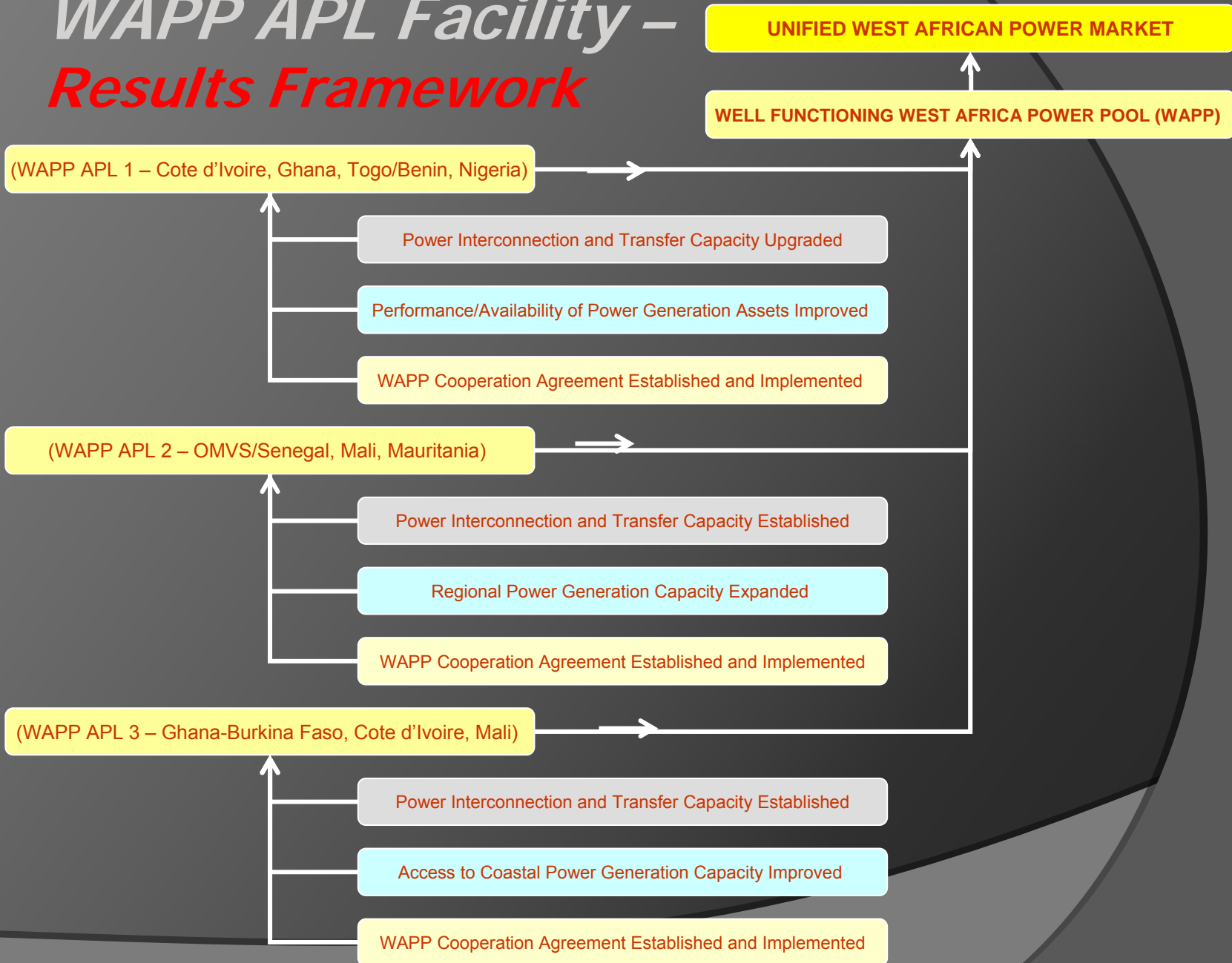




Working Group Exercise






WAPP APL Facility – Results Framework

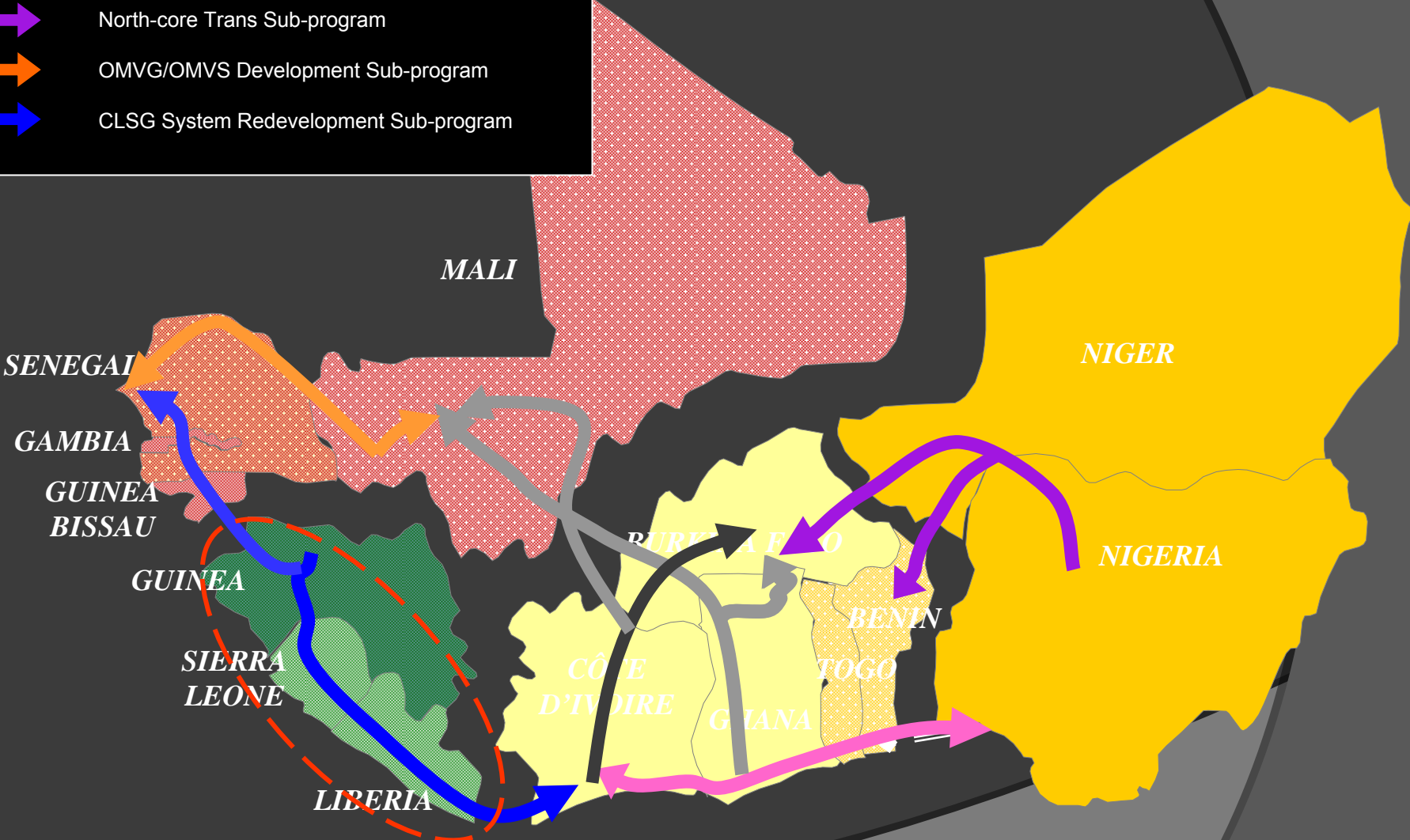




CLSG POWER SYSTEM REDEVELOPMENT SUBPROGRAM



-  Coastal Trans Backbone Sub-program
-  Inter-Zonal Trans Sub-program
-  North-core Trans Sub-program
-  OMVG/OMVS Development Sub-program
-  CLSG System Redevelopment Sub-program



Implementation Road Map



➤ **WAPP CLSG Power System Re-development Subprogram (Core Investments - 1)**

- Mt. Coffee R-O-T Project (60-100MW), Liberia
 - Refurbishment of Civil Structures
 - Installation of New Electro-mechanical Equipment
 - Installation of New Switchyard and Grid-tie Facility
 - Design-Construction of Upstream Via Reservoir
- Implementation Framework
 - Reconstruct-Operate-Transfer Concession with LEC
 - ECOWAS Energy Protocol



Mount Coffee Hydro Plant



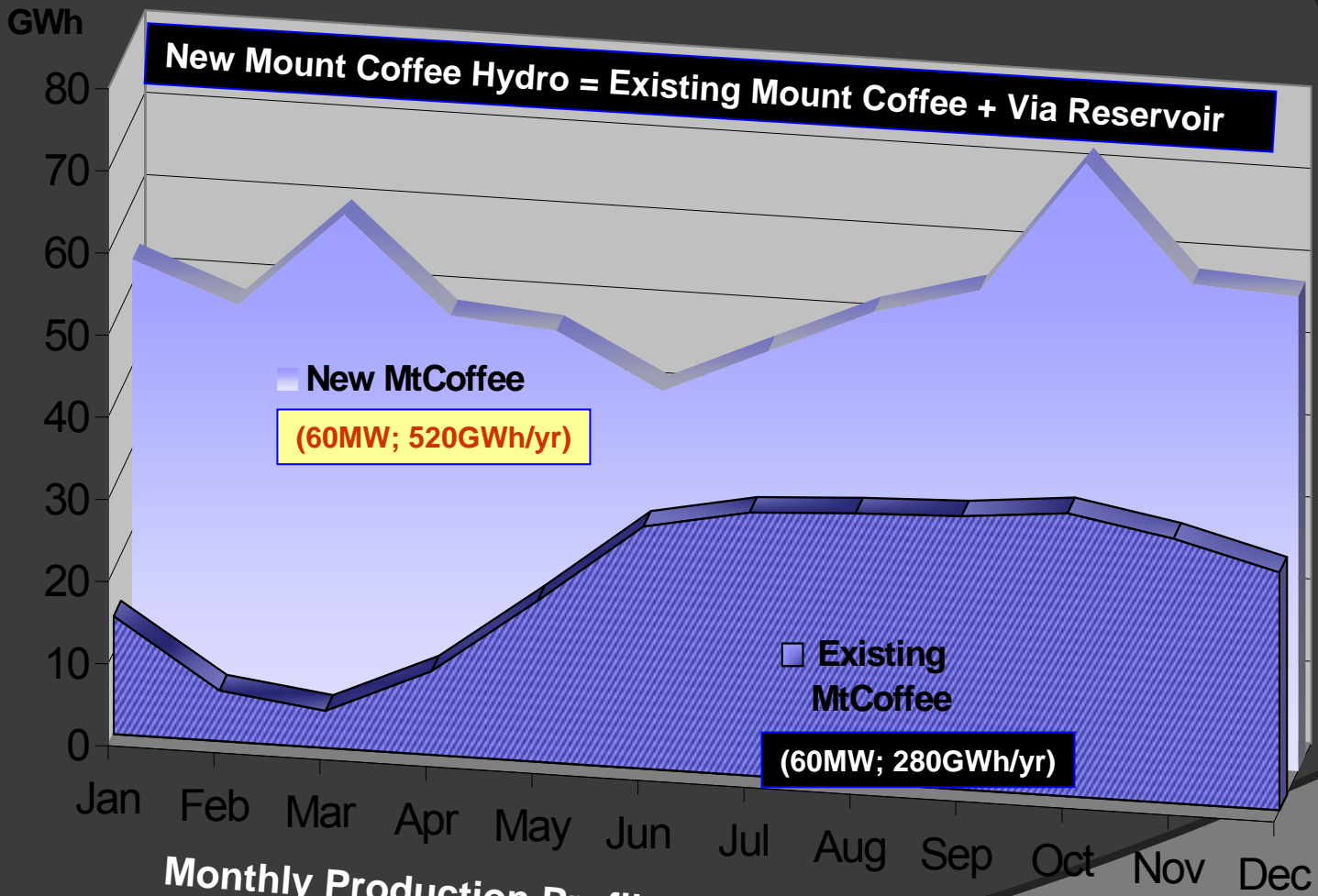
Towers - no conductors

Switchyard Remains (Mt Coffee)



Mount Coffee Hydropower Plant – Liberia

**Existing Mount Coffee Hydro
(60MW; 280GWh/yr)**



Monthly Production Profile of Mount Coffee HEP

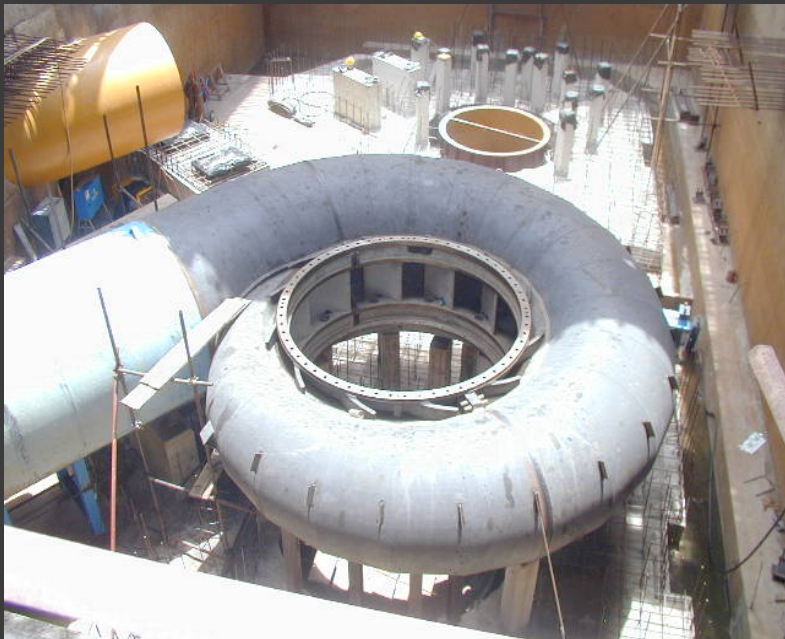


➤ **WAPP CLSG Power System Re-development Subprogram (Core Investments - 2)**

- Buyo Hydro Rehabilitation Project, Cote d'Ivoire
 - Rehabilitation and turbine/runner upgrade
 - Reservoir Dredging
- Bumbuna – Yiben Hydro Expansion Project (+100MW)
 - Installation of Additional Turbines at Bumbuna Facility
 - Design-Build Contract of Upstream Yiben Reservoir
- Implementation Framework
 - Public Utility (SOGEPE/CIE, NPA)
 - ECOWAS Energy Protocol



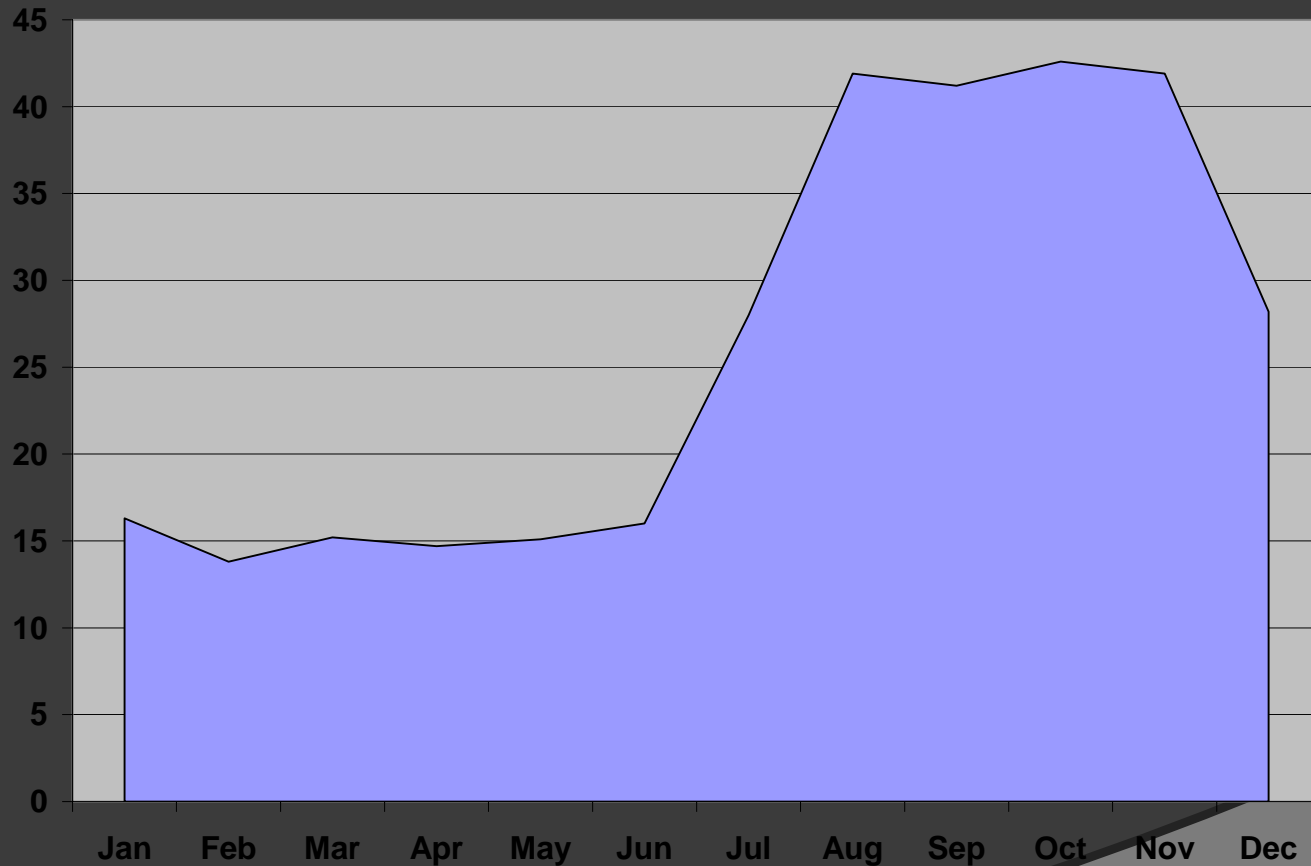
Bumbuna Hydro
(50MW; 315 GWh/yr)



Construction of Bumbuna HEP, Sierra Leone



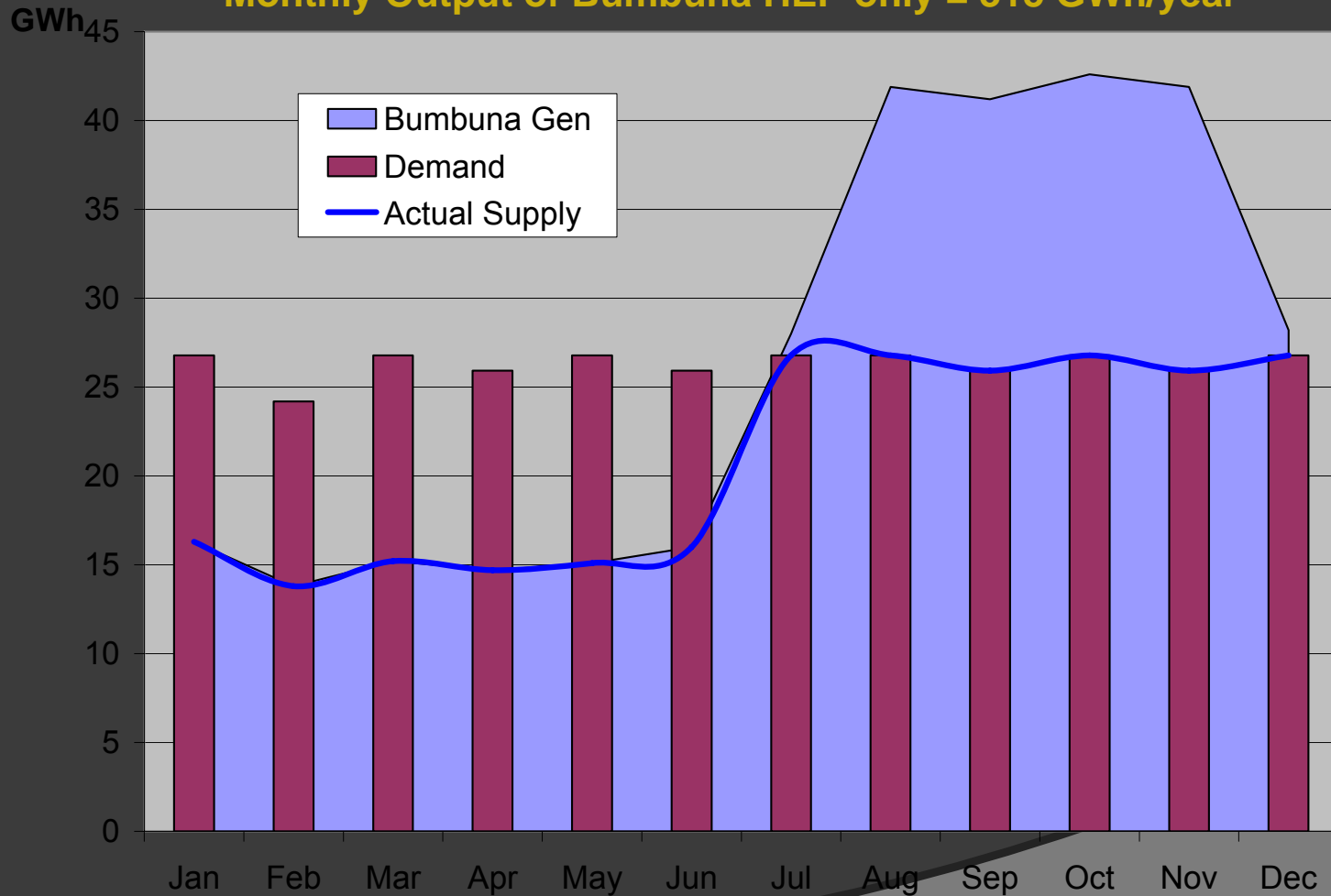
Monthly Output of Bumbuna HEP only = 315 GWh/year



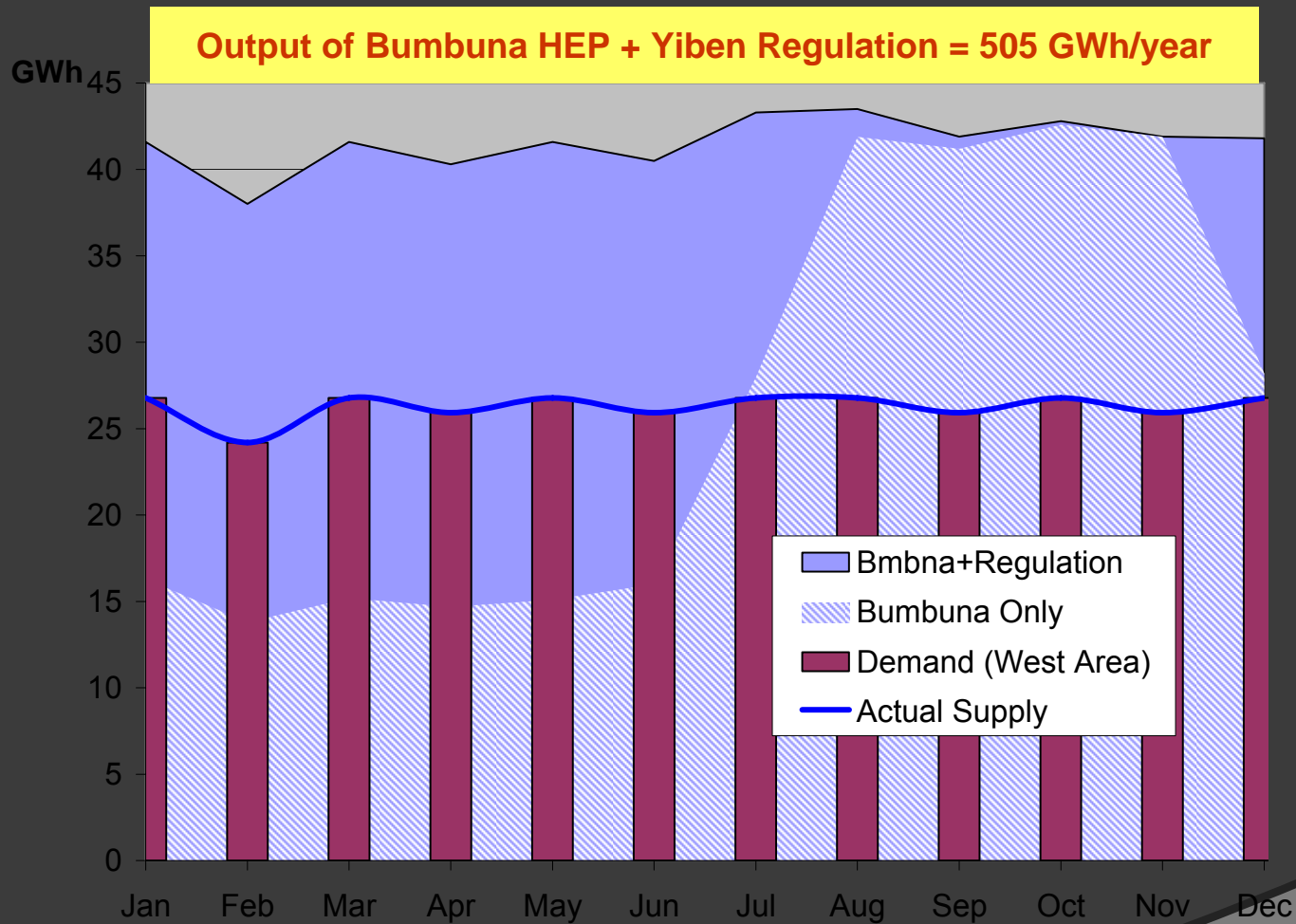
Energy Production Profile - Bumbuna HEP



Monthly Output of Bumbuna HEP only = 315 GWh/year



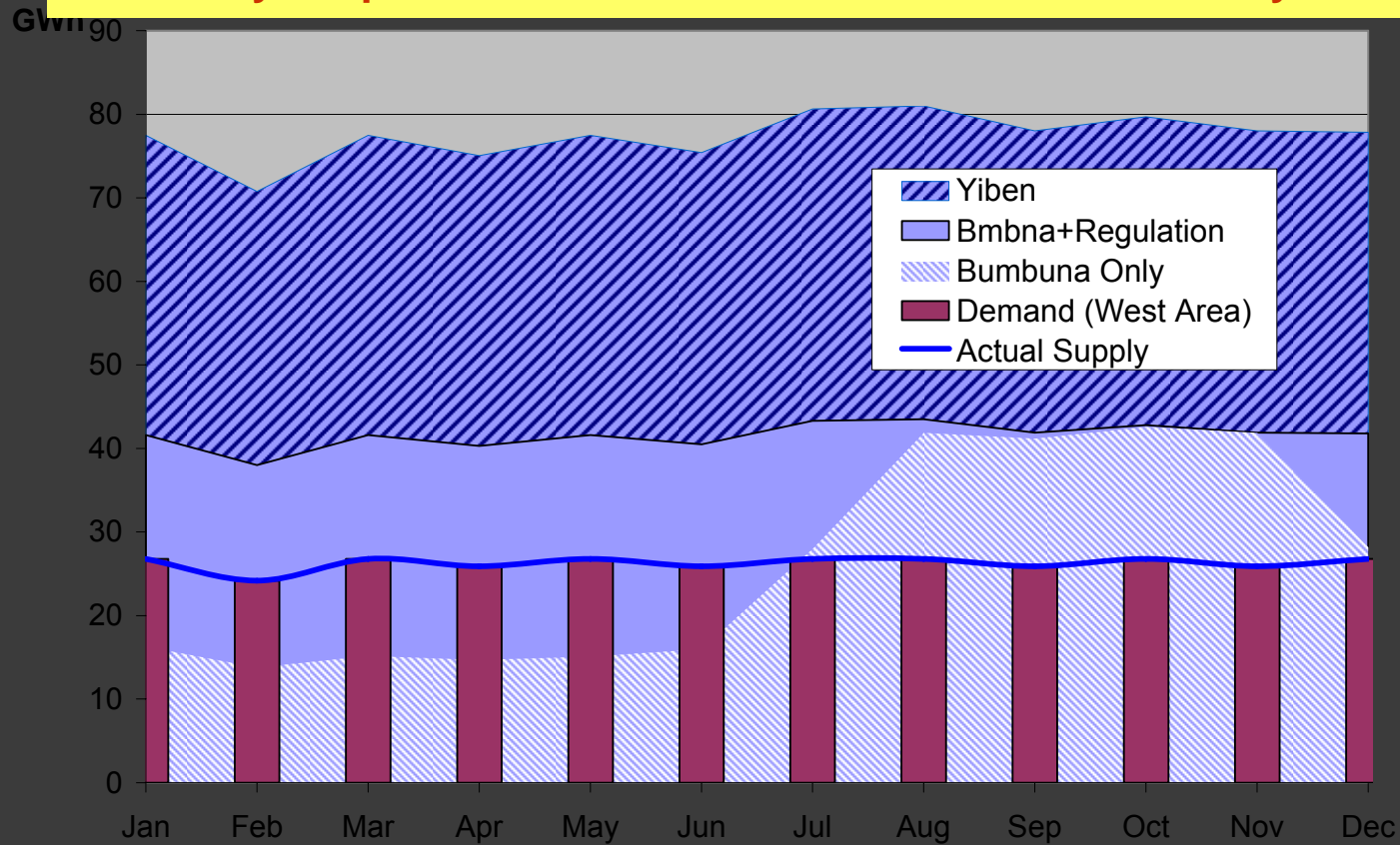
Demand & Production Balance - Bumbuna HEP



Demand & Production Balance - Bumbuna with Yiben Regulation



Monthly Output of Bumbuna and Yiben HEPs = 935 GWh/year



Demand & Production Balance of Bumbuna and Yiben HEPs

Interconnected Network of Cote d'Ivoire



THERMAL STATIONS: 606 MW
 TAG 100 MW (VRIDI 1: 4x25 MW)
 TAG 210 MW (CIPREL : 3x33 + 1x111 MW)
 TAG 296 MW (AZITO: 2x148 MW)

WEST AFRICA WEST AFRICA POWER POOL APL PROGRAM PROPOSED 225kV INTERCONNECTION FOR LIBERIA, SIERRA LEONE, GUINEA APL4



- EXISTING**
- 225 kV
 - 161 kV
 - 110 kV
 - 90 kV
- PROPOSED**
- - - 225 kV
 - - - 161 kV
 - - - 110 kV
 - - - 90 kV
- TRANSMISSION LINES:**
- ▲ HYDRO
 - ◻ THERMAL
 - ◻ SUB STATION
- POWER GENERATION PLANTS:**
- SELECTED CITIES
 - NATIONAL CAPITALS
 - - - INTERNATIONAL BOUNDARIES

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➤ **WAPP CLSG Power System Re-development Subprogram (Core Investments - 3)**

- 225kV Transmission Interconnection Component (1,060km)
 - Man (Cote d'Ivoire) - Sannequille (Liberia) + Subst. : 140 km
 - Sannequille (Liberia) - Nzérékore (Guinea) + Subst. : 140 km
 - Sannequille (Liberia) - Buchanan (Liberia) + Subst. : 250 km
 - Buchanan (Liberia) - Monrovia (Liberia) + Subst. : 110 km
 - Monrovia (Liberia) - Bumbuna (Sierra Leone) + Subst. : 220 km
 - Bumbuna (Sierra Leone) - Linsan (Guinea) + Subst. : 190 km
- Implementation Framework –
 - ECOWAS Supplementary Act (A/SA.3/01/08)
 - WAPP SPC with participation from SOGEPE, LEC, EDG, NPA



➤ **WAPP CLSG Power System Re-development Subprogram (Core Investments & TA - 4)**

- **WAPP Operational Security & Mitigation Plan**
 - WAPP Area Control Center, ICC Satellite (Buyo HPP)

- **SCADA/EMS Upgrade/Extension**
 - LEC
 - EDG
 - NPA

- **Power Exchange Agreements**
 - Economy Exchanges
 - Power Wheeling
 - Energy Banking
 - Emergencies



➤ **WAPP CLSG Power System**

➤ **Re-development Subprogram**

- “APL4 Project Concept” documents already outlined by WAPP:
 - CLSG T/L Project, including ESIA (*EIB TF funding in place, recruitment of Consultant in progress*);
 - Transaction Advisory TA (*WAPP SPC – PPIAF application*)
- Pre-investment funding gap :
 - National Sub-transmission Master Plans for Liberia & Sierra Leone (US\$ 3.6 million);
 - Pre-investment: New Mt. Coffee R-O-T (US\$ 1.6 million)
 - Pre-investment: Buyo Hydro Rehabilitation (US\$ 1.0 million)
 - Pre-investment: Bumbuna - Yiben Expansion (US\$ 1.0 million)



Provisional Cost Estimate (US \$ million)

A.1	WAPP 225kV Man-Linsan Interconnection Line	4.50	220.0	224.5
A.2	New Mount Coffee HEP with Via Reservoir	2.00	200.0	202.0
A.3	Bumbuna - Yiben Expansion HEP	1.00	160.0	161.0
A.4	Buyo HEP Rehabilitation	1.00	40.0	41.0
A.5	Liberia Sub-transmission Re-development	0.50	30.0	30.5
A.6	Bo-Kenema Area Sub-transmission Development	0.50	15.0	15.5
A.7	WAPP ICC Satellite, Cote d'Ivoire	0.50	10.0	10.5
A.8	LEC SCADA-EMS Re-development	0.50	4.5	5.0
A.9	NPA SCADA-EMS Re-development	0.50	4.5	5.0
	Total	11.0	684.0	695.0

