Energy Access Situation and Scenarios in West Africa: Access Rates, National Approaches and Policies in different ECOWAS Countries

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Accra, October 24 2011

OVERVIEW

1. General Background
2. Energy Access Situation in West Africa
   - Strategic Objective
   - Access Rates
   - National Approaches and Policies
3. Achievement at Country Level in ECOWAS
4. The Challenges Ahead
5. Opportunities
6. Conclusion

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HIGHLIGHTS

Energy Issues in ECOWAS Region

1. Huge demand and supply gap (more than 40 %) in modern energy services
2. 64 % of the total energy supply are covered by thermal power plants
3. 31 % are generated with Hydro Power
4. 5 % come from imports and other energy resources such as RE
5. Traditional biomass constitutes a vital part of the primary energy consumption (especially in the rural areas), with a total contribution of 80 %

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HIGHLIGHTS (2)

Proposed Approaches

6. Translate the White Paper into actions such as reorienting national funding to energy access policy goals
7. National Task Force for fund raising relating to universal access (taking advantage of existing and upcoming financing mechanisms at the global level)
8. Private sector could play a critical role in Regional Energy Access agenda (national governments to adopt strong governance and regulatory frameworks and engage in capacity building)
9. Public sector needs to leverage greater private sector investment where the commercial case is not attractive

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HIGHLIGHTS (3)

10. Public subsidies must be well used to reach the poorest to switch from traditional biomass to modern bioenergy for cooking (rural and peri-urban)
11. Operating consumer and business finance through local banks and microfinance institutions for renewables
12. Establishment of a comprehensive database on Energy Access for monitoring purposes (from ECOWAS regional model to national and local tools)
13. Policy platform for information sharing at national and regional level (ECREEE must play a leading role)
14. Setting targets is a necessary step to provide a framework for tracking progress and accountability

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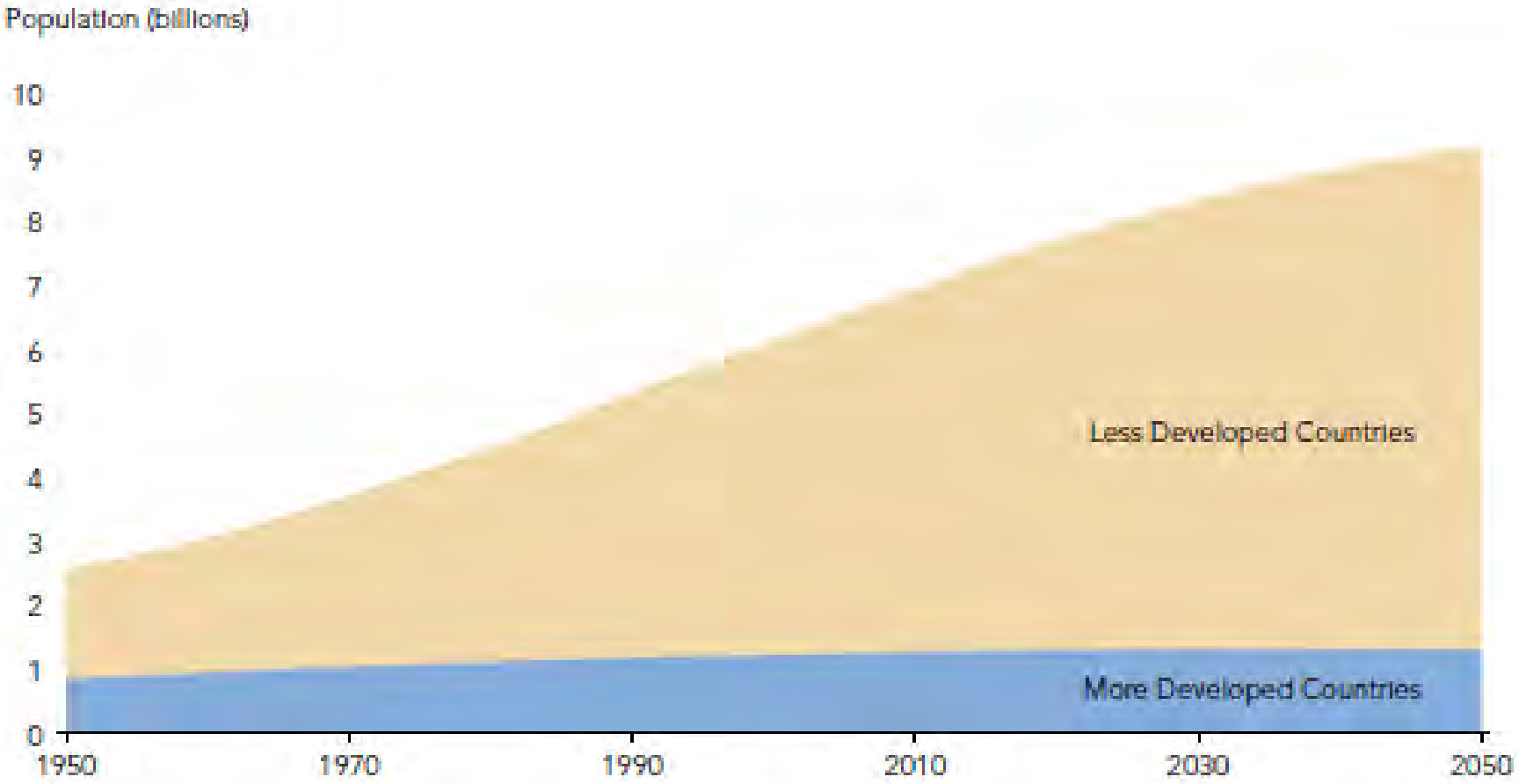
1 - GENERAL BACKGROUND

POPULATION: IN 2009, WORLD POPULATION STOOD AT 6.8 BILLION, UP ABOUT 83 MILLION FROM 2008

SSA: 836 M VS AFRICA: 999 (MID-2009 FIGURE)



Source: UN Population Division, *World Population Prospects: The 2008 Revision*, medium variant (2009).

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POPULATION CLOCK, 2009

		More Developed Countries	Less Developed Countries	World
Population		1 232 100 000	5 577 872 000	6 809 972 000
Births per	Year	14 359 000	124 590 000	138 949 000
	Day	39 340	341 343	380 683
Death per	Year	12 277 000	43 806 000	56 083 000
	Day	33 635	120 018	153 653
Natural	Year	2 082 000	80 784 000	82 866 000
Increase	Day	5 705	221 325	227 030

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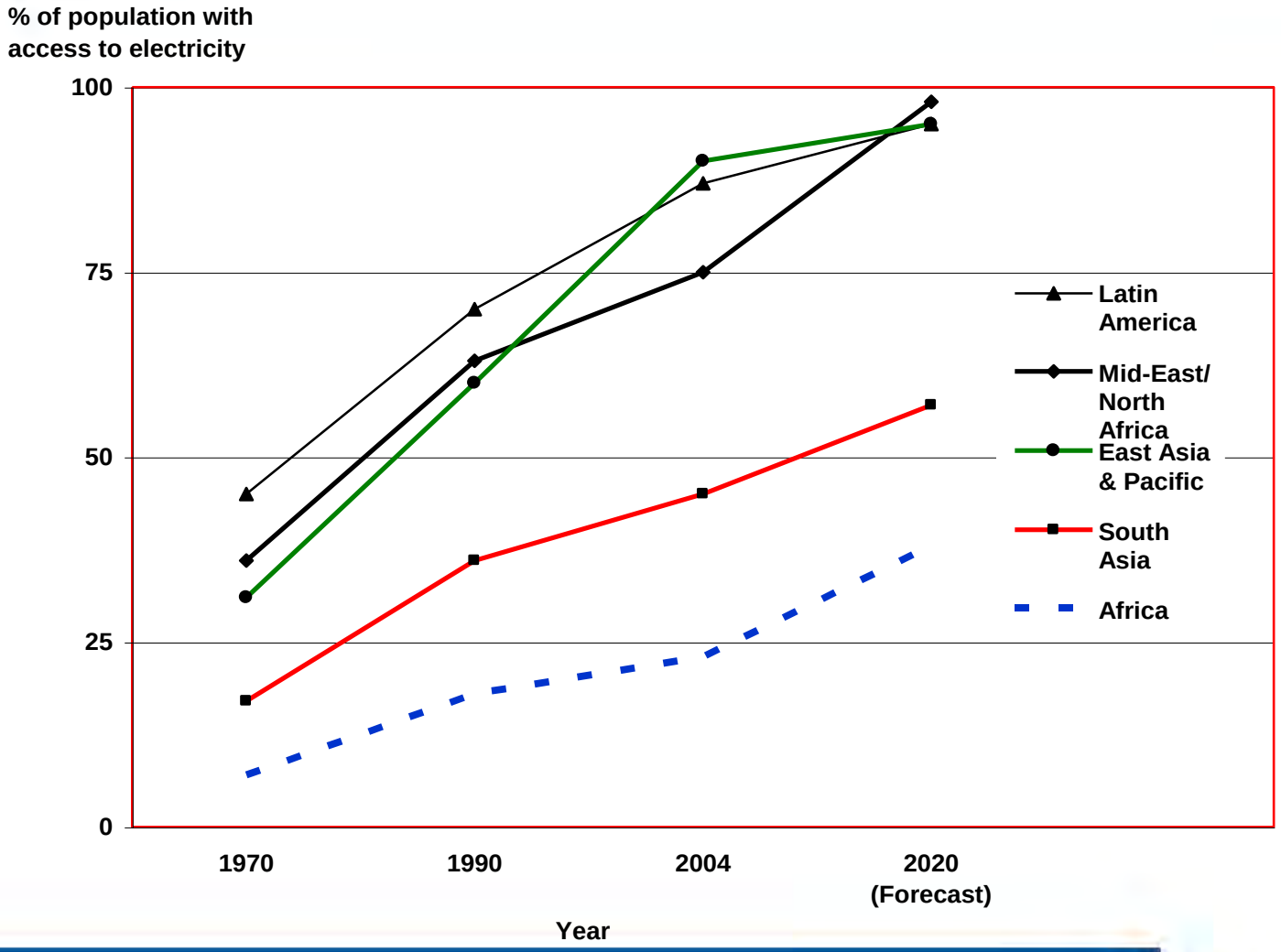
THE TOTAL POPULATION OF ECOWAS WAS ABOUT 300 MILLION IN 2010 (TECHNICAL PAPER – P.7)

Country	Population in million (2010)	Rural Population (% of total population)	Population Below Poverty Line (%)	GDP Current (100000 US $ in 2010	GDP Growth (% in 2010)	HDI Rank (2010 ranking)
Benin	8.8	58	37.4	6,633	3	134
Burkina Faso	16.5	80	46.4	8,820	9.2	161
Cape Verde	0.5	39	30	1,648	5.4	118
Côte d'Ivoire	19.7	50	42	22,780	3	149
Gambia	1.7	42	39.6	807	5	151
Guinea	10.0	65	30.5	4,511	1.9	156
Guinea-Bissau	1.5	70	51.6	879	3.5	164
Ghana	24.4	49	29	31,306	6.6	130
Liberia	4.0	39	80	986	5.5	162
Mali	15.4	67	25.5	9,251	4.5	160
Niger	15.5	83	63	5,549	8.8	167
Nigeria	158.4	50	43.1	193,669	7.9	142
Senegal	12.4	57	35.1	12,954	4.2	144
Sierra Leone	5.9	62	47	1,905	4.9	158
Togo	6.0	57	36.8		3.4	139
ECOWAS	**300 (325 yr15)**	**57.87**	**42**		5.1	
SSA	856	60				
World	6,900	44				

Most of the poor living in rural & periurban

2 - ENERGY ACCESS SITUATION

ELECTRICITY ACCESS OVERVIEW IN THE WORLD



- 585 million in sub-Saharan Africa lack access to electricity
- Connection rates as low as 8% in rural areas
- Figures from IEA, 2010
- Forecast by the WB, 2006

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ELECTRICITY ACCESS IN 2009 - REGIONAL AGGREGATES (P.8)

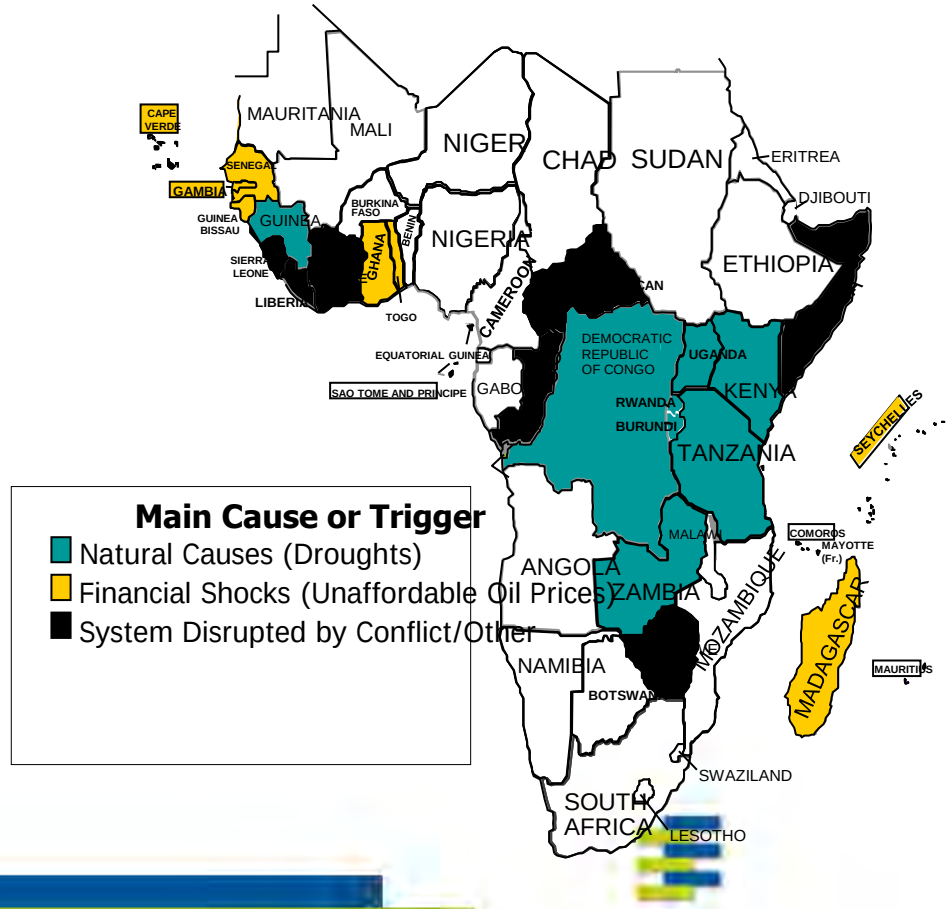
	Population without electricity millions	Electrification rate %	Urban electrification rate %	Rural electrification rate %
Africa	587	41,9	68,9	25,0
North Africa	2	99,0	99,6	98,4
Sub-Saharan Africa	585	30,5	59,9	14,3
Developing Asia	799	78,1	93,9	68,8
China & East Asia	186	90,8	96,4	86,5
South Asia	612	62,2	89,1	51,2
Latin America	31	93,4	98,8	74,0
Middle East	22	89,5	98,6	72,2
Developing countries	1 438	73,0	90,7	60,2
Transition economies & OECD	3	99,8	100,0	99,5
World	1 441	78,9	93,6	65,1

THE SITUATION IN WEST AFRICA

- Attaining the MDGs by 2015 in ECOWAS Member Countries requires that at least half the population of rural and peri-urban areas have access to modern energy services
- (ECOWAS White Paper)

- External shocks have contributed to deepen Energy Poverty

Almost 23 out of 48 SSA countries are currently vulnerable according to the World Bank Group



STRATEGIC OBJECTIVE

Support ECOWAS member countries to scale up "real" access to the less privileged populations of the region, so as to ensure affordable, reliable and sustainable supplies of modern energy services, as part of broader efforts to stimulate growth, and reduce poverty in order to achieve the MDGs by 2015.

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…STRATEGIC APPROACH…

Improved Enabling Environment

- Realistic costed government strategy (via PRSP)
- Funding commitments

Effective Policy & Regulatory Framework

- Balance between affordability for consumers & for governments
- Robust regulation
- Multiple forms of access provision
- Enhanced supplier and consumer incentives
- Opportunistic approach to private sector participation

Improved Management Capacity

- Capacity-building for project management & good governance
- Expand use of low-cost approaches & technologies
- Develop energy SMEs and cooperatives

Financially Healthy Utilities

- Cost-recovery for O&M costs at minimum
- Effective subsidy transfer mechanisms for grid scale-up

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THIS STRATEGIC APPROACH TRANSLATES INTO A RANGE OF OUTCOMES FOR COUNTRIES

- Progress towards the MDGs through expanded scope and quality of social services
- Meeting basic consumer needs for modern energy services including electricity
- Enhanced growth, productivity and competitiveness
- Reduced vulnerability to shocks - greater security of energy supply including basic household fuels
- Decreased fiscal impact of energy sector
- Reduced environmental impact

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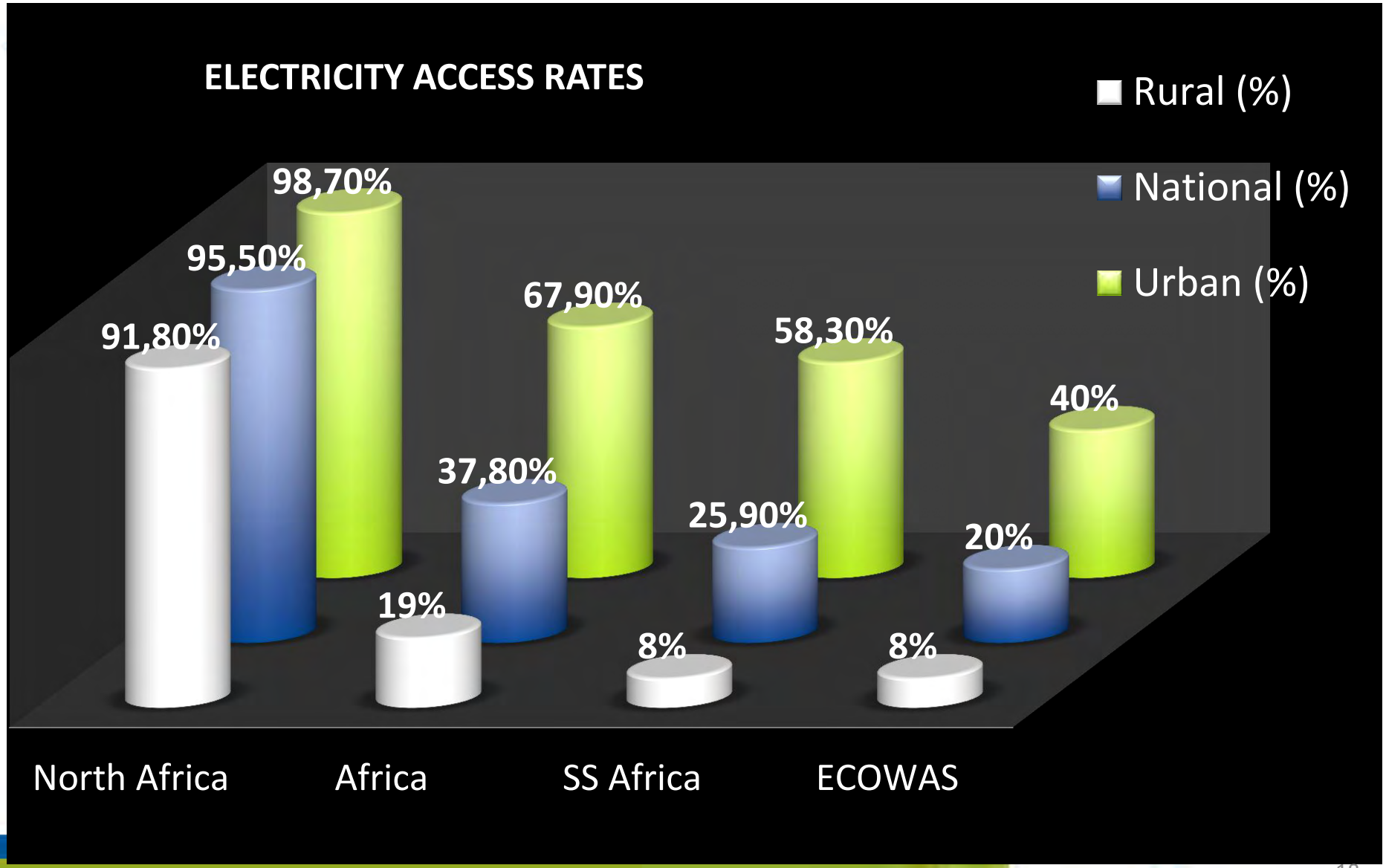
3 - ACHIEVEMENT AT NATIONAL LEVEL BY ECOWAS COUNTRIES: ASSESSMENT THROUGH ECOWAS POLICY PILLARS

ACCESS / PILLAR 1: ELECTRIFICATION



ELECTRICITY ACCESS 2009 – FOR SELECTED ECOWAS COUNTRIES VS SSA COUNTRIES

	Electrification rate (%)	Population without electricity millions
Benin	24,8	6,7
Burkina Faso	14,6	13,5
Cote d'Ivoire	47,3	11,1
Ghana	60,5	9,4
Nigeria	50,6	76,4
Senegal	42,0	7,3
Togo	20,0	5,3
Other Africa	17,0	85,2
Sub-Saharan Africa	30,5	585,2

IEA, World Energy Outlook 2010

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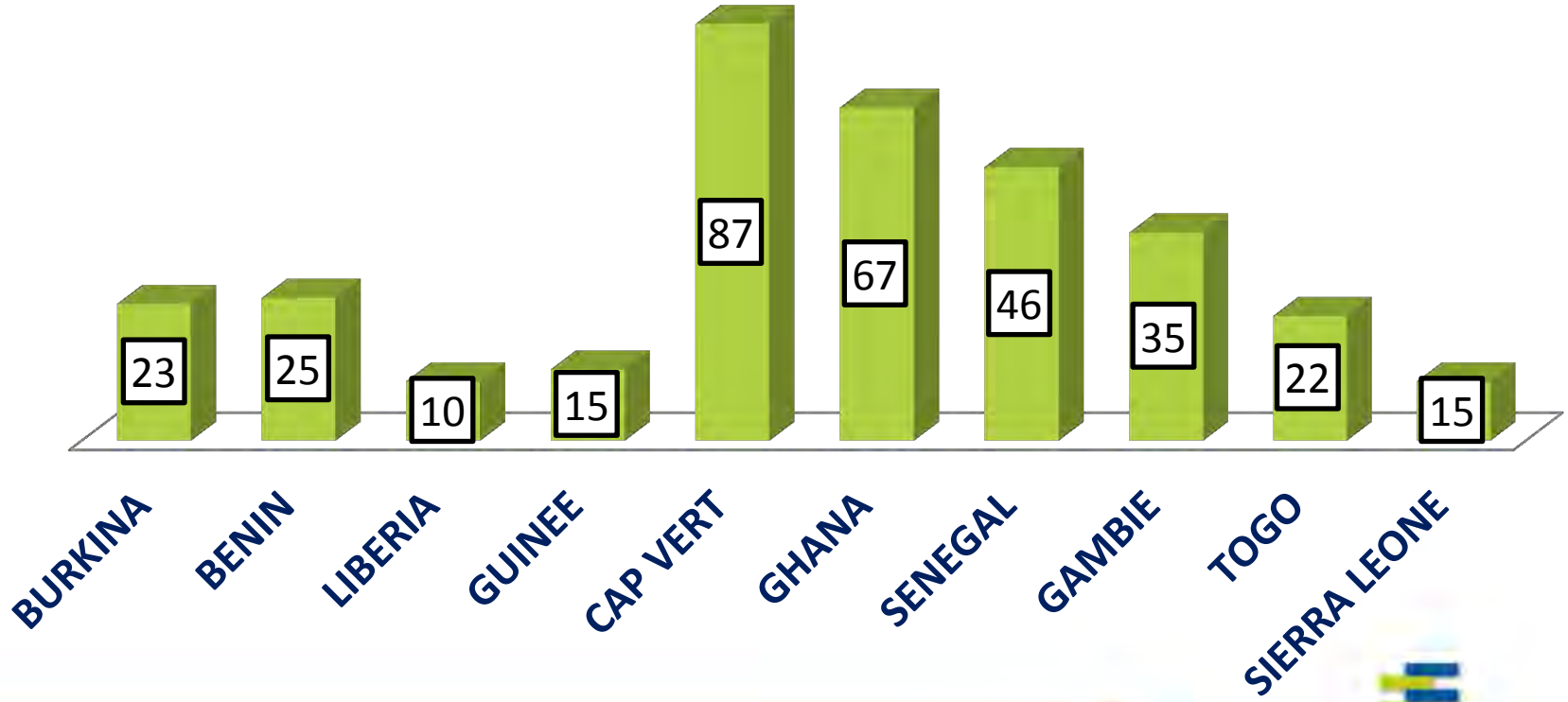
- # DISPARITY IN ACCESS RATES BETWEEN COUNTRIES GHANA AND CAPE VERDE: HIGHEST ACCESS RATES

Electricity Access Rates for Selected ECOWAS Member Countries (ENDA / 2009)

Average rural electrification rate is around 8% in ECOWAS



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APPROACHES AND POLICIES (P.10)

- **National Policies :**
- Many countries are engaged in the development of policies and legislation to support energy sector enhancement
- **Example**: Creation of rural electrification agencies (ASER, AMADER, SOPIE, ABERME, the late combining both energy conservation and rural electrification mandate)
- Access to energy services is made through **access to electricity**: (Benin, BF, Ghana; Nigeria; Mali, Senegal, Niger …) (See: Ghana National Energy Policy, 2010)
- Projects and programs aims to reinforce grid extension and connection of consumers with capacity to paid electricity bills
- **Major risk**: Power shortage that is limiting the impact of such approach on socio-economic development in ECOWAS region

ACHIEVEMENT (P.11)

- **National Programs on Energy Access :**
- At national level, programmes such as the national electricity scheme (NES) in Ghana and the butanization programme in Senegal have substantially improved energy access for the population
- Ghana NES was established in 1989 and included an electrification master plan for 4,221 communities; packages of 69 grid-based electrification projects over six phases of five years and the connection of 64 district capitals for phase 1.
- Such programs exist in other ECOWAS countries

ACCESS / PILLAR 2: MODERN COOKING FUELS

- Biomass accounts for more than 80% of total primary energy consumption. Data are easy to find: OECD/IEA 2010– Energy Poverty / WEO2011 Energy for All
- In 2009, IEA estimated that $9.1 billion was invested globally in extending access to modern energy services, supplying 20 million more people with electricity access and 7 million people with advanced biomass cookstoves.

Mali: FCFA 2.7 billion to subsidy LPG sector in 2007 (See: Energy Conservation Strategy Paper), March 2010 / ADB

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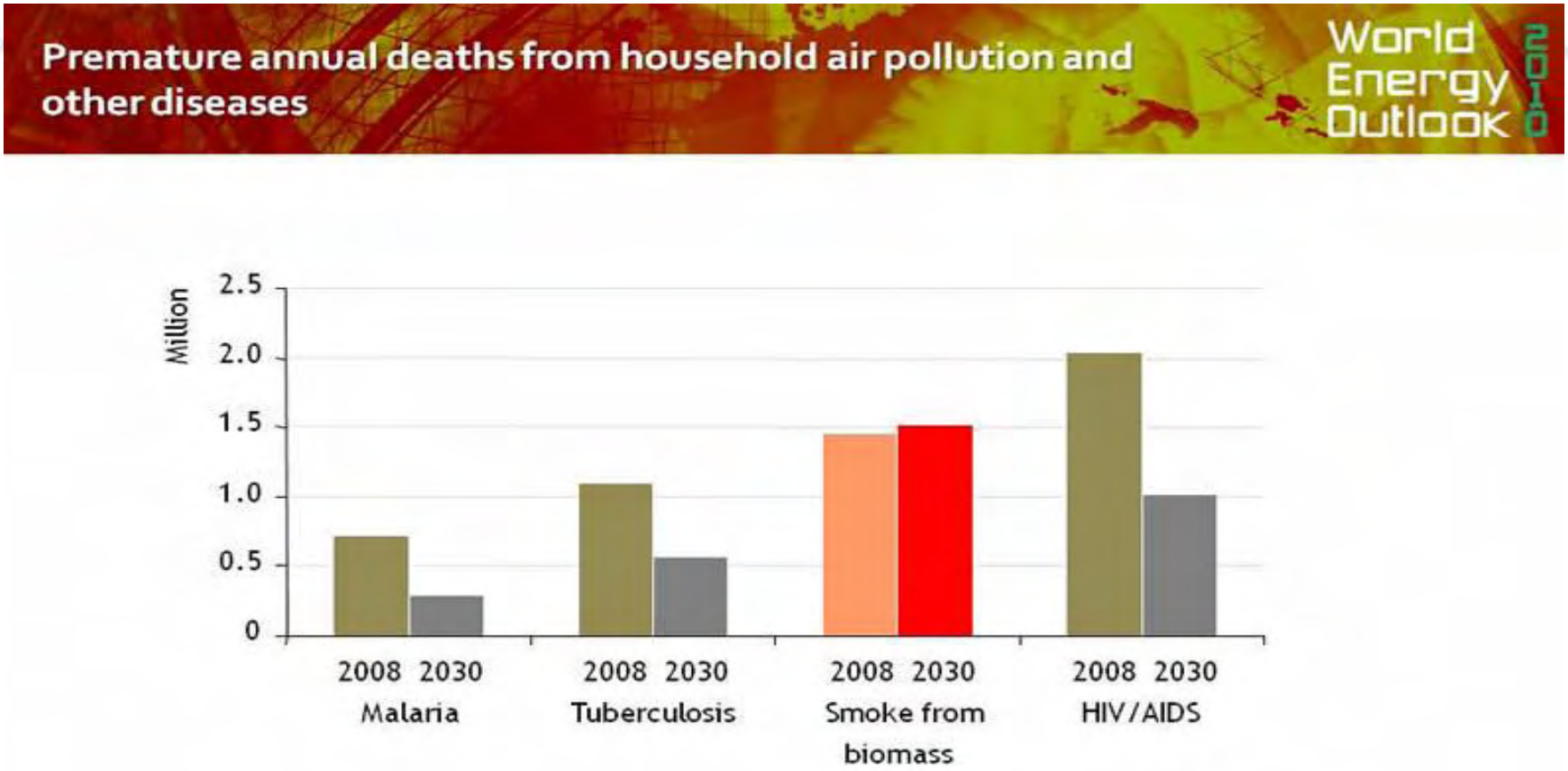
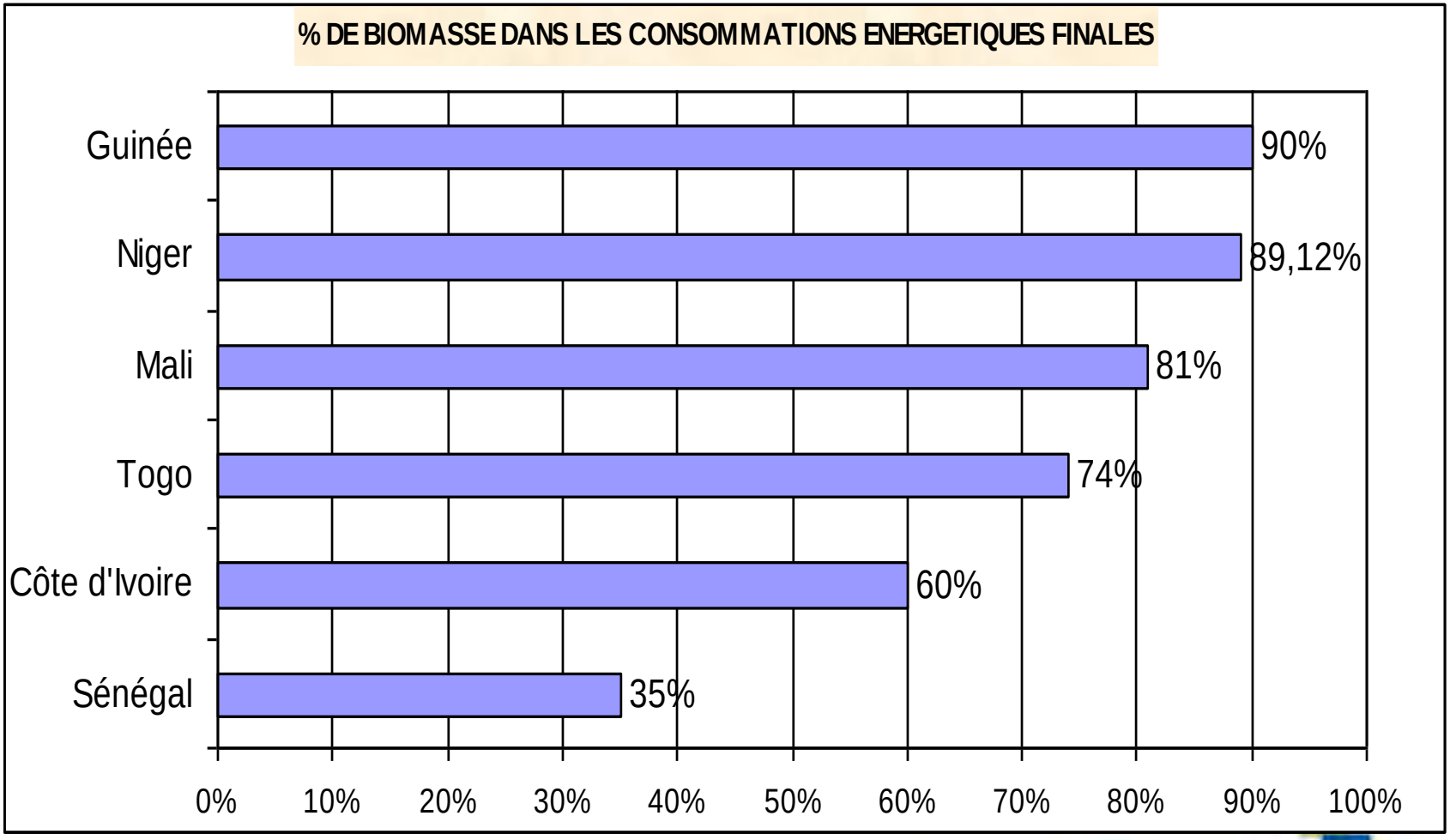
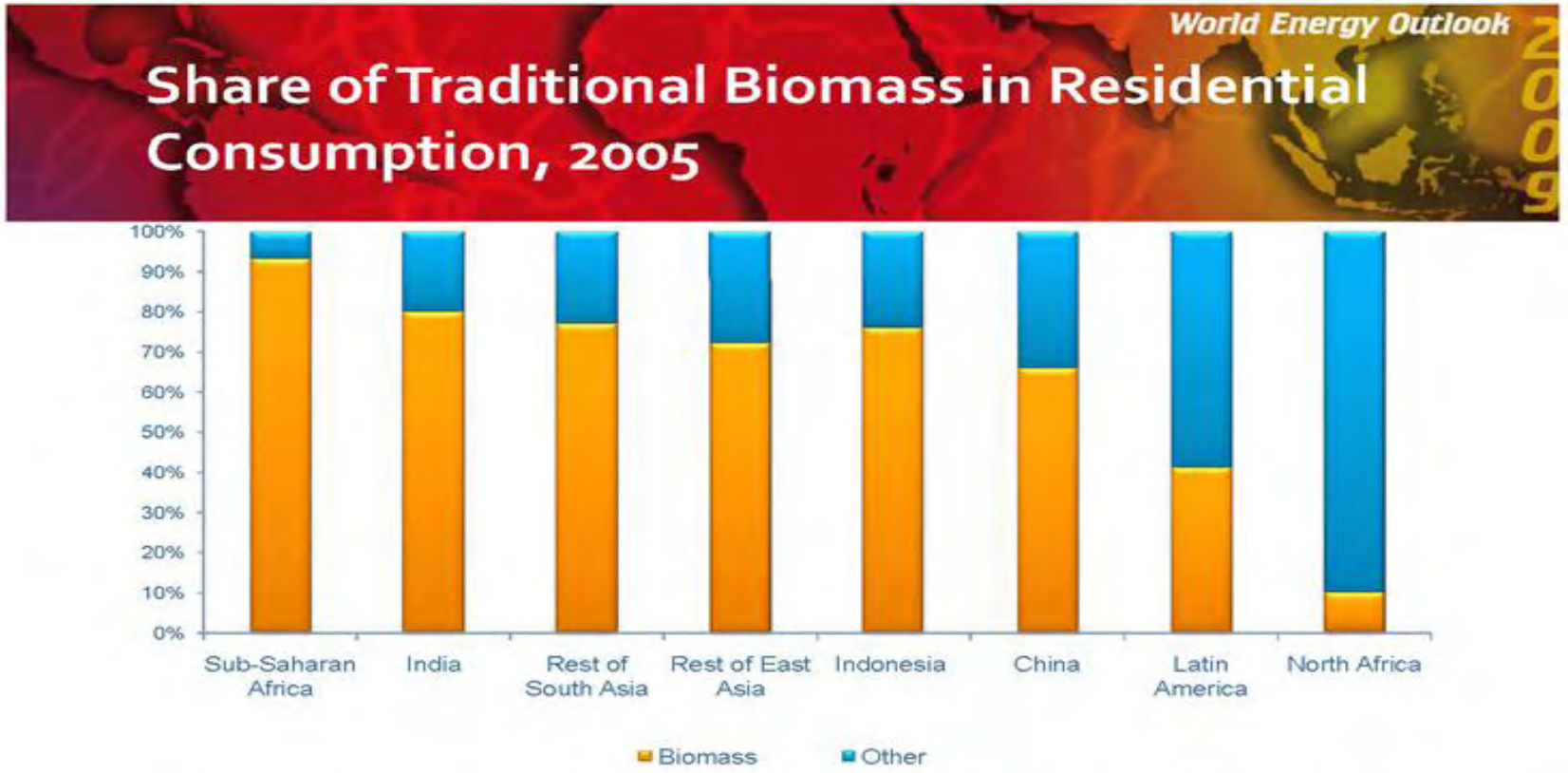
NEGATIVE IMPACTS ON HEALTH



BIOMASS IN ECOWAS REGION 2009



COMPARISON 2009 VS 2005: LIMITED PROGRESS ACHIEVED AROUND THE WORLD



In 2005 Biomass accounted for almost 80% of residential energy consumption in SSA compared to 70% in Developing Countries. Data for 2009 in ECOWAS region is quite similar to 2005 figures.

APPROACHES TO REDUCE RELIANCE ON TRADITIONAL BIOMASS AT NATIONAL LEVEL

- There are an **increased number of National Policies** and Programs in ECOWAS member countries to promote improved cook stoves (Burkina, Senegal, Benin, Niger...)
- **Improved charcoal** production techniques from biomass are also being developed
- Country like Burkina is engaged in the **promotion of biogas** for domestic cooking
- **Solar cookers** could be considered in the future as a viable option to substitute wood fuel for cooking in the Sahel region. Impact women quality of life and deaths reduction
- **LPG is the most popular** option in many countries particularly in the Sahel region.
- Niger is promoting mineral coal as alternative to wood fuel

SITUATION OF MODERN FUELS FOR COOKING

The IEA Energy & Development Index (World Energy Outlook 2010) can be used

COUNTRY	EDI RANK	EDI value	Commercial energy use per capita index	Electrification index	Electricity consumption index	Modern fuels for cooking index
Togo	58	**0,058**	0,014	0,10	0,057	0,059
Benin	52	**0,111**	0,038	0,15	0,031	0,219
Côte d'Ivoire	47	**0,142**	0,037	0,41	0,060	0,065
Nigeria	46	**0,144**	0,059	0,44	0,065	0,008
Senegal	45	**0,157**	0,040	0,35	0,054	0,188
Ghana	43	**0,195**	0,054	0,56	0,098	0,073
South Africa	10	**0,742**	0,873	0,72	0,902	0,474
Libya	1	**0,949**	1,000	1,00	0,907	0,892

APPROACHES AND POLICIES

- **Regional Policy for Energy Access:**
- **ECOWAS WHITE PAPER FOR A REGIONAL POLICY ON ENERGY ACCESS IN RURAL AND PERI-URBAN AREAS (Jan. 2009)**

1) **Turning point in the regional co-operation**
2) **Inspiring model for the rest of sub-Saharan Africa**

- **National Policies :**
- Based on the White Paper, many countries started the development of policies and legislation to support energy access
- The aim is to translate the regional policy objective into national policies and actions
- GTZ Renewable Energies in West Africa Study provides reference to national efforts: Benin, Burkina, Mali, Niger...

SUCCESSES IN ENERGY ACCESS POLICY IMPLEMENTATION

- **Some examples include:**
- **Senegal LPG project for fuel switching**
- **AREED Programme sponsored by UNEP that provided seed-capital to rural energy enterprises to promote LPG in Mali, Senegal and Ghana**
- **LPG promotion program in Côte d'Ivoire with PETROCI using small and medium sized enterprises as partners for distribution of LPG**
- **Such approaches should be more strengthened through public and private partnerships**

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ACCESS / PILLAR 3: MOTIVE POWER (P.17)

- No real economic activity can be promoted without access to mechanical or electrical motive power.
- Such power makes it possible to run, for example, water pumps and mills. Experiments carried out show that the costs of fitting a diesel motor and some key accessories is around 15,000$ for a village
- For all of the ECOWAS countries, 100% of the villages with more than 1000 habitants is expected to have access to motive power by the year 2030.
- UNDP Multi-Functional Platform (MFP) program is one of the most successful experience in some ECOWAS countries (Senegal, Mali, Burkina Faso, Niger)
- Motive power is the area where a general assessment should be conducted at the regional level for comparison purposes

4 – THE CHALLENGES AHEAD

SHORT & LONG-TERM CHALLENGES (P.10)

- **Improving access to energy services means overcoming multiple challenges.**

	Description	Comments
Challenges	Weak enabling environment at central government level	Energy access strategies lacking Limited government funding for sector
	Sub-optimal policy & regulatory frameworks undermine market functioning	Inappropriate policy stance leads to access bottlenecks Robust & consistent regulatory oversight lacking Minimal private sector operational or capital participation

SHORT & LONG-TERM CHALLENGES (2)

	Description	Comments
Challenges	Limited management capacity at operational level	Utilities lack capability to roll out and operate infrastructure Poor procurement governance
	Utilities in poor financial health	Utilities have monopoly position but financially weak, operating in a non-commercial manner Subsidies or financing for upgrading assets lacking
	Consumers have limited ability to pay	
	Unit costs for network construction and fuel are high	

ACCESS TO MODERN COOKING FUELS PRESENTS ADDITIONAL CHALLENGES

- **Traditional biomass use is widespread**

- 80% of SSA depends on fuel-wood and charcoal for cooking and water heating

- **Traditional cooking stoves endanger health**

- Over 95% of households in SSA cook with biomass on open fires or traditional inefficient stoves
- Smoke from cooking fires is leading cause of acute respiratory disease – a major killer

- **Biomass is harvested unsustainably**

- Results in loss of forest cover and river silting

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- **OPPORTUNITIES TO MEET ECOWAS ENERGY ACCESS GOAL**

1) POLICY LEVEL
2) TECHNOLOGY LEVEL
3) FINANCING LEVEL

MEETING ECOWAS'S ENERGY CHALLENGES REQUIRES A RADICAL SCALING-UP OF ACCESS

By 2030, member countries need to achieve "stretch" targets:

Electricity for Growth

Increase coverage for households (> 75% on average), support productive enterprises (100% mostly in urban and peri-urban areas) and rural areas close to the grid

Meeting Basic Needs

>50% households equipped with at least one modern, affordable light

>75% households use improved cook stove or LPG and fuel-wood supply is sustainable (policy and technology transfer)

Powering the MDGs

>75% of schools, clinics, community centers & local administration electrified, using grid extensions where least cost and decentralized solutions elsewhere (solar PV, independent grids, small renewables generation)

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ROLE OF RENEWABLE ENERGY

- **ECREEE Renewable Energy Project Pipeline contains almost 100 projects relating to Renewables, particularly solar energy (PV) for off-grid and mini-grids.**
- **But hydro and wind are also playing a critical role in the region (Guinea; Gambia, Cape Verde, Ghana, etc.)**
- **The Global Environment Facility (GEF-4) has set a Framework for Regional Program in the energy sector. Some projects being developed are focusing on Renewable energy (RE)**
- **RE for power on-grid, mini-grid & off-grid has a potential for successful commercial development**

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RENEWABLE ENERGY TECHNOLOGY (RET) OPTIONS FOR ECOWAS

Energy Source	Present	Near term	Medium term	Long term
Electricity	Grid or no Grid	Biomas-based generation using gasifier coupled to internal combustion engines	Biomas-based generation using gasifier coupled to micro-turbines and integrated gasifier	Grid connected photovoltaic using gasifiers coupled to fuel cells
Fuel	Wood, charcoal, dung, crop residue	NG, LPG, producer gas, biogas	Syngas, DME	Biomass derived DME
Cogeneration	In agro-industry sector for heat and power	Internal combustion engines, etc	Micro-turbines & integrated gasifiers	Fuel cells, fuel cell/turbine hybrid

RET OPTIONS FOR ECOWAS (2)

TASK				
Energy Source	**Present**	**Near term**	**Medium term**	**Long term**
Cooking	Woodstove	Improved woodstove	DME stoves, NG and PG	Electric stoves, catalytic burners
Lighting	Oil/kerosene lamps	Electric lights	Florescent lamps	Improved florescent lamps
Motive power	Human/ animal powered devices	Internal combustion engines, electric motors	Bio-fueled prime movers, improved motors	Fuel cells
Process heat	Wood, biomass	Electric furnaces, NG, PG	Solar thermal furnaces	Solar thermal furnaces with heat storage

ECOWAS REGIONAL CENTRE: AN INSTRUMENT FOR SUPPORTING RE & EE PROMOTION

The **ECOWAS Regional Centre for Renewable Energy and Energy Efficiency (ECREEE**) could be considered a an asset for all the region to assist member countries in EE and RE

Recently ECREEE set-up the ECOWAS Renewable Energy Facility (EREF) which aims at co-funding small and medium scale RE&EE projects in accordance with the ECOWAS White Papers on Energy Access.

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FINANCING MODERN ENERGY ACCESS

- ECOWAS member countries must drawn on experience from existing programmes using different financing and business models to provide modern energy access to rural and peri-urban communities

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Investment requirement for 100 % electricity access in ECOWAS between 2011-30:

Country	Population in 2010 (in million)	Population in 2030 (in million)	Current Electricity Access Rate (%)	Additional Households that would receive Electricity Between 2011-2030	Investment per annum between 2011-2030
Benin	8.8	13.9	24.8	2,307,772	126,927,471
Burkina Faso	16.5	26.0	14.6	4,294,520	236,198,613
Cape Verde	0.5	0.8	87%		7,113,748
Côte d'Ivoire	19.7	31.1	47.3	5,146,995	283,084,701
The Gambia	1.7	2.7	15	450,711	24,789,080
Guinea	10.0	15.7	15	2,602,883	143,158,580
Guinea-Bissau	1.5	2.4	15	395,123	21,731,740
Ghana	24.4	38.4	66.7	6,360,617	349,833,919
Liberia	4.0	6.3	n.a	1,041,541**	57,284,745
Mali	15.4	24.2	18	4,007,961	220,437,829
Niger	15.5	24.4	8	4,045,027	222,476,496
Nigeria	158.4	249.6	50.6	41,311,760	2,272,146,802
Senegal	12.4	19.6	42	3,242,323	178,327,786
Sierra Leone	5.9	9.2	15	1,530,068	84,153,739
Togo	6.0	9.5	22	1,571,859	86,452,259
ECOWAS	300.8	474.0	27.23	78,438,500	4,314,117,507

6 - CONCLUSION

CONCLUSION & WAY FORWARD

- Remove critical policy barriers prior to moving to full access scale-up roll-out.
- Assist the most disadvantaged communities to engage in energy access initiatives
- Improve up-stream governance and macro-economic enablers, in conjunction with sector policy issues
- Prepare multi-year investment program for access roll out supported by pooled donor financing.
  Implementation needs:
  - to identify investments, least cost options, financing options
  - Build capacity for procurement and supervision of turn-key contracts

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Questions?

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