP Technical Assistance and Network Integration Project to provide advisory services and support to the Director, ICC for the implementation of the regional electricity market;

- ✓ A Contractor was recruited and currently carrying out works for the design, supply and installation of Static Var Compensator (SVC) at Matam, Special Protection Schemes (SPS) at Segou and Sikasso, inter-trip relays at Kano and Birnin Kebbi, installation of Phasor Measurement Units (PhMU) at all 22 interconnecting substations within the WAPP Interconnected Power Systems and integration of PhMU into the ICC Wide Area Monitoring System (WAMS). Within the framework of this contract, the following key activities are been undertaken:
  - Factory Acceptance Testing (FAT) of SPS and PhMU have been completed;
  - SVC Design review and approval process is ongoing.
- ✓ A Contractor was recruited to implement the Contract related to Power System Stabilizer Tuning, Governor Testing, change of Settings and Synchronize the WAPP Interconnected Power System. Kick-off meeting was organized, and project implementation has commenced. The following are key completion dates:
  - SPS and PhMU installation and commissioning are expected by March 2020;
  - SVC installation and commissioning is expected by December 2020;
  - Synchronization of the WAPP Interconnected Power System is expected by June 2021.

6.3.1.2.4 Certification Program for System Operators

A Consultant has been recruited to develop a WAPP System Operator Certification Program to promote skilled, qualified, proficient and regionally certified Power System Operators to ensure the security of both national and regional interconnected power system. The Certification Program would provide the overall framework for training several proficient Power System Operators of Transmission System Operators (TSOs), Control Area Centers (CACs) and the WAPP ICC (SMO). The project is ongoing with the following deliverables already submitted following visit to Utilities and Centers of excellence to assess existing training and certification programs:

- Inception Report;
- Interim Report.

6.3.1.3. Operate and Manage the Integrated Market

I. Distribution Loss Reduction Program: The project is part of the program "Promoting a Climate Friendly Electricity Market in ECOWAS" (ProCEM) and supported by GIZ. The project seeks to improve the financial viability of the Distribution Utilities thereby allowing them to be credible and viable market participants in the regional electricity market. The following were achieved:
   - ✓ Completed a Distribution Loss Study which identified causes of high distribution losses and proposed solutions to reduce distribution losses which are currently above acceptable limits;

- ✓ Developed a monitoring and evaluation system for periodic assessment of distribution losses;
- ✓ Developed bankable projects for distribution companies to assist in securing funds for project implementation;
- ✓ Procured NEPLAN software for Distribution Companies and completed training programs for Distribution Companies on the use of NEPLAN software for distribution loss study;
- ✓ Organized Distribution Loss Forum for distribution companies to share best practices related to reducing technical and non-technical losses.

II. In order to remain an authoritative source of information especially with regards to operations of the WAPP Interconnected Power System, the ICC coordinated with Utilities periodically to prepare monthly report of their operations based on data submitted by Utilities;

III. The ICC was involved in various technical consultative meetings with stakeholders as part of its efforts to reinforce technical cooperation in all activities related to the establishment of the regional electricity market;

IV. In order to operate and manage the integrated market, the WAPP ICC through a Technical Assistance from the EU recruited two (2#) firms to give support in its initial operation as well as capacity building requirements.

6.3.1.4. Update and Maintain Management Information System and M&E

The following were achieved within the period of the 2016 - 2019 Business Plan:

- The WAPP ICC deployed Microsoft 365 as a collaborative tool for the staff of the WAPP Secretariat;
- The Department carried out diverse reviews to optimize the Local and Wide Area Network;
- The WAPP ICC carried out a major upgrade of the WAPP Website, designed and hosted separate websites for the ICC and the PIPES Departments;
- Following the joint Memorandum Of Understanding signed between the ECOWAS Energy Agencies/Institutions (WAPP, ERERA and ECREEE), the ICC collaborated with the other Agencies to prepare ToR and bidding documents towards the recruitment of Consultants for the development of an ECOWAS Energy Information System;
- The WAPP ICC replaced the interpretation system of the WAPP Secretariat and deployed a Video Conference system;
- With an increase in data requests and dissemination, a Data Protection Policy and a Data Confidentiality Agreement were developed for the Institution;
- The WAPP ICC initiated an IT Knowledge management system for the WAPP Staff;
- The WAPP ICC has also commenced the review and re-introduction of M-Files Document Management System for the staff.

6.3.2 Percentage Achievement on Objective N^0 3

The percentage achievement relating to the establishment of the regional electricity market is estimated at 77% as elaborated in Annex 4.

6.4 Realizations on Objective N^0 4: "Implement the WAPP Dark Fiber Project"

The goal of this project is to among others, reduce the management and financial costs of possessing excess Dark Fiber capacities by committing part or full to a pool or an inventory. In particular, the project shall aim to make available committed fiber to the telecommunications market within the ECOWAS region in a bid to boost competition in the telecommunications market industry as well as generate revenue for the WAPP Member Utilities. It is contemplated that participating Member Utilities shall enter into a Consortium Agreement and that a Management Company shall subsequently be procured to manage the business on behalf of the Consortium. The Management Company shall provide telecom operator customers with one-stop shopping for their fiber needs and a single point of contact for network design, scheduling of installation, maintenance and repairs and other interface with the participating utilities. It is envisaged that the WAPP ICC serves as the Coordinator of the Consortium Agreement.

6.4.1 Progress Made

- With support from the World Bank, a Consultant was recruited in May 2016 to review as well as finalize/update a Consortium Agreement that had previously been prepared and envisaged to be executed among the WAPP Member Utilities participating in the project. This review was done in order to have the Agreement be more reflective of business models that were being employed in other regions of the world.
- The final version of the Consortium Agreement was submitted to the WAPP Executive Board in October 2016. The Executive Board, having observed that most Member Utilities were not wholly ready owing to internal national constraints, decided to postpone the signing of the Agreement.

6.4.2 Percentage Achievement on Objective N^0 4

The percentage achievement in relation to implementing the Dark Fiber Project is estimated at 35%.

6.5 Realizations on Objective N^0 5: "Reinforce the Capacity of WAPP"

6.5.1 Progress Made

During the period, the Administration and Finance Department implemented the following activities in accordance with the objectives set out in the 2015-2019 Business Plan:

6.5.1.1. Capacity building of stakeholders (Member Utilities, Ministries in charge of Energy, Technical Partners, WAPP Secretariat) funded by WAPP Technical and Financial Partners

Several activities were conducted over the period relating to capacity building as detailed in Annex 5.2. The capacity building activities involved the organization of training sessions and study missions for the West African electricity sub-sector stakeholders. Funding for these training activities was provided by the WAPP Technical and Financial Partners through funds for the preparation or implementation of electricity infrastructure projects or direct support in the form of technical and financial assistance to the WAPP Secretariat. These Partners included the AfDB, USAID, GIZ, EU, WB and Government of Norway.

6.5.1.2. Training funded by the WAPP Secretariat

In the course of implementing the 2016 – 2019 WAPP Business Plan, the WAPP Secretariat funded the following capacity building activities with own resources:

- ✓ Training on "HumanManager HR Boot Camp: Intermediate Level" from October 5 to 9, 2016, in Lagos (Nigeria). One (1#) Professional Staff attended the Training;
- ✓ Training on "HumanManager Payroll Administration" from July 3 to 5, 2017, in Lagos (Nigeria). One (1#) Professional Staff attended the Training;
- ✓ Training on Microsoft Suite 2013 "Basic & Advance Functions" for Professional, General staff and Support Staff in Grand Popo, Benin, in May 2017 that covered the following:
  - Microsoft Office 2013: "Basic Functions": 2 Support Staff
  - Microsoft Office 2013: "Advance Functions": 10 Professional Staff & 4 General Staff
- ✓ Continuous Professional Development (CPD) Seminar on "IFRS Updates", from June 28 to 29, 2017, in Accra, Ghana. One (1#) Professional Staff attended the Training;
- ✓ CPD training on "Corporate Treasury Management", from July 12 to 13, 2017, in Accra, Ghana. One (1#) Professional Staff attended the Training;
- ✓ CPD training on "IPSAS Updates" from December 6 to 7, 2017 by the Institute of Chartered Accountants Ghana (ICAG). One (1#) Professional Staff attended the Training;

- ✓ Training on Principles of Economic Regulations and Electricity Tariffs from February 3 to 7, 2019 in Muscad, Oman. One (1#) Director attended the training;
- ✓ CPD Training: Accountancy, Audit & Insolvency from April 17 to 18, 2019 in Abuja, Nigeria. One (1#) Professional Staff attended the training;
- ✓ Training in coordination with the World Bank on Korea Power System Planning: power markets Master Class on Power Planning, Power Markets, Real Time Dispatch, Establishment and Operation of EMS from May 13 to 24, 2019 in Korea. Three (3#) Professional Staff attended the training;
- ✓ CPD Training on Working Capital Management from June 12 to 13, 2019 in Accra, Ghana. One (1#) Professional Staff attended the training;
- ✓ An in-house training for all WAPP Staff in the Use of HUMAN MANAGER SOFTWARE (The training focused on the Self-service Feature "Accessing Individual Payslip") on May 14, 2019 at the WAPP Secretariat in Cotonou, Benin;
- ✓ CPD Training on Annual Accountants conference from September 9 to 13, 2019 in Abuja, Nigeria. One (1#) Professional Staff attended the training.

6.5.1.3. Creation of WAPP Regional Centers of Excellence

The Objective of the WAPP Centers of Excellence is to create a network of training capacities in order to provide the West African industrial sector, in particular WAPP Member utilities, with training infrastructure and services that meet international quality standards and criteria.

The completion of these Centers shall provide a sustainable development of professional skills to support the planning, operations and management activities of the member utilities and provide a framework for sharing experiences, expertise and innovations. These Centers shall also bridge the gap between demand and supply of the skills required in the electricity sub-sector, particularly in the operation of regional interconnected networks and the management of the electricity market.

In the process of increasing and diversifying the energy supply in the region as well as creating the regional electricity market, the WAPP Secretariat has since 2008 also developed a strategy for building the capacity of its stakeholders, particularly based on human capital development, in order to ensure the sustainability of its programs and projects.

It should also be noted that all studies and investigations conducted in recent years on improving the performance of the national power systems of mainland ECOWAS Member countries, highlight the existence of significant gaps in human resources planning and management within power utilities. This is manifested in, among others, the shortage of qualified technicians in key areas of the electricity sub-sector and the challenge risks being exacerbated by the retirement, in the coming years, of the majority of experienced managers and technicians.

In light of this worrying human capital deficit and in view of the challenges associated with the expansion of the WAPP interconnected system as well as the operationalization of the regional electricity market, the reinforcement of staff capacities is of paramount importance to the Member utilities as well as the WAPP Secretariat. One of the strategies being pursued by the WAPP to address these challenges is the development of five (5#) Regional Centers of Excellence (RCEs) that shall be dedicated to the electricity sub-sector.

The WAPP RCEs are the "Centre des Métiers de l'Electricité (CME)" in Bingerville (Côte d'Ivoire), the "Centre de Formation et de Perfectionnement Professionnel" in Calavi-Cotonou (Benin), the "Centre de Formation et de Perfectionnement Professionnel" in Cap des Bîches (Senegal), NAPTIN Training Center in Kainji (Nigeria) and VRA Training Center in Akuse (Ghana). Each of these Centers has the basic infrastructure and proven training experience. It is envisaged that these five (5#) RCEs shall each be specialized in a specific field of training in order to cover all aspects of the electricity business with dedicated expertise.

It is against this backdrop that for the past five (5#) years, almost all the training sessions organized by WAPP have been held in these RCEs and this has enabled them to enrich their training catalogue and train more than twenty in-house trainers.

At the same time, WAPP, with the support of USAID and GIZ, prepared Business Plans for the RCEs of Calavi, Cap des Bîches and Kainji. These Plans have made it possible to determine the technical, economic and social feasibility of establishing the RCEs.

The funding needed to establish the RCEs has been determined as well as the institutional model to govern the networking of the Centers. The areas of specialization of each of the RCEs have also been proposed.

6.5.1.4. Recruitment of Personnel for WAPP Secretariat

The Objective of this activity is to ensure that the WAPP General Secretariat has the competent and necessary human resources to achieve its global vision.

During the period 2016 - 2019, the WAPP Secretariat undertook recruitment activities to strengthen its team to effectively meet the growing needs of the Institution. To achieve this objective, the General Secretariat has sometimes benefited from the support of some of its technical and financial partners.

During the period under review, 2016 to 2019, the Department of Administration and Finance conducted recruitment for the following positions:

6.5.1.4.1 Funded by WAPP:

- One (1#) Project Accountant (Contract);
- One (1#) Assistant Secretary (Contract);
- One (1#) Director of Information and Coordination Centre (Permanent);
- One (1#) IT Officer (Contract);
- One (1#) Project Coordinator (Permanent);
- One (1#) Protocol Officer (Permanent);
- One (1#) Executive Assistant (Permanent);
- One (1#) Accounting Assistant (Contract);

- One (1#) Budget Officer (Permanent);
- Two (2#) Drivers (Contract);
- One (1#) Driver (Contract);
- One (1#) Office Agent (Contract);
- One (1#) Secretary (Contract);
- One (1#) Internal Auditor (Secondment from TCN).

6.5.1.4.2 Funded by African Development Bank:

- One (1#) Procurement Officer (Contract);
- One (1#) Expert in Environmental and Social Safeguards (Contract).

6.5.1.4.3 Funded by World Bank:

❖ *For WAPP Secretariat:*

- One (1#) Expert in Renewable Energy (Contract);
- One (1#) Hydropower Expert (Contract) ;
- One (1#) Procurement officer (Contract).

❖ *For the Project Management Unit of the Northcore Project:*

- One (1#) Director (Contract);
- One (1#) Technical Coordinator (Contract);
- One (1#) Expert in Environmental Safeguards (Contract);
- One (1#) Expert in Social Safeguards (Contract);
- One (1#) Monitoring and Evaluation Specialist (Contract);
- One (1#) Specialist in Procurement and Contract Management (Contract);
- One (1#) Procurement Officer (Contract);
- One (1#) Finance and Accounting Manager (Contract);
- One (1#) Chief Accountant (Contract).

6.5.1.4.4 Funded by European Union:

- One (1#) Accounting Assistant (Contract);
- One (1#) ICC Project Technical Advisor (Contract).

6.5.1.4.5 Funded by USAID:

- One (1#) Legal Assistant (Contract).

6.5.1.5. Administration Management

During the period under review, the WAPP General Secretariat organized the following statutory meetings:

- Four (4#) Sessions of the WAPP General Assembly;
- Eight (8#) meetings of the WAPP Executive Board;
- Eight (8#) WAPP Donor Coordination meetings;
- Twelve (12#) meetings of the SPEC;
- Nine (9#) meetings of EOC;
- Nine (9#) meetings of DCC;
- Fifteen (15#) meetings of FC ;
- Fifteen (15#) meetings of HRGC.

6.5.1.6. Budget Execution over the period 2016 to 2019

		2016		2017		2018		2019	
		Budget (UA)	Actual (UA)	Budget (UA)	Actual (UA)	Budget (UA)	Actual (UA)	Budget (UA)	*Projected Actual (UA)*
1	Personnel Expenses	2,295,843	2,277,482	2,395,683	2,380,749	2,613,838	2,342,584	2,733,767	*2,640,821*
2	General Expenses	415,957	353,238	449,696	363,634	436,097	423,733	446,411	*377,830*
3	Administrative Expenses	680,133	1,039,913	728,955	914,860	668,555	803,709	792,102	*679,165*
4	Executive Board and Committee Meetings	772,110	466,801	734,157	691,653	783,644	619,169	193,442	*539,222*
5	Capital Expenses	281,657	181,162	209,890	103,091	170,184	138,237	69,909	*69,909*
	TOTAL	***4,445,700***	***4,318,596***	***4,518,381***	***4,453,987***	***4,672,318***	***4,327,432***	***4,830,417***	*4,306,946*

6.5.2 Percentage Achievement on Objective N^0 5

6.5.2.1. Capacity Building of Stakeholders

It should be noted that during the period 2016 to 2019, the WAPP Secretariat achieved a very good overall performance in terms of achieving the objectives set with regards to capacity building. A significant number of capacity building activities were carried out for the benefit of executives, operational directors, senior technicians and staff of all categories in the West African electricity sector (WAPP member utilities, national regulators, regional institutions in charge of electricity, ministries in charge of energy, etc.). These training courses covered almost all the themes identified in the 2016 - 2019 Business Plan, apart from the issues relating to reforms and restructuring of the electricity sector, with a view to integrating the gender dimension and mitigating the environmental and social impact of infrastructure projects.

The percentage achievements of the capacity reinforcement conducted per Group are detailed in Annex 5.1 and can be summarized as follows:

- Group 1 (Ghana, Nigeria) : 64%;
- Group 2 (Benin, Burkina, Côte d'Ivoire, Mali, Niger, Senegal, Togo) : 47%;
- Group 3 (Guinea, Sierra Leone, The Gambia, Guinea-Bissau, Liberia) : 71%.

The aggregate percentage achievement is therefore estimated at 61%.

6.5.2.2. Human Resource Management

The percentage completion of recruitments that were envisaged in the Business Plan is estimated as 60%.

6.5.2.3. Budget Execution over the period 2016 to 2019

The percentage achievement on the budget execution over the period is estimated to be 94% as elaborated in Annex 5.3.

6.6 Summary of Percentage Achievements on Objectives in 2016 – 2019 WAPP Business Plan

The following summarizes the percentage achievements on the Objectives in the 2016 – 2019 WAPP Business Plan:

Objective No.	Objective	Percentage Achievement
1	Update ECOWAS Revised Master Plan for the Generation and Transmission of Electrical Energy	100%
2	Implement WAPP Priority Projects	65%
3	Establish a Regional Electricity Market	77%
4	Implement the WAPP Dark Fiber Project	35%
5	Reinforce the Capacity of WAPP	61%

Also, the percentage achievement on the budget execution over the period is estimated to be 94%.

7 THE 2020 – 2023 WAPP BUSINESS PLAN

7.1 Perspectives of the WAPP in 2020 – 2023 and Strategic Analyses

With the launching of the electricity market in June 2018, the WAPP has graduated into another chapter of its existence. The ongoing advanced works on the WAPP Information and Coordination Center as well as some key transmission line projects in addition to the synchronization project imply that the period 2020 to 2023 shall witness the startup of the next phase market operations as well as the existence of a contiguous grid throughout the mainland ECOWAS region. These warrant that the WAPP during the period shall have to fully assume its role of Manager of the regional electricity market whilst ensuring stable operations on the grid and at the same time ensure that the priority projects contained in the ECOWAS Master Plan for the Development of Regional Power Generation and Transmission Infrastructure 2019 – 2033 are developed in time. In particular, the development of several regional Solar Power Parks shall add pressure on the regional grid management.

It is therefore vital that the WAPP sets itself clear objectives to guide its evolution in the short term, which integrate the afore-mentioned, and shall set the premise for the preparation of the 2020 – 2023 WAPP Business Plan. This Plan shall be the successor to the 2016 – 2019 Business Plan and shall aim to give orientation in efficiently deploying the meagre resources of the WAPP to address the potential issues to be overcome within the period whilst coherently pursuing the programs that were contained in the previous Plan. On the basis of an evaluation of the Strengths, Weaknesses, Opportunities and Threats of the current situation, realistic Objectives and accompanying work plans with resource requirements shall be proposed to steer the WAPP accordingly.

A strategic assessment of the situation of WAPP can be articulated as follows among others:

- **Strengths**

a. A firm and consistent political will;
b. A clear and consistent vision over the long-term;
c. A tradition of cooperation among ECOWAS Member States that prioritizes regional integration;
d. Excellent collaboration with the Department of Energy at the ECOWAS Commission as well as other ECOWAS entities in the energy sector such as the ECOWAS Regional Electricity Regulatory Authority (ERERA) and ECOWAS Center for Renewable Energy and Energy Efficiency (ECREEE);
e. A proven capacity to mutualize planning efforts resulting in common investment programs for the sub-region (development of Master Plans for Generation and Transmission infrastructure as well as several cycles of strategic Business Plans);
f. A demonstrated track record in project conception, preparation, and funds mobilization and project implementation;
g. Established framework of consultation and collaboration with International Financing Institutions;

h. Increasing capacity to attract private sector participation in the programs of WAPP – increasing membership from Private Sector as well as increased financing from Private Sector;
i. All-inclusive participation of WAPP Member utilities through Organizational Committees whose strengths lie in the capacities of their individual members, accustomed over time to working together towards a common objective, capable of transferring their knowledge and expertise based on terms and conditions to be developed and determined;
j. Willingness of heads of power utilities to enhance human resources and upgrade management and operating methods;
k. Significant and rapid development of cross-border interconnections and increased energy exchanges among WAPP Member Utilities;
l. Establishment of the Regional Electricity Market and its governance and management bodies;
m. Willingness of WAPP Utilities Members to collaborate to build their capacity through a network of Regional Centers of Excellence;
n. Very good experience of WAPP RCEs in the preparation and delivery of technical trainings for the benefit of their companies;

❖ **Weaknesses**

a. Low regional self-financing capacity compared to the investment needs which results in strong dependence on Funding Agencies;
b. Inadequate capacity to negotiate with the private sector on equal footing;
c. Inability to match demand with enough and quality supply (generation deficit, limited power exchanges, constant blackouts and brownouts, quality of product to be improved (high and uncontrolled costs, frequent load shedding);
d. Inefficient Power system operations at both the technical and commercial level (huge frequency deviations, significant technical and non-technical losses, low collection rates);
e. Delayed remittance of Member contributions may affect the pace at which the annual work programs of WAPP are implemented;
f. Rapidly evolving priorities of national power systems often render incoherent the regional Master Plan resulting in a need for its frequent review and update;
g. Low investment in capacity building from the Member Utilities;
h. Inadequate career or skills development plans in most WAPP Member Utilities;
i. Inadequate knowledge management policies in almost all the WAPP Member Utilities;
j. Insufficient qualified personnel to address the sector's challenges, particularly in terms of planning, organizing and managing large-scale electricity infrastructure projects as well as in operating electricity markets;
k. Training opportunities are most of the time misaligned with the needs of Member Utilities, especially with regards to academic and professional trainings;
l. Most experienced staff of power utilities are close to retirement and significant delays to recruit their replacements;
m. Outdated and poorly maintained teaching tools in the Training Centers;

❖ **Opportunities**

a. The expected interconnection of all mainland ECOWAS Member States during this Business cycle provides further market justification for the development of more efficient, environmentally-friendly and economic regional power generation facilities that could displace smaller, costly and older facilities within the Member States;
b. The launch of the regional electricity market as well as the expected commissioning of the infrastructure for the WAPP ICC implies that mainland ECOWAS Member States shall have increased options for addressing their energy needs;
c. The sub-region continues to be endowed with significant energy resources that could be harnessed for the benefit of the ECOWAS citizenry;
d. The diverse nature of these regional energy resources implies that their development could reduce dependence on fossil fuel-based generation thereby diminishing exposure to related exogenous shocks;
e. Strong private sector appetite to participate in the development of the WAPP system;
f. The gradual restructuring of the power utilities within ECOWAS Member States as well as the deployment of the Directive on the Securitization of Cross-Border Transactions is expected to yield increased efficiencies in management, operations as well as creditworthiness;
g. As part of energy transition measures, the cost improvement in deploying renewable energy projects, especially Solar, could translate to increased willingness by ECOWAS Member States to augment their portion in the regional energy mix;
h. Willingness of the Donors to support the development of the electricity sub-sector, particularly the WAPP and its projects;
i. Consideration of the energy sector as a priority area in the global environmental conservation agenda (COP21-22);
j. Strong growth in the electricity sector in most West African states;
k. Electricity sector reforms in most countries for greater efficiency and stability;
l. Great interest of the private sector and electrical equipment/equipment manufacturer to support the development of skills in the electricity sector through the provision of educational tools to RECs;
m. Consideration of the capacity building component in most regional electricity infrastructure projects;
n. Greater appreciation of gender needs and issues in the development of regional projects and programs in the electricity sub-sector.

❖ **Threats**

a. The disparity between electricity supply and demand to address the evolving energy requirements for a region with a high population growth rate;
b. Lack of knowledge on the functioning of the regional electricity market may result in utilities not taking full advantage of the benefits of the market;
c. A region that is increasingly being seen as high risk with regards to security;

d. Financial constraints within utilities affect their capacity to effectively take part in the development of the regional electricity market;
e. The inability of the power sub-sector to maintain cost-reflective tariffs;
f. Eroding human capital in the regional electricity sub-sector due to retirement of staff that far exceeds the influx of graduates specialized in power;
g. Scarcity of concessional funding affects the timely implementation of projects
h. Misalignment of procurement processes and/or requirements of International Financing Institutions adds to the complexities of regional project that are already complex in their nature;
i. Power sector is perceived as unattractive by skilled young people, who prefer to go into other sectors such as telecoms or mining industries;
j. Lack of coordination of the interventions of the Technical and Financial Partners with regards to capacity building leading to a multiplicity of initiatives sometimes in the same geographical area;
k. Lack of collaboration between higher education training institutes and the electricity companies, particularly in terms of defining curricula that meets the needs of the sector;
l. Non-payment on electricity trades could affect the viability and sustainability of the regional electricity market.

The planned evolution of the infant regional electricity market shall require a solid, reliable grid to support the operations and foster confidence in the market participants. As such, it shall be necessary that the priority projects indicated in the ECOWAS Master Plan for the Development of Regional Power Generation and Transmission Infrastructure 2019 – 2033 are diligently implemented. In addition, as the designated regional system and market operator, the WAPP ICC shall need to have the necessary resources and competencies to assume this role. Furthermore, capacities of the WAPP Member Utilities as well as the Secretariat shall have to be reinforced to ensure that they are well equipped with knowledge and know-how to adequately play their respective roles in the maturing regional electricity market.

7.2 Objectives of the 2020 – 2023 WAPP Business Plan

In light of the preceding contextual depiction and in taking into consideration the afore-conducted SWOT analyses, the following Objectives are proposed as goals for the 2020 – 2023 WAPP Business Plan:

- **OBJECTIVE 1 : Develop WAPP Priority Projects**
- **OBJECTIVE 2 : Operationalize Regional Electricity Market**
- **OBJECTIVE 3 : Restructure WAPP Secretariat**
- **OBJECTIVE 4 : Implement WAPP Dark Fiber Project**
- **OBJECTIVE 5 : Reinforce Capacity of WAPP**

These Objectives reflect the priority areas that require focus in this business plan cycle to enable WAPP on the one hand further consolidate the gains realized to date and on the other, attain an effective functioning of the regional electricity market whilst, at the same time, maximizing the utilization rate of its assets.

7.2.1 OBJECTIVE 1: "Develop WAPP Priority Projects"

Guided by the outcomes of the ECOWAS Master Plan for the Development of Regional Power Generation and Transmission Infrastructure 2019 – 2033, the projects to be pursued in this Business Plan cycle shall constitute a logical continuation of the investment program that was reflected in the preceding Plan whilst also supporting an efficient functioning of the maturing regional electricity market as well as completing the interconnections among mainland ECOWAS Member States. The projects to be addressed within this period by the PIPES Department are indicated in Annex 6 and shall mainly comprise two main activities:

- Preparation of pre-investment studies for the projects and mobilization of financing
- Monitoring and/or coordinating the implementation of the projects.

A key feature in the portfolio of projects is the completion of the integration of mainland ECOWAS national power systems as well as the development of the regional solar power parks. The latter envisages a scaled-up involvement of the private sector that shall in turn require more interventions from the traditional partners to support the WAPP Members engage more appropriately with the private sector.

7.2.2 OBJECTIVE 2: "Operationalize Regional Electricity Market"

The WAPP ICC, having been designated as the regional System Market Operator (SMO) and following the official launch of the commencement of the Regional Electricity Market on June 29, 2018, has continued to put in place the necessary policy, regulatory, technical and commercial framework required as part of the conditions precedent for the implementation of the various market phases as prescribed in the Market Roadmap. The WAPP ICC, in pursuant of positioning itself to carry out the reliability coordination and market administration functions, as a regional System Market Operator (SMO), and based on the activities and accomplishments outlined in the 2016 – 2019 Business Plan has set out in the 2020 – 2023 Business Plan, strategic objectives which underlay the various projects and initiatives that would be prioritized and implemented during the period through a prudent use of human, financial and technological resources aimed at ensuring a reliable operation of a synchronized WAPP Interconnected Power System.

During this Business Plan cycle, the WAPP ICC shall strive to attain the following:

- Achieve, Maintain and Enhance Reliability of the WAPP Interconnected Power System
- Market Design and Implementation
- Information Clearing House on Key Issues
- Excellence in Execution

- Sustain and Enhance a Robust Operational Planning Process
- Technological Advancement

In order to attain the afore-mentioned sub-Objectives, ICC shall, as also detailed out in Annex 7, pursue the following strategic actions during the period:

7.2.2.1. Influence Political/Regulatory Decision Making

The ICC shall continue to collaborate with the ECOWAS Regional Electricity Regulatory Authority (ERERA) in establishing governance documents that shall ensure transparency, fairness and security for market participants. Several governance documents have been prepared by ICC and approved within the scope of realization of the 2016-2019 business plan. The 2020-2023 business plan shall focus on the establishment of the following governance documents:

- WAPP Transmission Service Access and Use Procedures (WTSAUP)
- Minimum Regional Operating Standards
- Market monitoring Procedures
- Contract administration procedures (registering and approval)
- Transmission Pricing model (tariff model)
- Finalization of the Regional Market Rules for Phase 2

7.2.2.2. Electricity Market Development and Implementation

The Electricity Market Design, in accordance with the principles of gradual implementation proposed three (3) market phases. The proposed market implementation phases as per the market design and market road map are:

Market Phase 1: The Market Phase I involves formalizing existing trades carried out between countries on a "case by case" basis using approved standard procedures and contracts for short, medium or long-term bilateral commercial contracts and exchanges. In this phase, transmission pricing is based on that mutually agreed by the parties involved.

Market Phase II: The Market Phase II, shall in addition to the activities elaborated in the Market Phase I, include transactions based on bilateral agreements with transit through third countries and based on standard approved commercial contracts. Short-term exchanges during this market phase shall be carried out through a day-ahead market (regional optimization model).

Market Phase III: The Market Phase III, which is expected to be a competitive electricity market, comprising a day-ahead market, dynamic trade in the bilateral market, and the introduction of other market services (e.g. ancillary services) and financial products. This market shall be dependent on the adequacy of generation, transmission infrastructure, and sufficient operational reserves in the countries which would allow for competition.

The 2020 – 2023 Business Plan shall focus on the implementation of Market Phases I and II, and preparation towards Market Phase III. Consequently, the activities towards achieving this goal shall include:

- Completion and Commissioning of ICC Project as well as the realization of the backup facility for the ICC;
- Development and Implementation of WEB Portals;
- Synchronization of WAPP Interconnected Power System;
- Implementation of Ancillary Services Road map;
- Certification Program for System Operators.

7.2.2.3. Operate and Manage the Integrated Market

Under this strategic action, the following shall be pursued:

- Operationalization of ICC;
- Implementation and Enhancement of the WAPP Operation Manual;
- Coordinate and Enhance Robust Planning Process.

7.2.2.4. Update and Maintain Management Information System

The ICC envisages providing the following tools to support the WAPP Secretariat and its business processes:

- Implementation of a Geographical Information System (GIS):
- Implementation of Enterprise Resource Planning (ERP):
- Knowledge Management:

7.2.2.5. Update and Maintain Monitoring and Evaluation System

The WAPP Programs and Projects are mostly funded by Technical and Financial Partners that adopt the use of M&E to assess the successes of the Program/Projects so that funding can be adjusted as necessary and strategies improved. The results of continuous monitoring and evaluation can help prove to donors and financiers that their money is being used and allocated correctly.

Similarly, the use of software tools to track relevant Project Key Performance Indicators (KPIs) shall help in the management of the various Projects and Operations carried out by WAPP. Consequently, the WAPP shall strengthen the existing M&E unit by resuscitating the coordination meeting of M&E focal point from the member utilities, providing software tools that shall facilitate data collection and query. Recruitment of a Senior M&E Expert shall also be carried out within the period.

7.2.2.6. Enhancement of WAPP Member Utilities Infrastructure

The success of the electricity market is partly dependent on the proper functioning of the infrastructure at WAPP member utilities. Since the utilities serve as the primary source of data flow to the ICC through the SCADA/EMS System, ensuring the availability and safety of all the interconnected infrastructure is therefore a major concern for ICC.

Consequently, the ICC through the support of WAPP Technical and Financial Partners shall continue to pursue program/project that shall enhance the member utilities infrastructure such as SCADA Systems, Telecoms, Protection and Telemetry.

7.2.2.7. Implement Comprehensive Cyber Protection of Energy Infrastructure

The nature of the WAPP ICC Infrastructure requires the need for the WAPP to develop and implement cybersecurity measures to limit its exposure to third-party cyber risks and attacks. During the period of the Business Plan, the WAPP ICC shall undertake among others:

- Development of Cybersecurity strategies;
- Development of Cybersecurity standards;
- Identifying Potential Cyber security threats and impact to utility infrastructure;
- List of Data and security breaches;
- Implement cybersecurity requirements and procedures;
- Critical Assets identification;
- Cyber vulnerability assessment;
- Electronic Security Perimeter determination;
- Access control;
- Anomaly detection.

7.2.2.8. System-Wide Study Initiatives

To ensure the reliability and availability of the WAPP Interconnected Power System, it is envisaged to undertake some system-wide studies aimed at identifying, proffering and implementing recommending power system solutions. During the period of the business plan, the following system-wide study initiatives are envisaged:

- Develop strategies to be implemented to increase the stability of the grid system;
- Develop studies to implement reactive power compensation schemes where the risk of instability is high;
- Develop Remedial Action Schemes (RAS);
- Develop studies and strategies to effectively and better control real and reactive power flow.

7.2.3 OBJECTIVE 3: "Restructure WAPP Secretariat"

The projects being implemented and envisaged to be completed between 2020 and 2021 that include the:

- ICC Project : Construction of the ICC building
- CLSG Interconnection Project (Côte d'Ivoire, Liberia, Sierra Leone and Guinea);
- OMVG Loop Interconnection Project (Guinea, Guinea Bissau, Gambia and Senegal);

shall lead to the commencement of Phase 2 (the competitive phase) of the ECOWAS Regional Electricity Market. In accordance with the roadmap defining the evolution of the regional electricity market as well as the Resolutions of the WAPP Executive Board, the ICC shall become an autonomous institution in order to assume its role as an Independent Regional Market System Operator. As such, a restructuring of the WAPP Secretariat shall be necessary. This restructuring, which shall take into account Phase 2 of the market (i.e. the day ahead market) and also phase 3 of the market (i.e. the spot market), shall be undertaken by the WAPP Secretariat following a study involving the key stakeholders in the West African electricity industry as well as the WAPP Technical and Financial Partners.

7.2.4 OBJECTIVE 4: "Implement WAPP Dark Fiber Project"

The project aims to create a Dark Fiber leasing Consortium to provide an opportunity for WAPP member utilities to recoup part of their capital expenditures and offset part of their operating costs by either leasing excess dark fiber capacity on the WAPP transmission lines or generating revenue through any other identified value-added service.

The WAPP Dark fiber leasing consortium would engage a management company to oversee and implement the fiber leasing program with the WAPP ICC serving as coordinator for the participating utilities. The management company would provide telecom operator customers with one-stop shopping for their fiber needs and a single point of contact for network design, scheduling of installation, maintenance and repairs.

Following the completion of the Consortium Agreement and its adoption by the WAPP Executive Board, the 2020 - 2023 WAPP Business Plan shall focus on the endorsement of signatures by the member utilities and the recruitment of a Management Contractor that to commence the fiber business.

7.2.5 OBJECTIVE 5: "Reinforce the Capacity of WAPP"

It is evident that the success and sustainability of projects to integrate the national power systems of mainland ECOWAS Member States into a unified electricity market in order to have stable and competitive electricity undeniably depends on the quality of the human resources of the stakeholders.

The WAPP Capacity Building Program aims to develop specific expertise and skills to improve the performance of individual operators, but also to prepare for the efficient and safe operation of interconnected systems in a power pool environment. More specifically, the program aims to develop the "intangible" skills of the national electricity companies that constitute the regional energy pools.

This Program addresses capacity issues along the entire electricity delivery chain (generation, transmission, distribution - with associated issues of governance, regulation, planning, project preparation and financial structuring, marketing, etc.). However, as resources are very limited, it is necessary to establish priorities for intervention as indicated in the framework below.

In addition to the WAPP Secretariat, the strategic framework of the capacity building needs of WAPP stakeholders identifies four (4) groups ranked according to the maturity of their national electricity market and the structure of the electricity industry which are:

- ***Group I***, which includes the member utilities of Ghana and Nigeria whose electricity systems are integrated into the regional interconnected grid and are the most advanced in terms of reforms for the creation of national electricity markets. This group includes a total of eighteen (18#) WAPP member utilities;

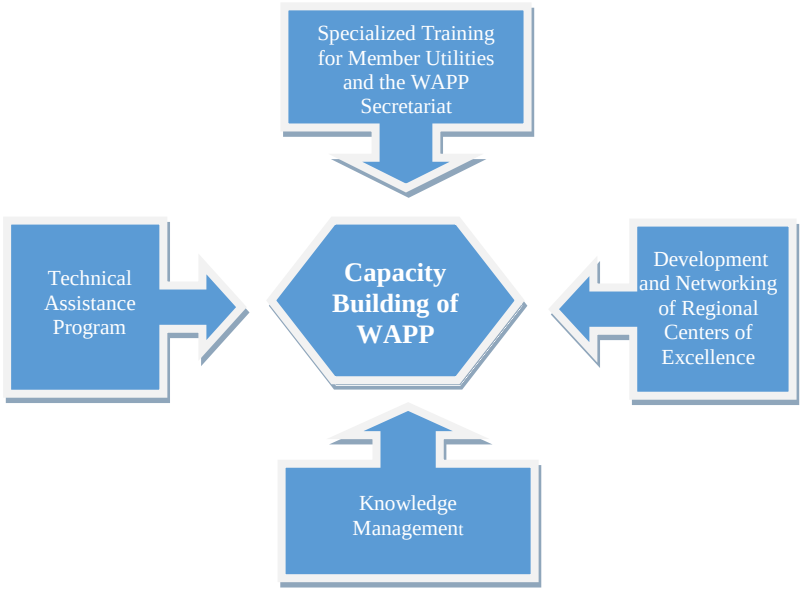
- ***Group II*** comprises the member utilities of Benin, Burkina, Côte d'Ivoire, Mali, Niger, Senegal and Togo and their grids are integrated into the regional interconnected system. The electricity systems of these countries are mainly managed by state-owned enterprises that are in various degrees of vertical integration. This group includes ten (10#) WAPP member utilities;

- ***Group III*** comprises the member utilities of The Gambia, Guinea, Guinea, Guinea-Bissau, Liberia and Sierra Leone and their electricity systems are individually isolated from the interconnected grid until at least 2019. The successive commissioning of the CLSG and OMVG projects shall enable these countries to be integrated into the regional interconnected system. With the exception of Guinea and Sierra Leone, one of the particularities of the networks in these countries is the low available capacity and the absence of national dispatch centers as well as transmission networks of more than 90 kV. This group includes six (6#) member utilities and are among the most vulnerable in the region with the most critical capacity building needs.

- ***The WAPP Secretariat*** plays a central role in, among other things, the development of electricity infrastructure and the coordination of electricity exchanges in the region. As such, capacity building is essential for the success of its activities, which is vital for the socio-economic development of the West African region.

WAPP, having upheld capacity building of its stakeholders as a top priority, has identified four (4#) main pillars of intervention that shall ensure the sustainability of its projects and programs. These pillars are illustrated below:

Strategic Pillars for Capacity Building Development



7.2.5.1 Specialized Training for Member Utilities and the WAPP Secretariat

In order to achieve efficient electricity systems, it is essential to have competent human resources that are in line with the evolution of the electricity industry. In addition, lack of skills is a real issue to address in order to deal with the inadequate human resources that hinder the establishment and smooth running of the regional electricity market in West Africa. The various recent studies on the situation of human resources in the member utilities have highlighted a number of areas of expertise that need to be strengthened. As detailed out in Annex 14.1 below in terms of activities and funding needs:

- Governance of the electricity sector;
- Technical and financial efficiencies of the MU;
- Electrical Systems Planning & Project Management ;
- Operation of Interconnected Networks and Regional Electricity Market.

7.2.5.1.1 Governance of the Electricity Sub-sector

The governance of the electricity sub-sector mostly relates to the Policy Reforms, Regulations, Rules, Pricing, Contracts, Gender, etc. It aims to improve the sector's overall operating framework in a holistic manner and make it more efficient, particularly by limiting the critical factors of sectoral governance, which are often problematic and areas of responsibility that are sometimes poorly defined.

Training courses are mainly intended for senior managers of utilities, regulatory agencies, public administrations in charge of energy, and international electricity institutions.

7.2.5.1.2 Technical and Financial Efficiencies of Member Utilities

This area of expertise deals specifically with all matters relating to the operation and maintenance of electrical works as well as the performance of the administrative, commercial and financial management of electricity companies. It aims to address the technical and managerial deficiencies of electricity companies and to improve the level of operational performance of the most fragile electricity companies.

These training courses cover topics such as the operation and maintenance of electrical systems, the planning and implementation of power infrastructure projects, substations, the reduction of technical and non-technical losses, the management of networks with a share of renewable energies, the certification of operators of the regional interconnected network, human resources management, financial and accounting management, information and communication technologies, leadership and corporate strategy, etc.

These trainings are intended for all professional categories of the Member Utilities and shall be provided according to the category and needs of each Member Utilities.

7.2.5.1.3 Planning of Electricity Systems and Management of Projects

This area relates to the preparation of strategic plans for the development of electricity systems, the identification, preparation, monitoring of the implementation and evaluation of electricity infrastructure projects. More specifically, it aims to address inadequate skills in terms of reference development, knowledge of the project life cycle, knowledge in project and contract management tools, monitoring of TFP procurement and disbursement procedures, as well as in financial structuring of electricity infrastructure projects with the participation of the private sector.

The training topics shall cover areas of Project Management, Procurement, Contract and Disbursement Management, Financial Structuring of Projects, Management of the Environmental and Social Impact of Projects, etc.

These training courses are intended for senior managers of departments/units in charge of electricity system planning within the MU and Ministries in charge of Energy.

7.2.5.1.4 Operation of Interconnected networks and Regional Electricity Market

The management of a regional electricity market and the operation of an interconnected electricity transmission system require fairly complex operations and perfect coordination among all the various stakeholders (injection of power plants, extraction of large industrial sites and the distribution network, interconnections with neighboring countries). The proper functioning of all these systems is ensured by a transmission system operator (TSO) for the operation of the interconnected system and by a market operator for the electricity market. In the West African electricity system, these two (2) functions are performed by ICC/WAPP and the five (5) Regulatory Zones based in the electricity companies.

The training courses cover aspects of SCADA Systems Management, interconnected grid reliability, Electricity Market Management, Electricity Exchange, Electricity Information Management, ICT, etc.

These training courses are intended for senior managers and technical staff of the departments/units in charge of network management, national electricity market operators, telecom specialists within the EC and managers of electricity regulatory agencies.

7.2.5.2 Development and Networking of Regional Centers of Excellence (RCE)

In a bid to have efficient and effective power utilities and given the acute shortage of quality human resources from the member utilities as well as the challenges related to the expansion of the West African electricity system in addition to the creation of the regional electricity market, staff capacity building is essential and a priority for WAPP.

One of the solutions proposed by the WAPP Secretariat in its capacity building strategy is the creation of a network of five (5) Regional Centers of Excellence dedicated to electricity careers. These are (i) CEB CFFP in Calavi, Benin, (ii) CIE CME in Bingerville, Côte d'Ivoire, (iii) NAPTIN Kainji Regional Training Center in Kainji, Nigeria, (iv) Senelec CFFP in Cap des Biches, Senegal and (v) VRA Academy in Akuse, Ghana.

During 2018, the WAPP Secretariat, with the support from USAID and GIZ, had developed the three (3#) Business Plans for the training centers of Calavi, Cap des Biches and Kainji with a view to transform them into RCEs.

The requirements are indicated in Annex 14.2.

7.2.5.3 Technical Assistance Program

Since its inception in 2006, WAPP has benefited from Technical Assistance by its Financial Partners. It is worth mentioning that without these essential supports, WAPP would not have been able to reach its current level of development.

The main technical assistance programs to WAPP have made it possible to first establish the Institution and start the activities, then to support the preparation of priority electricity infrastructure projects identified in the ECOWAS Master Plans and finally to support the establishment of the regional electricity market.

At this stage of its development, WAPP still needs these Technical Assistance programs to consolidate the achievements of the past decade and look forward to the future with confidence. The challenges of the new ECOWAS Master Plan for the Development of Regional Power Generation and Transmission Infrastructure 2019 – 2033, for which the WAPP Secretariat is responsible for preparing the priority projects, require new guidelines for renewable energy production and interconnection with other energy pools. Similarly, the challenges associated with the start of Phase II and III of the regional electricity market require new skills that WAPP must acquire to ensure among others, the successful implementation of these projects.

Apart from the technical support from the technical assistance partners to the development and implementation of WAPP projects and programs, it is essential to put in place mechanisms that enable WAPP stakeholders (i) transfer theoretical and practical knowledge, (ii) carry out power energy activities safely and efficiently, and (iii) sustainably own the technology transferred when the assistance to the programs would have ended.

To this end, WAPP shall put in place two (2) mechanisms, one for the preparation of technical assistance programs to integrate knowledge transfer and technology ownership and the other for the monitoring and evaluation of technical assistance programs.

The requirements are indicated in Annex 14.3.

7.2.5.4 Knowledge Management

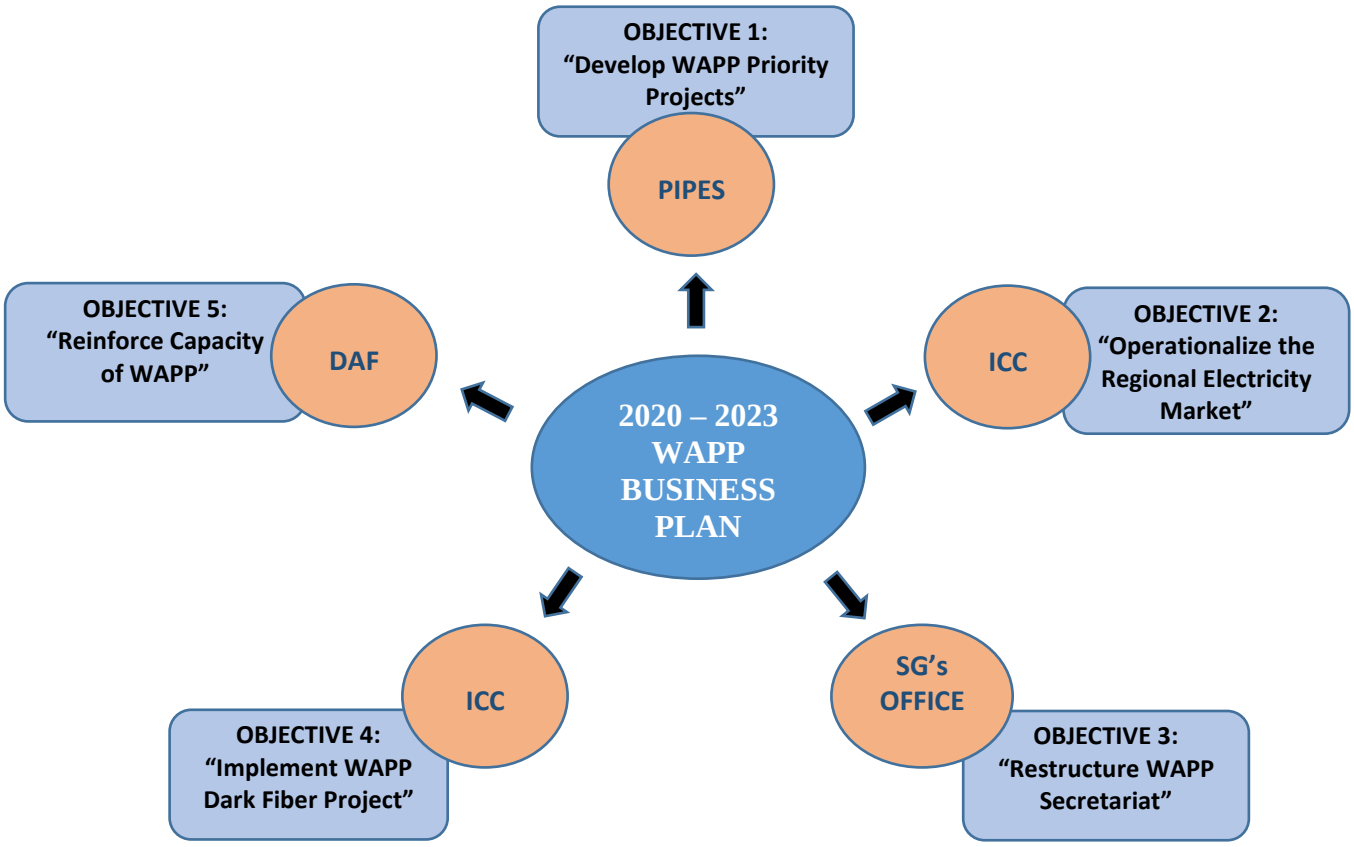
Since its creation in 2006, WAPP has produced and managed a wide range of information and data, including preparatory studies for electricity infrastructure projects, database for the operation of its electricity companies' electricity systems, contracts, administrative, accounting and financial information. Some of this information is very sensitive and requires particular attention before the competitive phases of the electricity market are put in place.

The establishment of a knowledge management system shall prevent loss and protect the knowledge produced by the different departments of the WAPP.

The requirements are indicated in Annex 14.4.

7.3 Implementation Requirements of the 2020 – 2023 WAPP Business Plan

With guidance from the WAPP General Assembly as well as the Executive Board and with direction from the WAPP Secretary General, the Objectives of the 2020 – 2023 WAPP Business Plan shall be pursued by the Departments in the WAPP Secretariat as indicated below:



7.3.1 Organizational and Human Resource Needs:

7.3.1.1 PIPES Department

The Planning, Investment Programming and Environmental Safeguards (PIPES) Department of the WAPP Secretariat is responsible for the preparation, mobilization of financing, coordination and monitor of the WAPP Priority Projects approved in the Master Plan. The PIPES Department works closely with utility teams and Ministries in charge of energy to ensure that pre-investment studies that include Feasibility, Institutional, Commercial, Environmental and Social Impact Assessments, are carried out by independent consultants to demonstrate the bankability of the Priority Projects. The PIPES Department also maintains constant interaction with the Technical and Financial Partners to among others, coordinate mobilize financing for the preparation and implementation of the projects and also coordinate the interventions of Donors on projects. During the implementation of projects, the PIPES Department assumes a coordinating and monitoring role even though with the Northcore Project, the Project Management Unit was attached to the Department. Periodic updates on the progress of projects are provided by the Department to the WAPP Strategic Planning and Environmental Committee, WAPP Executive Board and the WAPP Donor Coordination Committee.

The human resource complement of the Department comprises:

- The Director of PIPES, responsible for the supervision of the overall activities of the Department;
- The Head of Studies, Planning and Project Financing, responsible for the preparation of the Priority Projects and mobilization of financing;
- Two (2#) Project Coordinators responsible for portfolios of projects;
- One (1#) Project Coordinator seconded to the WAPP by EDG, facilitated by USAID;
- One (1#) Assistant that supports the administration of the Department.

An Expert in hydropower development and a resident Expert in the development of Variable Renewable Energy projects, both funded by the World Bank, also provide support to the Department. The process was ongoing to recruit a World Bank –funded Project Coordinator as well as an AfDB-funded Environmental Safeguards Expert to reinforce the capacity of the Department.

As indicated in Annex 8, the envisaged organizational structure of the Department for the period 2020 - 2023 assumes full-time personnel for the PIPES Department whose activities would continue to revolve around two (2#) Divisions (Studies, Planning and Project Financing; Coordination and Monitoring). The WAPP Partners shall still be approached to provide capacity reinforcement support through the provision of resident Technical Assistance as well as Resident Experts especially in light of the critical endeavor of ensuring an efficient implementation of the new ECOWAS Master Plan for the Development of Regional Generation and Transmission Infrastructure 2019 – 2033. Furthermore, in consideration of the increased number of projects expected to graduate into their construction phase during the period, the management of the Department shall also be reinforced by the recruitment of the Head of Division, Coordination and Monitoring and a Specialist in Monitoring and Evaluation.

7.3.1.2 ICC Department

The responsibilities of the WAPP ICC are as detailed in Section 4.4.1. However, as the regional System and Market Operator (SMO), the WAPP ICC shall, among others, carry out the following functions in addition to the afore-defined responsibilities:

- Coordinate interchange scheduling;
- Monitor in real time, power flow throughout the WAPP Network and take appropriate action on variances;
- Coordinate robust operational planning of the WAPP Interconnected Power System;
- Coordinate the use of regional transmission lines and administration of Open access transmission tariff;
- Manage the day-ahead market;
- Settlement of imbalances;
- Meter reading administration;

- Manage billing, settlement and payment processes;
- Administration of commercial databases.

In order to make the WAPP ICC Divisions more intuitive and sufficiently descriptive with respect to their underlying job functions, a functional organizational chart (Organogram) is proposed that is based on the preliminary draft that was developed within the framework of the ICC Project and that takes into consideration the market rules and design. The proposed Organogram comprises the Office of the Director, Information and Coordination Center overseeing three (3#) Divisions namely:

- Transmission Market Operations and Services Division;
- System Studies and Reliability Coordination Division;
- IT Enterprise, Support and Campus Operations Division.

The human resource complement of the WAPP ICC currently comprises:

- One (1#) Director, ICC who is responsible for developing department plans, guided by resource availability and objectives, and provides leadership and supervision to Heads of Division and staff of ICC to ensure efficient execution of all ICC activities;
- One (1#) Head of Division, Market Operations. This Division shall become the Transmission Market Operations and Services Division and shall be responsible for overseeing the execution of activities related to the implementation of the regional electricity market;
- One (1#) Head of Division, System Operations. This Division shall become the System Studies and Reliability Coordination Division and shall be responsible for overseeing the execution of activities related to studies and reliability coordination;
- One (1#) IT Specialist and two (2#) Assistants for IT related activities. These staff shall be within the proposed IT Enterprise, Support and Campus Operations Division;
- One (1#) Engineer supporting the Head of System Operations;
- One (1#) Engineer supporting the Head of Market Operations;
- Two (2#) SCADA/Telecom Engineers;
- One (1#) Engineer for Monitoring and Evaluation activities;
- One (1#) Bilingual Secretary.

In addition to the above listed personnel, the ICC is currently being supported by Technical Assistance funded by the EU.

A Senior International Power Pool Advisor has also been engaged and is providing support and advisory services to the Director, ICC on the implementation of the regional electricity market.

The Technical Assistance proposed a total human resource requirement of 53 people to fully execute the functions of ICC as an SMO. This implies the recruitment of an additional 42

persons. However, it is planned to stagger the recruitment process yearly by first realigning roles of existing personnel and then recruiting in the first year of this business plan at least six (6#) persons who will be part of the existing team prior to commencement of Site Acceptance Test (SAT) activities under the ICC Project.

A high-level organizational chart of the ICC/SMO is shown in Annex 9.

7.3.1.3 A&F Department

The Department of Administration and Finance supports the Office of Secretary General, Department of Information Coordination Centre and the Department of Planning, Investment Programming and Environmental Safeguards to attain the objectives of WAPP.

Specifically, the Department of Administration and Finance is responsible for the management of the human resources function, from recruitment, integration, training, performance management, compensation, discipline, retention, industrial relations right through to separation. At the level of WAPP Members, the Department implements the capacity building programs developed in collaboration with them (WAPP Members) and WAPP's Technical and Financial Partners. The Objective of these programs is to ensure that Members capacity building requirements for the operation and management of the interconnected network and the electricity market are met. To ensure customized delivery of these capacity building programs and minimize the associated costs, WAPP has proposed to transform five of its Members' most advanced training centers into regional centers of excellence.

The Department of A&F is also responsible for ensuring an effective and efficient working environment and organizes the meetings of WAPP Task Forces, Organizational Committees, Executive Board and General Assembly as well as missions of WAPP staff and Officers.

The management of WAPP's financial resources and asset falls within the ambit of the Department. Revenues mobilized from WAPP Members and its Technical and Financial Partners, and expenditures incurred in the running of the WAPP Secretariat and its various programs are reported on periodically in accordance with WAPP financial regulations and the reporting requirements of the funding agencies and subject to annual audits by independent audit firms.

As depicted in Annex 10, the Directorate of Administration and Finance is headed by a Director supported by three Divisions; namely, the Accounting and Finance Division, the Administration and Human Resources Division and the Capacity Building Division. Each Division is headed by a Head of Division.

The position of Head of Division of Accounting and Finance is not filled presently but is scheduled for filling in 2021. The Division has one Budget Officer (filled), one Accounting Officer (filled) and one Assistant Accountant (filled). Two Accounts Clerks (contractual) support the Accounting and Finance Division. During the period of the business plan, one Project Accountant and one Expenditure and Treasury Accountant shall be required. They

are both scheduled for filling in 2020. The World Bank through its Solar Project is providing one Accountant for its Projects in 2021.

The position of Head of Division of Administration and Human Resources is not filled presently but scheduled for filling in 2021. The Division is divided in two units, an Administration and Protocol Unit, and a Human Resources Unit, each headed by an officer and are all filled. The Human Resources Unit shall require a Human Resources Assistant in 2022 to support the Human Resources Officer. The Administration Unit has 13 support staff positions filled and another 12 on contract. No additional positions are required for the Administration Unit, but five contract driver positions shall be transformed into permanent positions.

The Capacity Building Division is headed by a Head of Department which is not filled and shall be filled in 2020. The head of the Division shall be supported by two capacity building professionals on contract, one responsible for planning and the other for monitoring and evaluation. The monitoring and evaluation officer shall be financed though donor funding. The positions shall be filled in 2021 and 2022 when the second phase of the market is in operation.

7.3.1.4 Office of the Secretary General

The following shall be required:

- Projects Administrator:

  - The position of Project Administrator under the Secretary General is necessary to ensure the coordination of cross-departmental projects. This position is currently filled by a contract staff.
  - The Project Administrator shall ensure the coordination of cross-departmental programs and projects.
  - The position shall be considered permanent in 2021 under the WAPP budget.

- Communications Officer:

  - The WAPP Secretariat shall recruit a Communications Officer whose responsibilities shall be among others, to assist the Secretary General in his internal and external communication activities with all stakeholders, through a wide range of media (Web, print, radio, television, etc.), to disseminate WAPP's messages, views and opinions, in order to enhance the image of the Institution and raise awareness of the Institution, its members and their activities.
  - Recruitment is planned for 2021.

7.3.2 Budgetary and Financial Needs:

As indicated in Annexes 11 to 14, the Budget of the 2020 – 2023 WAPP Business Plan has been estimated to be **US$18,813,022,445** comprising:

- **US$18,695,626,000** to cover the implementation of the Priority Projects during the period. US$11,485,086,000 has already been earmarked/secured from Partners and US$3,244,000 shall be from WAPP Member Utilities leaving a financing gap of **US$7,207,296,000** envisaged to be mobilized from Partners. The private sector shall be solicited to cover US$1,619,400,000 of this financing gap;

- **US$26,980,000** for the operationalization of the regional electricity market including the realization of a backup facility for the ICC. **US$24,658,500** is expected to be mobilized from Partners whilst US$2,321,500 is envisaged to be from WAPP Member Utilities;

- **US$59,215,400** to cover implementation of the Capacity Building Program (US$10,626,000), the development of the WAPP Centers of Excellence (US$47,039,400), Technical Assistance (USUS750,000) and Knowledge Management (US$800,000). An amount of US$9,407,880 has already been earmarked/secured from WAPP Member Utilities leaving a financing gap of **US$48,113,520** envisaged to be mobilized from Partners;

- **US$31,201,045** for the Operating Budget of the WAPP Secretariat that shall be facilitated by WAPP Member Utilities.

A 5% Contingency provision implies that the estimated Budget is ***US$19,753,673,567***

7.4 Expected Outcomes of the 2020 – 2023 WAPP Business Plan

Within this Business Plan cycle, it is envisaged that all mainland ECOWAS Member States would be interconnected and that the construction of the WAPP Information and Coordination Center in Calavi, Republic of Benin shall have been completed as well as the linkages to the designated Control Area Centers. At the conclusion of the period, it is expected that about 4,800 km of high voltage transmission lines and 1,290 MW of generation capacity, all renewable, shall have been commissioned. Also, approximately 3,961 km of transmission lines as well as 4,512 MW of generation capacity (all renewable) shall be under implementation/construction and that 4,569 km as well as 970 MW of generation (of which 520 MW shall be renewable) shall be under preparation. Furthermore, the structure of the WAPP Secretariat that shall be in place shall have taken into account the existence of a more mature regional electricity market as well as the outcomes of the study that shall have been conducted. Also, a Consortium Agreement as well as Management Company would have been established in relation to leveraging the excess fiber on the interconnected system. In addition, more than 1,600 participants, predominantly from the WAPP Member Utilities, shall have their capacities reinforced in various subjects. Special

efforts shall be deployed to maximize the participation of women and youth in the capacity building programs. The outcomes expected to be achieved are detailed out in Annexes 15 and 16.

7.5 Conclusion

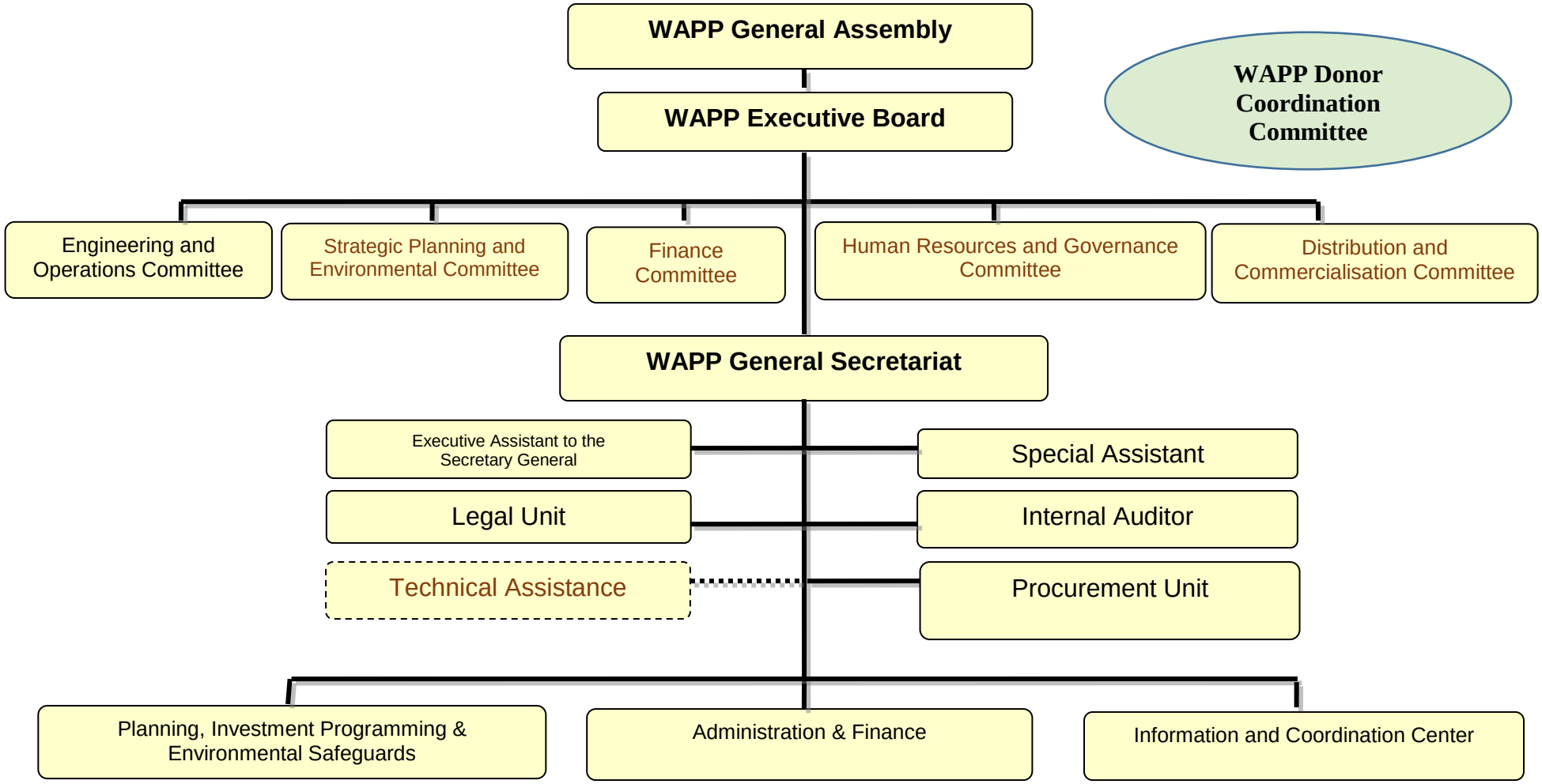
After having prominently pursued the first part of its mission statement "*To promote and develop infrastructure for power generation and transmission*" that shall culminate in the power systems of all mainland ECOWAS Member States being interconnected, the WAPP is poised to graduate into its next level of functioning that shall bring to the fore the second part of its mission statement being "*To assure the coordination of electric power exchanges among ECOWAS Member States*". In the short term, it shall therefore be incumbent on the WAPP to ensure that among others, the integration of the regional power system is complete and that the regional electricity market that was launched in June 2018 matures into its next phase with the completion of the WAPP Information and Coordination Center.

The 2020 – 2023 WAPP Business Plan seeks to build on the gains that were made in the preceding Plan and implement actions that shall be formulated from a strategic evaluation of the internal situation as well as the external environment of the WAPP. The orientation of the WAPP during the period is guided by five (5#) Objectives that among others (i) emphasize the continuing need to develop power generation as well as transmission infrastructure especially by furthering the energy transition endeavors of the sub-region through the employment of the abundant renewable energy resources and premised on the ECOWAS Master Plan for the Development of Regional Power Generation and Transmission Infrastructure 2019 – 2033, (ii) the operationalization of the regional electricity market as well as the commencement of market-based trading, and (iii) capacity reinforcement of WAPP Member Utilities that shall integrate gender and youth as well as the development of the WAPP Centers of Excellence.

The total Budget for the 2020 – 2023 WAPP Business Plan is estimated at US$18,813,022,445 comprising US$18,695,626,000 to cover the development of the Priority Projects, US$26,980,000 for the operationalization of the regional electricity market, US$59,215,400 to implement the Capacity Building Program as well as develop the WAPP Centers of Excellence, and US$31,201,045 for the Operating Budget of the WAPP Secretariat. A 5% Contingency provision on the total estimated Budget implies that the financial resources required is US$19,753,673,567.

It is therefore quite evident that the successful implementation of the Business Plan is highly contingent on the timely support and financial contributions of WAPP Member Utilities as well as the traditional Funding Agencies. A reinforced engagement with the private sector shall also be needed. The continued guidance of the ECOWAS Commission as well as enhanced collaboration with the ECOWAS Agencies as well as sub-regional Organizations involved in the electricity sub-sector shall remain vital in implementing the 2020 – 2023 WAPP Business Plan.

ANNEX 1: THE WAPP ORGANISATION

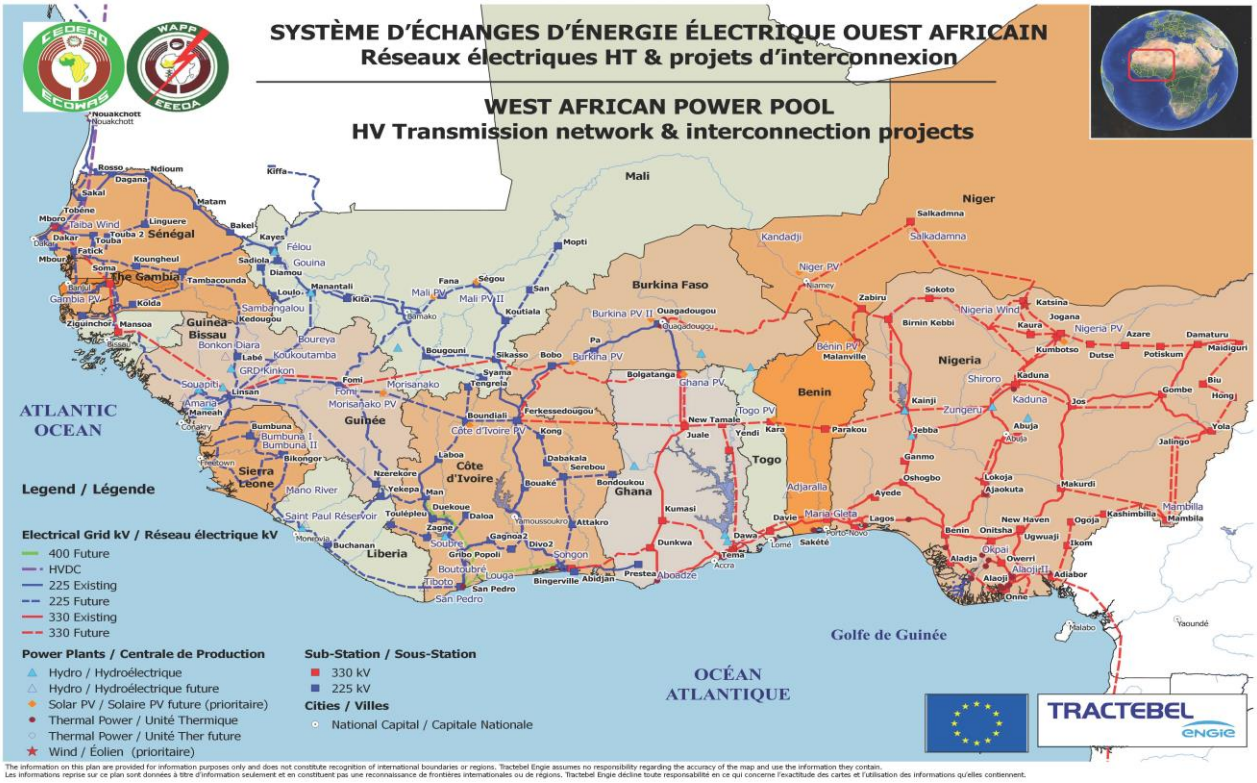


ANNEX 2: PERCENTAGE ACHIEVEMENT ON OBJECTIVE N^0 1 OF 2016 - 2019 BUSINESS PLAN

The Master Plan was updated and resulted in a Report titled "***ECOWAS Master Plan for the Development of Regional Power Generation and Transmission Infrastructure 2019 – 2033***".

The Summary outcomes are as follows:

	Project Type	Quantity	No. of Projects	Cost (US$ billion)
1	Generation	15.49 GW	47	25.91
2	Transmission Line	22,932 km	28	10.48
		TOTAL	*75*	*36.39*



The Objective was attained at 100%

ANNEX 3: PERCENTAGE ACHIEVEMENT ON OBJECTIVE N^0 2 OF 2016 - 2019 BUSINESS PLAN

		Project	Projected status by end 2019 according to 2016-2019 Business Plan	Expected Status by end 2019	% Completion	Challenges Encountered
A		*Preparation of Projects and mobilisation of financing*				
	1	330 kV Cote d'Ivoire – Ghana Interconnection Reinforcement Project;	Financing secured and construction of project in progress	Financing to completely implement the project was identified from EIB and KfW	85	0
	2	330 kV Ghana – Burkina Faso – Mali – Interconnection Project;	Financing secured to construction of project in progress	Recruitment of Consultants in progress to update pre-investment studies.	20	Changes in legislation in some of the involved countries relating to environmental protection as well as a change in the voltage of the interconnection
	3	330 kV WAPP Northcore Nigeria – Niger – Togo/Benin – Burkina Interconnection Project	Financing secured to construction of project in progress	Financing to implement the project was completely secured from AFD, AfDB, EU and WB	100	0
	4	225 kV Guinea - Mali Interconnection Project	Financing secured to construction of project in progress	Financing to implement the project was completely secured from AfDB, BOAD, EBID, EIB, EU, WB	100	0
	5	450 MW Souapiti Hydropower Project in Guinea	Financing secured to construction of project in progress	Financing to implement the project was completely secured by the Government of Guinea from China Exim Bank on the basis of the Feasibility Study that was prepared by WAPP with WB funding	100	0
	6	330 kV Nigeria - Benin Interconnection Reinforcement Project;	Financing secured to construction of project in progress	Pre-investment studies were being finalised. AfDB had indicated its keen interest to participate in the financing of the project	70	Delays in securing funding to do pre-investments studies.
	7	150 MW WAPP Regional Solar Power Park in Burkina;	Pre-investment studies completed and in process to mobilise financing for project implementation launched	With funding from WB, pre-investment studies were ongoing.	100	0
	8	Master Plan for MV Cross Border Projects	ECOWAS Heads of State and Government execute Supplementary Act adopting Master Plan	Terms of Reference for Study was prepared but was activity was subsumed under the preparation of a Rural Electrification Master Plan by the ECOWAS Commission	10	Activity was subsumed under the preparation of a Rural Electrification Master Plan by the ECOWAS Commission
	9	300 – 665 MW Amaria Hydropower Project in Guinea	Pre-investment studies completed and process to mobilise financing for project implementation launched	Terms of Reference for the pre-investment studies were prepared and process launched to recruit the reuired Consultants with funding from WB. The Government of Guinea however subsequently adopted a different implementation strategy for the project and as such, the procurement process was not completed.	15	The Government of Guinea adopted a different implementation strategy for the project and as such, the procurement process was not completed.
	10	225 kV Cote d'Ivoire – Liberia Interconnection Reinforcement Project	Pre-investment studies completed and process to mobilise financing for project implementation launched	Terms of Reference for the pre-investment studies were prepared and the process launched to mobilise funding. The NEPAD-IPPF expressed interest in supporting the preparation of the pre-investment studies and was processing a related Request from WAPP	12	Delays in mobilising funding to prepare pre-investment studies
	11	291 MW Grand Kinkon Hydropower Project in Guinea	Pre-feasibility Study adopted by relevant authorities in Guinea	The Government of Guinea was pursuing a different implementation strategy for the project.	0	The Government of Guinea was pursuing a different implementation strategy for the project.
	12	330 kV WAPP Median Nigeria – Benin - Togo - Ghana – Cote d'Ivoire Interconnection Project	Funding secured to prepare project and pre-investment studies launched	Terms of Reference for the pre-investment studies were prepared and the process launched to mobilise funding. Funding was secured from the WB to prepare the project and the process was ongoing to recruit the required Consultants.	65	Delays in mobilising funding to prepare pre-investment studies

		Project	Projected status by end 2019 according to 2016-2019 Business Plan	Expected Status by end 2019	% Completion	Challenges Encountered
B1		*Coordination and Monitoring of Projects under Implementation : TRANSMISSION LINE PROJECTS*				
	1	330 kV Volta (Ghana) – Lome 'C' (Togo) – Sakete (Benin) Interconnection Project;	Project Commissioned and operational	The segment of the project between Ghana and Togo was commissioned on April 10, 2019 and works on the remaining segment between Togo and Benin are expected to be completed in Quarter 1, 2020.	80	Delays in the implemenetation were realised as a result of among others, delays in the finalisation of the compensation for PAPs.
	2	225 kV Bolgatanga (Ghana) – Ouagadougou (Burkina Faso) Interconnection Project;	Project Commissioned and operational	The project was completed and energised on June 28, 2018 and the formal inauguration was held on October 5, 2018.	100	0
	3	330 kV Aboadze (Ghana) – Prestea (Ghana) – Bolgatanga (Ghana) Transmission Line Project;	Construction on 330 kV Kumasi (Ghana) - Bolgatanga (Ghana) of project in progress	The line segment between Kumasi and Bolgatanga was energised on April 29, 2019 whilst the segments Aboadze – Prestea as well as Prestea – Kumasi were energised in July 2019.	100	0
	4	225 kV Cote d'Ivoire - Liberia - Sierra Leone - Guinea Interconnection Project	Construction works in Progress	Construction works were ongoing and it is expected that the segment between Cote d'Ivoire and Liberia shall be energised by December 2019	100	0
	5	225 kV OMVG Interconnection Line involving (Senegal, The Gambia, Guinea Bissau, Guinea	Financing secured and Construction of project in progress	Construction works were ongoing	100	Delays in closing financing with Partners
	6	330 kV Cote d'Ivoire – Ghana Interconnection Reinforcement Project;	Construction works in Progress	The implementation of the project was deferred	0	The implementation of the project has been deferred due to a change in its prioritisation in Ghana and as such, the new commissioning date as proposed in the 2019 -2033 Master Plan is 2029.
	7	330 kV Ghana – Burkina Faso – Mali – Interconnection Project;	Construction works in Progress	Recruitment of Consultants in progress to update pre-investment studies. AFD, AfDB, KfW, MCC and WB have all indicated their keen interest to participate in financing the implementation of the project	10	Changes in legislation in some of the involved countries relating to environmental protection as well as a change in the voltage of the interconnection
	8	225 kV Guinea - Mali Interconnection Project	Construction works in Progress	Procurement of Contractors was in progress	35	Delays in securing and closing financing with Partners
	9	330 kV WAPP Northcore Nigeria – Niger – Togo/Benin – Burkina Interconnection Project	Construction works in Progress	Procurement of Contractors was in progress	40	Protracted discussions with Partners on the institutional framework to govern the implementation of the project that led to delays in financial closure
	10	330 kV Nigeria - Benin Interconnection Reinforcement Project;	Construction works in Progress	Pre-investment studies were being finalised. AfDB had indicated its keen interest to participate in the financing of the project	40	Delays in securing funding to do pre-investments studies.
	11	225 kV Cote d'Ivoire – Liberia Interconnection Reinforcement Project	Procurement of Contractors in progress	Funding being mobilised to prepare pre-investment studies	5	Delays in mobilising funding to prepare pre-investment studies
	12	225 kV OMVS Manantali – Kita – Bamako Transmission Line Project in Mali	Financing secured and Construction of project in progress	Procurement of Contractors was in progress	90	Delays in mobilising financing
B2		*Coordination and Monitoring of Projects under Implementation : GENERATION PROJECTS*				
	1	3,050 MW Mambilla Hydropower Project in Nigeria	Financing secured and Construction of project in progress	Construction works in Progress	100	0
	2	700 MW Zungeru Hydropower Project in Nigeria	Financing secured and Construction of project in progress	Construction works in Progress	100	0
	3	450 MW Souapiti Hydropower Project in Guinea	Financing secured and Construction of project in progress	Construction works in Progress	100	0
	4	450 MW WAPP Maria Gleta Regional Power Generation Facility in Benin	Financing secured and Construction of project in progress	Discussions on commercial arrangements were in progress	30	Delays in securing financing and he recruitment of a Transactions Advisor to support the countries negotiate the commercial agreements
	5	450 MW WAPP Aboadze/Domunli (Ghana) Regional Power Generation Facility;	Financing secured and Construction of project in progress	Allocaton of appropriate site with free-zone status was still pending with the Government of Ghana	10	Allocaton of appropriate site with free-zone status was still pending with the Government of Ghana
	6	300 MW Amaria Hydropower Project in Guinea	Pre-investment studies completed and process to mobilise financing for project implementation launched	Mobilisation of financing was in progress by Government of Guinea	100	The Government of Guinea adopted a different implementation strategy for the project.
	7	281 MW Koukoutamba Hydropower Project under OMVS (Senegal, Mali, Mauritania, Guinea)	Financing secured and Construction of project in progress	Mobilisation of financing was in progress by OMVS	40	Delays in securing financing for project implementation
	8	220 MW Tiboto Hydropower Project (Cote d'Ivoire, Liberia)	Pre-investment studies completed and process to mobilise financing for project implementation launched	The preparation of the project was still ongoing by the Government of Cote d'Ivoire with a Developer.	20	Delays in the conclusion of the project preparation
	9	181 MW Balassa Hydropower Project under OMVS (Senegal, Mali, Mauritania, Guinea)	Construction works in Progress	Mobilisation of financing was in progress by OMVS	35	Delays in securing financing for project implementation
	10	160 MW Boureya Hydropower Project under OMVS (Senegal, Mali, Mauritania, Guinea)	Construction works in Progress	Mobilisation of financing was in progress by OMVS	35	Delays in securing financing for project implementation
	11	147 MW Adjarala Hydropower Project (Togo, Benin)	Financing secured and Construction of project in progress	Project implementation strategy was under review by the Gov'ts of Benin and Togo	20	Financing was mobilised by the beneficiary countries from the China Exim Bank but due to challenges in achieving effectiveness of the Agreements, the project implementation strategy is being revisited by the involved countries.
	12	140 MW Gouina Hydropower Project under OMVS (Senegal, Mali, Mauritania, Guinea)	Construction works in Progress	Construction works were in Progress	100	0
	13	128 MW Sambangalou Hydropower Project under OMVG (Senegal, The Gambia, Guinea Bissau, Guinea)	Construction works in Progress	Implementation of the project was ongoing under a multi-phase contract facilitated through export finance	60	Delays in securing financing for project implementation
	14	88 MW Mount Coffee Hydropower Project in Liberia	Project Commissioned and operational	Project Commissioned and operational	100	0

		Project	Projected status by end 2019 according to 2016-2019 Business Plan	Expected Status by end 2019	% Completion	Challenges Encountered
B3		*Coordination and Monitoring of Projects under Implementation : MV CROSS BORDER PROJECTS*				
	1	Cote d'Ivoire - Liberia MV Cross Border Project	Project Commissioned and operational	Project Commissioned and operational	100	0
	2	Ghana - Togo South MV Cross Border Project	Project Commissioned and operational	Project Commissioned and operational	100	0
	3	Benin - Togo North MV Cross Border Project	Project Commissioned and operational	Project Commissioned and operational	100	0
	4	3rd Generation MV Cross Border Projects	Projects under preparation	Terms of Reference for MV Cross Border Master Plan Study was prepared but was activity was subsumed under the preparation of a Rural Electrification Master Plan by the ECOWAS Commission	10	Activity was subsumed under the preparation of a Rural Electrification Master Plan by the ECOWAS Commission
C		*Additional Projects Pursued During the Period*				
	1	150 MW WAPP Regional Solar Power Park in Mali;	Was not part of Business Plan	With funding from WB, pre-investment studies were ongoing.	100	0
	2	150 MW WAPP Regional Solar Power Park in The Gambia;	Was not part of Business Plan	Terms of Reference for a Feasibility Study were prepared and the process was ongoing to launch the recruitment process for the required Consultant with support from the WB.	100	0
	3	Solar Radiation Measurements Campaign within mainland ECOWAS Member States;	Was not part of Business Plan	Terms of Reference to recruit a Consultant to conduct a measurements campaign that would better precise the solar power potential within mainland ECOWAS Member States were prepared. The process was ongoing to launch the recruitment process for the required Consultant with support from the WB.	100	0
	4	St. Paul River Hydropower Development in Liberia	Was not part of Business Plan	With support from the WB and among other activities, the determination of an optimal plan to sequentially develop the hydropower potential of the river was done.	100	0
	5	225 kV Cote d'Ivoire – Guinea Interconnection Project	Was not part of Business Plan	Terms of Reference for the preparation of a Feasibility Study as well as a Line Route and ESIA Study were prepared and the process was ongoing to secure the required funding to recruit the required Consultants.	100	0
		Aggregate Average Completion			**65**	

ANNEX 4: PERCENTAGE ACHIEVEMENT ON OBJECTIVE N^0 3 OF 2016 - 2019 BUSINESS PLAN

	Objective	Projected Status by end of 2019	Expected Status by end of 2019	Percentage of Completion	Challenges
1	**Influencing Political/Regulatory Decision Making**			**100%**	
2	**Develop the Market**			**59%**	
	Implementation of the WAPP ICC	ICC Building construction completed; SCADA/EMS/MMS/WAMS System installed.	ICC Building construction ongoing; SCADA/EMS/MMS/WAMS System manufacturing complete.	*67%*	Delay in Building Construction
	Implementation of WAPP Operation Manual			*70%*	Delay in compliance to Manual by Utilities
	Interconnection Priority Project Synchronization	WAPP System Synchronized	SPS and PMU installed	*60%*	Procurement Process delayed due to unsuccessful bidding process following launch of tender for implementation of works
	Certification program	Certification program developed and operators certified	Draft course modules available for review	*50%*	
	Capacity Building for ICC Staff and staff of Operations Center	ICC Staff and Staff of Operators trained	ICC Staff trained	*50%*	Training for Stafff of Control Area Centers (CAC) not undertaken by Sponsor
3	**Operate and Manage the Integrated Market**			**65%**	
	Authoritative Source of Information	Publish monthly consolidated operations report of Utilities		*50%*	Non availability of data on time and lack of publication of available report as scheduled
	Robust Planning Process and Studies			*30%*	Non existence of an approved robust planning process Delay in receiving updated network model and response to clarifications when requested
	Distribution Loss Reduction Project	Distribtution Loss Study completed; Bankable projects for at least 3 utilities developed	Distribution Loss Study already completed; Bankable projects completed for 6 utilities	*100%*	
	Technical Cooperation	Participate in regional and international events on market and system operations	Participated in all planned regional and international events	*100%*	
	Ensuring Availability and Reliability of the Regional Power System			*10%*	Lack of infrastructure for reliability coordination
	Emergency program			*100%*	
4	**Update and Maintain MIS and M&E**			**85%**	
	Average Percentage Completion			***77%***	

ANNEX 5: PERCENTAGE ACHIEVEMENT ON OBJECTIVE N^0 5 OF 2016 - 2019 BUSINESS PLAN

5.1 Summary of Achievements on Capacity Building per Group of Countries

- ***Group of Countries (Ghana & Nigeria)***

Table I : Group I (Ghana & Nigeria)					
No.	**Project**	**2016 - 2019 Objectives**		**Achievements 2016 - 2019**	
		Training session	**Staff to be trained**	**Staff trained**	**% Achievement**
1	Electricity Market Business Processes / Operation of the Electricity Market	2	24	**17**	**71%**
2	Increase participation of private sector and PPP in the electricity sector	2	24	**8**	**33%**
3	Management of interconnected systems (deployment of the WAPP Operating Market)	2	24	**24**	**100%**
4	Reform & restructuring of the electricity sector to integrate gender aspect	2	24	**0**	**0%**
5	Make renewable energy projects viable in an interconnected system	2	12	**26**	**217%**
6	Legal agreements specific to the electricity sector (CAE, CTE, CSA, etc.)	2	16	**9**	**56%**
7	Mitigation of the environmental and social impact of electricity projects	2	12	**0**	**0%**
8	Study missions in the Energy Pools	1	10	**10**	**100%**
	TOTAL	**15**	**146**	**94**	**64%**

- ***Group II (Benin, Burkina, Côte d'Ivoire, Mali, Niger, Senegal, Togo)***

Table II : Group II (Benin, Burkina, Côte d'Ivoire, Mali, Niger, Senegal, Togo)					
No.	**Project**	**2016 - 2019 Objectives**		**Achievements 2016 - 2019**	
		Training session	**Staff to be trained**		**Training session**
1	Governance of the electricity sector (unbundling, regulation, electricity tariffs, etc.)	2	56	**0**	**0%**
2	Electricity Market Business Processes / Operation of the Electricity Market	2	40	**25**	**63%**
3	Increase participation of private sector and PPP in the electricity sector	2	40	**6**	**15%**
4	Management of interconnected systems (deployment of the WAPP Operating Market)	2	40	**40**	**100%**
5	Reform & restructuring of the electricity sector to integrate gender aspect	2	40	**0**	**0%**
6	Make renewable energy projects viable in an interconnected system	2	40	**50**	**125%**
7	Legal agreements specific to the electricity sector (CAE, CTE, CSA, etc.)	1	28	**22**	**79%**
8	Mitigation of the environmental and social impact of electricity projects	2	40	**0**	**0%**
9	Study missions in the Energy Pools	1	20	**20**	**100%**
	TOTAL	**16**	**344**	**163**	**47%**

- ***Group III (Guinea, Sierra Leone, The Gambia, Guinea-Bissau, Liberia)***

Table III : Group III (Guinea, Sierra Leone, The Gambia, Guinea-Bissau, Liberia)					
No.	**Project**	**2016 - 2019 Objectives**		**Achievements 2016 - 2019**	
		Training session	**Staff to be trained**		**Training session**
1	Operation & Maintenance of electrical systems	3	72	**192**	**267%**
2	Management of non-technical losses of electrical systems	2	36	**18**	**50%**
3	Project Management & Structuring	2	24	**15**	**63%**
4	Governance of the electricity sector (unbundling, regulation, electricity tariffs, etc.)	2	48	**4**	**8%**
5	Electricity Market Business Processes / Operation of the Electricity Market	2	48	**14**	**29%**
6	Increase participation of private sector and PPP in the electricity sector	2	24	**2**	**8%**
7	Management of interconnected systems (deployment of the WAPP Operating Market))	2	24	**24**	**100%**
8	Reform & restructuring of the electricity sector to integrate gender aspect	2	36	**0**	**0%**
9	Make renewable energy projects viable in an interconnected system	2	36	**16**	**44%**
10	Legal agreements specific to the electricity sector (CAE, CTE, CSA, etc.)	1	12	**5**	**42%**
11	Mitigation of the environmental and social impact of electricity projects	2	48	**7**	**15%**
12	Study missions in the Energy Pools	1	22	**8**	**36%**
	TOTAL	*23*	*430*	***305***	**71%**

5.2 Details of Capacity Building Conducted by Funding Source

A. Funding from the African Development Bank

Within the framework of the capacity building component of the Côte d'Ivoire-Liberia-Sierra Leone-Guinea (CLSG) Interconnection Project, the following activities were carried out:

- ✓ Training of seventy-nine (79#) employees of "Electricité de Guinée (EDG) S.A." in ten (10#) training modules covering the fields of *operation and maintenance of high and low voltage HV and MV networks, commercial management, security and electrical capacitation as well as planning and construction of distribution networks*, etc. These training sessions were held at the "Centre des Métiers de l'Electricité" (CME) in Bingerville, Côte d'Ivoire, from May 23, 2016 to July 29, 2016, for a total number of 415 man-days of training;
- ✓ Training of eighty (80#) employees of the Liberia Electricity Corporation (LEC) in ten (10#) training modules covering topics that included *operation and maintenance of transformers and substations, planning and operation of electricity distribution networks, management of technical and non-technical losses in electricity networks, maintenance and repair of transmission and distribution networks, high and low voltage networks, the fundamentals of electricity system protection,* etc. These training sessions were held at NAPTIN's Kainji as well as Lagos campuses in Nigeria from December 3, 2018 to February 15, 2019 and involved a total of 8,000 man-days of training;
- ✓ Eighty-one (81#) employees from the Electricity Distribution and Supply Authority (EDSA) as well as the Electricity Generation and Transmission Company (EGTC) of Sierra Leone were trained. These staff were trained in, among others, *the management and financial structuring of electricity infrastructure projects, the operation and maintenance of power plants, the operation and maintenance of electricity transmission networks and substations, the maintenance and repair of distribution networks, the planning and operation of the distribution network, the fundamentals of electricity network protection, the fundamentals of electricity tariffs and communication strategies, techniques to reduce technical and non-technical losses.* The training was conducted at the VRA Academy Campus in Akuse, Ghana, from March 10, 2019 to July 20, 2019 and involved a total of 810 man-days of training;
- ✓ Training of six (6#) Executives of the "Compagnie Ivoirienne d'Electricité" (CIE) on the themes of *leadership, roles and responsibilities of the manager, results-based management (RBM) and performance measurement, project and program management: planning, execution and control*. These training courses were held between March and August 2016 and involved training of 80 man-days;
- ✓ Training of twelve (12#) senior managers of the "Direction Nationale de l'Energie de Guinée" in *the operation and maintenance of electricity transmission networks, management of electricity losses from the distribution network, management of electricity infrastructure projects, financial structuring of projects, management of the electricity industry and also in the fields of preparation, analysis and financing of projects*.

The training sessions shall be held at the CME in Abidjan, in the course of November 2019, for a total of 120 man-days of training;

- ✓ Training of eighteen (18#) WAPP Secretariat Executives and Professionals on various topics including *leadership, management & negotiation in international development, sustainable development and climate change, international investment arbitration and treaties, financial and risk analysis, public procurement audit and control, monitoring & evaluation of projects and programs, PPPs and infrastructure financing, accreditation as international development project managers, contract and disbursement management, human resources management*, etc. These training courses were carried out between 2016 and 2019. In addition to these individual training sessions, special training on fraudulent practices, collusion and corruption was conducted for the benefit of thirty-eight (38#) multi-category staff members of the WAPP Secretariat. This training was held in Grand Popo (Benin) from November 13 to 28, 2017;

  Furthermore, this program partially funded (i) a study tour to the *US electricity market* for eight (8#) executives and professionals in July 2017 and April 2019, and (ii) a study tour to Germany on *renewable energy development* for four (4#) Members of the WAPP Executive Board in September and October 2018. In total, 400 man-days of training was involved;

- ✓ The recruitment of two (2#) Resident Experts at the WAPP Secretariat in charge of (i) *procurement* for a period of 36 months, of which 18 months were executed, and (ii) *environmental and social safeguards* for an initial period of 36 months that was extended by 18 months and of the latter, 9 months were executed;

- ✓ The acquisition of computer equipment and materials for the benefit of the Ministries in charge of energy and the national power utilities involved in the CLSG project as well as for the WAPP Secretariat. This equipment and materials consisted of nine (9#) video projectors, sixteen (16#) all-in-one Laser Color printers, twenty-six (26#) laptops, nine (9#) desktop computers, two (2#) All in One Multifunction photocopiers and one (1#) GPS unit.

B. <u>Funding from USAID</u>

Under the "Implementation Letter 3" (IL3) funding agreement, USAID supported the following capacity building activities:

- ✓ Training of thirty-six (36#) staff of LEC in six (6#) training modules covering the *operation and maintenance of power plants, operation and maintenance of the power transmission grid and substations, maintenance and repair of the power distribution grid, planning and operation of the power distribution grid, planning of power systems and environmental protection and electricity marketing*. These training sessions were carried at NAPTIN's Kainji and Lagos campuses in Nigeria from October 2 to 27, 2017. The total training involved was 360 man-days;

- ✓ Two (2#) training sessions involving ten (10#) Members of the WAPP Strategic Planning and Environmental Committee (SPEC) and eight (8#) staff of the WAPP Secretariat on

Public Private Partnerships (PPPs) including topics of private sector participation in PPPs, key PPP concepts and their requirements, PPP optimization models with their respective advantages and disadvantages, and PPP strategies. The two (2#) training sessions took place in Marrakech (Morocco) from January 23 to 27, 2017, respectively for Anglophones and, from January 30 to February 3, 2017 for Francophones. The total training involved was 130 man-days;

- ✓ Two (2#) study tours to European power pools in France and Belgium for the benefit of twenty-eight (28#) participants including twenty-three (23#) Members of the WAPP Engineering and Operating Committee (EOC), Two (2#) Staff from ERERA and three (3#) Staff from the WAPP Secretariat. These trips enabled participants to learn and document good practices in the *operation and management of international integrated electricity systems and the electricity market; to master the notions and concepts of the rules governing electricity market operations and, to know the organization and management tools necessary for the suitable management of electricity market operations and the operation of the regional interconnected system*. The study tours were held successively from November 14 to 18, 2016 for Francophones and from November 21 to 25, 2016 for Anglophones. The total training involved was 140 man-days;
- ✓ Two (2#) study tours to power pools in North America for the benefit of fourteen (14#) participants including seven (7#) Members of the WAPP Executive Board as well as seven (7#) staff from the WAPP Secretariat. This study tour was jointly organized with ERERA. The Objectives of this study tour were to expose participants to best practices in the organization, operation and management of an electricity market. The topics covered included *governance and operational rules, procedures and guidelines for the management and supervision of regional electricity markets in the United States; transaction and contract issues that govern the electricity market; technical, contractual and commercial aspects of connection to the interconnected grid and, conditions for balancing electricity supply and demand on the interconnected grid*. The study tours were organized in two groups, from July 23 to 27, 2018 and from March 23 to 30, 2019. The total training involved was 70 man-days;
- ✓ The Secondment of three (3#) Engineers from WAPP member utilities including one (1#) from ECG (Ghana) for two (2#) years, one (1#) from VRA (Ghana) for four (4#) years and one (1#) from EDG (Guinea) whose Secondment is still in progress. Also, the recruitment of one (1#) Legal Assistant on contractual basis;
- ✓ The recruitment of an Individual Consultant as Advisor in Public-Private Partnerships (PPP) for a period of three (3#) years covering the period June 1, 2015 to May 31, 2018. The PPP Advisor supported the development of the 450 MW WAPP Regional Power Generation Facilities at Maria Gleta in Benin and Domunli/Aboadze in Ghana;
- ✓ The development of a Gender and Equity Policy for the WAPP Secretariat. The Policy was adopted by the WAPP Executive Board in April 2017 and subsequently disseminated to all WAPP Secretariat Staff through a workshop;

- ✓ Partial funding of the pre-investment studies (feasibility, tender documents, line route, selection of substation sites and environmental and social impact) for the 330 kV Nigeria - Benin Interconnection Reinforcement Project;
- ✓ Joint funding with GIZ of the preparation of Business Plans for the WAPP Centers of Excellence (RCEs) of Calavi in Benin, Kainji in Nigeria and Cap des Bîches in Senegal. These Plans were adopted by the WAPP Executive Board in March 2018;
- ✓ The acquisition of a 4x4 vehicle for the use of the PPP Advisor.

C. Funding from GIZ

Within the framework of the regional program "Promotion of a Climate Friendly Electricity Market (PROMERC)" initiated by the GIZ, the following capacity building activities were implemented by the WAPP Secretariat:

- ✓ Two (2#) training sessions on the theme "*Integration of renewable energies into the interconnected regional grid"* were organized in collaboration with the ECREEE. These training sessions were held respectively for Francophone participants at CME from April 17 to 21, 2017 and for Anglophone participants at the VRA Academy in Akuse from May 2 to 5, 2017. A total of twenty-six (26#) employees from WAPP Member utilities and six (6#) trainers from the WAPP Centers of Excellence participated in these training sessions. Both sessions were preceded by a "training of trainers" session involving trainers from the WAPP Centers of Excellence. The total training involved was 250 man-days;

- ✓ Two (2#) training sessions on the theme of "*Integrated Electricity Market Principles"* organized in collaboration with the ERERA. The training sessions were held successively at CME from October 16 to 20, 2017 for Francophone participants and at the VRA Academy in Akuse from October 23 to 27, 2017 for Anglophone participants. A total of twenty-eight (28#) staff from WAPP Member utilities participated in these training sessions. The total training involved 140 man-days;

- ✓ Two (2#) training sessions on the theme "*Network planning and operation integrating intermittent renewable energies"*. Organized in collaboration with IRENA, these training sessions were held at CME, from May 7 to 11, 2018 for French-speaking participants and at the VRA Academy from May 14 to 18, 2018 for English-speaking participants. A total of forty-five (45#) participants from WAPP Member utilities, WAPP Centers of Excellence and the WAPP Secretariat benefited from these training sessions. The number of man-days of training involved was 225;

- ✓ Two (2#) training sessions in two (2#) modules on the theme "*Renewable Energy Power Purchase Contracts"*. The two (2#) francophone modules were held at CME from May 29 to June 5, 2018 and from July 3 to 6, 2018 respectively, whilst the Anglophone modules were held at the VRA Academy in Akuse from June 5 to 8, 2018 and July 10 to 13, 2018, respectively. A total of eighty (80#) participants from WAPP Member utilities, WAPP

Centers of Excellence and the WAPP General Secretariat participated in these training sessions, involving 400 man-days of training;

- ✓ Two (2#) fora on the theme "*Reducing technical and non-technical losses of electricity*" held in Abuja, from 11 to 15 June 2018 and in Dakar, from 20 to 23 November 2018. These two (2) fora brought together about seventy (70#) participants from power utilities involving a total of 350 man-days of training;

- ✓ Two (2#) study tours to Germany primarily for the Directors General, Chief Executives and Managing Directors of WAPP Member utilities as well as Executives of the WAPP Secretariat on *"Renewable energy planning, operation and integration"*. A total of twenty-two (22#) participants took part in these trips that took place from August 27 to 31, 2018 and September 17 to 21, 2018;

- ✓ Joint funding with USAID of the Business Plans of the WAPP Centers of Excellence at Calavi in Benin, Kainji in Nigeria and Cap des Bîches in Senegal. These Plans were adopted by the WAPP Executive Board in March 2018;

- ✓ The acquisition of the PSSE planning software package for the benefit of the WAPP Secretariat and the WAPP Member Utilities.

D. <u>Funding from European Union (EU)</u>

Within the framework of the various support from EU to the WAPP Secretariat, the following trainings were organized on behalf of ICC Staff:

- ✓ Training on "SCADA/EMS/DTS software including database maintenance/upgrade/modification and development, display realization, ICCP links, SCADA, EMS and WEB functionalities delivered by Grid Solutions SAS from 29/05/2017 to 23/06/2017 and from 17/07/2017 to 11/08/2017 at Massy, France. 3 professional Staff attended the training;

- ✓ Training on "WAMS software including Configuration, archiving management, PhMU configuration, network presentation, alarms, dedicated displays, archiving" delivered by Grid Solutions SAS from 11/12/2017 au 22/12/2017 at Edimburgh Montpellier. 3 professional Staff attended the training;

- ✓ Training on "OJT on SCADA/EMS" delivered by Grid Solutions SAS from 14/08/2017 to 08/09/2017 and from 25/09/2017 to 20/10/2017 and from 06/11/2017 to 01/12/2017 at Massy, France. 3 professional Staff attended the training;

- ✓ Training on MMS/Settlement/Billing in March 2018 at Massy, France. 03 Professional staff attended the training;

- ✓ Training on WAMS/PhMU in October 2018 at Massy, France. 05 Professional staff attended the training;

- ✓ Training on OJT on SCADA/EMS in March & June 2018 at Massy, France. 03 Professional staff attended the training;

- ✓ Training on OJT on MMS in May 2018 & April 2019 at Massy, France. 03 Professional staff attended the training;

- ✓ Training on Advance Certificate for the Executive Assistant (ACEA): Operational Management from 28 April to 03 May, 2019 in Dubai, UAE. 01 General Staff attended the training.

The following were also done with support from the EU:

- ✓ Two (2#) training sessions on the theme "*Wind Project Development*" organized in collaboration with the ECREEE. The session for the French-speaking participants took place from March 25 to 29, 2019 at CME and the session for the English-speaking participants from April 8 to 12, 2019, at the VRA Academy in Akuse. These two (2#) sessions were preceded by a "Training of trainers" session. A total of thirty (30#) participants from WAPP member utilities and the WAPP Secretariat participated in the sessions and this involved 150 man-days of training;

- ✓ The acquisition of three (3#) vehicles and the recruitment of three (3#) Drivers.

E. Funding from the World Bank

With funding from the World Bank, the following capacity building activities were realized:

- ✓ One (1#) Training session on the theme "*Affordable Overhead Power Lines*" for thirteen (13#) participants from WAPP Member utilities. This training was organized in collaboration with CIGRE South Africa National Committee in Cape Town (South Africa), from November 10 to 18, 2017 and involved 65 man-days of training;

- ✓ Two (2#) Training workshops on the theme "*Power Purchase Agreements (PPAs) and Transmission Service Agreements (TSAs)"* for forty-nine (49#) participants from CEB, SBEE, CEET, the Ministries in charge of energy of Benin and Togo, ERERA as well as the WAPP Secretariat that took place in March 2019 in Lomé and June 2019 in Cotonou;

- ✓ One (1#) Training workshop on the theme "*Power Purchase Agreements (PPAs) and Transmission Service Agreements (TSAs)"* for forty-nine (49#) participants from LEC, EDSA, EDG, EGTC, CI-ENERGIES, the Ministries in charge of energy of Côte d'Ivoire, Liberia, Sierra Leone and Guinea as well as TRANSCO CLSG that took place in July 2019 in Monrovia and October 2019 in Freetown;

- ✓ One (1#) Orientation Program for the recruited Members of the Project Management Unit of the North Core Project, held in May 2019 at the WAPP Secretariat.

F. Other Funding

The following was also done with support from other sources:

- ✓ The participation of one (1) staff of the WAPP Secretariat, with Norwegian funding, in the training workshop on the theme "*Electricity Markets*" that was organized in Abidjan from April 16 to 20, 2019 by the International Centre for Hydropower Dams.

5.3 Budget Execution over the period 2016 to 2019

		2016 (UA)	2017 (UA)	2018 (UA)	2019 (UA)	*Total (2016 - 2019) (UA)*
1	Budget	4,445,700	4,518,381	4,672,318	4,830,417	***18,466,816***
2	Actual	4,318,596	4,453,987	4,327,432	4,306,946	***17,406,961***
3	Percentage Execution	97%	99%	93%	89%	***94%***

ANNEX 6: PRIORITY PROJECTS TO BE DEVELOPED IN 2020 – 2023 WAPP BUSINESS PLAN

		2020	2021	2022	2023
	Preparation of Projects and Mobilisation of Financing				
	Project				
1	330 kV WAPP Nigeria - Benin Interconnection Reinforcement Project				
2	Ghana – Burkina – Mali Interconnection Project				
3	WAPP Median Backbone Nigeria-Benin-Togo-Ghana-Côte d'Ivoire Interconnection Project				
4	First Project from the St. Paul River Optimal Development Plan in Liberia				
5	150 MW WAPP Regional Solar Power Park Project in Burkina				
6	150 MW WAPP Regional Solar Power Park Project in Mali				
7	150 MW WAPP Regional Solar Power Park Project in The Gambia				
8	150 MW WAPP Regional Solar Power Park Project in Niger				
9	150 MW WAPP Regional Solar Power Park Project in Côte d'Ivoire				
10	WAPP Regional Battery Energy Storage System Project				
11	Ground measurement campaign of Solar Radiation within mainland ECOWAS Member States				
12	Study on overcoming challenges of integrating Variable Renewable Energy Power Plants into the WAPP Grid				
13	Solar Power Plant associated with Manantali Dam				
14	225 kV Côte d'Ivoire - Liberia Interconnection Reinforcement Project				
15	225 kV Côte d'Ivoire - Guinea Interconnection Project				
16	WAPP Western Backbone Senegal - The Gambia - Guinea Bissau - Guinea - Mali Interconnection Project				
17	Côte d'Ivoire - Burkina Interconnection Reinforcement Project				

		2020	2021	2022	2023
	Monitor and Coordination of Projects				
	Project				
1	330 kV Aboadze-Prestea-Kumasi-Bolgatanga Project in Ghana				
2	330 kV WAPP Northcore Nigeria - Niger - Togo/Benin - Burkina Interconnection Project				
3	225 kV Guinea – Mali Interconnection Project				
4	450 MW Souapiti Hydro Power Project in Guinea				
5	300 MW Amaria Hydro Power Project in Guinea				
6	225 kV OMVG Interconnection Project (Senegal, The Gambia, Guinea Bissau, Guinea)				
7	128 MW OMVG Sambangalou Hydropower Project (Senegal, The Gambia, Guinea Bissau, Guinea)				
8	140 MW OMVS-SOGEM Gouina Hydropower Project				
9	225 kV Côte d'Ivoire - Liberia - Sierra Leone - Guinea Interconnection Project				
10	2nd Circuit of 225 kV Côte d'Ivoire - Liberia - Sierra Leone - Guinea Interconnection Project				
11	450 MW WAPP Maria Gleta Regional Power Generation Facility in Benin				
12	225 kV OMVS-SOGEM Manantali - Bamako Transmission Reinforcement Project				
13	3,050 MW Mambilla Hydropower Project in Nigeria				
14	700 MW Zungeru Hydropower Project in Nigeria				
15	220 MW Tiboto Hydropower Project (Côte d'Ivoire, Liberia)				
16	330 kV WAPP Eastern Backbone in Nigeria				
17	330 kV WAPP Nigeria - Benin Interconnection Reinforcement Project				

		2020	2021	2022	2023
	Monitor and Coordination of Projects				
	Project				
18	Ghana – Burkina – Mali Interconnection Project				
19	WAPP Median Backbone Nigeria-Benin-Togo-Ghana-Côte d'Ivoire Interconnection Project				
20	150 MW WAPP Regional Solar Power Park Project in Burkina				
21	150 MW WAPP Regional Solar Power Park Project in Mali				
22	First Project from the St. Paul River Optimal Development Plan in Liberia				
23	150 MW WAPP Regional Solar Power Park Project in The Gambia				
24	150 MW WAPP Regional Solar Power Park Project in Niger				
25	150 MW WAPP Regional Solar Power Park Project in Côte d'Ivoire				
26	WAPP Regional Battery Energy Storage System Project				
27	225 kV Côte d'Ivoire - Liberia Interconnection Reinforcement Project				
28	225 kV Côte d'Ivoire - Guinea Interconnection Project				

In addition, projects that are under construction as indicated in the ECOWAS Master Plan for the Development of Regional Power Generation and Transmission Infrastructure 2019 – 2033 shall be monitored. This includes the 112 MW Gribo-Popoli Hydropower in Côte d'Ivoire as well as the 225 kV OMVS Kayes (Mali) – Tambacounda (Senegal) Interconnection Project.

ANNEX 7: ACTIVITIES REGARDING THE REGIONAL ELECTRICITY MARKET

The details of the activities to be carried out by ICC in relation to the regional electricity market and within the period 2020 – 2023 can be described as follows:

I. Achieve, Maintain and Enhance Reliability of the WAPP Interconnected Power System

- Achieve Synchronization of the entire WAPP Interconnected Power System.
- Promote transmission security of the WAPP Interconnected Power System.
- Develop and maintain reliable operation of the WAPP Interconnected Power System and wholesale regional electricity market.
- Provide a secure environment to protect the infrastructure of the WAPP Coordination Center, cyber, physical and personnel resources

II. Market Design and Implementation

- Develop market governance documents and enhancements to the market implementation phases of the regional wholesale electricity market (in collaboration with ERERA) that shall improve reliability and market efficiency and create value for ECOWAS citizens.
- Create and promote a conducive market environment within West Africa to new investments in the regional wholesale electricity markets that would attract and retain resources needed in the region.
- Realization of all precedent conditions in article 13 of the regional Market Rules and start operations of the day ahead Market.

III. Information Clearing House on Key Issues

- Authoritative source of independent and unbiased information on the operation of the WAPP Interconnected Power System and the regional wholesale electricity market and identifying operational security needs by analyzing the reliability of the bulk power system.
- Conduct stakeholder engagement activities in forums, national, regional and international conferences, as well as professional groups.

IV. Excellence in Execution

- Promote a work culture that strives excellent and flawless performance in all that is done and engenders market participant confidence in the operations, markets and planning.

V. Sustain and Enhance a Robust Operational Planning Process

- Strengthen operational planning capabilities to effectively coordinate the reliable operation of the WAPP Interconnected Power System.

- Coordinate with market participants, Transmission System Operators (TSOs) and other stakeholders to undertake regional operational planning studies and to analyze the reliability and operations of the WAPP Interconnected Power System.

VI. Technological Advancement

- Implement advanced technologies within the power sector to maintain reliable and secure operation of the WAPP Interconnected Power System.
- Reinforce and improve cyber security within the existing system.

In order to attain the afore-mentioned sub-Objectives, ICC shall pursue the following strategic actions during the period:

A. ***Influence Political/Regulatory Decision Making:***

The ICC shall continue to collaborate with the ECOWAS Regional Electricity Regulatory Authority (ERERA) in establishing governance documents that shall ensure transparency, fairness and security for market participants. Several governance documents have been prepared by ICC and approved within the scope of realization of the 2016 - 2019 WAPP Business Plan. The 2020 - 2023 WAPP Business Plan shall focus on the establishment of the following governance documents:

i. WAPP Transmission Service Access and Use Procedures (WTSAUP)
ii. Minimum Regional Operating Standards
iii. Market monitoring Procedures
iv. Contract administration procedures (registering and approval)
v. Transmission Pricing model (tariff model)
vi. Finalization of the Regional Market Rules for Phase 2

B. ***Electricity Market Development and Implementation:***

The Electricity Market Design, in accordance with the principles of gradual implementation proposed three (3) market phases. The proposed market implementation phases as per the market design and market road map are:

Market Phase 1: The Market Phase I involves formalizing existing trades carried out between countries on a "case by case" basis using approved standard procedures and contracts for short, medium or long-term bilateral commercial contracts and exchanges. In this phase, transmission pricing is based on that mutually agreed by the parties involved.

Market Phase II: The Market Phase II, shall in addition to the activities elaborated in the Market Phase I, include transactions based on bilateral agreements with transit through third countries and based on standard approved commercial contracts. Short-term exchanges during this market phase shall be carried out through a day-ahead market (regional optimization model).

Market Phase III: The Market Phase III, which is expected to be a competitive electricity market, comprising a day-ahead market, dynamic trade in the bilateral market, and the introduction of other market services (e.g. ancillary services) and financial products. This market shall be dependent on the adequacy of generation, transmission infrastructure, and sufficient operational reserves in the countries which would allow for competition.

The 2020 – 2023 WAPP Business Plan shall focus on the implementation of Market Phases I and II, and preparation towards Market Phase III. Consequently, the activities towards achieving this goal shall include:

- **Completion and Commissioning of ICC Project:** The ICC project involves construction of the ICC building at Calavi, Benin and the installation of SCADA/EMS/MMS and WAMS Systems. The project following completion, shall provide the necessary tools and equipment to allow the WAPP ICC carry out its reliability coordination (system operations) and market operation functions as a Regional System Market Operator. With the completion of this Project, the ICC/SMO shall be strategically positioned to carry out real-time monitoring of the WAPP Interconnected system and the operation of the day-ahead market. The completion and operationalization of the ICC Infrastructure project is a prerequisite to commence Market Phase II.

  Efforts shall also be intensified during this period to realize the backup facility for the ICC.

  ❖ **Development and Implementation of WEB Portals:** In addition to the SCADA/EMS/MMS/WAMS Systems, there is the need to develop web portals (sophisticated internet-based software applications and tools) that would allow market participants/members to transact business online. These web portals shall among others provide members with real-time data about the WAPP Interconnected Power System, scheduling, information exchange, emergency communication etc. Web portals shall be developed and implemented during the period of the business plan.

- **Synchronization of WAPP Interconnected Power System:** Currently, the WAPP Power System is being operated as three separate synchronous areas, constituted by Niger - Nigeria, Benin – Togo – Ghana – Côte d'Ivoire – Burkina and Mali – Senegal. The primary objective of the Synchronization Project is to synchronize the three (3#) synchronous areas into a single operated interconnected power system. The scope of the project involves the following:

  - Design, Supply, Installation and Commissioning of Static Var Compensator (SVC), Special Protection Schemes (SPS Relays), and Phasor Measurement Units.
  - Power System Stabilizer (PSS) Tuning, Governor Testing, Change of Settings and Perform Synchronization Test.

It is envisaged that both scopes of the project, which are currently ongoing, would facilitate efforts to ensure the possibility of a successful synchronization. The present business plan focuses on the implementation of all activities related to the overall project scope with the sole aim of having a synchronized and reliably operated WAPP Interconnected Power System.

- **Implementation of Ancillary Services Road map:** Within the framework of the Synchronization Project, an Ancillary Services Study to support the development of Ancillary Services Market was undertaken with a road map proposed. During this period of the business plan, the ICC shall work to implement the Ancillary Services Road map. The Ancillary Services Road map to be implemented shall include road map for the implementation of:

    - Primary Reserve
    - Secondary Reserve
    - Tertiary Reserve
    - Reactive Power and Voltage Support
    - Black-start Capability

- **Certification Program for System Operators:** The WAPP System Operator Certification Program seeks to complement the existing training and certification program and promote skilled, qualified, proficient and regionally certified Power System Operators to ensure the security of both national and regional interconnected power system. The System Operator Certification Program would provide the overall framework for training several proficient Power System Operators of Transmission System Operators (TSOs), Control Area Centers (CACs) and the WAPP ICC (SMO) to conduct system operations, implement real-time and coordinated actions at the national level and reliable coordination of the entire WAPP Interconnected Power System.

  Within the period of this Business Plan cycle, it is envisaged that a certification institution would have been identified and the relevant courses to be taught in the WAPP Centers of Excellence towards obtaining system operator certification completed. RTE International has a contract to develop and implement the WAPP System Operator Certification Program. The Certification Program would be based on a task analysis for each function of the TSO, CAC as well as the ICC. The program would define requirements for operator certification which shall include course modules to be completed, large bank of questions for an automatic exam builder for exam uniformity, passing grade etc.

- **Capacity Building for ICC and Control Area Centre (CACs) staff:** The concept of wholesale regional electricity market is relatively new in the region and requires the continual training and re-training of technical personnel for the smooth operation of the System. The ICC/SMO therefore considers developing and enhancing the skills and competencies of personnel as a priority in this 2020 - 2023 Business Plan. As such, during the period, the ICC/SMO in collaboration with the WAPP A&F Department, shall develop a well-structured training plan on various aspects of Electricity Market and would strive to develop and enhance the

skills and competencies of personnel with the assistance of Technical and Financial Partners.

C. ***Operate and Manage the Integrated Market***

The WAPP ICC/SMO shall, after completion of the ICC infrastructure project, operate and manage the integrated market. This shall involve maintaining the reliability (real-time monitoring, coordination of operations, network information exchange etc.) of the WAPP Interconnected Power System and carrying out its market operations functions. These shall be the prime tasks for the ICC as the Regional Market System Operator and the related activities shall include but not limited to the following:

- Authority source of information on key issues related to operations of the WAPP Interconnected Power System.
- Establish the methodology to transfer maximum capacity in each direction between neighboring countries.
- Transmission capability assessments and capacity allocation to contracts
- Reliability Coordination (Operational planning, real-time operations, scheduling, system operations information exchange and processing etc.)
- Administration of contracts.
- Meter Reading administration.
- Establishment of imbalances.
- Balance settlements (establishing post-factum daily imbalances)
- Management of settlement, billing, payment processes mainly in phase 2
- Dispute Resolution, Regulatory and Legal Market Affairs (only dispute relating to operation or meter readings,).

Under this strategic action, the following shall be pursued:

- **Operationalization of ICC:** In operating and managing the WAPP Integrated Electricity Market, the ICC shall effectively coordinate the two (2#) Technical Assistance teams funded by the European Union (EU);

- **Implementation and Enhancement of the WAPP Operation Manual:** The WAPP ICC/SMO would carry out activities to develop, review and adopt regional reliability procedures, standards, guidelines and strategies required to perform its functions effectively. These activities would be an enhancement to the WAPP Operation Manual and would seek to implement a series of Operating Procedures in accordance with the Control Area Centers and the Transmission System Operators. It is planned to adopt procedures related but not limited to the following:

  - Congestion Management
  - Emergency Operation
  - Interconnected Reliability Operation
  - Interchange
  - Protection

These Deliverables as well as the Certification Program shall be the primary inputs in defining among others, the project titled "Development of a training and certification program for system operators of the WAPP ICC".

In addition to the development of procedures based on the WAPP Operation Manual, additional policies (e.g. reactive reserve policies) and recommended revisions from previous studies such as the Synchronization Project would be incorporated into the Operation Manual.

- **Coordinate and Enhance Robust Planning Process:** The WAPP ICC/SMO is required to conduct a reliability assessment of the WAPP Interconnected Power System in collaboration with TSOs and CACs. This would require the implementation of a well-coordinated and robust planning process. During this business plan period, the WAPP ICC as part of efforts to coordinate and enhance a robust operational planning process would undertake the following activities:

    - Develop processes and guidelines for a WAPP Integrated Power System Model:
        - Determine minimum requirement for a quality model
        - Update and improvement of the WAPP grid system model
    - Operational Planning Guideline:
        - Data requirement for generation and transmission security assessment
        - Definition of contingencies or events to be studied
        - Reactive power planning
    - Develop methodology for Transmission Total Transfer Capability (TTC) calculation:
        - Criteria and process to evaluate TTC, Transmission Reserve Margin (TRM), and Net Transfer Capacity (NTC)
        - Evaluation of congestion possibilities
        - Power flow limitation through interconnection lines in case of emergency
        - Selectivity protection on interconnection lines to avoid propagation of incidents
        - Contingency and stability considerations

D. ***Update and Maintain Management Information System***

The WAPP Management Information Systems (MIS) is the key factor to using efficient and reliable technological systems to improve and evaluate WAPP business activities/processes, track progress to attain efficient decision making. ICC shall through the update and maintenance of a proper MIS shall help in strategic planning, management control, operational control and transaction processing.

In view of the indispensable need, the ICC shall provide for the following tools to support the WAPP Secretariat and its business processes:

- **Implementation of a Geographical Information System (GIS):** The GIS is a tool for data consultation and analysis with the functionality to update alphanumeric and mapping data of the various power systems and perform comparative analysis on the basis of the WAPP database. The ICC shall consolidate on the GIS database collated through a technical assistance funded by EU to provide a central GIS server available to all WAPP member utilities. The GIS shall enable:

    - Integration of multi-source data;
    - Consultation of mapping and alphanumeric databases emanating, on one part, from the power systems in the different countries and from the entire WAPP system on the other part;
    - Analysis of graphic data in simultaneous correlation with alphanumeric data and vice versa;
    - Analysis of development scenarios for purposes of planning and / or operational management of electric power resources.

    The software shall link the WAPP M&E and MIS alphanumeric databases with geo-referenced graphical objects.

- **Implementation of Enterprise Resource Planning (ERP):** This Business Plan identifies the urgent need for deploying an ERP system for the WAPP Secretariat. The ERP systems are large and complex IT applications designed to support and help to manage virtually every area of the WAPP business by integrating its internal processes with business planning and execution activities. The ERP technology to be adopted would streamline business operations, have easy-to-use functionality to give a real-time view of WAPP business anytime and anywhere on any device. The system shall consist of an integration of Finance, Human Resource Management, Procurement, Inventory Management, Expense and Requisition Modules.

    Considering the huge cost of acquisition of this technology, the WAPP shall rely on financial assistance from its Technical and Financial partners for the deployment of the system and training of users.

- **Knowledge Management:** The WAPP ICC is saddled with the responsibility of managing tremendous volume of information and data for the region. This information is not only utilized for the running of the regional electricity market but also for modelling and planning of future investments in the sector. The introduction of Knowledge Management in this business plan is to ensure that the ICC's objective of making significant knowledge available to the people and stakeholders that require it is met. In other words, the deployment of a knowledge management system shall make it easier and quicker for stakeholders to find, create, share, organize, distribute and institutionalize tacit (implied) and explicit knowledge.

E. ***Update and Maintain Monitoring and Evaluation System***

The WAPP Programs and Projects are mostly funded by Technical and Financial Partners that adopt the use of M&E to assess the successes of the Program/Projects so that funding can be adjusted as necessary and strategies improved. The results of continuous monitoring and evaluation can help prove to donors and financiers that their money is being used and allocated correctly.

Similarly, the use of software tools to track relevant Project Key Performance Indicators (KPIs) shall help in the management of the various Projects and Operations carried out by WAPP. Consequently, the WAPP shall strengthen the existing M&E unit by resuscitating the coordination meeting of M&E focal point from the member utilities, providing software tools that shall facilitate data collection and query. Recruitment of a Senior M&E Expert shall also be carried out within the period.

F. ***Enhancement of WAPP Member Utilities Infrastructure.***

The success of the electricity market is partly dependent on the proper functioning of the infrastructure at WAPP member utilities. Since the utilities serves as the primary source of data flow to the ICC through the SCADA/EMS System, ensuring the availability and safety of all the interconnected infrastructure is therefore a major concern for ICC.

Consequently, the ICC through the support of WAPP Technical and Financial Partners shall continue to pursue program/project that shall enhance the member utilities infrastructure such as SCADA Systems, Telecoms, Protection and Telemetry.

G. ***Implement Comprehensive Cyber Protection of Energy Infrastructure***

The nature of the WAPP ICC Infrastructure requires the need for the WAPP to develop and implement cybersecurity measures to limit its exposure to third-party cyber risks and attacks. During the period of the Business Plan, the WAPP ICC shall undertake among others:

- Development of Cybersecurity strategies;
- Development of Cybersecurity standards;
- Identifying Potential Cyber security threats and impact to utility infrastructure;
- List of Data and security breaches;
- Implement cybersecurity requirements and procedures;
- Critical Assets identification;
- Cyber vulnerability assessment;
- Electronic Security Perimeter determination;
- Access control;
- Anomaly detection.

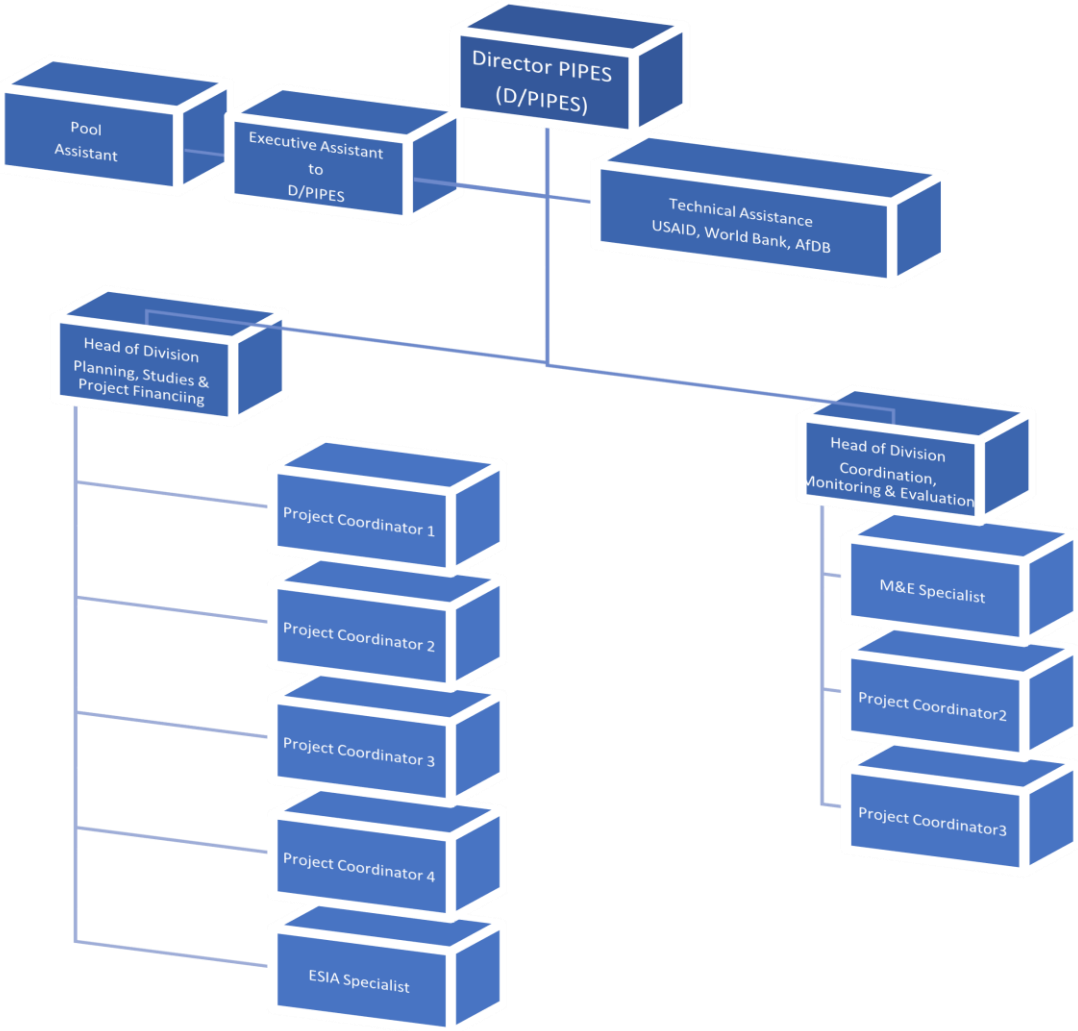
H. ***System-Wide Study Initiatives***

To ensure the reliability and availability of the WAPP Interconnected Power System, it is envisaged to undertake some system-wide studies aimed at identifying, proffering and implementing recommending power system solutions. During the period of the business plan, the following system-wide study initiatives are envisaged:

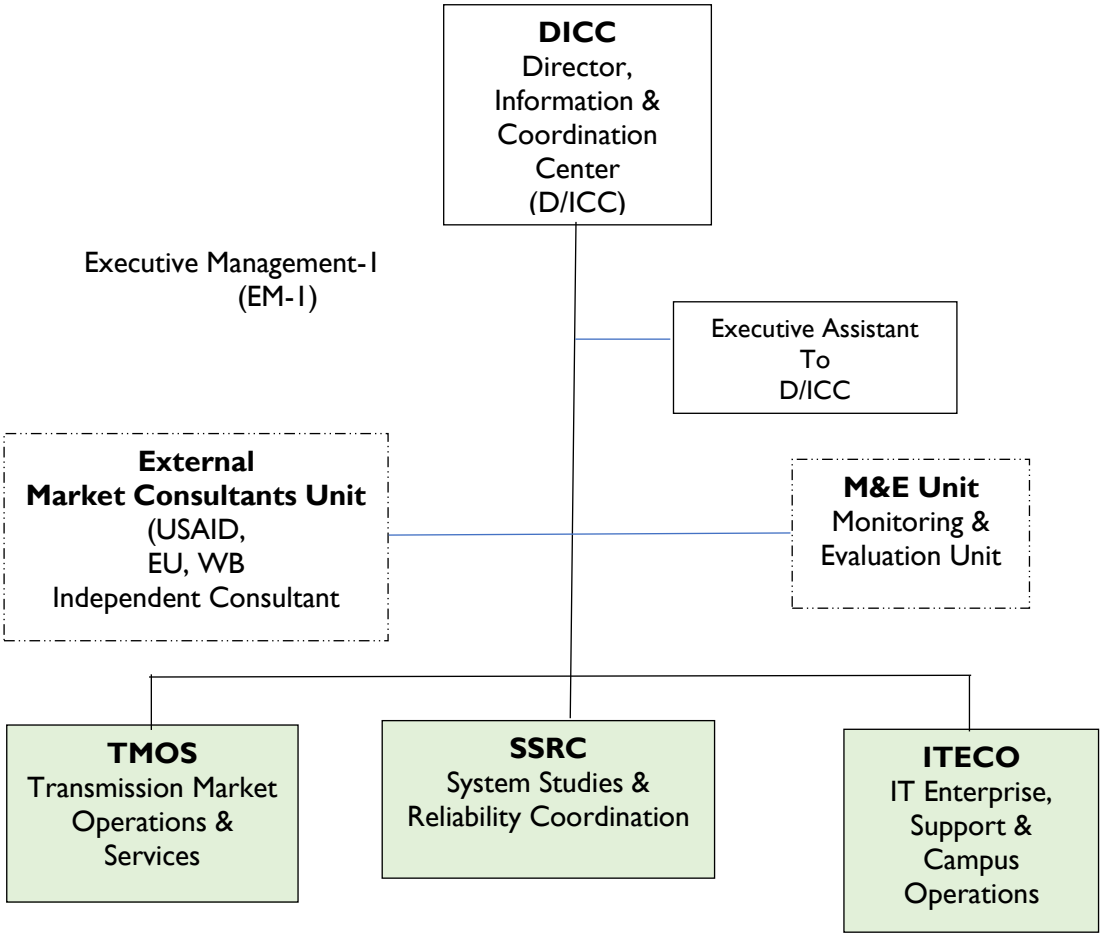
- Develop strategies to be implemented to increase the stability of the grid system;
- Develop studies to implement reactive power compensation schemes where the risk of instability is high;
- Develop Remedial Action Schemes (RAS);
- Develop studies and strategies to effectively and better control real and reactive power flow.

	ACTIVITIES	2020	2021	2022	2023
1	Influence Political/Regulatory Decision Making				
2	Electricity Market Development and Implementation				
3	Completion and Commissioning of ICC Project: **Completion of Building**				
4	Completion and Commissioning of ICC Project: **Supply and Installation of Equipment**				
5	Development and Implementation of WEB Portals				
6	Synchronization of WAPP Interconnected Power System: Design, Supply, Installation and Commissioning of Static Var Compensator (SVC), Special Protection Schemes (SPS Relays), and Phasor Measurement Units.				
7	Synchronization of WAPP Interconnected Power System: Power System Stabilizer (PSS) Tuning, Governor Testing, Change of Settings and Perform Synchronization Test.				
8	Implementation of Ancillary Services Road map				
9	Certification Program for System Operators				
10	Operationalization of ICC				
11	Implementation and Enhancement of the WAPP Operation Manual				
12	Coordinate and Enhance Robust Planning Process				
13	Implementation of a Geographical Information System (GIS)				
14	Implementation of Enterprise Resource Planning (ERP)				
15	Customer Relationship Management System				
16	Knowledge Management				
17	Update and Maintain Monitoring and Evaluation System				
18	Enhancement of WAPP Member Utilities Infrastructure				
19	Implement Comprehensive Cyber Protection of Energy Infrastructure				
20	System-Wide Study Initiatives				

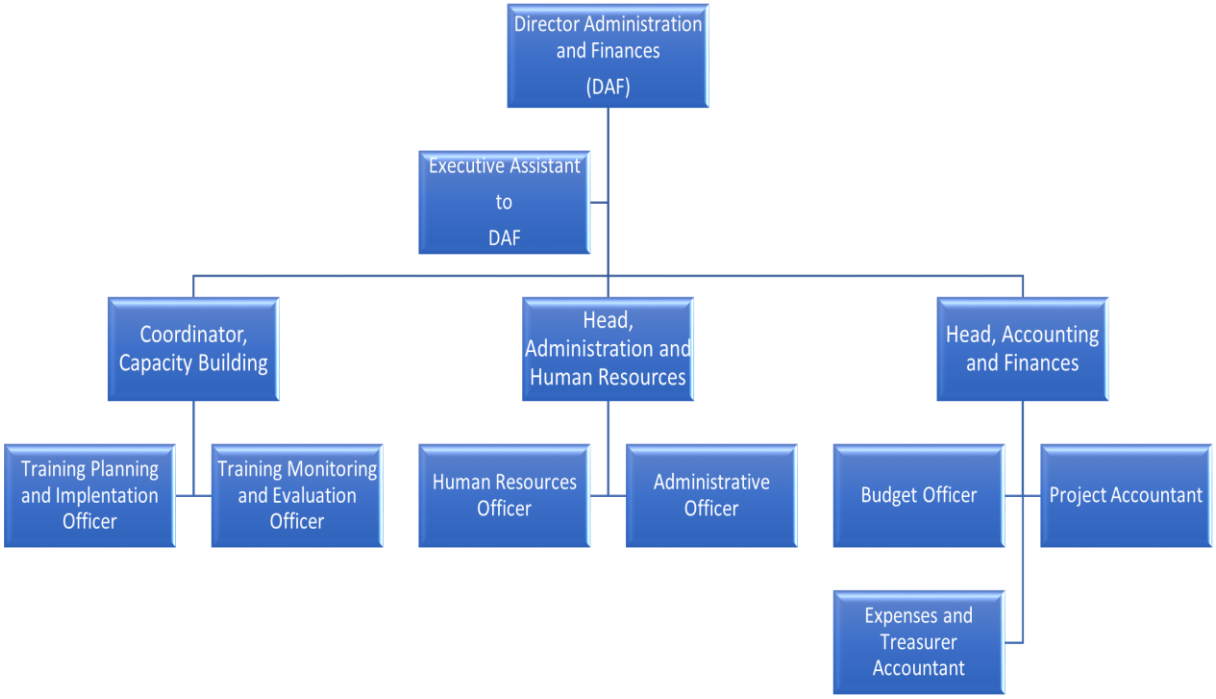
ANNEX 8: ORGANOGRAM OF PIPES DEPARTMENT



ANNEX 9: ORGANOGRAM OF ICC DEPARTMENT / SMO



ANNEX 10: ORGANOGRAM OF A&F DEPARTMENT



ANNEX 11: BUDGET FOR PIPES ACTIVITIES REGARDING THE DEVELOPMENT OF PRIORITY PROJECTS

	Priority projects	PIPES Activities*		Cost (US$ '000s)				Funding Requirement (US$ '000s)			
				2020	2021	2022	2023	Project Cost (Donors)			WAPP
								Required	Earmarked / Secured	Gap	
1	330 kV WAPP Nigeria - Benin Interconnection Reinforcement Project	Finalizing complementary Pre-investment Studies, Securing Financing, Following up on project implementation	WAPP	22	3	6	6				37
			Donors	684	24,091	36,000	20,000	80,684	684	80,000	
2	Ghana – Burkina – Mali Interconnection Project	Updating Pre-investment Studies, Securing Financing, Following up on project implementation	WAPP	20	107		3				130
			Donors	1,021	3,771	1,860	104,132	345,792	4,792	341,000	
3	WAPP Median Backbone Nigeria-Benin-Togo-Ghana-Côte d'Ivoire Interconnection Project	Recruiting Consultants, Preparing Feasibility study and ESIA, Securing Financing, Following up on project implementation	WAPP	20	111		3				134
			Donors	1,155	4,222	4,279	248,138	818,377	5,377	813,000	
4	First Project from the St. Paul River Optimal Development Plan in Liberia	Preparing Feasibility study and ESIA as well as Bidding Documents, Securing Financing, Following up on project implementation	WAPP	26	3	3	3				35
			Private Partner			127,750	153,300	511,000	-	511,000	
			Donors	4,408	637			5,045	5,045	-	
5	150 MW WAPP Regional Solar Power Park Project in Burkina	Finalising Feasibility study and ESIA, Securing Financing, Following up on project implementation	WAPP	14	3	3	3				23
			Private Partner		41,700	62,550	34,750	139,000	-	139,000	
			Donors	1,184				1,184	1,184	-	
6	150 MW WAPP Regional Solar Power Park Project in Mali	Finalising Feasibility study and ESIA, Securing Financing, Following up on project implementation	WAPP	14	3	3	3				23
			Private Partner		41,700	62,550	34,750	139,000	-	139,000	
			Donors	896				896	896	-	
7	150 MW WAPP Regional Solar Power Park Project in The Gambia	Preparing Feasibility study and ESIA, Securing Financing, Following up on project implementation	WAPP	14	39	3	3				59
			Private Partner			39,000	58,500	130,000	-	130,000	
			Donors	257	1,718			1,975	1,975	-	
8	150 MW WAPP Regional Solar Power Park Project in Niger	Preparing Feasibility study and ESIA, Securing Financing, Following up on project implementation	WAPP	8	46	3	3				60
			Private Partner				36,000	90,000	-	90,000	
			Donors	218	1,733			1,951	1,951	-	

	Priority projects	PIPES Activities*		Cost (US$ '000s)				Funding Requirement (US$ '000s)			
				2020	2021	2022	2023	Project Cost (Donors)			WAPP
								Required	Earmarked / Secured	Gap	
9	150 MW WAPP Regional Solar Power Park Project in Côte d'Ivoire	Preparing Feasibility study and ESIA, Securing Financing, Following up on project implementation	WAPP	7	26	3	3				39
			Private Partner				21,450	143,000	-	143,000	
			Donors	47	266	1,643		1,956	1,956	-	
10	WAPP Regional Battery Energy Storage System Project	Preparing Feasibility study and ESIA, Securing Financing, Following up on project implementation	WAPP	34	19	44	3				100
			Donors	34	258	1,687	20,850	140,979		140,979	
11	Ground measurement campaign of Solar Radiation within mainland ECOWAS Member States	Preparing Study	WAPP	31	33	22	18				104
			Donors	255	350	255	289	1,149	1,149	-	
12	Study on overcoming challenges of integrating Variable Renewable Energy Power Plants into the WAPP Grid	Preparing Study	WAPP	68	24						92
			Donors	345	545			500	500	-	
13	Solar Power Plant associated with Manantali Dam	Preparing Feasibility study and ESIA, Securing Financing, Following up on project implementation	WAPP	4	42	22	3				71
			Donors	42	797	1,733	4,170	30,372	2,572	27,800	
14	225 kV Côte d'Ivoire - Liberia Interconnection Reinforcement Project	Preparing Feasibility study and ESIA, Securing Financing, Following up on project implementation	WAPP	54	63	4	3				124
			Donors	-	739	2,848	797	133,384		133,384	
15	225 kV Côte d'Ivoire - Guinea Interconnection Project	Preparing Feasibility study and ESIA, Securing Financing, Following up on project implementation	WAPP	45	63	4	3	-	0	0	124
			Donors	0	795	2,848	797	133,384	-	133,384	0
16	WAPP Western Backbone Senegal - The Gambia - Guinea Bissau - Guinea - Mali Interconnection Project	Preparing Feasibility study and ESIA, Securing Financing	WAPP		214	5	4				223
			Donors			1,517	4,795	918,312	-	918,312	
17	Côte d'Ivoire - Burkina Interconnection Reinforcement Project	Preparing Feasibility study and ESIA, Securing Financing	WAPP		111	5	4				120
			Donors			1,109	2,595	129,704	-	129,704	
18	330 kV Aboadze (Ghana) – Prestea (Ghana) – Bolgatanga (Ghana) Transmission Line Project;	Following up on project implementation	WAPP	3							3
			Donors	-				258,700	258,700	-	

	Priority projects	PIPES Activities*		Cost (US$ '000s)				Funding Requirement (US$ '000s)			
				2020	2021	2022	2023	Project Cost (Donors)			WAPP
								Required	Earmarked / Secured	Gap	
19	330 kV WAPP Northcore Nigeria - Niger - Togo/Benin - Burkina Interconnection Project	Following up on project implementation	WAPP	9	9	9	9				36
			Donors	62,420	218,470	156,050	124,840	624,200	624,200	-	
20	225 kV Guinea – Mali Interconnection Project	Following up on project implementation	WAPP	6	6	6	6				24
			Donors	43,600	152,600	130,800	109,000	436,000	436,000	-	
21	450 MW Souapiti Hydro Power Project in Guinea	Following up on project implementation	WAPP	3							3
			Donors	270,000				1,350,000	1,350,000	-	
22	300 MW Amaria Hydro Power Project in Guinea	Following up on project development	WAPP	-	3	3	3				9
			Donors			90,000	180,000	600,000		600,000	
23	225 kV OMVG Interconnection Project (Senegal, The Gambia, Guinea Bissau, Guinea)	Following up on project implementation	WAPP	8							8
			Donors	144,400				722,000	722,000	-	
24	128 MW OMVG Sambangalou Hydropower Project (OMVG - Senegal, The Gambia, Guinea Bissau, Guinea)	Following up on project implementation	WAPP		3	3	3				9
			Donors		113,500	136,200	136,200	454,000		454,000	
25	140 MW Gouina Hydropower Project (OMVS - Senegal, Mali, Guinea, Mauritania);	Following up on project implementation	WAPP	3	3						6
			Donors	92,400	69,300			462,000	462,000	-	
26	225 kV Cote d'Ivoire – Liberia – Sierra Leone – Guinea Interconnection Project;	Following up on project implementation	WAPP	4							4
			Donors	103,400				517,000	517,000	-	
27	2nd Circuit of 225 kV Côte d'Ivoire - Liberia - Sierra Leone - Guinea Interconnection Project	Following up on project development	WAPP	0	3	3	3				9
			Donors		26,200	58,950	45,850	131,000	-	131,000	
28	450 MW WAPP Maria Gleta Regional Power Generation Facility (Benin);	Coordinating on Project Structuring, Securing Financing, Commercial Framework, and following up on implementation	WAPP	340	408	3	3				754
			Private Partner	300	300	87,750	117,000	468,000	600	467,400	
			Donors	210	490	117,000		117,700	700	117,000	
29	225 kV OMVS-SOGEM Manantali - Bamako Transmission Reinforcement Project	Following up on project implementation	WAPP	0	3						3
			Donors	17,000	12,750			85,000	85,000	-	

30	3050 MW Mambilla Hydropower Project (Nigeria);	Following up on project implementation	WAPP		3	3	3				9
			Donors	1,160,000	1,450,000	1,740,000	870,000	5,800,000	5,800,000	-	
31	700 MW Zungeru Hydropower Project (Nigeria);	Following up on project implementation	WAPP		3						3
			Donors	240,000	300,000			1,200,000	1,200,000	-	
32	220 MW Tiboto Hydropower Project (Cote d'Ivoire, Liberia);	Following up on project development	WAPP		3	3	3				9
			Donors			149,750	179,700	599,000		599,000	
33	330 kV WAPP Eastern Backbone in Nigeria	Following up on project development	WAPP		3	3	3				9
			Donors			241,500	289,800	966,000		966,000	
34	Donor Coordination Meetings	Coordinating the interventions of Donors and mobilizing funding for the development and execution of WAPP Priority Projects	WAPP	89	89	89	89				356
			Donors								
35	WAPP Strategic Planning and Environmental Committee	Evaluate and adopt program of PIPES and examine pace of implementation of WAPP Priority Projects	WAPP	93	93	93	93				372
			Donors								
36	Coopaeration with ECOWAS Commission	Reinforcing cooperation with ECOWAS Commission	WAPP	22	22	22	22				88
			Donors								
37	Technical Cooperation	Reinforcing relations in the domain of power exchanges	WAPP	30	30	30	30				120
			Donors								
38	Technical Assistance	Reinforcing the capacity of PIPES	WAPP								
			Donors	1,120	984	877	1,155	4,138	805	3,333	
			WAPP	**969**	**1,572**	**378**	**316**	**-**	**-**	**-**	**3,244**
			Donors	**2,145,096**	**2,384,216**	**2,876,906**	**2,343,108**	**17,072,382**	**11,484,486**	**5,587,896**	**-**
			Private Partner	**300**	**83,700**	**379,600**	**455,750**	**1,620,000**	**600**	**1,619,400**	**-**
			TOTAL	**2,146,365**	**2,469,488**	**3,256,884**	**2,799,174**	**18,692,382**	**11,485,086**	**7,207,296**	**3,244**

ANNEX 12: BUDGET FOR ICC/SMO ACTIVITIES REGARDING THE OPERATIONALIZATION OF THE REGIONAL ELECTRICITY MARKET

		Funding Requirement (US$)	Funding Source (US$)	
			Donor	WAPP
A	**Influencing Political/Regulatory Decision Making**	**520,000**		**520,000**
	Quarterly Technical Committee Meetings with ERERA	*160,000*		*160,000*
	Review and approve the 6 documents	*360,000*		*360,000*
B	**Electricity Market Development and Implementation**	**5,100,000**	**4,412,500**	**687,500**
	Completion and Commissioning of ICC Project	*1,650,000*	*1,650,000*	
	Satellite Systems	*1,600,000*	*1,600,000*	
	Project Management Activities (2021)	*50,000*	*50,000*	
	Development and Implementation of Web Portals	*500,000*	*500,000*	
	Implement Synchronization Project	*400,000*	*400,000*	
	Project Management Activities (2021)	*50,000*		*50,000*
	Stakeholder Meetings	*350,000*	*52,500*	*297,500*
	Implementation of Ancillary Services	*400,000*	*60,000*	*340,000*
	Certification Program	*100,000*	*100,000*	
C	**Operate and Manage the Integrated Market**	**3,000,000**	**2,550,000**	**450,000**
	Implementation and Enhance Operational Manual: Revise manual	*2,000,000*	*1,700,000*	*300,000*
	Coordinate and Enhance Robust Planning Process	*1,000,000*	*850,000*	*150,000*
D	**Update and Maintain Management Information System (GIS, ERP, KMS)**	**2,000,000**	**1,700,000**	**300,000**
E	**Update and Maintain M&E**	**100,000**		**100,000**
F	**Enhance WAPP Member Utilities**	**200,000**	**170,000**	**30,000**
G	**Implement Comprehensive Cyber protection**	**600,000**	**510,000**	**90,000**
H	**System Wide Study Initiatives**	**5,460,000**	**5,316,000**	**144,000**
	Consultancy for 3 studies	*4,500,000*	*4,500,000*	
	Workshops to Review	*960,000*	*816,000*	*144,000*
I	**Capacity Building for ICC and Control Area Centers**	**3,000,000**	**3,000,000**	
J	**Realization of Backup Facility for ICC**	**7,000,000**	**7,000,000**	
	T O T A L	**26,980,000**	**24,658,500**	**2,321,500**

ANNEX 13: OPERATING BUDGET FOR THE WAPP SECRETARIAT

		2020	2021	2022	2023	TOTAL (2020 - 2023)
	Description	**Budget (UA)**	**Budget (UA)**	**Budget (UA)**	**Budget (UA)**	**Budget (UA)**
1	Personnel Expenses	3,007,144	3,157,501	3,252,226	3,317,270	12,734,141
2	General Expenses	455,339	464,446	473,735	483,210	1,876,730
3	Administrative Expenses	839,628	890,006	943,406	1,000,011	3,673,051
4	Executive Board and Committee Meetings	796,111	804,072	812,112	820,233	3,232,528
5	Capital Expenses	139,818	279,636	288,025	296,666	1,004,145
	TOTAL	***5,238,040***	***5,595,660***	***5,769,504***	***5,917,390***	***22,520,594***
	TOTAL (US$)	***7,257,016***	***7,752,480***	***7,993,331***	***8,198,218***	***31,201,045***

1UA <=> US$ 1.385445 (As at July 31, 2019)

ANNEX 14: BUDGET FOR DAF ACTIVITIES REGARDING CAPACITY BUILDING

14.1 : Specialized Trainings for Member Utilities (MU) and the WAPP Secretariat

- ***Summary of Funding Requirements***

Projects		Requirements & Sources of Funding (kUS$)				
		Requirements	MU Contribution	TFPs	Secured / required	Gap
1	Management in electricity sector	1, 986	397	-	424	1 562
2	Technical and financial efficiency of the MU	3, 138	628	909	1 537	1 601
3	Electrical Systems Planning & Project Management	2, 556	511.2	201.6	712.8	1843.2
4	Operation of Interconnected Networks and Regional Electricity Market	2, 802	560.4	0	560.4	2241.6
	TOTAL	***10, 482***	***2, 096***	***1, 111***	***3 ,234***	***7, 248***

Projects		Annual distribution of funding requirements (kUS$)				
		2020	2021	2022	2023	Total
1	Management in electricity sector	306	490	595	595	**1 986**
2	Technical and financial efficiency of the MU	521	679	970	970	**3 138**
3	Electrical Systems Planning & Project Management	387	797	611	761	**2556**
4	Operation of Interconnected Networks and Regional Electricity Market	462	642	909	789	**2802**
	TOTAL	***1 676***	***2 608***	***3 085***	***3 115***	***10 482***

➢ ***Details of Funding Requirements***

1. Management in Electricity Sector					
No	Training Modules	Target Groups	Nber of training Sessions	Nber of participants	Budget (kUS$)
1	Reforms & Policies	II, III & WAPP	1	25	150
2	Regulations	II, III & WAPP	1	25	150
3	Tariff	II, III & WAPP	2	68	408
4	Contracts (CAA, CST, CSA, etc.)	II, III & WAPP	2	46	276
5	Gender	II, III & WAPP	1	42	252
6	Leadership and corporate strategy	II, III & WAPP	1	45	270
7	Corporate Management (Internal Control, Audit, etc.)	I,II, III & WAPP	1	45	270
8	Other trainings	I,II, III & WAPP	1	35	210
		S/TOTAL	***10***	***331***	***1 986***

2. Technical and Financial Efficiency of the Member Utilities					
No	Training Modules	Target Groups	Nber of training Sessions	Nber of participants	Budget (kUS$)
1	Operation and maintenance of electrical works	III & WAPP	1	40	240
2	Protection of electricity systems	III & WAPP	1	40	240
3	HWM works	I, II, III & WAPP	1	37	222
4	Reduction of technical and non-technical losses & EE	I, II, III & WAPP	1	44	264
5	Network management with a share of renewable energies	I, II, III & WAPP	2	62	372
6	Certification of operators of the regional interconnected network	Control Area Center	4	104	624
7	Human resources management (Planning, Training, Performance)	I, II, III & WAPP	1	39	234
8	Financial and accounting management	I, II, III & WAPP	1	39	234
9	Information and communication technologies	I, II, III & WAPP	1	45	270
12	Assistance & Management Secretariat	I, II, III & WAPP	1	45	270
13	Other trainings	III & WAPP	1	28	168
		S/TOTAL	***15***	***523***	***3 138***

3. Electricity Network Planning & Project Management					
No	Training Modules	Target Groups	Nber of training Sessions	Nber of participants	Budget (kUS$)
1	Planning and implementation of REs projects	III & WAPP	3	42	252
2	Project Management	II, III & WAPP	2	50	300
3	Procurement	I, II, III & WAPP	2	62	372
4	Contract management and disbursement	I, II, III & WAPP	1	20	120
5	Financial structuring of projects (PPP, BOT, etc.)	II, III & WAPP	2	30	180
6	Environmental and Social Project Management	I, II, III & WAPP	1	33	198
7	Carbon Market	I, II, III & WAPP	1	33	198
8	Gender & Energy	I, II, III & WAPP	1	33	198
9	Study missions on the Integration of RE	I, II, III & WAPP	1	40	600
10	Others	I, II, III & WAPP	1	23	138
		S/Total	***15***	***366***	***2556***

4. Operation of Interconnected Networks and Regional Electricity Market					
No	Training Modules	Training Modules	Training Modules	Training Modules	Training Modules
1	Management of SCADA systems	I, II, III & WAPP	2	54	324
2	Reliability of the interconnected system (Operation & Maintenance)	I, II, III & WAPP	2	50	300
3	Market Management of the electricity	I, II, III & WAPP	2	80	480
4	Electricity exchange	I, II, III & WAPP	1	40	240
5	Electricity information management (Reporting, etc.)	I, II, III & WAPP	1	40	240
6	ICT (Cybersecurity,	I, II, III & WAPP	1	40	240
7	Operating Manual of the WAPP	I, II, III & WAPP	1	40	240
8	Study missions on Energy Pools	I, II, III & WAPP	1	40	600
9	Others	I, II, III & WAPP	1	23	138
		S/TOTAL	***12***	***407***	***2 802***

14.2 : Development and Networking of Regional Centers of Excellence (RCEs)

Development and Networking of Regional Centers of Excellence (RCEs)		Requirements & Sources of Funding (kUS$)				
		Requirements	MU Contributions	TFPs	Secured / required	Gap
1	RCE Calavi (Benin)	10 724.30	2 144.86	8 579.44	2 144.86	8 579.44
2	RCE Cap des Biches (Senegal)	11 967.90	2 393.58	9 574.32	2 393.58	9 574.32
3	RCE Kainji RTC	22 347.20	4 469.44	17 877.76	4 469.44	17 877.76
4	Operation of the RCE network	2 000.00	400.00	1 600.00	400.00	1 600.00
	TOTAL	***47 039.40***	***9 407.88***	***37 631.52***	***9 407.88***	***37 631.52***

Development and Networking of Regional Centers of Excellence (RCEs)		Distribution of funding requirements (kUS$)		
		Phase I (2020-22)	Phase II (2023-24)	Total
1	RCE Calavi (Benin)	5 167.20	5 557.00	10 724.30
2	RCE Cap des Biches (Senegal)	7 803.50	4 164.40	11 967.90
3	RCE Kainji RTC	11 173.60	11 173.60	22 347.20
4	Operation of the RCE Network	1 000.00	1 000.00	2 000.00
	TOTAL	***25 144.30***	***21 895.00***	***47 039.40***

14.3 Technical Assistance Program

Technical Assistance Program		Distribution of funding requirements (kUS$)		
		Phase I (2020-22)	Phase II (2023-24)	Total
1	Appraisal of knowledge transfer mechanism	200	0	200
2	Establishment of Monitoring & Evaluation Mechanism	250	250	500
	TOTAL	***450***	***250***	***700***

14.4 : Knowledge Management

Knowledge management		Distribution of funding requirements (kUS$)		
		Phase I (2020-22)	Phase II (2023-24)	Total
1	Study on knowledge management establishment	250	0	250
2	Acquisition of knowledge management software	250	0	250
3	Knowledge management system establishment	100	200	300
	TOTAL	***600***	***200***	***800***

ANNEX 15: EXPECTED OUTCOMES ON OBJECTIVE 1

	Project	Expected Status by End 2023
1	330 kV WAPP Nigeria - Benin Interconnection Reinforcement Project	Implementation in progress
2	Ghana – Burkina – Mali Interconnection Project	Implementation in progress
3	WAPP Median Backbone Nigeria-Benin-Togo-Ghana-Côte d'Ivoire Interconnection Project	Implementation in progress
4	First Project from the St. Paul River Optimal Development Plan in Liberia	Implementation in progress
5	150 MW WAPP Regional Solar Power Park Project in Burkina	Implementation in progress
6	150 MW WAPP Regional Solar Power Park Project in Mali	Implementation in progress
7	150 MW WAPP Regional Solar Power Park Project in The Gambia	Implementation in progress
8	150 MW WAPP Regional Solar Power Park Project in Niger	Financing being secured for implementation
9	150 MW WAPP Regional Solar Power Park Project in Côte d'Ivoire	Financing being secured for implementation
10	WAPP Regional Battery Energy Storage System Project	Financing being secured for implementation
11	Ground measurement campaign of Solar Radiation within mainland ECOWAS Member States	Study completed and database established
12	Study on overcoming challenges of integrating Variable Renewable Energy Power Plants into the WAPP Grid	Study completed
13	Solar Power Plant associated with Manantali Dam	Financing being secured for implementation
14	225 kV Côte d'Ivoire - Liberia Interconnection Reinforcement Project	Financing being secured for implementation
15	225 kV Côte d'Ivoire - Guinea Interconnection Project	Financing being secured for implementation
16	WAPP Western Backbone Senegal - The Gambia - Guinea Bissau - Guinea - Mali Interconnection Project	Pre-investment studies in progress
17	Côte d'Ivoire - Burkina Interconnection Reinforcement Project	Pre-investment studies in progress

18	330 kV Aboadze-Prestea-Kumasi-Bolgatanga Project in Ghana	Remaining segment between Kintampo and Kumasi commissioned
19	330 kV WAPP Northcore Nigeria - Niger - Togo/Benin - Burkina Interconnection Project	Implementation in progress
20	225 kV Guinea – Mali Interconnection Project	Implementation in progress
21	450 MW Souapiti Hydro Power Project in Guinea	Commissioned
22	300 MW Amaria Hydro Power Project in Guinea	Implementation in progress
23	225 kV OMVG Interconnection Project (Senegal, The Gambia, Guinea Bissau, Guinea)	Commissioned
24	128 MW OMVG Sambangalou Hydropower Project (Senegal, The Gambia, Guinea Bissau, Guinea)	Implementation in progress
25	140 MW OMVS-SOGEM Gouina Hydropower Project	Commissioned
26	225 kV Côte d'Ivoire - Liberia - Sierra Leone - Guinea Interconnection Project	Commissioned
27	2nd Circuit of 225 kV Côte d'Ivoire - Liberia - Sierra Leone - Guinea Interconnection Project	Commissioned
28	450 MW WAPP Maria Gleta Regional Power Generation Facility in Benin	Financing being secured for implementation
29	225 kV OMVS-SOGEM Manantali - Bamako Transmission Reinforcement Project	Commissioned
30	3,050 MW Mambilla Hydropower Project in Nigeria	Implementation in progress
31	700 MW Zungeru Hydropower Project in Nigeria	Commissioned
32	220 MW Tiboto Hydropower Project (Côte d'Ivoire, Liberia)	Financing being secured for implementation
33	330 kV WAPP Eastern Backbone in Nigeria	Financing being secured for implementation

ANNEX 16: EXPECTED OUTCOMES ON OBJECTIVE 5

	Training Conducted On	No. of Participants Involved
1	Governance of the Electricity Sub-sector	331
2	Technical and Financial Efficiency of Power Utilities	523
3	Planning of Power Systems and Management of Projects	366
4	Operation of Interconnected Networks and Regional Electricity Markets	407
	T O T A L	1627