Delivery Mechanisms for Rural Electrification

Monica Gullberg, Elisabeth Ilskog, Anders Arvidson, Maneno Katyega

SEI Climate and Energy Programme Report 2004-01

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Delivery Mechanisms for Rural Electrification

A report from a workshop held in Bagamoyo, Tanzania 29–30 October 2003

A workshop report prepared as part of the project "Information dissemination on energy and environment in developing countries"

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Preface

Many countries in Southern and Eastern Africa are undergoing a re-organisation of their respective energy sectors as a part of energy sector reforms. In this process, the responsibility for rural electrification is often shifted from national electricity utilities to rural electrification agencies that have recently been formed or are in the process of being formed. The thinking and debating about how these new organisations can best assist in facilitating rural development is ongoing and strategies are under development. For example, what tools and criteria are to be used in prioritising between different public investments in rural electrification and how should the financial support be channelled? Should a public agency provide technical and other support to private investors? Which delivery mechanisms for providing rural areas with electricity services are working in the region and what are the conditions that make them work and contribute to rural development?

Some of the answers lie in exchanging experiences being made in the different countries in Eastern and Southern Africa who in many ways share similar conditions. A workshop on "Delivery Mechanisms for Rural Electrification" which is reported here provided such a forum to exchange experience across countries in Eastern and Southern Africa.

The workshop was held in Bagamoyo, Tanzania, 28-29 October 2003. The organisation was a joint effort between SEI, ÅF and AFREPREN. As organisers we would like to express our sincere gratitude to all the presenters and participants for making valuable contributions to the success of the workshop.

We would also like to thank the Swedish Development Cooperation Agency (Sida) for funding the workshop.

We thank Björn Kjellström for comments on a draft report. Nevertheless, we are solely responsible for any remaining errors and omissions.

Executive Summary

A two-day workshop was organised by the Stockholm Environment Institute (SEI), Ångpanneföreningen (ÅF) and the African Energy Policy Research Network (AFREPREN) in Bagamoyo, Tanzania, 29-30 October 2003, on the topic Delivery Mechanisms for Rural Electrification. The workshop was attended by 28 participants from Kenya, Mozambique South Africa, Sweden, Tanzania, Uganda, Zambia and Zimbabwe, representing energy service providers (private, public and cooperative), consumer groups, public energy authorities, researchers, consultants, NGOs and the Swedish International Development Cooperation Agency (Sida).

The topic of the workshop was how different types of electricity delivery mechanisms – i.e. the combination of an energy supply technology and the organisation managing it – can support rural development. Which energy services have high priority for rural development? What are the appropriate delivery mechanisms? How can the expansion of different delivery mechanisms be supported and made to work efficiently? These are some of the key questions that were discussed in the workshop.

The objectives of the workshop were to share experiences and develop a better understanding of existing and potential energy delivery mechanisms that contribute to development in rural areas in Eastern and Southern Africa. The workshop was targeted at, amongst others, the authorities which are in the process of being formed, or have recently been formed, to take charge of rural electrification such as the Rural Electrification Agencies and Rural Electrification Funds.

Four case studies were presented and discussed to provide an introduction to the topic, and concrete examples of different delivery mechanisms were given to inspire the workshop discussions. Focus group discussions were used to explore the participants' perceptions and experience of: (i) what rural development is, (ii) what role energy plays in rural development, (iii) which energy services are important for rural development, (iv) which delivery mechanisms are used and appropriate for different situations of energy service delivery in rural areas, and (v) what the institutional framework requirements are for delivering different types of energy services and supporting different types of delivery mechanisms. Furthermore, three working groups were formed, each to discuss one topic: (i) rural energy service demand, (ii) delivery mechanisms and (iii) institutional frameworks supporting rural energy service access and delivery mechanisms.

Important messages from the workshop include:

- Modern energy services which support income-generating activities are important for rural development.
- Activities to help develop income-generating uses of modern energy services are important.
- Modern energy services are also important for improved social welfare, which includes domestic uses.
- The private market will only deliver these energy services to any larger extent if public support is provided.
- In one way or another, governments need to contribute money for rural development, including modern energy supply.

- Grid extension is not always the most appropriate solution for rural electrification.
- Local organisations (private or other) for system management are important but will need external support.
- For local initiatives it is important that there are possibilities to access credits.
- Markets for small decentralized energy systems (e.g. Solar Home Systems), need to develop service responsibilities, or appropriate training for customers to assure good function of installed equipment.

Background

Access to modern energy services is recognized as an essential condition for fuelling broad-based economic growth necessary for sustainable poverty reduction. Energy services are necessary for the provision of basic services needed by individuals, communities and private enterprises. Consequently, increasing the currently low levels of access to modern energy services in many countries in Southern and Eastern Africa is considered a high priority and a major challenge confronting governments, the private sector and the science and technology community.

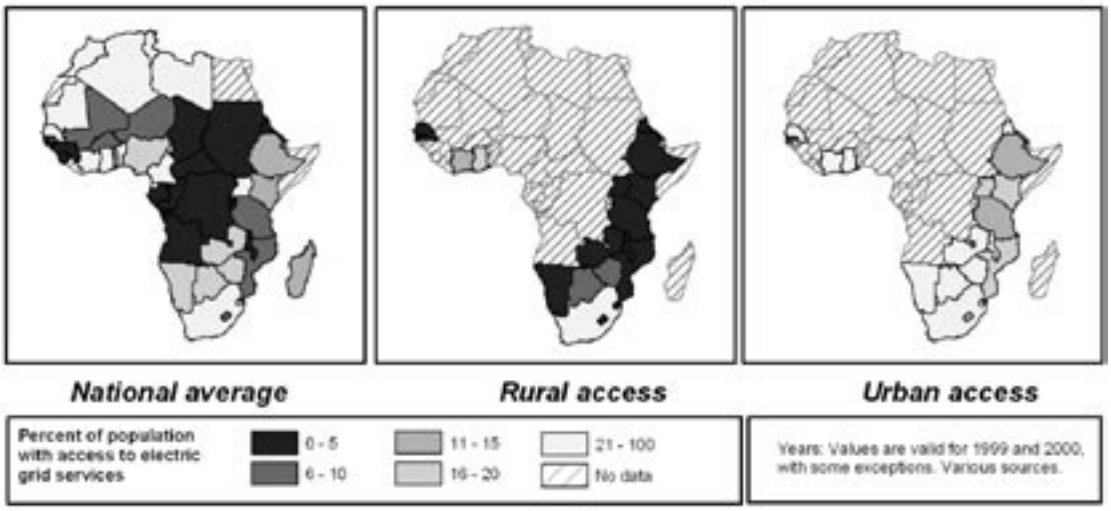

Figure 1 Access to electric grid services in Africa (by Mathias Gustavsson, University of Gothenburg, Sweden)

With the expectation of addressing these challenges, a wide range of energy sector reforms have been implemented over the last two decades in developing countries, and more are in the process of being implemented. Also, efforts have been made to move development forward through energy investments in developing countries. However, to a large extent these efforts have not significantly improved access to modern energy services in rural areas. In some cases where rural areas have been electrified a number of development expectations have not been fulfilled, and in others the deregulation has not created an environment which has been adequately supportive of increasing access to modern energy in rural areas.

To better understand effective ways in which rural energy access can be accelerated and meet development goals, such as poverty reduction, regulatory bodies need to develop arguments for why and how investments in rural energy supply shall be made. Extended energy supply is a

matter of making wise decisions on what to implement and how, in order to retain and develop national wealth and self-reliance parallel to making use of the accumulated experience and financing possibilities. It is important that benefits from investments and specific approaches for rural energy delivery mechanisms are identified. Also, deregulation brings the need for new and changing roles for existing and upcoming actors, both from the public and private sector.

Micro- as well as macro-perspectives are important for the development of sustainable investment policies in the energy sector. From the local rural perspective, details regarding the demand can be specified which are instrumental for achieving correctly sized systems, high system load factors and appropriate energy services. From this perspective, access to energy is one of many factors for development, investments for which shall be weighted against and related to those for water supply, education, healthcare, etc. From the national perspective it is possible to find generic energy for development needs and to focus financing schemes on these. Also, benefit of scale effects can be identified, as well as rational domestic energy resource usages.

Within the context of these challenges, a number of delivery mechanisms are being tried out in Eastern and Southern Africa. This workshop provided a forum where experience gained from these efforts was shared and discussed.

WORKSHOP OBJECTIVES

The objectives of the workshop were to develop a better understanding and share experience of existing and potential energy delivery mechanisms that stimulate effective development in rural areas in Eastern and Southern Africa. The workshop was targeted at, amongst others, the authorities which are in the process of being formed, or have recently been formed, who are in charge of rural electrification such as the Rural Electrification Agencies and Rural Electrification Funds.

Beyond this, the workshop objectives were to provide a forum for discussion and learning from each other's experiences, exchanging ideas and increasing cooperation among different actors in the field.

PARTICIPANTS

Participants in the workshop came from:

- organisations involved in the implementation of rural energy projects, private, cooperative and public;
- Ministries and regulatory agencies;
- The Swedish Development Cooperation Agency (Sida);
- consultants and researchers involved in rural energy projects; and
- consumer organisations.

The geographic focus of the workshop participants was Southern and Eastern Africa. Participants came from Kenya, Mozambique, South Africa, Tanzania, Uganda, Zambia, Zimbabwe and the organisers from Sweden. A full list of participants is found in Appendix III.

All participants were given the opportunity to reflect on the discussion theme and questions beforehand, and many of the participants sent their comments on these broad questions by mail before arriving at the workshop. The answers were very useful in finalising the workshop programme and discussion framework.

Figure 2 Eastern and Southern African countries represented in the workshop.

PROGRAMME AND METHOD

The following is a summary of the two-day workshop programme. A more detailed programme account is attached as Appendix I.

The workshop included the following main steps:

- Presentation of case studies that set the scene and gave examples of delivery mechanisms being used in Eastern and Southern Africa today.
- Focus groups discussions where participants discussed linkages between rural development and energy services, different delivery mechanisms and institutional requirements for extending rural areas with electricity services.
- Thematic discussions on rural energy service demand, delivery mechanisms and institutional frameworks supporting delivery mechanisms.
- Presentation of findings in thematic and concluding discussions.

Table 1 Summary of the workshop programme

Day I:	**Presentation of case studies**
	Lesco, Thungu Kabiri, Urambo, Kabale
	Focus group discussions
	Four groups on same theme, se attached questions
Day II:	**Thematic group discussions**
	Three groups:
	Energy service demand,
	Delivery mechanisms,
	Institutional arrangements
	Concluding discussions

Case studies

To set the scene for the workshop discussions four case studies were presented. These case studies provided real experience of delivery mechanisms for rural electrification used today in Eastern and Southern Africa. They represented four countries and four different organisational approaches to rural electrification. The presenters also provided their views regarding the strengths, weaknesses, threats and opportunities for their organisations.

Focus group discussions

Following the presentation of the case studies, participants were divided into four groups, each led by a moderator, who explored participants' views on the whole chain from prioritising modern energy services for rural development, through the mechanisms suitable for delivering it, to the appropriate institutional support. The questions for this discussion session are attached as Appendix II.

Thematic group discussions

In the second day of the workshop, three groups were formed each assigned the task of summarising a third of the first day's discussion, namely: (1) Energy Service Demand Priorities, (2) Energy Service Delivery Mechanisms, and (3) Institutional Framework in Support of Energy Service Delivery Mechanisms.

Concluding discussion

In the final concluding discussion, each of the three thematic group's conclusions were presented and discussed in plenum.

The views put forward by participants during these two days constitute the backbone of this report.

Results

CASE STUDIES

The following section is a summary of the case studies presented in the workshop. For the organisations who contributed by acting as case studies, a discussion on strengths, weaknesses, opportunities and threats (SWOT) have been added to the report. Here, strengths and weaknesses are internal factors, directly related to the business and under control of the organisation itself. Opportunities and threats on the other hand are created by external conditions related to the environment of the organisation, which the organisation cannot control.

LESCO – Lundazi Energy Service Company

Located in the eastern part of Zambia, close to the border of Malawi, Lundazi Energy Service Company (LESCO) has been in operation since 1999 with the first PV system installed in 2000. LESCO has two directors with equal shares and five employees. The basic concept of the company is to provide electricity services to clients through the provision of individual PV systems installed at the client's premises. The systems are owned by LESCO who supplies

service and maintenance, while the clients are responsible for protecting the system against damage and theft. The clients pay a monthly service fee in advance, which currently amounts to K35,000 (7 USD).

At present, LESCO has PV systems installed with 150 clients, most of them households where the electricity is used for lighting, television, video and radios. Other clients are small-scale businesses and institutions. Each system has a 50Wp photovoltaic panel, a solar battery, a charge regulator, four light points and a single socket. The default rate among clients is low. The number of potential clients queuing for a PV system amounted to 259 in October 2003.

Table 2 LESCO clients in October 2003

Type of customers	Number of clients
National service camp	63
Civil servants	20
Small-scale farmers	18
Small-scale enterpreneurs	18
Teachers	16
Agricultural camp	7
Rural health attendants	3
Traditional cheifs	3
Schools	2
Total	150

Financing of the PV systems has been provided by Sida through the Ministry of Energy and Minerals, Department of Energy (DOE). A repayment activity has been scheduled. The Government provided training of technicians (total of three weeks) and management training. The project partners (DOE and SEI) have been giving continuous support through workshops and field visits.

SWOT: LESCO

Besides the fact that PV systems are a renewable energy technology fuelled by the sun, the following strengths, weaknesses, opportunities and threats have been indicated:

Strengths

- LESCO is providing a service which is considered to be of high quality by the clients and for which there is a high demand.
- LESCO have well-trained staff. Technicians who can monitor and handle most of the problems which arise with the solar home systems and their management are experienced in running a business in the rural setting.
- The default rate is low. This is related partly to the knowledge ESCO has of their clients and their market, but also relates to the sanctions they apply to defaulting clients (disconnection).
- LESCO is operating a business where all operation and maintenance costs are covered by fees from the clients.

- SHS are modular and mobile which means that a PV system can be adjusted to meet individual needs and can also be installed in any place where it is required. A PV system can also be moved from one client to another.

Weaknesses

- With the current fee levels, it is difficult for LESCO to repay the investment capital.
- The number of clients needs to expand to reduce the overhead cost per client and to enable repayment of investment capital.
- LESCO lacks access to investment capital. They are dependent on the profits they make for reinvestments. This only makes it possible for the company to expand its operation at a very slow pace.
- There are some weaknesses in the capacity to prepare financial reports.
- Fees have to be adjusted to rapid inflation.
- The customers are dispersed and LESCO is dependent on well-functioning transport.
- The location is far from Lusaka where supplies and spare parts can be bought.
- LESCO has a limited stock of spare parts and bulbs.
- LESCO has no capacity to repair fittings and controllers.
- The low voltage of the PV systems makes it impossible to use appliances that require high voltage (such as welding, storage etc.)

Opportunities

- There are discussions in Zambia about setting up a national rural electrification agency and a proposal to institute a solar facility in Zambia. The development of these could negate the weakness of not having access to credit for LESCO.
- LESCO is recognised as a serious PV entrepreneur both by the market and by authorities and has good chances of expanding its business and should be a good candidate for credits if such a scheme opens in this field of business in Zambia.
- The very low level of electrified rural customers (2%) provides scope for expanding these types of businesses in Zambia. Many current modern energy service needs can well be met by smaller amounts of electricity. There are at present almost no alternatives for customers to access electricity services.
- Furthermore, in most places, due to a very limited expansion of the national electricity grid, solar and other distributed forms of electricity generation are still cheaper than the national grid.
- Distributed electricity generation can also be scaled to the availability of funds and does not require large investments as is the case with the grid.
- There is also the possibility for LESCO to diversify in terms of the products and services they can sell. The organisational form does not limit them to a specific energy technology.

Threats

- The clients' vulnerability to income fluctuations. This can be caused by climatic variations causing bad harvests and little or no income for clients dependent on farming. Also, civil servants sometimes have irregular incomes due to bottlenecks in the payment of salaries to employees, which can affect LESCO negatively.
- Without a national policy to provide some level of priority and support for rural electrification the potential for expanding LESCO's activities would be limited. This would result in a lack of investment capital.
- Depending on the national policy and priorities, competition from the national utility or other competitors could be a threat to LESCO. For example, this could be the case if different forms of energy technologies or electricity supply options are subsidised differently.
- Without a national policy on quality control poor quality products and companies on the market could ruin the reputation of PV and ESCOs.
- The interest rates, which are unpredictable and high, can be a threat to LESCO finances and make it difficult to set appropriate fees.
- Also, LESCO is exposed to foreign exchange risks since most of the equipment in the SHS is imported and they rely on imports for spare parts.
- Deteriorating road infrastructure could increase the transport costs for LESCO.

Tungu-Kabiri Community Micro Hydro Power Project

In Tungu-Kabiri in Meru South District approximately 185 km north of Nairobi, a micro-hydro power project has been ongoing since 1998 with the first electricity being produced in June 2001. The capacity of the scheme presently amounts to 14 kWe. The scheme, which is still in a project phase, will be owned, operated and managed by a community group formed as a corporation. The community group currently has approximately 150 members.

The business concept is based on a centralised business centre where the community has established premises to let to business enterprises or public services. The power to the centre is supplied during the day from 8.00 am to 4.00 pm. At present, power is used in eight separate stalls for welding, hair salon, barber, charging of mobile phones, selling of cold beverages and a video show room. An additional six stalls are planned for which a milling machine, oil processing (sunflower) and tobacco curing are desirable businesses. The clients are charged a flat tariff of 300 Kshs monthly (approx. 4.5 USD). Other planned developments of the scheme include water pumping and the supply of electricity to surrounding households. The women in the community have specifically advocated the water component.

The financing of the scheme has been through UNDP/GEF and ITDG and the implementation jointly through the Ministry of Energy, ITDG and the community. The community contributed labour to the project estimated at 30% of total costs. The members work on the scheme every week, and those who do not participate are liable to a fine.

SWOT: Tungu-Kabiri Community Micro Hydro Power Project

Besides the fact that micro-hydro utilises renewable energy, the following strengths, weaknesses, opportunities and threats have been indicated:

Strengths

- Participants from the community have been involved from the start of the project and are in charge of operation and maintenance to keep costs down. The community group also manages the project through a committee. Decisions are taken by the members.
- The scheme is modular and can deliver multiple end uses without significant losses.
- Distance to services has been considerably reduced (charging of mobile phones, welding of farming equipment etc.).
- The location of the business centre is such that it can be further developed.
- The Government has been involved throughout the whole process.

Weaknesses

- The installed capacity is presently heavily under-utilized.
- Staff technical training is insufficient.
- The present tariff does not cover maintenance costs or savings for expansion of the distribution network.
- Frequent black-outs in the system as a result of failure in the scheme.

Opportunities

- Limited competition (electricity) in the area.
- Clients' and potential clients' economy may improve through new businesses such as sunflower growing and oil extraction etc.
- New National Energy Policy is underway which will be favourable for decentralized energy systems.
- Development of standards ongoing.

Threats

- The scheme is likely to be affected by variations in precipitation (droughts and floods).
- The scheme is not big enough to meet utility needs of the community.
- Bad infrastructure (roads).
- Difficulties in obtaining proper equipment in the country.
- Market demand in the area remains under-developed.

UECCO Urambo Electricity Consumers Co-operative Limtied

In the town centre of Urambo village, 80 km west of Tabora in western Tanzania, there is a distribution grid and a power station with two diesel-generating sets (85 kW and 108 kW). The Urambo Electric Consumers Co-operative Limited (UECCO) owns and manages the system. UECCO was registered in 1993 as a pioneering electricity co-operative in Tanzania. By the time of its formation, the organisation inherited a system already in place, which had been installed on a local politician's initiative, had been managed by the local government for some years, but was by the time of the co-operative formation, well worn-out and malfunctioning.

During 1994 and 1995, rehabilitations of the distribution system and power plant were made by TANESCO, with the help of SEI and funds from Sida. Today, the number of members (consumers) amounts to 250.

Around five hours' power supply per evening is provided to the consumers in Urambo. Individual metering was installed for the majority of consumers during 1995, as fixed tariffs had proved to be disadvantageous for the co-operative. Initially, before meters were installed, around 67 consumers constituted a system average load of 77 kW, and paid far too little to make the organisation financially viable. When meters were installed and tariffs designed to cover costs, the system load dropped to less than half. Also, the number of members decreased during the first years after meter installation, but it has increased again. Today, some 250 consumers using on average 35 kWh per month, still only during evening hours, results in about the same system load as did 67 consumers initially. A large part of the load is for lighting. The present price per kWh is around 56 US cents/kWh.

UECCO is today led by an executive committee of ten elected members, of which one acts as a "Committee Member on Duty" on a weekly basis. Since 2001, the committee members receive remuneration equal to 5 USD for each Committee meeting, and 10 USD for each week on duty. The co-operative further employs two plant operators and one accountant.

Since the first general meeting in 1995, recorded general meetings have been held in April 1997 and March 2001. At general meetings, management and financial questions are sorted out.

SWOT: UECCO

The following strengths, weaknesses, opportunities and threats have been indicated by the co-operative in Urambo.

Strengths

- The staff and management of the organisation are familiar to the local area and the clients
- Good client base
- Transparency through member meetings
- Licensed electricity delivery organisation
- Well-educated technical and financial staff
- The co-operative is the full owner of the system
- Co-operative as a form of organisation is well known in Tanzania and there is legislation etc.

Weaknesses

- Difficult to keep tariffs high enough to cover costs
- Lack of spares in stock and shortages of material
- Limited capital available
- Long decision-making process
- High losses of electricity

- No funds for re-investments

Opportunities

- Favourable National Rural Energy Strategy
- Potential for micro-credits
- Limited competition in the area
- The market is expanding
- Possibility to buy bulk power from the national grid in the future

Threats

- Clients have limited purchasing power
- Rising exchange rate
- High inflation
- High interest rates and costs for equipment
- Clients' economy is vulnerable
- Limited capital in the region
- Limited educated manpower at the local market
- Political/religious interference

Kabale district, Uganda

As part of the initiative to increase access to electricity, Uganda has embarked on a ten-year rural electrification programme which is aimed at increasing rural access from the present 1% to 10%. This multi-pronged approach is supported by a number of donor and financing institutions including Sida. The Kabale Rural Electrification Project is part of this initiative.

This project is financed by an 11 million SEK grant through Sida following a bilateral agreement between the governments of Sweden and Uganda signed on 2nd November 2001.

The total length of the 33 kV line is about 20 kilometres with the main distribution line running from Katuna to Ryakarimira. The second line branches off from Katuna and extends to Karujanga town with an extension to Bushenyi. In addition, there are two 33 kV lines from Kakoma to Rutare and to Mugando respectively.

The transmission line will be a three-phase high voltage transmission line with six three-phase and six single-phase distribution transformers along the line. Construction of necessary three-phase and single-phase 0.4 kV distribution lines will also be included as appropriate for electricity consumers within the project area.

The development objective of this project is to contribute to economic growth and social development in the project area. In the long-term, the access to electricity is expected to enable:

- improved public services;
- new investments in agricultural and forestry related factories and commercial enterprises;

- less environmental stress by reducing the use of wood fuels, batteries and other pollutants associated with combustion of fossil fuels in existing small generating facilities;
- increased access to communication and information systems;
- improved security and evening activities as a result of better lighting.

The immediate objective is increased access to, and use of, electricity in the project area. It is expected that one year after the construction of the distribution line, the number of new grid electricity customers will be approximately 70 households, 15 institutions and 100 business sector enterprises.

In an effort to improve on the success potential of the project the following strategies have been adopted:

Way-leaves: In order to reduce project costs, the local population will not be paid for any way-leaves. This has the added advantage of transferring the feeling of ownership.

Cost of installation: The cost of extending the line to the premises will initially be met by the project finance. A decision on how to recover these installation costs is yet to be made.

Local participation: It is planned to involve the local communities as far as possible, especially in establishing the routes of the low voltage lines. This improves on the attitude of ownership.

Strengths, weaknesses, threats and opportunities

The Kabale rural electrification project has just started and there are few specific experiences to be evaluated from its realisation. However, there are several comparable projects on conventional grid extension from which many lessons have been learnt. The Kabale project has adopted some new approaches as listed above, based on previous experiences where installations have not been well taken care of, and/or where many potential consumers cannot afford the connection fees, costs for service line connections and house wiring.

Other common experiences from grid extension projects are that income-generating activities do not develop as expected, households continue using fuel-wood for cooking although there is access to power. On the positive side, grid extension may be both more environmentally friendly and more cost-efficient compared to smaller isolated systems, depending on the power sources.

To develop industrial or other income-generating uses of electricity, several innovative solutions are possible for the power distribution management. Training, or even facilities, can be provided, as in the Thungu Kabiri case. The power distributor can support retailers of electrical equipment.

FOCUS GROUP AND THEMATIC DISCUSSIONS

The following sections provide a summary of the main issues raised in the workshop. The results are divided into the three thematic areas that were used on the second day of the workshop illustrated in the figure below: energy services for rural development, rural energy service delivery mechanisms, and institutional framework supporting rural energy service delivery mechanisms.

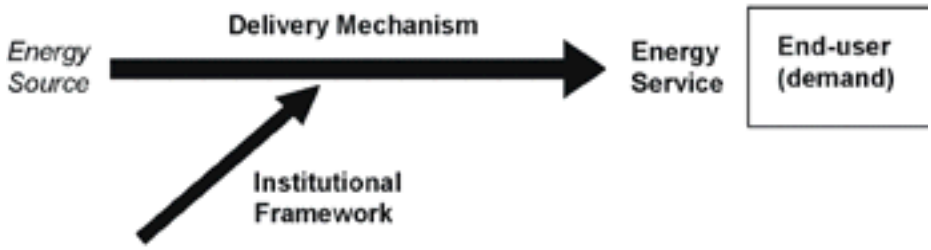

Figure 3 Schematic illustration of the topics of discussion during the second day of the workshop.

Energy service demand in rural areas

Identification and ranking of modern energy services for rural development was an exercise carried out during the first day's focus group discussion. This is an important starting point. With local advice on how modern energy services can support rural development, experiences from other parts of the world can be constructively used.

The focus group method applied is based on a participatory and quick session aimed at prioritising the most important energy services. This way, it lay with the workshop participants to both identify and rank energy services. About 30 minutes was allowed for the whole ranking session, before which not more than 30 minutes was spent on a general discussion covering what is important for rural development and how modern energy supply can help in the rural development process.

We use the term 'modern energy uses' in order to narrow down the issue of rural energy needs, but not to the extent that only electricity is covered. By doing so, we wish to shift focus from traditional energy sources and conversion technologies, which dominate today, towards more efficient solutions. We do not want to exclude fossil fuel based technologies that can be suitable for shaft power (diesel), heating or cooking (LPG).

Many participants put forward that economic activity is an essential key to development. It was agreed that besides business development, fundamental issues like food supply, education and health care must be assured. Most participants thought that assuring basic social welfare is the responsibility of the Government. Furthermore, participants believed that energy alone is not sufficient for development.

Categorisation varied in the different groups, and it is necessary to have the underlying discussion in mind when assessing the ranking. It appears from the first session, that modern energy for 'household energy uses' and 'income-generating activities' is regarded important for rural development. However, many of the energy services that during the first day were attributed to household needs are also important for health care, education and service-oriented business. This relates, for example, to lighting, which is an important energy service for all groups.

As regards cooking, although experiences from earlier rural electrification projects have shown that cooking habits often remain unchanged after the introduction of electricity, it was stressed by the participants that turning cooking into a less cumbersome activity, especially for women and young girls, is an important task. This does not necessarily have to be through electricity but by using other energy carriers. The issue was, however, not discussed further in the thematic discussion on demand in the second day.

In the demand group session on the second day, the energy service needs were summarised from all four groups and an attempt was made to find the most appropriate categorisation based on our knowledge about rural activities. Energy services were then divided into three main categories:

- Social welfare services
- Income-generating activities
- Domestic services

As regards information and communication technology (ICT), entertainment and transport, they can either be separate categories or they can be included in those above.

In addition to summarising the importance given to different energy services, we have interpreted that the more detailed energy services are specified, or the more contexts they appear in, the more crucial their provision or modernisation are for rural development. This way, we understand that:

- small scale industrial activities (workshops and agricultural processing, including grain milling),
- cooking,
- domestic water (pumping, treating, heating)
- information and communication technology,
- lighting,
- preservation of agricultural crops, and
- irrigation

are seen as energy services for which modern energy supply could boost rural development.

In the thematic session on demand, it was stressed that income-generating activities are vital for rural development and that modern energy services supporting these activities are important. On the other hand, the group strongly felt that the ranking on the first day could be misleading because it was not specific to modern energy services required for assuring the basic social welfare.

It was agreed that while social welfare is imperative for sustainable economic development, the economic development as such would take off predominately through value adding processes. Important modern energy services for rural development were grouped into a matrix as in Table 3.

While discussions were more detailed, an exact categorisation in a table naturally misses some nuances, for example ranking points given in italic indicate that it was attributed to an end user category or an energy end use rather than to an energy service. By marking some cells with an asterisk, we suggest that these are the cells to which one could expect ranking points to be attributed, based on the underlying discussion. For example, domestic lighting per se may be given lower priority, whereas if one assumes that the household comprises income-generating activities or educational activities, it is given higher ranking. In the social

Table 3 Provision of modern energy services and their importance for rural development

Energy Services	**Energy end use**							
End user category	Lighting	Industrial Production	Cooking/ Heating	Drinking water	ICT	Preserving Agricultural Crops	Irrigation	Sum
Social Welfare	*196*		*	*	*			196
Income-generating activities	*	201	*		*	100	85	386
Domestic Uses	130		*185*	*170*	*143*			628
Sum	326	201	185	170	143	100	85	

welfare category, only 15 were explicitly marked for outdoor lighting. Others were 'health' unspecified, 'education' unspecified, or 'welfare' unspecified.

The workshop objective is to identify suitable energy service delivery mechanisms for rural development and give input on how these are best supported by the Government through legislation and institutions. It is therefore useful to group the above demands as follows:

- Light electrical for domestic uses.
- Efficient (time- and energy-) solutions for cooking.
- Light electrical for social welfare.
- Light electrical for services (income-generating activities).
- Light electrical for value-adding processes (income-generating activities).
- Shaft power for income-generating activities.

In the demand thematic group session, it was said that the most innovative delivery mechanisms are required for social welfare and business applying high-load or shaft power. Domestic end uses mostly do not require incentives, education etc. if there is a sound market. A special case may be if LPG for cooking is promoted. For social welfare energy services, the challenge is to create a responsibility for, and efficient use of, investments. For business development, the challenge is to support development with training, access to equipment etc., while not taking the edge off the initiative. This accounts for service-oriented and small-scale businesses as well as industrial uses, however, the threshold for taking a risk is of course higher for big investments.

Delivery mechanisms for rural electrification

The second thematic group discussion dealt with the topic of delivery mechanisms.

The first day's focus group discussions concluded that the most important energy services were to support income-generating activities. This group's second day discussion was therefore concentrated on the delivery mechanisms for income-generating activities and what specific institutional needs were connected to these mechanisms. The discussion was limited to one hour. From the group discussion the following findings were outlined:

Different types of income-generating activities

Income-generating activities in rural areas were roughly divided into three categories:

- Income-generating activities through service-oriented businesses (low-load services), such as lighting and refrigeration in bars and restaurants, mobile phone battery charging, hair salons, video and music halls, lanterns for fishing etc.
- Value-added income-generating activities, such as sewing, welding, storage, lighter forms of agro-processing etc.
- Small-scale industries (high-load), such as agro-processing, brick-making, workshops etc.

Technological choices

Delivery mechanisms concern the issue of how to bring the specified energy service to the end-users. Delivery mechanisms consist of both the technology (generation and transmission/ distribution) and the organisation putting the technology to use in delivering energy services.

Considering specifically the technologies used, the following conclusions were made by the group:

PV for lighting and low-load service-oriented businesses

Technologies such as PV can contribute to development of income-generating activities utilising low-load power only. This is done mainly by providing low-load power for TV, music, cold drinks, and for bringing possibilities to extend the hours of business and productive work through lighting.

Grid and stand-alone systems for all types of income-generating activities

Grid and stand-alone systems were regarded by the group as a suitable delivery mechanism for all categories of income-generating activities discussed above, particularly when provided on a 24-hour basis and at a reasonable price.

The group, however, discussed the fact that these activities in most electrified rural areas have not been realised. The reason as stressed by the participants in the group was that income-generating activities such as small-scale industries cannot simply be brought about by bringing in electricity. Instead, electricity has to be integrated with other development conditions such as awareness building on potential ways to utilize the electricity for value added income-generating activities, demonstration, credit facilities and different types of market development. If this integration is not implemented, the income-generating activities performed by the end-users will remain within the category of low-load service-oriented businesses, such as serving cold drinks, music and TV.

Also, the number of household clients connecting to the grid or the stand-alone system will remain low mainly due to difficulties to pay the up-front connection costs.

Besides energy services for income-generating activities, social welfare and cooking were two areas that were thought to be important for rural development. In the social welfare group, a substantial part of the load would be from light electrical or heat (mostly for cooking). On the other hand, for specialist health care, loads can be high-load electric. For cooking, the workshop did not elaborate this in any length; many participants, however, put forward LPG

as a possible path for development. LPG can be used in individual households, or be supplied to larger kitchens for schools or health clinics.

Costs for technologies

PV systems are more expensive per unit energy delivered compared to small grids, if the system load factor is not very low in the system. On the other hand it is feasible to set up PVs for small loads.

PV systems are appropriate for social welfare, small business activities and domestic uses until a certain number of clients have developed interest in electric supply and the electricity demand is high enough for an alternative. Small grids are more suitable for a larger number of clients who have a higher demand for electricity. The small grid solution also allows industrial uses. As regards shaft power for small-scale industrial activities, stand-alone diesel engines may be appropriate until the total load at a site is high enough to justify a common small grid solution.

To facilitate the efficient utilisation of technologies, second-hand markets or leasing arrangements for both PV and small diesel generator sets are positive.

The difficulty of choosing the right size of modern energy supply system, and the fact that some social welfare demands are imperative for development, indicates that private sector initiatives are not sufficient for rural development.

Organisations

Considering organisations specifically as a delivery mechanism, the following conclusions were made by the group:

Most organisational types are suitable

It is obvious that different organisational forms have different advantages and disadvantages for running electricity schemes. In general, however, a smaller organisation such as a local private company or a co-operative has an advantage when handling the small-scale systems, as they are closer to their clients and can keep a low default rate.

However, all participants in the group agreed that all systems, from small-scale and stand-alone systems to larger grid systems, can be managed by most types of organisations, such as a public utility, a private company, an association or a larger co-operative. The group, however, made a distinction between the traditional form of a public utility and the reformed public utilities, where the traditional public utilities were regarded as not suitable for involvement in small-scale systems, as they did not have a client-oriented approach. A reformed public utility could better meet the challenge from privatisation. The participants did however in general express their worries concerning the privatisation of the electricity sector. “For private companies it is business, whereas for government it is taking care of its people. Private companies will not invest in rural areas if it is not found to be profitable.”

NGOs to deal with institutional support

During the discussion, it was stressed on that NGOs cannot take on the role of a private company as they are not profit-making. Instead of an NGO being involved in delivering energy services directly, NGOs are better suited to providing support to the smooth operation of the delivery mechanism. Such support can consist of awareness raising, training, demonstration,

networking, policy advice and research in the area, and be offered to the organisations involved in delivering the energy services, to the end-users or to the government regulating the energy market.

Institutional support

The role of the government as a provider of access to infrastructure to facilitate business was clearly emphasised in the group. The type of support that the government would need to provide was according to the participants the same for all kinds of organisations, however at different scales. Other governmental support mentioned was capacity building and tax reduction as incentives for organisations to involve themselves in rural electrification.

Also, the strategy for electrification must remain with the government to manage to make sure that things happen. As an example, the recently created Rural Energy Agency in Tanzania was regarded as a potential organisation.

The group also agreed that without some kind of financing mechanism and subsidies, rural electrification would not be an interesting area for any kind of organisation on a long-term basis. This was a role both for government and for donors.

The issue of institutional support was further dealt with by the third thematic group.

Institutional frameworks to support rural electrification delivery mechanisms

The topic of discussion was "What is the institutional framework in which rural electrification delivery mechanisms can be supported?"

The discussion focused on the identification of the actors who have a role to play in increasing access to rural electrification and the different actions these actors could or should ideally perform as well as the conditions that would make these actions possible.

There was a one-hour time limit to the exercise and therefore the discussion could not cover all the aspects but did manage to identify and discuss some of the important actors and their role in creating a supportive institutional framework.

Actors

The identified actors were government, national utilities, private sectors, donors, consumers, NGOs, community based organisations (CBOs), line ministries, training institutions and academic institutions.

Important functions, roles and necessary actions to be taken by actors

Government

- Not surprisingly, it was suggested that the most important role of the government is to formulate policies that clearly specify to actors the rules and conditions for which rural electrification should take place. Rules and conditions can include a variety of instruments such as tax exemptions for investments in generation to support economic development.
- It was also considered important that the national strategy for how overall objectives such as targets for increasing rural electrification are to be reached is clearly communicated to the public.
- Timely reviews of the policy to adjust it to changes in the conditions under which the market operates were considered important.

- The process in which policy is formulated and revised was also considered important and an area where improvements could be made so as to better involve stakeholders and include input from them.
- It was also considered important that this process is transparent and that in general, government priorities, strategies, and budget allocations be transparent and open for scrutiny and political debate. This relates, for example, to transparent resource allocations that might be made in relation to expanding rural energy access which for example are subsidies directed at specified investments, rules about use of natural resources such as biomass, water and other resources used in electricity generation.
- Related to this was a discussion on the importance of having a government that is accountable for its actions. Any poor governance issues should have consequences in elections or have legal consequences of mismanagement of, for example, public funds.
- It is also important that the government has the capacity to enforce regulations.
- Another important role of the government is to ensure that least cost investments are made using public funds. An example was that although theoretically competition can stimulate bringing down costs, there may be situations when the market or the number of actors on the market is too small to actually be able to create healthy competition. In such cases the government should be responsible for suggesting the conditions for when competitive bidding should be used or introduced in different areas.

National utilities

- It was considered important that national utilities demonstrate corporate responsibility, and as publicly owned companies, reinvest profit into rural electrification according to the policies outlined by the government.
- It was also considered important that national utilities be transparent as to how their funds are used and the financial situation under which they operate.

Private sector

- To take advantage and stimulate participation of the private sector in rural electrification initiatives, a proper regulatory framework with clear incentive and disincentive mechanisms is needed. Such a regulatory framework should be fair. It is also important that the sector is not over regulated but gives room for creative initiatives to be taken by the private sector.
- It was considered important that the private sector be supported by the government in forming Build Operate Transfer ventures.
- In order to ensure effective market competition and least cost, it was suggested that the government should support and stimulate the creation of a certain volume or number of private energy sector companies.
- The private sector should also be monitored so that they do not form cartels. This requires the government capacity to monitor and enforce laws.

Donors

- Donors should not support governments that have poor governance. Donors should also be accountable and take responsibility if they have supported poor governance resulting

in, for example, external debts to be paid for investments that have not resulted in positive development effects in the country.

- It was suggested that donor support is targeted and specific. It was thought that such an approach would ensure transparency for which types of investments the government supports.
- Donors should involve stakeholders sufficiently in programme and project formulation.
- Reasons as to why a donor organisation gets involved in supporting certain activities should be clear and transparent.

NGOs

- An important function of NGOs is considered to be awareness creation. This includes aspects from policy to technology
- Another important function of NGOs, also related to awareness, is to empower people to be heard, getting people's priorities and concerns included in policy formulation as well as when delivery mechanisms are implemented.
- Demonstrating alternatives for rural delivery mechanisms from technological choice to ways of organising delivery is also a typical role for NGOs.
- It was not considered appropriate for NGOs to be involved in actual electricity service delivery. Potentially there could be some exceptions when talking about providing social services. However, the main problem participants had with involving NGOs in electricity service delivery was that they can have an accountability problem since they are not answerable to anybody.

Consumers

- Increasing consumer awareness, and thereby their ability to influence policy makers, electricity service providers and others, can have an important impact on assuring that the right priorities are being addressed and that organisations (private or public) are performing responsibly and providing quality services.
- Increasing awareness means empowering consumers to influence and to become watchdogs of the actors on the market.
- One way of influencing this development is through supporting consumer associations.

Line ministries

- Integrated planning was stressed as something that could improve and speed up both access to rural electrification and the productive uses of electricity by using the opportunities that exist for coordinating government initiatives in the agricultural, health and education sector with government initiatives in the energy sector. Suggestions of where coordination could be of use were in irrigation programmes where small water flows could be used for pico hydro installations (very small hydro systems, up to 5 kW). Also, improving the conditions for rural development to occur will need inputs from, and access to, a range of services apart from energy. Coordinating the implementation of other services such as transport, water and financing could therefore potentially lead to a faster uptake of the benefits that electricity can provide under the right conditions.

- Also, existing delivery mechanisms for agricultural extension services can potentially be used to piggy-back electricity service delivery. In addition, where health or education programmes are planned, liaison with the energy sector can potentially include ways of devising more sustainable fulfilling of energy service needs.

Academia and training institutions

- Academia can support the process by providing relevant MSc and PhD courses.
- Academia could also potentially, although this was debated, be involved in technical quality control and in certification of equipment used for energy service delivery.
- Different forms of awareness can also be provided through primary, secondary and tertiary school education curricula. One area could be "building" of future consumers.

Table 4 Actors and actions to support delivery mechanisms for rural electricity delivery

	Stakeholders									
	Government	**National Utilities**	**Private Sector**	**Donors**	**Consumers**	**CBOs**	**NGOs**	**Line ministries**	**Training Institution**	**Academic**
Actions/ Responsibilities/ Incentives/ Restrictions	Policy formulation and review	Corporate responsibility to invest in RE of profit	Needs proper regulatory base which is fair and not over regulated	Not to support bad governance, else take responsibility for results	Consumer associations	May need government support through tax exemption	Awareness raising	Integrated planning with eg. Agriculture health education	Awareness in Primary, Secondary and Tertiary school	MSc and PhD degrees in energy sector related subjects
	Involve stakeholders in policy formulation	Transparent	Support BOT	Support target oriented programmes	Empowered to be strong on the market	Mobilise the public	Empower people to be heard	Delivery mechanisms through extension services	Building future consumes – shifting paradigm	Laboratories for labelling and certification
	Be transparent Accountable		Volume of private sector to ensure least cost	Involve stakeholders sufficiently in prog/proj formulation		Mobilise funds	Demonstrations		Training of trainers	R&D in markets and technologies
	Resource allocation		Not to form cartels	Be transparent			Not best for ESD exception may be social services		Capacity building	
	Ensure least cost/cost efficiency						Accountability problem			
	Incentives									
	Enforcement of regulation									

Conclusions

The workshop objective was to develop a better understanding and share experience of existing and potential energy delivery mechanisms that stimulate effective development in rural areas in Eastern and Southern Africa.

Beyond this, we wish to communicate workshop participants' views on why and how investments in rural energy supply can be made.

Looking at the specific strengths, weaknesses, opportunities and threats brought up from the case studies presented at the workshop special attention has been given to the following factors:

- Power supply and distribution is expensive.
- Local organisations have good insight into local conditions.
- It is important that managing personnel are well trained.
- Locally managed systems can be designed to meet the present demand situation.
- It may be difficult for a small organisation to set aside money for systems expansion.
- Default rates can be kept low in locally managed systems.
- There are many potential customers for a local power provider, but the ability to pay is often low.
- Locally owned equipment could constitute collateral for loans.
- It may be difficult to find spare parts for a remote and exclusively designed system.
- Generally, national energy policies are positive to small local power supply initiatives, especially where they include renewable energy technologies.
- In a broad perspective, the demand for modern energy in rural areas is enormous.
- Locally managed rural power supply businesses are in a good position to develop other, related business, and also other local development projects.
- Electricity supply businesses in rural areas are vulnerable to the general economic situation of rural consumers, to inflation, and to political instability.
- Poor supporting infrastructure, especially transport, may hamper power supply activities in rural areas.

Furthermore, from the workshop discussions the following messages have been derived. It has to be noted however that the conclusions expressed below are not necessarily supported by all workshop participants.

- **Income-generating activities using modern energy forms are imperative for rural development**
  Lighting up rural areas is a longed-for change among rural population, and electricity for TV, radio and charging of mobile telephones is highly appreciated for facilitation of access to news and communication. For economic development, however, this is not enough. Income-generation activities are needed to create employment opportunities.

- **Social services must be available**
  As pointed out above, the majority of the participants put forward that economic activity is an essential key to development. It was, however, also agreed that besides business development, fundamental issues such as food supply, education and health care must be assured. It was the view of most participants that assuring basic social welfare is the responsibility of the Government.

- **Bringing electricity to rural areas is not enough**
  Electricity by itself does not lead to development. From the case studies it is seen that even though electricity has been brought to the area, the effects on income-generating activities among the electricity clients are low. Even if electricity was supplied on a 24-hour basis, it is likely that the result would be the same. The biggest reasons being that rural poor people do not have the tools and knowledge necessary for the process. "Rural Development is not just a question about poverty, it's about people getting access to education, social services etc. Rural development is about people to overcome their poverty". Electricity therefore has to be implemented through an interdisciplinary process.

- **Extension of grid preferred but unrealistic**
  Extension of the national grid is the preferred option for most end-users. With this option being unrealistic at present, however, other alternatives have to be utilised. In general, individual PV systems are most suitable for scattered settlements and for lighting and low-load service-oriented businesses in rural population centres. Stand-alone systems were also regarded as suitable for industrial income generation activities (high-load), such as welding, storage and agro-processing, particularly if provided on a 24 hours basis.

- **A sound market for individual household PV systems is possible but not sufficient**
  For household size systems, such as small PV systems, it is quite likely that a market can develop, once there are appropriate financing schemes. One present challenge for the PV suppliers is to ensure functionality, either through training and help to self-help, or through service guarantees. However, small PV systems can only meet a fraction of the rural modern energy demand, given that industrial activity and other income-generating activities are important.

- **All organisations have advantages and disadvantages**
  In general, a smaller organisation such as a local private company or a co-operative has an advantage when handling the small-scale system, as they are closer to the client and seem to be able to keep a lower default rate. It was pointed out, however, that the national utilities today better meet the challenges from client-oriented approaches than previously, as a result of the restructuring process they have undergone. Opinions were expressed from participants that this could very well be the utilities' "peak of efficiency", and that a further restructuring of private organisations would hamper this positive trend.

  It is not likely that the private market can sufficiently provide the needed energy services alone. Further, opinions were raised that NGOs should not implement and run electrification schemes on their own, rather they should support other organisations and end users with awareness raising, training, demonstration, networking and research.

- **A decentralised government institution or equivalent to support local organisations**
  Challenges are basically two-fold when providing modern energy for rural development. On the one hand, a local anchorage is important for supporting income-generating activities and systems expansion. On the other hand, governmental financial support is

required to fulfil social welfare needs and requirements. It is therefore likely that an organisation with governmental support, but with decentralized, or ambulating personnel, is a constructive solution. Further, to sufficiently support local organisations and facilitate the efficient utilisation of technologies, it would be positive if there were a mechanism in place to move equipment, such as a functioning second-hand market or leasing system. This could be put in place through a decentralised government institution or an appointed NGO.

- **Continuing contribution from government and donors necessary**
  In one way or another, the Government needs to take on responsibility and contribute resources for rural development. These contributions include regulation of and support to private organisations for system management, assuring basic social welfare, and to initiate and run demonstration projects. Furthermore, it is important that the government institutions are transparent and that politicisation is avoided. Donors also need to continue contributing foreign financing.

Appendix I Workshop programme

Wednesday 29 October 2003

09.00 – 09.30	**Opening Speech** Mr. Kjell Larsson, Swedish Embassy, Dar es Salaam, Tanzania
09.30 – 10.00	**Introduction: Workshop objectives, programme, focus and frame of the discussions** Ms. Monica Gullberg, ÅF
10.00 – 10.30	**Experience from Tanzania's first electricity cooperative UECCO** Mr Chambala, Urambo Electric Consumers Cooperative
10.30 – 11.00	**Coffee**
11.00 – 11.30	**A case study of the ESCO in Lundazi in Zambia** Mr. Mukule Banda, Managing Director, Lundazi Energy Service Company, Zambia
11.30 – 12.00	**A case study on Community Micro Hydropower Project in Tungu-Kabiri, Kenya** Mr. Daniel Theuri, Intermediate Technology Development Group (ITDG)
12.00 – 12.30	**Rural electrification initiatives in Uganda: Kabale Project** Mr. Tobias Karekaho, Norplan Uganda Limited
12.30 – 13.00	**Introduction to the focus group discussions to be held in the afternoon** Mr. Anders Arvidson
13.00 – 14.00	**Lunch**
14.00 – 16.15	**Focus group discussions** Group 1 Mr. Anders Arvidson Group 2 Ms. Monica Gullberg Group 3 Ms. Elisabeth Ilskog Group 4 Mr. Maneno Katyega
16.15	**Coffee**
18.30 – 19.30	**Cocktail**
19.30 –	**Dinner**

Thursday 30 October 2003

08.30 – 09.00	**Introduction to morning's group discussions** Mr. Anders Arvidson
09.00 – 10.00	**Breakout sessions** Group "Demand" Ms. Monica Gullberg Group "Mechanisms Ms. Elisabeth Ilskog Group "Institutions" Mr. Anders Arvidson
10.00 – 10.30	**Coffee**
10.30 – 11.00	**Report from "Demand" group** Reporter I (to be decided)
11.00 – 11.30	**Report from "Mechanisms" group** Reporter II (to be decided)
11.30 – 12.00	**Report from "Institutions" group** Reporter III (to be decided)
12.00 – 12.15	**Closing remarks** Anders Arvidson, Monica Gullberg, Elisabeth Ilskog, Maneno Katyega
12.15 – 12.30	**Closing speech** Mr. Ngosi Mwihava, Assistant Commissioner of Energy (Renewable Energy), Ministry of Energy, Tanzania
12.30 – 13.30	**Lunch**
14.00 – 16.00	**Study visit**
18.00	**Back in Dar es Salaam**

Appendix II Template for focus group discussions

This is a condensed version of the focus group discussion template, excluding practical instructions, introduction to the subject, etc.

Introduction (5 minutes)

Opening question (5 minutes)

– **Let's find out some more about each other by going around the table. Could you please tell us who you are and how your work is related to today's subject, rural electricity delivery mechanism. Let's begin with you. Please!**

Introductory question (10 min)

– **Rural development. What does rural development mean to you? And what makes it happen? What is needed to make it happen?**

Probe for:

- What is rural development and how does one get from one situation or state to another and what are the forces, things, conditions or other that bring about a positive change?
- What are the conditions for rural development to occur?
- What is contributing to development?

Transition question (5 min)

– **What roles does modern energy play in rural development?**

Probe for:

- How does it relate to other conditions that can lead to rural development?
- Where, in a development process, is energy important?

Key question: Energy services, demand and priorities for development (20 min)

– **What types of energy services are important for rural development to occur?**

Probe for:

- What are important contributions that different energy services can play in meeting human needs and in stimulating rural development?
- At what stages in a development process does different types of energy services become important?
- Which comes first?
- Followed by what?
- In what way do they contribute to development?
- What do they make possible?

Exercise I

– **Next question is an exercise. I would like you to use the pieces of paper and pens you have in front of you to write down energy services that you think are important for rural development to occur in your country.**

– **I would like you to consider the range of different energy services that may be relevant in your country depending on the situation in a specific region or location.**

Comments:

- Let participants prepare a list of energy services that are important for rural development. Ask all participants to write down on pieces of paper the energy services they think are important for rural development. From basic energy services to more advanced. Capital letters so it can be seen from afar. Moderator or assistant moderator collect the pieces of paper and places them on a board or wall that everyone can see, throwing away the duplicates.

– **Under what conditions would you say that these energy services are most needed or useful?**

Probe for:

- Under what conditions are these energy services important
- What would be the order of introducing these types of energy services?
- How would you prioritise?
- Why would you prioritise that way?

Exercise II

– **We now have a list of energy services that you think are important for rural development. Let's pretend you have 100 value units earmarked for developing energy services in rural areas of your country and the power to make decisions about where these units should be invested to stimulate rural development. You can use the 100 units as you like, splitting it up in to smaller amounts, placing more on some, less on some and perhaps none on some. How would you rank investments to contribute to rural development?**

Comment:

- The units shall represent the degree of importance rather than the investment cost.

– **Use the pieces of paper to assign values of your choice, all adding up to 100 value units.**

Probe for:

- Once investments have been placed:
- Ask each and everyone: Why they made that choice, How and what they think that investment will lead to rural development.
- Explore to understand the investment choices of made and how it is influenced by the context of the situation in their country.

Key questions: Delivery mechanisms for meeting prioritised energy service demands (15 min)

– **Let's now think of which types of delivery mechanisms there are that could fulfil the different energy services we have talked about.**

– **Let's start off by talking about electricity delivery mechanisms that are in existence today. Any suggestions?**

Probe for:

- What do we mean by delivery mechanisms?
- Are there alternatives that have not been tried out but that could potentially be appropriate in meeting certain energy service needs under specific conditions?
- Write down the alternatives that come out for all to see.

– **Of these delivery mechanisms, which do you feel are suitable in meeting the different energy service needs that we have up on the board?**

Probe for:

- If you would apply one or several mechanisms for meeting the different energy service needs which do you think are suitable?
- Why are they suitable for meeting that energy service need?
- Why not suitable for meeting another energy service need?
- Why is this more suitable than another alternative?
- Explore the reasons for why they think the choices suggested are suitable.

Key question: Technological choice (10 min)

– **Are there any specific energy technologies or energy sources that are more or less appropriate to pair with the different delivery mechanisms with?**

Probe for:

- Why would you make that choice?
- How does it fit in with the capacity to handle that technology in your country today?

- What are the advantages and disadvantages of the different energy technologies in these different delivery mechanisms applications?

Comments

- This has probably become an issue already raised by participants in the previous question. If not, bring it out specifically and ask participants to share their thoughts on why a certain delivery mechanism is more or less suited to a certain energy technology.

Key question: Institutional requirements (15 min)

– **If we take a look at these different delivery mechanisms and the technologies that might be suitable to use in implementing them, what are the institutional capacitates necessary to make them work?**

Probe for:

- Are there any general or specific principles or values, laws, regulations or other societal agreements that need to be in existence for these mechanisms to work?
- Who are the stakeholders that need to be involved and engaged to make the different mechanisms work?
- What roles do different stakeholders need to perform to make the different mechanisms work in a sustainable way?
- What kind of capacities do the stakeholders need to possess in order to perform these functions?
- Why are these capacities important?
- What are the roles of the government in this mechanism?
- What is the role of the private sector?
- Is the public engaged? Do they need to be engaged?

Key question: Keys to implementing the plan (15 min)

– **What need to be done to make this happen?**

Probe for:

- What initiatives need to be taken and who should be taking which initiatives?
- What methods or processes are in place to define the energy service needs in rural areas today?
- How should the investment be funded?
- Who should take the initiative?
- By whom should investment priorities be made?
- How should investment priorities be made?
- What kind of national process is used to define what to prioritise in terms of national investments?
- Could it be done differently?
- If so how could it be done?
- Why should it be done that way?

Ending question (10 minutes)

– **Considering all things you have said, heard and seen here this afternoon, is there anything else that you would like to stress or recommend regarding what is important for deploying rural electricity delivery mechanisms for rural development?**

Probe for:

- Is there any specific recommendation you would like to put forward to policy makers in Southern Africa that you think are important for accelerating the development of rural areas energy sector related or related to other policy making.

Schematic overview of the discussion

- What is rural development and how does it happen?
- What is energy's role in rural development?

- What energy services and for what can contribute to making rural development happen?
- How can these services be delivered, through which mechanisms?
- Which energy technologies are related these mechanisms?
- What institutional framework is needed to make these mechanisms deliver these energy services?
- Who are the stakeholders and what are their roles in making this happen?

Appendix III List of Participants

Name	Organisation	Country
Mr. Daniel Theuri	Intermediate Technology Development Group (ITDG)	Kenya
Mr. Lugard Majoro	African Energy Policy Research Network (AFREPREN)	Kenya
Mr. Maximo B. A. Mandava	National Electricity Utility (DNE)	Mozambique
Mr. Maxwell Mapako	Energy and Development Research Centre, University of Cape Town	South Africa
Mr. Ngosi Mwihava	Ministry of Energy and Minerals (MEM)	Tanzania
Dr. Mwakahesya	Ministry of Energy and Minerals (MEM)	Tanzania
Mr. W A Chambala	Urambo Electricity Cooperative (UECCO)	Tanzania
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The Stockholm Environment Institute (SEI)

SEI is an independent, international research institute specializing in sustainable development and environment issues. It works at local, national, regional and global policy levels. The SEI research programmes aim to clarify the requirements, strategies and policies for a transition to sustainability. These goals are linked to the principles advocated in Agenda 21 and the Conventions such as Climate Change, Ozone Layer Protection and Biological Diversity. SEI along with its predecessor, the Beijer Institute, has been engaged in major environment and development issues for a quarter of a century.

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The SEI mission developed from the insights gained at the 1972 UN Conference on the Human Environment in Stockholm (after which the Institute derives its name), the work of the (Brundtland) World Commission for Environment and Development and the 1992 UN Conference on Environment and Development. The Institute was established in 1989 following an initiative by the Swedish Government to develop an international environment/development research organisation.

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