

Energy and the Millennium Development Goals in Africa



The Forum of Energy Ministers of Africa

Energy and the Millennium Development Goals in Africa

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Foreword

The current level of access to modern energy is very low in Africa compared to other developing countries. This poses a persistent impediment to our survival and economic development. The millennium development goals – (MDGs) agreed upon at the UN General Assembly in 2000 to reduce poverty by 2015 cannot be achieved in Africa unless drastic changes are introduced in the energy sector to address this enormous challenge.

To meet this challenge, the energy Ministers of Africa agreed to form the Forum of Energy Ministers of Africa – FEMA whose main objective is to assist African States and Sub-regional Organizations contribute to the achievements of the MDGs by increasing the level of access to modern fuels and other energy services. The ministers further set energy targets that will greatly enhance Africa's capacity in meeting the MDGs. These targets are:

- Doubling of the consumption of modern energy services including increased energy access for productive uses. The use of modern biomass technologies for industrial purposes to be explored.
- 50% of inhabitants in rural areas should use modern energy for cooking. Options should include improved cook stoves, which will result in both reduced air pollution and energy savings. Use of pressurized kerosene stoves and LPG stoves where the necessary support infrastructure is available can assist rural areas.
- 75% of the poor in urban and peri-urban should have access to modern energy services for basic needs
- 75% of schools, clinics and community centres should have access to electricity as this would enhance their competitiveness
- Motive power for productive uses should be made available in all rural areas

This report looks at the current status of energy in Africa, analyses the current trends and proposes strategic options to increase energy access. The level of investments required to provide the infrastructure needs for achieving the MDGs to transform the energy sector in Africa, has been estimated to cost about US\$20 billion per year. Financing options have been proposed which African Governments should closely consider to meet this financing challenge along with ways of lowering the costs.

This report is issued by FEMA to provide background analysis to support its advocacy Programme to address the challenges of increased access to modern forms of energy. It will be used in high-level discussions on investments in clean energy and development as well as in implementing the FEMA work programme.

FEMA is grateful for the support of the Energy Sector Management Assistance Program (ESMAP) managed by the World Bank which financed the services of Dr. Ogunlade Davidson and Mr. Michael Conteh who prepared this report under the overall guidance of Mr. James Baanabe, of the Ministry of Energy of Uganda and Ms. Dominique Lallement, of ESMAP. Mr. John Besant-Jones of the World Bank Energy Department peer-reviewed the report. Comments from Mr. Fritz Kolling and Mr. Liptow Holger of GTZ were very helpful in preparing the report.



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Executive Summary

1. The UN Assembly in 2000 agreed on eight goals along with their targets and indicators known as “Millennium Development Goals (MDGs)” as a means to reduce extreme poverty worldwide by 2015 using 1990 as the baseline. These goals which are oriented around creating employment and incomes, reducing hunger, combating preventable diseases, improving child health and education, arresting environmental degradation and halting discrimination against women, do not include improving access to modern fuels which is a major input in achieving them. Meeting these goals is very challenging, especially for Africa, which as a continent is the least consumer of modern forms of energy, the prime mover for overcoming poverty and delivering good education and health services. The paradox is that the continent is richly endowed with fossil fuels (coal oil and gas) averaging about 7% of global fossil resources, and significant renewable resources, though all these sources are unevenly distributed, but exploiting them for providing good quality of life for all Africans remain an uphill task. However, developing these resources will require overcoming major technical, financial and environmental challenges. Hence, the Forum for Energy Ministers of Africa (FEMA), realising the role of modern forms of energy in achieving these goals in African countries would like to suggest the following energy targets.

- Doubling of the consumption of modern fuels including increased energy access for productive uses. The use of modern biomass for industrial purposes should be explored.
- 50% of inhabitants in rural areas should use modern energy for cooking. Options should include improved cooking stoves, which will result in both reduced air pollution and energy savings. Use of pressurised kerosene stoves and LPG stoves where the necessary support infrastructure is available especially in rural areas.
- 75% of the poor in urban and peri-urban should have access to modern energy services for basic needs
- 75% of schools, clinics and community centres should have access to electricity as this would enhance their international competitiveness
- Motive power for productive uses should be made available in all rural areas. The use of bio-fuels should be explored as reliability on oil is reducing due to current price hikes.

2. Achieving these energy targets will require major strategic shifts to ensure that the needs of the poor are satisfied as well as improving the overall net productivity of African nations so as to meet and sustain the MDGs. The energy options for transforming most African countries from their survival stage to that of development and eliminating extreme poverty as well as creating wealth fall into three categories, namely:

- Options for ensuring macro-economic growth stability
 - Improving the overall economy by increasing net productivity
 - Mobilisation of local investments
 - Cross-Learning among national utilities
 - Promotion of external investments
 - Introduction of bio-fuels in the transport sector

- Options for providing targeted energy services for the poor in urban and peri-urban areas.
 - Widespread use of LPG
 - Use of cross-subsidy tariffs
- Options for energising rural areas.
 - Scaling up existing energy interventions
 - Provision of low cost but high impact energy interventions

3. The investment needs by African countries in meeting the MDGs was estimated by World Bank as US\$20 billion per year, which is around twice historic levels of financing. Further, there is need to invest 5% of GDP in infrastructure, as well as devoting a further 4% of GDP to cover operation and maintenance requirements. The electricity sector will account for 20%, amounting to US\$4 billion per year. Moreover, the World Energy Outlook from IEA estimated that it would cost US\$16 billion per year to electrify 500 million households. Using this estimate, electrifying about 150 million more in Africa will require investment needs of about US\$4.8 billion per year. These needs are huge because of Africa's infrastructural deficit relative to other developing countries, especially electricity access, and recent improvements have been slow. The current deteriorating service provision has forced African countries to depend on bilateral and multi-lateral assistance for funding their infrastructural development.

4. These estimated financing needs are very challenging. Hence, all possible financing options must be explored to reduce these needs such as intensification of regional and sub-regional power projects, regional procurement of crude oil and petroleum products, greater use of regional expertise, cross learning among regional utilities, and more rationale development plans. In addition, some recent instruments can be explored to further reduce these needs: namely, debt relief, better use of private investments, Aid and Grant, IDA funding and recent climate change initiatives.

5. Increasing its provision of modern fuels by fully exploiting its indigenous energy resources in an environmentally sound and economically optimal strategy will go a long way to contributing towards meeting the MDGs in Africa. However, implementing all the suggested options which have been demonstrated elsewhere will require detailed studies of the sub-regional and country circumstances. The energy benchmarks suggested are equally challenging, but using the policies and measures advocated, the task will be minimised.

6. A major challenge for African countries is to develop a comprehensive techno-economic strategy to exploit the upcoming prospects such as the IDA/ADF and the EUEI for energy infrastructure development. The recent decisions by G8 countries to increase development assistance to 0.56% of GNI by 2010 and 0.7% by 2015 should be fully exploited for energy development, as this will provide the engine for overcoming obstacles in achieving the MDGs by the appropriate time period.

7. The FEMA initiative will complement the expected activities of AFREC, which is expected to be ratified soon, as their concern is to provide adequate and affordable energy for all Africans.

1

General Introduction

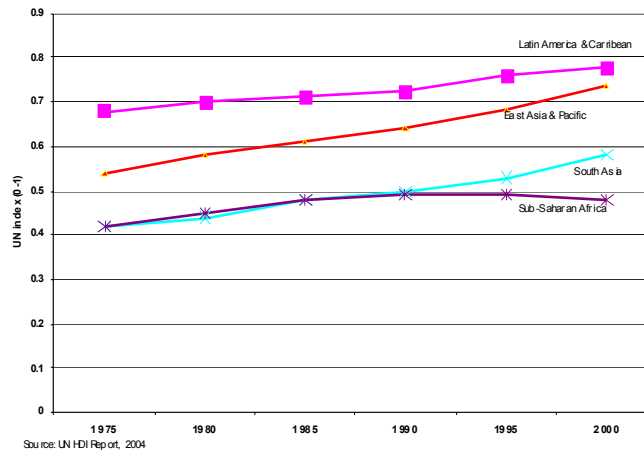
Introduction

1.1 The “Millennium Development Goals (MDGs)” was agreed upon at the UN General Assembly held in 2000 to reduce extreme poverty worldwide by 2015 using 1990 as the baseline. These goals are oriented around creating employment and incomes, reducing hunger, combating preventable diseases, improving child health and education, arresting environmental degradation and halting discrimination against women. Improving access to modern fuels, electricity and mechanical power is not among these goals, but is a major input in achieving these MDGs. This is true for African countries, the interest of this paper.

1.2 Africa has a land mass about 30 million square kilometers that is equivalent to USA, Europe, Australia, Brazil and Japan put together (World Bank, 2002) and a population of 885 million as of 2004 (World Bank, 2005) living in 53 countries with different sizes, peoples, socio-cultural entities, and resource endowments. Hence it is difficult to treat Africa as one entity. Unfortunately, Africa is deficient in infrastructure when compared to other developing regions, and this is more glaring in the energy sector. Some improvements have been achieved since these countries got independence some 40 years ago, but the impact is modest due to their low baseline, a result of the 600 years of slavery and colonisation. These factors coupled with weak internal policies have made the continent unable to cope with internal and external shocks. The importance of infrastructure to Africa’s development is adequately described below:

“The lack of adequate, reliable infrastructure is surely one of the biggest disincentives to investments in Africa. Poor transport links and irregular power supplies have stunned the growth of domestic companies and discouraged foreign firms from setting up manufacturing plants in the continent”. (African Business, July 2005)

1.3 The MDGs are linked to the Human Development Index (HDI), which is a measure of socio-economic parameters such as life expectancy, income and educational achievement. Generally, regions with higher HDI tend to have better socio-economic conditions, and further, increasing HDI indicates improvement in these parameters. Since the provision of modern energy services is linked with these parameters, it also linked to HDI. Fig. 1 shows that the HDI for all the developing regions are increasing with time except in Sub-Saharan Africa (SSA), which stagnated around 1990 and slightly declined after (UNDP, 2004). Changing HDI trends in Africa will require a substantial increase in modern fuels for socio-economic improvement, because at present, Sub-Saharan Africa houses a quarter of people living on less than 1\$/day, and this level is predicted to increase if current trends persist (World Bank, 2004).

Figure 1.1: Comparison of Human Development Index for Selected World's Regions

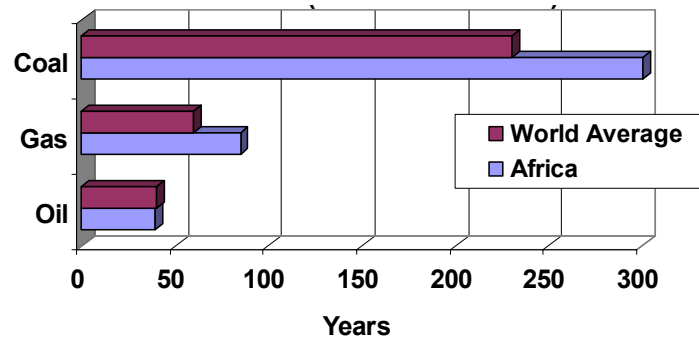
The Paper

1.4 The main objective of this paper is to present the position of the Forum for African Energy Ministers (FEMA) for the UN World Summit of September 2005. The paper should contribute to the November high-level discussion on investments in clean energy and development between the United Kingdom Government and the World Bank's President, and to the further development of the FEMA work program. Specifically, the paper should take into consideration the main concerns and priorities raised and presented by Energy Ministers at previous FEMA meetings. The paper will cover the current status of energy in Africa with supporting data and assessments of the implications.

1.5 More specifically, the paper should cover supporting data, analysis and other evidence demonstrating the importance of energy to the achievement of the MDGs with key output and outcome monitoring indicators which the FEMA Ministers would want to adopt in order to demonstrate to the international community their political commitment to and ownership of achieving results in energy.

Energy in Africa

1.6 Africa is richly endowed with fossil and renewable energy resources, which if fully exploited would provide a good quality of life for all Africans. Currently, 7%, 6% and 7.2% of the world's proven reserves of oil, coal, and natural gas are in Africa (BP, 2004). Further, 7 out of 8 recent oil finds and a growing number of new gas fields are in Africa (Davidson, 2002). Significant geothermal resources are along the Great Rift Valley in the eastern region, and solar energy and biomass potential are enormous due to Africa's geography. 10% of the world hydropower potential is in Africa, most of it not yet exploited. In general, Africa produces around 7% of the world's commercial energy, but only consumes 3% of it, and more than half of this is exported (Davison & Sokona, 2002). Further, the reserves production ratio for natural gas and coal are above the world's average as shown in figure 1.2

Figure 1.2: Reserves-to-Production Ratio for Fossil Sources (Africa and World)

Source: Davidson, 2004

1.7 Geothermal energy is in Kenya and Ethiopia, with a 45 MW power plant in Kenya. Wind energy is mainly along the Northern and Southern coastal areas. Most countries have potential for solar energy. Central Africa dominates biomass potential. Africa has a technically exploitable hydro potential of 1,888 TWh/yr with 41% in the Democratic Republic of Congo (DRC) (USDOE, 2000).

Table 1.1: Regional Fossil Fuel Reserves (Jan 1999)

Region	Petroleum (1000 bb/d)	Natural gas (bcf)	Coal (billion ST)
North	1151	1534	6.11
West	471	221	0.263
Central	83	4	0.261
East	149	0	0.12
South	588	85	176.97
Africa	2442	1844	183.7

Source: USDOE (2000)

1.8 Fossil fuel consumption varies among countries. Egypt, Algeria and Libya account for 58% while South Africa 14% of oil use. The remaining 27.5% is shared among the rest. The use of natural gas is similar, Algeria, Libya and Egypt use over half of total production, and Nigeria uses 11%. Recently, other natural gas producers include Tanzania that uses it mainly for power production. South Africa uses about 93% of coal produced. In general, modern energy consumption in the continent is very low and increases have been incremental. Between 1980 and 1996, modern energy use grew by about 30% in absolute terms with industry accounting for over 40%, of which over 80% is from the Northern and Southern regions (USDOE, 2000).

Table 1.2: Electricity Installed generation capacity in Africa 1997

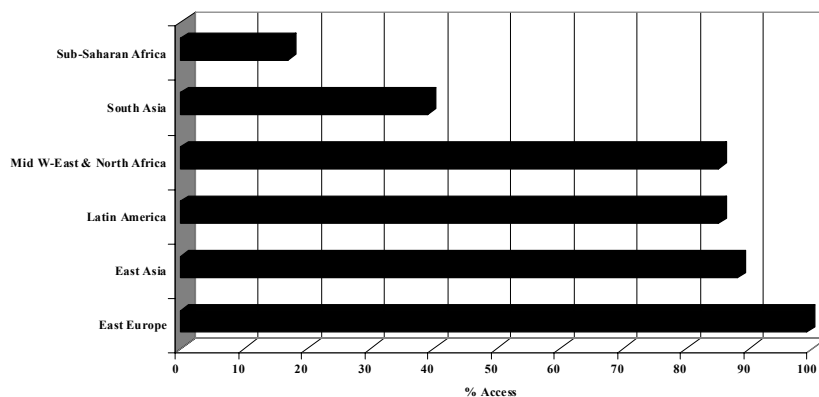
Region	Capacity (GW)	Share (%)			
		Thermal	Hydro	Nuclear	Other
North	32.88	87.7	12.3	0	0
West	9.61	52.2	47.8	0	0
Central	4.34	8.9	91.1	0	0
East	2.76	33.8	63.5	0	2.7
S. Africa	43.83	81.2	14.6	4.2	0
Africa	93.42	75.8	22.2	2.0	0.1

Source: [USDOE, 2000]

1.9 Electricity is produced mainly from hydropower and fossil fuels as shown in Table 1.2. An African uses only a third used by a Latin American. This use is skewed, since about 20% each is consumed in the Northern region and South Africa, and the rest is used in 45

countries. Access to electricity is very low as shown in Figure 1.3, though it is far higher in the Northern region. Rural areas are worse with only 2-3% access.

Figure 1.3: Population with Access to Electricity in Developing Regions, 2000



Source: Adapted from O'Sullivan & Hamaide, 2002

Energy and Development Challenges

1.10 Despite Africa's abundant fossil and renewable energy sources, it is the lowest consumer of modern fuels. Developing these resources to increase its modern energy modern fuels consumption will require overcoming major challenges.

Energy and Environment

1.11 Expanding fossil fuel use to meet Africa's survival and developmental needs will lead to an increase in air pollution and greenhouses gas emissions. Petroleum extraction and processing is posing some danger in the continent due to oil spills, but of more importance is gas flaring in oil fields. Over 70% is flared in both Nigeria and Angola, which could be used to provide power and industrial needs for Western and Southern Africa. Repeated droughts can cause serious water shortages for dams generating hydropower. The 1997 drought in West Africa resulted in the Akosombo dam, the main supplier of power in Ghana and neighbouring countries losing two-thirds of its power. The production and use of firewood and charcoal to cope with population demands is posing major environmental and health problems. In the Sahel, charcoal production has been strongly linked with desertification and deforestation, though the effect of other influences cannot be easily separated (WEA, 2000). The inefficient use of firewood and charcoal, the main cooking fuel in rural and peri-urban Africa leads to adverse emissions, especially when used in poorly ventilated surroundings. These exposures are strongly linked to diseases such as infectious and chronic respiratory diseases (tuberculosis, bronchitis and lung cancer) (Smith, 1998).

Widening Rural Access

1.12 Most rural Africans do not have access to modern fuels. Increased access would improve their living standards and boost in their industrial and agricultural activities. Generally, Rural Africa suffers from high dependence on firewood and some charcoal. Poor incomes, limited infrastructure, lack of skilled labour, and environmental instabilities are key constraints to improvements in these areas in the short and medium terms. Production activities, notably agriculture, rely primarily on human and animal power. Extending the national grid to rural areas is difficult, because of the required large investments compared to

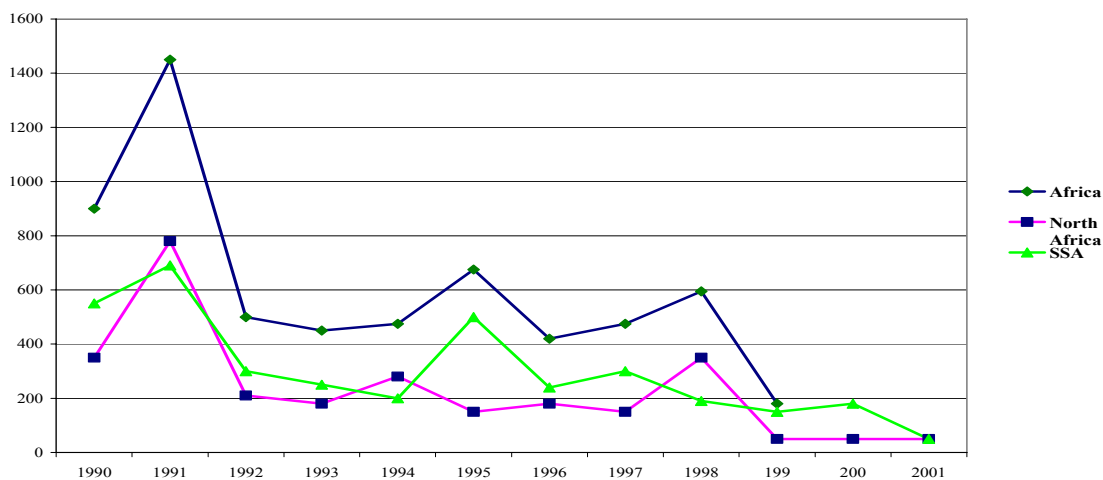
the density of people, and the inability of the poor to pay for even single-phase connection, or the associated electric appliances and fittings. This explains the low rural access to electricity, only 2-3%. Tackling energy for rural Africa requires innovative solutions.

Financing Energy Investments

1.13 Due to the weak economies of most African countries, external energy investments play a major role and so greatly influenced activities in the sector. Generally, Foreign Direct Investments (FDI) to Africa has been modest compared with other developing regions, less than 2% of the total to developing countries. It increased from an annual average of \$1.9 billion between 1983 and 1987 to \$3.1 billion between 1988 and 1992, and to \$6 billion between 1993 and 1997, but has been falling since then. Also, it has been mainly in the upstream oil and gas sectors. Some Official Development Assistance (ODA) has been directed at the energy sector, but it has been decreasing as is shown in fig.4. The net transfer per capita dropped from US\$ 32 in 1990 to US\$ 19 in 1998.

1.14 However, financing energy investments face many challenges because of the level of financing needed compared to the affordability of the intended users. The challenging areas include the downstream end in the oil and gas sectors and satisfying the power needs of the continent. A combination of local and external financing innovation may be needed that matches the needs and concerns for both cost recovery and affordability of the intended users.

Figure 1.4: ODA Investment in African Energy Sector ('000 US\$)



Source: IEA Data Base

Regional Cooperation and Trade

1.15 Political cooperation among African countries is quite significant, but trade is low, about 6% of the total trade – lower than in other developing regions such as Asia, where it accounts for 40%, though in recent times significant improvement has been made. The low manufacturing base, poor communication facilities, small markets and limited commodities for trading are some of the factors affecting trade (Davidson and Sokona, 2001). Although energy trading (oil, hydropower and natural gas) is progressing, more organised arrangements are needed because mechanisms such as joint procurement and concession pricing are yet to be exploited. Also activities within the existing sub-regional bodies such as: Common Market for Eastern and Southern Africa (COMESA), East African Community (EAC), Southern Africa Development Community (SADC), Economic Community of West African States (ECOWAS), West Africa Economic and Monetary Union (UEMOA), and Union of Maghreb

Arab States (UMA) should be fully utilised and harmonised. However, security between nations and loss of sovereignty pose some challenges for regional trade in energy.

2

Energy and Poverty Reduction, Options for Meeting MDGs

Introduction

2.1 Energy is not one of the MDGs but is a major multiplier of these goals as energy is the prime mover for overcoming poverty and delivering good education and health services, and for creating enterprises, which in turn generate employment and incomes. Hence, the linkages between energy and the MDGs within the African perspective while considering the regional differences are explored. The Poverty Reduction Strategy Papers (PRSPs) developed by African countries along with their development partners, though primarily not for energy per se, are critical economic planning instruments for the provision of energy services and so are commented on, as are the various energy options to achieve the MDGs.

Linkages between Energy and MDGs

2.2 Overcoming poverty essentially involves creating opportunity for the poor to access funds on a sustained basis by involving them in productive activities through either self or institutional employment. Meeting the MDGs, and overcoming extreme poverty should involve modern energy, as those activities linked with low quality or traditional energy have hardly resulted in rising incomes. Experience in Sub-Saharan Africa has shown that the lifestyle of people linked with the production of firewood and charcoal hardly improves beyond survival as most of the marginal gains go to the transporters (Davidson & Sokona, 2001). On the contrary, those involved in employment linked with LPG or electricity resulted in improved lifestyles (Prasad, 2002). Access to LPG by urban households in Senegal led to major timesavings and improved nutrition (Sokona, 2000). Paradoxically, most countries in Sub Saharan Africa that suffer from hunger also suffer from major on-farm and off-farm food losses which could be reduced through improved harvesting and storage facilities by the introduction of modern energy, and so reduce large food imports. Modern fuels can also boost yields through the use of environmentally sound options for fertiliser input and irrigation.

Table 2.1: Energy and the MDGs Linkage

Energy and the MDGs		
1	Eradicate extreme poverty and hunger	Increased modern energy is essential to generate jobs, industrial activities, transportation, and modernised agriculture in Africa. Most African staple foods need processing, conserved and cooked, and these require modern energy for reasonable quality of life.
2	Achieve universal primary education	Good educational facilities need electricity for teaching aids and for homes of students and teachers. Many children, especially girls, do not attend school in order to satisfy family subsistence needs.
3	Promote gender equality and empower women	Lack of access to modern fuels and electricity affects women and so lead to gender inequality. Household activities mostly done by women could be made easier with modern energy and save time. Time saved could be used for more productive activities.
4	Reduce child mortality	Diseases caused by poor quality water, and respiratory illness caused by the effects of indoor air pollution from traditional fuels and stoves, directly contribute to infant and child mortality
5	Improved maternal health	Women are disproportionately affected by indoor air pollution and water- and food-borne illnesses. Lack of electricity in health clinics, poor illumination in night deliveries, and daily household chores all contribute to poor maternal health, especially in rural areas.
6	Combat HIV/AIDS, malaria and other diseases	Electricity for communication (radio and television) is needed to spread important public health information to combat deadly diseases. Also, electricity is needed for illumination, refrigeration, sterilization, etc for effective health services.
7	Ensure environmental sustainability	Energy production, distribution and consumption in Africa has many adverse effects on the local, regional and global environment including indoor, and air pollution, and land degradation. Cleaner energy systems are needed to address environmental sustainability.
8	Develop a global partnership for development	The World Summit for Sustainable Development called for partnerships between public entities, development agencies, civil society and the private sector to support sustainable development, including the delivery of affordable, reliable and environmentally sustainable energy services.

Source: Adapted from (UN, 2005)

2.3 Although school enrolment has increased and disparities between girls and boys have been reduced in Africa, especially in the Sub-Saharan region (UN, 2005), for students to be more competitive and innovative, substantial modern energy input is needed to support teaching aids. The health of people, especially women and children can be improved with increased access to vaccines stored in an adequate environment. Present use of solar powered refrigerators in many African countries should be intensified as combating poverty and reducing child mortality remains a major challenge for African countries to meet the MDGs. Table 2.1 above summarises the link between modern energy provision and MDGs.

Energy and PRSPs

2.4 Poverty Reduction Strategy Papers (PRSPs) are national planning frameworks that define strategies and priorities for reducing poverty in lowest income countries. They are country driven, results oriented, comprehensive, and are based on long-term perspective of poverty reduction. They also provide guidance for debt relief under the Heavily Indebted Poor Country Initiative (HIPC). In a review by the World Bank as part of its effort to scale up energy access, 20 sets of PRSPs for countries in Sub-Saharan Africa, South Asia, East Asia, and Latin America were evaluated. It was found that energy was hardly given attention; the limited mentions tend to be focused on large infrastructure. Energy access issues were absent and important linkages with productivity and cross-sectoral applications were not addressed. Also traditional energy receives very little attention. The report concluded that the PRSPs

tend to focus on traditional, larger-scale infrastructure solutions and that smaller-scale energy inputs that can be useful to poverty reduction were ignored (World Bank, 2005).

Strategic Energy Options

2.5 Combating the energy challenges for meeting and sustaining the MDGs by African countries requires major strategic shifts that aim at satisfying the needs of the poor and improving their overall net productivity so as to sustain the MDGs. Options for transforming most African countries from their survival stage to development and so eliminate extreme poverty must result in a substantial increase in modern energy needs. Hence, options should go beyond satisfying rural needs and include those that will promote a sound macro-economic base. A major factor in suggesting these options is wealth creation as this is the main vehicle for tackling poverty. These options fall into three categories, namely:

- Options for ensuring macro-economic growth stability
- Options for providing targeted energy services for the poor in urban and peri-urban areas.
- Options for energising rural areas.

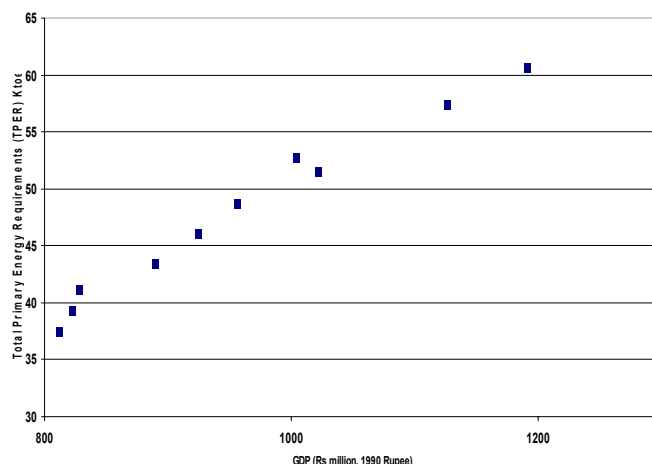
Options for Ensuring Macro-economic Stability for Growth

2.6 Sustaining MDGs in African countries will require sound macro-economic and social policies and measures, along with significant modern energy input. Historical evidence suggests that modern energy was a major driver in achieving socio-economic improvement in developed countries, especially energy for their industrial and transport sectors (Cook, 1976). Achieving 100% access to electricity and improving the availability of high quality transport fuels in the capital and main towns of African countries are indicators for creating the capacity to sustain the MDGs. Lack of adequate modern energy was seen as a key constraint to the export potential of industries in Senegal, Ghana, Uganda and Kenya (UNECA, 2004). Options for achieving macro-economic and social growth include:

- Improving the overall economy by increasing net productivity
- Mobilisation of local investments
- Cross-Learning among national utilities
- Promotion of external investments
- Introduction of bio-fuels in the transport sector

2.7 Among the few countries in the continent that have achieved macro-economic stability that will meet and sustain the MDGs are Mauritius and Tunisia. They achieved 100% access to electricity within 30 years, and have complete access to transport fuels along with reasonable road density. Use of astute national economic policies such as controlling imports and accelerating exports while maximising opportunities from the global economy were key factors for their success (UNECA, 2004). Mauritius took advantage of sugar exports to European Union (EU) through the preferential trade agreement, and used the sugar by-product for electricity production that now contributes 20% of the total power supply (Davidson & Sokona, 2002). Fig 5 illustrates the positive correlation between energy growth and economic performance for Mauritius.

Figure 2.1: Relationship between Energy Requirements and GDP, (A Case of Mauritius, 1992-2002)

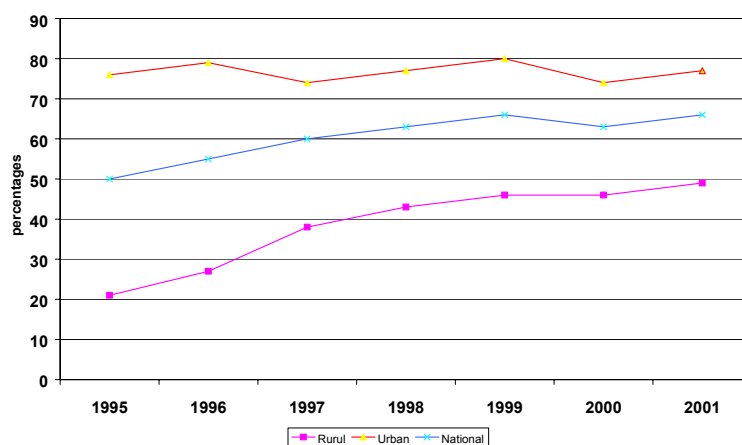


Source Data: Mauritius Government website

2.8 The use of local financing for infrastructural development can prove extremely useful as the case of South Africa in their national electrification programme which resulted in doubling their access to electricity in five years as shown in fig. 6 below. The political will and determination to succeed were strong factors for the success of this project. It has been shown that with electrification of both rural and urban areas as well as schools and clinics, the country to a large extent will meet the MDGs. The unique nature of South Africa’s history limits the replicability of the programme in other African countries due to their low savings potential, but social sectors have managed to mobilise local investments for development. Countries need to mobilise local funds through creation of local trust funds or setting up consumer associations for development of the energy sector. Senegal has tried such a strategy to supplement the development and operations of rural concessions.

2.9 The performance of power utilities in the continent varies significantly, and with relatively less effort suitable mechanisms can be instituted to ensure that utilities learn from each other in the continent. Generally, the good performers with 100% access tend to have lower electricity prices and low transmission and distribution losses.

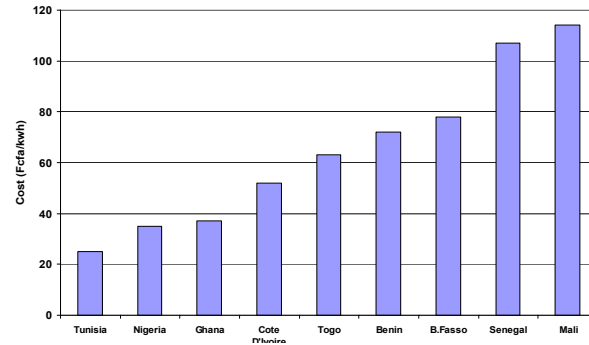
Figure 2.2: National Electrification Programme in South Africa



Source: Davidson & Makasonda, 2004

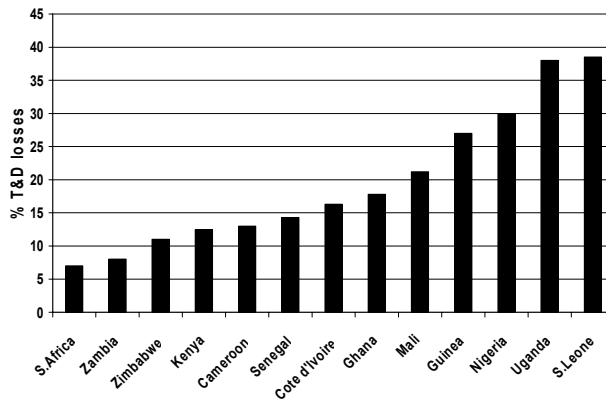
2.10 Hence, using electricity pricing, and transmission and distribution (T&D) losses as proxies for performance of these utilities, figs. 7 & 8 indicate a wide spread in performance for selected African countries. However, some of these utilities have shown some improvements in recent times such as reduction of T&D losses in Uganda from 38% to 30%. Therefore, with the necessary arrangements, learning can be promoted among utilities in the continent.

Figure 2.3: Electricity Tariffs in Selected African Countries



Source: UNECA, 2001

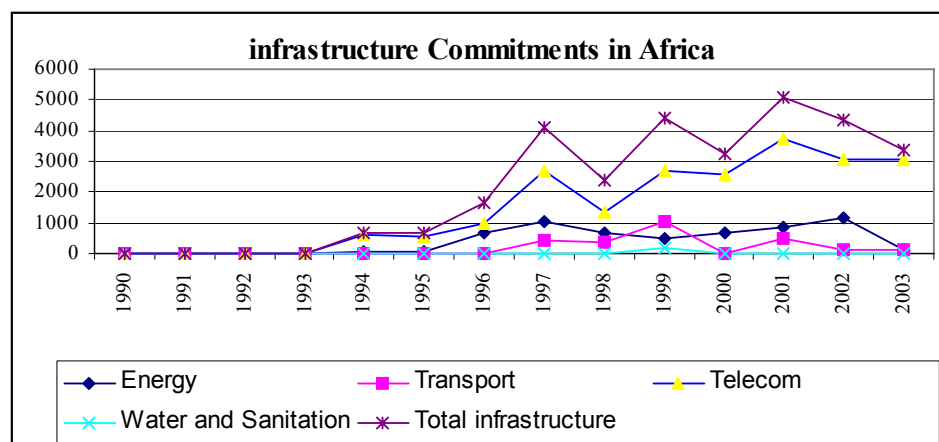
Figure 2.4: Electricity T & D Losses in Selected Countries



Source: Davidson & Sokona (2002)

2.11 Private sector participation in energy infrastructure in African countries is extremely low compared to other developing countries. It peaked in 2001 and since then has been declining. In general, private participation in infrastructure is either limited to a few countries or skewed to one sector, and in this case Telecommunications as shown in fig. 9. As a result, total private investment in African infrastructure is only 1-2% of total private investment in infrastructure for all developing countries, except telecoms that is 6%. However, private investments can have far more significant effect in the power sector of African countries if countries increase national ownership in these projects. Measures open to these countries include:

- Maximum use of local qualified and experienced personnel
- Utilisation of regional and sub regional expertise
- Undertake effective monitoring programmes
- Establish suitable program for transfer of expertise

Figure 2.5: Trends in Private Investments in Infrastructure in Africa

Source: World Bank, 2005

2.12 The continent has some experience of using bio-fuels, which has been replicated, in a few countries. The production and use of ethanol as additive to gasoline, up to 20% in Zimbabwe was successful and was replicated in a few countries though they were not as successful. The recent interest in bio-diesel in a few countries such as South Africa, Mali, Madagascar and Malawi needs close study for possible replication.

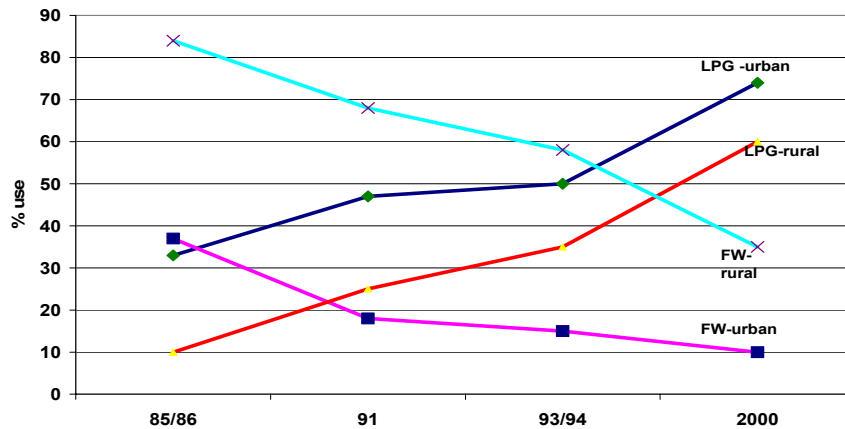
Energy Options Targeting Urban Poor

2.13 Unless specific energy policies are instituted targeting the poor in urban areas, the poor are either ignored or marginalized. Energy options for this purpose include the following:

- Widespread use of LPG
- Use of cross-subsidy tariffs

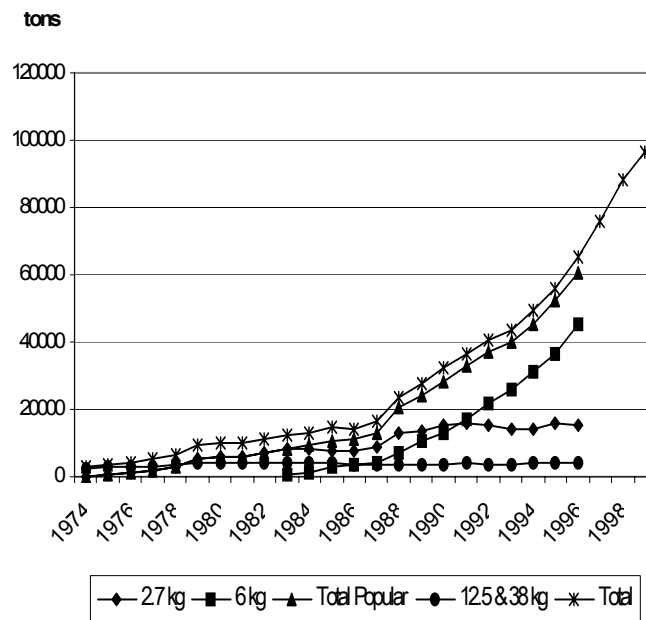
2.14 The use of LPG as a cooking fuel in most urban areas has proved successful in a number of African countries. However, there is a need for targeted subsidies and policies that are aimed at the poor in urban areas, as the role of government in countries that have proved successful is crucial. According to a study done in Botswana, within 15 years the share of those using LPG to cook in urban and peri-urban areas increased from 30% to 74%, while those using firewood dropped from 39% to 10%, a major transition from firewood to LPG as the result of targeted government actions as shown in figure 2.6 (Afrane-Okesse, 2001). Similar results were obtained in Senegal, which also shows that for a period of about 30 years, in the government bid to arrest desertification, deliberate policies were instituted to ensure that almost all people in urban and some rural areas use LPG for cooking (Sokona, 2000). The growth in use can be seen in fig.11. Different sizes of cylinders and specific stoves were introduced to cover the wide range of users. Other countries are now practising these programmes including Ghana, which introduced a production facility for LPG cylinders. Some countries such as Egypt have started thinking about piped gas distribution systems.

Figure 2.6: Comparison of Firewood and LPG as Cooking Fuel in Botswana, 1985-2000



Source: Drafted from Afrane-Okesse, 2001

Figure 2.7: LPG Market by Category in Senegal from 1974 to 1999



Source: Sokona, 2000

2.15 The use of specific electricity tariffs to target the poor in urban areas can result in increased access to electricity. The poverty tariff introduced by the South African government in 2002 as a response to the identified needs of the poor resulted in major changes in the lives of the urban poor because they had free 50 kWh per month. Electrified homes show major improvements of the life as opposed to un-electrified homes (Prasad, 2002). Several countries including Zambia and Zimbabwe are now practising similar programmes under the “life line tariff”.

Energising Rural Areas

2.16 Improving infrastructural services in African rural areas is not only needed but urgent. Unfortunately, the gains from most past rural energy interventions have been limited because they are either too small or aimed mainly at satisfying minimum household needs. Rural energy interventions that aim at meeting the MDGs should be scaled up and target productive

activities as well as satisfying public services and should make use of participatory approaches (increased involvement of communities). Hence, the strategic energy options include:

- Scaling up existing interventions
- Provision of low cost but high impact interventions

2.17 The use of LPG for cooking and for commercial activities in African rural areas can yield positive socio-economic improvements as was identified in rural Botswana. As indicated in fig.10, the use of LPG for cooking increased from 10% to 60%, while the use of firewood dropped from 82% to 35%. This change resulted in marked improvements in the socio-economic conditions (Afrane-Okesse, 2001). This programme has successfully scaled up energy provision in rural Botswana. Similar results have been shown for rural Senegal, although after the reduction in subsidies, the lowest income families went back to using charcoal and firewood.

2.18 A joint program between the government of Mali and UNDP to provide modern motive power for income generating activities such as grain milling and de-husking shows marked improvements in the social and economic life of women and children in Mali (UNDP, 2005). This intervention makes use of locally produced bio-fuels instead of imported diesel in specially built platforms for diesel engines. This programme is a clear example of scaling up projects because it started in 1993 with 4 platforms and grew to 48 by 1999, and 394 by 2004 serving 80,000 women in the country. This programme on the use of bio-fuels to replace diesel is being repeated in several African countries such as Zambia, Malawi, South Africa, Madagascar and Ghana. The current increases in oil price will make this project which is a successful cooperation between local groups, foreign firms and multi-lateral agency a very attractive option (African Business, 2005b). Further, a recent report by ESMAP clearly show that oil-importing countries in Africa suffer the most from oil shocks and strongly advocates for fuel diversification (ESMAP, 2005)

2.19 Improved biomass energy systems can have a positive impact on African rural areas and contribute towards meeting the MDGs. Using agricultural waste to produce electricity as being done in industries of sugar, wood, palm produce, etc. These can be scaled up to produce power beyond in-house use as is being done in Mauritius. The excess power can be sold to nearby households, public service units or production centres. Also, biogas from animal waste can be used as was done in Rwanda by the Kigali Institute of Science and Technology (KIST). They developed biogas systems to cope with a public health problem in rural prisons that resulted in annual savings of \$54,000 as only half of their normal stock of firewood was used (EA, 2005).

2.20 The use of improved biomass systems for household use can prove useful. The inefficient firewood cook stoves can be replaced by more efficient improved stoves as this will result in environmental and economic benefits. The development of “Mirt” stoves in rural Ethiopia in which 3.3m Euros was used to disseminate 45,000 stoves in 35 rural towns is an example of the use of improved stoves that contributes to meeting the MDGs (Tomowski, 2005). However, care must be taken to ensure that the overheads in undertaking the project do not exceed the benefits of the project.

2.21 Providing modern energy for the education and health sectors in rural areas will assist greatly in improving education and health. The provision of electricity for rural schools and clinics in South Africa and Kenya in their electrification programmes changed the lives of people. The use of photovoltaic in selected areas provided a useful niche in rural

development. The cases of South Africa, Uganda and Mali are good examples. Developing mini grids using mini hydro systems or other systems can be useful in providing electricity in rural areas. Also utilising recent low cost options such as Single Wire Earth Return system (SWER), poles sharing, limited loads, and reduction of transformer designs can reduce the overall investment cost of these systems (GNESD, 2005)

Promotion and Enhancement of Regional Energy Projects

2.22 The configuration of borders among African countries supports cooperation in the energy sector as it spreads energy resources across these borders and skews their distribution among countries. Most sub regions except west and central Africa have fairly well interconnected power grids. The Southern African Power Pool (SAPP) is operating, and with increased rationality and optimality, major savings can be made, estimated above 11,000 MW few years ago (Africa, 2002). However, utilising this saving in generation capacity will require significant investments in transmission and distribution will be required. Plans are well ahead for the West African Power Pool and the East African Power Pool.

2.23 Another set of regional projects is the development of oil and gas pipelines. The recent Chad-Cameroon oil pipeline is an example of cooperation between two countries with benefits to the two national economies and specific gains to the towns and villages along the route of the pipeline (Davidson, 2002). The natural gas pipeline between South Africa and Mozambique is an example of a country using commercial lending and local financing and the work done in record time. Similar projects with multi-lateral funding have taken far longer such as the West African Gas Pipeline. Presently, due to the size of many countries and their relative low demand, their petroleum requirements are very low if compared to world standards, and operating in isolation results in payment of large overheads for the bank transactions. Undertaking joint procurement can result up to 30% savings (Davidson, 1992). Successful regional projects need human and institutional capacities as well as harmonisation of legal and regulatory frameworks and standards.

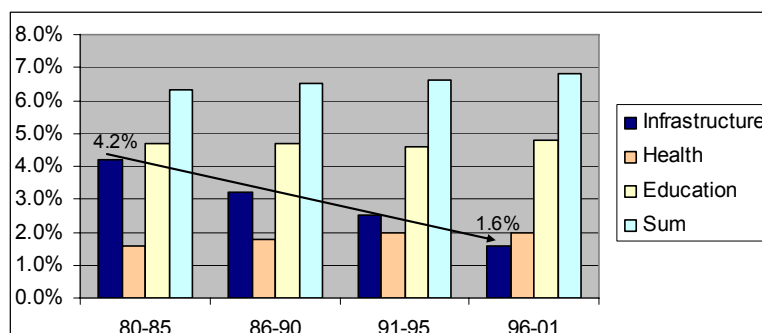
3

Investment Needs and Financing Options

Investments in Infrastructure in Africa

3.1 Many African countries at independence in the 1960s embarked on grand plans to develop their infrastructure (roads, water, power) through public investments. Some successes were achieved, but they were halted by the oil shocks in the 1970s. Reduced public expenditure led to deteriorating service provision. The low and declining public expenditure in infrastructure as shown in fig.12 for selected African countries forced many African countries to depend on bilateral and multi-lateral assistance for funding their infrastructural development, including energy.

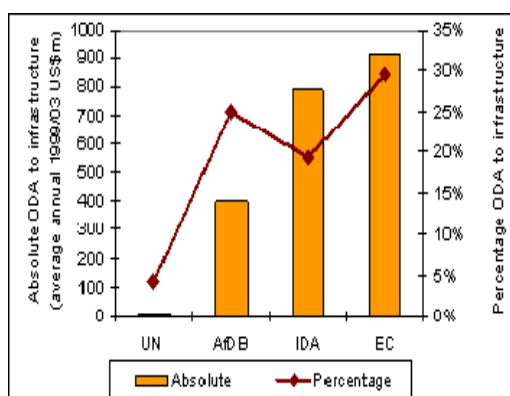
Figure 3.1: Public Expenditure in AFR (11 Country Sample) % of GDP



Source: World Bank, 2005

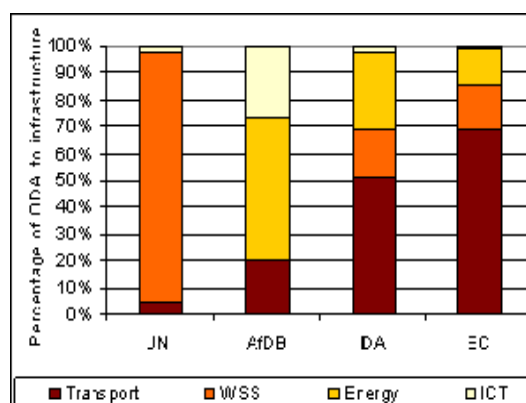
Donor Agencies and Multi-Lateral Participation in Energy Infrastructure

3.2 Generally, external assistance in African infrastructure has been low in comparison to other regions, and has been declining in share, and energy is not different as shown in fig.4. Energy investments from ODA to Africa peaked in 1990 with US\$1.4 bn and have been declining since with a slight increase in mid 1990s to US\$0.6 bn. In general, about two thirds of ODA for infrastructure comes from multi-lateral sources, primarily the European Commission, IDA and the African Development Bank, while ODA from the UN is negligible as shown in fig.13. Only the African Development Bank supported energy substantially as shown in fig.14. The decline in energy investments could be attributed to the policies advocated by some Donor agencies that favoured private participation in infrastructure. A rethink of such policies to include private-public participation is needed.

Figure 3.2: Absolute and Percentage Shares of ODA in Infrastructure

Source: OECD IDS Online Database, 1999/03

3.3 The situation is not different from the main bi-lateral agencies, Germany, Japan and France. Their areas of interest are water, sanitation and telecommunications rather than energy.

Figure 3.3: ODA Shares to Infrastructure by Multi-lateral Donors

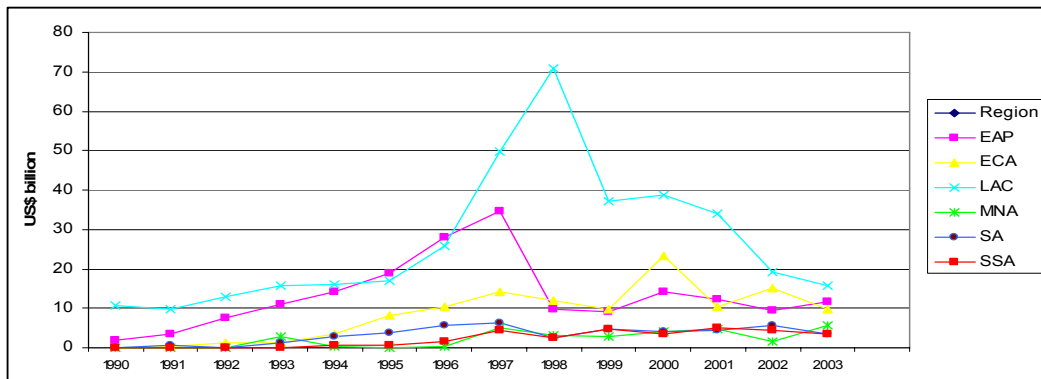
Source: OECD IDS Online Database, 1999/03

3.4 However, IDA commitments to SSA infrastructure including energy more than doubled from 2001 to 2005. This expansion was achieved in close collaboration with others through co-financing. In recent times, strong partnerships have been established between the World Bank, the African Development Bank and the European Investment Bank on individual country programs in infrastructure. Also a number of ODA countries are now requesting World Bank participation in the redefinition of their programmes of assistance in infrastructure.

Private Participation in Infrastructure Development

3.5 External private participation in African infrastructure is very low in comparison with other developing regions as shown in fig.15. It peaked around 1996 to 2000 and has been declining since. However, private capital to SSA has made some contribution, but is concentrated in certain niches. Moreover, almost 50% of these resources were to South Africa, and 70% was on telecommunications (African Business, 2005a).

Figure 3.4: Annual Investment in Infrastructure with Private Participation by Region, 1990-2003



Source: World Bank, 2005

3.6 Private participation in the power sector has been growing as a result of the poor performance of power utilities in the continent. In general most countries in the region are involved in either nationally initiated or externally motivated power sector reforms. As a result, 22 of the 53 African countries have private participation in their national utility, either as Independent Power Producers (IPPs) or Public Private Partnerships (PPPs). One of the most promising options is Corporatization that allows the electricity operator to be separated out from the government administration and to function as a separate legal entity with its own commercial and financial obligations (see box 3.1). However, most of these reforms hardly involve increasing electricity access to the poor unless there is a dedicated program for that (GNESD, 2005).

Box 3.1: Efficient Government Power Utility-Egypt

The Egyptian Electricity Authority (EEA) was changed to a new Egypt Electricity Holdings Company (EEHC), to manage the reform process. Generation was broken down into five generating companies, and distribution to seven distribution companies and one Transmission Company that remained 100% state owned, while EEHC acted as the co-ordinator. Private investors were allowed to own up to 49% in the 12 generating and distribution companies. Residential and commercial customers were made to pay economic rate for electricity used, while EEHC manages the extension of the grid and any new generation. Several generating plants were built during the 1990s to cope with rising demand with build-own-operate and transfer (BOOT) approach. One generating company built six new combined cycle plants under a fast track system with each having one 250 MW steam turbine and two 250 MW gas turbines. 3 of these plants were constructed ahead of schedule. NEM from Holland, Hyundai of South Korea and GE from USA were involved in the construction, but funding was from European Investment Bank (EIB) and the Arab Fund for Social and Economic Development (AFSED). Despite low tariffs in Egypt, EEHC hope to build new facilities with private participation to increase national generating capacity from present 18,300 MW to 26,000 MW by 2010. Similarly to ESKOM in South Africa, series of independent power producers were developed to operate competitively, though the bulk is still state owned. All electricity produced must be sold to the state owned transmission company, Egyptian Electricity Transmission Company (EETC). It shows that it is effective management that matters than ownership.

Source: African Business, July 2005

3.7 Some power reforms have focussed on expanding rural access through locally financed schemes or with external support. A wide variety of approaches has been adopted, but one such approach is described in box 3.2 below.

Box 3.2: Rural Electrification through Levy from Urban Areas

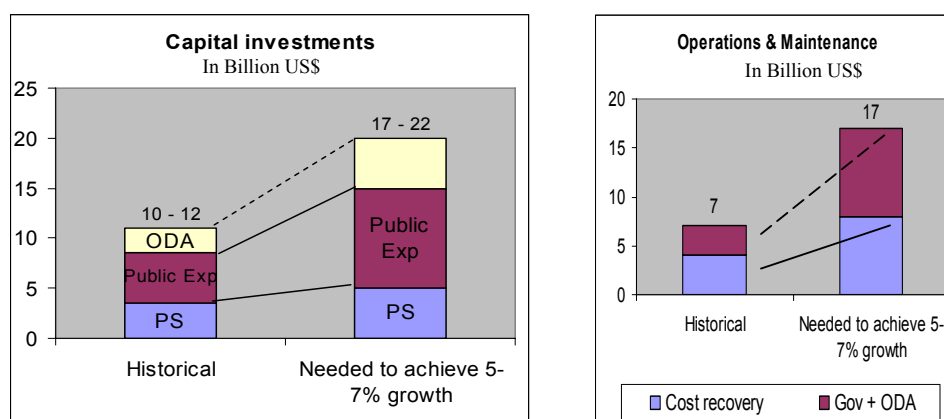
The rural electrification program in Zimbabwe was financed by the introduction of rural electrification levy of 1% on urban electricity users in 2001, though later increased to 6% in 2004. Rural energy projects were selected based on financial and economic viability, and projects implemented by utility and private contractors. Though 415 projects were planned by the plan, but 768 projects were completed. Rural access to electricity increased from 10% in 1991 to 20% in 2001, and 25% by 2004 mainly due to increased revenue. Apart from rural households also connected, were 901 government centres, 331 health centres, 1533 schools, and 593 small farms by June 2005. The success was based on successful marketing and proper project selection based on economic viability than potential for poverty reduction or political reasons. Other factors for success include efficient revenue collection, increased use of private contractors, capital subsidies for grid extension and cross-subsidies to support the poverty tariff.

Source: Mangwenwende, S.E. "Increasing Electricity Access while ensuring financial viability; A perspective from the African Industry.

Investment Needs

3.8 The investment needs for the infrastructure that will enable African countries meet the MDGs are huge because of their infrastructural deficit relative to other developing countries, especially with electricity access (see fig.3), and recent improvements have been slow. The World Bank estimated that SSA would need about US\$20 billion per year to meet its infrastructural needs for achieving the MDGs, which is around twice historic levels of financing as shown in fig.16. Further, to achieve this, SSA will need to invest 5% of GDP in infrastructure, as well as devoting a further 4% of GDP to cover operation and maintenance requirements (Eustache, 2005). The breakdown of these investment needs is shown in table 3.1. This shows that the electricity sector will account for 20%, amounting to US\$4 billion per year. Moreover, the World Energy Outlook from IEA estimated that it would cost US\$16 billion per year to electrify 500 million households (IEA, 2004). Using this estimate, electrifying about 150 million more in Africa will require investment needs will be about US\$4.8 billion per year.

3.9 The New Partnership for Africa's Development (NEPAD) has some priority energy projects, which if implemented will directly and indirectly produce positive impacts on the continent achieving the MDGs. These projects include the West African Gas Pipeline (WAGP) and projects providing interconnection between countries mainly in West and Southern Africa. These projects will strengthen the existing power pool in these sub regions. Recent studies have shown that it is more feasible to encourage interconnections among countries than promoting national diesel projects. Also, several countries, mainly in Northern, Eastern and Southern Africa have started dedicated rural energy development initiatives that should be carefully studied for replication in other sub-regions. These initiatives provide opportunities for facilitation and replication with external support.

Figure 3.5: Africa's Infrastructure Investment Needs

Source: Estache, 2005

Table 3.1: Estimated Investments Needs to Reach MDGs by World Bank (as percentage of GDP)

Needs	Electricity (%)	Telecoms (%)	Roads (%)	Rails (%)	Water (%)	Sanitation (%)	Total (%)
Investment	1.2	0.7	2.2	0.0	0.4	0.6	5.1
Operation and Maintenance	0.7	0.5	1.7	0.2	0.3	0.5	3.9
Total expenditure	1.9	1.2	3.9	0.2	0.7	1.1	9.0

Source: Estache, 2005

3.10 Investment needs can be reduced significantly by introducing energy efficiency policies and measures. The power sector in many African countries operates inefficiently. The use of modern powerhouse practises can provide up to 10% or more power for use by consumers. Reducing the very high T&D losses as demonstrated earlier in fig. 8 can reduce investments needs significantly as most operate with losses over 15%. Also, at household level, introducing more efficient cooking devices can save fuel. The use of improved stoves and more efficient production methods of charcoal manufacture could result in major savings of fuel wood.

3.11 Investment needs in rural areas need specific attention because of the unique features of such areas. Due to the level of poverty in these areas, relatively low investments may result in major gains in both the domestic and productive sectors. Providing improved and efficient kerosene, LPG and biomass stoves depending on fuel availability can provide major benefits. Use of well designed targeted subsidies that focus on bringing down upfront fixed cost of appliances (cooking stoves, LPG gas cylinders, electricity connection) than recurrent cost will substantially increase affordability. Also ensuring that user charges only cover supply costs can increase affordability. These relatively low investments can result in scaled up access to modern fuels by the poor.

Financing Options

3.12 Financing these needs to reach the MDGs as estimated by both the World Bank and IEA is very challenging. African countries must explore all possible financing options to meet these needs. Some of these options will assist African countries to reduce the total cost. These options include; intensification of regional and sub-regional power projects, regional

procurement of crude oil and petroleum products, greater use of regional expertise, cross learning among regional utilities, and more rationale development plans. All these options have been discussed previously in the paper. However, there are some existing financial instruments, which countries can exploit to satisfy their infrastructural development needs. These include:

- Debt Relief
- Better use of private investments
- AID and Grants
- IDA funding
- Recent Climate Change initiatives

Debt Relief

3.13 Africa as a continent is indebted not because its debt is high in comparative terms, but because of its inability to pay what it owes. As an example, between 1970 and 2003, the continent borrowed \$530 billion of which SSA borrowed \$290 bn. In the same period, Africa paid back \$540 billion and SSA repaid \$280 bn, but the continent still owes \$300 bn due to interest payments and penalties. Hence the recent debt relief announced by the G8 countries can provide opportunities for countries to use such a relief for developmental needs as 14 out of the 18 countries that are qualified are from Africa. However, using funds from the HIPC for energy projects will not be easy as it has been seen in Uganda due to other competing demands. Health, education and agriculture are the priorities. The energy ministry in the respective countries would need to show a compelling case to the finance ministry and to the development ministry to use such funds for the energy sector. Depending on the governance structure, other ministries or parliament may need to be convinced.

Better Use of Private Investments

3.14 Private involvement in infrastructure is very complex and can be time consuming. African government require significant amount of knowledge to cope with such transactions. Governments should explore the option of co-financing such projects with local investors. Here are some guidelines to assist governments.

- Government should initiate the private sector intervention, and not the other way round.
- Government should develop manuals for private sector investments in energy infrastructure. The manuals of South Africa and Mauritius can be adapted to suit other African countries.
- Use local or regional experts to undertake needs assessment, feasibility studies and risk assessment.
- Use international experts for financial and technical studies but with local or regional involvement.

Aid and Grants

3.15 Aid is normally mis-construed as the transfer of wealth from developed countries to developing countries without expectation of repayment, but African countries have found out that nearly all aid is tied to certain conditions, though these vary among the Development Assisting Countries (DAC). One such condition is that funds should be spent on specific goods from certain companies and specified consultants, preferably from the donor country.

Also, the continent attracts three types of aid: emergency aid – droughts, famine or crop failure, military aid – military support, and development aid – provision of goods and services, expertise, etc. Unfortunately, the latter that has most concern with strengthening of the economy and capacity building, is the least supported. African countries should secure more development aid.

3.16 An opportunity for grant funding for African countries is the EU Energy Initiative (EUEI), launched at the Johannesburg Summit as a long-term commitment from the EU to increase energy access to meet the MDGs. This initiative is demand led and aims at creating partnerships between the EU and African countries, also involving the private sector and other organisations. The support can take the form of co-financing as well as institutional support, capacity building, strategies or legislation and regulatory frameworks. The EU energy activities have been rising recently. Its energy commitments rose from \$670 m in 1997 to \$1,224 m in 2001 (EU, 2003). The EUEI is setting up an African Caribbean Pacific (ACP)-EU facility that has three activity areas; delivery of energy services, creating enabling environment and facilitating large investments. The challenge is for African countries to develop suitable energy projects to fully exploit this up-coming facility.

IDA Funding

3.17 The power sector is likely to dominate IDA lending for infrastructure in Africa in three main areas; power sector reforms to improve performance of electric utilities, regional integration projects to connect transmission networks and support the development of trading systems, and service expansion projects to promote access in rural and peri-urban areas. Some biomass based projects that aim at improving security of supply will also be included. All these areas fall within the suggested strategic options to meet and sustain the MDGs. The World Bank realises that the infrastructure development goals of Africa require coordinated multi-country action at the regional level. Hence, the Bank has established a new Department of Regional Integration, with a dedicated target of 10% of IDA resources to regional projects. The regional development of hydropower, gas reserves and reduction of gas flaring also is of interest to the World Bank.

Recent Climate Change Initiatives

3.18 The climate change debate has resulted in the creation of several opportunities to develop the energy sector of developing countries. Most of these opportunities are through the United Nations Framework Convention on Climate Change (UNFCCC) and the Global Environment Facility (GEF). Though most of them are grants, but they pose major problems to access. This is due partly to the rules and regulations of these initiatives, and partly to some inherent weaknesses in the infrastructure in developing countries especially those of Africa. These funds include:

- The clean development mechanism (CDM) a collaborative mechanism between developed countries and developing countries in the Kyoto Protocol on the UNFCCC for development of GHG reducing projects in developing countries by investments from developed countries.
- Other carbon financing funds

3.19 In general, accessing these funds will pose problems due to high transaction costs relative to the expected price of carbon credits.

4

Benchmarks for reaching MDGs

Energy Targets for Achieving MDGs

4.1 The above discussions clearly demonstrate that African countries have a great challenge in meeting and sustaining MDGs. Unfortunately as mentioned before, energy is not one of the eight goals, but the provision of modern energy services is crucial in meeting the MDGs. Hence, some energy targets for Africa are suggested for consideration in meeting the MDGs. These targets are:

- Doubling of the consumption of modern fuels including increased energy access for productive uses. The use of modern biomass for industrial purposes should be explored.
- 50% of inhabitants in rural areas should use modern energy for cooking. Options should include improved cook stoves, which will result in both reduced air pollution and energy savings. Use of pressurised kerosene stoves and LPG stoves where the necessary support infrastructure is available can assist rural areas.
- 75% of the poor in urban and peri-urban should have access to modern energy services for basic needs
- 75% of schools, clinics and community centres should have access to electricity as this would enhance their competitiveness
- Motive power for productive uses should be made available in all rural areas. The use of bio-fuels should be explored as reliability on oil is reducing due to current price hikes.

4.2 Achieving these targets or benchmarks will require certain financial and institutional arrangements. The main attributes of these arrangements can be summarised as follows:

- Modern energy provision will be used to reduce poverty by mainstreaming energy in national development planning including the PRSPs and specifically linked it with economic productivity, gender equity, education and health.
- Constant policy review will be undertaken and appropriate financing mechanisms instituted to cope with the financial demands of meeting the MDGs.
- Development and promotion of policies aim at enhancing the dual approach of high impact and low cost options.
- In extending the energy infrastructure, the minister of energy will work with finance ministers to gain from the G8 conclusions for that purpose. Further, they will work with other ministries, the private sector and other stakeholders to increase energy investments that address the challenges posed by MDGs.

- Knowledge and experience exchange within the continent and outside the continent will be used to overcome barriers to energy growth in meeting MDGs, especially technological barriers.
- Development and implementation strategies to scale up access to modern energy services and prioritise key areas for replication.
- Develop a range of institutional and technological policies for investments for improved and efficient energy services
- Promotion of regional projects to develop energy resources and infrastructure.
- In implementing these commitments, national circumstances will be considered.
- Liaise and cooperate with international partners.

Reporting and Monitoring of Targets

4.3 The targets given in the beginning of this chapter should be monitored regularly to identify progress among countries at formal meetings of FEMA, NEPAD and AU. Further, each country should report on them at future meetings of the CSD process, and reporting can be done sub-regionally.

5

The Forum of Energy Ministers in Africa (FEMA) Initiative

Background and Objectives of FEMA

5.1 The FEMA initiative is established to provide political leadership, policy direction and advocacy to increase access, better utilisation and management of energy resources for a sustainable social and economic development of Africa. This was against a background of the realisation of African Energy Ministers for the need for forum to confront the major energy challenges of the continent.

“FEMA is a platform to exchange experiences about successful approaches and will streamline the efforts of African countries along a common strategy to increase access to modern energy for achieving the MDGs.”

5.2 The main objective is to assist African States and sub-regional organisations to contribute to the achievement of the MDGs, the Johannesburg Summit targets and the Bonn Renewable 2004 declaration.

5.3 The immediate objectives are as follows:

- Raise the profile of the energy sector in national and regional planning to reflect its central role in achieving MDGs.
- Develop a coherent energy strategy for Africa, including re-strategising to increase modern energy supply and access.
- Promote a common approach expressed through specific, national and regional projects of benefits to African countries.
- Speak with a common voice and collectively advocate for the financing of regional projects.
- Promote interconnectivity, and develop common technical standards and codes of conduct.

5.4 The FEMA initiative will complement the activities of the African Energy Commission (AFREC) which was created by the Organisation of African Unity (OAU) “Lagos Plan of Action” in 1980 and concretised in 1996 with a study by UNECA and ADB that led to the formation of an interim secretariat. AFREC awaits ratification to come into force. FEMA also complements the African Union (AU) that has an energy programme on African Energy Policy for the electricity, oil, and gas sectors.

NEPAD and FEMA

5.5 The New Partnership for Africa's Development (NEPAD) vision is to pursue a common vision of Africa's leaders based on a shared conviction to eradicate poverty and promote growth and sustainable development. Its energy initiative fully recognizes the importance of energy in development of the domestic and productive sectors of the continent, and that absence of adequate energy services are the major barrier to the continent's competitiveness. NEPAD further realises that new paths based on partnership with others are needed to meet the energy needs of the continent. Hence, the energy objectives of NEPAD are the following:

- To increase access to reliable and affordable modern fuels in Africa from 10% to more than 35% in 20 years
- To improve reliability and lower the cost of energy for production that will enable annual economic growth of 6%
- To develop indigenous including hydro energy resources and rationalise its distribution
- To reduce environmental degradation associated with production and use of traditional energy in rural areas
- To support regional electricity transmission and gas pipelines so as to enhance cross-border energy flows
- To reform and harmonise petroleum regulations and legislation inn the continent.

5.6 As a means to operationalise these objectives, NEPAD has developed a short-term Action Plan as its priorities in energy. This plan has 23 energy projects; of which 7 are for power, 3 oil and gas, 4 studies, 3 capacity building and 6 facilitation projects.

5.7 Hence, the energy initiative of FEMA is within the energy programme of NEPAD, and FEMA will therefore act as an advocate of the NEPAD's energy agenda.

6

Prospects and Conclusions

Prospects of the Continent

6.1 After a disastrous period during the 1970s and 1980s, a lot of African countries are now doing reasonably well economically with a good number of countries recording above 5% annual growth rates such as Senegal, Mali and Ghana. Mozambique, in the wake of a murderous civil war, has not just secured peace but has regularly attained growth rates of between 7 and 9 percent. Nigeria, Tanzania and Madagascar are also growing at around 6 percent. These economic growth rates are higher than the population growth rates, a different feature to the situation in the 1990s. In addition, the continent has been recording overall growth rates of between 3% and 5.5% as recorded by the World Bank, UNDESA, IMF, and ADB.

6.2 However, unless the provision of modern energy services is increased substantially to support industrial activities, these benefits will not be fully realised. Overcoming poverty on a sustained basis will require major improvements in the continents net productivity.

6.3 With these positive features and the ever-increasing regional trade in the continent, there are prospects that countries can reach and sustain the MDGs.

Threats to the Continent

6.4 At present, the infrastructure of Africa is extremely sparse. Estimates of future investment needs and historic financing patterns are very challenging. A shortage of information and manpower is a major threat that can limit performance.

6.5 The impact of high oil prices can be disastrous though a few oil importers will benefit due to increased earnings. The majority of African countries, over 80% are oil importing and most of their economic activities are highly oil dependent and so are vulnerable to oil price impacts. According to a recent ESMAP report, countries are urged to promote fuel diversification to cope with such vulnerabilities (ESMAP, 2005) However, the continent as whole must develop useful strategies to cope with oil shocks that include both oil importers and exporters.

Conclusions

6.6 Meeting and sustaining the MDGs by African countries is a major challenge. Increasing its provision of modern fuels by fully exploiting its indigenous energy resources in an environmentally sound and economically optimal strategy will go a long way to contributing towards meeting the MDGs within the specified time. Various energy options have been suggested in this paper that will reduce poverty in both the urban and rural Africa.

These include the use of LPG, kerosene; etc to reduce the adverse effects of cooking energy along with improved cooking devices such as improved cook stoves provided their limitations are properly studied. The use of electricity in the overall improvement of the quality of life of Africans as it has adequately demonstrated in other continents is clearly demonstrated. However, implementing all these options will require detailed studies of the sub-regional and country circumstances.

6.7 The energy benchmarks suggested are equally challenging, but using the policies and measures advocated, the task will be minimised. Hence, building the energy infrastructure is crucial for Africa to overcome the challenges of raising a large number of its people out of living in extreme poverty.

6.8 A major challenge for African countries is to develop a comprehensive techno-economic strategy to exploit the upcoming prospects such as the IDA/ADF and the EUEI for energy infrastructure development. The recent decisions by G8 countries to increase development assistance to 0.56% of GNI by 2010 and 0.7% by 2015 should be fully exploited for energy development, as this will provide the engine for overcoming obstacles in achieving the MDGs by the appropriate time period.

6.9 The FEMA initiative will complement the expected activities of AFREC, which is expected to be ratified soon, as their concern is to provide adequate and affordable energy for all Africans. The energy activities of the African Union (AU) will be complimented by FEMA, especially in the development of a comprehensive African energy policy for the electricity, oil, and gas sectors. The FEMA initiative is within the energy programme of NEPAD as the common vision to eradicate poverty and promote growth and sustainable development is pursued.

References

- African Business (2005)** August/September 2005 No.312.
- African Business (2005) July 2005. No.311.
- Afrane-Okesse Y (2001)**. “Socio-Economic Assessment of the Energy Burden on Low-Income Households in Urban Botswana.” Procs. of Domestic Use of Energy Conference 2001, Cape Technikon, South Africa.
- BP 2004 (2004)**. “BP Statistical Review of World Energy”. London, British Petroleum.
- Cook, E (1976)** Man, Energy and Society, San Francisco: W.H. Freeman.
- Davidson, O.R (1992)** “Energy Issues in Sub Saharan Africa: Future Directions.” Annual Review of Energy and Environment. 17:359-403.
- Davidson, O.R. (2002)** “Oil and Gas in West Africa: Need for Long-Term Energy security Strategy” Distinguished Energy Lecture Series (DEALS). Obafemi Awolowo University, Ife, Nigeria.
- Davidson, O.R (2004)** “Energising Africa” IAEA Bulletin 46/1, June 2004.
- Davidson O & Sokona Y (2002)** “Think Bigger, Act faster” EDRC/ENDA, University of Cape Town, South Africa.
- Davidson O & Sokona Y (2001)** “Energy and Sustainable: Key issues for Africa” Procs. of African High-Level Regional Meeting on Energy and Sustainable Development. Edited by N. Wamakonya. UNEP .Nairobi, Kenya.
- Davidson, O.R & Mwakasonda, S.A. (2004)**. “Electricity Access for the Poor: A study of South Africa and Zimbabwe.” Vol.VIII No.4, December 2004.
- East African (2005) Monthly newspaper of East Africa. May 2005.
- ESMAP (2005)** “The Vulnerability of African Countries to Oil Shocks: Major Factors and Policy Options” by R. Beacon & A. Matter, Energy Sector Management Programme (ESMAP), World Bank. Report 308/05 August 2005.
- Estache, A (2005)** “What do we know about Sub-Saharan Africa Infrastructure and its Impact of its 1990’s Reform.” Working Paper. World Bank.
- EU (2003). “The EU Energy Initiative for Poverty eradication and sustainable development.” European Commission, ISBN 92-894-6052-0.
- GNESD (2004)**. “Power Sector Reform and its impact on the poor. “Journal of the International Energy Initiative.” Vol. VIII No. 4. Dec. 2004.
- IEA (2004)**. “World Energy Outlook 2004.” International Energy Agency, Paris, France.
- Modi, V (2005)**. “Energy Services for the Poor.” Commissioned paper for Millennium Project, UN.
- O’Sullivan, K& Hamaide, M (2002)** “Calculation sheet of access to electricity by country used for Business Renewal Strategy preparation.” March 2001, World Bank, Washington DC, USA

Mangwenwende, S.E.(2005) “Increasing Electricity Access while ensuring financial viability; A perspective from the African Industry.” AFREPREN Workshop on Electricity Access, Nairobi, Kenya, 2005.

NEPAD (2005) “The Journey so far.” The New Partnership for Africa’s Development, Johannesburg, South Africa.

Prasad, G (2002). “Options for a Basic Electricity Support Tariff.” Report to Department of Minerals and Energy and Eskom. Cape Town.

Sokona, Y (2000) “Widening access of rural energy services in Africa: What perspectives from the multi-functional platform case in Mali.” Business Briefing: Global power engineering & Technology.

Smith, K.R (1998). “The National Burden of Diseases from Indoor Air Pollution in India.” Mumbai, Indra Gandhi Institute of Development Research.

Tomowski, A.D (2005) “Energy and the MDGs-How to create an Impact.” World Bank Energy Week, Washington D.C March 14,2005.

UNECA (2004)” Economic Report on Africa 2004: Unlocking Africa’s Trade Potential in the Global Economic Overview.” E/ECA/CM 37/6 April 2004.

UNDP (2000) “World Energy Assessment.” New York, USA.

UNDP (2004) “Human Development Report 2004.” UNDP, New York, USA.

UNDP (2005) “Achieving the Millennium Development Goals: The Role of Energy Services.” UN, New York. USA January 2005.

USDOE (2000). “Energy in Africa.” Department of Energy/Energy Information Administration. Found at www/eia.doe.gov/emeu/cabs/Africa.html.

UN (2005) “The Energy Challenge for Achieving the Millennium Development Goals.” UN-Energy, New York, USA.

World Bank (2002) IBRD 32162 November 2002.

World Bank (2004) “World Development Report.” Washington. DC, USA.



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