



# **WAPP** **ERERA Forum Dakar**

Presented by:  
**Babatunde Adeyemo**  
**Director ICC**

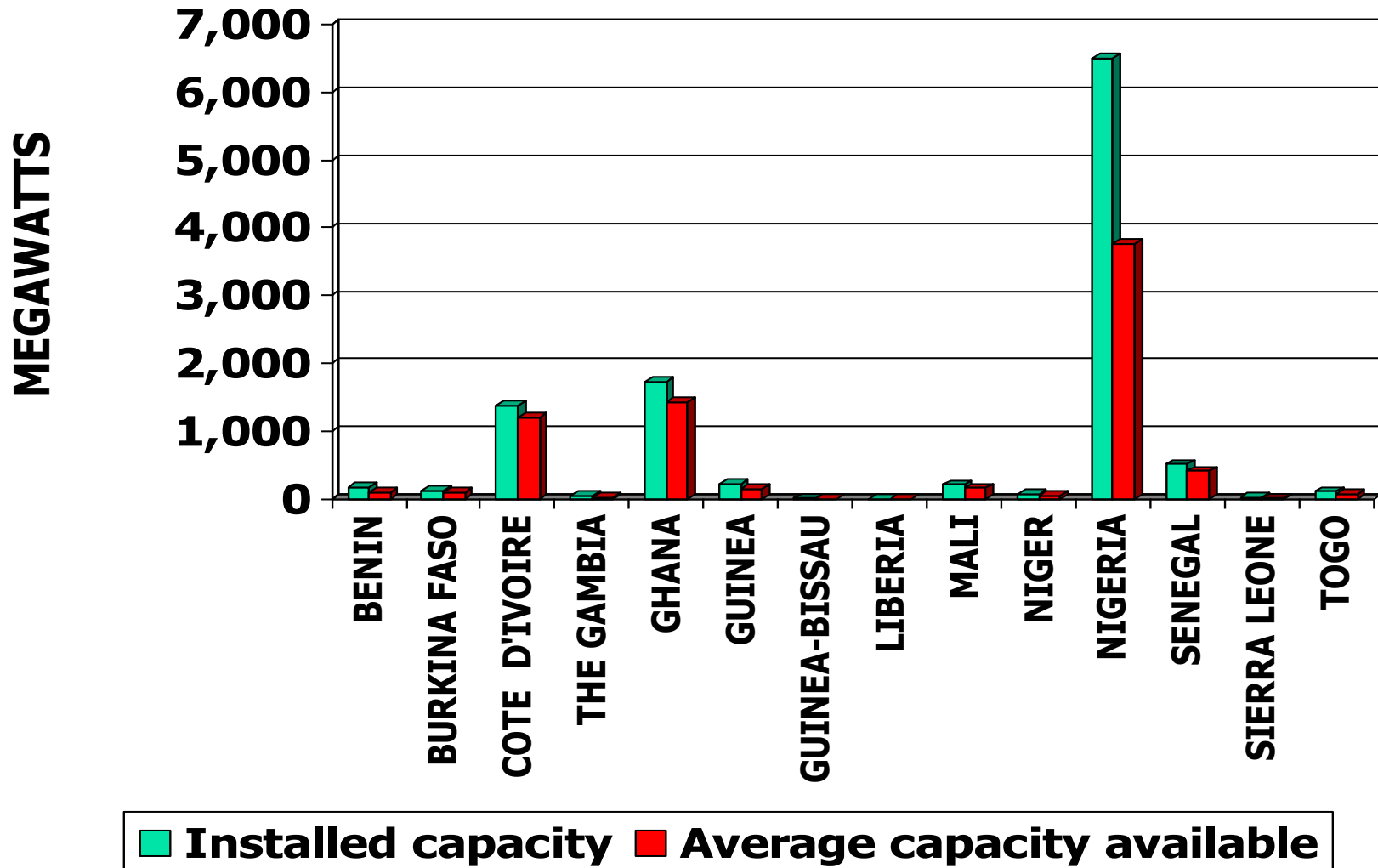




# POWER SUPPLY SITUATION

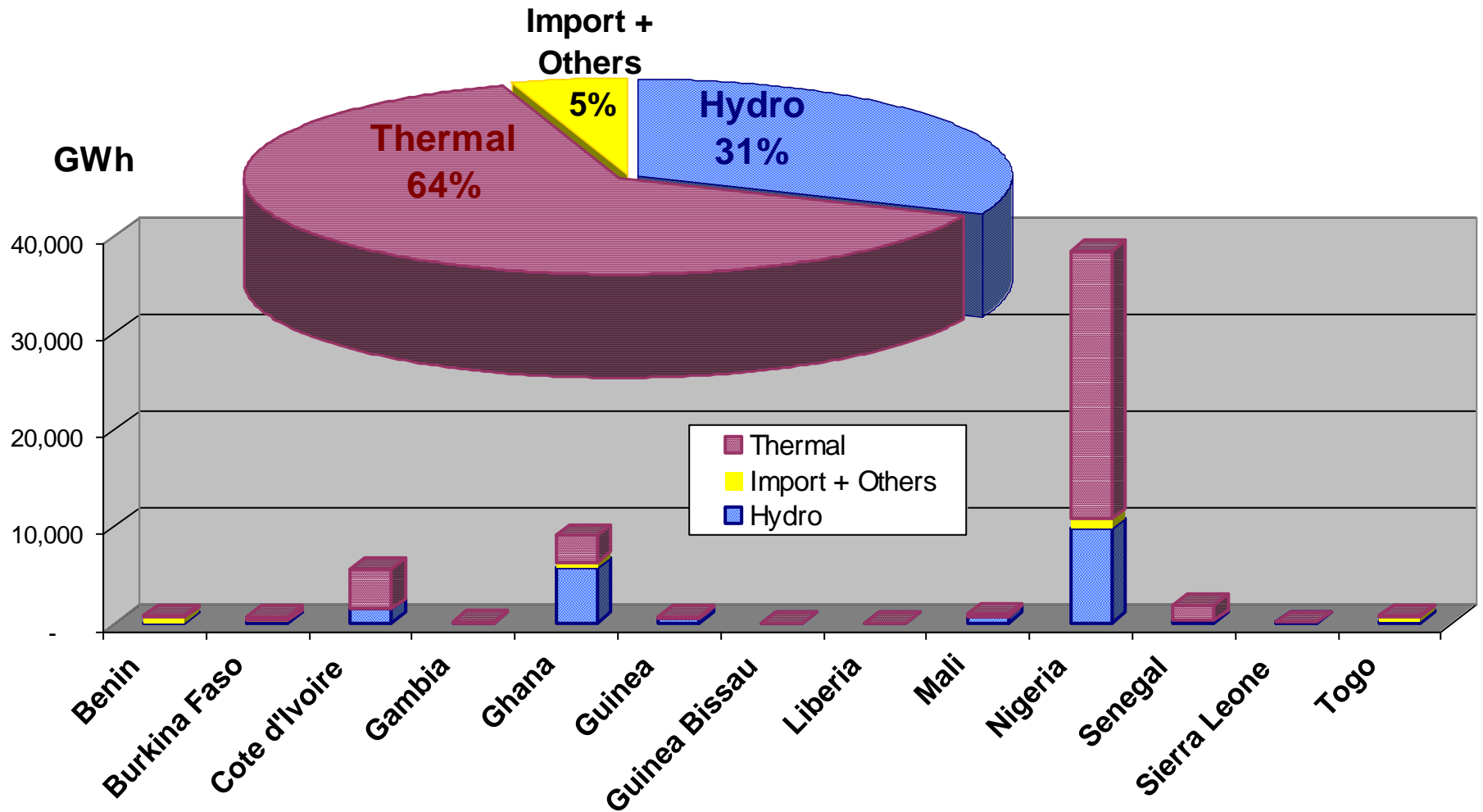


# Electricity Supply in West Africa



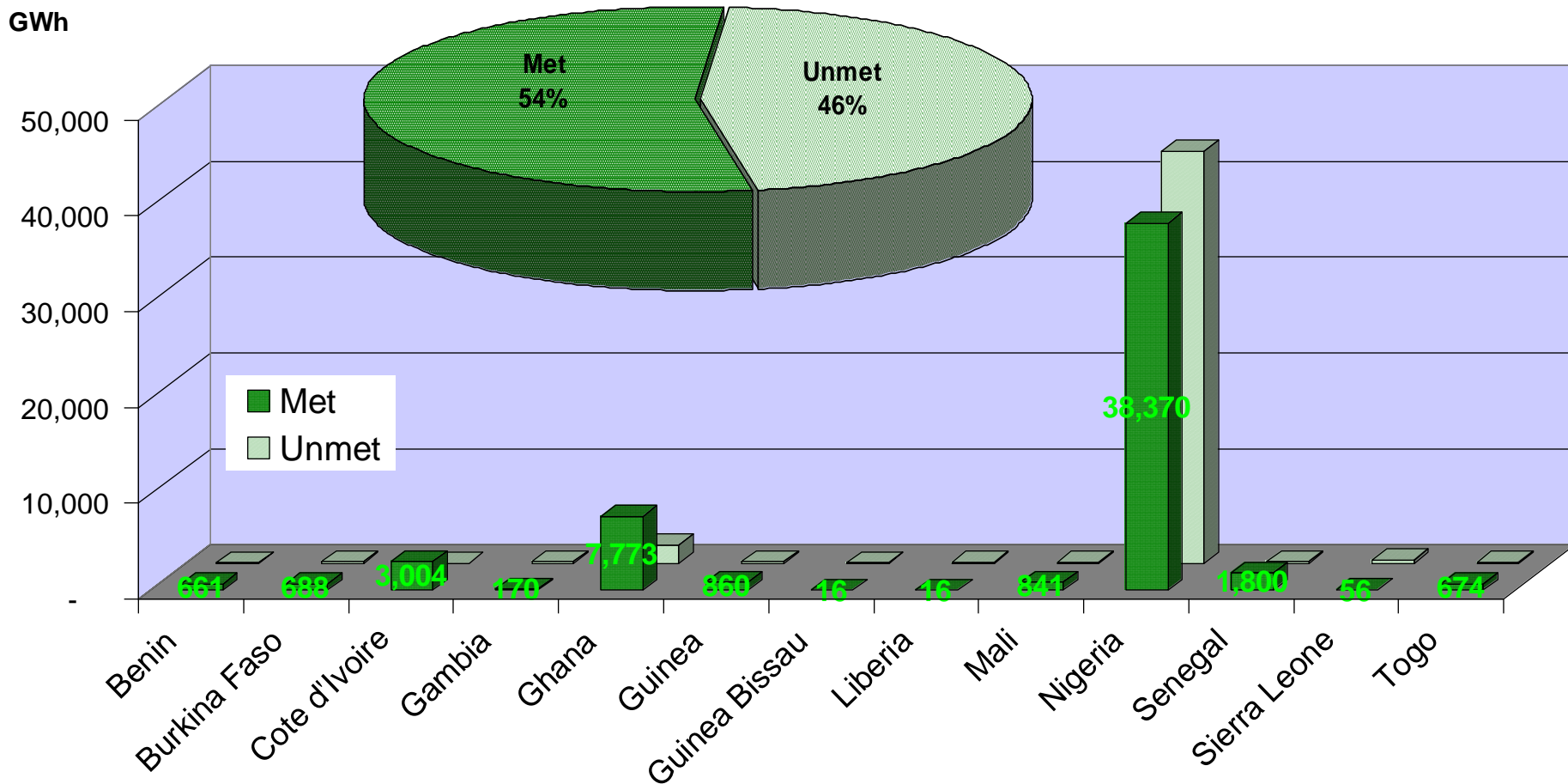
# Status of Power Supply in ECOWAS

## Supply Sources<sub>2</sub>



# Status of Power Supply in ECOWAS

## Demand-Supply Balance



# Status of Power Supply in ECOWAS



## Causes of Shortages

### ❖ Technical Causes

- ❖ Obsolete & unreliable equipment; Inadequate maintenance; Operations inefficiencies; Insufficient Capacity; and, Non-availability of primary energy sources.

### ❖ Financial Factors

- ❖ Low user tariffs; Low collection rates; and, Inadequate financial standing of utilities.

### ❖ Institutional Issues

- ❖ Planning & implementation responsibility; Bureaucracy in decision-making; Sensitivity of tariffs to low income/wage levels; and, volatile petroleum prices limiting fuel purchases.



# Criteria for Viable Regional Options

- ❖ Economic Consideration:
  - ❖ A viable sub-regional supply option must be economically cost competitive (lower cost) when compared with local alternatives



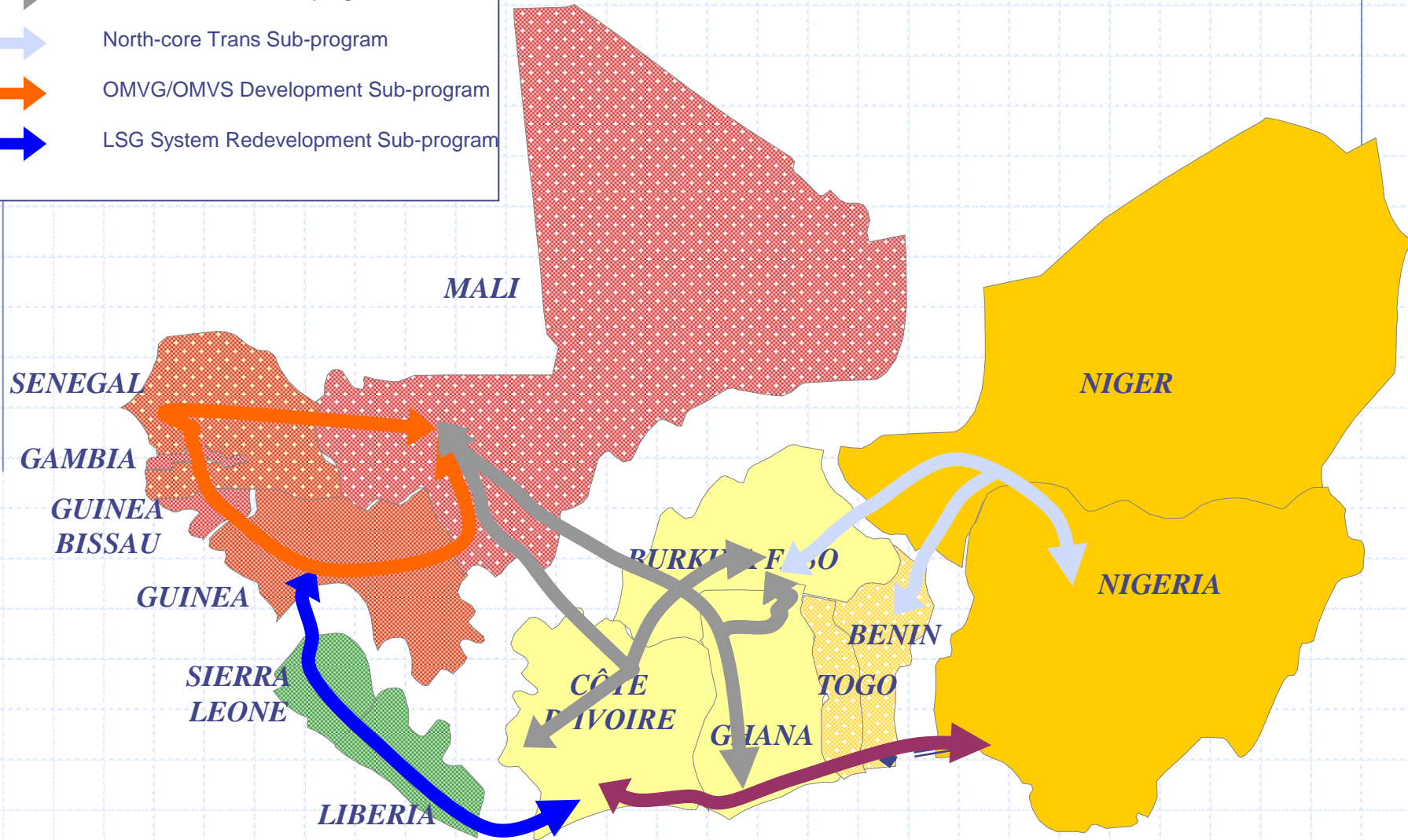
## Prevailing Situation

- ❖ **Inadequate/Non Existent Transmission Interconnections in ECOWAS Member States and also between ECOWAS Member States;**
- ❖ **Inadequate Generation Capacity in ECOWAS Member States resulting in Power Shortages;**
- ❖ **Inability of ECOWAS Member States to raise the necessary financing to implement the require projects to alleviate the situation.**





# WAPP PRIORITY PROGRAM



*Implementation Road Map*



# Implementation of Priority Projects - Status

- ❖ All project have been developed and funded
- ❖ North Corridor Project – Nigeria – Niger – Benin – Togo – Burkina Faso
- ❖ CLSG – Cote d'Ivoire - Liberia - Sierra Leone - Guniea
- ❖ Commissioning of Mali- Cote d'Ivoire Interconnection will link WAPP Zone 'A' and Zone 'B'
- ❖ Most projects will be concluded by 2017



# **IMPLEMENTATION OF WAPP POWER PLANTS**



# Implementation Strategy

- ❖ In order to implement the projects on a fast-track basis, Private Participation would be required;
- ❖ Private Participation will bring the needed capital to bridge the financing gap;
- ❖ Setting-up a Special Purpose Company (SPC) to manage and operate the project.
- ❖ Key Considerations in selecting SPC structure & PPP model
  - ❖ Create financial leverage for stakeholder utilities
  - ❖ Create an efficient borrowing platform that will provide comfort for potential private capital providers.
  - ❖ Facilitate proper allocation of risks between the public and the private sector



# WAPP Power Plants

- ❖ Build three (3) plants at locations with access to natural gas.
  - ❖ 400 MW combined cycle plant at Maria Gleta in Benin.
  - ❖ 400 MW combined cycle plant at Aboadze in Ghana.
  - ❖ 150 MW combined cycle plant within OMVS (To utilize new gas fields being developed in Mauritania)



# Implementation Strategy

- ❖ Project being implemented using the PPP model
- ❖ Two sites at Maria Gleta in Benin and Domunili in Ghana to be developed simultaneously
- ❖ Sithe Global (USA) has been selected as the developer for the Maria Gleta and Domunili plants
- ❖ Joint Implementation Committee in place
- ❖ Expected completion in 2017



# UPDATED ECOWAS MASTER PLAN



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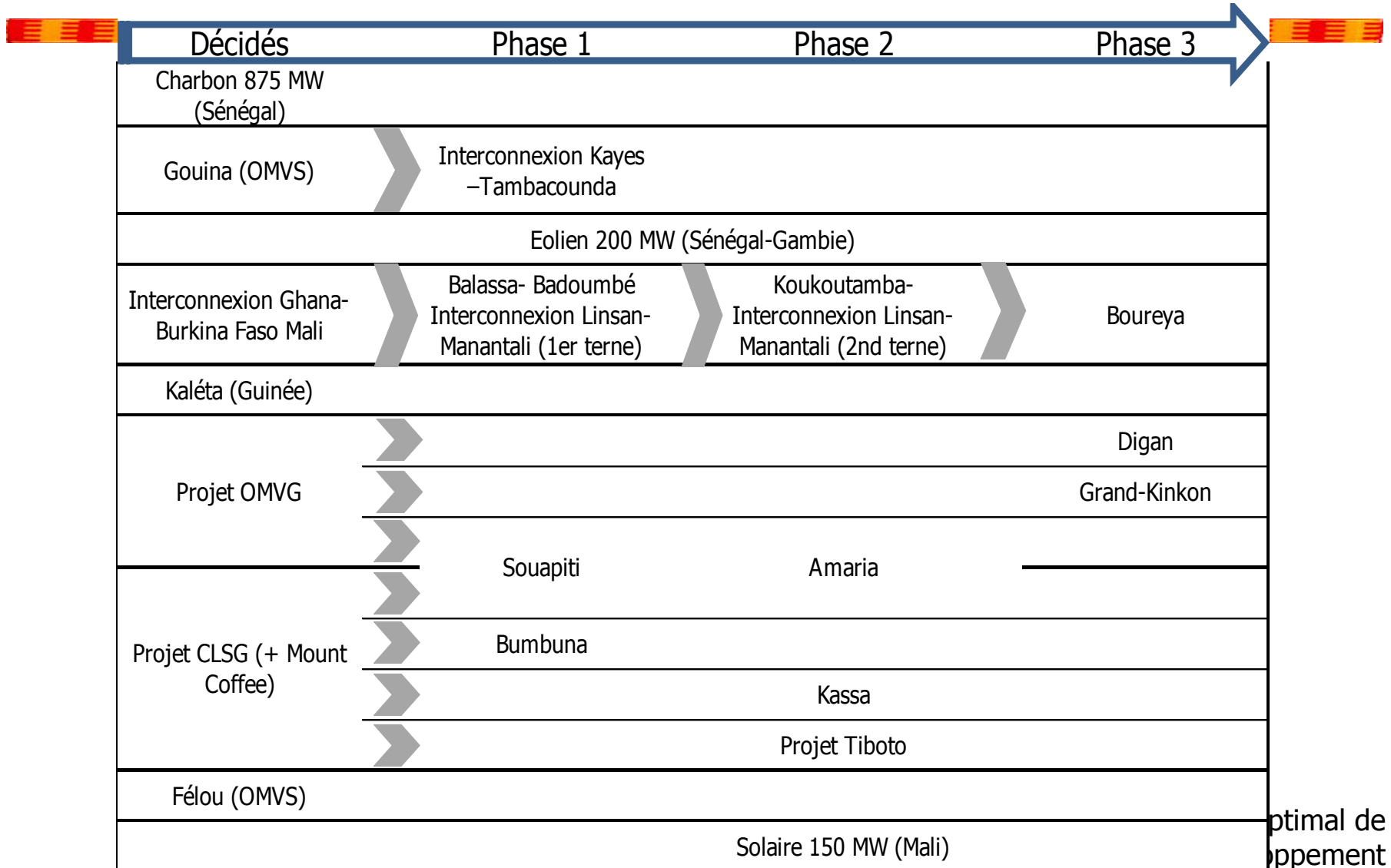


# Phases of Investment

- ❖ Phases for the project development planned to met the regional demand :
  - ❖ Phase 1: 2017 - 2019
  - ❖ Phase 2: 2019 - 2021
  - ❖ Phase 3: 2021 - 2023



# Phasing of the Priority Investments & Sequence (1)







# Phasing of the Priority Investments & Sequence 2

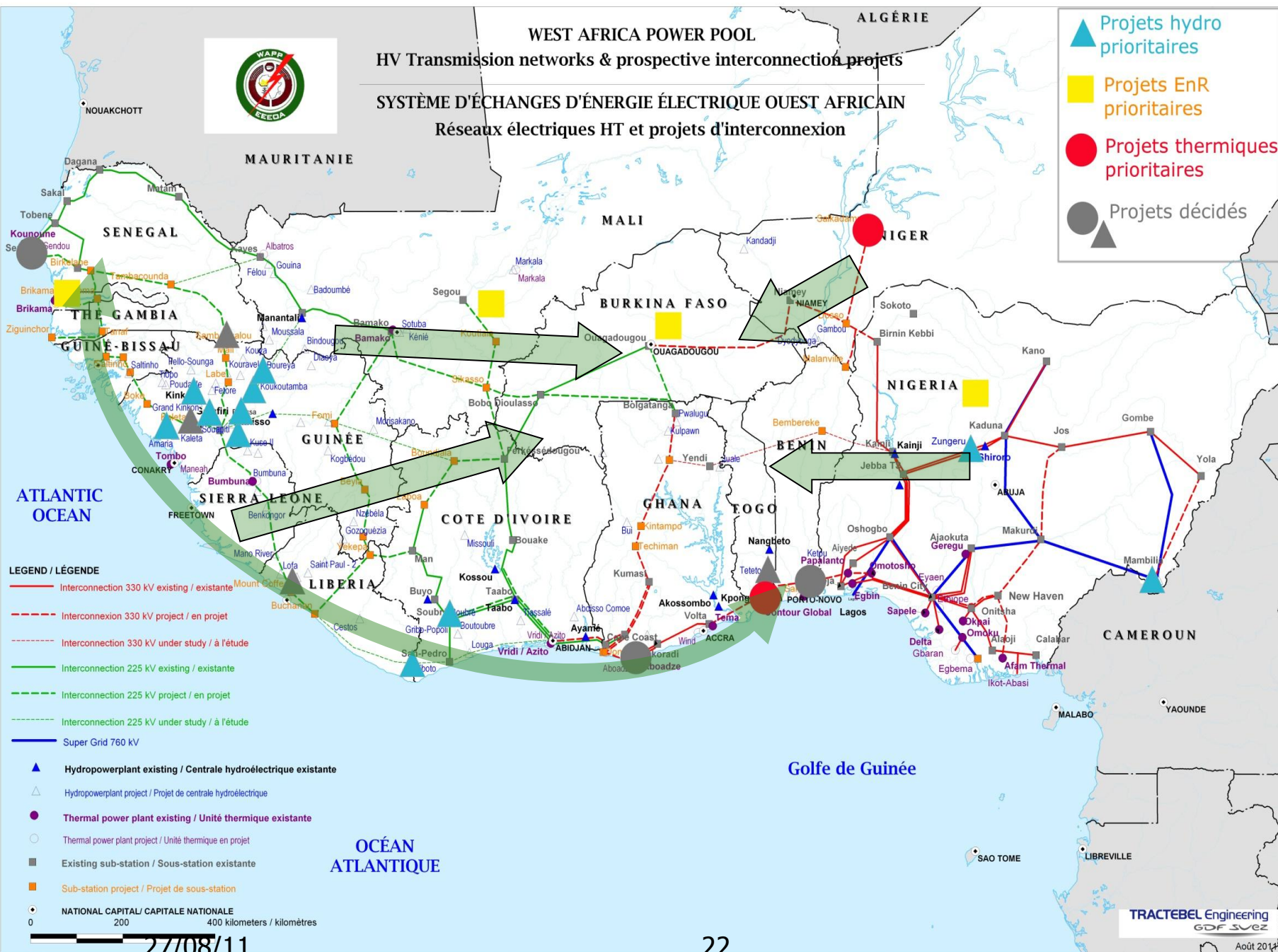
Décidés	Phase 1	Phase 2	Phase 3
Interconnexion Ségou-Ferkessedougou		Fomi-Boundiali	
	Projet Fomi		
	Projet Soubré		
Projet Dorsale Côtière			CC Togo
Aboadze (Ghana)			
Adjaralla (Togo)			
Maria Gleta (Bénin)			
Bolgatanga- Ougadougou	Axe 330kV Nord-Sud Ghana		
	Solaire 150 MW Burkina Faso		
	Projet Corridor Nord	Projet Salkadamna	
		Réseau 760kV	Mambilla
	Zungeru	Dorsale Médiane	
			Eolien 300 MW Nigeria Nord
			Renforcement Bénin Nigeria
6894 M\$	5726 M\$	5724 M\$	5887 M\$

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WEST AFRICA POWER POOL  
HV Transmission networks & prospective interconnection projects  
SYSTÈME D'ÉCHANGES D'ÉNERGIE ÉLECTRIQUE OUEST AFRICAIN  
Réseaux électriques HT et projets d'interconnexion

- ▲ Projets hydro prioritaires
- Projets EnR prioritaires
- Projets thermiques prioritaires
- ▲ Projets décidés





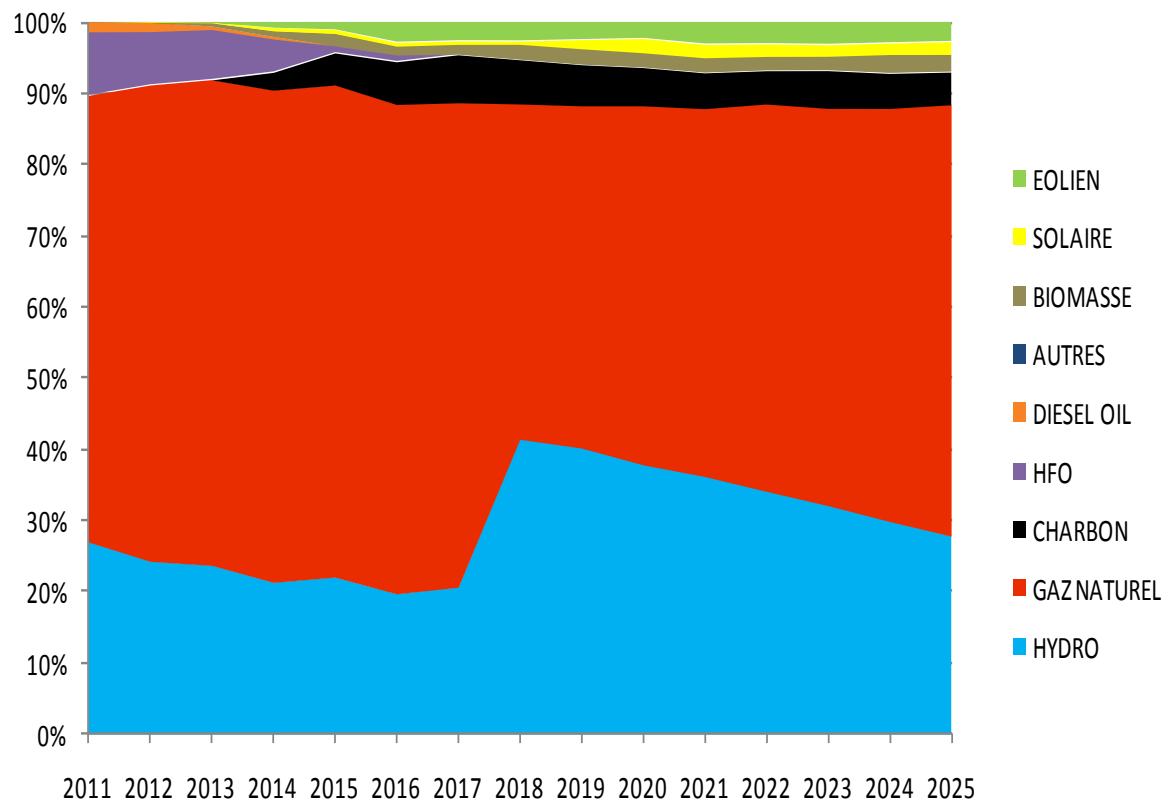
# Energy Mix Strategy

- ❖ Economic development of hydroelectric plants and reinforced regional interconnections to the N-1 criteria
- ❖ Study Recommendation:
  - ❖ Need for energy mix
  - ❖ Objective to have 10% renewable energy (not hydro) = Ambitious but realizable
  - Limited impact limité on total of developement (+2%)
- ❖ Renewable energy (Solar and Wind) requires political will and policy at State level
- ❖ 10% Renewable in 2020



# Energy Mix - Outlook

Mix Energétique en termes d'énergie produite



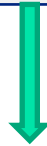




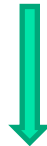
# REGIONAL MARKET DEVELOPMENT

# **MECARDOS Consultant**

**Market Road Map**



**Market Model for WAPP**



**Market Rules**



**5. Implementation  
& Recommendations**

**6. Training Recommendations  
& Training Manual**



# JUSTIFICATION FOR THE REGIONAL MARKET

## Political Willingness

- There is a political decision and instruments for the development of the regional market
- Resources are complementary in the region which suggests strongly the benefits of an integration in a regional market (oil and gas in the east mainly and hydro in the west)

## Regional Planning

- There are trades already ongoing in the region which demonstrates the capacity and willingness of countries to trade
- There is infrastructure being developed for regional trading



# LEGAL FRAMEWORK FOR REGIONAL MARKET

## Economic Cooperation

- ❑ **The ECOWAS Treaty**

## Energy Act

- ❑ **The ECOWAS Energy Protocol**  
Establish legal framework for securing competitive market

## Reforms

- ❑ **Unbundling of the large Utilities**
- ❑ **Separation of generation / retail** from monopoly business (main grid and distribution) in Nigeria, Ghana, Senegal

## Regulation

- ❑ **Supplementary Act A/SA.2/1/08** Establishing the ECOWAS Regional Electricity Regulatory Authority **ERERA**

## Regional Planning

- ❑ **Articles of Agreement** of the West African Power Pool Organisation and Functions (October 2005) **(WAPP)**

# Minimum Requirement for the Regional Market



## Technical Requirement

- Open access to the spare capacity in the transmission systems
- Agreement on a method for payment of wheeling services

## Market Governance

- Operation Rules
- Trading Rules
- Regional Regulations

# **MARKET DESIGN**

# PRINCIPLES FOR MARKET DESIGN



- **Cooperation**
  - **Gradualism**
  - **Transparency**
  - **non discrimination**
  - **Competitiveness**
  - **Environmental sustainability**
- ❖ **Respect national regulations**
  - ❖ **Facilitate infrastructure expansion (generation and transmission)**
  - ❖ **Rules easy to understand and easy to implement**
  - ❖ **Access to transmission infrastructure**
  - ❖ **Converging standards**



# STRUCTURE OF MARKET DESIGN

- The description of each Market Phase is made in an ordered manner following the next structure:
  - Market phase general description (introduction)
  - Conditions precedent to pass from one Phase to the following
  - Market Participants
  - Transactions in the market
  - The role of the regional Market Operator during the Phase
  - The role of the domestic TSOs during the Phase
  - The regional transmission network
  - Planning and regional projects



# **Implementation Plan**



## Market Phases - Summary

- **Phase 1:** (from now and 2015 approximately when most regional transmission infrastructure is expected to be commissioned). Main characteristics of this phase would be:
  - Formalise trading that today is carried out on a “case by case” basis and standardise procedures such as:
    - Bilateral agreements
    - Commercial Instruments (type of contracts, short term exchanges)
    - Procedures



## Market Phases - Summary

### Phase 1 Activities (continued)

- Transmission pricing agreed between parties
- Initiate the regional operational and commercial coordination
- Preparation for the following stage
- Regional regulator: enforcement of rules and dispute resolution



## Market Phases - Summary

- ❑ **Phase 2:** based on the preparations carried out during the 1<sup>st</sup> phase, and will include but not limited to the following:
  - Bilateral agreements with transit through third countries, based on standard commercial instruments
  - Back up of contracts in the market (possibility)
  - Short term exchanges through day ahead market (regional optimization model)
  - Regional transmission pricing
  - Regional Market Operations functions
- ❑ **Phase 3:** a long term vision which would include a “regional optimisation of the operation”.

# Preparatory Activities: Order of Precedence



Task #	Task	Preparation Phase 1	Preparation Phase 2	Preparation Phase 3
Ph 1.1	Develop and implement a dispute resolution procedure.	<div></div>		
Ph 1.2	Trained professional staff for dispute resolution	<div></div>		
Ph 1.3	Decision for allocating the market operation functions in an institution	<div></div>		
Ph 1.4	Implement decision on allocation of responsibilities of market operation	<div></div>		
Ph 1.5	Establishment of the MO with the needed infrastructure	<div></div>		
Ph 1.6	Development of "contract templates" for trading and the procedures for registering in the MO	<div></div>		
Ph 1.7	Approval of contracts and procedures regarding contracts	<div></div>		
Ph 1.8	Development and approval of regional market rules	<div></div>		
Ph 1.9	Agreement on a "glide path" to regional standards and operational procedures	<div></div>		
Ph 1.10	Internalisation by the countries of contracts, contracts procedures, regional market rules, regional standards adjustments and operational procedures	<div></div>		
Ph 1.11	Development of a training program	<div></div>		
Ph 1.12	Implementation of the training program	<div></div>		
Ph 2.1	Equip MO with the hardware and software necessary for phase 2		<div></div>	
Ph 2.2	Countries implement open access in their transmission systems		<div></div>	
Ph 2.3	Market rules for this stage are reviewed and "fine tuned" if necessary		<div></div>	
Ph 2.4	The agreed plan for implementation of regional standards continues being implemented		<div></div>	
Ph 2.5	Methodology for a regional transmission tariff and wheeling services is agreed, put in place and tariffs are actually calculated and enforced.		<div></div>	
Ph 2.6	Agreement on enforceability of regional transmission projects and reinforcement of domestic transmission systems.		<div></div>	
Ph 2.7	Training		<div></div>	
Ph 3.1	Agreement on the new markets to be introduced			<div></div>
Ph 3.2	Development of the market rules for the new markets			<div></div>
Ph 3.3	Agreement on enforceability of regional master planning (transmission)			<div></div>
Ph 3.4	Transmission tariff and congestion management			<div></div>

# Market Rules

- ❑ The Market Rules has:
  - 9 Chapters & 72 Articles
- ❑ Containing
  - Technical
  - ❑ Commercial
  - Financial
  - Settlement
  - Regulation
  - Legal
- ❑ Operations Hierarchy:
  - WAPP ICC- >
    - Control Area Center ->
      - National Control

Chapter I: Introduction and Objectives

Chapter II: General Conditions

Chapter III: The SMO

Chapter IV: The Control Areas

Chapter V: The Domestic TSOs

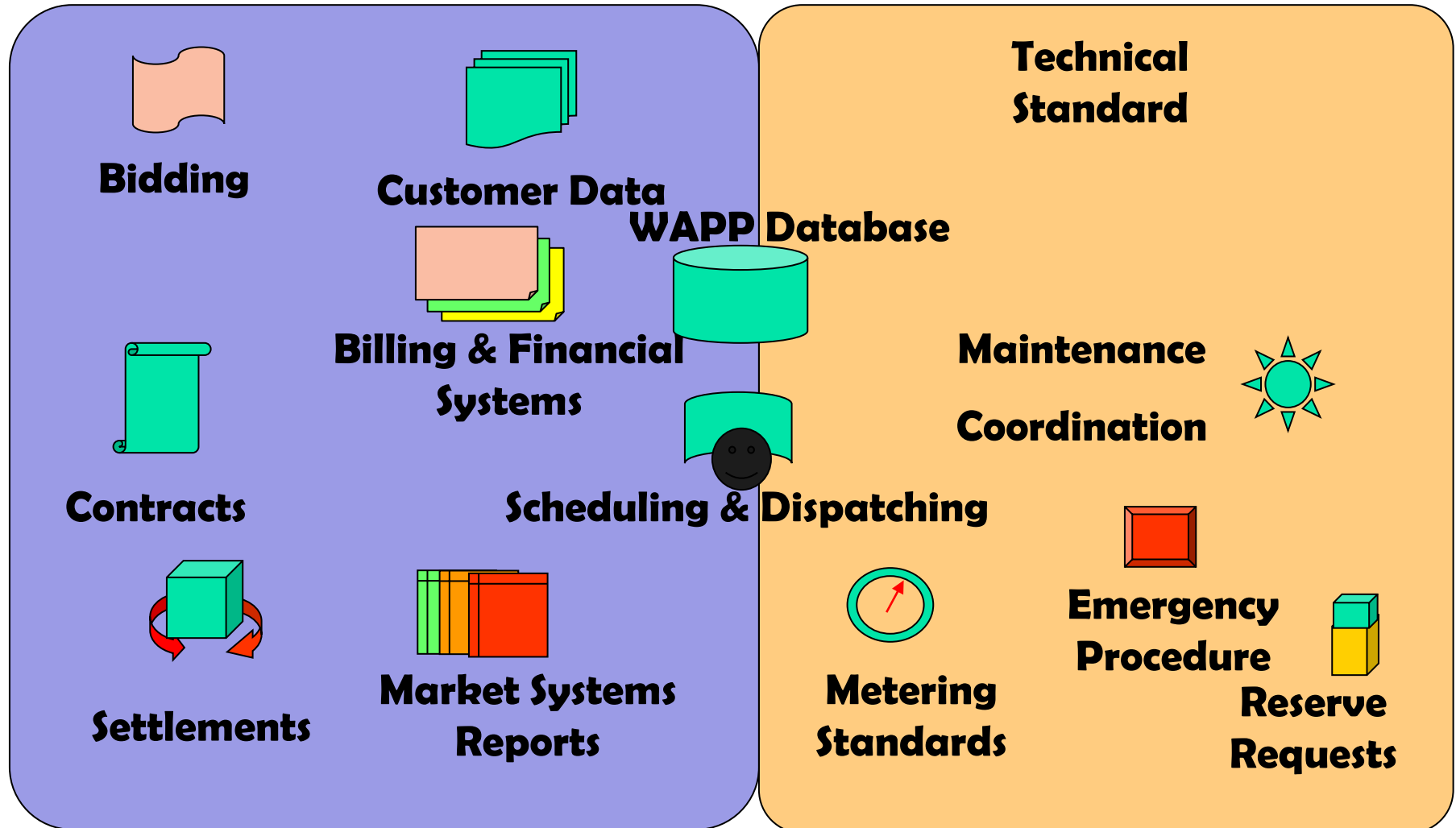
Chapter VI: Market Phase 1

Chapter VII: Market Phase 2

Chapter VIII: Governance

Chapter IX: Miscellaneous

# Regional Market Operator







## Issues for Sustainability

- ❖ Cost reflective tariff
- ❖ Reduction of technical and non technical losses
- ❖ Transmission Pricing will sent signal to Market participants
- ❖ Put in place support industry
- ❖ Urgent Capacity Building implementation
- ❖ Improved Energy Mix with increased Solar & Wind Energy



# THANK YOU

**Babatunde ADEYEMO**  
**Director Information and Coordination Center**

**WEST AFRICAN POWER POOL**  
**WAPP Secretariat**  
**06 BP 2907**  
**Cotonou, Benin**

**Tel. + 229 21 37 41 95**  
**Fax + 229 21 37 41 96**  
**E-mail [info@ecowapp.org](mailto:info@ecowapp.org)**

