

Capacity Building for Sustainable Energy Development and Poverty Alleviation in Sub-Saharan Africa – the Contribution of AFREPREN

About AFREPREN

African Energy Policy Research Network & Foundation for Woodstoves (AFREPREN/FWD) is an African initiative on energy, environment and sustainable development. AFREPREN/FWD brings together 97 African energy researchers and policy makers who have a long-term interest in energy research and the attendant policy-making process. AFREPREN/FWD has initiated policy research studies in 19 African countries, namely: Angola, Botswana, Burundi, Eritrea, Ethiopia, Kenya, Lesotho, Malawi, Mauritius, Mozambique, Rwanda, Seychelles, Somalia, South Africa, Sudan, Tanzania, Uganda, Zambia and Zimbabwe.

AFREPREN/FWD's ultimate goal is to promote the greater use of cleaner energy options such as renewables for poverty alleviation in Africa. The near-term objective of AFREPREN/FWD is to strengthen local research capacity and to harness it in the service of energy policy making and planning. Initiated in 1987, AFREPREN is a collective regional response to the widespread concern over the weak link between energy research and the formulation and implementation of energy policy in Africa.

Since its initiation, AFREPREN has successfully implemented over 90 research projects involving 234 African researchers and policy makers in 19 countries of Eastern and Southern Africa and forged collaborative links with West, Central and North African energy researchers and policy makers. Findings of the research undertaken by AFREPREN have been published in 13 major publications, one Energy Policy special issue journal, 24 Occasional Papers, 37 journal articles, 23 book chapters and over 300 Working Papers. Since 1987, AFREPREN has had an ongoing major research programme on renewables.

The current phase due to end in 2004 also has a major programme on renewables. Entitled “**Renewables and Energy for Rural Development**” the programme is examining options for the provision of modern energy services to low-income rural areas of Africa with special emphasis on the commercial/services/productive uses of energy.

Other ongoing major programmes of AFREPREN include:

- Energy Services for the Urban Poor
- Energy Sector Reform
- Special Studies of Strategic Significance for the Energy Sector in Eastern and Southern Africa (ESA)

Additional information on these programmes is available on the AFREPREN website (www.afrepren.org).

AFREPREN's Renewable Energy Research Programmes

As mentioned earlier, AFREPREN has undertaken extensive research work on renewables in all the research phases running from 1987. The past research phases examined the fundamentals of renewable energy technologies, and the status of their dissemination in selected African countries.

In the ongoing research phase of 1999–2004, one of the core research theme groups was titled “Renewables and Energy for Rural Development”. The theme-group objective is to identify options for the provision of renewable and sustainable energy services to low-income rural areas of Africa with special emphasis on commercial/ service/ productive use of energy.



Stephen Karekezi
GNESD/AFREPREN/FWD
Director (Kenya)
Stephenk@africaonline.co.ke



Waeni Kithyoma
GNESD/AFREPREN/FWD
Secretariat (Kenya)
afrepren@africaonline.co.ke

Objectives of the Theme group

- Analysing the impact of current renewables and rural energy policies.
- Assessing current rural household and community energy practices and technologies.
- Reviewing rural income generating activities and energy technologies used.
- Establishing what is hindering the removal of identified barriers in the dissemination of renewable energy technologies (e. g. absence of rural entrepreneurs, funding mechanisms, capacity building and policy).
- Assessing the gender dimension of renewables and rural energy.

Key Research Issues

- Impact of the government and utilities policies, programmes and institutional framework on the provision of renewables to rural areas.
- Analysis of existing decentralised private sector energy production and distribution activities in rural areas.
- Comparative analysis of renewables and rural energy use in rural areas.
- Analysis of components for promoting the production and deployment of renewables and rural energy by private entrepreneurs.
- Gender sensitivity of government and utilities’ policies and programmes on the provision of renewables and rural energy for domestic use and for income generating activities.
- Gender analysis of energy practices in rural households and energy use in rural income generating activities.
- Impact of the gender derived and gender driven power relations at the household and community levels in the use of modern energy.

Based on the above research work, AFREPREN has over the years published a wide range of journal articles, research reports, working papers, occasional papers and major publications on renewables. These publications are distributed widely to energy sector stakeholders in Africa, as well as other parts of the world. The objective of these publications is to inform decision makers in policy making. Some of the key publications on renewables published by AFREPREN are provided in Annex 1.

AFREPREN’s Energy Training and Capacity Building Programme

The number of African energy policy analysts has grown in the last few years as a result of training programs and capacity building initiatives of various training institutes, development programs and networks such as the African Energy Policy Research Network (AFREPREN). The supply of skilled energy policy analysts is, however, still insufficient. This is partially due to the difficulties faced by formal education institutions in Africa. African policy analysts have identified important constraints facing formal energy education in Africa. Key problems include the following:

- A high attrition rate of senior and experienced staff from institutions of higher learning due to the erosion of teaching and research conditions;
- Inadequate remuneration for the academic and supporting staff;
- Lack of funds for research, conference attendance and institutional attachment;
- Inadequacy in the provision of external examiners and opportunities within these institutions for staff exchanges; and
- Scarcity of funds for the purchase of textbooks, journals and equipment.

AFREPREN’s training and capacity building program is designed to assist capacity building in the region and to address the above shortfalls by building on the substantial expertise and information that AFREPREN has developed over the last 10 years. AFREPREN has built substantial expertise in energy policy analysis as well as published a large body of literature on African energy issues. It has published 11 major books and over 200 Working Papers on the African energy sector as well as a diskette set and CD-ROM on African energy issues. AFREPREN has also established a substantial library of over 20,000 documents, books and journal articles covering various energy issues. It also has access to a wide range of diskettes, CD-ROMs, audiotapes and videos on energy issues. With links to over 100 African energy experts and numerous international energy agencies and experts, AFREPREN is well placed to assist in training and strengthening up

coming African energy professionals in energy policy analysis skills.

AFREPREN runs the following key training and capacity building programmes:

Masters Program:

- Support for MSc or MA research studies on energy policy
- Support for MSc or MA in energy policy subjects

In future, AFREPREN plans to launch a joint AFREPREN/Universities MSc/MA training programme in Africa.

To date, a total of 15 scholarships have been offered to candidates from Eastern and Southern Africa.

Regional Short Term Training Courses:

- Short-Courses for energy policy makers
- Research Techniques and Methodology Workshops
- IT Workshops

A total of six courses have been undertaken in the 1999–2004 research phase, and about 80 African energy researchers and stakeholders have participate in these courses.

Regional/National Policy Seminars:

Regional and national events organised by the AFREPREN Secretariat and the national focal points in AFREPREN member countries. The main objective is to disseminate research findings to national policy makers and researchers. In the 1999–2004 research phase, over 25 national and regional policy seminars have been organised in AFREPREN member countries.

The training and capacity building programmes mentioned above cover a wide range of energy subjects including renewable energy. The next section describes AFREPREN's renewable energy programmes and contribution to the international conference on renewables held in Bonn, June 1–4, 2004.



Figure 1
East and Horn of Africa: Ethiopia, Kenya, Uganda and Tanzania

Contribution to the International Conference on Renewable Energies

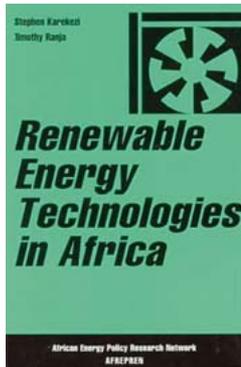
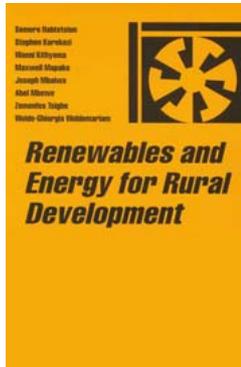
AFREPREN, with support from Sida/SAREC and the Heinrich Böll Foundation, organised a side event titled: 'What are the Benefits of Renewables in Africa?' This side event, the only one with a dedicated focus on Africa, was organised to present the findings of the study on Renewables in East and Horn of Africa, which is coordinated by AFREPREN with funding from the Heinrich Böll Foundation office for East and Horn of Africa. Approximately 50–80 people attended the side event, drawn from different geographical regions and institutional affiliations. The bulk of participants, were, however, Africans.

The study was launched by AFREPREN and HBF (Regional Office for East and Horn of Africa) and its main objectives were:

- To examine the viability of 10% renewables target proposed at the Johannesburg WSSD Summit in selected African Countries
- To assess the benefits and drawbacks of the 10% renewables target in Eastern Africa

The study was undertaken in four countries: Kenya, Uganda, Tanzania and Ethiopia (Fig. 1). In parallel to the country studies, a regional study was also prepared. The study also included national level consultations in the four countries,

AFREPREN’s Renewable Energy Title Series:



as well as regional consensus building and brainstorming on the regions’ priorities for renewables.

One of the key outcomes of the study was the dissemination of information on renewables to policy makers in the four East and Horn of African countries participating in the study. In addition, renewable energy technologies that have a direct impact on poverty alleviation were also highlighted, and are beginning to receive attention from policy makers in the region.

Contribution to the International Action Plan – Renewables 2004 Conference

AFREPREN in conjunction with the Heinrich Böll Foundation, Regional Office for East and Horn of Africa, submitted a commitment, which was included in the International Action Plan. The International Action Plan was one of the major outcomes of the Renewables 2004 conference, and is a compilation of voluntary actions from governments, international bodies, NGOs, national and regional institutions.

The Action plan submitted by AFREPREN and HBF has a strong focus on the dissemination of small and medium scale renewables, which can alleviate poverty. The objective of the action is to develop a prioritized listing of small and medium scale renewables and cleaner energy options suitable for poverty alleviation in Africa that can be implemented in the region.

A growing number of experts within the AFREPREN Network believe that these technologies would have the greatest impact on alleviating poverty and enhancing economic development in sub-Saharan Africa. AFREPREN will continue to promote these technologies, and undertake research studies and assessments, which can be used to lobby policy makers and other stakeholders.

Other Contributions

AFREPREN participated in the conference plenary sessions, namely:

- (i) Multi-stakeholder Dialogue
- (ii) preparation of a summary for one of the conference ministerial sessions
- (iii) participation in the Science Forum.

Annex 1: AFREPREN’s Renewable Energy Title Series

Renewables and Energy for Rural Development in sub-Saharan Africa

Edited by Maxwell Mapako and Abel Mbewe (2004)

Energy supply is a key factor in economic and social development, but too little attention has been given to the needs of rural households, farmers and small businesses. Rural households in sub-Saharan Africa still derive most of their energy from biomass sources. Lack of modern energy supplies in rural areas constrains efforts to alleviate poverty and improve living standards. *Renewables and Energy for Rural Development in sub-Saharan Africa* addresses this situation.

The original research contained in this volume identifies the options for the provision of modern and improved energy services based on renewables to low-income rural areas, with special emphasis on the productive uses of energy. In the five countries represented – Botswana, Eritrea, Ethiopia, Zambia and Zimbabwe – the volume focuses on whether a decentralized approach to energy delivery is better than more centralized provision, the role of income-generating activities in attracting modern energy services to rural areas, and the barriers as well as opportunities that exist in the promotion of renewable energy technologies in the rural areas of sub-saharan Africa. This latest volume is a further contribution to addressing the practical energy needs of sub-Saharan Africa.

Renewable Energy Technologies in Africa

Stephen Karekezi and Timothy Ranja (1997)

The energy sector is widely acclaimed as the heart and lungs of any programme for economic development. At the same time, energy at household level and in the rural areas is essential for everyday life. Renewable energy technologies can play a major role in both respects. This book sums up across the whole of Eastern (including the Horn) and Southern Africa (including South Africa itself) what is now

known about the innovation and deployment of renewable energy technologies in the region.

Successive chapters deal with bio-energy, solar and wind energy and small hydro technologies. The authors examine the African energy sector's overall geo-political and socio-economic setting as well as specific non-technological factors that impinge on renewable energy development, namely: financing, institutional structures for energy management, human resource development, equity and access, and environmental considerations. The book, which concludes with a special section on policy recommendation, provides an essential text for training a new generation of African energy specialists.

Energy Options for Africa: Environmentally Sustainable Alternatives.

Edited by S. Karekezi and Gordon Mackenzie. (1993).

As African economies seek to recover from what is commonly now described as the 'lost' decade of the 1980s, energy policy has become a crucial component in the region's industrial, transport and environment strategies, and in meeting household fuel needs.

This volume is a guide to policy makers and development agencies for determining environmentally sound energy options and priorities for the region. The contributors – leading energy and environment specialists from Botswana, Ethiopia, Ghana, Kenya, Nigeria, Senegal, Sierra Leone, Sudan and Uganda – identify the key requisites for such development: innovative policy instruments and institutions, and incorporation of environmental costing; mobilization of both local and external financial resources; management training and technology acquisition; energy efficiency; increased supply of environmentally benign modern fuels and energy technologies.

Energy for Rural Development.

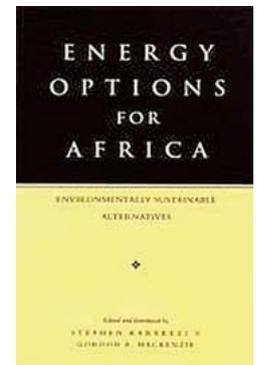
Edited and Introduced by M.R. Bhagavan and S. Karekezi. (1992).

This book contains essays presented at a United Nations Meeting of Experts on the Role of New

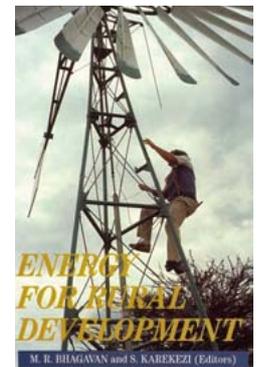
and Rural Development. With an introductory essay by the Swedish-based energy policy analyst Dr. M.R. Bhagavan and the Kenya Based Facilitator of the African Energy Policy Research Network (AFREPREN) Stephen Karekezi, the volume comprises national and regional studies examining the technological, economic, political, social issues concerned with energy for rural development, raising questions on productivity, income, institutions, local participation, information and assessment of resources and technologies. The studies relate to the rural situations in sub-Saharan Africa, North Africa, North Africa and the Middle East, South and East Asia, Central America and the Caribbean Eastern Europe and the Soviet Union. Each study is written either by local energy specialists and academics or by experts associated with the United Nations and its Agencies.

Annex 2: AFREPREN Journal's Articles on Renewables, Rural Energy And Poverty

- [1] "Domestic Use Versus Income Generating Activities in Delivering Modern Energy to Rural Botswana." Joseph Mbaiwa and Oganne D. Gontse in Journal of Energy, Published by JESA. February 2004.
- [2] "Electricity from Bagasse in Zimbabwe". Charles Mbohwa and Shuichi Fukuda. In Biomass and Bioenergy Journal, Vol. 25, No. 2 Published by Elsevier Science Limited, Oxford, United Kingdom, December 2002.
- [3] "Bagasse Energy Cogeneration Potential in the Zimbabwean Sugar Industry". Charles Mbohwa. In Renewable Energy, Vol. 28 Published by Elsevier Science Limited, Oxford, United Kingdom, 2002.
- [4] "Bagasse Energy Cogeneration in Zimbabwe: The Technology, Possible Improvements and Setting the Right Environment." Charles Mbohwa and Shuichi Fukuda. In The Proceedings of the Zimbabwe Institution of Engineers. Published by the Zimbabwe Institution of Engineers, 2002.



Energy Options for Africa



Energy for Rural Development

- [5] "Gender Compliance with Technological Innovation for the Improved Charcoal Stove in Uganda". Joan Kyokutamba. In *Renewable Energy*, Published by Elsevier Science Limited, Oxford, United Kingdom, 2002.
- [7] "An Assessment of Policies and Programmes Designed for the Production and Distribution of Modern Renewable Energy to Rural Areas in Botswana". Joseph E. Mbaiwa. In *Renewable Energy*, Published by Elsevier Science Limited, Oxford, United Kingdom, 2002.
- [8] "Energy, Gender and Poverty Issues and their Linkages with Energy Policy and Planning". Abel Mbewe. In *Renewable Energy*, Published by Elsevier Science Limited, Oxford, United Kingdom, 2002.
- [9] "Rural Energy Access: Promoting Solar Home Systems in Rural Areas in Zambia – A Case Study". Oscar Kalumiana. In *Renewable Energy*, Published by Elsevier Science Limited, Oxford, United Kingdom, 2002.
- [9] "The Potentials of Wind Energy Applications in Eritrea". Semere Habtetsion. In *Renewable Energy*, Published by Elsevier Science Limited, Oxford, United Kingdom, 2002.
- [10] "The Case for De-Emphasizing PV in Renewable Energy Strategies for Rural Africa". Stephen Karekezi. In *Renewable Energy*, Published by Elsevier Science Limited, Oxford, United Kingdom, 2002.
- [11] "Renewable Energy Options for a Developing Country: The Case of Ethiopia". W. Wolde-Ghiorgis. In *Renewable Energy*, Published by Elsevier Science Limited, Oxford, United Kingdom, 2002.
- [12] "Poverty and Energy in Africa – A Brief Review". Stephen Karekezi. In *Energy Policy*, Volume 30, Nos. 11-12. Published by Elsevier Science Limited, Oxford, United Kingdom, 2002.
- [13] "Renewables in Africa – Meeting the Energy Needs of the Poor". Stephen Karekezi. In *Energy Policy*, Volume 30, Nos. 11-12. Published by Elsevier Science Limited, Oxford, United Kingdom, 2002.
- [14] "Renewable Energy Strategies for Rural Africa: Is a PV-Led Renewable Energy Strategy the Right Approach for Providing Modern Energy to the Rural Poor of Sub-Saharan Africa?" Stephen Karekezi and Waeni Kithyoma. In *Energy Policy*, Volume 30, Nos. 11-12. Published by Elsevier Science Limited, Oxford, United Kingdom, 2002.
- [15] "Disseminating Windpumps in Rural Kenya – Meeting Rural Water Needs using Locally Manufactured Windpumps". Mike Harries. In *Energy Policy*, Volume 30, Nos. 11-12. Published by Elsevier Science Limited, Oxford, United Kingdom, 2002.
- [16] "Renewable Energy for Rural Development in Ethiopia: The Case for New Energy Policies and Institutional Reform". W. Wolde-Ghiorgis. In *Energy Policy*, Volume 30, Nos. 11-12. Published by Elsevier Science Limited, Oxford, United Kingdom, 2002.
- [17] "The Energy Sector in Eritrea – Institutional and Polity Options for Improving Rural Energy Services". Semere Habtetsion and Zemenfes Tsighe. In *Energy Policy*, Volume 30, Nos. 11-12. Published by Elsevier Science Limited, Oxford, United Kingdom, 2002.
- [18] "The Impact of Large Renewable Energy Development on the Poor: Environmental and Socio-Economic Impact of a Geothermal Power Plant on a Poor Rural Community in Kenya". Nicholas Mariita. In *Energy Policy*, Volume 30, Nos. 11-12. Published by Elsevier Science Limited, Oxford, United Kingdom, 2002.

- [19] "Promoting Equity in Large-Scale Renewable Energy Development: The Case of Mauritius". Kassiap Deepchand. In *Energy Policy*, Volume 30, Nos. 11-12. Published by Elsevier Science Limited, Oxford, United Kingdom, 2002.
- [20] "Commercial Scale Cogeneration of Bagasse Energy in Mauritius". Kassiap Deepchand. In *Energy for Sustainable Development*, Vol. V, No. 1. Published by International Energy Initiative Inc., Bangalore, India, March 2001.
- [21] "PV for Rural Areas - The Power Utility (ZESA) Zimbabwe's Experience". Ikhupuleng Dube. In *Renewable Energy*, 2001. Published by Elsevier Science Limited, Oxford, United Kingdom, 2001.
- [22] "Disseminating Renewable Energy Technologies in Sub-Saharan Africa". Stephen Karekezi. In *Annual Review of Energy and the Environment*, Volume 19, Palo Alto, California, 1994.
- [23] "Smoke in the Kitchen". Stephen Karekezi and Patience Turyareeba. In *Boiling Point* No. 34, September 1994.
- [24] "The KCJ - From Artisan to Factory". Stephen Karekezi and Dominic Walubengo. In *Boiling Point* No.31, August 1993.
- No. 4 Energy for Rural Development in Zimbabwe – Proceedings of a National Policy Seminar
M. Mapako (ed)
- No. 6 Energy for Rural Development in Zambia – Proceedings of a National Policy Seminar
L. Chandi, A. Mbewe & C. Mulenga (eds)
- No. 9 Energy for Rural Development in Eritrea – Proceedings of a National Policy Seminar
S. Habtetsion and Z. Tsighe (eds)
- No. 10 Renewable Energy Technologies in Africa – An Energy Training Course Handbook
S. Karekezi, W. Kithyoma & L. Majoro (eds)
- No. 11 Energy for Rural Development in Ethiopia – Proceedings of a National Policy Seminar
M. Teferra (ed)
- No. 12 The Socio-Economic and Environmental Impact of Geothermal Energy on the Rural Poor in Kenya
N. Mariita
- No. 19 Cogeneration in Zimbabwe – A Utility Perspective
B. Batidzirai

Annex 3: AFREPREN's Occasional Papers on Renewables:

- No. 1 AFREPREN Regional Policy Seminar on Renewables – Focus: Cogeneration
S. Karekezi, J. Kimani and J. Wangeci (eds)
- No. 2 Bagasse-Based Cogeneration in Mauritius – A Model for Eastern and Southern Africa
Kassiap Deepchand
- No. 3 Energy for Rural Development in Botswana – Proceedings of a National Policy Seminar
B. Mogotsi & S. Bok (eds)
- No. 21 Opportunities for Cogeneration in a Reforming African Power Sector
Kassiap Deepchand (ed)
- No. 22 Renewables and Rural Energy Development in Botswana: Proceedings of a National Energy Policy Seminar
J. Mbaiwa (ed)
- No. 24 The Potential Contribution of Renewables in Ethiopia's Energy Sector: An Analysis of Geothermal and Cogeneration Technologies
Prof. W. Wolde-Ghiorgis

Copies of the Occasional Papers and abstracts of the journal articles can be downloaded from the AFREPREN Website (www.afrepren.org).

For a printed version of any of the publications,
please contact the AFREPREN Secretariat at:

AFREPREN/FWD House,
Elgeyo Marakwet Road
P.O. Box 30979, 00100 GPO
Nairobi, Kenya
Phone: + 254-20-566032, 571467, 573714,
560403
Fax: +254-20-561464, 566231, 3740524
Email : afrepren@africaonline.co.ke
Website : www.afrepren.org