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TAKING THE NEPAD ENERGY INITIATIVE FORWARD: REGIONAL AND SUB-REGIONAL PERSPECTIVES

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ACP	African, Caribbean and Pacific countries
AFREPREN	African Energy Policy Research Network
AGI	African Gas Initiative
DRC	Democratic Republic of Congo
EDRC	Energy and Development Research Centre. University of Cape Town
ECOWAS	Economic Community of West African States
EU	European Union
GDP	Gross Domestic Product
GW	Giga Watt
HR	Human Resources
ICT	Information and Communication Technologies
LPG	Liquid Petroleum Gas
NEPAD	New Partnership for African development
RETS	Renewable Energy Technologies
SADC	Southern Africa Development Community
SAPP	Southern African Power Pool
SMMEs	Small, Medium and Micro Enterprises
SSA	Sub-Saharan Africa
UNCCD	United Nations Convention on Combating Desertification
UNCTAD	United Nations Center for Trade and Development
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change

1.1 Focus of the NEPAD Energy Agenda

The NEPAD energy agenda should be aligned with its key objectives of eradicating poverty, putting Africa on a sustainable growth and development path and promoting the role of women in all activities.

It is therefore appropriate to review the socio-economic aspects related to the NEPAD objectives in order to understand the challenges Africa is facing and be able to develop appropriate energy initiatives to achieve the developmental objectives.

Sub-Sahara's population is growing at 3% just below the GDP growth rate of 3.4%. Real GPD in Africa has remained constant as a share of world total since 1970 at about 2% and is expected remain there till 2020. At this rate of economic growth it would be unrealistic that the goal of sustainable development growth can be met in the foreseeable future. A significantly higher growth rate in GDP is required. Southern Africa has worked out that a 6% GDP growth rate is required to have meaningful impact on eradicating poverty.

The critical question is what would be the energy implications of meeting the NEPAD objectives.

To eradicate poverty it is important to understand its causes. Poverty has not received significant attention from an energy perspective and yet together with water is important means to development and livelihood including providing for nutrition and health. Procurement of energy is also a significant cost to the household and hence affects income levels. Poverty is defined in general terms to be a result of lack of employment, insufficient income earning opportunities and the low potential of traditional agriculture[2]. With respect to income, the UNCTAD report even paints a gloom picture that per capita income in sub-Saharan Africa is 10% below the level reached in 1980 and that the income of the 20% poorest is declining at 2% a year. Poverty is higher and more severe in rural areas and peri-urban areas than in urban areas. If energy is to make a significant impact in this regard, it should be channelled to improve incomes in rural and peri-urban areas.

Poverty is also associated with female-headed households (UNDP, 2002) as a result of lack of able-bodied males to earn income. Most rural households in Africa are headed by women as men migrate to cities in search of work. Such female headed households are the poorest and have no access to the means to increase their incomes. In energy terms

[2] UNDP, 2002 Report

many studies have established the involvement of women and children in collection of energy particularly fuelwood and tilling the land, processing and providing the food. A large share of the micro-enterprises in Africa operating in rural, peri-urban and urban areas is owned by women. Table 1 below shows involvement of women in household chores and micro enterprises. Although these situations have been realised in the past, they still remain unresolved.

Table 1. Involvement of Women in energy associated enterprises and household chores

Enterprise	Women involvement
Beer brewing	54% of women surveyed in Tanzania use 1kg wood/1 litre of beer
Bakeries	wood constitutes 25% of bread production costs in Kenya
Fish Smoking	1.5-12kg/wood/kg smoked fish in Mali 940% of processing costs)
Palm oil processing	0.43 kg wood/1 litre oil. 55% of income of female headed households in Cameroon study
Gari (cassava) processing	1kg wood/4kg gari
Food preparation & processing	48% of mothers in a District of Ghana involved 49% in one village in Burkina Faso

UNDP, 1997- Energy after Rio

To address the plight of women, energy has to lessen their burden and increase their productivity.

Typically, the economies of Africa are dominated by a few multinational corporations that are often profit oriented and not that sensitive to the plight of the marginalized groups and the poor. Energy supply paradigms have tended to be built on the same model of monopolistic structures that tend to supply energy to the industrial complex, neglecting the needs of the poor. The potential that is in Small, Medium and Micro Enterprises (SMMEs) to catalyse industrialisation and create the much needed employment has not been exploited. Similarly the potential in moving from few actors and large energy supply-side structures to new systems with multitude of small scattered installations that are manufactured, distributed, marketed and operated by a myriad of individuals and small firms remain a lip service.

1.2 Why NEPAD Should Succeed

NEPAD being an initiative that brings cooperation and cohesion among Africans should be able to realistically address problems of poverty, economic growth and solving the problems of its marginalized people such as women, children and disabled. The initiative comes when Africa has built its own capacity in human resources to support NEPAD activities. African experts are expected to identify with the developmental concerns of Africa and give the necessary passionate support to NEPAD's success. It is therefore

important to provide the necessary challenge to African experts to provide their expertise to Africa which funded their educational development.

By now Africa must have learnt from its failures in the past similar initiatives that have been largely driven by donors and foreign experts with short term interests in the outcomes of the initiatives.

Africa's failure to address long standing problems is often blamed on lack of resources particularly funding and initiatives such as NEPAD can only benefit from development agencies as the sources of that funding. Financing provided by development agencies often has strings attached and may not apply to a multi-speed[3] approach to development of the whole of the continent.

The challenge NEPAD faces is innovative ways of sourcing funding both at home and abroad, and engage African expertise to design projects that can get funding with minimum strings attached.

Another crucial element is to ensure sustainability of NEPAD as an initiative. The success or failure of NEPAD may be judged on this premise and a way of ensuring sustainability of the initiative is to build own capacity in the continent that can carry NEPAD forward. Having African 'think tanks', measurable targets, monitoring and evaluation systems against set targets and responding to changes will be some important aspects in keeping NEPAD on track to achieve its objectives.

1.3 Conceptual Framework

The conceptual framework on taking the NEPAD energy initiative forward is presented in Fig 1 and the framework concentrates on the regional and sub-regional energy imperatives.

1.3.1 Critical Energy Issues for NEPAD

The most critical issues associated with energy in Africa are the under exploitation of its energy resources and the low consumption of commercial energy or improved energy (e.g. biomass) which may be a combination of poor access and low incomes. Africa's abundant energy resources remain under-exploited due to lack of capital, and the socio-economic environment is not favoured by Foreign Development Investment.

To this effect, the paper reviews Africa's energy resources, current consumption, the energy gap, means of harnessing the diversity of energy resources for the various consumers and how to improve access to the energy. Currently access to modern fuels and electricity is poor. Some refinement and re-packaging of energy may be required prior to improving access.

[3] Developing at the same pace.

At the 9th Commission on Sustainable Development governments accepted that they could only commit to halve people living on US$1/day if access to affordable energy is a prerequisite (UNDP Thematic Trust Fund). Since access to modern energy is essential for increasing productivity and improving people's livelihoods, new approaches are needed to deliver such energy services. Access should protect interests of the poor while providing incentives for enhanced private sector investment in energy.

1.3.2 Needs to Meet NEPAD Energy Objectives

Energy development infrastructure visa vis financing and skills are seen as the major constraints to harnessing Africa's abundant energy resources. Most of the lucrative energy resources such as oil are being exploited by foreign oil companies for their markets in the developed world. Access to modern energy in particular is restricted by the low incomes of the majority of Africans, hence limiting affordability. The low access also limits indirectly the reliability of supply and energy distribution networks. For instance, throughout Africa, power and fuel-cut-offs are frequent as a result of poorly managed utilities.

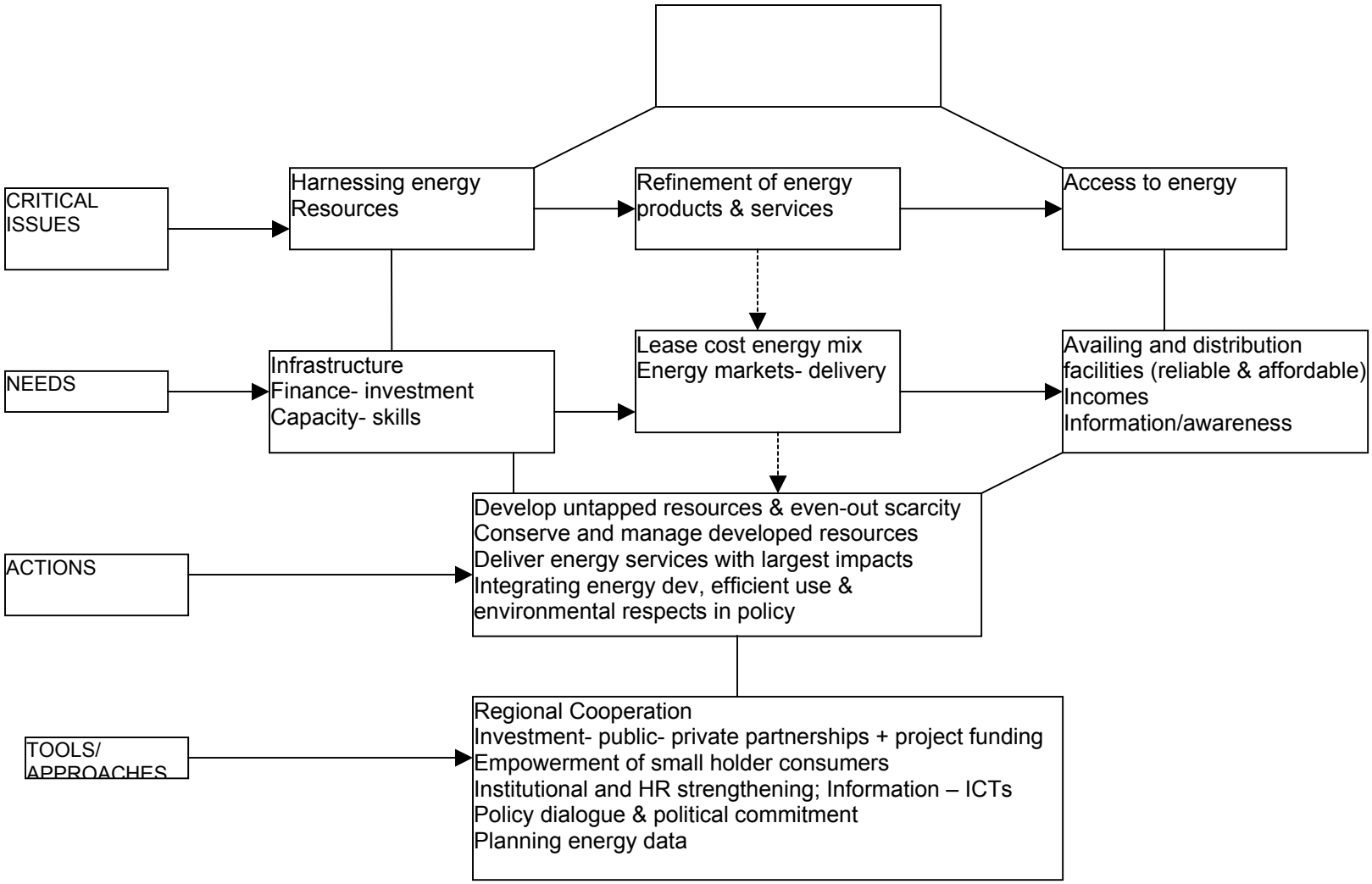
Information on available energy mixes can be critical in improving access. Since access and improving incomes can be a "chicken and egg situation", varied packages of energy mixes can make it possible for the low income groups to match their incomes when offered a wide range of technologies that can meet their requirements.

To match supply and access, least cost mix of energy diversities are required provided by markets that are sensitive to the regional socio-economic circumstances.

Important elements in increasing access to and consumption of clean commercial energy by the majority of Africans, economic development and lessens the burden on women (in line with NEPAD long term objectives) are linked to a number of related issues among them how to harness Africa's energy resources, overcoming investment constraints. For example opportunities of NEPAD's impact are seen in:

- Boosting energy trade within the continent
- Joint investments by African states in hydropower dams, regional gas pipelines and regional electricity grids;
- Providing a policy environment in which renewable energies can thrive and environmental and social aspects are part of the agenda.
- Enhancement of sub regional energy initiatives and capacities.

Fig 1.1 Conceptual Framework for NEPAD Energy Agenda



1.3.3 Actions for NEPAD

Actions that have a regional or sub-regional perspectives are those that will achieve a multi-speed approach to ensure that Africa develops together as a whole entity. The severe problems that afflict the energy sector in Africa are holding back economic growth and its benefits. There are also disparities in development both geographically and in social strata and the challenge is to even-out energy deficit at all levels. This can be met from regional oriented energy projects as evidenced by some regional power trade e.g. in Southern Africa and East Africa. The share of the trade is however still small to make a significant impact. For instance in the Southern African Power Pool (SAPP), the Short Term Energy Market is currently only trading about 2% of electricity and mostly from ESKOM.

Considering the expense in providing new energy supply services, it remains critical to conserve and manage already existing energy services. In providing energy, past tendencies for Africa have been to treat social and economic development goals as being different. The failure has been in the emphasis on social upliftment and yet that cannot be solved in isolation from economic development. Focusing on social uplift tends to be unsustainable and eventually does not improve income. This has been tempted by trying to supply energy for domestic use, which is crucial but not an end in itself. The focus is to target the groups with potential to create sustainable employment and grow incomes. These are the Small and Medium business enterprises (e.g. the small commercial farmer) not the poor of the poorest. There is evidence that small scale enterprise can grow and use its income within the area of production to improve incomes in the vicinity, unlike large industrial complexes that spend their incomes in urban luxury set-ups. Africa therefore needs to focus on areas where energy can make the largest impacts.

The environmental impact of energy systems while an important global issue is a second generation problem to Africa. The first generation problem is to increase access to energy for poverty reduction and economic growth. Africa seems to have gone on the bandwagon of environmental management champions before learning to feed its own people. Important energy solutions that NEPAD should focus on are those that will take Africa through the first generation problems. Often second generation problems like improving environmental management can be built-in in integrated policies for the first generation problem rather than make dedicated focus on environmental management. The challenge will then to make the policies work.

2.1 Energy Resources

Africa is endowed with vast energy resources and Table 2 presents known energy resources for sub-Saharan Africa (SSA) towards the end of the 1990s decade (EU/UNDP, 1999).

Table 2 Energy Resources for Africa

Energy fuel/source	Reserves	Units	% of Global	Consumption (Mtoe)
Oil	9300	M toe	6.7	42.0 (25.5)
Natural Gas	9.9	trillion M^3	6.8	1.5 (0.9)
Coal	61700	Mt	6.0	19.2 (2.3)
Hydropower	200	GW	10 (17)[4]	
Uranium			17	
Electricity				17.3 (5.0)
TOTAL Modern energy				80(33.7)
Biomass	84 (1.7/yr)	Billion tons		184.8(175.2)
TOTAL				264.8(208.9)

Source: EU/UNDP (1999)

The fossil fuel resource (technically and economic proven) to production ratio is over 266 for coal, over 86.2 for natural gas and 26.8 for oil compared to 227 for global coal, 61.8 for global gas and 39.9 for global oil. These figures indicate substantial energy resources for the continent particularly for coal and natural gas. New discoveries of oil and gas have grown by 25% and over 100% respectively in the past 20 years (EDRC/ENDA book, 2002) and more discoveries of oil and gas are continuing.

In addition to the fossil reserves, Africa has 17% of the global known low cost uranium most of it concentrated in Namibia (7%) and South Africa (9%).

Africa owns 10% (17% of untapped resources) of the global hydro resources concentrated in the Great lakes region and in countries along the Atlantic Coast from Guinea to Angola (34%). The DRC alone has 60% of Africa's hydro resources 46% of which are technically exploitable and 27% economically exploitable.

Biomass resources are estimated at 82 billion tons with an annual average growth of 1.7 billion tons. This rate of growth affords nearly three times the per capita wood demand in the continent at current consumption levels. The problem is localised scarcity and depletion through land use activities. Planning data are however required to determine

[4] Africa however has 17% of global untapped hydropower resources that can increase Africa's electricity capacity 4-fold.

whether there is a net loss or gain of forest reserves in the continent. Forestry and agricultural residues have become a significant untapped renewable biomass energy resource.

There are also many promising wind, geothermal and solar resources in many parts of Africa.

Although significant, the resources are not evenly distributed as shown in Table 3. Oil and gas are concentrated in Northern and West Africa in selected countries namely Algeria, Nigeria, and Libya. Other reserves are in Angola, Gabon, Equatorial Guinea and Congo. More recently some oil reserves were discovered in Sudan, Cameroon and Tunisia and gas in Mozambique, Namibia and Tanzania.

Table 3. Regional Fossil Fuel Reserves 1in 1999

Sub Region	Oil (1000 bbl/day)	Natural Gas (Bcf)	Coal (million stone ton)
North Africa	1151	1534	6.11
West Africa	471	221	0.263
Central Africa	83	4	.261
East Africa	149	0	0.12
Southern Africa	588	85	176.97
AFRICA	2442	1844	183.7

EDRC/Enda, 2002

Of energy consumption in the sub-Saharan Africa 7.3% is coal, 15.9% oil, 0.6% Natural Gas and the bulk is dominated by traditional biomass. The global energy share is 6.5% with a total share of 30.2% of modern energy in the African continent. Biomass contributes 69.8%. The share of modern energy without SA is 16.1% and biomass 83.9% showing some large disparities that Africa faces in achieving the multi-speed development approach under such diverse economic condition.

The per capita commercial energy consumption is below 0.6 toe/cap and has not improved since 1980. It is even declining. This is less than 10% of per capita consumption in Europe, showing that Africa has a large energy consumption gap compared to the developed world. The low levels of consumption are due to low industrialisation, low incomes with consequences on low ownership of energy intensive devices and as a result Africa produces more fossil fuels than it consumes. All African sub regions, apart from East Africa, are net exporters of fossil fuels, mostly in form of oil (Table 4).

Table 4. Production, consumption and net exports for Africa's fossil fuels.

Sub Region	Production (EJ)	Consumption (EJ)	Net Exports (EJ)
North Africa	12.67	4.64	8.05
West Africa	5.74	1.42	4.31
Central Africa	1.99	0.31	1.69
East Africa	0.12	0.42	-0.32
Southern Africa	7.42	5.22	2.21
AFRICA	27.93	12.02	15.91

EDRC/Enda, 2002

Although Africa oil producing countries account for 10% of world oil market, the region only consumes 3% of global consumption.

Africa imports far less oil than it exports and major destinations are Europe (55%), North America 30%, Latin America 5.4%, Asia 7.2% and only 1.6% to other African countries, and 1.2% others.

Table 5. Thousand barrels per day

Region	Crude imports	Crude exports	Product imports	Product export
North Africa	139	2054	102	642
West Africa	38	2681	117	42
East and Southern Africa	494		77	6
Africa Total	671	4735	296	690

Afrepren (1999)

Oil reserves in the 1990s was 9605 million tonnes and production was 298 million tonnes showing a significant untapped potential. Afrepren (1999) estimated that Angola's oil alone could satisfy 86% of SADC needs. Currently Angola exports 93% of its production to outside Africa. Table 5 shows that Africa remains a net exporter of its fossil fuels regardless of the fact that over half of the Africa countries import petroleum and are spending 15- 60% of their export earnings on oil imports.

At most, Africa is expected to consume only half of its production even by 2010.

Collectively the continent import cost can be reduced by Africa supplying all its needs by largely buying and selling among African countries. The notion that African countries cannot afford foreign currency is not an issue as they continue to pay for fuel imports to other external countries.

Oil is mostly used as a transport energy fuel. However coal, hydropower and oil deliver efficient energy for development when transformed into electricity and the levels of electricity generation and access are presented in Table 6 below.

Table 6. Electricity Generation in Africa and Access

Sub Region	Capacity (GW)	Thermal share %	Hydro share%	Other share%	Access %
North Africa	32.88	87.7	12.3	0	86
West Africa	9.61	52.2	47.8	0	18
Central Africa	4.34	8.9	91.1	0	9
East Africa	2.76	33.8	63.5	2.7	10
Southern Africa	43.83	81.2	14.6	4.2	21
AFRICA	93.50	75.8	22.2	2.0	

Source: EDRC/Enda, 2002.

Table 6 shows that most of the electricity generated in Africa (76%) is from thermal/fossil fuels particularly from coal and oil, 22% from hydropower and the rest from other sources probably nuclear (southern Africa) and geothermal (East Africa).

2.2 Additional and Refinement of Energy Resources

Natural gas has been recently exploited and could be a major fuel in future for thermal electricity generation. It is known that most of the newly constructed power plants in developed countries are increasingly of natural gas than of coal.

Gas associated with oil that some oil producing countries such as Nigeria are flaring, coal bed methane abundant in coal bearing countries, and land fill gas that can be generated from waste could provide additional fuels for electricity generation that are cleaner than the conventional oil and coal. Biomass by-products such as sugar bagasse are also finding their way into the electricity/power sector. Introduction of land fill gas and bagasse in the sector can also address waste management that is often a problem in many African countries.

On average oil operators in Sub Saharan Africa flare 76% of their associated gas compared to a global average of 4%. At the price of oil, this is equivalent to US$3 billion annually (AGI, 2001). The only obstacle at the moment is the cost of construction and operation of a gas gathering system that is to collect gas from oil wells to gas treatment units where for example LPG can be extracted. The same gas is a candidate for power generation. For instance the 980 km gas planned pipeline from Nigeria to Benin, Togo and Ghana will be dedicated for power generation. Individual countries would not

possess the financial resources and technical capability to tackle the cost of investment in this area.

2.2 Access to Energy

The abundant energy resources need to be developed and delivered reliably to all categories of energy consumers to be of benefit to for overall development.

There is general low access to modern energy in Africa (3-5%- EDRC/Enda 2002-Oil and Gas chapter) acting as an obstacle to poverty eradication and sustainable development. Using access to electricity, as an example, apart from North Africa that is nearly full electrified, the rest of Africa averages less than 15% of access to electricity. Improved access to electricity can improve production capacity of enterprises and livelihoods.

The challenges that need to be confronted as part of the NEPAD Energy agenda are:

1. The limited energy trade among African countries
2. Poor investment capacity of individual countries to harness the large energy resources.
3. Low delivery capacity of energy services for development and social upliftment.
4. Distorted energy policies and inefficient energy institutions and utility management.
5. Inadequate focus on African energy policy analysis
6. Untapped African expertise to drive the continent's energy agenda
7. Lack of gender sensitive energy planning.
8. Poor information/awareness on energy choices.

The previous discussion has pointed out poor energy trading among African countries. There are also no collective planning and mechanisms for cooperating to improve individual economies. The potential to address both the limited energy trade among African countries and poor investment capacity of individual countries to harness the large energy resources is seen through enhanced regional cooperation. While some cooperation has been started at sub-regional level (e.g. for electricity trade and there are planned projects for gas and oil pipelines), greater intensity is required for intra and inter regional cooperation for rapid economic growth that can meet NEPAD goals.

Rapid economic development and social upliftment requires consumption of a critical mass of modern energy and the levels of energy consumption and quality of energy being used are a hindrance to development.

On one hand, the low incomes of the majority of African that have rural life prevents significant uptake of modern energy. The low energy prices that African governments stipulate sometimes are also not realistic to sustain delivery of services and tariffs are sometimes guided by political agenda than economics. For example electricity cost of grid-supplied electricity in Africa is 2-3c.kwh (off-peak) which is far low than the global average of over 5c/kwh (REF).

The old inefficient institutional structures that are plagued by bureaucracy also impede timely and efficient delivery of energy services.

The potential in delivering energy services through decentralized systems provided by small suppliers has not been realized as the markets for e.g. photovoltaic electrification are not full developed.

While the per capita energy consumption is lower than global average, the energy intensity of GDP is also highest in Africa partly indicating low energy use efficiency. This could also be attributed to traditional energy that is used at low efficiencies, for which most is used informal sector and thus not properly accounted for in the generation of GDP.

Either energy policies are not well articulated in Africa or they are not followed. In the case of where policies are not properly articulated, lack of dedicated resources are often the cause. In the case where policies are not implemented, politics often derails logical thinking.

Africa has some capacity for energy policy analysis but often is not utilized. Due to the link with official development assistance (ODA) and multilateral money in energy development, most policy advice is provided from external technical experts who often are not versed in socio-economic circumstances of the continent.

Most of the energy planning data are incomplete and/or outdated and do not capture the rapidly changing socio-economic circumstances. Traditional energy is most affected by this paucity of data.

There is an obvious lack of involvement of women in energy planning and yet their role in social upliftment is critical.

Meeting Africa's energy needs will be strengthened by greater regional cooperation in:-

- Energy development and trade
- Investments and Financing (also involving private sector in energy investments),
- Empowerment of small holder enterprises with potential to grow.
- Development and strengthening of necessary policies and institutions, better exchange of information and experiences, and better generation of planning energy data.

4.1 Energy Trading

The largest potential for regional cooperation in energy trade is seen through enhancement of regional and sub-regional electricity grids, construction and expansion of natural gas pipe networks, oil and gas exploration activities, oil refining and trading of oil on the continent. Electricity grid can even be extended beyond sub-regions in stages. Gas networks may be more practical at sub-regional level with electricity generated from the gas being fed into the grid.

Electricity development can be realized through exploitation of Africa's huge untapped hydro potential of 200GW. With less than 10GW so far developed (EU/UNDP, 1999) an opportunity exists to even-out disparities in geographical availability of the hydropower. With the major hydro potential resources located within central Africa the regional power trading can only be achieved through transnational interconnections that will be costly for individual countries to invest in alone. There will be tremendous benefits in joint investments and imposing common environmental standards. For instance, close to 1billion US$ (1992 prices)was estimated as a potential saving in upgrading interconnections between Zambia, Malawi, Mozambique, Zimbabwe and South Africa between 1995 and 2010 (EU/UNDP, 1999).

The planned power trading pools, grid inter-connectors are a good start and the implementation of the planned gas pipelines in the sub-regions of West Africa, East Africa, North Africa and Southern Africa is necessary to deliver more modern energy. The economies of scale will also result in affordable prices.

It has been demonstrated that oil trade has an outward orientation while African countries spend significant export earnings to bring oil into Africa and even those that produce oil such as Nigeria also import refined petroleum products into the continent. The countries with large refinery capacity such as South Africa and Cote d'Ivoire could be used to refine Africa's products guaranteeing reliable supply to the continent. Joint oil procurement programme is also a solution e.g. SACU countries employ that and backed by South Africa's infrastructure are well supplied with petroleum products. What also needs to be improved is communication of information on oil and gas buyers' needs and sellers' availability. High political (civil strife) and economic (failure to pay due to lack of foreign currency) risks have been hindrances to energy trading but structured financial

techniques can reduce the credit risk associated with failure to pay for Africa's oil by African countries.

There is need for regional cooperation in exploration and putting a price tag to coal bed methane for those countries with deep reserves of coal, landfill gas from the abundant poorly managed waste, and harnessing gas currently being flared.

South Africa's coal and gas to liquids plant is currently the largest in the world. As more gas comes on stream from Mozambique, the gas to liquids industry will increase and the continent can benefit from the technology, skills and investment of the South Africans.

While the potential of such trade is being recognised, Africa should accelerate the process through the political commitment and support that is evident in NEPAD.

On a smaller scale market, what probably needs to be established are common standards for RETS and LPG devices and cooking devices to enable trade to take place across the region particularly at sub-regional level.

To that end an all Africa energy development and trade plan is required. The plan should stipulate priority energy resources assessment, development and trade with project concepts that provide budget estimates and timeline for implementation.

4.2 Investments and Financing

Utilities in Africa are failing because they have been subsidised by governments which are now financially ailing. New financial injection is required and Africa is not a popular destination for FDI. The possible solution is to interest regional private sector entities to invest in energy projects e.g. through infrastructure building, operation and maintenance contracts, manufacture of components and energy products.

Mobilisation of local private capital and local entrepreneurial initiatives through credit financing can also boost access to energy particularly electrification of low income areas.

There are trends that private sector is moving from oil and gas exploitation to include electricity generation which is an encouraging development. African Banks and lending agencies have done little energy business and should be encouraged to make capital available for interested Africans companies to participate in energy industry.

A good example of private -public cooperation in investments is the construction of Maputo Gas pipeline where private sector capital and expertise investment, and developmental goals are met.

4.3 Empowerment of Small holder enterprises

It is important to devote more attention to initiatives and policies that can make a wholesome impact. It is realized that empowering small scale holders that have potential to grow can result in a larger impact of economic and social upliftment. The small holders are many in Africa and when equipped with skills can grow to higher levels of enterprises. By virtue of small holders being in close contact with the majority of the population, they are in a position to share their benefits with the poorer segments of society through employment.

Supporting micro-enterprises will be targeting women folk that can grow to small and medium enterprises.

Photovoltaic based electrification directed at poverty alleviation has a role in sustainable development. Good lessons have already been learnt by Governments being involved in planning and implementation of PV projects. Now private sector involvement that is also picking up should be allowed to take hold.

4.4 Strengthening Capacity and Policies

Strengthening of institutions to manage the power pools and gas networks are required including structured financial techniques that can reduce the credit risk associated with failure to pay for Africa's oil by African countries. There various skills that become needed to match the new energy agenda.

This can be achieved by favouring diffusion of energy mixes through market forces and private sector but protecting the rights and the needs of the poor.

5.1 Key Principles of Success

A few key principles of success are required so that NEPAD should not fall into the same pit as the other initiatives that have failed in the past. In order to achieve measurable impacts in particular spheres of development NEPAD should:-

1. Choose a few interventions and implement those, with targets (temporal and spatial) that are achievable.
2. Spearhead energy policies that have large impact on wide scope of development and not just focus on communities as that can be addressed by just providing resources.

3. 4. Implement a flexible approach towards deeper energy integration that combines multi-speed development (targeting all Africa) and the variable geometry approach (considering comparative advantage).

4. Give a chance to African scholars and experts to shape the NEPAD energy agenda unlike similar past initiatives that failed because they were imposed and controlled by outsiders i.e. donors and multilateral organisations who were pushing for their own agenda.

5. Know where in the economy to induce growth through energy and define who the small holders with highest potential to grow (farmer, enterprise etc.) are as they can successfully drive rural incomes since they spend incomes in their vicinity unlike the large holders that spend their income on luxury goods- away from the poor.

5.2 Action Plan

The proposed Action Plans for the energy agenda under NEPAD is summarised in Table 7 below. Effort should be made to avoid duplication of programmes that are already being implemented by Regional entities such as SADC and ECOWAS. Rather the NEPAD programmes and projects should enhance what these entities are doing and add new critical ones.

6.1 Conclusions

It is evident that Africa has enough energy resources that are sufficient to fuel its own development but so far most of the fuel is consumed externally. This is particularly so with oil that is sold in crude form and imported back as refined products and yet the continent has some countries with refinery capacity that can supply the bulk of Africa's needs.

The huge hydropower resources and natural gases require further investments to exploit them and this is an area that requires joint investments as individual countries cannot cope.

Trading of energy especially for oil and electricity among African countries can significantly improve the uneven distribution of energy resources in the continent. To achieve that some capacity building for various institutions in financing, energy etc is imperative.

Access, apart from systems of delivery being poor, can be improved by good pricing and market policies. Targeting a market with potential to grow like the small scale commercial oriented holders will probably enhance sustainable supply and access to modern energy.

It is realized that for the NEPAD Energy Agenda to be sustainability, a dedicated African energy "think tank" is required to steer the agenda.

6.2 Recommendations

The first development that NEPAD must consider is creation of an energy think tank that can develop and refine any Action Plan that is being proposed in fora like this meeting.

Another important element of the agenda is to establish a system of monitoring and evaluating progress on the planned course of action taking into consideration development of appropriate indicators for the evaluation.

There are lessons that NEPAD can learn from activities of existing sub regional bodies such as SADC (e.g. the SADC energy planning Training programme) and ECOWAS which can be upgraded to a continental status.

A key principle is for NEPAD to focus on a few critical requirements at a time (e.g. in each 5-year plan) that can be achieved rather than hope to solve all energy problems and never achieve any.

Africa has large disparities among the countries in terms of levels of development, hence NEPAD has to identify those interventions that can be implemented in all region and those that can be implemented in certain countries with comparative advantage.

Table 8. Proposed 5-Year Action Plan for NEPAD Energy Agenda

Category	Subcategory	Projects/Programmes	Timeline
Energy Resources	Assessment & Planning	Resolving the unknowns related to potential of gas flared, coal bed methane and land fill gas, forestry and agricultural residue resources	Yr1+ updates
	Assessment & Planning	Refining the partially known energy resources e.g. natural gas potential and in both cases exposing the market value and associated risk levels of energy investment that can attract private sector investors. Potential markets for RETS.	Yr1+ updates
	Development	Conference of donors to source funding for Implementing of the planned infrastructure investments.	Yr1+ updates
Investment and Financing	developing energy financing	Lobbying for investors through multi-stakeholder dialogue, public- private sector dialogue and partnerships to expand energy development.	Yr1+ updates
Policy	Policy development and dialogue	Policy adjustments opening regulated markets to competition and adequate pricing systems that are transparent and efficiency that can attract private sector investments.	Yr1+ updates
	Policy development and dialogue	Creating regional and sub regional standards (e.g. for renewable energy technology trading) and policies that incorporate environmental and social aspects.	Yr1 & 2
Institutions	Technical Assistance	Establishment of an Energy Think tank	Yr1
	Institutional strengthening and development	Credit financing structures particularly for the oil and gas industry.	Yr1-3
	Institutional strengthening and development	Strengthening institutions for electricity and oil and gas regulation, management of investment portfolios, pricing and capital flow rules.	Yr 1-2
	Institutional strengthening and development	Improving energy governance	Yr 1-2
Capacity	Training	Energy planners, utility regulators and energy companies on meeting the energy needs of the African continent.	Annually
	Training	Rural energy planning and environmental management & participation of women in the energy planning.	Annually
Information	Sharing	Information sharing on energy choices	Ongoing
	Energy Tools	Development of planning data, energy statistics and ICTs.	Ongoing
Monitoring and Evaluation	Systems	Development of indicators of success, Putting targets, Monitoring and evaluating system in place	Yr 1 Yr 1 End of Yr 5

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