

Energy access

## Making power sector reform work for the poor

### SUMMARY FOR POLICYMAKERS

"The first thematic programme of the GNESD focuses on Energy Access issues. The aim of this activity is to review the existing energy policies with respect to energy access in different regions in Africa, Asia and Latin America and identify the effects of the reforms that has been carried out in the past and recommend policy measures which can increase the possibility of reaching energy to the poorer section of people currently without access".



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**GNESD**

GLOBAL NETWORK ON ENERGY FOR SUSTAINABLE DEVELOPMENT

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## **GNESD**

The Global Network on Energy for Sustainable Development (GNESD) is UNEP facilitated knowledge network of Centres of Excellence and Network Partners, renowned for their work on energy, development, and environment issues. The main objective of GNESD is to work for reaching the Millennium Development Goals (MDG) by:

- Strengthening the Members Centres' ability to acquire, assimilate, and apply existing knowledge and experiences.
- Working for a better understanding of the links between sustainable energy and other development and environment priorities, and technology and policy options, leading to better articulation of practical policies that can be adopted so as to promote and highlight the crucial role of energy for sustainable development.
- Working to provide research findings to the Governments to be considered in formulating their policies and programmes, and the private sector to attract investments in the energy sector, so that these favour energy sector growth for sustainable development, especially for the poor in the developing countries.
- Promoting a communication infrastructure that provides a means for Members to share experiences and draw on each other's strengths, expertise, and skills, and
- Strengthened South-South and North-South exchange of knowledge and collaboration on energy issues of common interest.

GNESD is one of several Type II partnerships in the field of Energy that were launched at the World Summit on Sustainable Development (WSSD) in Johannesburg, September, 2002

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# Summary

Following on from the *Policy Research* and *Dissemination* phases of its research activities, the GNESD's Energy Access Working Group has now completed the *Policy Implementation* phase.

In the first two phases, the Working Group assessed the impact of power sector reforms on the poor and proposed policy options and recommendations that would improve access to electricity services by the poor. In the *Policy Implementation* phase, each of the nine contributing centres prepared and analysed detailed Case Studies demonstrating the effectiveness of policies that have been implemented in the following areas:

- Protecting funds for electrification of the poor from being used or misappropriated for other purposes.
- Explicit focus on the poor in the reform process.
- Participation of the poor in electrification initiatives.
- Measures that support low-cost technology options that lower the cost of electricity for the poor.

The results—presented as for previous Working Group investigations in sub-regional reports, a synthesis report, and this summary for policymakers—feature the lessons learned from these cases of successful implementation and provide guidance for policymakers as to how this success could be emulated elsewhere. In essence, the results can be summarised as follows:

## Protecting funds

- It is crucial that funds for electrification of the poor are protected so that they are not used for other purposes. Electrification of the poor must be made a specific goal and implementation of rural electrification programmes and use of funds should be guided by strong and clear policies. Such policies are missing in many developing countries.
- Measures that have supported such protection include a transparent planning process and stringent monitoring of use of funds.

## Explicit focus on the poor

- Power sector reforms have often failed the poor because of a lack of explicit policies addressing their needs. If there is no policy framework

focused on the poor, or if regulations or tariff structure hinder their access to electricity, pro-poor policies must be formulated and approved.

- Instruments such as subsidies and lifeline tariffs can be helpful. However, these must be designed with great care to ensure that they are actually targeted at those they are intended to help and are not captured by other sections of the community.
- Tariff design must take account of the ability of poorer households to pay. Where other payments (e.g. connection charges) are a barrier, they must also be adjusted to the ability of the poor to pay.

As a final point, almost all of the sub-regional reports stress the need to use energy services to add value to existing local production chains. It is essential to promote policies to develop productive activities that will generate income for poor households to allow them to pay for the services and thereby avoid a constantly growing and permanent need for subsidies.

#### Participation of local communities

- Participation of local communities in electrification initiatives is important at all levels of planning and implementation. Their participation will ensure that local needs are addressed and will help to overcome perceived barriers to the introduction of new technologies. Failure to understand this can prevent the success of otherwise well planned projects.
- Sustainable community participation in management of electrification projects requires making use of local resources to the greatest extent. Involvement of NGOs and local entrepreneurs is crucial in mobilising communities and in ensuring that the technology used is appropriate to local needs.
- Special attention may need to be paid to the situation of women, in order to facilitate their involvement in the electrification process.

#### Low-cost technologies

- Standards and guidelines that encourage low-cost technical solutions have been shown to improve access to energy services by the poor (for instance, in Malawi, Mauritius, Morocco and Tunisia).
- Technological innovation, if appropriate to local conditions, can not only help to improve energy access but also livelihoods. For example, in two remote villages in Brazil, locally grown biomass used as a lower cost alternative to diesel fuel for generators is both lowering the cost of energy and opening up opportunities for farmers.

# I – Introduction

## Global Network on Energy for Sustainable Development (GNESD)—Background

Even though it is now widely accepted that access to modern energy services is fundamental to the process of poverty eradication, energy deficiency continues to limit the development of millions of poor people around the world, as well as affecting their health and causing environmental degradation. Finding ways to increase access to affordable, adequate and reliable modern energy services for the poor remains a major challenge for developing countries.

As illustrated by Box 1, this 'energy poverty' is not generally the result of a lack of physical resources, nor, in most cases, is it due to unwillingness or failure to attempt to address the issue.

Furthermore—and contrary to what might be expected given the apparent scale of the challenge—the amount of commercial energy that would be needed to overcome the energy poverty situation globally is negligible compared to the world's energy consumption. According to UNDP, providing the poor with modern energy services as envisioned in the Millennium Development Goals Energy Vision would increase global energy demand by about only 1 per cent of its current level.

Over the past three decades, developing countries have introduced extensive power sector reforms, and many have experimented with renewable forms of energy. But in spite of this, energy services still fail to reach the poor, largely because the particular problems of the poor were overlooked in a process of reform which assumed that greater economic efficiency would, of itself, extend access to everyone. It was identification of the existing pattern of energy sector development, and of its failure to satisfy the needs of the poor, that formed the starting point for the work of the Global Network on Energy for Sustainable Development's Energy Access Working Group.

### The GNESD study—Work to Date

During the first two phases of the Working Group's activities (*Policy Research* and *Dissemination*) the contributing Centres (see Box 2) assessed the impacts of energy sector reforms on the poor's access to energy services, using a common approach to address two broad questions:

- Have recent power sector reforms addressed the 'energy access' challenge facing the poor, or have

#### Box 1: West Africa—abundant resources, low consumption

West African countries suffer chronic energy poverty, a prevailing circumstance that is partly responsible for current low levels of economic and social development.

The average per capita consumption of electricity in the 15 ECOWAS member countries is roughly seven and a half times lower than that of OECD countries.

However, even though ECOWAS countries consume very little electricity, they have significant energy potential (e.g. oil and gas reserves in Nigeria, Ghana and Côte d'Ivoire; hydroelectric potential in Nigeria, Guinea, Ghana, Liberia, Côte d'Ivoire and Mali; and a year-round abundant solar resource throughout the region).

It is under-exploitation of these rich resources combined with inadequate policies, mainly in the area of electricity supply and distribution, that has prevented access to electricity, particularly for the poor.

the reforms actually contributed to the growing problem of inadequate energy services for the poor in the developing world?

- Based on rigorous analysis, which are the proven and robust policy options that would lead to improved, cleaner and more sustainable energy services for the poor in developing countries?

The outcome of the first two phases included the proposal of policy options and recommendations to improve the poor's access to modern energy services. However, energy is a highly complex, cross-cutting issue that faces policymakers with considerable challenges often involving institutional and other changes, over and above the already difficult process of planning and providing the physical infrastructure. For decision makers in the South, many of whom work with very limited resources, a lack of empirical evidence demonstrating that proposed policy options actually work is a major barrier to their effective adoption.

It is precisely the identification of policy options and strategies that have worked—as well as their backing up with well analysed Case Studies and implementation guidelines—that formed the objective of the third phase of the Access Working Group's work: the *Policy Implementation Phase*.

The investigations carried out by each of the Centres contributing to the study comprised an in-depth examination of at least two Case Studies where policy options have been successfully implemented in four main areas: 'explicit focus on the poor'; 'participation of local communities'; 'ring-fencing (protection) of funds'; and 'low-cost technical options for electrification'<sup>1</sup>.

The summaries of the results of these investigations, presented below, provide examples of successfully implemented solutions, followed by key findings that demonstrate success and policy recommendations that could help to replicate this elsewhere.

The policies presented fall, roughly, into two groups. Those covered by 'ring-fencing of funds' and 'low-cost technical options' address issues for which the necessary expertise is not likely to be found at the local community level. These

#### **Box 2: Energy Access Working Group Centres and the regions they cover:**

- AFREPREN/FWD – East Africa
- American University in Beirut (AUB) – Middle East
- Asian Institute of Technology (AIT) – South and South East Asia
- Energy Research Centre (EDRC) – Southern Africa
- Energy Research Institute (ERI) – China
- Environnement et Développement du Tiers Monde (ENDA-TM) – West Africa
- Federal University of Rio de Janeiro (COPPE/UFRJ - CENBIO/USP) – Brazil
- Fundacion Bariloche (FB) – Latin America and the Caribbean
- The Energy Research Institute (TERI) – South and South East Asia

Energy Access Working Group Centres are assisted by a Secretariat, currently located at the UNEP Collaborating Centre on Energy and Environment in Risoe, Denmark

policies will therefore, of necessity, be top driven, more aggressive and probably short-term in nature.

The second group, 'explicit focus on the poor' and 'participation of local communities' relate to long-term strategies adopting a bottom-up approach and address issues such as affordability, tariffs, appropriate technology, and the environment.

The Centres' reports are examined below in terms of their principal focus. However, the full scope of any individual report may be somewhat wider than this, meaning that the division into two groups is not 'watertight'. The Case Studies are real-world situations that are invariably complex but also rich in lessons that can be drawn and this is reflected in the broad reach of the policy recommendations resulting from their analysis<sup>2</sup>.

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<sup>1</sup> Owing to time constraints, none of the Centres addressed this policy option directly and there is therefore no corresponding separate section in this summary. However, where relevant subjects were touched upon, findings are summarised in 'Technology Focus' boxes within the main text.

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<sup>2</sup> Full copies of the detailed Case Studies can be found on [www.gnesd.org](http://www.gnesd.org)



## li – Protecting Rural Electrification Funds ('Ring-fencing')

In spite of a reform process stretching back over almost three decades and significant resources being allocated for rural electrification, the majority of the poor in a number of developing countries remain without access to electricity.

This is largely because the funds for rural electrification have not been properly ring-fenced (i.e. protected from misappropriation or misdirection). For example, in Kenya (one of the countries examined in the following Case Studies), 80 per cent of the funds intended to expand rural electrification are being used to finance operational losses of the national utility, leaving very little to be used for the intended purposes. Comparison with countries where ring-fencing has been implemented demonstrates the effectiveness of such measures.

### **Northern and Eastern Africa: Tunisia, Morocco, Mauritius and Kenya**

The hypothesis that ring-fencing of rural electrification funds leads to significantly higher rural electrification levels was tested by analysing the degree to which ring-fencing has contributed to the success of rural electrification programmes in Mauritius, Tunisia and Morocco. This is contrasted with the case of Kenya, where ring-fencing is absent, and rural electrification levels remain very low despite the existence of a rural electrification levy for around 30 years.

To allow meaningful comparison between the different countries, the study selected the following two factors, considered as crucial components of ring-fencing:

- Transparent planning and project selection processes.
- Stringent monitoring of disbursements of rural electrification funds.

### **Successful implementation and key findings**

The Tunisian, Moroccan and Mauritian programmes have achieved very high electrification levels in rural areas and have increased access to electricity among the poor. In Tunisia, access to electricity appears to have contributed to reduction in rural poverty levels as more commercial activities opened up and social services improved. Compared with these successful rural electrification efforts, the result in Kenya has been poor. Data supporting these findings are summarised in Table 1.

The achievement of high rural electrification levels in Morocco, Tunisia and Mauritius is due, to a large extent, to their efforts in ring-fencing the rural electrification fund. In terms of the two factors considered as crucial (above): all three countries introduced transparent planning and project selection, detailed standards and guidelines to ensure low costs, and very stringent mechanisms to monitor disbursement of funds. Kenya, on the other hand, failed to introduce transparency and detailed standards and had only partial and ineffective monitoring of use of funds. In addition to the two factors, the experience of Morocco, Tunisia and Mauritius highlights the importance of the following policy aspects for the success of rural electrification schemes.

#### *Government commitment*

Governments played key roles in electrification of the poor in Tunisia, Morocco and Mauritius, by developing electrification phases that targeted different villages and social-economic priorities. They also made large financial contributions—for instance, in Tunisia the government bore 85 per cent of the total cost of rural electricity. In contrast, rural electrification in Kenya, which depended on an electrification levy, remained ineffective mainly due to the lack of clearly set implementation policies and goals that are enforceable through legislation and monitored by an independent regulator.

#### *Community involvement in 'ring fencing'*

Community involvement ensures that the poor are not left out of the electrification process and can actually afford the connection costs. In Tunisia, Morocco and Mauritius rural

communities were involved in the electrification process, participating in the decision-making bodies, making contributions towards the electrification of the villages and in the selection of the schemes to be electrified. Making rural communities aware of the electrification schemes helps ensure that the funds for electrification actually reach the target group.

## **Lebanon**

Lebanon has had full electrification since the 1970s, meaning that pre-electrification measures are not applicable to the country. However, within the framework of a policy to curb energy wastage, Lebanon is seeking to introduce a subsidised tariff for low-income consumers that is adequately protected (i.e. ring-fenced) to prevent other social classes from benefiting.

Low-income consumers in Lebanon currently enjoy a subsidy of 50–70 per cent, but all consumers using less than 400 kWh/month are benefiting from this to varying degrees. At the same time Lebanon's electricity sector is experiencing severe difficulties as a result of planning, technical, financial and administrative problems. The national utility is having to rely on US\$400–500 million/year from the government to offset its expenditure.

### **Successful implementation and key findings**

As Lebanon is currently in the process of investigating

*Table 1: Comparison of results of rural electrification programmes in Morocco, Tunisia, Mauritius and Kenya*

<b>Rural electrification statistics</b>				
	<b>Morocco</b>	<b>Tunisia</b>	<b>Mauritius</b>	<b>Kenya</b>
Duration of rural electrification programme (REP)	27 years	32 years	37 years	31 years
Rural electrification levels at the beginning of REP	n.a.	6%	n.a. <sup>1</sup>	<1%
Estimated total investment on capital cost	US\$4.05b	US\$585m	US\$22m	US\$103m
Estimated no. of connections	5 375 000	609 000 <sup>1</sup>	737 000	93 080
Rural electrification level in recent year	72%	96%	100%	1%

*n.a.* = Not available (1 = There was no explicit division between rural and urban electrification at inception of REP)

ways of ring-fencing subsidies for the poor while tackling the delicate problem of its utility's finances, it is too early to comment on implementation or extract true policy recommendations.

However, a scheme that carefully defines low, medium and high consumption tariff categories in such a way as to provide a subsidised tariff only to a low consumption group is being devised. Under the scheme, the cost of subsidy would be borne by a higher-than-cost tariff for high consumers, with the subsidised group having a limit on its monthly consumption. It is expected that the scheme will not only successfully limit the subsidy to the targeted user category but will also increase the value of electricity invoiced by around 40 per cent. Overall, the proposed tariff structure will lead to greater simplicity and equity, and will increase revenue.

### Policy recommendations

Analysis of the Case Studies of rural electrification in Mauritius, Morocco and Tunisia has established the importance of ring-fencing policy measures for rural electrification funds. The examples of Kenya and Lebanon<sup>3</sup> demonstrate the adverse impact on the poor of inadequate 'ring fencing'. If rural populations (and in a broader sense, the poor) are to have access to affordable electricity services, governments, regulatory authorities and electricity agencies need to establish key measures to protect (i.e. ring-fence) funds: transparent project selection processes, stringent monitoring of fund disbursement, and detailed standards and guidelines that ensure low costs. The study identified the following policy steps in this process:

- National government's commitment to pro-poor rural electrification is crucial to ensuring that the poor have access to affordable electricity services. There is a need for separate and comprehensive pro-poor energy policies which are missing in most developing countries. At present, most investment in pro-poor energy initiatives is via programmes and projects that have lower priority than other sectors in overall development strategies.
- Implementation of a pro-poor electrification programme and use of funds should be guided by

strong and clear policy. The government should make the goal of electrifying the poor explicit in electricity sector legislation and in a rural electrification master plan.

- An effective entity (i.e., rural electrification agency) should be constituted to manage pro-poor electrification funds and to source funds from local and international lenders/donors. Furthermore, this entity should develop standards and guidelines for implementation of pro-poor electrification schemes that ensure quality construction at low cost, and should promote private-public partnerships (PPP) and private sector participation in pro-poor electrification schemes, particularly for off-grid systems.
- Governments must formulate strong regulatory frameworks to enable regulatory commissions to function effectively and monitor pro-poor energy programmes without interference. For example, an auditing department in the electricity regulatory body should monitor whether capital projects are implemented as planned, and according to the required quality. The audit department would investigate material usage and expenditure, and could also act as a watchdog against collusion between the project implementation unit and contractors.
- It is crucial to involve local communities, bringing together local community actors from various sectors to discuss energy needs and possible solutions. This participatory approach not only improves the planning process but also increases the local community's sense of ownership of the strategic planning and decision-making process, as well as enhancing the 'ring fencing' of funds for pro-poor electrification programmes.

### Technology Focus 1: Encouraging low-cost technologies

Detailed standards and guidelines that encourage low costs in electrifying the rural population were another important measure used in Tunisia, Morocco and Mauritius. Standards that could help to ensure cost effectiveness include single-wire earth return and transformer locations that are determined on a line-by-line basis depending on current and future demand growth.

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<sup>3</sup> The case of Lebanon did not focus explicitly on rural electrification but on 'ring fencing' of subsidies that are supposed to benefit the poor.

## lil – Explicit Focus On The Poor

Phases I and II of the GNESD Working Group's programme confirmed that market-led power sector reforms have failed to address the needs of the poor in developing countries, and that failure was largely the result of a policy vacuum where the needs of the poor were concerned. Successful policies that target the poor were therefore a natural main focus for the majority of the reporting Centres in *Phase III*.

Providing the poor with electricity access means ensuring that poor people actually receive electricity services when a village or town is electrified and that the service is priced in such a way that they can afford electricity to cover their basic needs. In examining policy options that have led to successful outcomes, the Centres covered, *inter alia*:

- Targeted subsidies of electricity prices: the main policy used by countries to support affordability of grid-based electricity. The studies found mixed results regarding this policy option.
- Lifeline tariffs: another frequently used instrument to support sustainable access to electricity. The studies show that such tariffs need to be carefully designed if they are not to be appropriated by untargeted sections of the population and are not to place too great a burden on utilities.
- Connection charges: often a significant barrier to access for low-income households. Studies indicate that reducing the initial payment and lengthening the repayment period can increase connection rates.

### Western Africa: Ghana and Cote d'Ivoire

Ghana and Côte d'Ivoire, have introduced policies and measures to improve access to electricity while ensuring affordable pricing (lifeline tariff in Ghana) and subsidies (Côte d'Ivoire).

The Government of Ghana made access to electricity and affordable tariffs for the poor a specific goal and one of the key commitments of its reform programme, designed to achieve electrification of the whole country by 2020.

A National Electrification Scheme (NES) was launched in 1989 with the objective of extending reliable electricity supply to all parts of the country, over a 30 year period.

A complementary activity to the NES was the Self-Help Electrification Project (SHEP), introduced to assist communities in obtaining connection to the national grid ahead of the dates fixed for their connection under the NES.

Increase in electricity tariffs to bring them to their economic/cost recovery levels is also a prime objective of Ghana's electricity sector reforms. In order to cushion poor consumers from possible adverse effects of this, a social 'lifeline' tariff, well below the cost of supply, was introduced.

Cote d'Ivoire introduced policies with similar objectives from 1996 onwards. The government launched three main initiatives: 'Social Electrification', comprising special electrification programmes funded by the electricity sector and public and private funders; a 'Moderate Domestic Tariff', targeting the social group with monthly consumption not exceeding 40 kWh; and a 'Subsidised Connections' initiative, supporting households with subscription for a capacity of no more than 30 amps.

### Successful implementation and key findings

Although the envisaged outcome of Ghana's reforms is yet to be achieved, and it is still unclear as to how access initiatives will fare as and when the full basket of reforms is implemented, the NES/SHEP and the lifeline tariff have so far had positive effects in helping to ensure that poor people have access to affordable electricity and are able to maintain it.

It is estimated that the NES/SHEP allowed the country to more than double its overall electrification rate (from 23 to 50 per cent) in the 1988–2003 period. In a similar period, connections in rural areas, where most people are poor, appear to have trebled (from 8 to 24 per cent).

In spite of some imperfections in the lifeline tariff mechanism—notably 'leakage', i.e. people not actually classed as poor benefiting—it is plausible to assume that without the introduction of this tariff most of the 180–200 thousand 'lifeline' customers would have been denied the use of electricity because of their inability to pay for the service.

In Cote d'Ivoire, the combined effect of 'Subsidised Connections' and the other social initiatives has significantly increased low-income households' connections to the electricity network.

The withdrawal of subsidies, in 2001, provides an interesting opportunity to compare a situation with a policy in

### **Box 3: Impact of connection subsidy removal in Côte d'Ivoire**

Between 1993 and 2001, the government of Côte d'Ivoire subsidised low-voltage electricity connections to the tune of 30 to 75 per cent of connection cost, depending on the distance separating households from the grid.

In 2001, the decision was made to remove connection subsidies, leaving potential customers to cover all grid connection costs.

By 2003, withdrawal of subsidies had led to a drop of over 50 per cent in household connections in Côte d'Ivoire compared to pre-1999 figures. For some areas close the country's borders the reduction is likely to have been more than 60 per cent.

It is a widely held view that efforts to combat poverty will be seriously hampered by such a decrease in electricity access rates (especially given the pressure of present population increase of 3.8 per cent per year).

place (i.e. the subsidies) and the situation without it (see Box 3). The significant drop in request for connections indirectly highlights the positive impact of a policy in favour of social connection subsidies.

Findings also indicate that in Côte d'Ivoire, as elsewhere, the initial investment for electrification services remains a major barrier that prevents poor and low-income households from benefiting from the electrification process. This question of capital outlay also applies to renewable energy technologies in a context where there are few funding mechanisms for these technologies and where they are often priced well beyond the means of poor households.

#### **Policy recommendations**

Analysis of the Case Studies has identified some policy and regulatory gaps that need to be addressed in the otherwise successful policies described above.

In communities where the prevalence of poverty is very high, even mechanisms such as Ghana's SHEP are not sufficient to guarantee access to electricity. The poorest communities may still lack access to electricity because they cannot meet the cost of low-voltage poles or other equipment. Ghana's experience suggests that in such situations the district or local authorities should assist in the procurement of the necessary equipment.

Steps should be taken to ensure that lifeline tariffs are better targeted and more equitable. There is a need for a participatory planning process, involving the local communities and other stakeholders, to develop a clear statement of eligibility conditions and for overall control and management strategies for subsidies.

Access to electricity infrastructure does not guarantee that poor people can use electricity services, since monthly recurrent charges could still be unaffordable even where

lifeline rates exist. It is therefore recommended that policies to support electricity access for poor and low-income households should target the use of electricity for productive small-scale business applications that allow people to increase their disposable income. The Ghanaian experience has shown that a subsidy scheme for small customers such as corn millers and irrigation farmers would be beneficial.

Decentralised electrification using alternative options such as renewable energy can offer suitable solutions and should be considered as a means of improving access to energy for remote areas located far from the grid. Renewable energy technologies (RETs), including non-electrical ones, that have been developed in other parts of the world should be disseminated by experts, taking account of local conditions to provide technologies that are suited to local communities' capacities to operate and maintain them.

### **Southern Africa: South Africa, Botswana and Malawi**

South Africa, Botswana and Malawi are three sub-Saharan countries that have successfully implemented pro-poor energy policies and strategies aimed at assisting the poor in obtaining access to electricity, though with different approaches in the three countries.

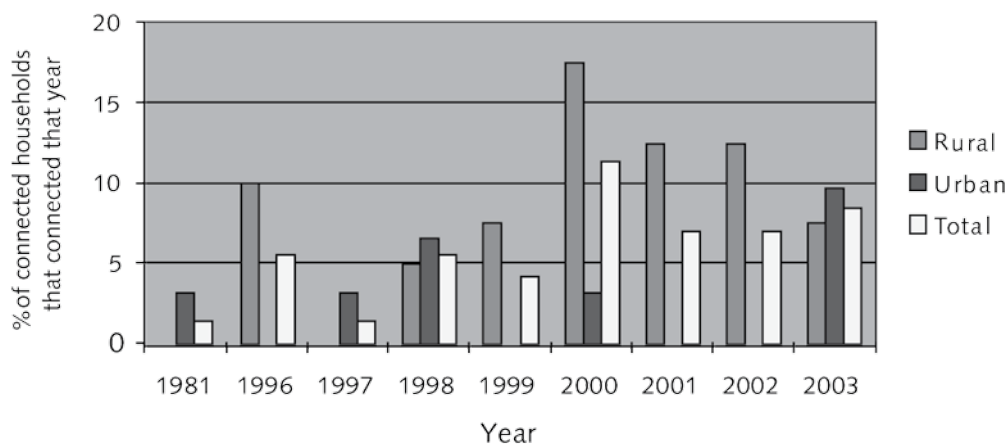
In South Africa, a National Electrification Programme (NEP) facilitated access to electricity. To help ensure that the poor were able to afford to use the electricity provided, the programme was backed up by an Electricity Basic Services Support Tariff (EBSST) giving poor households 50 kWh per month free of charge. Solar electrification via concessions was also introduced. The South African regulators' stated policy in 1998 is summarised in Box 4.

Botswana introduced a Rural Electrification Collective Scheme (RCS) to reduce the burden of upfront costs for rural customers connecting to the grid. Under the scheme, groups of potential customers make an initial down payment to cover part of connection costs and repay the rest over an agreed period.

Malawi has experimented with a Rural Electrification Programme and a low-cost electricity pilot programme in the

#### **Box 4: Statement by National Regulator in South Africa, 1998**

'It is understood from the very beginning that the primary motivation for massive electrification of disadvantaged communities was not to achieve economic benefits. For socio-political reasons it made sense at the time, and it still does, to improve the quality of life of millions of South Africans while at the same time creating opportunities for jobs and prosperity.'



**Figure 1: increases in connection rates in Botswana after adjustment to RCS in 1996/1999**

densely populated township of Mbayani, (see *Technology Focus 2*).

### Successful implementation and key findings

South Africa's NEP was successful in expanding the numbers of poor households connected to the national grid. However, benefits from cooking and heating with electricity were lower than expected because many poor people can only afford electricity for lighting and media. After electrification a majority of lower-income households continued to use non-electric fuels for their more energy-intensive needs.

The NEP also contributed to the welfare of communities by providing improved health care in clinics and evening adult education in schools. The ability to use computers and photocopiers where schools could afford them also benefited education.

Evaluation of the concessionaire approach for rural solar electrification in South Africa indicates that very poor households cannot afford to participate. Many of them find it difficult to pay even a subsidised monthly fee, as they still have to obtain energy supplies for cooking and water heating.

In Botswana, changes made to levels of down payment for connection charges and to length of repayment periods under the RCS led to increased connection rates amongst the poor without additional cost to the utility or the government (see Figure 1).

### Policy recommendations

There are lessons to be learned for other developing countries from the differing experiences and approaches of these three countries, summarised below:

- If there is no existing policy framework to assist the poor, pro-poor policies must be formulated and approved.
- Both the government and utility must have the political will to implement pro-poor policies.
- Dedicated financing must be secured. It may come from the utility's revenues or it may be a direct government subsidy.
- The mode of payment for electricity must be adjusted to the ability of the poor to pay. For example, innovative financing mechanisms such as micro credit, etc. could be developed through PPPs or by encouraging the private sector via government incentives in the form of financial safety nets such as financial guarantees and insurance schemes.
- Tariff design, through community participation, is important for the success of the programme.
- Income-generating uses of electricity should be encouraged. If newly connected poor households take up productive activities using electricity they will be able to pay for the electricity they consume and will have an opportunity to move out of poverty.
- An energy development strategy which seeks to benefit the poor must not be restricted to electrification; it must also improve access to complementary non-electric fuels, appliances and safe/efficient practices.

### Technology Focus 2: Ready Boards in Mbayani

Under the pilot programme introduced in Mbayani, Malawi, 150 households obtained access to electricity using compact 'ready boards'. These 15 amp capacity boards had sockets marked 'TV', 'refrigerator', 'hotplate', 'iron', and 'bulb'.

Use of the boards lowered the cost of electrifying the households, thus making electricity accessible to those who may otherwise not have been able to afford it.

The scheme was financed from the national utility's funds with the connected households repaying the cost of the boards over 5 years. The scheme represented a net cost to the utility, but this was mainly a result of inadequate planning and poor tariff design.

## Latin America and Caribbean: Argentina and Peru

Argentina and Peru have implemented policies with the express intention of improving access to electricity by the poor, but with different targets. Argentina targeted problems affecting the urban poor; Peru focussed on the rural poor.

In Argentina, an Outline Agreement—signed by municipalities, electricity service companies, and the provincial and national governments—regularised the situation of around 700 000 illegal users in poor urban areas of Greater Buenos Aires.

In Peru, a National Rural Electrification Plan (PNER), launched by the Project Executive Board (DEP), promoted the implementation of programmes aimed at laying transmission lines, setting up sub-stations and small-scale hydro-electric plants, solar photovoltaic systems and wind generators.

### Successful implementation and key findings

Both the Peruvian DEP and the Argentine Outline Agreement promoted coordinated actions involving the participation of different institutional levels. This was more the case in Argentina, where the national, provincial and municipal authorities coordinated the initiative with electricity service companies.

In Peru, the PNER increased rural electrification levels from 57 per cent in 1993 to 76 per cent in 2003. Coordination was accomplished by centralising planning within the DEP, prioritising the work to be carried out and informing potential stakeholders and investors. The diversity of projects implemented proved attractive to potential investors.

In Argentina, formerly illegal users expressed satisfaction at becoming legitimate consumers and service companies benefited from the additional revenue and decrease in non-technical losses. To ensure sustainability of the initiative, particular attention will have to be paid to lower-income users who now have a regularised service but who risk falling back on their former practices under the pressure of the economic crisis.

### Policy recommendations

Consideration of the experience of Argentina and Peru has led to the following general policy recommendations.

- If a country's regulatory framework for electricity forbids the implementation of cross subsidies, it should be re-formulated.
- Policy measures to promote access to electricity by the poorest users should include the fixing of progressive tariff structures for household users, to allow higher-income users (with high consumption) to subsidise poorer users (with lower consumption).
- Use of electricity for productive purposes should be subsidised in rural areas by, for example, charging

higher tariffs for medium and large commercial and industrial users.

Some conclusions drawn more specifically from the Case Studies are:

- A clear distinction should be made between energy poverty mitigation policies for rural and urban areas.
- Energy theft is one of the most serious urban problems. However, regularisation programmes can become self-financing because they generate new funds (from those 'regularised').
- The sustainability of programmes is jeopardised if they are not accompanied by appropriate tariff schemes.
- Where rural programmes have proven successful they comply with the following requirements: financing to implement access; appropriate payment mechanisms; proper educational and equipment maintenance structure; and the backup of a sound institutional structure.

## Brazil

Brazil's government has developed policies to improve energy access for the very poor in both its 'interconnected' and 'isolated' systems (Box 5). Efforts for the isolated system include a '*Luz Para Todos*' (Light for All) programme in the Guarita's Indigenous Land and initiatives to promote electricity generation from biomass in rural communities. For the interconnected system, they include a subsidised electricity tariff policy.

The 'Light for All' biomass initiative involved installation of a biomass generating system in an isolated village (see *Technology Focus 3*).

In the interconnected system, the need for a subsidised electricity tariff became evident when prices rose after power sector reform. To alleviate the burden on low-income users, the Brazilian government introduced discounts on monthly consumption for low-consumption users.

### Box 5: Brazil's isolated and interconnected systems

Brazil's power sector is characterised by its division into two large systems: the interconnected (grid) system and the isolated system.

Eighty-five per cent of the electricity carried by the interconnected system, covering most of the country, is generated in hydropower plants. The isolated system includes small local grids, mainly in the Northern Amazon.

Many poor communities in these isolated regions are far from the distribution grid and rely on (expensive) diesel to generate electricity.

### Technology Focus 3: biofuels in Amazon

Much of Brazil's off-grid electricity is produced from generators powered by diesel, a fuel which (due to transport cost) is very expensive.

A generator using the shells of the Amazonian fruit cupuaças has been installed in the isolated village of Aquidabam, as a low-cost fuel alternative to diesel.

The 300 families in the village depend largely on the cupuaças crop for their livelihood. Power produced by the generator is now used to refrigerate the crop and pulping machines are also being installed.

In Aquidabam, the electricity supply has brought benefits to the community (including night classes made possible by the provision of lighting). However, the major benefit that has arisen is from the refrigeration units that allow the cupuaças to be sold off-season when prices are higher.

In another isolated village (Vila Soledade) an unreliable diesel generator with high running cost was replaced, in 2003, by a new unit adapted to use in natura palm oil as fuel. For the 700 inhabitants of this village—an organised community with schools, churches, food stores and public telephones—the project brought an increased and more reliable electricity supply and, most importantly, use of a locally produced biofuel. A unique feature of the project is that there is now an ongoing, parallel project to grow palm trees to provide sufficient oil to cover most of the electricity demand.

The positive results of this project have led to its replication in other parts of the Amazon.

### Policy recommendations

Analysis indicated the following policy recommendations:

- Where incomes are low, electricity supply must contribute to activities that promote economic opportunities for inhabitants.
- If off-grid electrification is to be successful, a specific two-step approach must be adopted to assessment of the electricity systems of isolated communities. Local production chains should be identified and planners should then identify how electricity could increase value in those chains. This could be achieved by building of the capacities of local communities to make productive use of energy and of the potential for micro and small scale industries in the area. In other words, extending electricity services does not just mean providing physical access. A full package of extension services should be put in place and should be integrated into the planning stages for provision of new access.
- Rules for off-grid suppliers should be made flexible and should match communities' real needs (for example, in many isolated communities there is no need to supply power 24 hours per day (as rules require) since many people are outdoors most of the day).
- Local communities should be more involved in assessment and operation of off-grid systems. Capacity building should include education on regulations and alternative energy.
- In Brazil's interconnected system (as elsewhere), encouraging suppliers to use more efficient technologies, including low-cost grids, can help to moderate electricity prices.

### Successful implementation and key findings

As the 'Light for All' initiatives began or were completed in 2005, it is too early to assess their performance. However, an important factor is that these actions form part of an integrated approach to sustainable development that includes sinking of wells, provision of housing and development of productive activities. Expected outcomes are increased food production and investment in milk processing as well as making possible improved access to education and health services for local children.

Analysis of the tariff subsidy in the interconnected system shows that households consuming 31–80 kWh suffered a real increase of 56 per cent between 1994 and 2000, and close to 80 per cent for those consuming up to 30 kWh. Furthermore the discounted price, difficulties with revenue collection and power theft have adversely affected the financial health of distribution companies. This experience illustrates the difficulties in achieving universal access via tariffs that are affordable to the poor while at the same time ensuring financial viability of distribution companies.

### China

In China's rapidly developing economy an imbalance between power supply and demand is increasingly forming a bottleneck that is restricting development of the rural economy. The government has introduced a number of programmes that have been successful in expanding rural electrification.

The Rural Hydro-Based Electrification (RHE) programme—which implemented three batches of hydropower-based rural electrification systems in the 1985–2000 period—was the earliest and most widespread programme. It reached 252 million people, of whom 80 per cent were in poor, remote and ethnic minority regions.

The National Township Electrification Programme (NTEP) focused on providing remote unelectrified populations that would not otherwise be electrified with renewable-energy-based electricity. PV, wind power and small hydro power



(SHP) systems are now satisfying the electricity needs of townships without connection to the grid.

### **Successful implementation and key findings**

The RHE programme successfully combined local willingness with central government financing to allow the development of hydro-based projects that answered localities practical energy needs as well as helping to improve river regulation for drainage and irrigation and contributing to environmental protection. Government efforts included policy support from central government (e.g. policies clarifying plant asset ownership and financial issues), matched by support from local government in raising funds, providing labour and facilitating programme implementation.

The NTEP is almost completed. When it is, all of China's townships will have access to electricity both for household use and for centralised township services such as schools and hospitals, and residential requirements.

A unified implementation and management approach throughout was important in securing smooth progress for the programmes—the central government configured programmes at the national level and counterpart agencies implemented them downstream in accordance with local conditions and requirements. This approach avoided unnecessary bureaucracy and delay, as well as possible corruption.

The capacity of China's own market to provide the required technology and services was also very important. The RHE, for example, relied on mature SHP design, device manufacture, and civil construction experience within China.

### **Policy recommendations**

- Unified management and effective implementation within a vertical institutional framework can be key factors for success. A leading office with participation of local authorities can ensure that programmes are well coordinated with all sectors involved in poverty reduction.
- Several recommendations can be made regarding financing: electrification programmes for remote areas are investment-intensive and contributions from international donors can help to build up a sound base for such efforts; financing mechanisms should be developed to create a sustainable financing resource; government subsidy for the poor can serve as seed funding in the early stages, but favourable policies should be developed to attract private or PPP participation to gradually decrease dependence on direct government support; a rural electrification fund or renewable energy fund could be developed from a small levy on all consumers, with local governments being encouraged to provide matching funds from administration and provincial infrastructure construction budgets.

- After-sales service for operation of PV system is an important issue. Provision of continuous training in the local community is required to ensure safe and effective electrification. Similarly, follow-up support to finance battery replacement is also important. Some kind of fund or cost-sharing mechanism needs to be provided for the purpose.

## IV – Participation Of Local Communities

The participation of local communities at every stage of electrification initiatives can bring very great benefits. Conversely, its absence can lead to the failure of otherwise well thought out electrification plans. The importance of community involvement is summed up in Box 6.

### South and South East Asia: Nepal and Indonesia

In the 1990s, Nepal and Indonesia, faced with financial difficulties in extending their national grids to rural areas, embarked on programmes promoting off-grid use of RETs.

During the 1980s and 1990s, Indonesia introduced successful demonstration projects using small PV systems and

a Presidential Aid/Assistance Project (BANPRES), which had the goal of testing the technical and social viability of PV for large-scale household electrification programmes. In 1997, the government set a target for 50 MW<sub>p</sub> of PV to be installed by 2005. Under these schemes, users made down payments and then had to meet monthly fees, meaning that selection for participation was based on ability to pay.

The E7 network<sup>4</sup> then launched one of the first programmes to disseminate RETs using a bottom-up approach. Communities were mobilised through focus group discussions involving both men and women in what was possibly the first initiative to include women so conspicuously in all aspects of electrification.

4

E7 members are electricity utilities of G7 countries. There are currently 8 members.

#### Box 6: Benefits of public involvement

Public involvement can bring a range of benefits to all stakeholders including governments, developers and other parties.

##### For governments

- Increased credibility and legitimacy through transparent decision making (particularly important when making controversial decisions).
- Positive relations between government departments when planning public involvement.
- Increased commitment of all stakeholders to decisions made.
- Development of a sense of responsibility and ownership towards projects among local communities.
- Increased equity within society

##### For developers

- Better information about the needs and preferences of local communities.
- Acquiring of useful local knowledge in early project planning phase.
- Better technical design, and therefore reduced project costs.
- Reduction in risk of serious confrontations, thereby minimising delays and long-term costs.
- Increased chance of securing further contracts as a result of positive national and international image.
- Increased knowledge on local energy requirements and potentials for the private sector and private-public partnerships to undertake projects.

##### For other parties involved

- Better understanding of development projects by the public and of implications of projects for people's lives.
- Provision of assistance that corresponds to actual needs.
- Improved sustainability of projects, meaning greater probability of real improvements in living conditions.
- Opening of a channel for communities to voice their concerns to government and developers.
- Better accountability of government and developers to communities and increasing level of confidence.

(Adapted from 'Public Participation in Electric Power Projects, UNDP, Programme for Asian Cooperation on Energy and the Environment' and TERI Report for GNESD)

In 1996, the government of Nepal started the Rural Energy Development Programme (REDP) to promote modern forms of energy, electricity in particular, in order to alleviate poverty, improve the livelihoods of rural people and preserve the environment. The main focus areas of the REDP have been development of micro-hydro energy systems, preservation of the natural environment, improvement of local economies, building of local people's capacity, local resource mobilisation and enhancement of local processes and institutions.

### **Successful implementation and key findings**

The Indonesian and Nepalese Case Studies were analysed in terms of four indicators: representativity (whether the decision making process is accessible to all sectors of the rural population); affordability (whether the electricity is affordable for the rural poor); sustainability (mainly considering the technical viability of the project); and replicability (to what extent the programme could be replicated in other areas).

#### *Representativity*

The approach adopted in both countries succeeded in stimulating and maintaining community participation. Both sought to be as inclusive as possible so as to leave no one out of the decision making process.

A major focus of Indonesia's E7 project was the incorporation of all human resources available at the grassroots level. E7 initiated Focus Group Discussions (FGDs) where women were included on an equal footing with men to obtain their perspectives on the electrification process. Both men and women contributed to discussions of electricity service contracts at each stage up to project conclusion. Training programmes were also implemented with the assistance of local NGOs, to ensure acceptance of the electrification schemes and create conditions under which the projects could be maintained independently with a high level of community participation and user responsibility.

Nepal's REDP programme relies on the mobilisation of the community. In each village, community organisations (COs) and functional groups (FGs) are formed. Specifically, each household sends one female and one male representative to the COs. Each CO elects representatives to form the FGs, ensuring that every household regardless of gender, ethnic group and social status is represented in the decision making process. Furthermore, all important decisions (e.g. electricity tariff) are taken during mass meetings, where all of the community members gather for discussions.

Involving women in the community organisations is said to be one of the most challenging tasks of the community mobilisation process. Women interviewed during a field survey in Nepal said that they were surprised to be involved in the decision making process and felt shy to start with. The fact that COs are gender specific allows the women to gain self confidence and, by the time the FO is formed, they are used to talking in public, discussing and making decisions.

#### *Affordability*

In Indonesia, it was found that schemes that feature high down payments and short maturities for consumers limit electricity access to high-income groups. Cooperative membership fees in addition to the costs of obtaining a system can also be burdensome for villagers.

In Nepal, consumers using electricity for lighting found the cost to be the same as kerosene or less. However, the tariff structure (charging for power rather than energy consumed) is such that poorer people tend to find use of appliances difficult to afford.

#### *Sustainability*

In Indonesia, the use of locally made system components proved to be both financially and technically sustainable. An intensive training programme in operation and maintenance management was found necessary to ensure strong institutional support that users could rely on.

In Nepal, REDP-supported projects are technically sustainable because of the training of the operators and the maturity of the micro-hydro sector.

#### *Replicability*

Some of the innovative design features of the 50 MW<sub>p</sub> project in Indonesia have since been used in other World Bank/GEF financed projects. The project also encouraged Indonesian firms to manufacture system components, making them more affordable.

REDP, which began as a pilot programme, has expanded its activities to 25 districts in Nepal, working with different ethnic and income groups.

### **Policy recommendations**

In implementing projects such as those in Indonesia and Nepal, the following legal prerequisites, regulatory measures and institutional and organisational needs should be addressed:

#### *Legal prerequisites*

- A high level of decentralisation as well as government bodies responsible for rural electrification and RETs are necessary for the success of rural electrification projects involving local communities.
- To avoid early breakdowns and ensure long term technical sustainability, high-quality technical standards should be available and only qualified companies following these should install the energy systems.

#### *Regulatory measures*

- Independent power producers should be allowed to generate, transmit and distribute power and to set their own electricity tariffs.

#### *Institutional and organisational needs*

- A transparent institutional structure should be put in place during an electrification initiative.

- Organisations such as local NGOs should be available and allowed to work with villagers.
- Rural cooperatives should be intensively trained to handle technical, financial and other aspects of a project, and to interface with local, national and/or international project stakeholders.
- Local authorities should be included from the project design stage to ensure linkage between rural electrification and other development initiatives. Intensive monitoring should be conducted to ensure technical and financial sustainability of the project.

#### *Skills and capacity needs*

- Some community members need to be trained in both technical and project management aspects as well as in monitoring of the project.
- A network of reliable energy system manufacturers needs to be available and associated with the project from the beginning. This will ensure that the energy systems are installed to appropriate technical standards. If a network of suppliers is not available at the beginning of the programme, it could be created by using some of the programme money to encourage its development.

#### *Financing*

- Donors need to be involved in rural electrification initiatives and sensitised to the need for involving communities in such programmes. Financial institutions able to manage the money granted by the donor need to be in place.
- Local communities need to have access to local banks to deposit the revenue generated by the electricity tariff.
- Availability of financial institutions lending small amounts to poor communities is also a key factor for the success of community-based electrification initiatives. This might require an awareness-raising campaign, as there is often a perception of high risk in rural electrification programmes.
- Financial mechanisms (subsidies, tax credit, etc.) should be developed to help local communities and the private sector manufacturing rural electricity systems.
- Subsidies should be fixed carefully in accordance with factors such as village population, median family income, etc. to ensure that they are effectively channelled to lower income groups.

## **India**

Much of India's power sector reform has concentrated on conventional measures such as unbundling and privatisation. However, there are positive examples of rural electrification initiatives that have closely involved local communities, often organised into cooperatives (see Box 7).

For example, in the Sundarbans Islands, in West Bengal, schemes using biomass gasification, SPV and wind-diesel hybrid systems have helped commercial activities to flourish and have brought improvements in health and education. An underlying principle for these schemes was that active involvement of consumers was paramount for success.

In a second Case Study, the Anakapalle Rural Electricity Cooperative Society (ARECS), in Andhra Pradesh, involved local people in an effective cooperative model that distributes energy but is not involved in generation.

### **Successful implementation and key findings**

The Sundarbans and ARECS programmes have made significant social and economic impacts on their respective regions, especially encouraging commercial activities. They provide important lessons about how to devise mechanisms to make local communities an integral part of electrification initiatives.

First, there is a need to design mechanisms to make local communities an integral part of initiatives and to consult local people right from the planning phase. This strengthens community involvement at the start and helps in overcoming any perceived barriers to introducing a new technology.

Second, to ensure that community participation is sustained, it is vital to inform people about the use of electricity in general, and more specifically about the technology used. In Sundarbans and ARECS this was achieved through awareness programmes. Technical skills for routine maintenance were also taught to young people, both providing employment and enhancing people's economic implication in the electrification project.

Financial commitment on the part of the community can also be important for success. For the ARECS initiative, 30 per cent of the equity was raised from the local community

#### **Box 7: The cooperative model in India**

A cooperative can be defined as a group of consumers or producers banding together to achieve a common business purpose.

In India, cooperatives have been significant in overcoming poverty and encouraging socio-economic growth since independence, in 1947.

Rural electricity cooperatives (REC) were first mooted in the 1950s and now, in spite of misgivings about financial deficits and high subsidies for some of them, a nationwide sample has shown that REC-served villages have household connection rates four times greater than villages served by the state electricity board.

by connection charges. This not only helped raise capital for the cooperative, but also increased local people's sense of ownership. In Sundarbans, where the scheme is for a renewable-energy-based mini grid, capital support was primarily in the form of grants and loans (highlighting the need for capital support to promote these technologies). However, connection charges ensure a certain degree of financial commitment by the local communities

Another important aspect of both the Sundarbans and AREC schemes was the link between the electrification project and the use of electricity to pump water. Integrating energy and water services in this way greatly enhances the benefits of electrification by meeting two basic needs instead of just one.

### Policy recommendations

The following are key policy recommendations to ensure successful community participation in rural electrification initiatives.

- Policymakers must understand that public participation is an ongoing process and that it should be integrated into the overall decision-making framework.
- Implementing agencies must recognise that local people are best equipped with knowledge about their natural, social and cultural environments; working with them can help identify key concerns and issues right from the planning stage.
- Understanding public perception of electrification initiatives is important. NGO's and development agencies should be consulted at an early stage to understand the public's potential expectations regarding the project.
- A flexible and conducive regulatory environment is essential to promote community participation. Regulatory regimes should foster autonomy of cooperatives; consultative procedures that take account of concerns of weaker sections of society should also be established.
- It is essential to establish sound monitoring and evaluation of programmes to assess performance of community-based models.
- Promoting electrification through active participation of local communities calls for adequate institutional support. In planning village-level electrification initiatives planning often lays emphasis on technical design and operating and management aspects, overlooking management.
- Involvement of NGOs and local entrepreneurs is crucial in mobilising the rural communities.

- Capital subsidies are inherent to rural electrification, but subsidies are only useful in enhancing electricity access if they are targeted efficiently.
- It is essential to place electricity in a holistic framework of rural development to enhance the benefits of electrification and its contribution to development
- Distributed generation (e.g. as in the Sundarbans) can play a key role in meeting electricity needs in villages where grid extension is neither logistically nor economically viable.



In Sundarbans, entrepreneurs now generate more income because stores with electric lighting can stay open later

## V – Conclusion

This survey of the work of the GNESD's Energy Access Working Group began with a stark truth: in spite of a considerable period of power sector reforms, many of the world's poor still lack effective access to modern energy services. The reform process has, by and large, failed the poor.

In contrast to this, the Case Studies presented in the survey send out a strong signal that failure is far from inevitable. First, they show that when policies that explicitly address the needs of the poor are properly designed, a top-down approach can do much to avoid the dissipation of resources and help to prepare the enabling environment that providers need if they are to successfully serve the poor.

If the poor are to have access to affordable electricity services, governments, regulatory authorities and electricity agencies need to establish key measures to protect (i.e. ring fence) funds: transparent project selection processes, stringent monitoring of fund disbursement, and detailed standards and guidelines that ensure low costs.

But the survey also shows that this top-down approach cannot by itself guarantee success. Many energy projects have failed because they have not taken account of local realities on the ground and have overlooked the importance of local knowledge and the potential dynamism of communities that have a sense of ownership of projects. The Case Studies that focus on community participation and the resulting policy recommendations indicate ways in which channels of communication can be opened to give communities a voice that both policymakers and service providers can hear, and that can help steer projects to success.

Related themes, stressed in the policy recommendations, are the need for energy to be provided for uses that generate income and the need to make energy access part of an integrated approach to sustainable development, notably by integrating it with other services (for example, water), to provide a basis to climb out of the poverty trap. Poor people everywhere are willing to pay for their services and are anxious to use them to start the development process. Carefully designed policies that fill the existing vacuum are the key to initiating that process.

In summary, we can conclude that focussed and innovative research with a focus on pro-poor policies could have a significant effect on poverty reduction if implemented efficiently by governments. Use should be made of past experiences to focus research on a change in approach to the issue of availability of clean energy services for the poor, in order

to develop technical and financial innovations and institutional strengthening through improved human resources and good governance.

Research, in turn, should lead to guidelines or rules of business for governments that allow them to adopt a fresh approach that is more clearly oriented towards a pro-poor energy strategy. Innovative policy research in the energy sector can provide new knowledge from which to forge better practices and frameworks that will improve energy access for the poor. Such knowledge will also foster capacity building and tailor-made training programmes that will allow policymakers, energy and non-energy experts, and planners to adopt a learning-by-doing approach that is supported by research. This will enable them to switch to a fast track to implementation of pro-poor poverty reduction policies to attain the Millennium Development Goals.

And finally, as a number of the GNESD Phase III Case Studies have underlined, poverty reduction cannot be achieved through energy access alone. Energy access can act as a catalyst, but targets will only be met if energy planning is integrated into overall development strategies for other sectors.