Scaling up Modern Energy Services in East Africa

To alleviate poverty and meet the Millennium Development Goals

Draft document for endorsement
by EAC Energy Ministers

July 2005

Support for the energy scale up initiative

The United Nations Development Programme (UNDP) and the Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) have supported this initiative. The two institutions are at the forefront globally in the East Africa region and globally in supporting and promoting the agenda of scaling up access to modern energy services to meet the Millennium Development Goals.

UNDP puts high priority on facilitating increased access to modern energy services and has energy/poverty activities in 90% of the countries in which it operates. UNDP contributed funding to this energy scale up initiative with resources made available through the Global Village Energy Partnership (GVEP), which has programmes in Kenya, Uganda and Tanzania.

GTZ has a long-standing commitment to implementing projects in African countries on behalf of the German government. The supported projects are aimed at reducing poverty by linking energy activities to other relevant sectors, enhancing private sector engagement and developing local capacities. GTZ is one of the leading institutions in the dissemination of renewable energy and energy efficiency.

UNDP and GTZ are open to continue to support the follow up development and implementation of this strategy, pending endorsement by the East African Community (EAC) Energy Ministers.

UNDP

gtz

Deutsche Gesellschaft
für Technische Zusammenarbeit

Cover photo: Hydro power scheme, Mbuiru Village, Kenya, implemented by Intermediate Technology Development Group/ Ministry of Energy. (Photo: Zul)

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Introduction

Objective of the regional services scale up initiative

The objective of this initiative is to scale up energy services in East Africa to support the Millennium Development Goals (MDGs). The strategy focuses on rapid implementation at country level of high-impact, low-cost, scaleable (HILCS) energy interventions demonstrated to alleviate poverty. It is a first step towards ensuring that energy is integrated into the national development planning and poverty reduction strategies, with Energy Ministers working with their sectoral counterparts to ensure adequate energy input in planning, agriculture, health and education.

The key objective of the regional energy scale up strategy is to maximize activities, opportunities and investments in targeted areas to support the MDGs. The first step in the strategy is to secure a political recognition and endorsement to scale up energy access in the region. This document provides evidence that argues for a regional scale up initiative, together with some of the technical interventions possible with rough costing and indicators of impacts.

Analyses show that in all EAC countries with HILCS energy options, the energy services of 48 million people (about 50% of the region's population) could be improved leading up to 2015. This would require estimated investments of USD 1.4 billion.

Consideration of this document marks the decision point for Ministers – whether to engage in the next step of a process that will lead to a more detailed regional energy scale up strategy, an implementation framework, and a follow-up programme supported by the donors.

On the basis of an endorsement by Ministers to proceed with a regional energy scale up agenda, this document will form the foundation for coordinating the energy scale up agenda with the Forum of Energy Ministers of Africa (FEMA). Representation of this initiative will be sought at the 2005 World Summit at the UN General Assembly in New York, 14-16 September. The initiative will also be linked with Country Reports being prepared for the Commission on Sustainable Development in 2006 and 2007.

Draft strategy background

At the December 2004 Energy for Development (E4D) Conference in the Netherlands, the Energy Ministers of Kenya, Uganda, Tanzania, Rwanda and South Africa began a dialogue on energy access issues. The Ministers were motivated to tackle the need and urgency of scaling up energy services to the urban and rural poor outside the 'business-as-usual' approach, and to benefit from sharing thoughts, experience and practice in moving forward.

The Ministers asked the United Nations Development Programme (UNDP) to facilitate a continuation of this dialogue as a follow up to the International Conference for Renewable Energies, Bonn, and the E4D, within the general framework of access to modern energy services. UNDP subsequently proposed the formation of a core group of partners to facilitate the regional scale up strategy. This core group will continue to work together to develop, design, implement and coordinate a regional framework and strategy.

The East African region comprises four countries: Republics of Kenya, Uganda, Rwanda and the United Republic of Tanzania. Kenya, Uganda and Tanzania have formed a cooperation framework under the East African Community (EAC) treaty, which is working towards a political union. Rwanda, which will shortly join the EAC, is included as an observer member of the regional grouping and is usually invited as an observer in EAC summit meetings.

This regional strategy includes the four countries, but is not necessarily limited to this grouping. Malawi has indicated interest to engage in a regional dialogue and there are clear signals that other countries will follow suit. The principle of a focused and pragmatic approach to this strategy will guide its design and implementation, including which countries are to be eventually included in the initiative.

An analytical framework for scale up

All 191 United Nations member states have pledged to meet the MDGs by 2015. The goals are quantified targets for addressing extreme poverty in its many dimensions while promoting gender equality, education, health, and environmental sustainability. Although the provision of adequate, affordable and reliable energy services is not one of the goals, it is a prerequisite if the MDGs are to be achieved. (For an overview the MDG targets and their energy linkages, see Annex 1.)

It is clear that if the MDGs are to be achieved, the 'business-as-usual' approach is inadequate to provide the energy services in health, education, agriculture and other sectors needed to meet the goals. A significant and rapid scale up of these energy services is necessary. There is a growing body of experience and evidence on how to approach an MDGs-based energy access and scale up. This is derived in large measure from the work of the UN Millennium Project, managed by the Earth Institute at Columbia University in conjunction with UNDP collaborative initiatives.

2 Energy targets for 2015

A recently released paper[1] commissioned by the Millennium Project recommends energy targets for each country to be achieved by the year 2015. They are meant to be part of a vision rather than targets that represent necessary or sufficient prerequisites for meeting the MDGs:

Target 1: Enable the use of modern fuels for 50% of those who at present use traditional biomass for cooking. Support efforts to develop and adopt the use of improved cook-stoves, means to reduce indoor air pollution, and measures to increase sustainable biomass production.

Target 2: Access to reliable modern energy services for all urban and peri-urban poor.

Target 3: Electricity for services such as lighting, refrigeration, information and communication technology, and water treatment and supply for all schools, clinics, hospitals and community centres.

Target 4: Access to mechanical power within the community for all communities for productive uses.

The underlying assumption is that these targets can be met with an approach that has **high impact, low cost** and is **scaleable**. This approach is referred to as the **HILCS framework**. The elements of this approach serve as the analytical framework for the regional scale up strategy.

Using these targets, the analytical framework in developing the regional energy scale up strategy consists of addressing four questions:

- Which energy services to scale up?
- What it will cost?
- What will the benefits be?
- How are these energy services to be delivered?

With respect to *which* energy services and their costs and impacts, it is important to distinguish between energy services and energy technologies. Energy services refer to the benefits produced by using energy supplies. These services can be generated from a variety of primary energy sources – oil, gas, coal and renewables. They can be delivered by different energy carriers and systems for energy transformation and transportation, ending with delivery of energy services. Such services include lighting, heating, cooking, motive power, mechanical power, transport and telecommunications.

[1] Modi, V. 2005, *Energy services for the poor,* Earth Institute and Department of Mechanical Engineering, Columbia University. A draft version is available on the web www.columbia.edu/cu/mechanical/modi/MDPpaper.pdf

Fuels used traditionally by the poor – fuelwood, charcoal, local coal and kerosene in urban areas; fuelwood, crop residues and dung in rural areas – provide few and low-quality energy services, such as basic heating for cooking and limited quality lighting. By contrast, good-quality heating and lighting, electricity and modern fuels – natural gas, liquefied petroleum gas and modern biomass fuels such as ethanol, biodiesel and methanol – provide mechanical power for agro-processing, refrigeration for clinics, motive power for transport, and telecommunications for education and public awareness.

Energy services are ultimately associated with the energy technologies that provide them. This document reviews the demands for specific energy services within the region and proposes an array of technologies that have high impact in meeting these demands, are low cost to implement, and can be readily scaled up. Estimates are also made of the costs and impacts of these energy interventions.

The fourth and critical question, 'How are these energy services to be delivered?' would be addressed following an endorsement by EAC Energy Ministers of the regional scale up initiative. It is recommended that a regional support programme be mounted to refine the regional strategy and develop an implementation framework that would nominally consist of:

- Establishing appropriate regional networks, institutional arrangements, and institutional capacity to address the scale up agenda.
- Raising awareness at the regional level.
- Mobilizing political and regional institutional support.

Energy scale up in the EAC

Applied to the conditions of East Africa, the four targets address the immediate needs of the poor who constitute the vast majority of the region's population. This regional energy scale up initiative centres on the rapid implementation of high impact, low-cost energy interventions with attendant impacts on poverty reduction.

By meeting the four energy targets for 2015, the East African countries — within the HILCS framework — will provide improved energy access for about 50% (48 million people) of the region's population. By concentrating on high-impact, low-cost options this can be achieved at investments of USD 1.4 billion, which is low compared to conventional supply-side investments.

Reaching these targets through national level implementation can be strongly supported by a regional dimension that provides added value to national efforts in terms of political dynamics, financial leverage, possible economies of scale, technical support, capacity building, networking, information sharing and knowledge management. Broadly speaking, a scale up strategy would:

- Address the energy policy, planning and budgeting context at the national level.
- Develop a framework for implementing technical interventions to meet energy goals.

Policy, planning and budgeting

The implementation of a scale up strategy will ultimately require a national commitment reflected in the national level policy, planning and budgeting processes, best captured by each country's Poverty Reduction Strategy Papers (PRSPs). These papers form the basis for the broad development agenda for poverty eradication throughout the Eastern Africa sub-region. Public financing from both domestic resources and official development assistance, combined with private entrepreneurship and investment, are needed to develop energy services for the poor.

The public sector will remain an important – and often the main – source of financing for investment over the medium term for the energy sector where the country or regulatory risk deters private investors. Public sector resources will remain crucial for investing in energy service delivery for the poorest groups and marginal areas due to private sector perception of risk, even within reformed markets.[2]

As a result, addressing the PRSPs and how they can be adjusted to better reflect the required energy inputs, forms one part of a scale up strategy. Analyses of PRSPs examine the energy profile to determine to what extent the different types of demands for energy are being financed. To meet the full energy requirements of the MDGs, two complementary approaches need to be adopted:

- Developing large-scale infrastructure work and the associated large-scale investments to meet the energy requirements for urban, industrial and commercial applications.
- Implementing community level, decentralized approaches better suited to meeting energy demands of the poor in particular, who still rely on biomass as their primary source of energy.

A review of the PRSPs indicate that where energy is included in national planning, the focus is entirely on the first component of large-scale infrastructure, to the exclusion of the providing energy access at the community level targeted at the poor. Existing country strategies emphasize grid extension to improve services in education, health, water and agriculture sectors and to spur economic growth. While the strategies set clear targets for grid-based electrification, they do not set any targets for energy services from sources other than the grid. Huge investments in large power generation facilities and grid electrification have been made in the past, but have had minimal benefits for a majority of the poor.

More capital-intensive, infrastructure-oriented energy investments will be crucial to eventually meet the MDGs. However, this option will obviously require a longer lead time for extensive planning, resource mobilization and implementation before any benefits of increased access to modern energy services are realized.

The modest costs and significant benefits of HILCS energy interventions indicate that there should be a refocusing of priorities and investment to accelerate the delivery of services to the poor and to meet the MDGs. This regional energy scale up initiative constitutes a cost-effective component of an energy strategy that captures by far the greatest gains in meeting the MDGs.

For a summary of the key PRSP priorities targeting the achievement of MDGs by country see Annex 2.

Energy interventions

The choice of the necessary technical interventions and the design of an implementation framework will be undertaken by assessing:

- Energy services relevant to achieving the MDGs.
- Energy gaps that will be addressed in EAC countries.
- Constraints and opportunities for scaling up activities.
- Impacts, costs and scale up potentials of different energy options.

This will lead to the prioritization of key areas and favourable energy interventions in each country, as well as recommendations for the necessary actions to implement scale up projects.

Motive power for productive uses (Photo: UNDP)

[2] *The Energy Challenge for Achieving the Millennium Development Goals*, UN-Energy, New York, July 2005.

Which energy services to scale up in EAC countries?

The East African region has a population of close to 100 million people and is characterized by high poverty levels. The majority of people depend on land husbandry, often at subsistence levels. Their energy sources are derived mainly from traditional biomass consisting of fuelwood, charcoal and agricultural waste, which contribute to more than 70% of the region's energy mix. Household cooking and heating constitute the largest energy demand.

Modern energy sources such as electricity or liquefied petroleum gas (LPG) are available only for to a few urban centres and economic structures, with the majority of the poor excluded. Currently, less than 5% of East Africa's rural population and 40% of its urban population (12% overall), are connected to the grid.

East Africa's economies are largely driven by agriculture and small enterprise, characterized by infrequent use of motive energy, and consequently, low levels of energy consumption. This makes it less attractive for private enterprises to offer services in this sector. Access to modern energy services such as electricity or motive power, coupled with private sector development and improved financing schemes for the poor, could trigger increased productive use of energy to generate additional income and begin lifting millions out of poverty.

The situation today

Women and girls are disproportionately burdened by lack of access to modern fuels and electricity because they are responsible for fuel gathering, cooking and food preparation. In addition to the time spent gathering fuels, most traditional staple foods involve a large amount of threshing, husking or grinding, which is mostly done by female labour in the poorest households and regions due to lack of access to mechanical power. They also suffer considerable damage to their health, especially respiratory diseases from indoor air pollution, by having to cook indoors on poorly vented stoves. Many girls are withdrawn from school to attend to such domestic chores, resulting in lifelong damage to their literacy and economic opportunities. As a result, energy services such as heat for cooking and power for food processing are particularly important for women and girls.

With an estimated 92% of households in the region using biomass for cooking, more than 40% of the population is exposed to indoor air pollution, which causes acute respiratory infections, pulmonary tuberculosis and especially an increase in infant and prenatal mortality. An estimated 500,000 people die each year because of exposure to indoor air pollution in Sub-Saharan Africa. A progressive shift to cleaner liquid and gaseous fuels is an essential and cost-effective prerequisite to meeting a portion of the national targets for the MDGs relating to health.

Table 1: Basic patterns of energy consumption in EAC countries

	Population (million)			Energy consumption		Electrification	
	Total	Urban	Rural	Biomass	Modern	Urban	Rural
Kenya	31.9	10.5	21.4	70%	30%	46%	4%
Rwanda	8.1	0.5	7.6	90%	10%	48%	1%
Tanzania	36.5	12.0	24.5	90%	10%	38%	2%
Uganda	24.4	3.0	21.4	93%	7%	8%	1%
Total EAC	**100.9**	**26.0**	**74.9**	**92%**	**8%**	**40%**	**5%**

Due to EAC's increasing population and inefficient use of traditional biomass fuels, forests and woodlands are rapidly disappearing. In Tanzania, for example, 40 million m^3 of wood are used every year, while the sustainable yield is estimated to be only 24 million m^3 annually. However, modern fuels such as Liquified Petroleum Gas (LPG) cannot compete economically with traditional biomass. Without a more efficient use of biomass and incentives to shift to modern fuels, the 'firewood gap' will increase and each year will contribute to a more critical environmental situation.

Although consumption of modern energy is extremely low in poor households, the expenditures for energy are relatively higher than in non-poor households. For example, in Tanzania an average poor household spends 35% of its income on energy, basically for kerosene lighting and charcoal. A more efficient energy use can reduce these expenditures so that the income can be invested in more productive activities.

Many schools in remote locations in East Africa do not have access to adequate lighting, let alone the power needed to run computers. Access to modern forms of energy services invariably improves the quality of learning and can even reduce child dropout rates. Health centres cannot offer vital medical services without modern cooling systems and medical equipment, which require electricity. Without modern lighting, many community centres cannot be used in the evening, hindering the social development of villages and communities.

Constraints to scaling up

Critical gaps and constraints to scaling up energy services include:

Insufficient institutional capacity to develop clear, cost-effective and feasible implementation strategies targeting poverty reduction. This includes inadequate capacity for analyses, planning, implementation, monitoring and evaluation of energy supply and end use, and impacts on poverty and growth. Realistic and informed policy development and planning at the national level is impeded by incomplete or non-existent data, which affects the defining of goals and targets, as well as achieving and monitoring results. Global data on consumption is available but detailed information regarding demographic resource distribution, consumption intensities, patterns and trends, especially in rural areas, is unavailable.

Lack of general awareness about energy issues, lack of planning mechanisms, and lack of a strategy to effectively address the MDG goals through better delivery of modern energy services for productive sectors, such as health, water and education.

Inadequate available financing at several levels. This includes the necessary allocations from national budgets (as reflected in the PRSPs); non-engagement of the private sector due to few business opportunities designed for energy-poverty reduction and perceived high risk; and inadequate and unresponsive micro-credit and consumer financing for individuals and institutions.

Poor donor coordination results in a lack of strategic interventions to fill the gap between financing needs and availability for investments in energy supply capacity.

Opportunities for scaling up

There are many opportunities to launch scale up activities now, particularly given the dynamics of international support together with the MDGs discussion, but also experiences and structures to build on. These include:

Demand for modern energy services in households and in the education, health, water and agricultural sectors by an estimated 80 million people still using traditional biomass stoves, as well as poor conversion technologies for service delivery, market transformation, product improvement and trade and environment.

High potential of locally available energy sources, such as hydro, solar, geothermal and wind energy.

Woman collecting wood in arid zone (Photo: UNDP)

PRSPs can be strengthened by Ministers to offer more appropriate institutional arrangements, leading to better inter-sectoral coordination and greater impacts.

Ongoing political initiatives such as the restructuring of the power sector, the implementation of a power master plan for East Africa, and the creation of Rural Energy Agencies in Tanzania.

Existing or past initiatives in each country targeting energy services across various sectors, providing best practices examples, technical knowledge and organizational experience to implement sustainable projects, especially in the efficient use of biomass.

Success stories show that there are tested, proven, cost-effective methods of increasing access to energy services with measurable benefits that contribute to achieving the MDGs targets. Replicable and scalable African success stories targeting improved services to achieve the MDGs include the distribution of LPG in Senegal, electrification programmes in Tunisia and South Africa, and Multifunctional Platforms (MFP) in Mali.

Ongoing donor support for rural energy projects in EAC countries, such as support to mini-hydro development in Tanzania (NORAD), the Rural Energy Transformation Programme (World Bank) in Uganda, the Energy Advisory Project (GTZ) in Uganda, the European Union Energy Initiative (EUEI), and the Global Village Energy Partnership (GVEP) programmes in Kenya, Uganda and Tanzania.

Opportunity to leverage resources given the potential changing perspectives internationally, particularly the adoption of the Millennium Development Goals as the accepted basis of rapid economic and social development. Africa is increasingly on the international agenda, as evidenced by the recent G8 commitment to double the flow of aid to Africa.

Options for HILCS interventions in the region

Traditionally, investments in energy services have been concentrated on large centralized power production facilities distributed through national grid systems. These types of services are either too expensive or physically out of range for the majority of the poor in East Africa. As a result, more than 85% of people living in the EAC region have no access to modern energy services or the attendant benefits of social services, such as health and education.

A variety of enhanced energy access initiatives targeting rural and urban development have been implemented, or are being implemented, in Africa and the sub-region with varied successes. In EAC countries, successes were achieved by distributing improved stoves in urban and peri-urban areas. However, these successes have not been necessarily aligned to the MDGs agenda or focused on scale up potential and opportunities.

On the basis of the four target energy services, national and regional energy experts – supported by senior officials from the energy ministries of each of the four countries – recently identified a number of technologies that match the high impact, low cost, scaleable profile. These include:

- Modern biomass.
- Improved cook stoves in combination with smoke hoods.
- Liquefied petroleum gas (LPG).
- Grid electricity.
- Multifunctional platforms (MFP).
- Mini-hydro.

This shortlist of technologies is not exclusive and does not preclude other high-potential possibilities such as solar, wind and biogas from being adopted as part of a scale up strategy. For the moment, these technologies have initial investment costs that create an immediate barrier to their widespread adoption. They can, however, readily serve a niche market where other technologies are not feasible or economic, and may become more competitive with a changing technology and pricing environment.

Cost and impacts of HILCS

A key component of the planning process is to identify regions and sectors where energy services have high impact on poverty alleviation at a low cost. It is necessary to include all available energy options, develop criteria to evaluate their impact according to the MDGs and national development plans, and estimate the costs involved for their dissemination. (The costing per country for the various energy interventions is in Annex 3.) In preparing this strategy, country reviews were undertaken to look at HILCS options under the specific parameters of each country. With respect to population distribution, the demand for services versus availability and quality of existing services was reviewed for all sectors of the economy, together with the availability of natural resources and country experiences. The options outlined in Table 2 were analyzed in each country, identifying the scale up potential and the costs of addressing the MDG targets.

Analyses show that in all EAC countries with HILCS energy options, the energy services of 48 million people (about 50% of the region's population) could be improved by 2015. This would require estimated investments of USD 1.4 billion. The potential projects listed in Annex 3 demonstrate that:

- In **Rwanda**, increasing adoption of improved cook stoves at a cost of USD 6.4 million will benefit more than 3 million, through reduced firewood consumption and improved indoor air quality.
- In **Uganda**, connecting 460,000 urban households to electricity would cost USD 138 million and improve the quality of life of 2.3 million people.

Table 2: Impact, cost and potential of energy options in EAC

HILCS option	Impact	Estimated cost per capita (USD)	Scale up potential in EAC	Risks
Improved stoves for rural areas	Less time for wood collection, reduced indoor pollution, protection of natural resources	5-10	High	So far no success story known in EAC
Improved stoves for urban areas	Reduced energy expenses, reduced indoor pollution, protection of natural resources	5-10	Medium	None identified
Biomass substitution by LPG or other fuels	Reduced indoor pollution, protection of natural resources	7-15	High	Extended subsidies may be required
Water pumping systems	Improved health, increased income from agriculture	25	Depends on geographical parameters	Insufficient wind data
Decentralized electrification of schools, hospitals, communal centres	Improved learning, lower drop-out rates in schools, improved medical services	25	Medium	None identified
Multifunctional platforms (MFP) (diesel, grid, mini-hydro)	Increased production and income generation	25	High	No experiences in EAC, organizational capacity required
Electrification of urban/peri-urban households (grid connection and increased uptake)	Better lighting and communication, opportunities for productive use	60	High	Increase in energy expenses, low productive use
Electrification of community centres (mini-grids, grid extension)	Better lighting and communication, opportunities for productive use	50-70	High	Increase in energy expenses, low productive use

- In **Tanzania**, improved charcoal stoves in urban areas would cost USD 2.75 million, leading to reduced consumption and bringing improved health benefits to 2.7 million people.
- In **Kenya**, increasing the consumption of LPG would cost USD 46 million and result in cleaner fuel and improved health for 400,000 households.

Prioritizing HILCS options for each country

Interventions with high costs do not necessarily have the highest impact meeting the MDGs. It is the task of the national energy policymakers, together with other key stakeholders such as the private sector, rural communities, NGOs and research institutions, to build a consensus – based on this analysis –

about which priority areas should be targeted for interventions and to develop sustainable schemes for implementation. This process includes:

- Developing adequate institutional arrangements.
- Building up the necessary institutional capacity to implement the identified scale up options on national level.
- Raising the profile of the energy access agenda at the regional and international levels.
- Mobilizing political, institutional and financial support for implementation.

Table 3 gives an overview of selected options to meet MDGs as prioritized by country during a meeting of national Energy Ministries and regional energy experts at a regional workshop held in Nairobi 25-26 June 2005.

Table 3: Selected options to meet MDGs by country

Target	Kenya	Uganda	Rwanda	Tanzania
Use of improved stoves and modern fuels for 50% of households	Improved firewood and charcoal stoves Biogas in rural areas (for cooking and lighting) Increased production of biomass	Improved charcoal stoves Improved charcoal kilns Increased production of biomass	Improved charcoal kilns Increased production of biomass Improved charcoal and firewood stoves Increased use of peat	Improved firewood and charcoal stoves Biogas in rural areas (for cooking and lighting) Improved charcoal kilns
Modern energy services for all urban and peri-urban poor	LPG distribution in urban areas Co-generation for sugar industry Grid connection	LPG distribution in urban areas Grid connection	LPG and kerosene distribution in urban areas Grid connection	LPG distribution in urban areas
Electricity for services and motive power for communities	Mini-hydro for community services including water pumping	Mini-hydro for community and productive uses, water pumping	Mini-hydro for community and productive uses	Mini-hydro for community services including water pumping Windmills for water pumping

Selling improved wood stoves (Photo: GTZ)

Implementation framework

The regional dimension adds value to national efforts in terms of political dynamics, financial leverage, possible economies of scale, technical support, capacity building, networking, information sharing and knowledge management. How these elements are harnessed for rapid implementation of a scale up strategy are central to the question, 'How are energy services to be delivered?'

One of the main purposes of the 2 August 2005 Energy Ministers meeting in Kampala, beyond endorsing the strategy in principle, is discussion of the implementation framework, and particularly the institutional framework to support the implementation of the regional strategy.

To date, the following participants are involved:

- EAC countries.
- Energy Ministers, who have so far taken the lead.
- Staff of Energy Ministries, who have tentatively endorsed the strategy.
- The EAC, which emphasizes economic cooperation and development with a strong focus on the social dimension. It is nominally designated as a leading regional institution to facilitate this regional initiative.
- Two lead donors, UNDP and German Development Cooperation.

Scaling up energy services will require the inclusion of other participants/stakeholders in the short term, with a high priority on:

- Other government ministries because of cross-sectoral implications with reference to national PRSPs.
- Other donors to coordinate existing and proposed programmes and opportunities, and assist in financing.
- Private sector stakeholders.
- Other processes, such as the Millennium Project, the European Union Energy Initiative, and the Global Village Energy Partnership, which share common goals to increase energy access to enhance economic and social development and reduce poverty.

Other key stakeholders, such as NGOs, communities and civil society organizations in general, need to be included in the design and implementation of a regional strategy at the earliest opportunity.

Conclusions

This document offers broad suggestions for possible energy service interventions, their costs and their impacts. An endorsement in principle of a regional energy scale up initiative from EAC Energy Ministers is an important first step towards developing an implementation framework for delivery of high-impact, low-cost, scalable energy services to help alleviate poverty and meet the MDGs.

A Ministerial endorsement marks the beginning of the next phase: to define the process and further develop the regional strategy and the implementation framework, including the institutional framework, for moving forward.

East African countries must begin implementing energy interventions to improve the access to modern energy for the poor. This strategy shows that, with limited resources, a large part of the population can benefit if high-impact, low-cost energy options are implemented. Regional and historical development trends show that the MDGs will not be achieved within the prescribed timescale without substantial scale up of energy inputs that target the poor.

To meet development goals, improved energy access must be discussed simultaneously with other key issues such as economic productivity, gender equality, education and health. There is a need to ensure that energy considerations are properly addressed in broader development strategies through review of policy, institutional and regulatory frameworks, technical capacity development and appropriate financing mechanisms.

The vicious cycle of low income leading to low energy consumption and therefore limiting the offer of modern energy services can only be interrupted by stimulating a more productive use of energy. To supply poor rural and peri-urban regions with electricity and motive power is not enough: people must be educated about how to use energy to add value to their products and services.

Many energy interventions have failed due to technical, social and organizational problems. The interventions in EAC should focus on energy options that are easy to implement, involving local capacity and low operational costs. If energy interventions do not help to generate additional income, they should not increase the already high energy expenses of poor households.

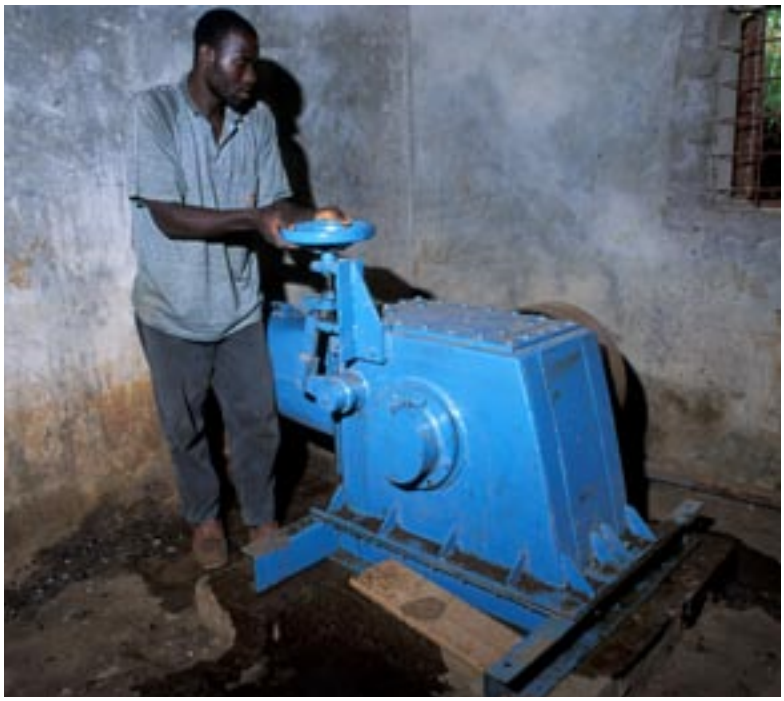
African woman using Liquefied Petroleum Gas (courtesy of WLPGA)

Recommendations

1 EAC Energy Ministers endorse a significant increase in access to modern energy services within the HILCS framework for the purposes of meeting the Millennium Development Goals, pending the development of a detailed regional strategy and implementation framework. It is understood that this approach is complementary and does not supplant other energy programmes and initiatives being taken at the national and regional levels.

2 EAC Ministers agree to further develop a more detailed and accurate regional strategy and implementation framework with the understanding that UNDP and the German government are open to leading the support for a follow-up to this meeting, including assisting the further development of the regional strategy and implementation framework, and supporting a regional programme aimed at the rapid assessment and implementation of HILCS energy interventions in partnership with national governments.

3 The regional scale up strategy will be developed and coordinated within existing regional and global initiatives, notably the Forum of Energy Ministers of Africa (FEMA), the Millennium Summit 14-16 September 2005 and the Commission on Sustainable Development in 2006 and 2007. It is also understood that implementation and delivery is primarily at the national level, supported by a regional framework.



Hydro power scheme, Mbuiru Village, Kenya, Implemented by Intermediate Technology Development Group/ Ministry of Energy (Photo: Zul)

Annex 1: Energy and MDG linkages

MDG target	Energy linkages
1. Eradicate extreme poverty and hunger	Energy inputs such as electricity and fuels are essential for creating jobs, industrial activities, transportation, commerce, micro-enterprises and agriculture. To meet human nutritional needs, almost all staple foods must be cooked, which requires heat and fuels.
2. Achieve universal primary education	To attract teachers to rural areas, electricity is needed for schools, and children need illumination after dusk to be able to study. Many children, especially girls, do not attend primary school as they must collect wood and water to meet family subsistence needs.
3. Promote gender equality and empower women	Adult women spend a large part of their day cooking and collecting water and fuelwood, which leaves them with little time for other productive activities. Without modern fuels and stoves, and a lack of mechanical power for food processing and transportation, women often remain tied to drudgery.
4. Reduce child mortality	Disease caused by lack of clean boiled water, and respiratory illness caused by the effects of indoor air pollution from traditional fuels and stoves, directly contribute to infant and child disease and mortality.
5. Improve maternal health	Lack of electricity in health clinics, poor illumination for nighttime deliveries, and the daily drudgery and physical burden of fuel collection and transport, all contribute to poor maternal health conditions, especially in rural areas.
6. Combat HIV/AIDS, malaria and other diseases	Electricity is needed for radio and television, which can spread important public health information to combat deadly diseases. Health care facilities require electricity and the services that it provides (illumination, refrigeration, sterilization, etc.) to deliver safe, effective services.
7. Ensure environmental sustainability	Energy production, distribution and consumption can contribute to indoor air pollution, local particulates, land degradation, acid rain, and global warming. Cleaner energy systems are needed to address all of these issues to contribute to environmental sustainability.
8. Develop a global partnership for development	The World Summit for Sustainable Development (WSSD) 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.

Annex 2: MDG energy highlights in PRSPs

Country	MDG energy highlights
Kenya	Main sources of energy: wood fuel 70%; petroleum 21%; electricity 9%. Overall electrification 15% (Urban, 46%, rural, 4%). **Specific objectives of Kenya's PRSPs are to:** • Implement urgent measures to minimize the effect of power crises on the economy by exploring the opportunities for increased power imports and domestic production • Ensure adequate supply of energy to stimulate economic growth • Undertake investment in energy potential areas by boosting power accessibility to rural areas • Diversify energy resources • Reduce dependence on imported petroleum products **Key actions to address provision and access to energy include:** • Strengthening the Rural Electrification Programme, which will in turn expand rural electrification and distribution network • Increasing private sector participation in power generation, transmission and distribution • Exploring grid-interconnection with East, Central and Southern Africa • Speeding up the implementation of all planned generating plant • Exploring the possibility of using alternative sources of power including the exploitation of coal deposits and wind energy
Rwanda	Main sources of energy: wood fuel 90%; others (electricity/petroleum) 10%. Overall electrification 5%. **Key actions to address energy supply include:** • Increase the energy supply to meet demand • Improve access to energy • Identify rational use of energy resources • Promote rural access to affordable and sustainable energy • Improve the energy sector management/ governance • Mitigate environmental, health and safety impacts of energy production and use
Tanzania	**Interventions to increase energy access include:** • Strengthened institution arrangement for rural energy development • Contribution of solar, wind, biomass and coal for electricity generation increased from the current 0.5% in 2003 to 3% percent by June 2010 • At least 10% of the population using alternatives to wood fuels for cooking by 2010
Uganda	Main sources of energy: wood fuel, 97%, petroleum, 21%, and electricity, 9%. Overall electrification, 15% (Urban, 8%, rural, 1%). **Key actions to address energy supply include**: • Widen access to energy through rural electrification targeting 10% by 2012) • Short- and long-term hydro development through public and private sector • Investment will be led by the private sector • Commercially viable tariffs will be established • Subsidize provision of infrastructure for rural electrification to reduce costs for rural users

Annex 3: Costs and scale up potential of different HILCS options in EAC

The following tables present the cost estimates by country for each target. The cost estimates indicate that the HILCS (high impact, low cost, scaleable) options can be implemented with moderate investments and have significant impacts. The following should be noted:

- Grid extensions in rural areas are assumed to be within a maximum of 10 km from existing distribution lines.
- Use of improved biomass stoves reduces fuel consumption by up to 70%. Smoke hoods reduce indoor air by up to 62%.
- Corresponding programmes to increase biomass production and management will be essential to ensure sustainable supply of biomass.
- MFPs can be diesel, micro-hydro or electricity driven.

Table 3.1: Rwanda

Target	HILCS option	Unit cost (USD)	Total cost (USD million)	Scale up potential (beneficiaries)	Impact
1	Increasing adoption of improved cook stoves	10	6.4	> 3,000,000	Reduced firewood consumption and improved indoor air More employment opportunities for artisans
2	Increasing LPG distribution and consumption in urban centers	80	1	75,000	Reduced indoor air pollution
3 & 4	Mini-hydro systems (> 50KW)	250,000	4	75,000	Improved health care, education and income
	Mini-hydro systems (> 25KW)	125,000	1.25	28,000	Develop 10 sites to provide power for health care and schools and for productive activities including grain milling and shops, hence improving welfare and income of 28,000 people

Grid extension is a high priority HILCS option in Rwanda, but the current power shortage makes it unattractive.

Table 3.2: Uganda

Target	HILCS option	Unit cost (USD)	Total cost (USD million)	Scale Up potential (beneficiaries)	Impact
1	Increasing use of improved stoves and smoke hood	10	5	2,500,000	Reduced firewood consumption with economic and health benefits
2	Connecting 460,000 urban households to electricity	300	138	2,300,000	Better quality energy services such as lighting, communication and productive use
	Increasing consumption of LPG	38	2.4	3,000,000	Reduced indoor air pollution
3 & 4	Grid connection (within 10 km of existing transmission and distribution lines)	140,000	140	10,200,000	Improved health services especially in maternity, laboratory services, and improved performance in rural schools More opportunities for existing and new small enterprises to generate incomes
	Diesel MFP (20 kW)	32,000	49	1,500,000	1500 communities benefit: grinding mill will reduce drudgery, especially for women Water pump will improve access to safe water

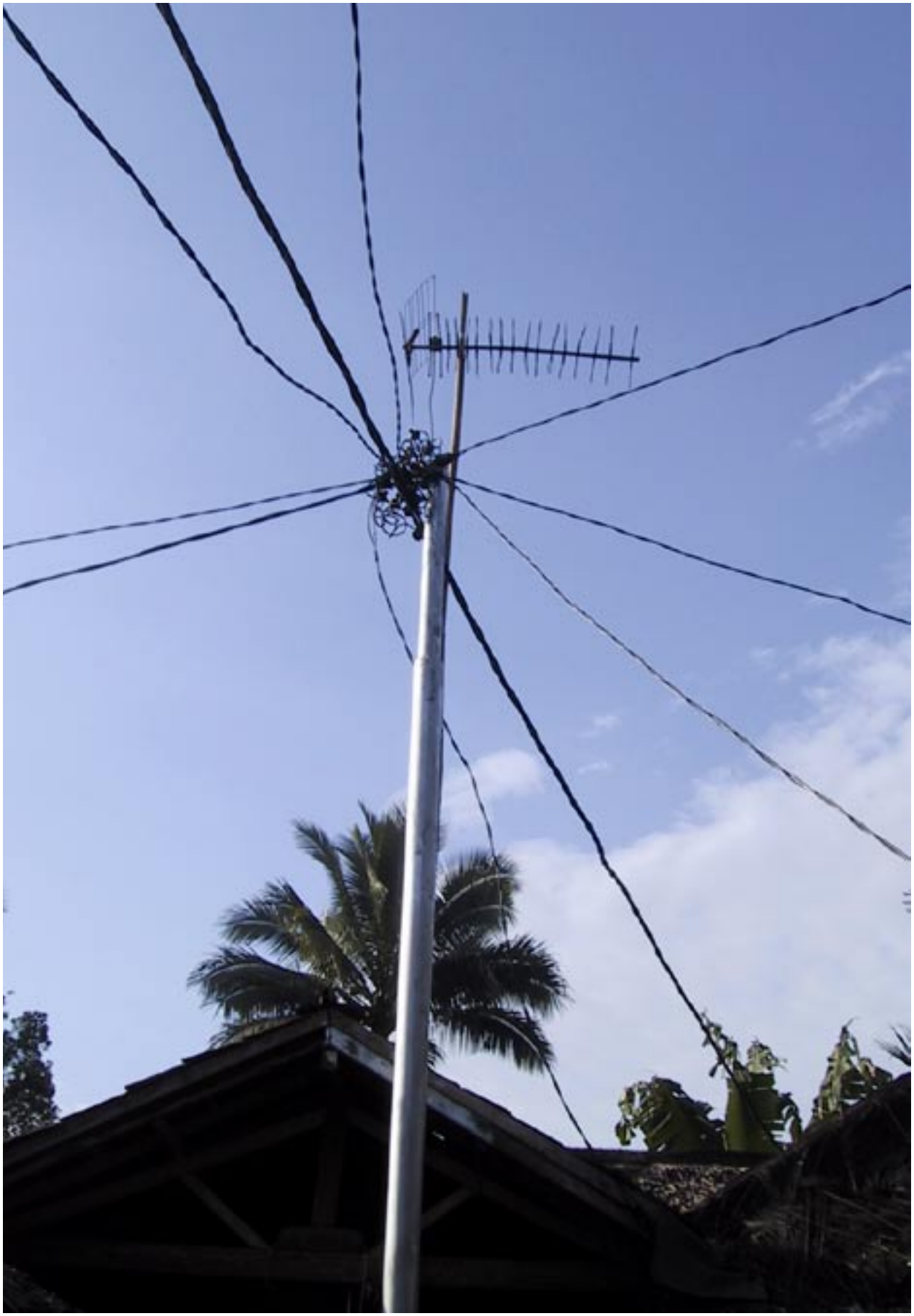
Micro-hydro as a HILCS option offers a huge potential in Uganda. However, data on the number and capacities of potential sites is not available, hence costing cannot be done.

Table 3.3: Tanzania

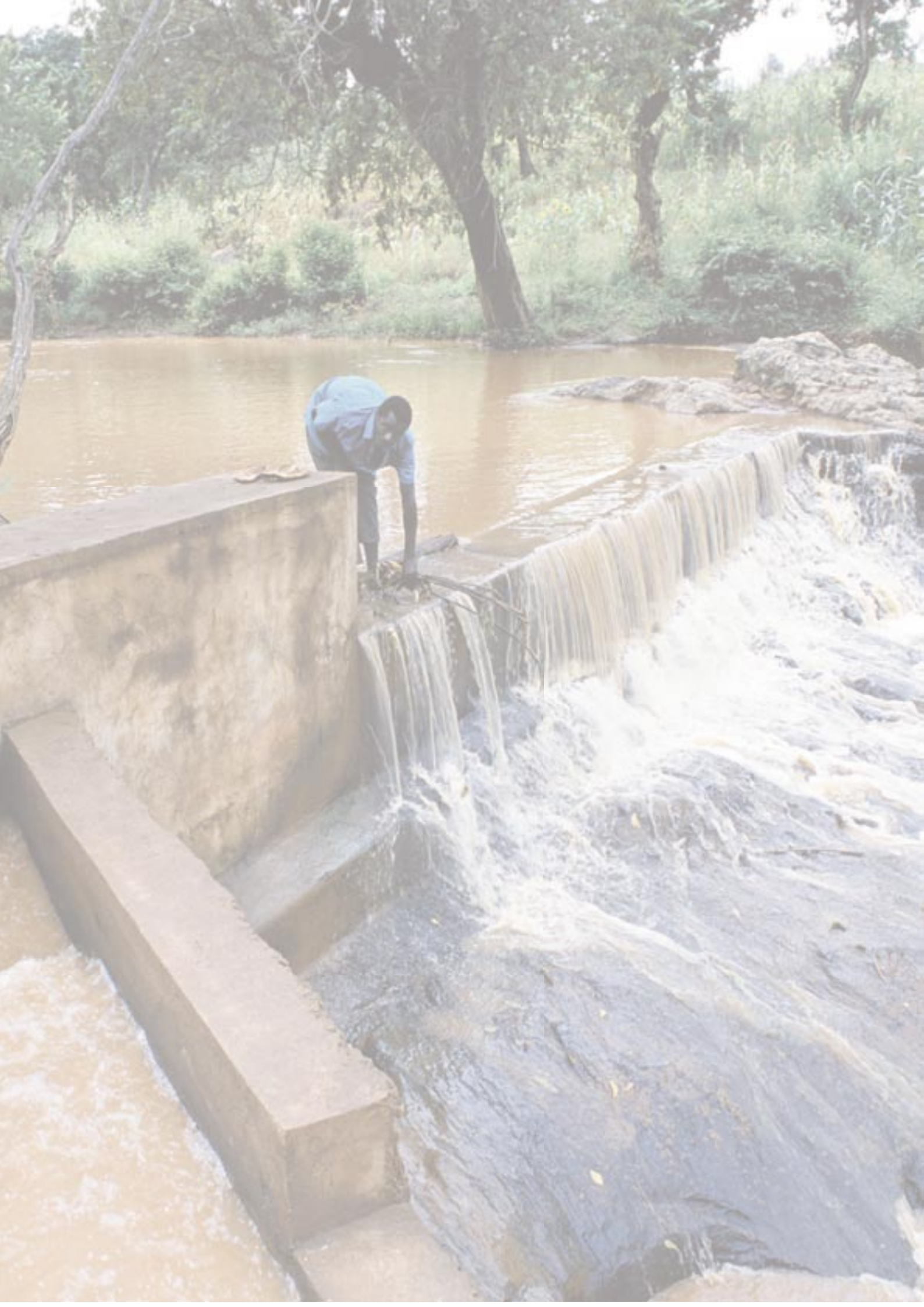
Target	HILCS option	Unit cost (USD)	Total cost (USD million)	Scale up potential (beneficiaries)	Impact
1	Improved firewood stoves for rural areas	10	27	13,500,000	Reduced firewood consumption in 2.7 million rural households
2	Improved charcoal stoves in urban areas	5	2.75	2,750,000	Reduced charcoal consumption urban population
	Grid connection to households in urban area	300	570	9,500,000	Increased electricity access to 1.9 million households
3 & 4	Multifunctional platforms (MFPs)	15,000	60	4,000,000	4,000 villages will benefit from this service, reducing drudgery for women and adding value to their activities
	Windmills	25,000	25	1,000,000	Develop windmills in the dry areas to help pumping water for income earning activities like irrigation schemes
	Small hydro	60,000	1.2	20,000	Develop 20 sites, the power generated will be used for productive activities and hence generate income to the target population, and improve living their standard

Table 3.4: Kenya

Target	HILCS option	Unit cost (USD)	Total cost (USD million)	Scale up potential (beneficiaries)	Impact
1	Increasing use of improved stoves and smoke hood	7	4	2,500,000	Improved health and cost savings for 500,000 households
	Increasing consumption of LPG	80	46	2,000,000	Cleaner fuel and improved health for 400,000 additional households
3	Micro hydro systems (>30kW)	90,000	10	100,000	Access to mechanical power to 100 communities for health, education, agriculture, etc.
3 & 4	Grid connections (within 10 km of existing grid)	1,000	245	2,285,000	457,000 new connections
	Bagasse Cogeneration (25MW)	3 million	75	200,000	Increased grid access to 40 communities in the sugar belt



Rural grid distribution. (Photo: GTZ)



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