

Responding to International Energy-Related Environmental Challenges: The Case of the African Energy Policy Research Network

*By Stephen Karekezi**

In the recent past, three important global environment initiatives have refocused attention on energy efficiency and renewables. The first was the publication of the widely-acclaimed report of the World Commission on Environment and Development chaired by Gro Harlem Brundtland of Norway.

The second important event was the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro, Brazil in 1992. At this Conference, an ambitious environment and development document entitled "Agenda 21" was endorsed by a large number of multinational companies. In addition to other objectives, Agenda 21 sought to operationalize the concept of sustainable development. The Rio Conference also provided the venue for the third important event, the signing of the United Nations Framework Convention on Climate Change (UNFCCC) by 155 Governments.

Energy efficiency and renewables feature in both Agenda 21 and the Climate Change Convention. Because of the important role of fossil fuels in the build-up of greenhouse gases and concomitant climate change concerns, renewables and energy efficiency are perceived to constitute an important option for mitigating and abating the emissions of greenhouse gases (Socolow, 1992). This issue has attracted considerable attention from industrialized countries' researchers and policymakers many of whose countries have largely managed to provide modern energy services to virtually all their inhabitants.

The above perception is, however, not fully shared by developing countries, particularly, those from Africa. In contrast to the industrialized world which is worried by the long-term global environmental impact of current patterns of energy production and use, African countries are largely preoccupied with the immediate and pressing demands for a minimum level of modern energy services for the majority of their population – many of whom have no electricity and continue to rely on inefficient and environmentally hazardous unprocessed biomass fuels.

Although the contribution of African countries to global greenhouse emissions is, on a per capita basis, much smaller than that of industrialized countries, there is growing realization that Africa is likely to be disproportionately affected by the impacts of climate change. Of particular interest is the dependence of many African countries on rain-fed agriculture which is believed to already be under threat from unpredictable weather patterns triggered by what appears to be climate change linked to the accumulation of greenhouse gases in the atmosphere. Nonetheless, the position of Africa on the climate change question is far from unanimous. During the negotiations before and after the signing of the

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Climate Change Convention, support for binding targets that would require dramatic increases in the uses of renewables and energy efficiency technologies was, at best, lukewarm on the part of oil-exporting and fossil-fuel dependent African countries such as Nigeria and South-Africa.

In industrialized countries, greater interest in energy efficiency and renewables partly stems from concern over global environmental problems but is also partly driven by a growing perception of energy as a service which moves energy sector development away from a purely supply oriented and conventional fuel-dependent strategy to one that places demand-side interventions, energy efficiency measures and renewables on an equal footing with increases in conventional energy supply. Hence the growing interest in alternative energy response measures such as demand side management (DSM), integrated resource planning (IRP), decentralized energy systems and renewables.

In general there is now a growing consensus that the role of alternative energy development approaches (encompassing renewables, energy efficiency and decentralized energy options) will grow in importance in the energy sector of industrialized countries. The acceptance of alternative energy approaches is further underlined by the diminishing use of the term "alternative" because of the growing perception that renewables, energy efficiency and decentralized energy approaches are an important option for mainstream energy sector development.

A similar consensus has not yet emerged in Africa for a variety of reasons. Alternative energy sector approaches are constrained by the limited pool of energy sector planners in Africa. The few who are available are employed by the nationalized utilities which have a strong supply-oriented culture, or work in Ministries of Energy where the unattractive remuneration packages dampen work enthusiasm and commitment. Energy sector planners outside the utilities and Ministries are rare. It is only recently that a number of NGOs and independent research institutes have started developing the capacity to evaluate and develop energy sector plans. These new agencies often operate under stringent financial constraints which limit their capacity to undertake long-term energy sector review.

NGOs and research institutes outside the government and utilities often face serious difficulties in gaining access to the requisite information and data. Information that would normally be publicly available in the developed world would either not be available or be declared confidential and proprietary material that can only be divulged to employees of the government and utilities. The advent of multi-party democracy which has ushered in greater transparency is changing the situation and access to the existing information and data is improving.

The accuracy and reliability of the available data, however, is far from satisfactory. This is particularly true of demand side data and renewable energy resource assessment which requires regular surveys. This is further compounded by the existence of an informal sector that taps the electricity sector often without appropriate documentation and outside the metering system. Comprehensive surveys that would capture this segment of the consuming sector are costly.

Finally, the most important near-term barrier to alternative energy approaches appears to be acceptance by senior energy analysts, policymakers and utility managers in Af-

rica. In this respect, the experience of the African Energy Policy Research Network (AFREPREN/FWD) in introducing energy efficiency and demand-side management issues in its research program is particularly instructive.

African Energy Policy Research Network (AFREPREN)

The AFREPREN program brings together over 90 African energy researchers and policymakers from Eastern and Southern Africa who have a long-term interest in energy research and the policymaking process. AFREPREN members include senior energy policymakers (from the level of Assistant Minister of Energy to directors of national utilities), university researchers, and NGO representatives. AFREPREN has initiated policy research studies in 18 African countries. In addition, AFREPREN maintains close collaborative links with energy researchers and policymakers from several other African countries.

The key objective of AFREPREN is to strengthen local research capacity and to harness it in the service of energy policymaking and planning. Initiated in 1989, AFREPREN is a collective regional response to the wide-spread concern over the weak link between energy research and the formulation and implementation of energy policy in Sub-Saharan Africa. AFREPREN members decide on the structure, direction and mode of operation of the Network. A Secretariat established at the offices of the Foundation for Woodstove Dissemination (FWD) in Nairobi, Kenya coordinates the research program of AFREPREN and provides the requisite administrative and technical support.

Milestones

Important achievements of the network include the following:

1. The establishment of a research network involving over 90 principal and assistant researchers from 18 countries of eastern and southern Africa. In its first, second and third phases, AFREPREN showed very encouraging signs of success, indicated by an increased impact on the region's energy policymaking process; timely submission of research reports by the overwhelming majority of researchers and, positive assessment of an independent evaluation commissioned by its principal donors in 1993.
2. The successful launching and implementation of 18 major regional research projects in the 91 subject areas of Renewable Energy Technologies, Biomass, Oil and Gas, Coal and Gasification, Institutions and Planning, and, Electricity.
3. The worldwide release of 9 major volumes on energy that brings together the summary findings of the first phase of the AFREPREN research program:
 - African Energy Issues
 - A New Environmentally-Sound Energy Strategy for the Development of Sub-Saharan Africa
 - Energy Management in Africa
 - Rural Electrification in Africa
 - Energy Options for Africa – Environmentally Sustainable Alternatives
 - Biomass Energy and Coal in Africa
 - Transport Energy in Africa

• Energy Utilities and Institutions in Africa

These nine publications constitute a major contribution to the region's energy literature and are unique in having been largely authored by local energy researchers in the region.

4. The production of over 100 research reports as well as numerous special issue papers which assess the state of art in particular research theme groups and provides guidance on research methodology.
5. Publication of 120 working papers on energy issues, Energy Country Profile reports; dossiers on energy publications, AFREPREN Library Acquisition reports; 15 newsletters, and over 20 AFREPREN Information Circulars and Updates.
6. The establishment of an AFREPREN office in Nairobi, Kenya which provides the following services to AFREPREN members: provision of logistical and management support; distribution of background documentation, and the regular publication of AFREPREN publications, newsletters, brochures and reports.
7. The organization of eight major Regional Workshops that brought together all AFREPREN principal researchers, theme editors, resource persons and observers. These Workshops provided excellent platforms for assessing the progress of research work, strengthening network coordination, facilitating the exchange of information, and increasing the impact of the policy research work of AFREPREN.
8. The organization of three special Seminars examining various aspects of the energy sector in Africa. The first was a UNEP and DANIDA-financed Meeting of African Energy and Environment Experts to prepare a *A New, Environmentally-Sound Energy Strategy for the Development of Sub-Saharan Africa*. The second Seminar was a specialized Training Seminar on *Energy Efficiency* organized in Gaborone, Botswana in conjunction with one of the main Regional Workshops. The third Seminar was a high-level African Energy and Environment Policy Seminar held in Nairobi, Kenya and which brought together over 40 African senior energy policymakers and experts from eastern, southern, central and western Africa as well as observers from Sweden, Norway and Denmark.
9. The provision of support for the formulation of a national energy policy for the newly formed Government of Zambia. AFREPREN provided instrumental financial and technical support for the preparation of background documents for Zambia's national energy policy initiative, as well as, for the organization of sector-specific national seminars.

While the above achievements appear to be substantial there are other important but less tangible achievements of the network. The first and perhaps most important benefit is a result of the unique composition of the research teams. Whenever possible, the country teams are composed of a researcher from the academic community (usually the national university or independent research agency/NGO) and a researcher from the government sector (usually the national Ministry of Energy or national energy utility).

There are now six country teams in which joint teams of policymakers and researchers undertake research projects.

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The pairing approach effectively ensures that the policymaker who is the primary target of the findings of the AFREPREN research program is involved in all aspects of the Network. In the newly launched phase of the AFREPREN research program, the pairing approach has been further strengthened. The advantage of pairing has been demonstrated in terms of the quality of research findings (compared with research projects carried out either by researchers only or by policymakers only) and linking of research work to active and ongoing policy formulation and implementation. At least seven countries (Angola, Ethiopia, Kenya, Mauritius, Sudan, Uganda and Zambia) have recorded implementation of the results of the research project. In the 1995-1997 phase of the AFREPREN, the number of country pairings has been increased to further replicate the successful pairing strategy.

The second important benefit realized by AFREPREN is the extent to which the research program has contributed to local institutional development. AFREPREN was formulated and is now coordinated and managed by local researchers who have a long-term interest in local energy issues. At least six of the country research teams have established independent energy policy centers in Botswana, Kenya, Mozambique, Uganda, Zambia and Zimbabwe. Another important benefit is the opportunity that the network provides to key energy policymakers and researchers to address long-term policy issues that are rarely given the required level of attention.

Between 1987 and 1994, the AFREPREN program has implemented research projects around six major energy themes, namely: Renewable Energy Technologies (RETs), Electricity, Biomass Energy, Coal and Gasification, Institutions & Planning, Oil and Gas.

Ensuring Greater Emphasis on Environment and Related Energy Efficiency Issues

As shown above, the AFREPREN research program was, until 1994, organized along supply-side lines. At the fourth Workshop of AFREPREN, concern was raised with respect to the continued focus on energy supply emphasized by the supply themes of the current AFREPREN research program. While renewables were perceived to be adequately addressed by the AFREPREN research program, some network members stressed that environment and demand-side issues have not received the expected level of attention and successfully argued that the potential for energy efficiency had not been sufficiently examined by the AFREPREN research program.

To address the energy and environment nexus and related energy efficiency issues, AFREPREN requested two of its members, Stephen Karekezi and Ogunlade Davidson to prepare a special strategy document to address this gap in the AFREPREN research program. The document was entitled: "A New, Environmentally-Sound Energy Strategy for the Development of Sub-Saharan Africa." In this document, major recommendations were made with respect to the need for energy efficiency and demand-side management interventions in the energy sector of the region. The document stated that energy efficiency/DSM measures provide the opportunity of using energy savings to supply more consumers with no added adverse environmental effects. To promote

energy efficiency, the document urged the implementation of, *inter alia*, the following measures:

1. Encourage the development and establishment of energy service companies in the public and private sectors. Activities of these companies should include promotion, testing, manufacture and marketing of energy efficient technologies and implementation of energy efficiency/DSM programs.
2. Support R&D efforts in energy efficiency/DSM and establish mechanisms for accessing information on available energy efficient technologies such as, improved cookstoves, efficient electrical household appliances and lighting systems, efficient electrical motors, and energy conscious architecture. Special attention should be placed on the development of new methodological tools and innovative approaches for technology adaptation and modification.
3. Develop national energy efficiency/DSM packages which provide performance data and relevant technical specifications of known technologies. These packages should be designed to assist policymakers, entrepreneurs, researchers and end-users in selecting appropriate energy efficient technologies and formulating feasible energy standards. In addition, the packages should include information on known practices such as basic retrofitting, housekeeping measures and more complex management and public education techniques for reducing energy consumption.

In the main, the options outlined above received broad support within the AFREPREN network but there was some residual skepticism arising from two negative perceptions:

1. A tendency to perceive the growing interest in global environmental issues and related energy efficiency/DSM as a transitory fad in the North that like other fads of the past (renewables, biomass and integrated national energy planning) will yield few tangible benefits and, more importantly, may take resources away from ongoing and planned energy initiatives aimed at meeting urgent and pressing problems faced by the region's energy sector.
2. A lingering suspicion that the emphasis on environmental conditionality and energy efficiency/DSM may be the leading edge of a hidden agenda aimed at denying the region its fair share of the world's dwindling resources of fossil fuels. This was reinforced by existing data showing that Africa's per capita consumption of commercial energy was the lowest in the world (World Bank, 1992) and that the bulk of petroleum production was destined for export markets in the industrialized world rather than internal consumption.

Convincing the skeptical minority within AFREPREN of the viability and utility of giving greater prominence to demand-side issues and environment was an uphill task which holds important lessons for ongoing and planned energy efficiency/DSM initiatives in the region (for example the regional energy efficiency program of the Southern African Development Community, SADC). Within the skeptical minority, the pragmatists were the first to turn around on the issue of DSM. As expected and as explained below, the rationale was not altruistic.

1. The pragmatists realized that the region is, more than ever, dependent on external donor agencies for its development and, in certain cases, for its survival. The energy sector is under the same pressure. Within donor circles, an emphasis on demand-side issues, energy efficiency and environment is now a must. AFREPREN, like other energy initiatives on the continent, has to accommodate the new thinking, which in any case is highly beneficial to the region's future development.
2. It also dawned on the pragmatists that an emphasis on DSM and end-user oriented methodologies and techniques for incorporating environmental factors in energy development will assist in equipping the region's policymakers with the necessary skills to negotiate with the energy efficiency experts and assorted consultants who are already descending on the region in increasing numbers. DSM, energy efficiency and global environment issues are, in some respects, the latest fads and the region's policymakers need to be able to separate the sound ideas from the frivolous and unnecessary exercises. Otherwise, past errors associated with past fads (integrated energy planning, renewables and, biomass energy) may be repeated.
3. The pragmatists also realized that end-user oriented strategies provide the region with the opportunity to reduce the high capital and investment cost and environmental problems associated with a purely supply-side approach.

Eventually, the rest of the skeptical minority became supportive of demand-side and environment issues because of the following reasons:

1. A demand-side and environmental perspective requires close collaboration with end-users and thus ensures participation – a key to development; another important spin-off in that it operationalizes an integrated approach to development.
2. By moving away from a purely supply-oriented approach, the demand-side perspective ensures that *management and organization* are at the center of energy policy debate. This is particularly important to the African region where the energy sector is characterized by mismanagement and disorganization.

To strengthen the understanding of the above issues, AFREPREN organized a special training workshop on energy efficiency/DSM and environment in early 1992. Consequently, the third phase of the AFREPREN research program placed greater emphasis on environment and energy efficiency/demand side issues with all the projects making a determined effort to take account of environmental concerns. In addition, two projects focused on two important energy-related environmental issues, namely, indoor air pollution and greenhouse gas emissions.

As a response to its members' call for more emphasis on environment and energy efficiency/demand side dimensions of the region's energy sector, AFREPREN has reoriented its new research program along the following six major cluster of issues:

- *Local and Regional Environmental Impacts of Energy:* Examining both existing and projected impact of the energy sector on the local and regional environments and designing cost-effective measures of mitigating potentially negative

impacts of energy production, transformation and use.

- *Energy and Climate Change:* Assessing the policy implications of the United Nations Framework Convention on Climate Change and developing realistic and practical negotiating as well as implementation options for the African energy community. Researchers in this theme are examining options for mitigating greenhouse gas emissions in the transport sector.
- *Management and Efficiency:* Design and assessment of techniques for improved management and increased efficiency of existing energy assets with specific reference to the power sector and stimulation of power exports and imports in the region.
- *Institutions:* Formulation of innovative institutional initiatives that promote equitable access to energy services; special attention to be focused on the opportunities and pitfalls inherent in the current emphasis on privatization and deregulation of the power sector in the region.
- *Capacity Building and Technology:* Addressing the challenge of capacity building for effective energy policy formulation, analysis and implementation with specific reference to the development of appropriate human resource development, training, and technology acquisition programs for the energy sector.
- *Finance and Markets:* Financing energy investments in Sub-Saharan Africa through the identification of practical ways of securing external financial resources and mobilizing local savings and markets on terms that are not inimicable to the interests of the region and equity aspirations of the region.

Several important lessons that the above experience teaches and that would be of interest to other developing countries are:

- The initial reaction to the introduction of global environment and related response options such as energy efficiency/demand side issues in the energy sector is more often-than-not skeptical.
- Changing the above perspective is not an event but a process that is long-term. In addition, initially emphasis should be placed on showing the tangible and short-term benefits that accrue from initiating energy activities that are end-user oriented and environmentally sound. In effect, greater stress needs to be placed on outlining the "win-win", "no-regrets" and "revenue neutral" options (e.g., reduce import bills while reducing greenhouse gas emissions through improvement in transportation efficiency.) This provides an important incentive that engenders early enthusiasm and support and lays the foundation for developing partnerships that will ensure long-term participation and commitment.
- Whenever possible, environment and related response options such as energy efficiency/DSM should be introduced in existing and ongoing energy programs to minimize disruptions and ensure rapid acceptance.
- Regular and frequent training in energy-related environmental problems as well as appropriate response options such as energy efficiency/DSM is a vital requirement and should be a central component of all energy initiatives in Africa.