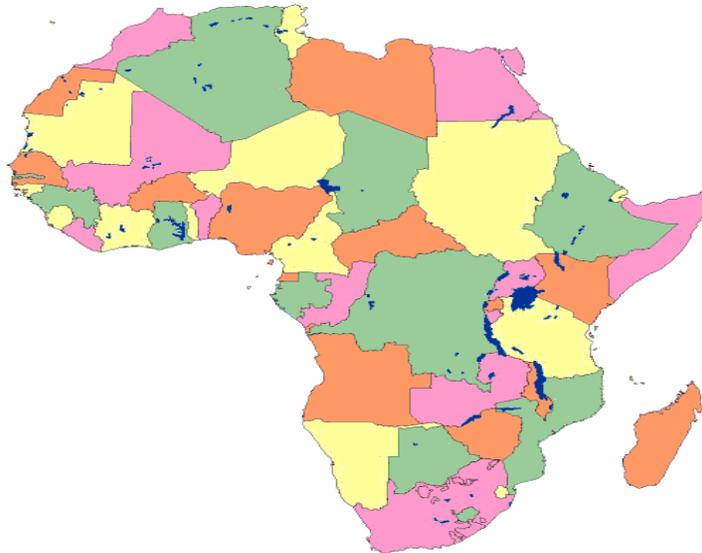




UNITED NATIONS
ECONOMIC COMMISSION FOR AFRICA

African Regional Implementation review for the 14th Session of the Commission on Sustainable Development (CSD-14)



Report on “Energy for Sustainable Development”

Prepared by the Economic Commission for Africa (UNECA) of behalf of the Joint Secretariat UNECA, UNEP, UNIDO, UNDP, ADB and NEPAD Secretariat

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ACRONYMS

A21	Agenda 21
ADB	African Development Bank
AFREC	African Energy Commission
AMCEN	African Ministerial Conference on the Environment
ARIA	Assessment of Regional Integration in Africa
AU	African Union
BOAD	Banque Ouest Africaine de Développement (WADB)
CEB	Chief Executives Board for Coordination
COMESA	Common Market for Eastern and Southern Africa
CSD	Committee on Sustainable Development
EAPP	Eastern Africa Power Pool
ECCAS	Economic Community of Central African States
ECOWAS	Economic Community of West African States
EE	Energy Efficiency
ESCO	Energy Service Company
EU	European Union
FAO	Food and Agriculture Organization
GEF	Global Environment Facility
GNESD	Global Network on Energy for Sustainable Development
GNP	Gross National Product
IAEA	International Atomic Energy Agency
ICT	Information and Communications Technology
IEA	International Energy Agency
IEPF	Institut de l’Energie des Pays Francophones
ISED	Indicators for Sustainable Energy Development
JPOI	Johannesburg Plan of Implementation
LPG	Liquefied Petroleum Gas
MDG	Millennium Development Goals
MTOE	Million Ton Oil Equivalent
NEPAD	New Partnership for Africa’s Development
NGO	Non Governmental Organization
ODA	Official Development Assistance
PCFV	Partnership for Clean Fuels and Vehicles
PEAC	Pool Energétique d’Afrique Centrale
PFIA21	Plan for the Further Implementation of Agenda 21
PRSP	Poverty Reduction Strategy Paper
R&D	Research and Development
RC	UN Regional Commissions
RE	Renewable Energy
REC	Regional Economic Communities
REEEP	Renewable Energy and Energy Efficiency Partnership
RET	Renewable Energy Technology
SADC	Southern African Development Community

SAPP	Southern Africa Power Pool
SSA	South Saharan Africa
STAP	Short Term Action Plan
UMA	Union du Maghreb Arabe
UN	United Nations
UNEP	United Nations Environment Programme
UNDESA/DESA	United Nations Department of Economic and Social Affairs
UNDP	United Nations Development Programme
UNECA/ECA	United Nations Economic Commission of Africa
UN-Habitat	United Nations Programme for Habitat
UNIDO	United Nations Industrial Development Organization
WAGP	West Africa Gas Pipeline
WAPP	West African Power Pool
WB	World Bank
WEC	World Energy Council
WSSD	World Summit on Sustainable Development

PREFACE

The Commission on Sustainable Development, at its fourteenth session (CSD-14) in April 2006, will undertake a review of progress achieved at all levels in the implementation of targets and goals on the thematic cluster of “Energy for Sustainable Development, Atmosphere/Air Pollution, Climate Change and Industrial Development”.

This report is prepared to serve as the African regional review report on progress achieved at regional and sub-regional levels in the implementation of the commitments, goals and targets related to the theme of “energy for sustainable development” agreed upon in Agenda 21 (A21), the Programme for the Further Implementation of Agenda 21 (PFIA21), the ninth session of the Commission on Sustainable Development (CSD-9) and the Johannesburg Plan of Implementation (JPOI).

Scope of the Report

This report seeks to review activities undertaken, and assess the overall progress made by various organizations at regional, sub-regional and international levels, to achieve the commitments, goals and targets agreed during the above-mentioned meetings.

Actions reviewed and documented in this section do not intend to exhaustively represent all initiatives taken by every development actor in Africa. To carry out such a comprehensive review would have required more consultations, means and good will from all actors. The report is mainly based on the compilation of responses to surveys sent to major regional, sub-regional and international organizations active in energy in Africa. Also, progress made at national levels will not be assessed in this report. Individual countries will report on their national situations separately to the CSD.

As the Secretary-General’s report will focus on progress in implementation, this report is based on data and quantitative and qualitative information in the form of factual evidence sent by various organizations.

Organization of the report

The report comprises five main sections:

Section 1 presents an overview of the current African energy situation, highlights the energy potential of the continent, its pattern of energy production and consumption, and the link to poverty reduction and sustainable development.

Section 2 reviews the goals, targets and commitments made at A21, PFIA21, CSD9, and WSSD, and recalls the main energy issues from an African perspective.

Section 3 makes a critical assessment of the progress achieved in the implementation of the four main issue areas identified, which are “Energy accessibility for poverty alleviation”, “Changing patterns of energy production and consumption”, “Development

of advanced and cleaner energy technologies”, and “Crosscutting issues including finance, international, capacity building, regional trade, technology transfers, etc.

Section 4 summarizes the constraints identified by the actors in implementing the commitments, and recalls other key challenges to energy development in Africa.

Section 5 draws lessons from the identified constraints, and maps a way forward through specific recommendations addressed to various energy stakeholders.

EXECUTIVE SUMMARY

Africa is endowed with a diversity of energy resources unevenly located across the continent. They include relatively important reserves of oil, gas and coal that account for 9.4%, 7.9% and 5.54% respectively of the world total¹. The hydropower potential of the continent amounts to 13% of the world. In Africa, energy is produced mainly from biomass (47%), oil (24.8%), coal (16.5%), gas (10.4%), and other renewable sources, such as large and small hydro dams, solar, and geothermal sources (1.3%)². The continent has abundant solar irradiation ranging from 5 to 7 kWh/m², all year round, and it enjoys a relatively strong wind power potential in Northern, Southern and Eastern Africa. Finally, the continent has an estimated geothermal energy potential of 9,000 MW in the Rift Valley area in East Africa³.

Energy consumption in Africa is largely dominated by combustible renewable resources (biomass, animal wastes, municipal and industrial wastes). Energy from biomass accounts for more than 30% of the energy consumed in Africa and more than 80% in many SSA countries. Biomass constitutes the main energy resource for the large majority of African households for cooking, drying and space heating. While electricity access data varies widely depending on the reporting sources, IEA data reports average rates ranging from 70% to over 94% in Northern Africa, and 23% in sub-Saharan Africa, with large disparities between countries (for instance less than 4% in Uganda compared to 66% in South Africa or 100% in Mauritius), and between urban and rural areas, where in the latter, rates can be as low as 1%⁴.

Review of goals, targets and commitments made at A21, PFIA21, CSD-9 and WSSD

A21, PFIA21, CSD-9, and WSSD all recognized that energy issues must be given high priority by policy-makers, financial institutions, regional organizations, development actors, and all stakeholders if one is to achieve the MDG and sustainable development on the continent. Energy considerations should be appropriately integrated into socioeconomic programmes and into the planning, operation and maintenance of long-lived energy consuming infrastructures.

The WSSD calls upon the international community to reinvigorate their commitment to address the special challenges facing Africa, mobilize resources for effective support to Africa's efforts to implement NEPAD objectives, and other initiatives on energy on the continent.

From an African perspective, commitments, targets and goals made by the various actors during the above-mentioned meetings, can be clustered into the four issue-based categories discussed below.

Assessment of Accomplishments and Gaps

Issue 1: Energy accessibility for poverty alleviation

¹ BP energy statistics 2005, www.bp.com

² IEA key energy statistics, 2002

³ NASA Solar Map, and WEC energy analysis

⁴ WEC, IEA 2002

To address the problem of energy accessibility various organizations undertook a large array of measures, including: Energy access scale-up initiatives; Productive use of rural/renewable Energy; Capacity development and investment in mini-hydro power systems; and Development of an African regional rural electrification programme.

The issue of accessibility to modern energy was linked to poverty alleviation efforts in some cases, but unfortunately not always. The need for more generation capacity has been recognized; however, efforts to solve the problem stumble over chronic lack of public funding and little interest of investors and financial institutions in the African energy market, mainly due numerous disincentive measures built into national institutional, policy, legal and regulatory frameworks.

Still, with close to two third of Africans without access to modern energy and trapped into economic poverty, there is much to be done at all levels to achieve commitments.

Issue 2: Changing patterns of energy consumption and production

Activities undertaken by various actors on this issue include: Sustainable Transport Action Network for Africa (Sustran-Africa); Wood Energy Information System (WEIS); Improving Energy Efficiency (EE) in small industries and in cities and developing EE and Energy Service Companies (ESCO); Development of Renewable Energy; Development of rural energy enterprises; and removing barriers for the development of RE. These diverse actions have not succeeded in increasing the share of RE in the energy mix, generating substantial energy savings, protecting forests and increasing access to modern energy.

Initiatives taken for changing consumption and production patterns for sustainable development have essentially lacked the strong political support from national governments that they require, and the minimum critical scale of projects that can create a momentum of change. Activities are much too localized, not promoted enough and often too controversial to intuitively be understood by African people and adopted by most governments.

Issue 3: Development of advanced and cleaner energy technologies

This issue was not viewed as a priority for the continent, though advanced energy technologies may provide answers to the problems of decentralized rural energy development and energy efficiency. Consequently, in this domain, few actions were carried out with the exception of some capacity building and networking initiatives. A lot more could be done especially in providing support to local research centers and universities, and in promoting innovative local energy enterprise ideas, based on indigenous material and locally available resources.

Issue 4: General and Crosscutting Issues

Support to NEPAD energy programmes

Considerable efforts were deployed by the international and African communities to promote NEPAD and support NEPAD energy initiatives. Many UN special organs and organizations have responded well to NEPAD. Despite this good will, NEPAD energy initiatives have not made the anticipated progress and many initial expectations of African people remain unmet.

Financial Issues

Similarly to other development sectors in Africa, the energy sector suffers from meager funding and reduced financial options. Funding levels in the African energy sector remain very low and have not increased significantly for many years. Programmes such as the ADB FINESSE and various UNEP Finance initiatives dealt with the problem of capacity building within financial institutions in order to raise awareness and increase the share of energy investments in their portfolio. The sector received investments from various sources including regional and international financial institutions, as well as multilateral organizations. Analysis however shows that the sector is still under-funded and run the risks to collapse further unless business-as usual approaches are changed.

Capacity Building

Several actions were implemented with the aim to strengthen the capacity of energy planners and developers, education and research institutions and centers of excellence. Formal training and networking schemes were used. Overall, African human capacity in energy is viewed by African as adequate to make progress. However, national and sub-regional institutions are often severely under-equipped in communication and information management tools.

Gaps in actions implemented proceed from the small number of capacity enhancement programmes aimed at addressing the needs of sub-regional organizations such as the RECs, Power Pools, etc. Therefore, they remain a weak link when it comes to designing and implementing regional integration projects that normally fall under their leadership.

Constraints and Challenges to Achieve Targets

Analysis of the African energy sector reveals a continent that is undersupplied in modern energy. When energy is available, it is supplied in a form that is usually inappropriate for the needs of the majority of people and economically unaffordable by most of those who have access to it. Some specific challenges in the sector can be identified as: Low energy production due to largely untapped energy resource potential; Uneven regional distribution of energy resources; Weak share of Renewable Energy in the energy mix; Low oil refinery capacity; Underdeveloped transport, transmission and distribution infrastructure; Low private sector participation and investment in the energy sector; Very low access to energy in rural Africa; Non-efficient utilization of energy; and Inadequate policy, regulatory and institutional framework.

Lessons learnt

The following lessons could be distilled from the responses to the review surveys:

- To take full account of the specific human, economic and environmental constraints of the African context in order to design solutions;
- African governments needs to translate their commitments into stronger political will and support to energy development activities lead by their partners;
- Increase exchanges of innovative approaches to address problems related to energy for development between Asia, Latin America and Africa;
- Emphasize trainings in energy analysis and modeling; and
- More efforts are needed to boost the development of RE.

Recommendations

Major initiatives must be taken and scaled up at all levels to make progress, particular to:

Prioritize efficient institutional, regulatory and policy frameworks

African Policy-Makers are urged to pay special considerations to policy measures that clarify the role of various stakeholders (public and private), improve investments climate in general through more favorable legal and regulatory reforms, strengthen the role of independent energy regulatory bodies and lift barriers to the realization of regional integration projects in energy.

Increase financial flows towards the African energy sector

International development partners, including the UN, should enhance their role to support African Nations to undertake the necessary reforms conducive to a coherent, transparent and attractive investment framework and increase their advocacy and funding function to mobilize and significantly increase the financial flow towards Africa for investment in energy projects. Commitments made to set the NEPAD energy initiatives, as priority for the continent should be reinforced.

Improve the share of RE in the African energy mix

African Governments should put in place coherent regulatory and policy frameworks that support the development of thriving markets for renewable energy technologies and recognize the important role of the private sector. This includes removing barriers and allowing for fair competition in energy markets and taking into account the concept of internalizing external costs for all energy sources.

Promote energy regional integration as a catalyst for development

The RECs, with the support of international partners, must pursue with dedication, their efforts to promote regional energy trade as an efficient means to reduce the uneven distribution of energy resources on the continent, reduce energy import cost burdens on most national economies, and increase the supply of secure and environmentally sustainable energy.

AFREC should receive more assistance to accelerate the achievement of energy integration between all African regions, through up-to-date energy information, regional and national capacity development of pertinent energy-decisions tools.

Link rural energy development programmes to poverty reduction strategies and the achievement of the MDG

International development partners, regional, sub-regional as well as national energy stakeholders should view the energy access problem as inseparable from poverty reduction efforts and economic growth strategies. They should therefore be willing to drastically increase their financial participation in the sector and assist in the development of key infrastructure that can sustain the minimum economic growth required to break the cycle of poverty and achieve the MDG.

Promote coordination and coherence among all international partners

More efforts must be made by all energy stakeholders, especially UN organizations to create coherence, complementarities and thus effectiveness in all actions on the continent. This can be achieved in the framework of a collaborative mechanism such as UN-Energy-Africa.

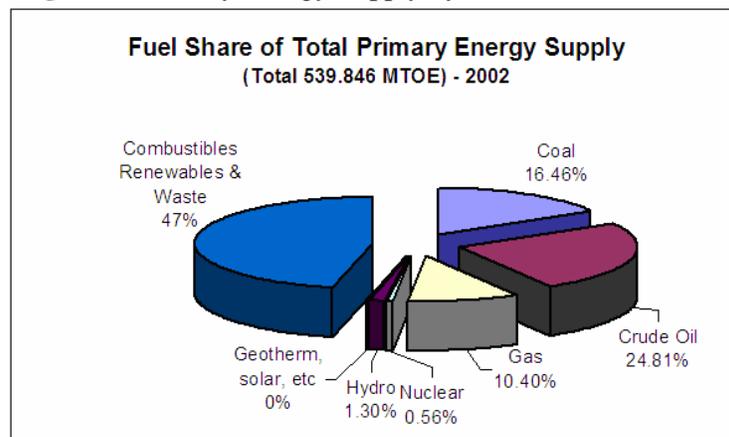
SECTION I

A Brief Assessment of the Current Energy Situation in Africa

▪ What is energy used for in Africa?

Most social and economic activities require the use of energy in various forms and quantities. Energy is as important to households for basic uses such as cooking, heating and lighting as it is to large industries for production of heavy goods or still to fuel automobiles. The world consumed in 2002, the staggering high amount of 7,095 million tons of Oil Equivalent (MTOE) in the form of oil, natural gas, coal, electricity and combustible renewables and waste⁵. For its development, the world thirst for energy is growing at a faster rate than ever. According to recent BP statistics, energy consumption has grown by 4.3% between 2003 and 2004⁶. In countries, mostly in the developing world, where the availability of energy is limited or where energy is economically unaffordable for most households or the society in general, development is seriously impaired, and growth limited. Energy is thus an essential ingredient for socioeconomic development. Rightfully then, issues of energy supply, access and security, as well as issues related to the impact of the consumption and production patterns of energy on the world sustainability, have been at the core of the world attention for decades.

Figure 1: Primary Energy Supply by Fuel in Africa in 2002



▪ Statistical overview of energy resources in Africa

Africa is relatively well endowed with energy resources. In 2004, its proved oil, gas and coal reserves were 9.4%, 7.9% and 5.54% respectively of the world total, compared to 8.5%, 4% and 2.19% respectively for South and Central America⁷. The hydropower potential of the continent amounts to 13% of the world. In Africa, energy is produced mainly from biomass (47%), oil (24.8%), coal (16.5%), gas (10.4%), and other renewable sources, such as large

⁵ IEA (2004)

⁶ BP (2005)

⁷ BP (2005)

and small hydro dams, solar, and geothermal sources (1.3%)⁸ (Figure 1). However, Africa is a vast continent with 53 countries and energy resources are unevenly regionally located. Most of the hydropower potential lies in central and western Africa, oil and gas resources are located in the western and northern parts of the continent, coal reserves are concentrated almost exclusively in Southern Africa, and geothermal is only being developed in eastern Africa. It is apparent from Figure 2 and 3 that 68% of all proved natural gas reserves of the continent is located in two countries (Nigeria and Algeria), while more than 74% of proved oil reserves is found in Nigeria and Libya. These three countries hold the large majority oil and natural gas reserves of the continent. Because of its geographical location across the equator, Africa has abundant solar irradiation ranging from 5 to 7 kWh/m², all year round, and it enjoys a relatively strong wind power potential in Northern, Southern and Eastern Africa. Finally, the continent has an estimated geothermal energy potential of 9000 MW in the Rift Valley area in East Africa⁹. Based on these potential and reserves, it could have been possible to achieve a well-balanced energy generation mix on the continent. However, due to numerous barriers this is not currently the case.

Figure 2: Proved Natural Gas Reserves in Africa, in 2004¹⁰

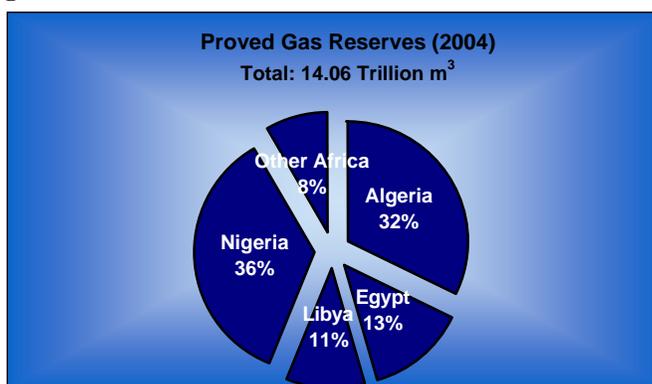
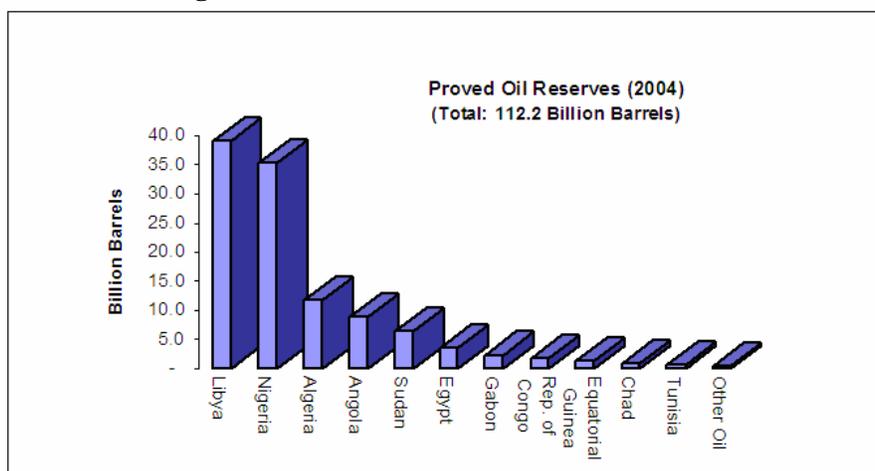


Figure 3: Proved Oil Reserves in Africa, 2005



⁸ IEA (2002)

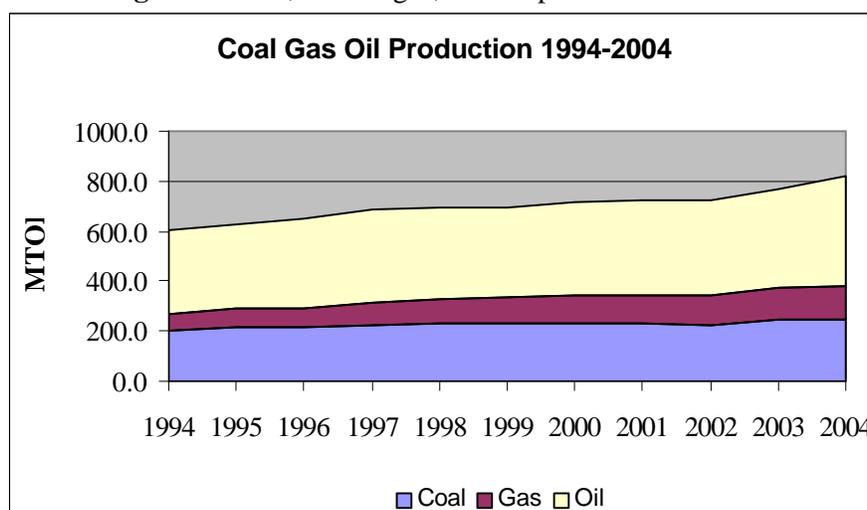
⁹ NASA

¹⁰ Compiled from BP (2005)

- **Statistical overview of the energy consumption and production**

Africa exports more of its energy than it consumes. In the last decade, oil, natural gas, and electricity production have increased by 48.1%, 24.3% and 32.8% respectively, while coal production increased much less (**Figure 4**). In absolute terms, oil remains the largest source of modern energy in Africa, with production reaching 441 MTOE in 2004, which represents 11.4% of the world total. In Southern Africa, efforts for improving the energy resource mix through more import of electricity within the Southern African Power Pool, led to a slower increase of coal production.

Figure 4: Coal, natural gas, and oil production in Africa



Despite its relatively important energy resources, Africa generates only 3.1% of the world electricity, less than any other region of the world (Figure 5). This share has not changed for the last 10 years and most analysts forecast that it will remain the case for the next 15 years, though production of fuels used for electricity will continue to grow steadily. Electricity is generated mainly from coal (46%), gas (23%), hydro (18%), oil (11%) and nuclear (2%) (Figure 6). Other renewable sources such as solar, geothermal, wind, etc. play an insignificant role so far. On the continent there are strong disparities among countries: South Africa alone generates close to half of the total African electricity. Many African countries mostly in SSA with the exception of South Africa, rely heavily on hydropower (70% to 80%) for their electricity generation.

Figure 5: Electricity Generation per Region

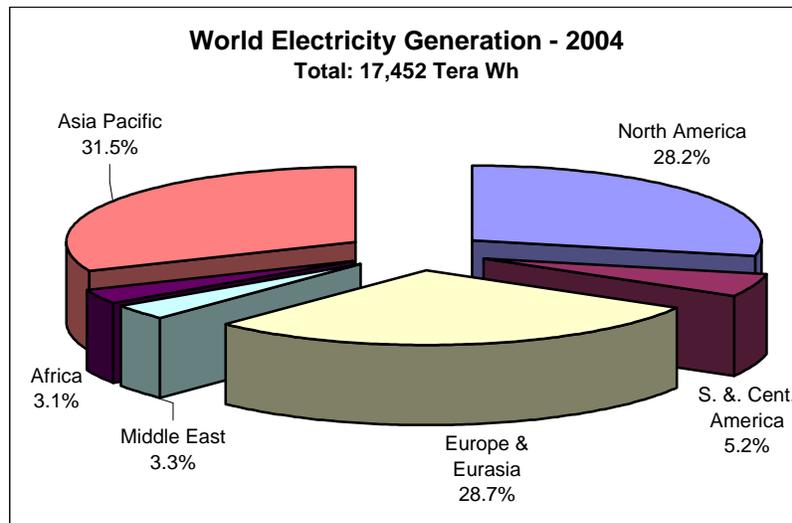
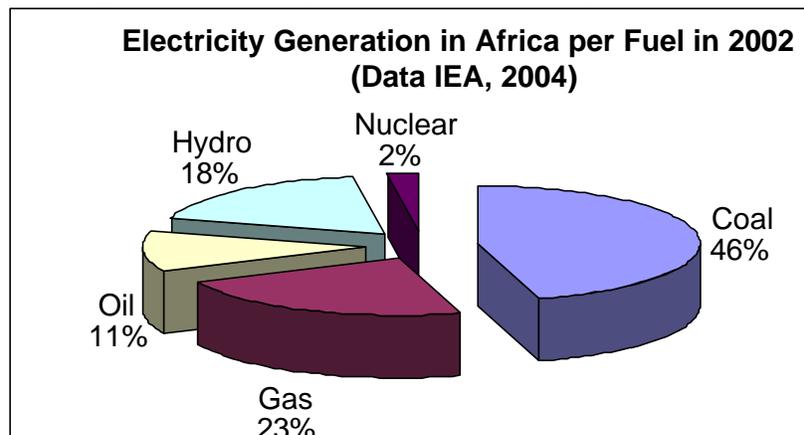


Figure 6: Electricity Generation in Africa per Fuel, 2002



With a population of 13.1% the world total, Africa consumes only 5.5% of the world energy. The per capita energy consumption of 0.5 TOE, far lower than the world average of 1.2 TOE per capita, makes the continent lag behind all the others in energy use. Energy consumption in Africa is largely dominated by combustible renewable resources (biomass, animal wastes, municipal and industrial wastes). Energy from biomass accounts for more than 30% of the energy consumed in Africa and more than 80% in some countries such as Burundi (91%), Rwanda and Central Africa Republic (90%), Mozambique (89%), Burkina Faso (87%), Benin (86 %), Madagascar and Niger (85 %) ¹¹. Biomass constitutes the main energy resource for the large majority of African households for cooking, drying and space heating. Several million people are involved in the production, distribution and sale of fuelwood and charcoal. From 1994 to 2004 primary energy consumption has increased by 24% (Figure 7).

All African countries consume some oil mainly for transportation, electricity generation and industries regardless whether they have refinery capacities or not (Figure 8). Gas consumption, however, is limited mostly to the few countries that produce it, such as Algeria,

¹¹ FAO Report (2005)

Libya, Egypt, Tunisia, Nigeria, Cote d'Ivoire, or those that are located in close proximity with them. This is explained by the lack of transboundary pipeline infrastructure for the transportation of natural gas. South Africa, with its large reserve of coal, is the only country with a significant use of coal.

In 2002, the continent electricity consumption was only 514 kWh per capita, lowest of all other world regions. The very limited availability of electricity combined with affordability issues to electricity services in most countries in Africa, have made access to electricity by most Africans very elusive. While electricity access data varies widely depending on the reporting sources, IEA data reports rates ranging from 70% to over 94% in Northern Africa, and an average of 23% in sub-Saharan Africa. These numbers do not reflect the large disparities between countries (for instance less than 4% in Uganda compared to 66% in South Africa or 100% in Mauritius), and between urban and rural areas, where in the latter, rates can be as low as 1%¹².

Figure 7: Modern Energy Consumption Trend in Africa

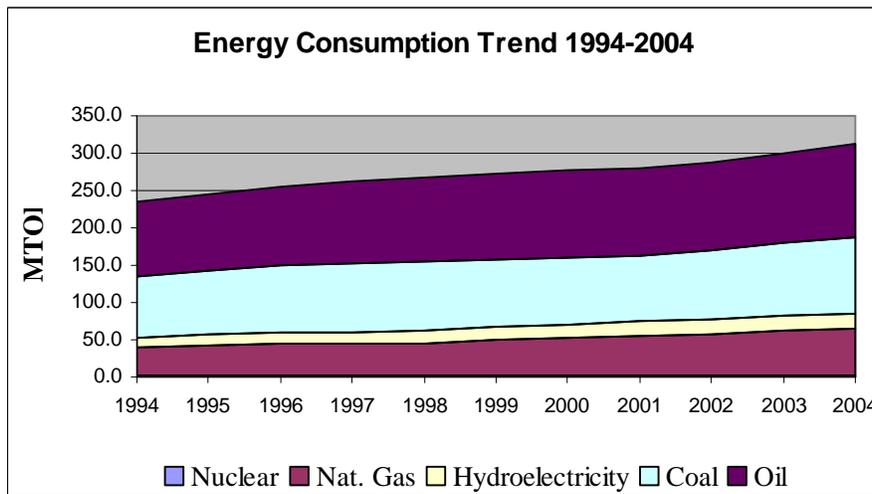
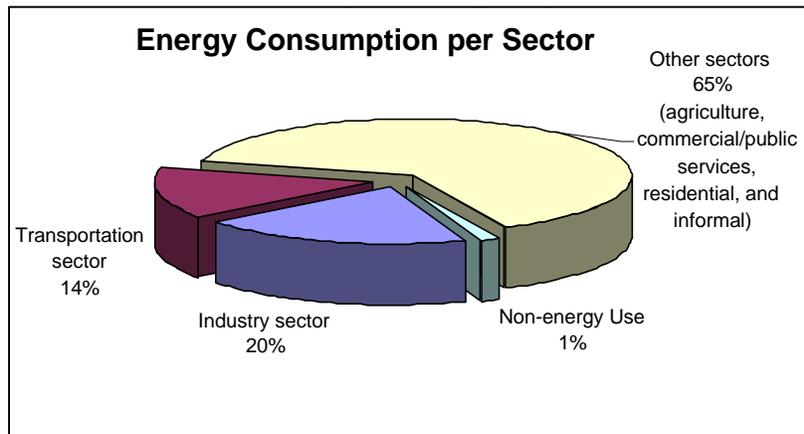


Figure 8: Energy Consumption per Sector



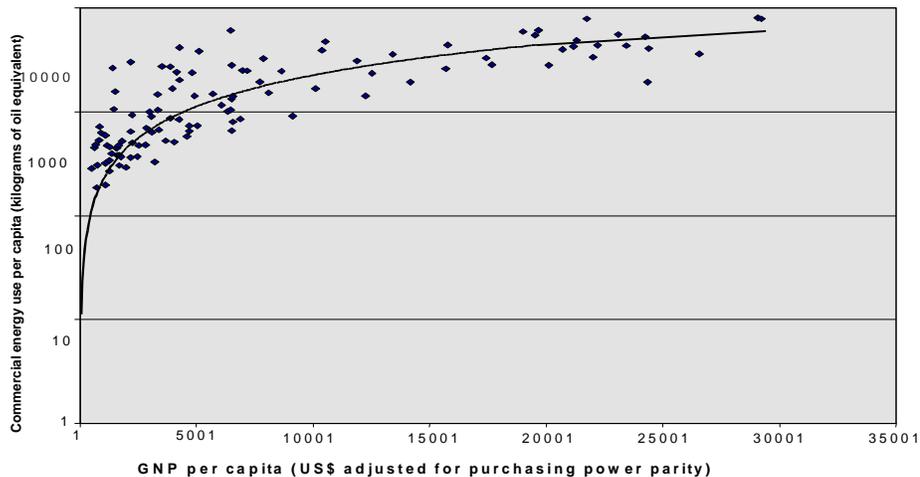
¹² WEC, IEA (2002)

- **Link between energy, poverty and economic development**

Limited availability of modern energy critically impairs socioeconomic development. Industries and productive activities (agriculture, commerce) require energy in various forms to fuel machines, power transformation processes, conserve perishable goods, ensure transport, etc. According to UNIDO, high levels of income per capita tend to be associated with higher levels of industrialization¹³.

Though, not specifically referred to in the targets of the Millennium Development Goals (MDGs), energy supply is an underlining requirement to achieve most of the MDGs. Without access to adequate energy services, the majority of Africans would continue to suffer from deep poverty, since energy is required for most basic household needs, such as cooking and heating. According to World Bank indicators database, there is a strong correlation between modern energy consumption and GNP per capita. The GNP tends to rapidly increase as commercial energy use per capita increases, mainly for low-income countries. When the countries reach a level of per capita energy consumption of around 10.000 TOE, factors such as efficient utilization of energy by industries, energy production and transformation systems and households tend to make the difference for economic growth to continue, so that more energy consumption does no longer imply more income for the country (Figure 9).

Figure 9. Energy consumption versus GNP
Source: World Bank, World Development Indicators database.



¹³ UNIDO IDR (2004), p.31

SECTION II

Review of goals, targets and commitments made at A21, PFIA21, CSD-9 and WSSD

Agenda 21 (A21), the Programme for the Further implementation of Agenda 21 (PFIA21), the 9th session of the Committee on Sustainable Development (CSD9), and the World Summit on Sustainable Development (WSSD), all recognized that energy issues must be given high priority by policy makers, financial institutions, regional organizations, development actors, and all stakeholders if one is to achieve most development goals and the MDGs. Energy considerations should be appropriately integrated into socioeconomic programmes and into the planning, operation and maintenance of long-lived energy consuming infrastructures.

The world community reached specific agreements during the above-mentioned meetings. In order to boost implementation and facilitate evaluation of progress achieved, the meetings adopted programmes of actions or implementation plans including targets, timetables and partnerships, and underlined the role of various partners at all levels (international, regional, sub-regional and countries level.)

From an African perspective, commitments, targets and goals made by the various actors can be clustered into the following four issue-based categories:

- 1) *Improving energy accessibility for poverty reduction;*
- 2) *Changing energy consumption/production patterns for environment and resource sustainability;*
- 3) *Developing advanced and cleaner energy technologies and fuels; and*
- 4) *Cross-cutting energy measures, including measures on international finance, trade, capacity development, technology transfer, and gender issues.*

The various actions and measures agreed in the above-mentioned meetings are compiled in the scoping paper written by UNDESA. A brief analysis shows that they can be cross-organized in the following four clusters of measures: technical, institutional/regulatory, policy, and capacity development measures. They are summarized in table 1.

Most recommended and agreed actions pertain to institutional/regulatory and policy measures. Thus, per the number of recommended actions identified and agreed upon by the international community, it appears that policy and institutional actions are viewed as high priority and capacity building measures are also very important. Technical issues are important though a fewer number of actions were proposed.

An overview of commitments and actions agreed during the above-mentioned meetings reveals that most of them are related to crosscutting issues including regional trade, international cooperation, finance, international trade, and capacity development and training. Environment related issues such as changing consumption/production patterns, and the development of cleaner fuels and technologies rank second, while energy accessibility improvements though very important rank last because they are addressed indirectly by the preceding issues.

Table 1: Analysis of actions and commitments made during A21/PFIA21/CSD/WSSD

Issue	Technical	Institutional/ Regulatory	Policy	Capacity Development and Training	total	%
Energy Accessibility	5	3	5	2	15	14.7%
Changing Consumption/production Patterns (Renewable Energy, Energy Efficiency)	4	5	7	2	18	17.6%
Advanced/cleaner technologies (including cleaner fuels)	4	4	3	5	16	15.7%
Cross Cutting Issues (Regional, International, Finance, Trade, Capacity Development, Technology Transfer, Gender)	7	12	13	21	53	52.0%
Total	20	24	28	30	102	100.0%
	%	%	%	%	100	%
	19.6	23.5	27.5	29.4		
	%	%	%	%		

The WSSD/JPOI calls upon the international community to reinvigorate their commitment to address the special challenges facing Africa’s efforts to achieve sustainable development and give effect to a new vision based on concrete actions for the implementation of Agenda 21, PFIA21 and WSSD in Africa. The Plan recognizes the New Partnership for Africa’s Development (NEPAD) as a pertinent instrument for achieving sustainable development on the continent.¹⁴

The JPOI states that achieving sustainable development will include actions at all levels to deal effectively with energy problems in Africa, including through initiatives to:

- Establish and promote programmes, partnerships and initiatives to support Africa’s efforts to implement NEPAD objectives on energy, which seek to secure access for at least 35 per cent of Africa’s population within 20 years, *especially in rural areas*.
- Provide support to implement other initiatives on energy, including the promotion of cleaner and more efficient energy use of natural gas and increased use of renewable energy, and to improve energy efficiency and access to advanced energy technologies, including cleaner fossil fuel technologies, particularly in rural and peri-urban areas.

NEPAD recognizes that energy plays a critical role in the development process; first, as a domestic necessity, but also as a factor of production whose cost directly affects prices of other goods and services, and the competitiveness of enterprises. NEPAD also recognizes that the search for abundant and cheap energy would focus on rationalizing the territorial distribution of existing, but unevenly allocated energy resources through regional energy cooperation and integration.

¹⁴ ECA/SDD (2004)

Recognizing that Africa's small market sizes and low purchasing power have been major barriers to universal access to modern energy services for development, NEPAD recognizes that the "business-as-usual" approach will not meet Africa's energy demand. Therefore, the strategy adopted to promote development of the African energy infrastructure aims at capitalizing on regional markets rather than country-specific coverage thereby generating the economies of scale necessary to lower transaction costs and increase competitiveness.

The NEPAD energy-related objectives are:

- To increase access to reliable and affordable commercial energy supply by Africa's population from 10 to 35 per cent or more in 20 years, especially in rural areas;
- To improve the reliability and lower the cost of energy supply to productive activities in order to enable economic growth of 6 per cent per annum;
- To rationalize the territorial distribution of existing and unevenly allocated energy resources;
- To strive to develop Africa's abundantly available solar energy resources;
- To reverse environmental degradation that is associated with the use of traditional biomass fuels in rural areas;
- To exploit and develop the hydropower potential of the river basins of Africa;
- To integrate transmission grids and gas pipelines so as to facilitate cross-border energy flows; and
- To reform and harmonize petroleum regulations and legislation in the continent.

NEPAD developed a Short Term Action Plan (STAP) for infrastructure development in the energy, water, transport and information and communications technology (ICT) sectors, with support from the African Development Bank (ADB), which was designated as the lead agency for NEPAD infrastructure planning and implementation. The Plan was reviewed by the Workshop of Regional Economic Communities (RECs) convened in Abidjan, Côte d'Ivoire in June 2002, and adopted by the first ordinary session of the Assembly of Heads of State of the African Union held in July 2002 in Durban, South Africa. The STAP is to be complemented by a more comprehensive Medium- and Long-term Action Programme, which is currently under preparation.

The STAP for energy infrastructure development initially comprised 23 projects categorized under the four following areas:

- Facilitation – establishment of the policy, regulatory and institutional framework required to create a suitable environment for investment and efficient operations;
- Capacity building - initiatives to empower the implementing institutions in order for them to perform their mandates;
- Investment – physical and capital investment projects; and
- Studies to prepare future priority projects.

The African Development Bank carried out a review of all NEPAD infrastructure projects, in close consultation with the RECs¹⁵ and the NEPAD Secretariat, after one year of implementation, and came up with a list of "top twenty" priority projects.

The energy infrastructure development projects, which appear in the list include:

¹⁵ i.e. ECOWAS, SADEC, ECCAS, ESC, COMESA, UMA, etc.

- One facilitation project: Sub-regional power pools (Southern and West Africa).
- Two studies:
 - Great Inga Integrator Project; and
 - Subregional power interconnections (East, Central and West Africa).
- One capacity building project: African Energy Commission (AFREC).
- Three investment projects:
 - West African Gas Pipeline;
 - Kenya-Uganda oil pipeline; and
 - Mepande Uncua Hydropower Project.

The WSSD Plan of Implementation states “To promote effective implementation of Agenda 21 at the international level, actions to be undertaken should include, among other things, encouraging partnership initiatives for implementation by all relevant actors to support the outcome of the World Summit for Sustainable Development”. During WSSD, the UN has received some 32 partnerships submissions for energy projects with substantial committed resources. These include:

- EU Energy \$700 million partnership Initiative for Poverty Reduction and Sustainable Development, with the European Commission, Brussels, as a leading partner;
- Global Network on Energy for Sustainable Development (GNESD) led by UNEP;
- Global Energy Partnership, with UNDP and the World Bank as leading partners;
- The Renewable Energy and Energy Efficiency Partnership (REEEP) led by the UK Government;
- Clean Fuels and Vehicles Partnership with the US Environmental Protection Agency (EPA), UNDESA and UNEP as leading partners;
- Indicators for Sustainable Energy Development (ISED) with IAEA as a leading partner;
- The South African energy utility ESKOM partnership to extend modern energy services to neighbouring countries; and
- The nine major electricity companies of the E7 agreements with the UN to facilitate technical cooperation for sustainable energy projects in developing countries.

Finally, it is worth recalling that the United States announced that it would invest up to \$26 millions in energy projects in developing countries in 2003.

SECTION III

Review of Progress Achieved in the Implementation of the Energy Agenda

This section seeks to review actions undertaken by various actors to achieve the commitments, goals and targets agreed during the above-mentioned meetings, and assess the overall progress made mostly by sub-regional (e.g. Regional Economic Communities), regional (e.g. ADB, AU, NEPAD, etc.) and international institutions (e.g. UN organizations, IEPF and others) toward attaining the established objectives. It is worth mentioning that actions reviewed in this section do not intend to exhaustively represent all initiatives taken by every development actor in Africa. It focuses mainly on the compilation of the responses to surveys sent to the major actors. Also, progress made at national levels will not be assessed in this report. Individual countries will report on their national situations separately to the CSD.

As mentioned before analysis of actions agreed in A21, PFIA21, CSD and WSSD show that priority energy issues in Africa can be clustered in the following four main issues:

- Improve energy accessibility for poverty reduction;
- Changing consumption & production pattern of energy for environment and resource sustainability;
- Develop advanced and cleaner energy technologies and fuels; and
- Crosscutting energy measures, including on international, finance, trade, capacity development, technology transfer and gender issues.

These issues are in line with the NEPAD energy programme. However, this progress review report will also assess initiatives taken directly by NEPAD or implemented in support of the NEPAD, following the WSSD.

ISSUE 1: Improve energy accessibility for poverty reduction

- **Statement of issue priority for Africa:**

Analysis of African population accessibility rate to modern energy reveals that this issue is of paramount importance to development on the continent, and must be given a first priority attention by all energy stakeholders. Current levels of access to modern energy services and resources fail to meet the needs of most Africans particularly the rural and urban poor population in Sub-Saharan Africa (SSA). Much greater access to energy services and resources, including peri-urban and rural electricity as well as cleaner cooking fuels, is essential to achieve all of the MDGs, and create sustainable development. Numerous actors envisaged a large array of measures, which spans from increasing the supply energy, through various crosscutting measures, to improving the efficiency of its usage.

- **Brief review of the commitments/actions implemented**

Energy scale-up initiative

The UN-Habitat “energy scale-up initiative” aims to facilitate access to modern energy services for the urban poor while reducing the incidence of harmful indoor air pollution within informal settlements in sub-Saharan Africa. This to be achieved through policy change, development of regulatory instruments and pilot demonstrations. Specific project objectives include: Promote access to renewable energy technologies affordable for the urban poor; Increase the number of households and businesses using energy-efficient cooking stoves and cooking places (i.e. smoke extracts); Develop recommendations on policy implications of energy provision vis-à-vis environmental sustainability.

Productive use of rural/renewable Energy

The UNIDO energy activities in Africa focus on fostering the development of efficient, cost effective and environmentally sound energy systems and providing access to energy for the poor. The main activities are centered on “packaging” rural energy programmes, that is combining components such as capacity building, technology transfer, training, financing, costing, increasing the income level of rural people , etc. UNIDO has been also developing a different energy service delivery model which looks beyond the energy aspects of the project. In conjunction with other partners (i.e. governments, NGOs, academia, etc.), UNIDO energy service delivery models evaluate a range of factors that link amongst other things, increased production, new types of production, and new social possibilities to the energy supplied by the project. The model is entitled “productive use of rural/renewable Energy”. It involves supplying energy and capacity building for production of energy.

Capacity development and investment in mini-hydro power system

The francophone institute for environment (IEPF) has implemented pilot projects for the promotion of micro/mini-hydro electric systems in Rwanda (Nyakabanda), Cameroon (Bapi, Figure 10) and Madagascar (Ambositra). UNEP/GEF in partnership with IEPF, ADB, UNIDO, UNEP and UNECA completed the feasibility study of a regional project for capacity development and increase investments in mini/micro hydropower in 11 sub-Saharan African countries¹⁶.

¹⁶ In phase 1: Benin, Burundi, Cameroon, Congo, Gabon, Equatorial Guinea, Mali, Central African Republic, Democratic Republic of Congo, Rwanda and Togo. The project is to be expended in 10 more countries in the second phase.



Figure 10: African village entrepreneur building a 4kW pico-hydro turbine, based on Sri-Lanka Technology, in Bapi village in Cameroon. Courtesy, IEPF project in Bapi.

Development of a regional rural electrification programme

The revised ECOWAS Treaty establishes that “the aims of the Community are to promote co-operation and integration, leading to the establishment of an economic union in West Africa in order to raise the living standards of its people, and to maintain and enhance economic stability, foster relationships among Member States and contribute to the progress and development of the African Continent”. These objectives call for harmonization and co-ordination of national policies and the promotion of integration programmes, projects and activities in various fields, and in particular, in energy.

In order to comply with these objectives in the field of energy, ECOWAS is implementing a community Energy Programme, which includes the following major initiatives:

- West Africa Power Pool (WAPP);
- West Africa Gas Pipeline (WAGP);
- ECOWAS Energy Protocol;
- ECOWAS Energy Observatory;
- Regional Regulatory Body for the Electricity sector; and last but not least,
- Access to Energy for Rural and Peri-urban Populations in member countries.

- **Progress Achieved**

The implementation of the above-described commitments and actions contributed to achieve progress in the following ways:

- ✓ The importance of access to affordable and clean energy services for the urban poor largely residing within informal settlements has now become more recognized as an important human settlements agenda item among sub-Saharan African governments at both the local and national levels. As a result, country-to-country and city-to-city dialogue and cooperation is beginning to take place in this important issue area.
- ✓ Funds were mobilized to implement various UNIDO activities including:
 - Capacity-Building for identification and removal of barriers for the rational use of energy in Small and Medium Scale (SME) enterprises in Ethiopia,
 - Capacity-building for growth oriented and competition of MSME development in Ghana;

- Hydro-energy capacity building and assessment in Mozambique, Uganda, Tanzania,
 - Rural energy productive use programme in several countries in West Africa;
 - Renewable energy development programmes in Zambia,
 - Reinforcement of national and regional capacity to implement the Multipurpose platform in Senegal, Cote d'Ivoire, Burkina Faso, and Guinea.
- ✓ Close to one hundred pilot sites for potential micro/mini hydropower plants were identified and analyzed for technical, environmental and economic feasibility, in the 11 selected countries. The regional mini/micro Hydropower project has mobilized \$1million of funding from UNDP/GEF at its preparatory phase. In addition, important funding commitments from the ADB and the countries involved were made. The project has concluded its pre-feasibility phase in mid-2005. The full active phase is to be launched by the end of 2005. The project is to be extended to 10 more countries in a subsequent phase.
 - ✓ IEPF activities in the context of improving energy access also include the implementation of several pilot projects in photovoltaic, wind and biogas in Burkina Faso, Tunisia, and Guinea respectively.
 - ✓ The ECOWAS Heads of State and Governments adopted in Accra, in December 2003, the European Initiative on Energy for Poverty Eradication and Sustainable Development, and voted Decision A/DEC.3/12/03 on the Regional Rural electrification Programme.

The ECOWAS Executive Secretariat, supported by UNDP, France and the EU decided to start the process of drafting the White Paper intended to support the definition of a Regional Policy for access to energy services in rural and peri-urban areas in Member States focusing on meeting the MDGs. As part of this process of developing and finalizing the White Paper, a regional Forum was organized in Bamako, on 16 to 19 May 2005, which brought together major institutional stakeholders in order to define, on a participatory and concerted basis, the components of a regional policy for access to energy services for rural and peri-urban zones to meet the MDGs.

ISSUE 2: changing consumption/production patterns of energy for environment and resource sustainability

• Statement of issue priority for the Africa

Energy and development experts recognized that the current production and consumption patterns of energy are not sustainable. More emphasis must be put on improving the energy production resource mix, through increased use of RE sources such as photovoltaic, wind, geothermal and hydro; promoting energy efficiency and conservation practices; and increasing the use of cleaner fuels, such as biofuels.

Both clean air and an efficient transport system are essential to sustain urban development, but urban transport heavily dependent on fossil fuels is highly polluting, particularly in Africa, due to the age, quality and condition of its rolling stock. Emissions from transport vehicles contribute as much as 70% of air pollution and the larger the city, the larger its percentage contribution to the problem. Cars, trucks, motorcycles, scooters, buses and other public transport vehicles (both in the formal and informal sectors) emit significant quantities

of carbon monoxide, hydrocarbons, nitrogen oxides and fine particulate matter. Where leaded gasoline is used (as it is through most of Africa except in some 7 countries: South Africa, Cote d'Ivoire, Swaziland, Lesotho, Botswana and Mozambique) vehicles remain a significant source of lead in urban air with its attendant health effects.

- **Brief review of the commitments/Actions Implemented**

Sustainable Transport Action Network for Africa (SUSTRAN-Africa)

This UN-Habitat project established a regional mechanism that promotes the adoption of suitable sustainable transport options (NMT-Non Motorized Transport; TDM-Transport Demand Management; BRT-Bus Rapid Transit; and, LUP-Land Use Planning) which have proven successful in Asia and Latin America and in African urban centers. It is a regional networking initiative, maintained and housed by an existing local organization in collaboration with other local and regionally-based institutions which have an expertise and interest in sustainable transport as well as international organizations of that nature. It includes the identification of African urban centers that are ready to implement sustainable transport initiatives with priority given to projects in Senegal, Ghana, South Africa, Tanzania, Uganda and Kenya and includes four set of transport options (BRT – Bus Rapid Transit; NMT- Non-Motorized Transport; TDM – Transport Demand Management; and, LUP – integrated urban transport and Land-Use Planning) that have proven successful in other developing countries of Asia and Latin America.

Wood Energy Information System (WEIS)

One of the major priorities of the FAO Wood Energy Program is to improve wood energy statistics and information (*Wood Energy Information System (WEIS)*) as a major tool for the promotion of sustainable wood energy systems. It is aimed to generate and disseminate information created from wood energy activities and assist countries to develop their wood energy planning and policy capabilities. It consists of several components:

- Unified Wood Energy Terminology (UWET) with standardized terms, definitions and conversion factors commonly used for the collation and presentation of woodfuel statistics;
- Wood Energy Data Base (WEDB) with national annual production, trade and consumption of woodfuels. The database contains over 115,000 records from more than 200 countries;
- Guide for woodfuel surveys;
- Set of wood energy planning tools called WISDOM (Woodfuel Integrated Supply/Demand Overview Mapping); and
- Website and newsletter (Forest Energy Forum) for disseminating information generated by the program.

In addition, FAO assist countries to enhance national capabilities of Forestry Services and Energy Agencies for wood energy planning and policy development.

Improving Energy Efficiency (EE) in small industries and developing EE and Energy Service Companies (ESCO)

UNIDO EE effort has focused on:

- Support programmes on environmentally sustainable industrial development strategies and technologies, including transfer of environmentally sound technologies within high priority industrial sectors; and
- Carrying out activities aimed at improved energy efficiencies and industries and cleaner production.

UNIDO's traditional industrial plant level based approach involves reducing a plant's industrial energy consumption in a variety of technical ways, including lower energy consumption method of production, processing or initiating product changes linked with the lower process energy inputs.

UNEP energy efficiency activities are mainly aimed at reducing the emission of greenhouse gases by identifying and carrying out Energy Efficiency (EE) improvements as an integral part of Cleaner Production (CP) assessments in industrial enterprises. It also provided support for energy efficiency efforts through the promotion of the establishment of specialised energy service companies (ESCOs) that provide Monitoring and Targeting (M&T) energy services to industrial and commercial clients. The energy efficiency activities in Africa have been promoted through National Cleaner Production Centres that are jointly supported by UNEP and UNIDO.

IEPF initiated and supported several activities in Energy Efficiency, mainly at country level, including:

- The development of ESCOs dealing with energy demand-side management and promoting energy savings markets, in Cote d'Ivoire, with funding from the World Bank and the GEF. As a result, two ESCOs are operational and financially sustainable. This initiative has been approved by the GEF for duplication in Mali, Benin, Senegal, and Mauritania.
- The Energy-City programme, implemented in Burkina Faso, helped city organizations to achieve energy savings, through energy auditing and various saving measures.

Development of Renewable Energy

UNEP renewable energy activities focus on the needs of developing and transition economies in various facets of renewable energy technology research, development, and commercialization. The following are the key activities implemented under the theme of renewable energy:

The African Rural Energy Enterprise Development Initiatives (AREED): AREED seeks to develop new sustainable energy enterprises that use clean, efficient, and renewable energy technologies to meet the energy needs of under-served populations, thereby reducing the environmental and health consequences of existing energy use patterns. The AREED approach offers rural energy entrepreneurs a combination of enterprise development services and start-up financing. This integrated financial and technical support allows entrepreneurs to plan and structure their companies in a

manner that prepares them for growth and to appear less risky to mainstream financial partners willing to invest in them¹⁷.

Mediterranean Renewable Energy Programme (MEDREP): The key objectives of MEDREP Finance are to investigate different approaches to finance renewable energy companies and projects in target countries, and to structure various support mechanisms that help lenders and investors scale up financing to this clean energy sector. Tunisia, Morocco, and Egypt are the first three Mediterranean countries to be reviewed for the programme.

Solar and Wind Energy Resource Assessment (SWERA): SWERA seeks to bring sustainable energy approaches to developing countries through increased investment in renewable energy projects. The database and analytical tools developed through SWERA helps governments formulate realistic energy policies and programmes that are based on sound knowledge of available renewable Resources. African countries involved in the SWERA effort include Ethiopia, Ghana and Kenya.

Removal of barriers to renewable energy technologies in Africa: This UNEP project focused on identifying barriers to implementation of renewable energy technologies (RETs) in Egypt, Ghana and Zimbabwe and proposes measures to overcome such barriers.

- **Progress Achieved**

The implementation of the above-described commitments and actions contributed to achieve progress in the following ways:

- ✓ There is now an active, vital and functioning network of individual, institutions and government representatives sharing information and knowledge regarding issues of sustainable transport infrastructure investment and air quality management within the sub-Saharan African countries of Senegal, Ghana, Tanzania, Kenya, Uganda and South Africa. Lessons and experiences are being shared in the areas of Bus-Rapid Transport and non-motorized transport within a city-to-city cooperative framework.
- ✓ FAO Wood Energy Program has achieved the following:
 1. The “Unified Wood Energy Terminology (UWET)” is gradually adopted by countries and national and international agencies for the collection and presentation of wood energy statistics and information.
 2. The “Wood Energy Data Base (WEDB)” has been improved with data of national production, trade and consumption of woodfuels of all African countries.
 3. Improved national energy balances, including wood energy, are being implemented in four countries: Senegal, Niger, Togo and Mali during the next 2 coming years. The approaches will be expanded to 10 countries in the next 5 years.
 4. A “Guide for Woodfuel Surveys” in English and French is being used for the collection and dissemination of woodfuel data.

¹⁷ www.ared.org

5. WISDOM (Woodfuel Integrated Supply/Demand Overview Mapping) has been applied at national level (case of Senegal) as well as at sub regional level (wood energy maps of 10 Eastern African countries are being prepared among which Rwanda, Burundi, Congo, Tanzania, Kenya, Sudan, and Somalia). The maps include woodfuel supply/consumption balances and hot spot of areas facing unsustainable woodfuel production.

✓ UNIDO EE programmes were implemented in several countries including Ghana, Nigeria, Tanzania, and Tanzania. These actions typically involved identifying barriers to energy efficiency improvements within a given sector followed by activities aimed at the removal of those barriers. The barriers removal activities focus around capacity building at various levels as well as designing and putting in place appropriate regulatory reforms.

✓ AREED programme supported a broad range of energy enterprises that marketed a variety of energy services in Senegal, Mali, Ghana, Zambia and Tanzania. AREED applies a market based approach to help rural and peri-urban households (and enterprises) climb the energy ladder. AREED has now invested in 25 clean energy enterprises with many additional investment opportunities receiving business development assistance from AREED partners. The investments include enterprises involved in a wide range of products and services, including:

- solar crop drying;
- efficient charcoal production;
- manufacturing efficient cook stoves;
- wind powered water pumps;
- solar water heating;
- liquefied petroleum gas (LPG) distribution;
- biofuel development (Box 1);
- biofuelled multifunctional platforms; and
- energy efficient motors and lighting.

Box 1: Zambia Goes “Nuts” for Local Fuel



The supply of liquid fuels in the Zambezi region of northwestern Zambia is often erratic and expensive, but the oily Jatropha nut can provide a viable and locally produced alternative fuel for use in lamps and diesel engines. The thorny Jatropha plant is found in abundance in the region and used as hedging and a natural division between properties. The nuts from the plant, however, are mostly wasted.

Enter entrepreneur Henry Ngimbu, who saw the potential to displace imported fuels with locally produced Jatropha oil. In 2001, he started **Rural Challenge International (RCI)** and began producing Jatropha oil and its by-product of “pressed cake” fertilizer using a manual oil can then lead to rural electrification and help families escape poverty,” says E+Co’s B-REED Program Manager, Gina Rodolico.

There is also potential to replicate the investment with other farmers and create sufficient scale to negotiate higher prices for rural products. With training to rotate crops and use organic fertilizers, the project will also advance the practice of sustainable land management.

Source : AREED project www.areed.org

✓ With a US\$6.7 million investment from the Global Environment Facility (GEF), SWERA is developing new information tools for energy planners and project developers, including regional and national maps of solar and wind energy resources. SWERA is also developing a geographical information system (GIS) interface that will allow easy access

to data and thus help the screening and pre-investment evaluation of wind and solar energy-based renewable energy projects. Thirteen countries, including Ghana, Ethiopia and Kenya participate in the initial phase of SWERA.

ISSUE 3: Develop advanced and cleaner energy technologies and fuels

- **Statement of issue priority for the Africa**

This issue is generally not perceived as high priority in Africa. Notwithstanding, the development of advanced and cleaner technologies was viewed as a way to diversify the energy supply, particularly to increase the share of RE sources in the energy mix, and provide innovative technical solutions to supply modern energy in rural areas. Most activities are of regulatory/policy nature and are undertaken at national level.

- **Brief review of the commitments/Actions Implemented and progress achieved**

The Partnership for Clean Fuels and Vehicles (PCFV)

PCFV is a UNEP-sponsored energy-related partnership that was established during WSSD in September 2002. The main purpose of the partnership is to reduce vehicular air pollution in developing countries through the promotion of clean fuels and vehicles. The Partnership currently works to support developing countries in their efforts to improve fuel and vehicle technologies that reduce air pollution¹⁸.

The main achievement of the partnership was to create awareness among members on the environmental and health danger associated with the use of lead gasoline and old petrol vehicles. As a result, many African countries committed to limit the age of their Vehicles Park on the road, move towards catalytic converters and phase out the production of leaded gasoline. Several countries have already stopped producing leaded gasoline.

ISSUE 4: General and Crosscutting energy issues including international, finance, trade, capacity development, technology transfer and gender issues

Sub Issue 1: Progress in International Support to AU/NEPAD Energy Initiatives¹⁹

- **Statement of Issue Priority for Africa**

UN system's response to NEPAD Initiative

¹⁸ UNEP PCFV

¹⁹ ECA/SDD (2004)

In its resolution 57/2 of 16 September 2002, the General Assembly of the United Nations has welcomed NEPAD as an African Union led, owned and managed initiative and urged the international community and the United Nations system to organize support for African countries in accordance with the principles, objectives and priorities of NEPAD. The United Nations within the existing programming and coordination mechanisms developed an operational framework to support NEPAD.

- **Progress Achieved**

Progress achieved in supporting NEPAD includes:

- ✓ *Establishment of a NEPAD Focal Point at the UN Headquarters*

At the global level, the UN Secretary-General has established the Office of the Special Adviser on Africa, effective 1st May 2003. Its mandate includes coordinating global advocacy in support of NEPAD, coordinating all reports to the General Assembly and ECOSOC on NEPAD, and following up on the recommendations of global conferences and summits as they relate to Africa. The Office of the Special Adviser on Africa serves as the focal point for NEPAD at the UN Headquarters.

- ✓ *UN system-wide coordination in support of NEPAD*

The Office of the Special Adviser on Africa is providing support, in collaboration with ECA, to the Secretary-General in promoting a coordinated, system-wide response in support of Africa's development, particularly the implementation of NEPAD, through the UN System Chief Executives Board for Coordination (CEB). The CEB provides oversight and policy guidance to the entities of the UN system in their support for Africa's development. Support to NEPAD has been on the agenda of the CEB since 2001.

- ✓ *Advocacy and awareness raising for NEPAD energy programme*

Within African countries, UN agencies and information centres are expected to support the NEPAD secretariat in popularising NEPAD and increasing local awareness and ownership of the programme. Several Public Information services on Africa have joined the effort to publicize NEPAD activities. A global advocacy strategy for NEPAD was developed as a collaborative effort by the Office of the Special Adviser on Africa, ECA, and the Department of Public Information.

- ✓ *Activities of some UN agencies and programmes*

Several agencies and organizations of the United Nations system have aligned their activities in Africa with the priorities of NEPAD. Most have established a special office in charge of NEPAD and the AU in Addis-Ababa. They have all provided substantive support to the NEPAD Secretariat to develop its five-year strategic plan, including the Short Term Action Plan on Energy and the Action Plan for the Environment Initiative of NEPAD. The later was adopted by the African Ministerial Conference on the Environment (AMCEN) and the African Union.

The United Nations²⁰, in collaboration with the Government of Senegal, convened a workshop of African energy experts on “*Operationalizing the NEPAD Energy Initiative*” which took place in Dakar, Senegal in June 2003. The main purpose of the workshop was to develop proposals for the implementation of the short-term action plan and propose measures to ensure that the programmes established through the World Summit on Sustainable Development (WSSD) follow-up are in support of NEPAD energy objectives.

Accordingly, the Dakar workshop identified actions/issues that could be help expedite the implementation of energy project in the NEPAD short Term Action plan. The workshop examined funding options that could be exploited to advance the NEPAD goals/objectives with regard to rural energy, renewable energy and energy efficiency. Some of the WSSD partnerships could be used to disseminate best practices in Africa, create training synergies and develop sub-regional energy master plans. The UN system was urged to support NEPAD, inter alia, by assisting with access to post-WSSD mechanisms.

✓ *Annual Regional Consultation of UN Agencies working in Africa*

At the regional level, the annual regional consultation meeting of the United Nations agencies working in Africa is the framework for coordination and collaboration among the entities of the UN system at the regional level (Box. 2). These annual regional consultation meetings provide a platform for achieving system-wide coherence and effectiveness in support of NEPAD.

✓ *UN Energy-Africa*

Following a recommendation adopted by African energy ministers in Nairobi in May 2004, and the creation of UN-Energy at the global level, UN organizations active on energy in Africa created, in May 2004, a collaboration mechanism called UN Energy-Africa. UN Energy-Africa also serves as the sub-cluster on energy in support of the NEPAD energy agenda within the infrastructure cluster of the UN regional consultation framework.

Box 2: UN Annual regional consultation meeting

The UN support to NEPAD and the AU is organized around seven clusters to enable agencies and organizations of the UN system to pool their efforts and synergies in support of NEPAD in a cost-effective and coordinated manner. The clusters are as follows:

- Infrastructure development: water and sanitation, energy, transport, information and communications technologies (ICT) convened by ECA;
- Governance, peace and security convened by UNDP;
- Agriculture, trade and market access convened by FAO;
- Environment, population and urbanization convened by UN-Habitat;
- Human resource development, employment and HIV/AIDS convened by UNICEF;
- Science, Technology and Innovation convened by UNESCO; and
- Advocacy and communication convened by OSAA.

ECA convenes all clusters together during the annual regional consultation of UN agencies working in Africa.

✓ *Progress made on NEPAD energy related investments*

²⁰ The Department of Economic and Social Affairs (UN DESA), the Office of the Special Adviser on Africa, and the United Nations Environment Programme (UNEP) Collaborating Centre on Energy and Environment.

The NEPAD energy initiative evolves around the development of major infrastructure that requires important investments. Some progress can be reported since 2002, including the following investments:

- ADB has approved USD 580 millions for the financing of infrastructure and energy projects prioritised in the NEPAD Short Term Action Plan (STAP) approved by the Heads of State. These include projects in table 2 ;
- The World Bank has approved USD 570 millions for Energy projects in West and Southern Africa;
- Canada has contributed USD 10 million for projects preparation and the NEPAD Secretariat is now working with ADB to mobilise contributions by other development partners;
- The French Government and the Development Bank of Southern Africa (DBSA) have equally contributed to the cost of establishing a R25 million NEPAD project preparation facility. The facility is hosted by the DBSA;
- Negotiations to access USD 1 billion committed by Japan for infrastructure projects are making good progress as well as with India regarding USD 200 millions offered in 2003;
- The EU Commission has earmarked about 10 millions Euros for the four Sub-Saharan regions pilot basins within the Integrated Water Resources Management (IWRM) initiative. North Africa is covered under the Mediterranean Basin;
- Africa Energy Fund and the Emerging Africa Infrastructure Fund, initiated by the UK Department for International Development (DfID) as a Public/Private Partnership venture and has been capitalized at \$305 millions; and
- The preparation of other high priority sub-regional energy infrastructure projects is being accelerated for funding by the ADB:
 - Mphanda-Nkua hydroelectric power project in Mozambique;
 - Nigeria-Benin-Togo-Ghana and DRC-Angola-Namibia electricity inter-connectors;
 - Kenya-Uganda oil pipeline; and
 - West Africa Gas pipeline.

Table 2: ADB funded NEPAD energy projects in 2003

Project Description	Funding
Algeria-Morocco-Spain Electricity Interconnection Project	94,56
Nigeria-Togo-Benin Power Interconnection Project	18,07
ECCAS member countries Electrical Networks Interconnection Study	3,60
Nile Lake countries Electricity Networks Interconnection Study	2,86
Total	US\$ 119.09 millions

Sub Issue 2: Financing of energy programmes

- **Statement of issue priority for the Africa**

Mobilizing finance for development is a dominant issue for Africans. The energy sector in Africa lacks appropriate finance for the development of key energy generation, transport and distribution infrastructure. Overall, financial flows in this sector are far below the needs. The uneven regional distribution of energy resources calls for a rapid development of sub-regional oil and gas pipelines, as well as inter-country power lines. The high level of poverty and generally low technical capacity on the continent require the development and the use of innovative financial instruments and mechanisms that promote favorable terms that are commensurate with the needs and priorities of African countries.

- **Brief review of the commitments/actions implemented**

UNEP Finance Initiatives

UNEP has been working with the finance sector since the late 1990s on new approaches to financing sustainable energy in developing countries. These efforts to green energy finance flows builds upon UNEP's Finance Initiative (FI), which now include a membership of over 170 banks and 85 insurers committed to integrating environmental considerations into their internal and external business activities and asset management. UNEP also works closely with the Basel Agency for Sustainable Energy (BASE), a UNEP Collaborating Centre that promotes and facilitates investment in the renewable energy and energy efficiency sector. Other UNEP initiatives to improve financial flow in the energy sector in Africa include:

- *Sustainable Energy Finance Initiative (SEFI)*: SEFI provides current and targeted information to financiers while facilitating new economic tools that combine social and environmental factors - both risks and returns - as integral measures of economic performance.
- *The Renewable Energy Technology/Energy Efficiency Investment Advisory Facility (IAF)*: IAF helped financial institutions to evaluate potential renewable energy technology or energy efficiency investments in developing countries and countries with economies in transition. The first phase of the project is completed with interesting results and effort is being made to have second phase.

Regional and international financial institutions investments in Africa's energy sector

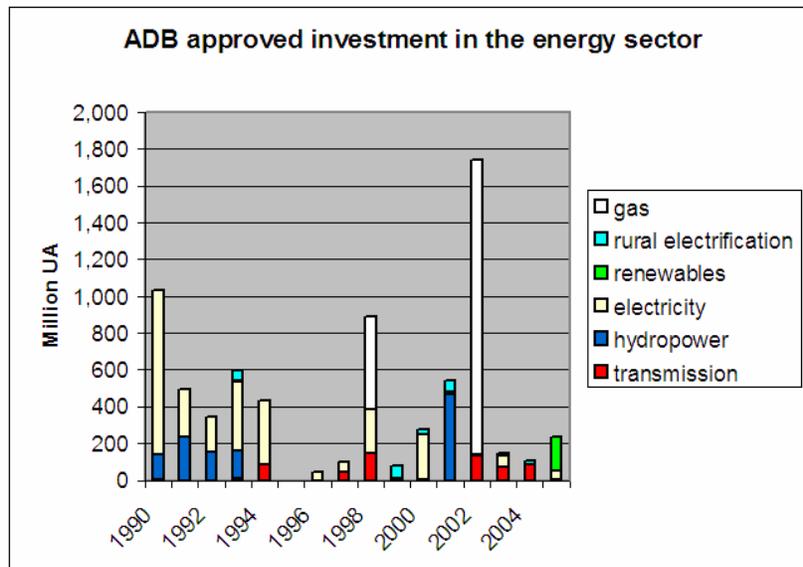
In the previous sub-section we highlighted some of the investments of regional and international financial institutions in support of the NEPAD energy programme. The overarching goals of all investments of the development banks are to promote development and reduce poverty on the continent. The strong link between sustainable energy provision and poverty reduction implies that the provision of energy should be high on the agenda of financial institutions working in Africa. Currently, the World Bank, the BOAD, the ADB, and the DBSA and other sub-regional institutions are the major actors for the financing a number of projects and programs in the field of energy in Africa.

- **Progress Achieved**

The implementation of the above-described commitments and actions contributed to achieve progress in the following ways:

- ✓ Between 1976 and 2003 the ADB group made cumulative loan and grant approvals exceeding 49 billion US dollars. Of this amount, approximately 9.4% was invested in the power sector (Figure 11). This translates to about 4.5 billion US dollars. The majority (87%) of these investments were made in the electricity sub-sector. The remaining 13% supported projects in the rest of the sub-sectors (e.g. petroleum, fuel wood, solar, geothermal, coal and energy in general) (ADB report)²¹.
- ✓ ADB is also supporting a number of projects and programs in the field of renewable energy in Africa that are either in the process to be or have been recently approved. Some recent examples are:
 - 11 Sub-Saharan African countries capacity building small hydropower (€37.5 million total amount of which 18 million by the ADF and 10 million Global Environment Facility GEF).
 - renewable energy studies for Uganda, Tanzania and Gambia (€2.5 million)
 - Mozambique energy reform program on rural electrification (isolated grids and PV) (€67 million).
 - Solar/gas power stations in Morocco and Egypt (€200 million each).
 - Nigeria small hydropower and rural electrification study (€2 million).

Figure 11. Investments of the African Development Bank in the energy sector by year of board approval. The figures are given in the Bank’s Unit of Account, which is a basket of major international convertible currencies calibrated to be equivalent to the Special Drawing Right (SDR) of the IMF. Its exchange rate on 31 May 2005 was UA1.00 = US \$ 1.45661.



²¹ ADB report (2005)

- ✓ The UNEP IAF has assisted a variety of development and commercial banks, and private investors to assess prospective debt and equity investments in the sustainable energy sector. These include projects or investment funds involving wind, biomass, biogas, geothermal, small hydro and district heating technologies, as well as energy service companies (ESCOs). IAF recently supported a \$1.2 million biomass plantation in Tanzania.

Sub-Issue 3: Capacity Building and Networking for sustainable development

- **Statement of issue priority for Africa:**

Overall, the energy sector in Africa suffers from poor planning and decision making tools. This is due to both inadequate human and technical capacity, and insufficient scientific capacity to provide decision-makers with well-informed technical data and policy options. Thus, capacity building and training at regional or country level, as well as large awareness raising programmes are considered of high importance for the development of the continent. Networking on thematic energy issues is viewed as a pertinent mean to achieve knowledge dissemination.

- **Brief review of the commitments/actions implemented**

Training on energy planning and analysis

IAEA provided assistance and capacity building in energy planning and in energy-economics-environment analysis to Member States upon request, through a variety of mechanisms. Such assistance, technical support and training, are consistently listed as top priorities among African countries concerned about harnessing energy sector growth for sustainable development, both on a regional and national basis.

The IAEA also has with South Africa and UNDESA, a WSSD partnership project assessing energy development in service to sustainable development goals, which includes energy sector modeling, statistical and policy analysis.

With ECA and UN Energy Africa, the IAEA is conducting a regional capacity building project in the use of integrated resource planning (IRP) to provide an assessment of “Sustainable Development in Sub-Saharan Africa,” including training in energy sector modeling and analysis.

Advanced education in energy resources, planning and policy

IEPF in collaboration with “Agence Universitaire de la Francophonie” located in Dakar, and the “Centre d’enseignement spécialisé en énergie (CRES-É)” established a Master Degree programme in energy and its environment, and a training curriculum in energy policy development, covering various themes such as “energy resources”, “method of resource assessment”, “analysis and modeling”, “energy sector planning”, etc. Other training and awareness raising initiatives undertaken by IEPF dealt with issues related to power sector reform and Public-Private partnership for power sector development.

Since 1998, IEPF has launched a programme to assist countries develop national energy information system. The second phase of this project launched in 2004 with 1.1million euros co-funding from by IEPF and the EU assists Togo, Niger, and Senegal establish their National Energy Information System, through the provision of adequate equipment and the training of a national team.

In the framework of UN Energy-Africa, ECA in partnership with UNEP undertook a study to assess power sector reforms in Africa, with the objective to promote the mainstreaming of social and environmental considerations in power sector reforms in Africa.

Global Network on Energy for Sustainable Development (GNESD)²²

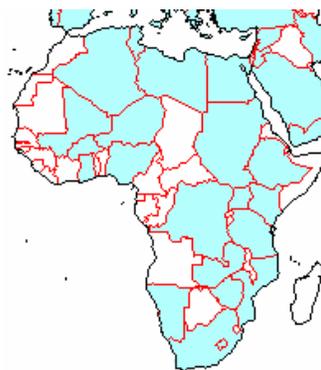
This is a global network that was launched during WSSD with a purpose of promoting partnership for the sustainable development of the energy sector. GNESD is helping to promote research, transfer and take-up of green and cleaner energy technologies in the developing world. The Network is achieving this by strengthening collaboration between existing "centres of excellence", and work through these centres to influence sustainable energy policies, strategies and programmes.

- **Progress Achieved**

The implementation of the above-described commitments and actions contributed to achieve progress in the following ways:

- ✓ The IAEA has national energy planning and capacity building projects in Egypt, Ghana, Morocco, Nigeria, Sudan and Tunisia. The IAEA has also a regional energy analyses project that encompasses 14 countries: Burkina Faso, Democratic Republic of Congo, Ethiopia, Ghana, Kenya, Mali, Mauritius, Namibia, Niger, Nigeria, Sudan, United Republic of Tanzania, Uganda, Zambia and Zimbabwe. Figure 12 provides regional distribution of the people trained. For Africa, there were 22 trainees in the first half of 2005, 38 in 2004 and 28 in 2003. These involve not only training in energy modeling and analysis, but also technical support for national case studies or regional analyses.
- ✓ Twenty people are currently enrolled in the IEPF sponsored Master programme, while 24 representatives of the UEMOA countries were trained on energy policy development. Several hundred people participated to the awareness raising workshops, and currently, three countries (Togo, Senegal, and Niger) are in the

Figure 12: Regional distribution of participating countries in IEAE energy planning capacity building in Africa



²² GNSED

process of establishing a national energy information system.

- ✓ Three African centers of excellence (ENDA-TM, Senegal, AFREPREN, Nairobi, and URC, South Africa) are members of the GNESD network. The focus of the network was on energy access and poverty, on which several technical publications were written. GNESD is supported by the several European countries (France, Germany, UK and Denmark).

Sub-Issue 4: Africa Regional Energy Integration

- **Statement of issue priority for the Africa**

Expanding regional cooperation in the energy sector to further regional economic integration has been a concern of most Regional Economic Communities (REC). They seek to promote energy pooling and cross-border energy flows to minimize the cost of supply through economies of scale and to enhance the security and reliability of supply. Good indicators of achievement should assess progress made in joint development of hydropower generating facilities, energy pooling through cross-border pipeline projects, regional power pooling and expansion of cross-border oil pipelines²³.

- **Brief review of the commitments/actions implemented**

All energy divisions of the RECs aim at ensuring the availability of a sufficient, integrated, efficient and cost effective infrastructure system that will support and sustain regional economic development, trade and investment for poverty alleviation. They are all committed to support NEPAD energy initiatives and to undertake joint development or use of hydropower generating facilities, expand sub-regional power pools and interconnection of electricity grids, develop, where cost effective, cross-border gas and oil pipelines projects.

In West Africa, the establishment of a regional electricity market through the West African Power Pool (WAPP), and the provision of natural gas to Benin, Togo and Ghana from Nigeria for electricity generation and industrial uses through the West Africa Natural Gas Pipeline (WAGP) and the ECOWAS Energy Observatory are among the current priority actions.

The core of ongoing efforts in Southern Africa include: facilitating the implementation of the Southern African Power Pool (SAPP) Plan; establishing and maintaining a regional energy-planning database; facilitating the creation of an information exchange system in all SADC Member States; developing a regional capacity building programme for the creation of national electricity regulatory authorities in the SADC Member States; and establishing and operationalizing the Western Corridor Project.

²³ ECA ARIA (2004)

In the other sub-regions of Africa, such as Central and Eastern Africa, efforts to develop an energy programme are being pursued. The Central Africa Power Pool (PEAC) was established in April 2003, in Brazzaville. It is to cover the 11 countries of the Economic Community of Central Africa States (ECCAS). The latest of the power pool arrangements, the Eastern Africa Power Pool (EEAP) was launched in March 2005.

- **Progress Achieved**

The implementation of the above-described commitments and actions contributed to achieve progress in the following ways:

- ✓ *Implementation of the SAPP, and WAGP*

The WAPP is still in its development stage. The following advances were made: The Study on the W.A. Regional Regulation Mechanism for Electricity Sector was launched and data collection was completed in 2003; Regional Energy Master Plan and Stability Study was developed; The Energy Protocol was adopted by the Council of Heads of states and Governments and ratification by member states is underway. Also, the ECOWAS Council of Ministers adopted in Accra, in December 2003 the regulation on the operationalisation of the ECOWAS Energy Observatory. Currently, studies for four priority connection projects²⁴ are completed, and funding partially secured.

Progress was also made on the West African Gas Pipeline (WAGP) with the ratification of the treaty and adoption of relevant legal instruments to be ratified by member state parliaments by end of 2004. Construction of the pipeline was to start by mid-2005.

- ✓ *Implementation of the SAPP*

The SAPP market started with two players ZESA and ESKOM. It now includes Nampower (Namibia), Botswana Power Corporation, Electricidade de Mozambique, Hidroeléctrica de Cahora Bassa (Mozambique), Kariba North Bank (Zambia) and Swaziland Electricity Board. In 2003, the energy and volume traded on the Short-Term Energy Market (STEM) was 713GWh and US\$3.6 million respectively, in comparison to 739GWh and US\$2.9 million for 2002. The price of energy increased from 0.4 to 0.6 Usc/kWh from 2002 to 2003.

The World Bank and NORAD, in November 2003, approved the sum of US\$178.6 million for the SAPP Power Market Project. The first phase of the project has started and it consists of the upgrade of the SAPP Coordination Centre, the feasibility study for the transmission line from Zambia to the United Republic of Tanzania, and the strengthening of the transmission corridor from Inga to SAPP.

Furthermore, the World Bank has pledged financial support to SAPP and SIDA has approved a grant of SEK10 million (approximately US\$1.6 million) to SAPP for the development of long-term transmission pricing policies and implementation procedures and ancillary services

²⁴ Interconnection between Mali and Cote d'Ivoire; Ghana-Togo-Benin; the Sambagalou hydroelectric project and interconnection between Guinea Bissau-Ghana-Senegal; Interconnection between Cote d'Ivoire-Burkina Faso, and Nigeria-Benin.

market development in June 2004. The Coordination Centre has received a grant of NOK35 million from NORAD to develop a competitive electricity market for Southern Africa²⁵. Figure 13 shows progress made to interconnect countries of the SAPP.

Western Corridor Power Project (Westcor)

The Westcor Project aim is to harness the large water resources of the Congo River at Inga, to produce and supply electric power, initially for the five countries²⁶ involved but ultimately to the whole SADC sub-region. The estimated \$7 billion project will comprise the construction of a 4,000 MW hydroelectric dam, a transmission line and a telecommunications line. The Inter-Governmental Memorandum of Understanding (IGMOU) and Inter-Utility Memorandum of Understanding (IUMOU) of the project were signed in South Africa on 22 October 2004.

²⁵ www.sadc.org

²⁶ Botswana, Angola, Namibia, South Africa and DRC

✓ *African Energy Information Management*

Some progress were achieved in the collection, management and dissemination of energy information in Africa by several actors: The World Energy council (WEC), the International Energy Agency (IEA) and the UN statistics section of UNDESA have developed databases of statistics for the African energy sector. Other institutions active in this area at the regional level include FAO, IEPF, UNDP and UNEP. The African Energy Commission (AFREC), an African Union technical organ, launched in May 2005 the African Energy Information System (AIES). These advances will assist Africa in the collection and management of key energy information and assist decision-makers in formulating sound energy policies, based on best practices and up-to date technology options.

✓ *Progress achieved in NEPAD STAP*

In section III (Issue 4) of this report, we highlighted the progress achieved in the implementation of the NEPAD Short Term Action Plan that features many energy infrastructures projects.

Assessment of Accomplishments and Gaps

As mentioned before, this review of achievements for the implementation of commitments made during WSSD/A21/PFIA21/ CSD is by no mean exhaustive of every action undertaken by all energy stakeholders in Africa. To carry out such as a comprehensive review would have required more consultations, means and good will from all actors. However, based on responses to the surveys, and in view of commitments made during WSSD, A21, PFA21 and CSD, the following qualitative assessment of progress achieved during the last few years on the main energy issues can be made:

Energy accessibility issue

The problem of energy accessibility has been addressed by many international organizations on a bilateral or multilateral level, African development partners, regional, sub-regional and country level organizations. This issue has been linked with poverty alleviation efforts in some cases, but unfortunately not always. The need for more generation capacity has been recognized; however, efforts to solve the problem stumble over chronic lack of public funding and little interest of investors and financial institutions in the African energy market, mainly due numerous disincentive measures built into national institutional, policy, legal and regulatory frameworks.

Therefore, with close to two third of Africans without access to modern energy and trapped into economic poverty, there is much to be done to achieve commitments and targets at national, sub-regional and regional and international levels.

Some of the gaps and shortcomings identified in the global strategy for achieving equitable energy access for all are:

- The lack of general recognition and acceptance that the energy issue is an integral part of the poverty reduction debate and a prerequisite for reaching sustainable development.
- Approaches to design rural energy development strategies and policies are still supply driven based on constraints and means relevant in urban areas.
- Sub-optimal use of human, technical and financial resources by various international, regional and national organizations due to lack of coordination and coherence among various development programmes and institutions.

Overall, the resources used for action were inadequate to make a significant difference on the energy accessibility challenge.

Issue of changing patterns of consumption and production

Approaches used to address this issue include the development of renewable energy sources, modernization of the biomass energy sector, development of EE and RE service companies and actions to achieve sustainable urban transport. These diverse actions have not succeeded in affecting the continent RE mix, in generating substantial energy savings, protecting forests and increasing access to modern energy.

Initiatives taken for changing consumption and production patterns for sustainable development have essentially lacked strong the political supports from national governments that they require and the minimum critical scale of projects that can create a momentum of change. Activities are much too localized, not enough advertised and often too controversial to intuitively be understood by African people and adopted by most governments.

Issue of development of advanced energy technologies

This issue was not viewed as a priority for the continent, though advanced technology may bring an answer to the questions of decentralized rural energy development and energy efficiency. Consequently, in this domain, few actions were carried out with the exception of some capacity building and networking initiatives.

Efforts to develop advanced energy technologies in Africa, as committed in the above-mentioned international meetings, were insufficient. A lot more could be done especially in providing support to local research centers and universities, and in promoting innovative local energy enterprise ideas, based on indigenous material and locally available resources.

Crosscutting Issues

Support to NEPAD energy programmes

Considerable efforts were deployed by the international and African communities to promote NEPAD and support NEPAD energy initiatives. Many UN special organs and organizations have responded well to NEPAD. Despite this good will, NEPAD energy initiatives have not made the anticipated progress and many initial expectations of African people remain unmet.

Shortcomings in the various initiatives derive from many factors, including:

- Evolving institutional status of the NEPAD with respect to the African Union and regional organizations;
- Low and insufficient human and institutional capacity at the NEPAD secretariat and technical divisions;
- Slow progress in the design and formulation of priority energy projects of the NEPAD;
- Unclear procedure and framework to most international development partners as to the way to efficiently assist NEPAD; and
- Regional Economic Communities (REC) generally do not have the human, technical, financial and institutional capacities to carry out the implementation of NEPAD projects as they are expected to in the NEPAD implementation plan.

Financial Issues

Similarly to other development sectors in Africa, the energy sector suffers from meager funding and reduced financial options. Despite many publicized announcements of commitments made by various development partners (bilateral and multilateral) funding levels in the African energy sector remain very low and have not increased significantly for many years. Actions reviewed in this report try to address some of the barriers to a larger participation of financial institutions in the sector. Programmes such as ADB FINESSE and various UNEP Finance initiatives deal with the problem of capacity building within financial institutions in order to increase the share of energy investments in their portfolio. Analysis however shows that the sector is still under-funded and run the risks to collapse further unless business-as usual approaches are changed.

Some of the shortcomings in the implementation of the finance targets are due to:

- Commitments made by bilateral and multilateral organizations in terms of increase of the ODA and grants to Africa did not materialized;
- Continued lack of innovative initiatives by financial institutions and investors; and
- Weak involvement of national financial institutions and low mobilization of indigenous capital for development.

Capacity Building

Several actions were implemented with the aim to strengthen the capacity of energy planners and developers, education and research institutions and centers of excellence. Formal training and networking schemes were used. Overall, African human capacity in energy is viewed by African as adequate to make progress. However, national and sub-regional institutions are often severely under-equipped in communication and data acquisition and processing tools.

Gaps in actions implemented proceed from the small number of capacity enhancement programmes aimed at addressing the needs of sub-regional organizations such as the REC, Power Pools, etc. They therefore remain a weak link when it comes to design and implementation of integration projects that normally fall under their leadership.

SECTION IV

Constraints and Challenges to Achieve Targets

This section presents an overview of the main energy challenges in Africa, and describes the constraints identified in implementing energy activities on the continent

Overall, a synoptic picture of the African energy sector reveals a continent that is undersupplied in modern energy. When energy is available, it is supplied in a form that is usually inappropriate for the needs of the majority of people and economically unaffordable by most of those who have access to it. This is testified by a very low access rate to processed energy, particularly in the rural areas; the dominant usage of cheap or free form of energy such as biomass; and, paradoxically, an intensive waste during the transformation of energy resources and usage of products and services available. Approaches and recommendations must take full cognizance of the specifics of external constraints to the sector and the limitations of the instruments used so far to induce changes.

External constraints to the energy sector

Electrification rate versus population growth: The never-ending race of electrification

When one compares the current rate at which new electricity connections are made in most African countries to the growth rate of the population, one easily realizes that Africa is involved in a never-ending race to reduce energy poverty, unless dramatically different actions are taken to boost the number of new people having access to electricity. In Sub-Saharan Africa, the number of people having no access to electricity grew from 434.5 millions in 1990 to 516 millions in 2000. This never-ending race is explained by the fact that while the number of people having access to electricity increased by 19% between 1990 and 2000, the number of people grew by 30% in the same period²⁸. The problem of energy poverty seems thus to worsen in absolute terms²⁹.

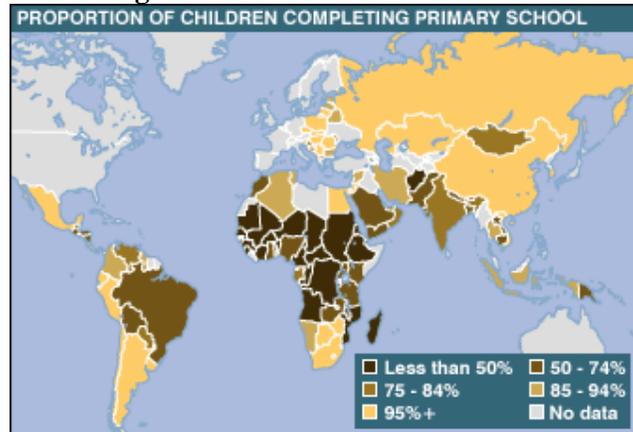
Low education level

Africa is the continent with the highest percentage of children not completing primary school (see Figure 14). Low education is spread across African societies, however its highest density is found in sub-Saharan rural areas, the same regions where access to energy is the lowest. Implementing “energization” programmes in rural areas, with full participation by local population is constrained by the level of education of the population. This reduces their ability to act as agent of change for the design of local energy solutions including the development of local entrepreneurship for installation and maintenance of decentralized energy systems, as well as for the development of productive use activities.

²⁸ IEA WEO (2002), and UN Statistics

²⁹ Moulot (2005)

Figure 14: Education level in Africa



source: World Development Report, 2003

The strong centralized state

While most African countries have launched some level of reform of their power sector since the early nineteen, these reforms focused on solving many of the technical and mostly financial inefficiencies caused by historically bundled vertically integrated sector, under the control of governments. Power sector reforms undertaken under pressure from the Breton Woods Institution (World Bank and IMF) are aimed at increasing the competitiveness of the sector, reducing the role of states in the management of the sector and striving to attract more private sector participants in the production and distribution of electricity³⁰. Results are however meager. Energy policies design and planning are still strongly centralized at the highest level of governments. The role of local governments, cities, regional councils and village-level communities is very weak, and usually limited to political lobbying with the central governments. Though not specific to the energy sector, this fact constitutes a significant constraint for the development of sustainable energy in non-urban areas. The non-involvement of the local population in most rural level energy projects has led to cost-ineffective investments and simple failure of many energy projects³¹.

Constraints identified by actors while implementing commitments

Poor infrastructure and high up-front energy cost barriers for access to Energy by the urban poor

In part due to poor infrastructure and prohibitively high up-front costs, the poor often face much higher energy costs than the non-poor. This is compounded by limited access to appropriate financing schemes that can allow the poor to overcome the high-up front costs of cleaner energy devices and appliances. Other important energy challenges facing the poor, include low incomes that are not sufficient for the procurement of energy services to meet

³⁰ AFREPEN (2001)

³¹ NEXANT (2002)

basic needs such as sufficient energy to cook food, provide affordable transport, power pumps for potable water; sterilize medical equipment; and, provide space heating.

There currently exists formidable market and regulatory barriers for the urban poor to access affordable and modern energy services. These barriers must be tackled in a comprehensive national and intra-regional fashion and have not yet (UN-Habitat report)³².

Energy and urban transport constraints

As sub-Saharan African cities experience increased urbanization and motorization, air pollution, particularly from vehicles still using leaded gasoline, is worsening. By providing access to business and public facilities, urban transport plays a critical role in the development of urban areas and for overall economic growth, but it also generates a number of externalities in terms of accidents, noise, traffic congestion and air pollution at local as well as global levels. The latter is becoming a major environmental and health concern in Sub-Sahara Africa. High rates of urbanization and motorization (4% to 8% in a number of cities) are expected to be sustained from the next decade, coupled with low-income solutions to daily commuting. Consequently, propensity to importing older vehicles, using cheaper two-wheelers which pollute more, consuming unsafe fuel and postponing vehicle maintenance is expected to prevail in the short and medium term.

Wood sector information, financial and institutional constraints (FAO report, 2005³³)

Fuelwood and charcoal (woodfuels) are major energy sources in most of African countries. However, they are not receiving the attention deserved by Forestry and Energy organizations. The lack of reliable information on woodfuel production and consumption is commonly pointed out as a critical limitation in the formulation of wood energy policies. However, more often this is the result of the absence of sectoral policies as well as the lack of clear institutional responsibilities of forestry and energy agencies of most countries. As a result, the level of analysis is often limited to broad generalizations leading to speculations and often biased assumptions.

The support for the implementation of wood energy activities is gradually improving but many constraints remains, such as:

- Insufficient support from national Forestry services and Energy Agencies is weak;
- Unprepared human resources of above mentioned organization for the participation on wood energy planning and policy development activities; and
- Funds available are rather limited for the implementation of planned wood energy activities.

Other challenges for energy development in Africa

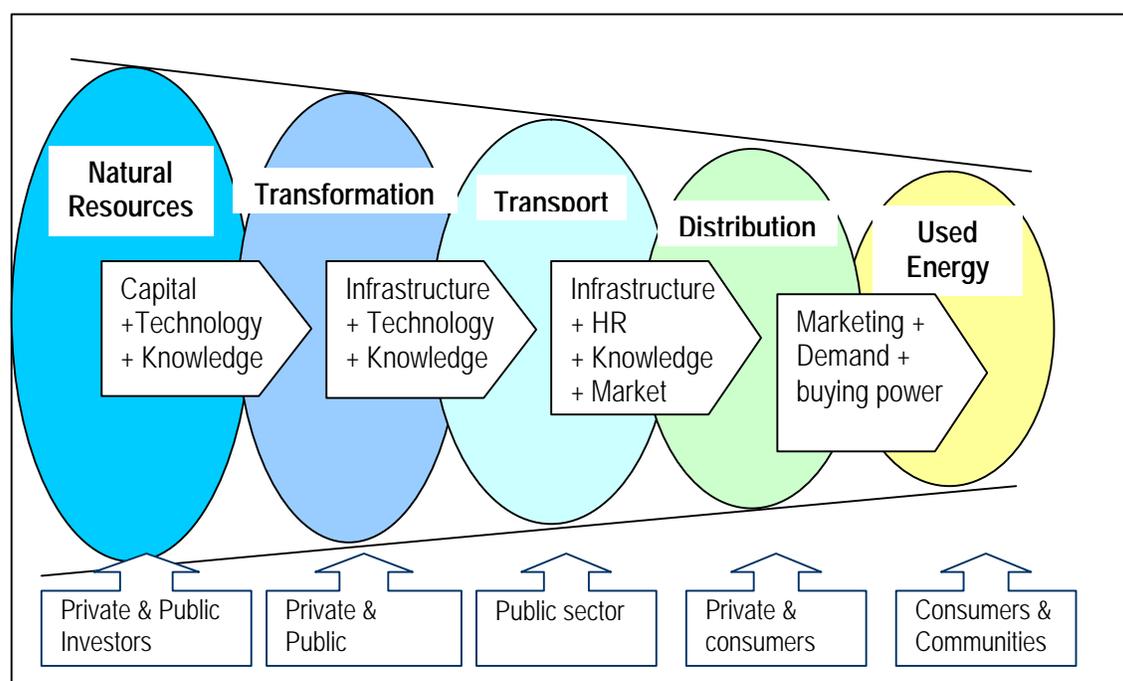
Analysis of the low technical, economical and environmental performance of the energy sector in Africa, reveals a bundle of challenges, all urgent, that must be addressed in order for the continent to break the cycle of energy poverty, and make progress towards sustainable

³² Habitat report (2005)

³³ FAO report (2005)

development. Figure 15 shows a simplified energy production to service chain, with highlights on requirements and constraints to move from one stage to the next. In the context of existing energy natural resources, there is a need for capital, technology and knowledge to transform the energy resources into useful energy that is transported when infrastructure, technology and knowledge are available. It is then distributed provided there are infrastructure, human resources, knowledge and an identified market. With proper marketing strategies, and an established demand with buying capability, distribution can be done commercially. There are thus many challenges linked with each of these steps in the chain.

Figure 15: Simplified energy production to service chain



Resource Challenges

- *Low energy production (untapped energy resource potential)*

Though overall the continent contains abundant and a large variety of energy resources from non-renewable fossils to renewable, modern energy production is far below the needs of the population and the production facilities. This is due to the fact that the energy potential of the continent is largely untapped. The WEC estimates that only 7% of the hydropower potential is used, while wind, geothermal, solar and other renewables sources are barely exploited. This is mostly due to unavailable investment capital from public and private sources, low technology capacities of countries, and generally inadequate science and knowledge facilities, for example for resources assessment and feasibility studies.

- *Uneven regional distribution of energy resources (Weak regional energy trade)*

As mentioned in section I, of the 53 countries in Africa, the largest energy potential is found only in a limited number of them. Hydropower potential is the most evenly spread, but the biggest concentration is on the Congo River with a potential of more than 40,000 MW. Oil and gas are mostly concentrated in Algeria, Nigeria and Libya, while coal is mostly found in Southern Africa, and geothermal potential in Eastern Africa. Based on IEA statistics (2002), the Maghreb countries together with the Republic of South Africa account for more than 82% of the African electricity generating capacity. Therefore, many African countries suffer from scarce energy resources, and must pay high prices to import energy. This poses the challenge of developing, at a faster rate, regional energy transport networks such as Oil and Gas pipelines and cross border and sub-regional electricity networks in order to boost intra Africa energy trade.

- *Weak share of Renewable Energy in the energy mix*

A review of the proved energy potential in African presents a striking diversity of resources, which offers a unique opportunity for an optimal energy resource mix for power generation. Though oil, gas and coal are the dominant source of electricity generation (accounting for almost 80%)³⁴, African has an almost untapped hydropower, geothermal, photovoltaic, and wind potential. Combustible renewables such as biomass that constitute the dominant energy source for African households are mostly traditionally used in an unsustainable manner that poses much threat to human health and the environment. Improving the electricity generation resource mix is a predominant challenge for sustainable development. Lack of investments, inadequate policy framework and low technical capacity are, among numerous other causes, responsible for the low level of development of RE in Africa.

Transformation Challenges

- *Low oil refinery capacity*

The refinery capacity of Africa represented in 2004, 3.9% of world total (Table 3), the lowest of all world regions³⁵. Further, the throughput of the refineries has been dropping steadily since 1998 due mainly to aging equipment and deficient maintenance. Even in a major oil producer country such as Nigeria, problems with refineries have led to frequent fuel shortages, and forced the Nigerian National Petroleum Corporation (NNPC) to import petroleum products³⁶. Even though all African countries consume some oil and petroleum products, half of them do not have any refinery facility. Many import refined products from the nearest source. African refinery capacity is mostly concentrated in North, South and West Africa, but half of the continent distillation capacity is in North Africa. Without sufficient financial and technical resources to maintain and invest in more refinery capacities, African countries are even more compelled to export their oil production, and deprive the local population and industries from the necessary fuel for development and daily energy uses, like transportation.

³⁴ see figure 5

³⁵ BP (2005)

³⁶ USDOE (1999)

Table 3: World oil refineries capacities

Oil: Refinery capacities									
Thousand barrels daily *	1994	1996	1998	2000	2001	2002	2003	2004	share of total
Total North America	18710	18703	19554	19937	20183	20143	20316	20459	24.2%
Total S. & Cent. America	6007	6069	6283	6437	6429	6534	6615	6589	7.8%
Total Europe and Eurasia	26523	25757	25255	24754	24735	25045	25176	25194	29.8%
Total Middle East	5690	5912	6187	6362	6662	6814	6944	7109	8.4%
Total Africa	2830	2987	2881	3034	3217	3294	3313	3311	3.9%
Total Asia Pacific	15943	18040	19696	21437	21614	21732	21566	21930	25.9%
TOTAL WORLD	75703	77468	79856	81961	82840	83562	83930	84592	100.0%

BP statistics 2005

Transport, transmission and distribution challenges

- *Transport, Transmission and distribution Infrastructure*

Historically, and even after power sector reforms were undertaken by many countries, the transmission sector has remained under the control and management of governments. It is viewed as a strategic sector generally clustered under national infrastructure. However, the high cost of energy transport and transmission infrastructure such as High Voltage power lines, oil and gas pipelines is responsible for the low progress in expanding national distribution electricity grids, and the low level of regional and sub-regional electricity, gas and oil trade among African Nations. It is established that the larger share of most rural electrification projects is the cost of medium voltage transmission lines to the village sites. Furthermore, the electricity transmission sector is often plagued with serious technical problems, leading to heavy electricity line losses while demand is still unmet³⁷.

Cross-cutting challenges

- *Low private sector participation and investment in the energy sector*

African governments have not been able neither to finance the expansion or refurbishment in the power sector nor to attract private sector investment. The International Finance Corporation (IFC) estimated that, between 1990 and 1998, FDI in the power sector in SSA was only 6% of all infrastructure FDI inflows into the region. In comparison, telecommunications accounted for 89% of all FDI inflows in this period. Far more popular destinations for the electric sector are East Asia and the Pacific, Latin America, and the Caribbean.

Between 1990 and 1999, private investment in electricity in SSA was \$2.9 billion, representing less than 2% of all private electricity projects in developing countries³⁸. The bulk of private investment in electricity was in Latin America and the Caribbean, with almost 40% of the total. More private investment is essential to mobilize resources for the development of

³⁷ Bahgavan (1999)

³⁸ World Bank Data

the sector and, more importantly, alleviate the budgetary burden on African state-owned power utilities³⁹.

This low private sector's investment level has been affecting progress in the NEPAD energy programme. Box 3 identifies some of the hindrances to more private sector involvement.

BOX 3: Hindrances to private sector development related to NEPAD

The workshop revealed that factors contributing to impeding private sector development in Africa included:

- Prevailing poor policy environment in most African countries;
- Weak institutional mechanisms for policy dialogue and consultation between the corporate sector and the Government in a number of African countries, resulting in insufficient exchange of information on their respective NEPAD-related activities;
- Poor infrastructure facilities in many countries which hinder business activities;
- Lack of an enabling governance environment; and
- Limited use of public-private partnerships for addressing a whole range of NEPAD priorities

©ECCAS NEPAD workshop, Libreville October 2004

○ *The rural energy challenge*

In the framework the modern energy access challenge, the issue of providing sustainable energy in the rural areas must be highlighted. Sixty to seventy percent of Africa's population live in rural areas and rely heavily on traditional and unprocessed biomass (wood, animal dung, agricultural waste, etc.) for their daily domestic energy needs, with limited choice and options of fuels for their productive activities. The rate of access to modern energy in these areas drops to as low as 1%, in some countries.

Sustainable modern energy provision in rural areas of SSA countries is hindered by numerous barriers including: i) dispersed settlements that increase investment and transactions costs of rural electrification projects; ii) low population density; iii) inadequate technology context for the rapid expansion of new appliances and technical services; iv) high illiteracy prevalence that limits their ability to act efficiently as agents of change in their environment; v) difficulty of legal recourse in case of disputes because most legal offices are in cities far from the villages; vi) low real demand for electricity; and most of all vii) low and irregular incomes of potential consumers of energy resources and services.

Acknowledging the fact that traditional African government policies based on the extension of electricity power grid have achieved a limited success in increasing access to modern

³⁹ ECA ERA (2004)

energy in the rural areas, new approaches promoting diversification of energy resources, including the modernization of the traditional wood sector, adopting decentralized energy generation systems approaches and innovative financial and energy delivery mechanisms based on a bottom-up approach to the rural energy problem are called for.

- *Non-efficient utilization of energy (in buildings, and industries)*

Due to the inefficient use of energy, Africa uses by far more energy to create \$1 of wealth (as reflected by “units of energy consumed per \$ GDP”) compared with other developing countries.

Pilot studies conducted through a UNDP/GEF regional project in West Africa (Senegal, Côte d’Ivoire) revealed a potential of energy savings of close to 30% in buildings, through appropriate awareness campaigns, regulatory and fiscal measures⁴⁰. This kind of savings can be achieved in other sectors such as transport, industry, and thermal power production.

On the production side, two third of energy is wasted, in the form of heat, during the process of transforming⁴¹ primary energy into its useful form. Much saving potential exist in the mostly old and inefficient thermal power plants used on the continent. Also, loose regulations on the quality control of the power transmitted and used lead to much loss in transmission lines. It is safe to say, that at least 30% to 40% more electricity can be made available to Africans through a variety of energy efficiency measures. Though the investments required are cost effective in time, the environmental benefits by the reduction of emission of green house gas (GHG) emissions provides everlasting benefits

- *Inadequate policy, regulatory and institutional framework*

Most stakeholders’ reports compiled in this regional review underlined the problem of inadequate institutional framework including policy and regulatory frameworks, as the essential challenge to overcome in order to improve the energy sector in Africa. Solving the chronic lack of public funding requires attracting bilateral, multilateral and private partners to the energy sector. They would not only bring the required finance for investments in expansion and maintenance of infrastructure and equipments, but also enrich the sector with new managerial and technical skills and knowledge and innovative technologies. Unattractive policies and laws and non-transparent regulatory measures and bodies, and unstable institutional frameworks are hindrances to bilateral, multilateral and private sector’s participation in any development sector.

The challenges and constraints compiled in this section are certainly daunting, but not insurmountable. Progress can be made! In the next and final section, specific recommendations are compiled from a large source of actors to address the challenges identified.

⁴⁰ UNDP/GEF (1997)

⁴¹ WEA (2000)

SECTION V: Lessons Learnt and Way Forward

This section summarizes lessons learnt by different participants to the review undertaken, provides some recommendations of workable approaches to address the challenges of energy for development in Africa. The recommendations are not only based on suggestions made by the respondents to the survey, but they also reflect, through several Boxes, suggestions made in several other pertinent gatherings that dealt with the issue of energy in Africa. The main goal is to gather different perspectives in order to help expedite implementation of the specific actions so as to meet the overall targets outlined in WSSD/A21/CSD.

Lessons learnt

The African energy sector has still a long way to go to meet the needs of most Africans, especially the urban and rural poor. Progress is slow due to many hindrances including: i) low investments (manifested mostly through largely untapped energy potential and underdeveloped infrastructure and energy transport networks); ii) inefficient management and planning that results in sub-optimal financial performance of the electricity sector; iii) inadequate institutional framework including policy and regulatory measures that deter a larger participation of the private sector; and iv) low technical capacity leading to premature failing of many existing equipment.

The following lessons could be distilled from the responses to the review surveys:

1. Taking full account of the specific human, economic and environmental constraints of the African energy challenge is central to achieve targets and commitments made by stakeholders. For rural energy for instance, effectiveness can only occur when the specificities of the African rural areas are integrated in the design of solutions.
2. There is great opportunity to share experiences between rural and urban poor areas so as to test innovative approaches to rural energy access (electrification and modern energy sources for household cooking fuel) within an urban setting because of a higher density of population and larger willingness to pay for public services in urban areas and stronger adoption of innovation in the urban setting (UN-Habitat).
3. Unless commitments of African governments are translated into stronger supports to development programmes (particularly capacity building programmes) initiated by international partners, projects have little chance to achieve their goals and targets (IAEA). Governments must therefore be involved at the earliest stage possible in the design of the commitments to be implemented.
4. There is a need to provide more opportunities for sharing innovative approaches between Asia, Latin America and Africa to address many problems related to energy for development, particularly for energy access to the poor and for urban transport infrastructure investment patterns tied to air-quality management (UN-Habitat).

5. The generation of information and the adoption of wood energy policies and programs aimed to develop sustainable wood energy systems are vital for the contribution of wood fuels, and their derived energy, for food security, poverty alleviation, economic development, SFM and climate change mitigation through carbon substitution and sequestration (FAO).
6. When building sustainable energy investment capacity within a financing organization, the approach needs to be flexible as different institutions follow different 'product development' paths. Changing the way a financial organization considers new investments therefore requires both better information and new mandates to combine social and environmental factors – both risks and returns - as integral measures of economic performance. To enter a new sector, some banks first focus on creating the right policies while others focus on training personnel. Learning 'hands-on' by taking first investments or developing specialized funds or loan portfolios are other approaches (UNEP).
7. IAEA has found that trainings in energy analysis and modeling using specific national and regional data and context are requested by many African decision-makers.
8. In order to boost its investments in Renewable Energy and Energy Efficiency Development, the ADB has launched a programme called "Financing Energy Services for Small-scale Energy users – FINESSE" programme. The main goals of the ADB FINESSE program are to build capacity in the Bank's Regional Member Countries (RMCs) and internally within the Bank to mainstream renewable energy and energy efficiency projects. This ultimately will lead to more renewable and EE projects within the Bank's investment portfolio and create awareness within the bank on the pressing energy needs for poverty reduction.

Way Forward

Efforts undertaken by various actors must be pursued with dedication to improve the institutional, legal and regulatory environment, attract more investors and private sector participants to the energy sector, haste the pace of regional integration projects, promote environmentally safe energy technologies such renewable energies, and increase access to modern energy to the rural and urban poor so as to reduce poverty and achieve the MDG. Major initiatives must be taken and scaled up to make progress, particular to:

Prioritize efficient Institutional, regulatory and policy framework

In order to address issues such as the lack of funding, low private sector participation and overall low performance of the energy sector, African Policy-Makers are urged to pay special considerations to policy measures that clarify the role of various stakeholders (public and private), improve investments climate in general through more favorable legal and regulatory reforms, strengthen the role of independent energy regulatory bodies and lift barriers to the realization of regional integration projects in energy (Box 4).

Box 4. Releasing Africa's Energy Potential

With respect to specific policy measures, I believe that much would be gained if African countries were to consider the following:

- *First*, we would encourage African countries to step up their efforts to develop comprehensive and coherent policy frameworks for their energy sectors, with particular attention paid to stipulating clearly the roles of the public and private sectors in the development of modern energy sources. Often, lack of policy clarity has tended to discourage private investments in the energy sector.
- *Second*, African countries would benefit much from intensifying their efforts to further improve their investment climates for both domestic and foreign investors. In this regard, legal and regulatory reforms require urgent attention.
- *Third*, in many of our countries the regulatory environment for the energy sector needs strengthening. In particular the establishment of accountable, transparent, and independent regulatory bodies has been shown to encourage much-needed private investment. It would be advisable to give such bodies the mandate of setting appropriate tariffs to ensure fair returns for private investors while at the same time protecting consumers from monopoly pricing practices.
- *Fourth*, encouraging greater competition in the energy sector could yield high returns. This could include unbundling of generation, transmission, and distribution systems, and encouraging, to the extent possible, the emergence of independent power producers (IPPs).
- *Fifth*, we would advise governments to give much greater priority to ensuring the realization of regional energy projects and programs. Given the uneven distribution of energy resources across the continent, high investment costs, the large economies of scale to be realized, and the improved reliability and quality of services to be gained, multinational projects are often the most economical approach to energy development. For example, fully utilizing the immense hydroelectric potential of the Congo River at Inga has been shown to have the potential of supplying central, western, southern, and even North Africa. In addition, the creation of regional power pools has proved to hold many important benefits as evidenced by the successful example of the Southern Africa Power Pool (SAPP).

In addition to these specific policy measures, I believe that it is also essential that African countries pay particular attention to improving the access of the poor to energy sources, particularly in rural areas. This will require first, improving the supply of biomass, and second, increasing the supply of modern energy sources.

Extract from O. Kabbaj, President of ADB Message at Fourth International Forum on African Perspectives. "Better Access to Energy for Africans" Organized by the African Development Bank and the OECD Development Centre, 26 November 2004, Paris, France

Increase financial flows towards the African energy sector

International development partners, including the UN should enhance their role to support African Nations to undertake the necessary reforms conducive to a coherent, transparent and attractive investment framework and increase their advocacy and funding function to mobilize and significantly increase the financial flow towards Africa for investment in energy projects. Commitments made to set the NEPAD energy initiative as priority for the continent should be reinforced.

Promote energy regional Integration as a catalyst for development

All Regional Economic Communities of Africa seek to increase trade among its member countries and then expand its market to other trade zones. Energy trade must be pursued with dedication by the RECs with the support of international partners as an efficient means to reduce the uneven distribution of energy resources on the continent, reduce energy import cost burdens on most national economies, and increase the supply of secure and environmentally sustainable energy (Box 5).

The African Energy Commission (AFREC) should receive more assistance to accelerate the achievement of energy integration between all African regions, through up-to-date energy information, regional and national capacity development of pertinent energy-decisions tools.

Box 5. Regional Integration is a Crucial Catalyst of Africa's Renaissance

Integration is no doubt a vital tool for accelerating the economic, social, cultural and political development of African countries; because affirmation of a common will to come together and for integration is likely to alleviate and indeed eliminate the sources of violent conflicts.

Furthermore, enlargement of national markets and harmonization of regulatory frameworks will help create an environment conducive to profitability of investments in the Continent.

From African Union Vision, 5th AU summit

Improve the share of RE in the African energy mix

To achieve significant progress in the development of Renewable Energy on the continent, governments should put in place coherent regulatory and policy frameworks that support the development of thriving markets for renewable energy technologies and recognize the important role of the private sector. This includes removing barriers and allowing for fair competition in energy markets and taking into account the concept of internalizing external costs for all energy sources. Such frameworks are essential to realizing the potentials for renewable energy technologies in an effective and efficient manner, to creating favourable conditions for public and private investments in renewable energies, and to extend modern energy services to populations currently without access (Box 6). African decision-makers are then urged to fulfil their commitments with regards to the development of RE (Box 7).

Box 6. Prioritise coherent regulatory and policy frameworks that support the development of Renewable Energy

Recognizing the diversity of circumstances among regions and countries as well as their common but differentiated responsibilities and respective capabilities, Ministers and Government Representatives underline the need for coherent regulatory and policy frameworks that support the development of thriving markets for renewable energy technologies and recognize the important role of the private sector. This includes removing barriers and allowing for fair competition in energy markets and taking into account the concept of internalizing external costs for all energy sources. Such frameworks are essential to realizing the potentials for renewable energy technologies in an effective and efficient manner, to creating favourable conditions for public and private investments in renewable energies, and to extend modern energy services to populations currently without access. Ministers and Government Representatives take note of countries who have adopted, and others who will adopt, targets for enhancing the share of renewables in their national energy mix.

Extract from Recommendation 4 of political declaration. Bonn renewables2004, June 2004

Box 7: Africans governments are committed to developing Renewable Energy

African Energy Ministers are committed to:

1. Promote sustainable production of biomass and its efficient utilization in all sectors
2. Promote research to assess and analyse renewable energy resources
3. Promote the incorporation of renewables in existing and planned energy master plans
4. Ensure the establishment and the strengthening of enabling institutional, legal and regulatory frameworks for the renewable energy sector, and especially in the area of public-private sector partnerships.
5. Promote increased community public and private sector participation in renewable energy development and dissemination for poverty alleviation, empowering women, income generation and enterprise creation.
6. Incorporate renewable energy education and public awareness in educational curricula at all levels but with specific attention to the African context.
7. Incorporate renewable energies in the agenda of the consultative processes between African countries and their major cooperating partners.
8. Increase cooperation across countries in the Africa region and also with other developing countries, for removing barriers, sharing lessons and increasing the uptake of renewable energy technologies.
9. Raise awareness on the implications of the current limiting global outlook on renewables e.g. particularly hydro, on the African energy system and hence sustainable development.

Extract of African Ministers Declaration on RE in Bonn Renewables2004, June 2004

Link rural energy development programmes to poverty reduction strategies and the achievement of the MDG.

Experts agree that energy poverty is linked to economic poverty and social welfare. Thus the low access to modern energy (for lighting, cooking and production for example) is a barrier to socio-economic development of most Africans. Energy access for the poor, particularly in rural areas should be given a priority consideration in any development policy and programme. International development partners, regional, sub-regional as well as national energy stakeholders should view the energy access problem as inseparable from poverty reduction efforts and economic growth strategies. They should therefore be willing to drastically increase their financial participation in the sector and assist in the development of key infrastructure that can sustain the minimum economic growth required to break the cycle for poverty and achieve the MDG (Box 8).

Box 8. Investments for Growth and Poverty Reduction

Growth will also require a massive investment in infrastructure to break down the internal barriers that hold Africa back. Donors should fund a doubling of spending on infrastructure – from rural roads and small-scale irrigation to regional highways, railways, larger power projects and Information & Communications Technology (ICT). That investment must include both rural development and slum upgrading without which the poor people in Africa will not be able to participate in growth. And policies for growth must actively include – and take care not to exclude – the poorest groups. There should be particular emphasis on agriculture and on helping small enterprises, with a particular focus on women and young people. For growth to be sustainable, safeguarding the environment and addressing the risks of climate change should be integral to donor and government programmes. This programme for growth takes over a third of the total additional resources we propose.

Extract from “OUR COMMON INTEREST”
REPORT OF THE COMMISSION FOR AFRICA, 2005

Promote coordination and coherence among all international partners

Given the number and diversity of international development partners intervening in the energy sector, more efforts must be made to create coherence, complementarities and thus effectiveness in all actions on the continent. This can be achieved in the framework of a collaborative mechanism such as UN-Energy/Africa among UN agencies, UN programmes and Funds and key non-UN organizations active in energy in Africa, in collaboration with regional organizations such as the AU and AU/NEPAD.

REFERENCES

- ADB Report (2005) ADB report to the African CSD14 regional review meeting, October 2005
- AFREPREN (2001) AFREPREN, “Power Sector Reform in Africa” proceedings of a regional policy seminar, April 24-25, 2001, Nairobi.
- Bahgavan (1999) AFREPREN, “Reforming Power Sector in Africa”, edited by M. R. Bahgavan, 1999
- BP (2005) BP Statistical Review of the World Energy, June 2005, www.bp.com
- ECA ARIA (2004) Assessing Regional Integration in Africa, ECA, 2004, www.uneca.org,
- ECA ERA (2004) ECA Economic Report for Africa (ERA), Unlocking Africa’s Trade Potential, www.uneca.org, 2004
- ECA/SDD (2004) ECA/SDD - “Regional Follow-up to WSSD outcomes and NEPAD Energy Initiative” African Ministers of Energy Meeting, Nairobi, May 2004
- FAO report (2005) FAO Report to African Regional Review Meeting for CSD14, 2005
- GNESD Global Network for Sustainable Energy Development, www.gnsed.org
- Habitat report (2005) UN-Habitat report to Africa CSD14 regional review meeting, October 2005
- IEA (2002) IEA key energy statistics, 2002, www.iea.org
- IEA (2004) IEA key energy statistics, 2004, www.iea.org
- IEA WEO (2002) IEA, World Energy Outlook, 2002
- Moulot (2005) “Unlocking Rural Energy Access for Poverty Reduction in Africa”, J. Moulot, UPDEA 15th congress, June 2005
- NASA NASA Solar Map, and WEC energy analysis, www.nasa.gov
- NEXANT (2002) NEXANT, “Rural Energy Services- Best practices, may 2002 www.sari-energy.org
- UNDP/GEF (1997) UNDP/GEF regional Project RAF92G32 on “Green House Gas Mitigation through Efficient Utilization of Energy in Buildings”, Cote d’Ivoire and Senegal, 1997-2000
- UNEP PCFV (2004) UNEP Partnership for Clean Fuel and Vehicles (PCFV),

www.unep.org/pcf/v/.

UNIDO IDR (2004)	UNIDO, <u>Industrial Development Report 2004: Industrialization, Environment and the Millennium Development Goals in Sub-Saharan Africa, The new frontier on the fight against poverty</u> , 2004, www.unido.org
USDOE (1999)	USDOE EAI, “Energy in Africa”, 1999
WEA (2000)	World Energy Assessment, <u>Energy and the Challenge of Sustainability</u> , 2000, UNDP Editing.
WEC (2003)	WEC, The potential for Regionally Integrated Energy Development in Africa: A discussion paper”, 2003
WEC, IEA (2002)	World Energy Council data, IEA 2002, www.wec.org
World Bank Data	World Bank Database on Private Participation in Infrastructure (PPI), www.worldbank.org