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"Renewable Energy Development in Nigeria: a Country Report"

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RENEWABLE ENERGY DEVELOPMENT IN NIGERIA: A COUNTRY REPORT *

BY

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Basic Information on Nigeria



- Total Area: 92.4 million hectares (Land 86%, Water 14%)
- Forest and Woodlands: 11.6%
- Polity:
- Population:

1.

- Crude Oil Reserves
- Natural Gas Reserves

Democracy (Presidential System) 140 million 4.76 Btoe 4.32 Btoe

- Some Socio-Economic Indicators in 2004
 - GDP/Capita: \$493
 Population Growth Rate: 2.85%
 Installed Grid Capacity: 6,220MW of which 60% is available
 Access to Electricity: 40% of population for 6hrs daily
 Energy Consumption per capita 810.1 kgoe
 Electricity Consumption per Capita 72kWh



Basic Information on Nigeria Cont'd



(a) Table 1: RE Resources							
Resour	rces	Estimated Potential					
Large H	ychro (MIVV)	15,000 MVV					
Small H	ychro (MIVV)	3,500 MW					
Solar	Oshada Osh	3.5 - 7.0 kWh/n ? -day					
Wind		2-4 m/s annual average @ 10m height					
12000	Fuelwood*	0.120 million tonnes/yr					
Biomass	Animal Waste*	0.781 million tonnes/yr					
R St. Site	Agric Residue*	0.256 million tonnes/yr					
*Production	n levels	Nor Date & Age Date & Age Date					





- The economic reform, based on the National Economic Empowerment and Development Strategy (NEEDS), is liberalizing and deregulating the Nigerian Energy Sector. The Nigerian Electricity Regulatory Commission(NERC) and the Directorate of Petroleum Resources (DPR) were established.
- Planning for the sector, including RE, is vested on the Energy Commission of Nigeria (ECN), established in 1979 with the overall legal mandate of:
 - * "Producing strategic plans and coordinating national policies on energy in all its ramifications".
- The National Energy Policy (NEP), whose draft was submitted by the ECN in 1993, was finally approved by Government in 2003 after two reviews.
 - The NEP emphasizes the optimal utilization of the nation's energy resources for sustainable development through public private partnerships.





- Energy demand and supply projections covering the industrial, transport, household and services sectors of the economy were undertaken using IAEA models:
 - Model for the Analysis of Energy Demand (MAED)
 - Wien Automatic System Planning Package (WASP)
 - Both MAED and WASP are scenario-based
 - The three scenarios used were:
 - Reference growth with GDP growing at 7%
 - High growth with GDP growing at 10%
 - Optimistic growth with GDP growing at 11.5%
- The National Renewable Energy Masterplan, with set targets/milestones and time-lines, was completed in November 2005.





Demography, social behaviour, economic indices and technology level were used as inputs, using the IAEA Energy Demand projection models

Total Energy Demand Projection by Sector

	0.0			0	Growth	100		10 20	Par A
Scenario/Sector	Demand, Mtoe			rate, %	Share, %				
	2000	2010	2020	2030	2000-2030	2000	2010	2020	2030
Reference Growth Scenario	1	61 10.		A 64	6	10		0200	62 6
(7%)	33.15	50.72	83.78	157.79	5.3	100	100	100	100
Industry	3.56	7.81	22.64	61.5	10	10.7	15.4	27	39
Transport	9.91	13.62	18.51	25.18	3.2	29.9	26.8	22.1	16
Household	15.21	21.55	31.44	47.86	3.9	45.9	42.5	37.5	30.3
Services	4.47	7.74	11.19	23.25	5.7	13.5	15.3	13.4	14.7
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High Growth Scenario (10%)	33.15	56.87	108.66	250.84	7	100	100	100	100
Industry	3.56	12.59	39.47	145.21	13.2	10.7	22.1	36.3	57.9
Transport	9.91	13.48	19.7	33.36	4.1	30	23.7	18.1	13.3
Household	15.21	22.42	33.6	34.27	2.8	45.7	39.4	30.9	13.7
Services	4.47	8.38	15.89	38	7.4	13.5	14.7	14.6	15.1
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Optimistic Growth Scenario	0	0 0	De a A		a Drie		0.0	N.O.	0 0
(11.5%)	33.15	66.52	146.43	328.15	7.9	100	100	100	100
Industry	3.56	22.24	80.94	219.94	14.7	10.7	33.4	55.3	67
Transport	9.91	14.59	22.39	45.08	5.2	30	21.9	15.3	13.7
Household	15.21	20.26	23.06	13.68	-0.3	45.6	30.5	15.8	4.2
Services	4.47	9.44	20.04	49.45	8.3	13.7	14.2	13.7	15.1

Source: "Energy Demand Projections for an Industrializing Nigeria", Report ECN/EPA/06/01





Projected Peak Total Electricity Demand (MW)

Scenario	2005	2010	2015	2020	2025	2030
Reference (7%)	5,746	15,730	28,360	50,820	77,450	119,200
High Growth Rate (10%)	5,746	15,920	30,210	58,180	107,220	192,000
Optimistic (11.5%)	5,746	16,000	31,240	70,760	137,370	250,000





(b) Targets for Renewable Energy Contribution to Electricity Generation (MW) in Nigeria

S/N.	RESOURCE	SHORT	MEDIUM	LONG
10,00	Hydro (large)	1930	5930	48,000
2	Hydro (small)	100	734	19,000
3	Solar PV	5	120	500
4	Solar Thermal	-	1	5
5	Biomass	-032 2023	100	800
6	Wind	1	20	40
2.00	All Renewables	2,036	6,905	68,345
	All Energy Resources	16,000	30,000	192,000
10635	% of Renewables	13%	23%	36%





- While ECN plans for RE, R&D and Pilot projects are mainly undertaken at
 - The National Centre for Energy Research and Development at Nsukka
 - The Sokoto Energy Research Centre, Sokoto
- The 2 Centres and some other units in universities and polytechnics have produced and demonstrated a number of RE systems ready for mass-production and commercialization.











3. Practical Renewable Energy Projects in Nigeria .. Cont'd





A 1000-litre Solar Water Heating System at the Maternity Ward of Usmanu Danfodiyo University Teaching Hospital, Sokoto constructed by SERC.





3. Practical Renewable Energy Projects in Nigeria .. Cont'd









A-2 Tonne Dryer at NAPRI, Zaria, Constructed by SERC









4. Challenges To Energy Utilization in Nigeria



Capacity Limitation:

- The technical expertise to develop, deploy and manage renewable energy is inadequate.
- The infrastructure for the manufacture of renewable energy system components is not available in the country.

Lack of Financial and Fiscal Incentives:

Financial and fiscal incentives are not available to fasttrack the development of the supply and demand sides RE market.

of the

Lack of Awareness:

- There is the general lack of awareness of the benefits of

RE.





Inadequate Resource Assessment:

- Reliable resource database to assist investment decisions for RE industry is absent.

Inadequate Institutional Framework:

- There is no institution specifically charged with the regulation of RE industry
 - With the mandate of the Nigerian Electricity Regulatory Commission limited to electricity plant capacities of 1MW and above, there is no agency to licence smaller capacities that are often associated with RE electricity.
- Intermittency of Resource Availability
 - The challenge of energy storage and system management during periods of lack of resource adds to the complexity of the systems. 24





High Initial Investment Cost:

- RE systems have high initial cost. This has limited the penetration of the systems into the market.

Inappropriate Tariffs on Electricity Services:

- With the deregulation and liberalization of the energy sector in Nigeria, a conducive atmosphere is being created for appropriate tariffs on electricity services in the country. This opportunity would enable RE electricity to be competitive in the market, in the medium to long term.



The Way Forward



- Institutionalization of the National Energy Policy and the National Energy Masterplan through an Act of the National Assembly for sustainability.
- Establishment of a Renewable Energy Fund to serve as the instrument for the provision of financial incentives to local manufacturers, suppliers and users of RE, especially with reference to the rural areas.
 - Provision of adequate fiscal incentives to local suppliers and manufacturers of RE system components.
 - Sustenance of the energy sector reforms by successive governments.
- Intensification of promotional and advocay activities on RE.





- Intensification of R and D into RE technology to further bring down costs.
 - The enormous financial benefits now derived from the depletable fossil resources need to be partly invested in the development of RE infrastructure in partnership with the private sector.
- Establishment of regulatory framework for the RE industry.
 - Development and sustenance of the RE resource database.
- Sustenance and strengthening of cooperation within and between sub-regions.



6. Conclusions



- The low level of energy access in Nigeria, can be increased by the active use of renewable energy resources.
- Hydro, solar, wind and biomass have significant potentials to make the difference.
- Renewable electricity is projected to contribute 13%, 23% and 36% in meeting the nation's total electricity demand in the short, medium and long terms.
- There is the need to institutionalize both the NEP and the NEMP (incorporating the REMP) through an Act of the National Assembly.
- There is the need for the establishment of a RE Fund to cater for incentives to local manufacturers, suppliers and users of RE.
- There is the need for fiscal incentives to local suppliers and manufacturers of RE system components.
- There is the need to sustain and strengthen cooperation within and between sub-regions.





THANK YOU AND GOD BLESS

