

2017 GHANA ENERGY SUMMIT

POWER SUPPLY: LONG, MEDIUM AND SHORT TERM DEMANDS

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PRESENTATION OUTLINE

GHANA'S POWER SYSTEM

CURRENT SUPPLY SITUATION

DEMAND PROJECTION

SUB REGIONAL SUPPLY SITUATION

FUEL REQUIREMENTS

WAY FORWARD

RECOMMENDATIONS



GHANA'S POWER SYSTEM

Generation

Base Load: Hydro & Thermal



Makers

VRA , TCo, Sunon Asogli, CENIT, Bui Power, AKSA, Karpower & Ameri

Transmission

Bulk System – High Voltage



Movers

System Operator & Transmission Owners

GRIDCo

Distribution

Local System



Users

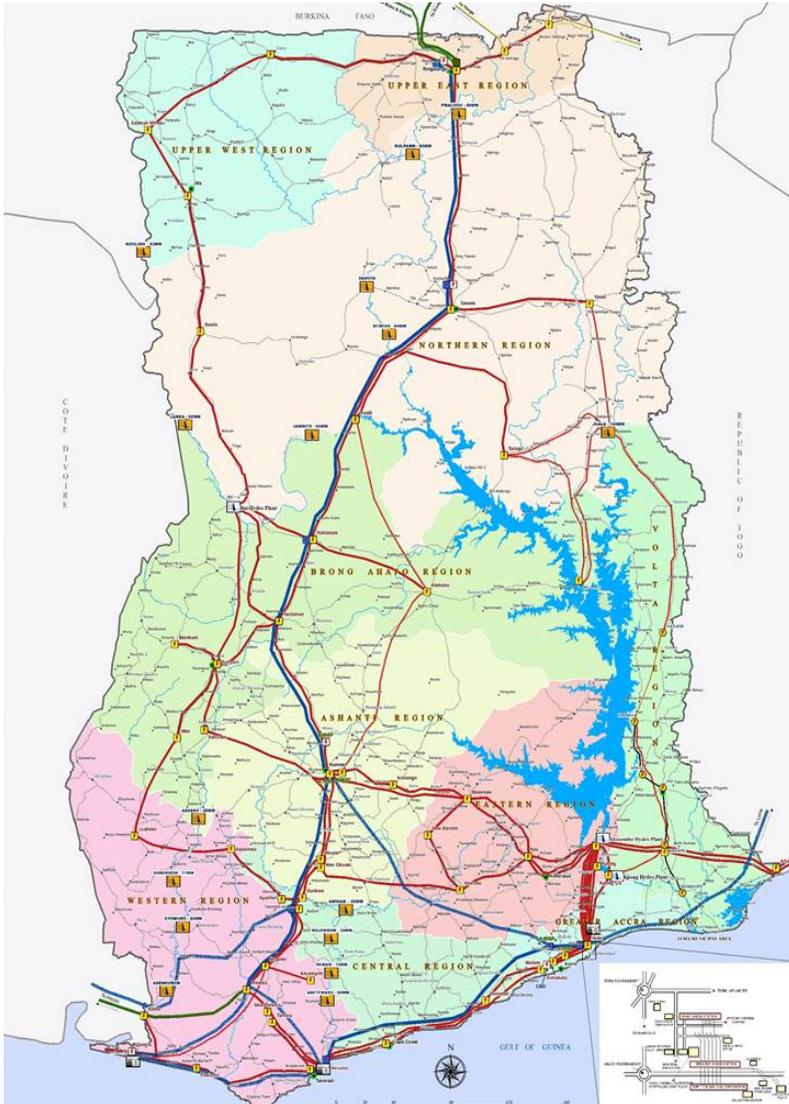
ECG, NEDCo, EPC, Bulk Customers

CURRENT SUPPLY SITUATION - GENERATION

- ❑ Installed Generating Capacity **4205 MW**
- ❑ Embedded / Distributed Generation **47 MW**
- ❑ Some capacity is unavailable due to:
 - Natural Gas supply challenges;
 - Limited liquid fuel stocks;
 - Relatively low hydrology at the hydro-power plants;
 - Generating unit outages for Maintenance; and
 - Generating unit outages due to fault



CURRENT SUPPLY SITUATION - TRANSMISSION



Voltage Levels : 69, 161, 225, 330 kV

Bulk Substations: 68 nos.

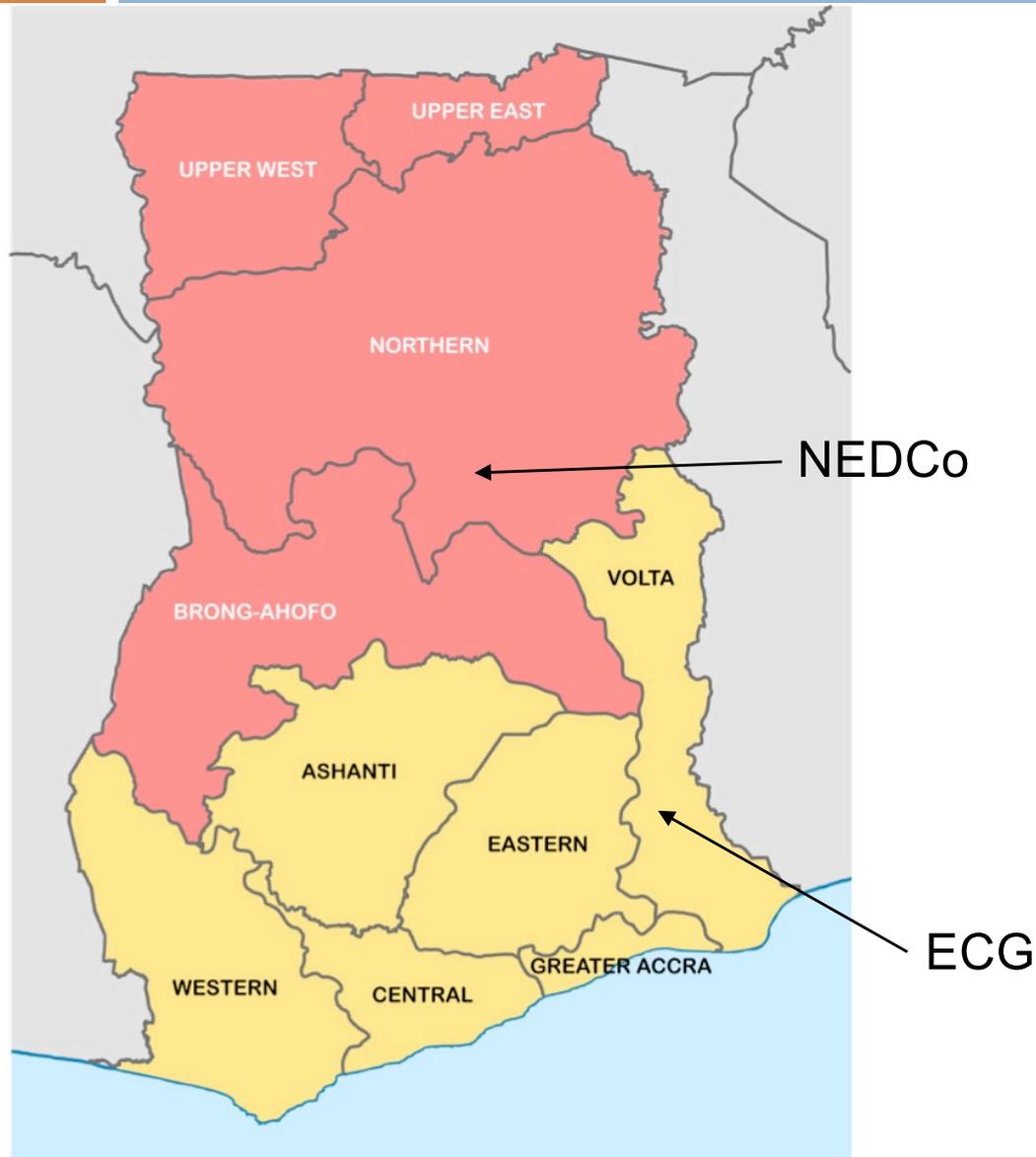
Transmission Network: approx. 5,200 km

Interconnection (WAPP):

- **Burkina Faso**
- **Togo**
- **Cote D'ivoire**

- **Transformer Capacity : 4600MVA**
- **Approx. 80% equipped with OPGW**

CURRENT SUPPLY SITUATION - DISTRIBUTION



Distribution Companies : ECG , NEDCo and EPC

Energy Consumption

- ❑ ECG : 71%
- ❑ NEDCo: 9%
- ❑ EPC : 1%
- ❑ Other Bulk Customers: 19%

ECG Network Statistics

33kV : 19,995 km

11kV : 20,469 km

415V : 68,018 km

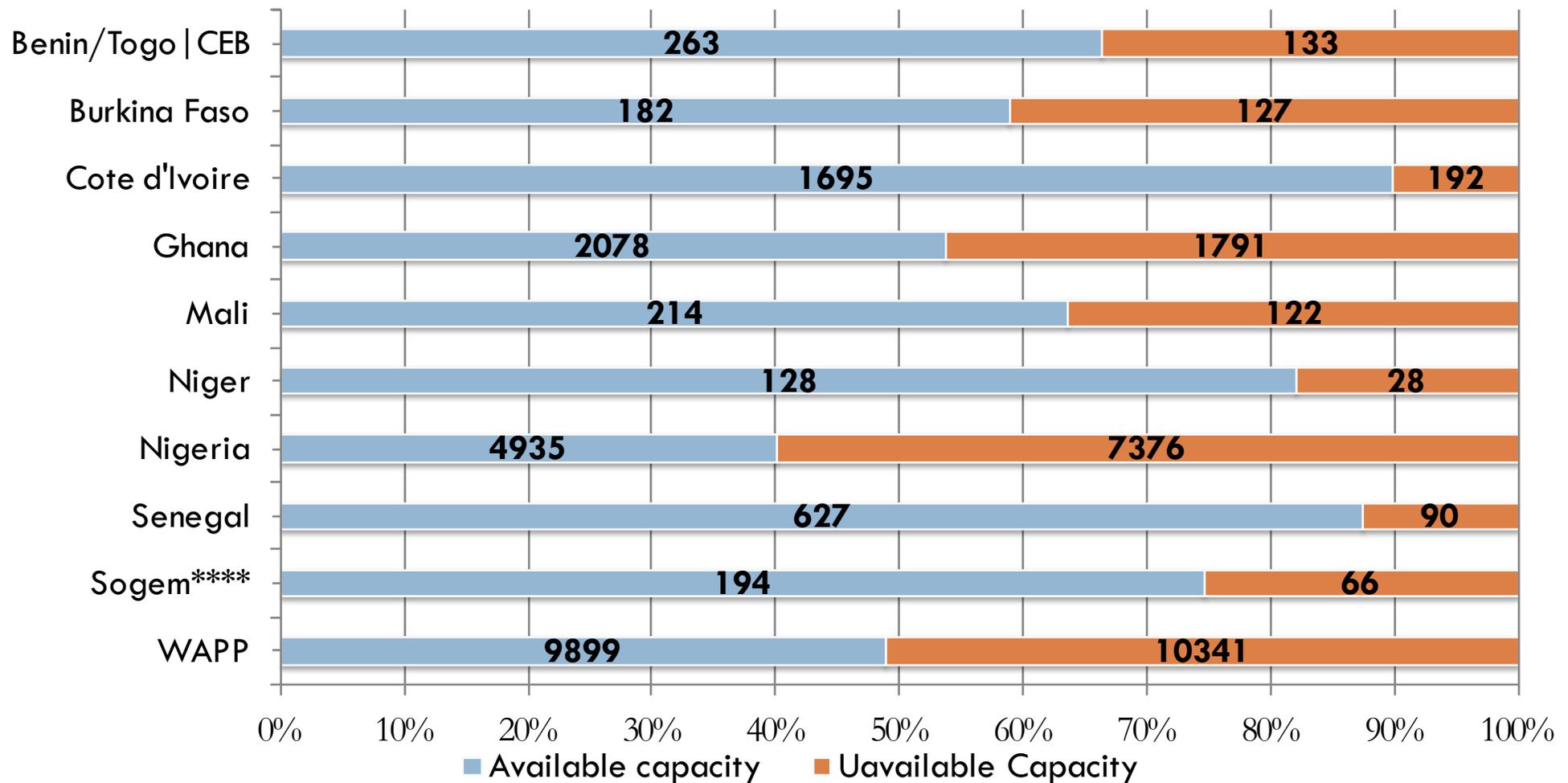
NEDCo Network Statistics

Medium Voltage : 12,582 km

Low Voltage : 16,490 km

SUB-REGIONAL SUPPLY SITUATION

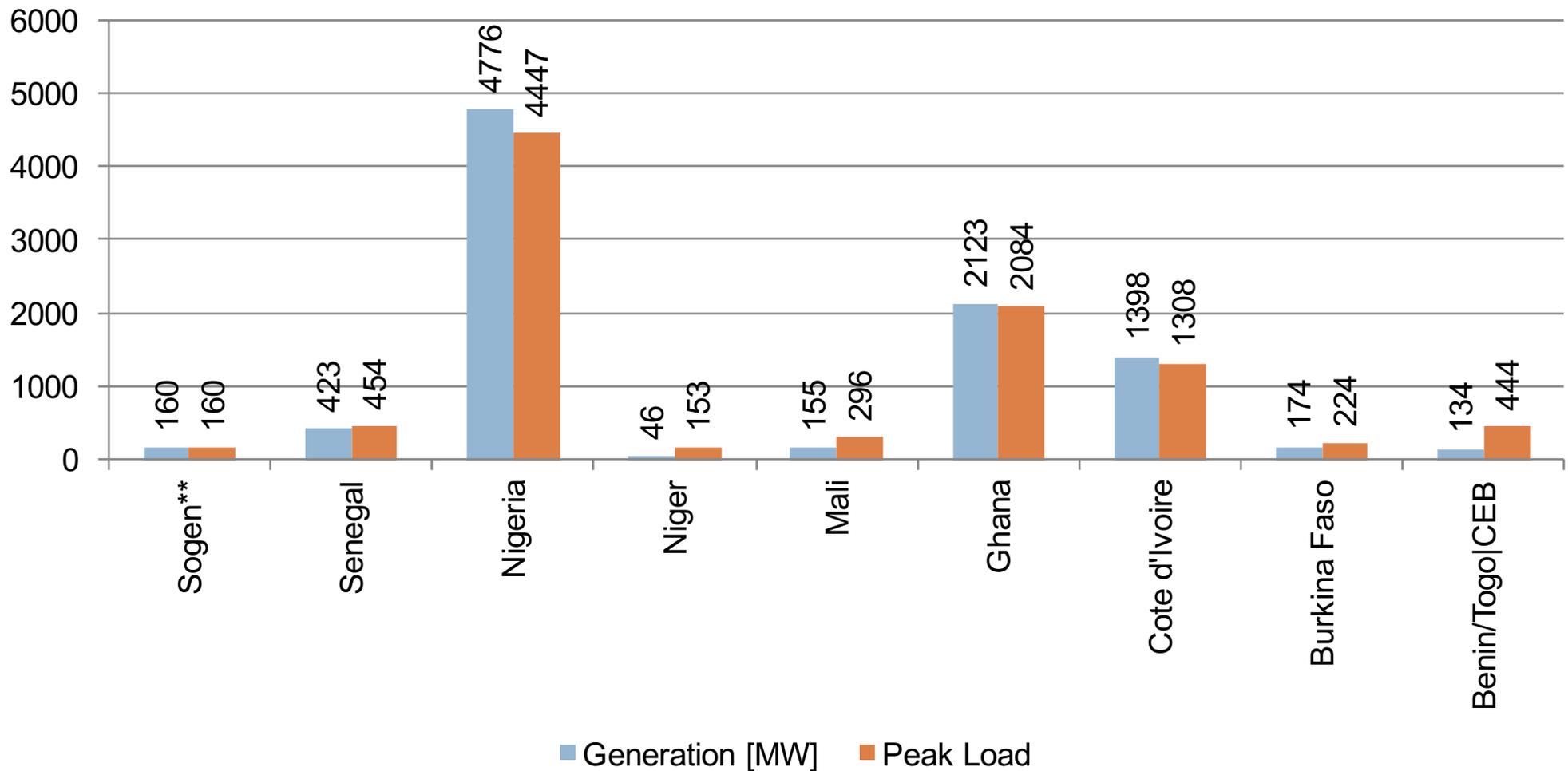
Available Capacity of Total Installed Capacity for February 2017



Source: (WAPP 2017)

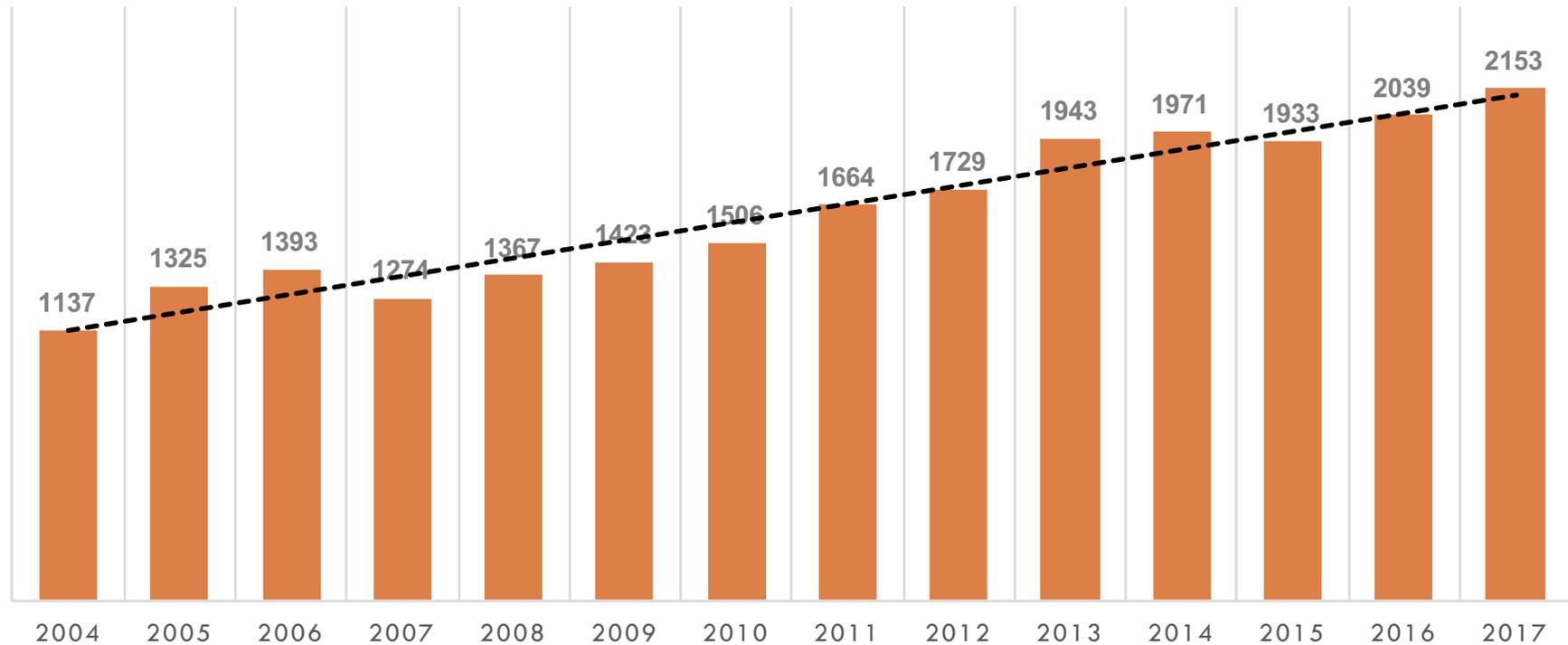
SUB-REGIONAL SUPPLY SITUATION (2)

Supply and Demand Profile for February 2017



Source: WAPP Feb 2017 Report

GHANA'S POWER DEMAND - TREND



□ All time Peak Load – **2153MW**

(March 17, 2017)

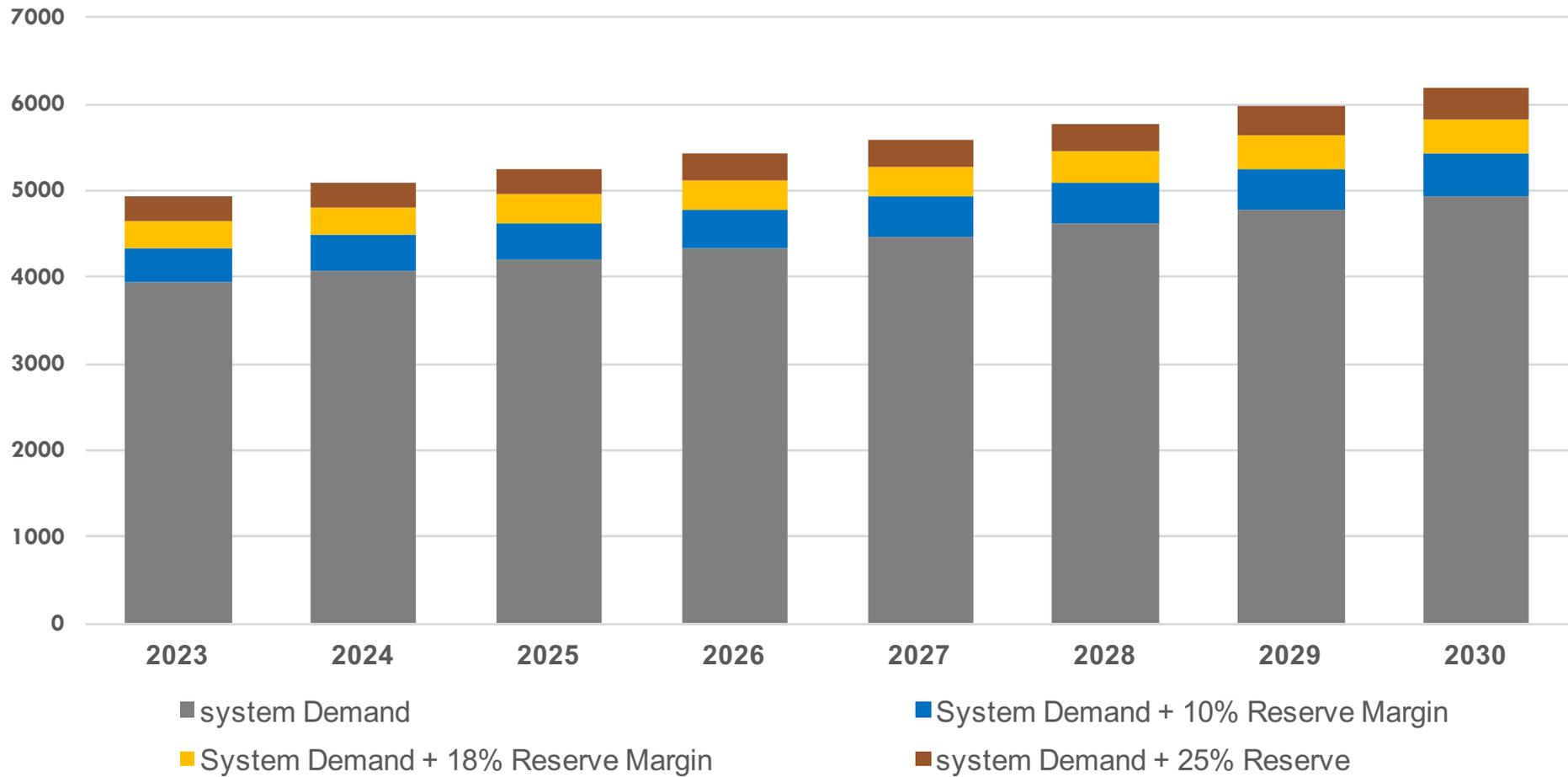
Growth : - 10% p.a

DEMAND PROJECTIONS – Short to Medium term

Year	2018	2019	2020	2021	2022
Projected System Demand (MW)	2,646	3,128	3,462	3,712	3,828
Total Supply Required (Demand + Reserve)	3,308	3,910	4,327	4,640	4,784
Total Dependable Hydro Capacity (MW)	1,120	1,120	1,120	1,120	1,120
Total Dependable Thermal Capacity (MW)	2,362	2,462	2,462	2,462	2,462
Total Existing Renewables (MW)	22.5	22.5	22.5	22.5	22.5
COMMITTED GENERATION PROJECTS					
Karpower Phase II	220	220	220	220	220
CENPOWER	360	360	360	360	360
Early Power	142	300	400	400	400
GPGC	100	100	100	100	100
VRA T3	0	120	120	120	120
Amandi	0	190	190	190	190
Total Committed Generation (MW)	822	1290	1390	1390	1390
Expected Total Installed Generation (MW)	4,326.50	4,894.50	4,994.50	4,994.50	4,994.50
Surplus (MW)	1.019	985	668	355	211

DEMAND PROJECTIONS – Long Term

Projected System Demand (MW) : 2023 -2030



FUEL SUPPLY SECURITY

Fuel Cost

Based on the projected thermal generation of 9,937.48 GWh for 2017, an estimated **US\$952 Million** will be required to purchase LCO, Natural Gas, HFO and diesel to run the thermal plants. About **US\$ 295** million will be required by VRA and about **US\$ 657 million** will be required by the IPPs.

Source: Electricity Supply Plan 2017

TYPE OF FUEL	COST (Million USD)
VRA – LCO	147
VRA – GAS	130
VRA – DFO	18
TOTAL VRA FUEL COST	295
IPP – GAS	181
IPP – LCO	114
IPP – HFO	357
IPP – DFO	5
TOTAL IPP FUEL COST	657
TOTAL VRA & IPP COST	952

WAY FORWARD— MARKET REFORMS

Establish Electricity Market as per LI 1937 – *GRIDCo is currently developing the Market Rules*

Benefits

- ❑ Provides **transparent pricing signals for Market Participants and investors**
- ❑ Provides **access to larger pool** of available energy which allows for increased **competitive pricing**, enhances **system reliability**
- ❑ **Increases customer satisfaction**
- ❑ Consumers make greater effort to use existing and available capacity more efficiently
- ❑ Rewards efficient and cost effective generation units

WAY FORWARD— RENEWABLE ENERGY GENERATION

- RE holds emphatic promise and certainty in achieving a more reliable and readily available electric power supply and delivery at affordable cost
- Abundant investment opportunities exist for renewable energy integration in the Ghana energy sector
- **Efficient use of energy via conservation and demand response**

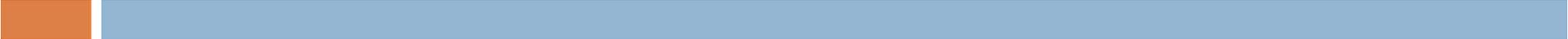


WAY FORWARD



- **Demand Side Management**
 - Energy Efficiency Architecture
 - Fast track migration to LED lamps
- **Regulation on Embedded / Distributed Generation**
 - Scope
 - Capacity
 - Voltage
- **Integrated Resource and Resilience Planning (IRRP) Project**
 - Initiative supported by USAID
 - Development of an Integrated Power Sector Master Plan (IPSMP)

RECOMMENDATIONS (1)



- Accelerate implementation of LI 1937 – Competitive electricity market implementation
- Provide alternate fuel paths to power plants in Tema
- Develop LNG infrastructure
- Encourage decentralization and diversification of generation portfolio mix
- Develop identified Small Hydro Sites
- Ensure sufficient transmission network availability
- Fuel Diversity

RECOMMENDATIONS (2)

- Aggressively integrate grid-connected wind and solar PV energy into the electricity sector
- Provide incentives to spur private and public sector investment and ownership in Solar PV
- Leverage investments and efforts being made under the West African Power Pool to meet Ghana's electricity needs
- Help develop and enforce WAPP-wide reliability standards and operating procedures to ensure regional power system reliability, transmission network resilience, secured and efficient cross border power transfers



THANK YOU