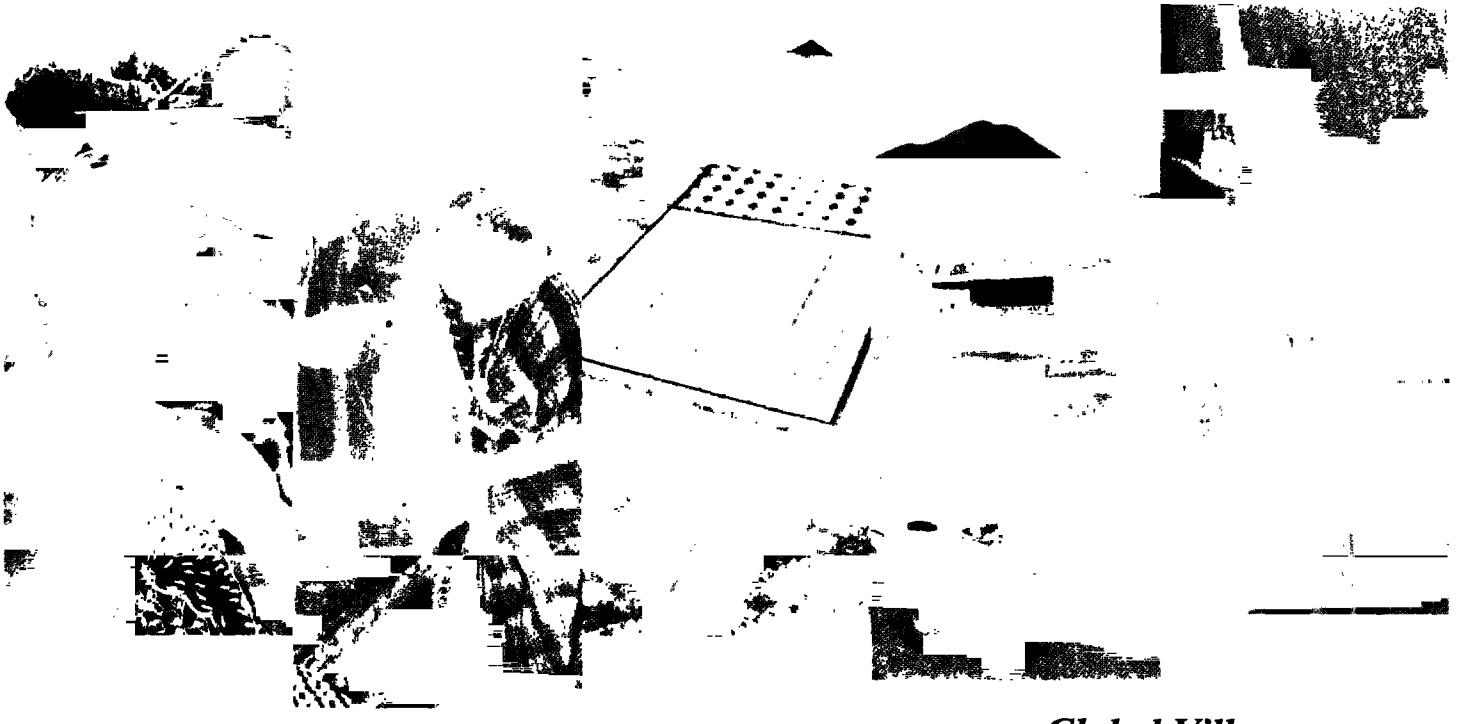
ESM268

Energy and Poverty Reduction: Proceedings from South Asia Practitioners Workshop Colombo, Sri Lanka, June 2-4, 2003



Global Village

Energy Partnership

(GVEP)

Energy

Sector

Management

Assistance

Programme

ESMAP

Report
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JOINT UNDP / WORLD BANK

ENERGY SECTOR MANAGEMENT ASSISTANCE PROGRAMME (ESMAP)

PURPOSE

The Joint UNDP/World Bank Energy Sector Management Assistance Programme (ESMAP) is a special global technical assistance partnership sponsored by the UNDP, the World Bank and bi-lateral official donors. Established with the support of UNDP and bilateral official donors in 1983, ESMAP is managed by the World Bank. ESMAP's mission is to promote the role of energy in poverty reduction and economic growth in an environmentally responsible manner. Its work applies to low-income, emerging, and transition economies and contributes to the achievement of internationally agreed development goals. ESMAP interventions are knowledge products including free technical assistance, specific studies, advisory services, pilot projects, knowledge generation and dissemination, trainings, workshops and seminars, conferences and roundtables, and publications. ESMAP work is focused on three priority areas: access to modern energy for the poorest, the development of sustainable energy markets, and the promotion of environmentally sustainable energy practices.

GOVERNANCE AND OPERATIONS

ESMAP is governed by a Consultative Group (the ESMAP CG) composed of representatives of the UNDP and World Bank, other donors, and development experts from regions which benefit from ESMAP's assistance. The ESMAP CG is chaired by a World Bank Vice President, and advised by a Technical Advisory Group (TAG) of independent energy experts that reviews the Programme's strategic agenda, its work plan, and its achievements. ESMAP relies on a cadre of engineers, energy planners, and economists from the World Bank, and from the energy and development community at large, to conduct its activities under the guidance of the Manager of ESMAP.

FUNDING

ESMAP is a knowledge partnership supported by the World Bank, the UNDP and official donors from Belgium, Canada, Denmark, Finland, France, Germany, the Netherlands, Norway, Sweden, Switzerland, and the United Kingdom. ESMAP has also enjoyed the support of private donors as well as in-kind support from a number of partners in the energy and development community.

FURTHER INFORMATION

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Energy and Poverty Reduction:

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How Can Modern Energy Services Contribute to Poverty Reduction?

Colombo, Sri Lanka

June 2-4, 2003

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Acknowledgments

The South Asia Practitioners Workshop (SAPW) benefited tremendously from contributions from a number of professionals and organizations across the globe, especially from those in Asia.

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Anil Cabraal & Katharine Gratwick
The World Bank

Venkata Ramana
Winrock International

Abbreviations and Acronyms

ADB	Asian Development Bank
CER	Certified Emissions Reductions
CFLs	Compact Florescent Lights
DESI	Decentralised Energy Systems Pvt. Ltd.
ECS	Electricity Consumer Society
ERAP	Energy Resources for the Alleviation of Poverty
ESCO	Energy Service Company
ESD	The World Bank/GEF-assisted Sri Lanka Energy Service Delivery Project
ESMAP	Energy Sector Management Assistance Programme
GEF	Global Environment Facility
GVEP	Global Village Energy Partnership
ICDP	Integrated Conservation and Development Program
LGA	Lalith Gunaratne Associates, Sri Lanka
LPG	Liquefied Petroleum Gas
MFI	Micro Finance Institution
MOU	Memorandum of Understanding
MVIT	M. Vishweswaraya Institute of Technology
NBFC	Non-Banking Financial Company
NGO	Nongovernmental Organization
NIC	Newly Industrialized Country
O ILAW	A Rural Electrification Program of the Philippines Department of Energy or Light
OOPP	Object-Oriented Project Planning
PCI	Participating Credit Institutions
PREGA	Promotion of Renewable Energy, Energy Efficiency and Greenhouse Gas abatement
PV	Photovoltaic
R&D	Research and Development
RERED	The World Bank/GEF-assisted Renewable Energy for Rural Economic Development Project
RET	Renewable Energy Technology
SAPW	South Asia Practitioners Workshop
SEEDS	Sarvodaya Enterprises and Economic Development Services Ltd
SELCO	Solar Electric light Company
SHG	Self Help Group
SHSs	Solar home Systems

UNDP	United Nations Development Programme
VHS	Video Home System
WI	Winrock International
WBREDA	West Bengal Renewable Energy Development Authority
WSSD	World Summit on Sustainable Development

Currency Equivalents

$1 USD = 58.06 Bangladesh Taka (BDT)
45.86 Bhutan Ngultrum (BTN)
45.86 India Rupees (INR)
72.93 Nepal Rupees (NPR)
57.47 Pakistan Rupees (PKR)
96.67 Sri Lanka Rupees (LKR)

Preface

If you live beyond the reach of the electricity grid does this mean you have no access to modern energy services? Countless individuals involved in energy service delivery in the South Asia region have demonstrated that the answer to this question is clearly "no;" there are clean, safe, affordable alternatives to grid-based power, including village-based micro-hydro schemes. Furthermore, these alternatives have the potential to reduce poverty and increase social and economic welfare by providing much needed services to schools, clinics, and small and medium enterprises, among others. Many of these alternatives, including those provided by Energy Service Companies (ESCOs) in the South Asia region, were showcased during the South Asia Practitioners Workshop (SAPW), held in Colombo Sri Lanka from June 2-4, 2003—the proceedings for which are featured in the following pages.

While alternatives do exist, the potential for scale-up is limited by a lack of coordination, understanding, and trust among the wide variety of stakeholders involved—namely governments, multilateral agencies, the private sector, nongovernmental organizations (NGOs), and local communities. These impediments to scale-up are not found in South Asia alone. The Global Village Energy Partnership (GVEP),[1] through which the SAPW was convened, has identified similar impediments throughout Africa, Latin American and the Caribbean, and East Asia and the Pacific.

Overcoming these impediments and scaling up modern energy services is, however, necessary if we are to make a lasting impact on poverty reduction and achieve the Millennium Development Goals by 2015. As one example, indoor air pollution, which contributes to child mortality, can be reduced by improved cookstoves and other related modern energy services. While such stoves exist, usage is only a fraction of what it could be because of limited distribution channels, income, information, and political will. As these impediments persist, two billion people continue to live without access to modern energy services—a number that grows daily.

GVEP has identified ways to address these impediments to scale-up, including holding multi-stakeholder, multi-sectoral workshops to enhance coordination among diverse groups, and catalyzing investments. As of July 2003, half a dozen such workshops have taken place around the world. The SAPW was among GVEP's efforts to encourage scale-up by promoting the sharing of lessons learned and the creation of a network of service providers throughout the region of South Asia.

[1] GVEP is a voluntary partnership launched at the World Summit on Sustainable Development in Johannesburg in August 2002, which aims to increase access of modern energy services to those under and unserved.

There is a consensus that the status quo—two billion people living without access to modern energy services around the globe—is unsustainable. There is also a widespread understanding that unless efforts to provide modern energy services are scaled-up, critical developments for health, education, agriculture, telecommunications, transport, small and medium enterprises, and other sectors will be impeded. May we, in our collective efforts, reverse this trend.

Dominique Lallement
The World Bank
Energy Advisor, EWD, The World Bank and Coordinator, GVEP Technical Secretariat

Executive Summary

1. Background

The Global Village Energy Partnership (GVEP), launched at the World Summit on Sustainable Development in August 2002, aims to increase access to modern energy services to those under and unserved. Activities of GVEP include assisting in the drafting and implementation of country action plans; capacity building; financing facilitation; knowledge sharing; and monitoring program results and impacts in a multitude of countries around the world. The South Asia Practitioners Workshop (SAPW) was part of a series of GVEP activities, which address the Partnership's aim of increasing access.

2. Workshop

The SAPW was held in Hotel Colombo Plaza, Colombo in Sri Lanka, from June 2-4, 2003. The South Asian region was chosen to host the workshop primarily because several good practices and lessons emerged from the village energy programs implemented in the region over the last two decades. The World Bank/UNDP Energy Sector Management Assistance Programme (ESMAP) and Winrock International (WI) jointly sponsored the workshop.

Before the workshop, the GVEP Technical Secretariat led an online consultation on topics relevant to the workshop. A total of 84 responses were received and the feedback was used to develop the principal themes of the workshop. Participants were also asked to send project profiles showcasing good practices from project implementation, and 28 profiles were received in response.

Fifty-five professionals from 12 countries participated in the workshop, 85 percent of them practitioners from South Asia. Representatives of Southeast Asia, Africa, and Latin America also attended as observers. The workshop consultations were held over two days, and a field trip was arranged on the third day to visit two community micro-hydro projects and a solar Photovoltaic (PV) dealership.

3. Purpose and Focus

The workshop had two primary objectives: (i) provide a forum for the practitioners to exchange lessons and best practices from their experiences in tackling the challenge of scaling up rural energy services; and (ii) develop methods, such as a community of practice and an online dialogue, to advance knowledge in the rural energy sector in the future. The principal focus of the workshop was

"tackling the challenge of scaling up of rural energy services" using non-traditional means. Discussion at the workshop was conducted over six themes, covering different aspects of the challenge of scale-up:

i) Areas that need strengthening to scale-up village energy access

ii) Policies of national, bilateral, and multilateral institutions in scaling up energy access

iii) Access to financing for village energy businesses and consumers

iv) Role of energy for improving the in economic situation and quality of life of households and enterprises

v) Influence of subsidies and fiscal measures on rural energy markets and services

vi) Ensuring consumer satisfaction: Product and service quality, and consumer education.

4. Summary of outcomes

In addressing the challenge of scaling up energy services to meet the needs of those under and unserved, the SAPW acknowledged that no single model or approach would suffice, despite considerable enthusiasm for the provision of rural services through private sector enterprises and NGOs[2]. It was also recognized that a coordinated approach among public and private energy service providers, rural consumers, government agencies, and international donors using grid and off-grid means, is indispensable if the delivery of sustainable modern energy services is to be accelerated. Some of the key recommendations from SAPW are:

Consumer Diversity. Poorer consumers must not be overlooked by projects and programs that seek to increase energy access to rural areas. Effective fee-for-service approaches are needed to deepen access to reach poorer consumers. Effective risk mitigation measures are also needed to encourage service providers to serve this market.

Energy Use Scale-up. There is a need to support a diversity of applications, particularly for productive uses and livelihood improvements, although energy is not the only critical input. Hence it is most important to understand the structure of demand, from consumptive uses (e.g., lighting and home power), community uses (e.g., health, education, drinking water), and productive uses (e.g.,

[2] This reflected the profile of the participants.

irrigation, agricultural product transformation, SME-manufacturing, telecommunications).

Capacity of Service Providers. The capacity and number of service providers must be increased significantly if access is to be scaled up. Future programs should address entrepreneur training and the issue of investment in service infrastructure as well as working capital required for service providers.

Donor Code of Conduct. There was a strong and unanimous appeal for GVEP and multilateral agencies to intercede on behalf of local service providers to convince bilateral donors to avoid technology-dumping projects. The participants felt that the World Bank, UNDP, and GVEP were in a special position to convince donors to adopt a "Donor Code of Conduct" where support is given to achieve the broader development objectives of a country and to strengthen local capacity to deliver affordable and sustainable services. Such approaches are also in the self-interest of donors as it would open up much larger market opportunities compared to the typical short-term market boost created by a heavily subsidized initiative in a project.

Gender Sensitivity. There is a need integrate a gender component into the provision of modern energy services to ensure that the needs of the full community are addressed. Women should also be directly involved in the decision making and planning of energy interventions.

Building Trust among Partners. The need for improved dialogue among key players leading to comprehensive village energy policy and planning was made evident. Among the issues that need attention through dialogue are: leveling the playing field among service approaches and technology options, and removing the antagonism between the traditional utilities and the private and non-profit service providers, recognizing that they can operate in different market segments. The practitioners acknowledged that governments had a critical market enabling and financing role to play.

Financing. Financing for pre-investment activities, investments, working capital, and consumer financing is essential. The participants noted the need for a rural energy fund financed through tax revenues with specific provisions for subsidizing the poorest.

Policy Issues. There was a strong appeal for strengthening the policies in developing countries. Key policy recommendations were:

- Adopt an integrated approach to energy services development planning and implementation that includes decentralized interventions;
- Create a level playing field for government-owned and private ESCOs;
- Facilitate "scalability" of rural energy services for the poor;
- Improve local capacity to facilitate decentralized implementation;
- Support community mobilization and participation; and
- Explicitly include energy as a critical input to poverty alleviation/ reduction efforts.

Policy instruments that could be considered included:

- Remove entry barriers, and adopt transparent and equitable subsidies;
- Remove market distorting pricing and taxation;
- Target financing mechanisms and incentives to benefit the poor;
- Provide funding and incentives for capacity building; and
- Ensure inter-sectoral coordination, including balancing environmental and poverty concerns.

Priority follow-up actions recommended to GVEP partners were to:

- Support development of a pro-poor, comprehensive rural and peri-urban energy policy as a part of national energy policy;
- Support development of appropriate policy instruments based on emerging best practices and lessons learned;
- Support establishment of a national rural and peri-urban energy policy formulation and implementation mechanisms; and
- Facilitate stakeholder participation in policy formulation.

Workshop Follow-up

The two immediate products expected after the SAPW:

Knowledge sharing: Using feedback from the online consultation and workshop proceedings, the GVEP Technical Secretariat will develop a Practitioners Compendium that will serve as a guide on emerging practices in designing and

implementing village energy programs. It will be targeted at all stakeholders. This Compendium will be available in print form as well as online.

Networking: GVEP will coordinate an informal network, including via a listserv, with all the practitioners who attended the workshop and others to act as a forum to exchange information and experiences, and benefit from each other's work.

Conclusion

The participants acknowledged that the SAPW provided an opportunity for them to obtain a broader cross-country perspective of issues, and to understand good practices and constraints with respect to off-grid and mini-grid service provision. It provided a unique forum for practitioners to interact and for relationships to form. It also identified the large remaining challenges: financing and capacity building and improved knowledge sharing. The practitioners recognized the need for broader consultation with beneficiary communities during project design and implementation, the importance of continuing to develop more scalable energy service delivery approaches, and the significance of engaging in deeper and more focused discussions with policymakers.

1

Workshop Overview

Background

1.1 Over two billion people, most of them in rural areas, but increasingly in peri-urban areas, still lack access to modern energy services, including electricity. Energy poverty is an integral component of economic poverty, and improving access to energy services is a necessary element for sustainable rural, economic and social development, however, provision of reliable and cost-effective energy services is rarely enshrined as a priority in most national policies. Since the World Summit on Sustainable Development, it is increasingly considered an important element in meeting the Millennium Development Goals, including halving the number of people living in poverty by 2015.

1.2 In South Asia, several energy service delivery initiatives have been developed to supplement government-led grid-extension programs. While many of these initiatives have been successful, they have remained of insufficient scale to meet the demand. Thus even after more than two decades of global and national interventions, the challenge remains as to how to scale-up energy services in rural and peri-urban areas in particular, so people may improve their productivity as well as quality of life in an environmentally sustainable way.[3] Documenting the existing approaches and disseminating them widely, and facilitating a continuing exchange of knowledge through networking are essential in promoting large-scale energy-poverty reduction programs. The South Asia Practitioners Workshop (SAPW), under the aegis of the Global Village Energy Partnership (GVEP), was designed specifically to facilitate this process.

[3] Despite innovative interventions, electrification rates for the countries within the region are as follows: Bangladesh: 31% with 19% rural and 80% urban, according to the Bangladesh Household Income and Expenditure Survey (carried out in Dec 2001). The current rate is higher, but estimated to be less than 35%, Bhutan 35%, India, 43%, Nepal, 15%, Pakistan, 53%, Sri Lanka, 62% (Department of Energy, Bhutan, 2002; IEA World Energy Outlook, 2002).

Global Village Energy Partnership

1.3 The Global Village Energy Partnership—launched at the World Summit on Sustainable Development in Johannesburg, South Africa, in August 2002—seeks to increase energy access to the millions of unserved and underserved people in developing and transitional economies to enhance economic and social development and reduce poverty. GVEP, a "Partnership of Partnerships" with approximately 250 members, brings together developing and industrialized country governments, public and private sector organizations, multilateral and bilateral organizations, consumer groups, and non-government organizations (NGOs). GVEP activities include assisting in the drafting and implementation of country action plans; capacity building; financing facilitation; knowledge sharing and monitoring results and impacts around the world. SAPW was part of a series of GVEP activities in different parts of the world, which address the Partnership's aim of increasing access.

Workshop Objectives and Focus

1.4 SAPW's aim was to support a regional consultation that would permit service providers to meet and share knowledge and experiences on nontraditional off-grid and mini-grid electricity services. This aim is aligned with GVEP's capacity building and knowledge management goals. The workshop had two primary objectives:

- To provide a forum for the service providers to exchange lessons and best practices from their experiences in tackling the challenge of scaling up the rural energy services; and
- To develop tools and mechanisms that would advance knowledge management in the rural and peri-urban market segments.

1.5 By aiming to understand the rural and peri-urban energy demand and tackle the challenge to deepen and broaden the market through filtering the actual field experiences, the workshop directly addressed the twin issues of energy poverty and market development—two of the key strategic areas in efforts to tackle the poverty challenge.

1.6 The primary focus of the workshop was on electricity services from renewable energy technologies. While there are rich experiences and successful models in promoting other options to meet the needs of unserved areas, such as biogas, improved stoves, and liquefied petroleum gas (LPG), the organizers agreed that the workshop needed to concentrate on a chosen topic to prevent the discussions from becoming diffused over too many topics and help derive

meaningful conclusions and recommendations. Several renewable energy-based lighting and power service delivery models have been conspicuously successful in South Asia, and have gone a long way in promoting commercialization.

1.7 Sri Lanka was chosen as the host country for the workshop primarily because a significant body of best practices in non-grid energy services has emerged out of both the country and the South Asian region, which has a great deal to offer to the rest of the developing world. This workshop also provided many of the practitioners from the South Asia region the opportunity to meet and share their experiences for the first time. Fifty-five participants representing 12 countries attended SAPW, more than 85 percent of them from the South Asian region (Annex 2). It is worth noting that most participants were from non-governmental organizations and the private sector. A few representatives from other developing regions were invited as observers with the expectation that similar consultations could take place in those regions in the future. Feedback from the participants indicates that the workshop largely succeeded in fulfilling its objectives (Annex 7).

Workshop Structure and Methodology

1.8 The SAPW was implemented in three modules:

1. Pre-workshop preparation

1.9 Two months before the workshop, an online dialogue was initiated among prospective attendees of the workshop and other stakeholders, including all GVEP partners, to encourage a discussion on the likely issues and themes to be covered at the workshop. This dialogue generated very useful discussion, attracting responses from 57 professionals. Apart from providing valuable suggestions on the issues relating to scaling up of rural and peri-urban energy services, the consultation strongly endorsed the need for a platform like this workshop for the actual service providers. A summary of the responses from the online consultation is provided in Annex 5 of this report.

1.10 In addition, the participants were asked to provide short case study descriptions on best practices/lessons from their programs in a pre-suggested format to ensure uniformity. Twenty-eight project profiles were received, which are presented in the companion ESMAP Technical Paper and also available through http://www.gvep.org.

2. Workshop

1.11 The workshop was held over two days, with an additional day dedicated to a field trip covering two rural energy projects (see Annex 1 for workshop agenda). The principal theme of the workshop was "tackling the challenge of scaling up rural energy services." At the beginning of the workshop, four practitioners made presentations on their experience in tackling this challenge (see Annex 4 for the presentations made at the workshop). Then, to examine and comprehend the different dimensions and aspects of this challenge, the workshop discussion was divided into six themes. A moderator coordinated discussion on each of the themes. Each moderator prepared a set of questions to form the basis for discussion in the breakout sessions. During the breakout sessions each moderator, through a set of questions and probing interventions, guided the dialogue and responses among the participants to elicit the most salient features of their experiences, as well as gaps that have not been addressed to date. Following the moderators' presentations on the outcomes of their individual sessions, a concluding plenary session discussed the significant conclusions and possible next steps for the various stakeholders involved in the workshop. The six themes and the moderators responsible for them are provided below:

i) Areas that need strengthening to scale-up energy access—Dipal Barua, Grameen Shakti, Bangladesh.

ii) Policies of national, bilateral, and multilateral institutions for scaling up energy access—K.V. Ramani, Consultant, Malaysia.

iii) Access to financing for village energy businesses and consumers—Jayantha Nagendran, DFCC Bank, Sri Lanka.

iv) Role of energy for improving the economic situation and quality of life of households and enterprises—Veena Joshi, Swiss Development Cooperation, India.

v) Influence of subsidies and fiscal measures on rural energy markets and services—Hari Sharan, DESI Power Ltd., India.

vi) Ensuring consumer satisfaction: Product and service quality and consumer education—Lalith Gunaratne, LGA Consultants Ltd., Sri Lanka.

3. Post-workshop follow-up

1.12 The SAPW project envisages four products: i) compilation of pre-workshop online dialogue, ii) workshop proceedings, iii) development of a practitioners network, and iv) a practitioners compendium.

- The formation of a network of practitioners would be facilitated (under the aegis of GVEP) to enable knowledge and information exchange in the future. This network will enable the practitioners to post case studies with good practices and lessons, to engage in debate on relevant village energy issues, and to develop cooperation among regions and programs.
- In addition to the proceedings and online dialogue, the GVEP Secretariat is developing a practitioners compendium, available in print and electronic form through http://www.gvep.org, which highlights lessons learned and best practices as contributed by participants during the SAPW. It is the expectation that this compendium will grow to encompass best practices from service providers throughout the developing world.

Summary of Workshop Presentations

1.13 Although the workshop was designed to encourage maximum exchange among participants, a series of presentations was also given over the course of the three-day event to provoke and enrich discussion. The full presentations are available in Annex 3. Immediately following is a summary of the key points that emerged from each of the presentations.

Inaugural Session:

1.14 **Honorable Karu Jayasuriya, Minister for Power and Energy of Sri Lanka:** In his welcome address, the minister stressed the government of Sri Lanka's commitment to the delivery of energy services to sustain economic growth and improve people's quality of life. He also underlined the government's commitment to rural electrification, with a goal to reach 85 percent rate of access to grid and/or off-grid electricity services under the current administration. In meeting this challenge, he reiterated the government's and his own commitment to and engagement in nonconventional energy supplies, including the significant opportunities for using renewable energy sources. The minister expressed his gratitude to both the United Nations Development Programme (UNDP) and The World Bank for their work within Sri Lanka in renewable energy development. Finally, it was his hope that participants from other countries would take with them the example of Sri Lanka's rural electrification programs.

1.15 **Dominique Lallement, Energy Advisor, The World Bank and Coordinator, GVEP Technical Secretariat:** In her presentation, Ms. Lallement illustrated the critical role that energy plays in poverty reduction and economic and social growth. Within this framework, she introduced the Global Village Energy Partnership (GVEP), which aims to increase modern energy services to

those under and unserved worldwide, highlighting themes that emerged from recent GVEP events, including the dire need for funding for pre-investment activities. Furthermore, Ms. Lallement acknowledged the important role of governments within the Partnership and the need to understand their policy priorities, such as 85 percent electrification for Sri Lanka by the current administration.

1.16 **Miguel Bermeo-Estrella, UN Resident Coordinator and UNDP Resident Representative, Sri Lanka:** Mr. Bermeo-Estrella, in his remarks, underscored UNDP's commitment to providing modern energy services, including through both ESMAP and GVEP. He noted his own experience in piloting off-grid renewable technologies in Pakistan 20 years ago and the failure to scale-up because of high costs. Within this context Mr. Bermeo-Estrella stressed the need to more actively involve the private sector.

Plenary Session:

1.17 **"Highlights of the Online Dialogue," Venkat Ramana, Winrock International:** Dr. Ramana provided an overview of the online dialogue, which was conducted in the months leading up to the workshop and moderated by Ms. Katharine Gratwick of the GVEP Technical Secretariat, to solicit key inputs on the focus for the workshop and foster exchange between the workshop participants and the larger base of GVEP partners. Two questions were raised to guide the consultation: 1) What critical changes need to occur to scale-up existing schemes to reach the unserved and underserved; 2) What best practices have emerged from experiences to date that could be replicated elsewhere? The primary themes that emerged, which were dealt with in greater depth during the workshop, included necessary policy reforms, measures to access financing, the requisite link between energy and socio-economic development, the importance of well-crafted subsidies, customer service, and solutions for scale-up.

1.18 **"Complementary Role of Grid and Off-Grid Rural Electrification," Mohammod Saiful Alam, Bangladesh Rural Electrification Board**: Efforts to electrify rural Bangladesh have been largely successful because of the decentralized model of the rural electric cooperatives. In his presentation Mr. Alam explained how these cooperatives operate within the wider national policy framework. He also sketched a picture of the potential supply options for further off-grid power generation, including biomass, mini-hydro, river currents, solar power, and tidal power. Despite widespread and largely successful efforts and a plethora of supply options, only 20% percent of Bangladesh's population has access to electricity.

1.19 **"The business of village energy business," Harish Hande, Selco India Ltd:** If solar home systems are to address household lighting and power needs, well-tailored consumer financing schemes must be available. Harish Hande's experience is that these schemes must be available at the consumer's doorstep to help build user confidence about the technology and mitigate upfront costs. A number of such schemes have been successful in Sri Lanka and India, with lesser success recorded in Vietnam, due to the fact that local rural banks have a tradition of lending primarily to the agricultural sector and solar systems are considered a luxury Mr. Hande stressed the costly nature of awareness programs to banks and consumers, noting that it takes a considerable amount of time to establish successful financing schemes. He also underscored the lack of adequate funds for the build-up phase of these lending and service programs.

1.20 **"Observations on livelihood impacts," Pavankumar Siddhi, Sungrace Energy Solutions Ltd:** Pavankumar Siddhi profiled the wide range of Sungrace's 7,000 clients in India—from basket weavers to blacksmiths—who have benefited from solar lanterns. Artisans have been able to increase their working hours and attract more customers and households general hygiene and productivity have been increased. Appropriately designed supplier and consumer financing schemes, as noted by Harish Hande, are, however, among the most decisive factors of success. Different micro-credit schemes are needed for farmers and hawkers, who have very different income streams. Mr. Siddhi also underscored the importance of collaborating with existing village-level organizations to deliver both product and financing instruments. Working with existing organizations builds credibility and ultimately helps guarantee payback.

1.21 **"Financing village energy products and services," Indrani Hettiarchchi, Sarvodaya Enterprises and Economic Development Services Ltd. (SEEDS):** While integrated doorstep service, including both micro-credit and maintenance, has proven to be successful for solar home systems in Sri Lanka, equally important is accounting for future grid developments. In her presentation Ms. Hettiarchchi highlighted, among other elements, SEEDS' buy-back arrangements for those who receive grid power. There is, however, insufficient coordination with the regional and national power authorities to ensure that off-grid and mini-grid developments are fully accounted for in the grid extension, which is necessary for the long-term sustainability of SEEDS and other micro-financiers.

1.22 **"Empower—Employment and Power Partnership for Village Development," Hari Sharan, DesiPower Ltd., India:** Rural electricity projects can do more than deliver light and improved productivity to existing enterprises;

they can also be a significant source of employment, as testified by Hari Sharan in his presentation of DesiPower Ltd., which provides a host of energy services based on biomass, biogas, and solar energy in India. Of utmost importance, as attested by Indrani Hettiarchchi, is, however, that a level playing field be created between off-grid and mini-grid developers, such as DesiPower, and the grid to ensure long-term sustainability.

1.23 **"Role of Energy Forum in the Energy Sector of Sri Lanka," Asoka Goonawardene, Energy Forum, Sri Lanka:** The Energy Forum, a non-profit organization promoting renewable and decentralized energy technologies, provides a unique convening function, allowing the vast array of stakeholders (NGO, local and national government, private sector, community organizations) to meet and exchange information on energy service delivery in Sri Lanka. The Forum also carries out its own studies, as described by Asoka Goonawardene, in an effort to improve delivery of energy services. Of primary importance to the Energy Forum is bridging the divide, as noted in earlier presentations, between the state-led grid extension and private sector and NGO off-grid and mini-grid development. Without reconciliation among these diverse stakeholders and a coherent national policy that reflects developments on the ground, modern energy service delivery will continue to be slow.

2

Thematic Discussions

2.1 The workshop focused on six themes related to the principal challenge of scaling up the provision of village energy services to a level where people may access sustainable, reliable and affordable energy services. These themes were covered in two sets of three parallel breakout groups (i.e., each participant could contribute to at least two discussions). The reports of the six moderators are presented in Annex 3. This section summarizes the discussions that occurred in each group, and the conclusions reached therein.

Areas that Need Strengthening to Scale-up Village Energy Services

Background

2.2 Access to modern energy services can help eliminate poverty in rural and peri-urban areas, especially through income generation and employment opportunities. In addition, modern energy services can yield multiple positive results in terms of improved quality of life, women's welfare, children's education, health benefits and other services such as water and telecommunications. Demand for modern energy services, however, outstrips supply. As one example, over 400 million households worldwide do not have access to electricity, with only 5 million households being added annually. For electricity delivery, the necessity of looking beyond the traditional grid-based approach and considering off-grid and mini-grid methods to meet the demand of the unserved rural and peri-urban populations has become clear.

2.3 Several successful models have demonstrated in off-grid or mini-grid technologies, but they have remained isolated and small in scale with limited impact. Considering the important role of energy in eliminating poverty and creating productive opportunities for income enhancement, it is imperative that decentralized energy services are scaled-up significantly; scaling up is the single largest challenge facing the energy sector in developing countries.

2.4 At the workshop, there was a clear consensus that the term "scale-up" has different connotations, including:

- Increase in modern energy consumption per unit (person/household/industry/land);
- Expansion of service area coverage, in terms of numbers of villages, households, and people with access to modern lighting, power, heating and cooling services; and
- Greater diversity of end-use applications based on modern energy services to progress beyond basic minimum uses at the household level to productive applications at the household and community levels.

Questions

2.5 The 20 participants in this breakout session debated the overarching theme of 'the areas that need strengthening to scale-up modern village energy services' using the following questions as the basis:

- What needs to be done to encourage government-owned utilities and other service providers to expand services and adopt broader technological choices?
- What are the options available and what needs to be strengthened to expand ways to mobilize additional resources to make rural electricity services affordable, especially to the poor?
- How can expansion of village energy services be packaged with complementary products and services so that social and economic development of rural communities can take place at a faster pace? What do governments, donors, service providers, and communities need to do for such approaches to be adopted and implemented rapidly and practically?

Conclusion

2.6 The participants reached a variety of conclusions relating to various dimensions of the challenge of scaling up energy services. The specific aspects influencing the challenge were also discussed and expounded upon in the other parallel breakout sessions, and there was considerable convergence on how to address the challenge.

- The key solution to scaling up energy services is to reduce the cost of access to reach a greater number of people. A number of steps need to be taken to accomplish this. While these steps have been adopted in the past, efforts have been uneven and uncoordinated. A more systematic approach is required, incorporating the following measures adapted to specific conditions.

    - Build local capacity to equip the communities to handle design, implementation, and management.
    - Expand the choices available by designing appropriate energy service packages that match technologies with energy demand.
    - Promote enterprise approaches to inculcate a culture of pay-for-service, which would create a stake in good performance of energy technologies for users as well as service providers, and result in high volumes and low costs.
    - Focus on energy services for productive uses to create economic opportunities that would improve consumers' ability to pay.
    - Hold governments and donors accountable for the costs they add to intervention programs by their excessive involvement in supply chain, i.e., the cost of bureaucracy should not be passed on to the consumer.
    - Channel funds directly through NGOs and private sector to minimize bureaucracy and corruption.
    - Maintain service facility and train local staff for providing maintenance and after sales service, which would lower the failure rates and keep lifecycle costs low.

- Building trust among consumers on energy choices offered and institutions implementing the programs is key in making the interventions viable and sustainable. Direct involvement of consumers in different stages of program implementation is important.

    - Provide consumers with correct and necessary information so expectations will be realistic.
    - Share successful examples and lessons with local communities to increase their level of comfort with the choices. Documentation and dissemination are critical in this regard.
    - Utilize local NGOs and micro finance institutions (MFIs) as a link between private sector and local communities.
    - Ensure that program risks are shared among all stakeholders in a balanced, transparent, and equitable manner.
    - Create a forum for policymakers and politicians so they can communicate better with the public.

- Developing appropriate policies at various levels is necessary to provide clear signals to all the stakeholders.
    - Express government commitment to private sector involvement and local capacity building in clear and unambiguous terms and follow up with necessary mechanisms to translate the commitment into programs.
    - Offer incentives for private investment in rural energy service delivery infrastructure.
    - Reward innovation in designing programs/models targeting the poor.
    - Subsidize "remoteness" to target poor since poverty is often increased by isolation.
    - Provide special incentives for energy service programs with income-generating activities.
    - Offer seed capital for prospective energy entrepreneurs to increase technical capacity.
    - Stop all dumping of donor funding that leads to unsustainable projects.
    - Ensure there is no direct competition between government and private sector in implementing programs.

- Most village energy programs, private or public, cannot be viable without incentives of some kind. It is important to design focused financial and fiscal incentive mechanisms, which would help move the sector in the direction of complete commercialization in the future while ensuring that access could be increased for the poor.

    - Subsidies should be continued, but in a focused way, with the objective of reducing them gradually.
    - Create awareness among MFIs and non-banking financial companies (NBFCs) regarding village energy programs so that they could enter the sector to provide financial packages for energy services.
    - Set up special funds to target the poor.
    - Develop innovative financial instruments like guarantee funds to mitigate the risk of new technologies or of new businesses (e.g. from the entrepreneur or financial intermediary perspective); this is normally done by equipment manufacturers.

Policies of National, Bilateral, and Multilateral Institutions in Scaling up Energy Access

Background

2.7 The policy context on village energy services has been transforming over the last decade, as underlined at the World Summit on Sustainable Development (WSSD), with the renewed emphasis on poverty elimination as the principal challenge. Energy is no more considered an "output" by itself, but an "input" to the process of economic development. Linked with this development approach is the focus on energy services for socially and economically productive applications as opposed to just household uses. Furthermore, the approach has shifted from traditional subsidy based approaches to liberalizing energy sector and markets by addressing a range of policy, institutional, and financing barriers. Despite notable progress in these reforms, the majority of the rural poor still does not have access to modern energy services, and scale-up remains a serious challenge. There is a need to revisit the policies at various levels guiding village energy programs.

Questions

2.8 The following questions were put to the breakout session participants to identify the policy changes needed to accelerate the rural energy delivery in South Asia consistent with development priorities:

- What critical policy changes are required to enhance rural energy access, with priority to the "needs of the neediest?"
- How do you ensure consonance between pro-poor policies and environmental policies?
- Will greater privatization of electricity markets tend to "exclude" the poor and lower income groups who are unable to participate in the market? If so, what policy "safeguards" can ensure that the benefits of a more transparent and cost-effective market-oriented paradigm also ensure equity of access?
- Which energy policy changes can ensure a more balanced focus among (a) social and economic transformations in rural development, (b) electricity and fuels, (c) centralized and decentralized energy options?
- What incentives could be made available to the public sector, the private sector, and NGOs to ensure the delivery of both electricity and modern fuels to rural homes for basic needs as well as productive enterprises?

2.9 Fifteen participants debated these questions in the breakout session, which resulted in the following outcomes by way of conclusions and recommendations.

ESMAP Conclusions

- A poverty-driven approach has to be pursued in conjunction with the ongoing and future market transformation in rural energy. However, this needs a two-pronged strategy—one aimed at creating "markets" for the poor, whose ability to pay is limited, and the other a more conventional "penetration" strategy that targets those who can afford conventional services.
- National energy policies should explicitly include the following additional objectives to reflect a strong commitment of the government:
    - Promote local capacity to facilitate decentralized implementation.
    - Clear mention of energy as a critical input to poverty alleviation.
    - Adoption of a decentralized, integrated approach to development planning, including energy interventions.
    - Creation of a level playing field between public and private sector entities in program implementation.
    - Inclusion of environmental safeguards for scaling up services.
- Regulatory framework needs to be strengthened, and developed where it does not exist to address:
    - Service quality assurance, including standards.
    - Pricing.
    - Market entry barriers (e.g., licensing, clearance procedures, etc.).
    - Mandatory service quotas to ensure access for the poor.
- There is a need for a carefully designed subsidy regime that offers a package of instruments to meet different requirements of the stakeholders, based on the acceptance that subsidies in some cases have to continue until a level playing field is created for all forms of energy. Such subsidies should also be targeted in the form of incentives for those programs and energy systems, which could cater to productive applications (e.g., community level power supply systems, mini grids for small scale industries, etc.).

- Substantive support for research and development, and innovation in program implementation and product application are absolutely necessary to facilitate scale-up of energy services.
- Interdepartmental coordination should be achieved at national and provincial levels if energy services are to be targeted to various applications in the fields of agriculture, health, sanitation, small industry, education, water, etc.
- International donors should actively facilitate least cost technology transfer (which has not been effective to date) to ensure a level playing field. They should also consider setting special "energy fund" mechanisms especially for the poor, and tailor lending policies to the needs of the poor.

Financing for Village Energy Businesses and Consumers

Background

2.10 Rural electrification has in general focused only on extending the main grid. These grid-extension programs are often highly subsidized because financial returns on most schemes are low because of low energy consumption by individual household users, high cost of connecting dispersed consumers, and a tariff structure that favors small, household consumers. Decentralized renewable energy options have emerged as complementary alternatives through community-based power generation and home-based stand-alone systems, as they do not require as large up front investments (even though the up-front cost per KW installed is often higher than for conventional grid technologies). Availability of finance for such alternatives, however, has been an important barrier in scaling up these alternatives.

Questions

2.11 The key problem in financing village energy programs has been identified as "a paucity of debt capital for development of rural, off-grid energy solutions." To arrive at possible solutions to tackle this, the following questions were formulated and debated by the breakout group, which consisted of 11 participants:

- What have been the "successful" models and what led to their success?
- What are the remaining challenges in creating access to financing? How can the divergence between users and providers of finance be bridged in addressing these challenges?
- What are the recommendations for different stakeholders (credit users, credit providers, government, and donors) to address these challenges?

Conclusions

- Providers of financing (banks, NBFCs, MFIs) should develop a better understanding of the market. The wide range of players (consumers, entrepreneurs, equipment suppliers, etc.) has different financing requirements, and the instruments should be designed to meet the needs of the different segments of the market.
- Minimizing the transaction cost is key to making energy financing in remote rural areas viable and the cost of capital affordable. Working with locally established MFIs is an effective way of minimizing the costs. Standardizing procedures for lending, collateral requirements, and project due diligence would result in fast-track projects and reduced costs.
- Flexibility in structuring repayment terms would improve the credit access for consumers with different affordability profiles.
- Innovative institutional models are necessary to mitigate risks associated with rural energy lending. The models should be such that the risk would be borne by those who can manage them best.
- Training is required for both the lenders and the borrowers to develop a basic understanding of different technological options, financial management, and business skills, which could help ensuring both sustainable relationships and projects.
- Given the uneven capabilities of stakeholders in most village energy programs, project preparation assistance is absolutely necessary for feasibility studies, community mobilization, lending negotiations, institutional formation, etc. Upfront support in the form of grants and soft credit is essential. These costs would undoubtedly decline with experience and training.
- Setting up guarantee mechanisms against risk of loan default will increase the level of comfort in financing transactions. Such mechanisms should, however, influence rather than drive the investment decisions.

Energy for Improvement in Economic Situation and Quality of Life

Background

2.12 The rural household, farm, cottage industry, enterprise and community are the ultimate users of energy services and therefore are the most important stakeholders in the process of scaling up energy services. Energy services will only be scaled up if providers of such services understand and meet the needs of the consumer. Most of the failures in village energy interventions to date can be attributed partly or fully to the failure of providers to understand the needs of consumers, and vice-versa. The process of understanding is heavily influenced by the ability of the practitioners to grasp the realities of rural life. Thus it is

crucial that village energy projects be designed, implemented, and managed by those practitioners who are in proximity to rural communities.

Questions

2.13 The breakout group consisted of 15 participants, who dealt with the following questions:

- How can energy access be scaled up in such a way that the aspirations of the rural people are met, in terms of bettering their economic situation as well as their quality of life?
- What would scale-up of services mean to the rural communities and consumers in terms of their lifestyles?
- What are the roles for different stakeholders (service providers, donors, governments, etc.) in facilitating the scale-up of services?

Conclusions

- Additional time that becomes available from access to energy services appears to be the most valued indicator for quality of life among inhabitants of remote rural areas. Increased incomes, extra study hours, enhanced safety, larger connectivity, and entertainment through radio and television are all highly valued. These impacts need to be monitored, documented, and disseminated in a systematic way to be able to market the services properly.
- Understanding people's aspirations and designing appropriate energy service packages that lead to sustainable market development while meeting those aspirations should be paramount for the practitioners. However, to do this, practitioners need to understand the ingredients of good practices:
    - Various energy services, not just electricity, have the ability to improve the quality of life, so the interventions will have to be integrated;
    - Projects based on exclusively on 100% subsidies distort markets and prevent development of private entrepreneurs;
    - Willingness and ability to design energy and associated services to suit the requirements of the consumers, taking into consideration local culture and long-term sustainability;
    - Patience and competence to ensure people's participation and ownership of the community as a whole from the beginning to the end of a project; and
    - Willingness to educate the users on the limitations of technology so that people's expectations could be tempered with reality;
- Capacity building in the community of users, especially for women, is important. Institutional arrangements at the grassroots level should be

such that they could be empowered to own and manage the energy services in the rural areas.

- Increasing the understanding of the consumer and other stakeholders about market processes is another important element of capacity building.
- Governments should play the role of a facilitator to initiate and support public-private partnership mechanisms that are mutually complementary in scaling up of energy services in remote rural areas and to poorer sections of the population. Donors should concentrate on reducing the transaction costs of financing to communities to increase efficiency in delivering services.

Impact of Subsidies and Fiscal Measures

Background

2.14 Subsidies have been the mainstay of grid-based rural electrification as well as off-grid village energy interventions in most developing countries for several decades. Only in the last 10 years have efforts been made in South Asia—with the aid of a number of fiscal and financial incentives—to promote commercialization of village energy services. There have been some notable successes in this regard. Biogas digesters in Nepal, micro credit solar programs in Bangladesh, and village hydro programs in Sri Lanka are some of the examples in South Asia. Direct subsidies continue in many village energy programs in developing countries. On the whole, the record of subsidies has been quite mixed, and there are strong opponents and proponents of subsidy policies. Usually, subsidies are useful in the initial stages of the program, but eventually become self-limiting because the amount of subsidy available determines the magnitude of the program. Subsidies can therefore be a serious barrier in scaling up of energy services. As a result, any program or policy aimed at scale-up needs to consider the potential impacts of subsidy (or its absence) carefully.

Questions

2.15 Eleven participants discussed the following questions to examine the likely impact of subsidies and other fiscal measures on the scaling up of village energy services:

- What has been the effectiveness of subsidies and other incentives in achieving penetration of energy service delivery systems in the rural areas?
- What has been the impact of subsidies and other measures on accelerating commercialization of village energy service programs?
- What is the impact of subsidies in providing access to energy services for the poor?

- What are the issues related to subsidies and incentives in scaling up of energy services?

Conclusions

- While subsidies for village energy services are justified in the name of the poor and with the goal of providing incentives to increase quality and coverage, there is little evidence that they have actually benefited the poor, which comprise the largest percentage of rural populations. Most subsidy programs are stopped before they reach the poor; thus subsidy design and penetration time need to be scrutinized to ensure that the poor benefit.
- The equipment prices have not been tangibly reduced because of direct cost or interest subsidies. Investment cost subsidies, on the other hand, may have a potentially positive effect on the price of energy services because they help the volume of sales to increase, which in turn can further reduce the price.
- Subsidies could be a limiting factor in scaling up the energy services. Subsidy should be applied to high volumes by reducing the value of subsidy per unit gradually. Market forces should decide the parameters.
- Subsidies on fossil fuels should be eliminated to create a level playing ground.
- A tax could be levied on fossil fuels to raise funds for scaling up village energy services, especially targeted at the poor.
- The subsidies should promote community and bottom-up approaches. It is essential that affected grass roots enterprises and communities are fully involved.
- The overall conclusion is that subsidies should continue, but should be designed with specific goals in mind. They could be phased out gradually based on the market requirement. Subsidies should specifically
    - Be focused/targeted toward poor.
    - Be lifeline tariffs to meet basic needs.
    - Be matched for grid and off-grid services.
    - Address "remoteness."
    - Be investment cost subsidies to guarantee profitability of private initiatives.

Ensuring Consumer Satisfaction: Product and Service Quality and Education

Background

2.16 Commercial marketing of grid and off-grid decentralized technologies requires providers to focus on "customer satisfaction." Customers are satisfied

only if their needs are met in the most efficient way at a reasonable cost. Continued good performance is important if the customer is to pay money back where credit and other means are used to sell the energy systems.

Questions

2.17 The aim of the breakout session was to discuss how to ensure consumer satisfaction through product and service quality and consumer education.

- What should be the trade off between the cost and quality of systems based on the current level of affordability in the marketplace, willingness to pay, and the cost of the system? This would apply to any off-grid village energy system (solar PV, micro-hydro, etc.).
- How should standards be regulated and what role should the government play (in light of the new push to establish policies to incorporate off-grid and grid-based electrification under one umbrella)? How should this be different for decentralized systems like solar PV and mini grid systems like micro-hydro?
- What kind of delivery models would be appropriate in promoting village energy services (e.g., fee-for-service)?

Conclusions

End User Issues

- Mobilization and participation of the community is key to matching technological interventions with social needs;
- Currently there is a mismatch between community aspirations and the available energy service choices because of a variety of barriers; and
- Programs are still largely "technology push" supply-side initiatives.

Service Provider Issues

- Inadequate flow of information from utility, government, politicians;
- Need for consumer education to ensure they follow guidelines in using systems;
- Timely recovery of loan payments from consumers is a risk;
- Lack of standardization in equipment and procedures hurts the quality; and
- Quality standards specified by donor-funded projects are focused on specific components rather than processes- or systems, and often are tied to donors' own domestic suppliers.

Technology-specific Issues

- Skills of promoter/installer are not up to standards;
- Neglected maintenance is the most important reason for system failures and consumer dissatisfaction;

- Subsidies often distort priorities (promoters may be interested only in the subsidy); and
- Monitoring of the performance is essential.

The overall conclusion was that to affect the scaling up of energy services, the above issues have to be addressed. Some suggestions made in this regard were:

- Mobilize communities with the help of existing grassroots-level organizations;
- Ensure that awareness campaigns relate to rural life;
- Recognize, encourage, and facilitate local competencies in program design and implementation;
- Donors should provide support for R&D for appropriate technologies;
- Educate consumers about choices and specific appropriate technologies;
- Support regional sharing of knowledge of good practices and lessons;
- When establishing standards 'be safe rather than sorry' to minimize risk to end users;
- Maintain flexibility in the standards as projects evolve;
- Integrate off-grid energy with grid extension in the energy sector restructuring process—be transparent;
- Foster public-private partnerships to ensure that required services are provided at a reasonable cost; and
- Integrate energy objectives with development objectives at a decentralized level.

3

Workshop Conclusions

3.1 The workshop discussion generated: (i) an understanding of the role of rural energy services in economic development and quality of life improvements; (ii) an increased awareness of the challenges and approaches to deepening and expanding the market; (iii) concrete examples and highlights of how practitioners have tackled these challenges; and (iv) recommendations for overcoming the remaining challenges. It was made clear during the workshop that GVEP could be an effective vehicle for helping to address many of these challenges. It was also recognized that such recommendations must be analyzed and adapted to specific, local conditions.

3.2 The main conclusions from this workshop were as follows:

Knowledge Sharing

3.3 This forum provided the first opportunity for many of the practitioners to meet and share experiences across countries. The format of the breakout sessions was useful in giving the participants the opportunity to have more in-depth discussions on specific topics. The exchange needs to be proactively encouraged to continue, and to continue this exchange GVEP is supporting an online village energy consultation as well as creating and managing a common listserv for the participants.

The Challenge of Scale-up

3.4 While there was considerable enthusiasm for private/NGO efforts in the provision of rural services among the participants, scaling up to meet the needs of those under and unserved will require additional efforts. The issue of scaling up energy services has several dimensions and is more complex than previously considered:

3.5 **Consumer Diversity.** Increasing energy access to rural populations must encompass not only serving the richest in a rural community, but also the poorer households. The dominant existing service delivery models follow a top-down approach and consequently are reaching only the richest of rural consumers as they depend on sales of off-grid energy products to consumers for cash or for relatively short-term credit. More effective fee-for-service approaches are needed to deepen access to reach poorer households. Nevertheless few private or NGO delivery agents or financiers have the ability to handle the associated long-term risks of the fee-for-service model. Therefore, effective risk mitigation measures are needed that cover repayment risk, policy and regulatory uncertainties, and risk of natural/man-made disasters to encourage service providers to develop a deeper market. Service providers could also be given additional means-tested incentives to target poorer consumers.

3.6 **Energy Use Scale-up.** There is a need to increase energy usage beyond the basic minimum required for lighting and operating small appliances, thereby supporting a diversity of applications, particularly for livelihood improvements. The participants did, however, acknowledge that energy is but one input needed for productive use promotion.

3.7 **Practitioner capacity.** The capacity and number of service providers need to be scaled up significantly if access is to increase. This issue has not received adequate attention in past project designs, the majority of which are effectively still at a pilot scale. Training, investment in service infrastructure, and working capital required for service providers must all be addressed. To build capacity, it was suggested that there needs to be a way of working in partnership with traditional rural infrastructure agencies that already have substantive service delivery capability in rural areas. The Bangladesh Rural Electrification and Renewable Energy Project may provide additional lessons in enlisting electric utilities to consider off-grid options and building practitioner capacity. The Self Help Group (SHG) model from India was cited as a good model to consider for scaling up as well.

3.8 **Donor Coordination and "Donor Code of Conduct."** There was a strong and unanimous appeal for GVEP and multilateral agencies to intercede on behalf of local service providers to convince bilateral donors to avoid technology-dumping projects. Too many donor projects were viewed as offering short-term benefit to the donor country commercial interests and perhaps a few local "well-connected" firms. The heavily subsidized projects kill the commerciality of the market by creating unrealistic expectations among rural consumers. Furthermore the un-sustainability of too many donor projects gives the off-grid energy

technologies a bad reputation. There was an appeal for donors to avoid single projects and instead to contribute to strategic development of the sector, which includes and builds the capability of local service providers. While there is a recognition that many developing country governments are often attracted by "free" donor resources and are willing to accept most donor projects irrespective of long-term consequences (with the exception of Bhutan), the participants felt that the donors have a special obligation to "do no harm." They also felt that the World Bank and GVEP were in a special position to convince donors to adopt a "Donor Code of Conduct" where donors support the achievement of broader development objectives of a country and work to strengthen local capacities to deliver affordable and sustainable services.

3.9 **Public-Private Partnerships and Building Trust among Partners.** While there is much talk about building partnerships, there continues to be suspicion among key players—government, utilities, private sector, NGOs, and financiers. There is also a need to build partnerships with the beneficiary communities. The current situation calls for improved dialogue among key players with an aim at creating a comprehensive rural electrification policy and plan. Mechanisms must be in place for transparent and fair access to subsidy funds. Among key issues to be tackled through multi-stakeholder dialogue were: leveling the playing field (e.g., in Sri Lanka, no VAT on kerosene or electricity sales, but 10 percent VAT on other off-grid technology); and removing the antagonism between the traditional utilities and the private/NGO service providers (partly because of utilities fearing their reduced access to subsidy funds and competition). The practitioners acknowledged that governments had a critical role to play in creating market enabling markets and financing opportunities; therefore, there is a need to build trust among all partners: government, private sector, NGOs and financiers. The Energy Forum appeared to be a convening body that could be effective in building consensus among the key players in Sri Lanka. No similar forums were highlighted in other countries.

3.10 **Financing.** Financing for pre-investment activities, investments, working capital, and consumer financing is essential. While some projects have provided financing for project implementation, pre-investment funding is not an area that has received adequate attention and support. The exception cited was the GEF pre-investment support to develop village hydro schemes in Sri Lanka. Without this support there would be no incentive for local project developers to mobilize the local communities, organize the community into Consumer Electric Societies, help design the project, train operators and managers, and supervise construction. As noted above, risk mitigation instruments are also important. The participants noted the need for a rural energy fund financed through tax revenues with specific provisions for targeting the poor.

3.11 **Policy.** There was a strong appeal for strengthening the policies in developing countries. Key policy recommendations were:

- Adopt an integrated approach to energy development planning and implementation, including decentralized energy interventions;
- Create a level playing field for government-owned and private ESCOs;
- Facilitate "scalability" of rural energy services for the poor;
- Promote/enhance local capacity to facilitate decentralized implementation;
- Support community mobilization and participation; and
- Explicitly include energy as a critical input to poverty alleviation/reduction efforts.

3.12 Policy instruments that could be considered include:

- Remove entry barriers and transparent and equitable subsidies;
- Removal of market-distorting pricing and taxation;
- Financing mechanisms and incentives that target the poor and productive uses;
- Funding and incentives for capacity building; and
- Inter-sectoral coordination including balancing environmental and poverty trade-offs.

3.13 Policy recommendations to the international community included:

- Donor countries to demonstrate their own commitment to environment-friendly energy policies;
- Donor countries to increase technology transfer to level the playing field internationally; and
- Increased consultation with beneficiary-developing countries in design of international rural energy funding programs.

3.14 Priority follow-up policy actions recommended were:

- Support for a pro-poor, comprehensive rural and peri-urban energy policy as part of a national energy policy;
- Support to governments to develop appropriate policy instruments based on best practices and lessons learned;
- Support to establish a national rural and peri-urban energy policy formulation and implementation mechanisms; and
- Ensure stakeholder participation in policy formulation

4

Recommendations for GVEP

4.1 The workshop participants strongly endorsed the need for a global initiative like GVEP, and saw a clear role for it in facilitating several activities at international and national levels.

- Networking and knowledge sharing through workshops, online consultations, etc. among different stakeholders is seen as a key function for GVEP.
- GVEP should compile project profiles, best practices in terms of capacity building, local empowerment, financial and institutional models, developmental impacts, etc. and disseminate widely to the stakeholders the world over.
- GVEP should coordinate efforts at assessing energy service needs in different regions, and work with donors to mobilize resources for meeting these needs.
- GVEP should actively network not just with energy practitioners, but with other sectors working at poverty reduction so energy services could be appropriately targeted.
- GVEP should assist in evaluating the overall developmental framework within which the practitioners operate.
- GVEP should make special efforts to "genderize" the energy intervention processes. Highlighting the role of women in the energy system, family, and society, and educating men about this role is an important aspect of this process.
- GVEP should initiate a coordinated dialogue with and among donors to develop a "Donor Code of Conduct."

Annex 1

GVEP South Asia Practitioners Workshop

Colombo, Sri Lanka

Monday, June 2, 2003

Agenda

08:00 – 09:00	Registration
09:00 – 10:00	**Inaugural Session** ***Welcome*—Anil Cabraal, EASEG, Senior Energy Specialist, EASEG, The World Bank** **Inaugural Address—*Hon. Karu Jayasuriya, Minister for Power and Energy, Government of Sri Lanka*** *Global Village Energy Partnership*—Dominique Lallement, Energy Advisor, EWD, ESMAP Manager, The World Bank, and Coordinator, GVEP Technical Secretariat *Special Address*—Miguel Bermeo-Estrella, UN Resident Coordinator/ UNDP Resident Representative for Sri Lanka
10:00 – 10:30	*Tea/Coffee Break*
10:30 – 12:30	**Plenary Session: Overview Presentations** Chair: Anil Cabraal, The World Bank **Highlights of Online Dialogue** ***Venkata Ramana, Winrock International*** **Complementary role of grid and off-grid rural electrification**

Mohammod Saiful Alam, Bangladesh Rural Electrification Board

The business of village energy business
Harish Hande, Selco India Ltd.

Observations on livelihood impacts
Pavankumar Siddhi, Sungrace Energy Solutions Ltd.

Financing village energy products and services
Indrani Hettiarchchi, SEEDS Ltd.

12:30 – 14:30 **Lunch**

Luncheon Speaker: Hari Sharan, DesiPower Ltd., India
Empower - Employment and Power Partnership for Village Development

14:30 – 17:30 **Breakout Session I (Three Parallel Groups)**

Policies of national, bilateral, and multilateral institutions in scaling up energy access
Moderator: K.V. Ramani, Consultant, Malaysia

Access to financing for village energy businesses and consumers
Moderator: Jayantha Nagendran, DFCC Bank, Sri Lanka

Role of energy for improvements in economic situation and quality of life of households and enterprises
Moderator: Veena Joshi, Swiss Development Cooperation, India

Tuesday, June 3, 2003

08:30 – 09:30 **Plenary Session**
Chair: Anil Cabraal, The World Bank

Presentations by Moderators of Breakout Session I

09:30 – 12:30 **Breakout Session II (Three Parallel Groups)**

Influence of subsidy and fiscal measures on rural energy markets and services
Moderator: Hari Sharan, DesiPower Ltd., India

Ensuring consumer satisfaction: Product and service quality, and consumer education
Moderator: Lalith Gunaratne, LGA Consultants Ltd., Sri Lanka

What areas need strengthening if rural energy access is to be scaled up?
Moderator: Dipal Barua, Grameen Shakti, Bangladesh

12:30 – 14:00 ***Lunch***
Luncheon Speaker: Asoka Goonawerdene, Energy Forum, Sri Lanka
Role of Energy Forum in the Energy Sector of Sri Lanka

14:00 – 15:00 **Plenary Session**
Chair: Venkata Ramana, Winrock International

Presentations by Moderators of Breakout Session II

15:00 – 15:30 ***Tea/Coffee Break***

15:30 – 17:30 **Concluding Session**

Major challenges and follow-up actions needed to ***Scale-up Sustainable Village Energy Services for Poverty Reduction.***
Chair: Dominique Lallement, Energy Adviser, EWD, Manager, ESMAP, World Bank
(a) What could be done by the practitioners—private sector, NGOs, financial community, and others outside of the government and donor community— within existing policy constraints; and
(b) What policy changes are desirable for deeper impact, and accordingly, what priority actions are needed from governments and the donor community?

19:00 – 21:00 **Official Dinner**

Wednesday, June 4, 2003
Field Visits Deraniyagala Division, Sabaragamuwa Province

Site 1. Kambili Oya Gollahinna Village Hydro Project

Site 2. Tantirikanda Village Hydro Projectx

Annex 2

Workshop Participants

1. Fifty-five participants attended the workshop over two days. These comprised a range of stakeholders (Figure A2.1), but predominantly the project developers and NGOs, who implement the programs on the ground. However, a number of practitioners belonging to the government sector who implement the projects also participated in the workshop. Geographically, more than 60 percent of the participants were from South Asia, while the rest, who attended as observers, were from Southeast Asia, Africa, and Latin America (Figure A2.2). The participants from the U.S.A. are the workshop sponsors and organizers from the World Bank and Winrock International.

Figure A2.1 Distribution by Category

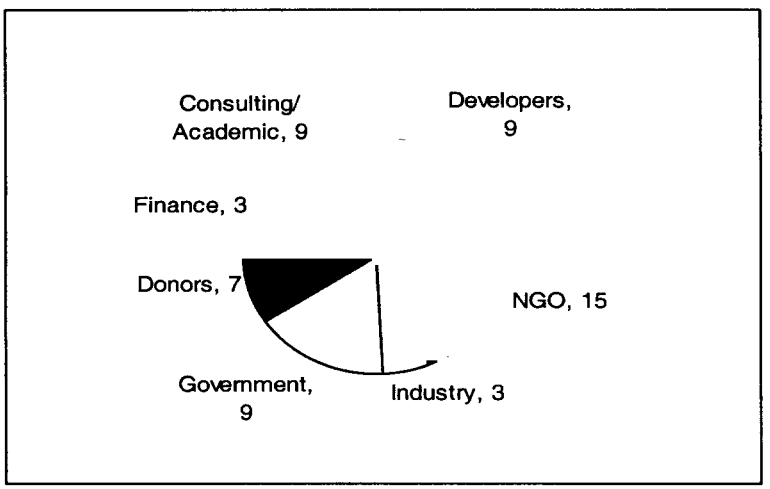
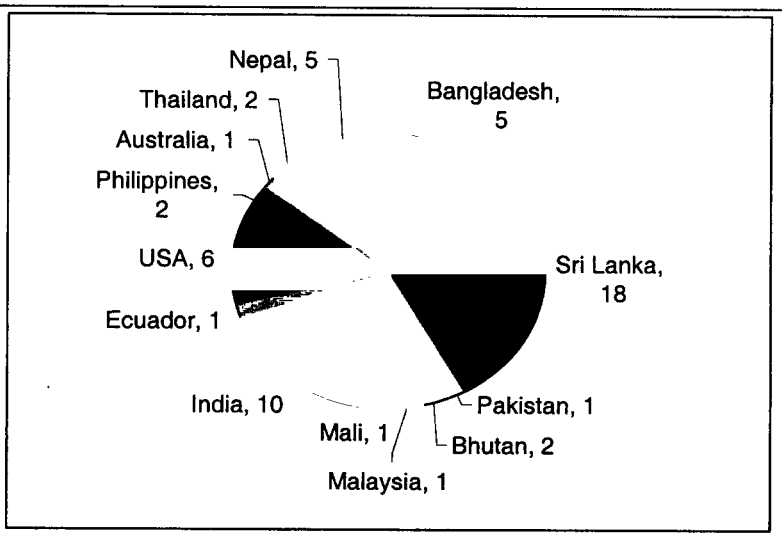


Figure A2.2 Distribution by Country



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Annex 3

Breakout Session Reports

This section provides the summary reports from the six moderators. During the workshop, the moderators were encouraged to adopt their own approach in conducting their individual sessions to elicit maximum response from the participants; some used case study examples from individual participants to illustrate the conclusions from the discussion, others used questions to discuss and derive conclusions. This diversity of methods resulted in a rich output of ideas and suggestions.

THEME 1

What Areas Need Strengthening if Rural Energy Access is to be Scaled Up?

Dipal Barua, Grameen Shakthi, Bangladesh

Background

Access to modern energy services can help eliminate poverty in rural and peri-urban areas, especially through income generation and employment opportunities. In addition, modern energy services can yield multiple positive results in terms of improved quality of life, women's welfare, children's education, health benefits and other services such as water and telecommunications. Demand for modern energy services, however, outstrips supply. As one example, over 400 million households worldwide do not have access to electricity, with only 5 million households being added annually. For electricity delivery, the necessity of looking beyond the traditional grid-based approach and considering off-grid and mini-grid methods to meet the demand of the unserved rural and peri-urban populations has become clear.

Several successful models have demonstrated in off-grid or mini-grid technologies, but they have remained isolated and small in scale with limited impact. Considering the important role of energy in eliminating poverty and

creating productive opportunities for income enhancement, it is imperative that decentralized energy services are scaled-up significantly; scaling up is the single largest challenge facing the energy sector in developing countries.

Definition of Scale-Up

Scaling up energy services could mean one or all of the following:

- Expand the coverage from the existing level to reach wider sections of the poor;
- Enhance the energy supply per capita (that is, quantity); and
- Increase the choice of energy options.

The immediate objectives of scaling up were recognized as:

- Extending the benefit of a successful village energy service to the masses;
- Developing a sustainable service delivery model, and;
- Accelerating the move toward commercialization.

Breakout Session

Twenty participants were present in this session. The main objective of the breakout session, which dealt with the overarching theme of the workshop, was to explore measures that mitigate barriers to scaling up, as well as to identify the key areas that need strengthening to ensure increased energy access to rural communities. The following questions were used as the basis for discussion:

- What needs to be done to encourage government-owned utilities and other service providers to expand services and adopt broader technological choices?
- What are the options available and what needs to be strengthened to expand ways to mobilize additional resources to make rural electricity services affordable, especially to the poor?
- How can expansion of village energy services be packaged with complementary products and services so social and economic development of rural communities can take place at a faster pace? What do governments, donors, service providers, and communities need to do for such approaches to be adopted and implemented rapidly and practically?

After nearly four hours of discussion, the participants reached a variety of conclusions relating to various dimensions of the challenge of scaling up of energy services. As was evident from the presentations at the plenary sessions, the specific aspects influencing the challenge were discussed and expounded upon in the other parallel breakout sessions as well. Furthermore, there was

considerable agreement on what the requirements are for addressing the challenge from the different sessions. The most important conclusions from this breakout group are presented below:

- The key solution to scaling up energy services is to reduce the cost of access to reach a greater number of people. A number of steps need to be taken to accomplish this. While these steps have been adopted under various intervention programs in the past, efforts have been uneven and uncoordinated. A systematic approach is recommended, based on the following measures, adapted to specific conditions.
    - Build local capacities to equip the communities in handling design, implementation, and management so transaction costs can be minimized.
    - Expand the choices available by designing appropriate energy service packages that match technologies with energy demand.
    - Promote enterprise approaches to inculcate a culture of pay-for-service, which would create a stake in good performance of energy technologies for users as well as service providers, and result in high volumes and low costs.
    - Focus on energy service for productive uses to create economic opportunities that would improve consumers' ability to pay.
    - Hold governments and donors accountable for the costs they add to intervention programs by their excessive involvement in supply chain, i.e., the cost of bureaucracy should not be passed on to the consumer.
    - Channel funds directly through nongovernmental organizations (NGOs) and private sector to minimize bureaucracy and corruption.
    - Maintain service facility and train local staff for providing maintenance and after sales service, which would lower the failure rates and keep lifecycle costs low.

- Building trust among consumers on energy choices offered and the institutions implementing the programs is critical in making the interventions viable and sustainable. Direct involvement of consumers in different stages of program implementation is important. The participants recommended the following steps:
    - Provide correct and necessary information to the consumers so expectations remain realistic. Unreasonable expectations and lack of education in this regard have contributed to a negative image whenever the technologies have fallen short in performance.
    - Share successful examples and lessons widely with local communities to increase their level of comfort with the choices. Documentation and dissemination is critical in this regard.
    - Utilize local NGOs and micro finance institutions (MFIs) as a link between private sector and local communities. With their local

knowledge and assimilation into the cultural milieu, they will be better able to communicate.
  - Ensure that program risks are shared among all stakeholders in a fair, transparent, and equitable manner.
  - Create a forum for awareness creation among policymakers and politicians so they can communicate better with the public.

- Developing appropriate policies at various levels is necessary to provide a clear signal to all the stakeholders.
  - Express government commitment to private sector involvement and local capacity building in clear and unambiguous terms and follow up with necessary mechanisms to translate the commitment into programs.
  - Offer incentives for private investment in rural energy service delivery infrastructure. While this has been done in some countries, it has been neither consistent nor adequate to be able to attract large private investment.
  - Reward innovation in designing programs/models targeting the poor. The target-oriented, number-crunching approaches in the past have not encouraged innovation, which could have led to cost reductions and better performance. Lessons need to be derived from this experience while designing scaled-up programs.
  - Subsidize "remoteness" to target the poor because poverty is often increased by isolation.
  - Provide special incentive for energy service programs with income-generating activities. Such focused programs would have direct linkage with the other developmental activities, and the people would appreciate how these programs would directly assist in bettering their lives.
  - Offer seed capital for prospective energy entrepreneurs to increase technical capacity. Lack or shortfall of initial capital is a major barrier for prospective entrepreneurs in this field.
  - Stop all dumping of donor funding that leads to unsustainable projects.
  - Ensure there is no direct competition between government and the private sector in implementing programs. There have been instances in the past (e.g., in India) where programs with cash subsidies and the ESCOs using soft credit competed for the same clients, creating uncertainty among consumers.
- Most village energy programs, private or public, cannot be viable without incentives of some kind. It is important to design focused financial and fiscal incentive mechanisms, which would help move the sector toward complete commercialization in the future while ensuring that access could be increased for the poor. Specific recommendations that emerged are:

- Continue subsidies, but in a focused way, with the objective of reducing them gradually.
- Create awareness among MFIs and NBFCs regarding village energy programs so they could enter the sector to provide financial packages for energy services.
- Set up special funds to target the poor.
- Develop innovative financial instruments like guarantee funds to mitigate the risk of new technologies or of new businesses (e.g. from the entrepreneur or financial intermediary perspective); this is normally done by equipment manufacturers.

Theme 2

Policies of National, Bilateral, and Multilateral Institutions in Scaling Up Energy Access

K. V. Ramani, Rural Energy Specialist, Malaysia

Background

Rural energy policies in South Asia have been changing over the years. Moving away from traditional grant-subsidy regimes, governments have sought to introduce policy changes in an attempt to liberalize energy markets. Subsidies on electricity and fuels are being rationalized, import barriers on energy technology are being lowered, fiscal and financial incentives are being offered to encourage private investment, and innovative approaches are being encouraged in rural energy financing and project delivery.

Reactions to the impacts of these policy shifts have been mixed. Governments cite higher numbers of households/villages electrified, populations with access, pump sets energized, fuel delivery nodes established, and so on, as indicators of progress. The private sector, NGOs, and the development community, on the other hand, point to persistent energy market distortions, unreliability of grid power even for connected consumers, the insignificant share of decentralized renewable energy in rural energy supply, and the adverse impacts of market mechanisms on the poor.

While reconciling these differing views is a challenge, the fact remains that the majority of rural populations is without access to electricity or other modern fuels. While policy change is taking place, the pace of the change might not be sufficient to achieve a major breakthrough. Rural energy policy in South Asia has, therefore, come under heightened scrutiny, especially in the wake of the Millennium Summit and the World Summit on Sustainable Development. The most notable outcome of these events has been a fresh call to reduce poverty

through a comprehensive package of measures, including measures to increase energy access. Given that much of poverty in South Asian countries is a rural phenomenon, the implication is that village energy policies have to transform further and more rapidly, to be able to contribute to a new, pro-poor rural development agenda. This is a core objective of the Global Village Energy Partnership (GVEP), under whose umbrella the SAPW was organized.

Organization of the Breakout Session

Fifteen workshop participants attended the breakout session. About half of them were private sector representatives engaged in renewable energy systems. The others represented national government agencies, NGOs, and the research community. The session lasted for five hours.

The aim was to identify what policy changes were needed to accelerate the process of rural energy delivery in South Asia consistent with current rural development priorities. Participants were asked to draw upon their experiences to discuss the central issues that impinge on policy, with special attention to lessons learned in their respective country contexts, as also in the international arena. In particular, they were asked to address the following questions:

- What critical policy changes are required to enhance rural energy access, with priority to the "needs of the neediest?" How do you ensure consonance between pro-poor policies and environmental friendly policies?
- What specific policies are needed to further open the markets for rural energy services? Will greater privatization tend to "exclude" the poor and lower-income groups who are unable to participate in the market? If so, what policy "safeguards" can ensure that the benefits of a more transparent and cost-effective market-oriented paradigm are gained in a "developmentally accountable" manner to ensure equity of access?
- Which energy policy changes can ensure a more balanced focus among (a) social and economic transformations in rural development, (b) electricity and fuels, (c) centralized and decentralized energy options? What incentives could be made available, respectively, to the public sector, the private sector, and NGOs to ensure the delivery of both electricity and modern fuels to rural homes for basic needs as well as productive enterprises?

The session used a variant of the Object-Oriented Project Planning (OOPP) methodology to provoke discussions on the above and related issues. The methodology essentially involved initial written contributions from each participant, followed by discussions on key items of interest. The conclusions on each topic reflected the majority views at the end of the session through a frequency analysis of individual contributions. The main point of divergence

between the full-fledged OOPP methodology and the one used in the session was that, because of time constraints, the discussions focused on suggestions and recommendations for the future, with problem analysis featured as a part of these. (OOPP methodology normally requires separate sessions for problem identification and solution suggestions.)

Policy Priorities and Objectives

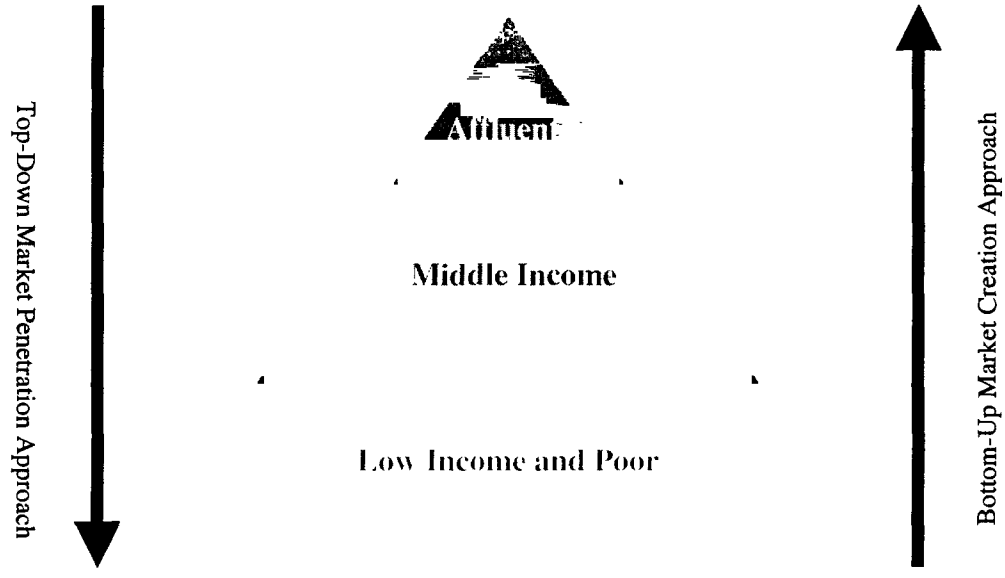
The session was broadly divided into two stages. In the first, participants discussed the central features of the policy environment today and identified the main priorities of future change. Given the workshop's emphasis on "scaling up" rural energy services, they established a common reference point as to what scaling up means in the policy context. A set of policy objectives was identified in relation to this. In the second, and more intensive, stage, a range of policy recommendations was made and prioritized, and a set of proposals was drawn up for immediate follow-up actions. The main outcomes of the first stage are summarized here.

Rural Energy Policy Environment

The participants felt that the following key areas of emphasis today characterize the rural energy policy environment:

- Poverty reduction is an overarching concern in rural energy;
- Energy services provided to the rural people need to target:
    - basic/social needs at the household level, and
    - productive needs at the household and community level
- Perceptions of policy gaps and the need for change differ among the government/public sector, the private sector, and stakeholders.

Given the above, a poverty-driven approach to rural energy development can be pursued in conjunction with ongoing and future market transformation in rural energy. However, it requires two parallel strategies, one aimed at "creating" markets at the level of the poor who do not have sufficient purchasing power to acquire electricity and modern fuels, and the more conventional market "penetration" strategy under which the initial beneficiaries would be those who could afford modern energy services. The two strategies are represented in the following figure:



"Scaling Up" Rural Energy Services

Scaling up rural energy services has three dimensions and it needs to be monitored accordingly by separate indicators for each. These are:

- Scaling up of modern energy consumption per capita/household;
- Expansion of service area coverage, in terms of numbers of villages, households, and people with access to electricity and modern fuels; and
- Greater diversity in end-use applications based on electricity and modern fuels to progress beyond basic minimum uses at the household level to productive applications at the household and community levels;

Policy Objectives

In addition to the current set of objectives that feature in national energy policies, the participants identified the following new ones for incorporation into policy documents:

- Promotion of local capacity to facilitate decentralized implementation, including community mobilization and participation;
- Explicit mention of energy as a critical input to poverty alleviation/reduction;
- Adoption of a decentralized, integrated approach to development planning and implementation, including energy interventions;
- Creation of a level playing field for government-owned and private energy service companies; and

- Inclusion of environmental safeguard objectives to facilitate the "scalability" of rural energy services for the poor. That is, such safeguards could increase attention to cleaner RETs that are suitable for rural situations otherwise, but are not receiving adequate policy emphasis to highlight their environmental advantages.

Recommendations on Policy Instruments

Based on the preceding discussions, participants recommended several policy measures on various aspects of rural energy. The relative priorities among these measures—and the relative priorities within each set of measures—were established by a voting process as the following:

Regulation/Deregulation

The regulatory framework for energy in general and rural energy in particular was identified as the most important area of policy change, receiving the highest number of votes. The following recommendations call for both further regulation in certain areas and deregulation in others.

- Regulation of service quality assurance
  - equipment standards;
  - supply reliability standards;
  - safety standards; and
  - joint government-stakeholder monitoring of compliance with standards, specifications, and service quality.
- Price regulation
  - rational cost-recovery pricing; and
  - price ceilings to protect poor and low income consumers
- Deregulation of market entry barriers
  - further privatization of energy services
  - a "hands off" policy on the private sector's role in renewable energy technologies, and
  - promotion of community-level ESCOs to lower the operation and maintenance costs of decentralized energy systems
- Mandatory service quotas to ensure inclusion of the poor in rural energy programs

Subsidies

Pricing and capital cost subsidies were identified as the next most important area of policy attention. As listed below, greater importance was assigned to the introduction of new pro-poor subsidies for rural energy services, with a stress on target group specificity and decentralized energy services.

- Introduction of subsidies:
  - focused/targeted subsidies for the poor;
  - lifeline tariff subsidies to meet basic needs;
  - matching subsidies for grid and off-grid services;
  - specific subsidies to address "remoteness;" and
  - investment cost subsidies to guarantee profitability of private initiatives.
- Discontinuation of subsidies on fossil fuel; and
- Transparency of subsidies.

Funding/Incentives for Capacity Building

Financing and incentives to develop capacity for rural energy development was considered the next policy priority, addressing both user needs and the needs of private energy providers. This countered the perception that local capacity was crucial to make use of locally available resources and to promote local self-reliance.

- User capacity
  - Awareness building on quality-of-life benefits of energy services; and
  - knowledge development on energy options.
- Enterprise capacity
  - gearing government/donor resources to commercial capacity building for renewable energy technologies; and
  - developing local/regional skills to further open markets.

Support Measures for R&D

Participants identified inadequate research and development as the cause of low manufacturing capacity in renewable energy technologies and other equipment for rural users. It was also considered the reason behind the high cost of technologies relative to rural incomes. Policy actions recommended to address the issue were:

- Increased investment in R&D; and
- Incentives to R&D focused on cost reduction to enhance affordability.

Intersectoral Coordination

Participants viewed the lack of policy coordination among different aspects of rural energy development as a key shortcoming. This was seen to hamper the effective use of modern energy for rural socio-economic transformation because

of a lack of other infrastructural inputs. Recommendations to address the problems included:

- Cross-ministerial policy analyses and coordination for optimal resource allocation; and
- Inter-sectoral policy coordination to balance trade-offs, for example, between market liberalization and poverty reduction, and between environmental and poverty agendas.

Taxation

Although governments in South Asia for rural/renewable energy development have offered certain tax incentives, the participants felt that these were not adequate to bring about a major change in rural energy supplies. Bearing in mind the budgetary resource constraints of governments, they recommended:

- A tax/levy on affluent users to raise funds for service extension to poor users; and
- Tax rebates for renewable energy technologies to promote the poor's access to energy services.

Fiscal/Financial Incentives and Mechanisms

As with taxes, some governments in the subcontinent have also offered incentives to promote rural energy services. Again, the participants felt more could be done in this area by offering:

- Incentives to renewable energy systems capable of meeting "productive" uses of energy, possibly to larger-capacity systems that can drive productive appliances besides meeting household needs.
- Incentives to sustain and expand effective demand, that is, the ability of rural people to afford modern energy services through higher purchasing power.
- Special "rural energy funds" for the poor, perhaps financed from tax on grid-connected urban users.
- Develop lending policies tailored to the poor.

Competition Policy

Market entry barriers, such as licensing and legal restrictions, were identified by the participants as stumbling blocks to scaling up rural energy services. In particular, they felt that decentralized renewable energy systems were not offered fair market conditions and, accordingly, called for policy changes to:

- Ensure a level playing field among all service providers; and
- Ensure free entry of producers and distributors into the market.

Investment Incentives

The participants recognized that governments have made an effort to provided incentives to the private sector for rural energy supply. However, they felt there was scope to further enhance the levels of these through:

- Fiscal/financial incentives to private sector rural ESCOs.

Support for Innovation

Participants also felt the need for policies to encourage rural development and rural energy supply NGOs with particular emphasis on:

- Fiscal/financial incentives to support innovative NGO approaches for replication.

Follow-up Actions

In the concluding part of the session, participants identified a number of follow-up actions that could be taken by GVEP. These were in two parts: one set of proposals focusing on actions on the part of the international donor community in general and donors who are partners of GVEP in particular; and another set of actions for the GVEP Secretariat in drawing up its future work program.

International Dimensions of Rural Energy Policy

While participants acknowledged and expressed their appreciation of the support provided by donor countries to rural energy in the developing world, they were of the view that such support should not be confined to financial/technical assistance but should be reinforced by the following concrete actions on their part:

- Donor countries to demonstrate their own commitment to environmental-friendly energy policies.
- Donor countries to increase least cost technology transfer to level the playing field internationally; and
- Developing countries to be included in design of international rural energy funding programs.

Priorities for Follow-Up Action

For the GVEP Secretariat, participants proposed a number of immediate actions to assist developing countries to design more robust policy frameworks

capable of meeting the GVEP objectives. These consisted of recommendations for:

- Support for a *pro-poor, comprehensive* rural energy policy as a part of national energy policy.
- Dissemination of good/bad practices on a continuing basis to facilitate decision making.
- Support to governments to develop appropriate policy instruments based on good/bad practice lessons.
- Support to establish a national rural energy policy coordination mechanism, ensuring stakeholder participation.

Moderator's Observations

Although the participants of the breakout session reflected a mix of private sector, government, and NGO representatives, the private sector group formed a substantial majority. As such, the outcomes of the session were guided to a certain extent by the private sector's perception of what governmental policy implies and what changes are warranted. Despite this slight bias, however, what was encouraging was the new awareness of the private sector about the social context of rural energy services, especially the poverty dimension. Several of the recommendations for policy change signal this awareness in the form of specific measures focusing explicitly on the poor. This is an encouraging development in light of policy innovations that might place new responsibilities upon the private sector in terms of "community" or "public service" obligations, while allowing further market liberalization.

Theme 3

Access to Financing for Village Energy Businesses and Consumers

Jayantha Nagendran, DFCC Bank, Sri Lanka

Background

The provision of electricity has traditionally been the preserve of state-owned power utilities, not only in South Asia, but also in many parts of the world. These utilities build, own, and operate the generation, transmission, and distribution facilities. Rural electrification has in general focused only on extending the main grid, often supported by heavy subsidies, which are deemed necessary as the financial returns on most schemes are low because of low energy consumption by individual users, high cost of connecting dispersed consumers, and a tariff structure that favors small, household consumers.

Technological advancement and advocacy by pressure groups have drawn government and private sector attention to new models of rural electrification, particularly to address the needs of unserved or underserved populations. These concepts and approaches include decentralized renewable energy options through community-based power generation, energy service companies, and home-based stand-alone systems, which do not require as large up front investments (even though the up-front cost per KW installed is often higher than for conventional grid technologies). Such alternative approaches are meant to complement and not compete with traditional grid extension, and they often serve as pre-grid electrification measures.

Financing models have emerged in recent years to meet the needs of these rural energy services using a combination of credit and grant funds. They have met with varying degrees of success. The credit users have typically been individual consumers, community-based micro power producers, and fee-for-service energy businesses and retailers of energy systems and components. Credit providers have ranged from mainstream banks and non-bank financial institutions to micro finance providers such as thrift societies and NGOs.

The Challenge

Given that the goals, requirements, and circumstances of the users and providers are varied, a one-size-fits-all approach to financing is not effective. Thus, the development of successful credit delivery models requires the matching of the needs and circumstances of the borrower with the requirements of the credit provider to create sustainable win-win solutions. Credit providers tend to suffer from traditional conservative views on lending and lack awareness of the technologies under consideration, and hence do not see rural energy services as a bankable business. On the other hand, those seeking credit often lack a credible track record, have a negligible stake in the venture, and expect the cost of credit to be at prime lending rates, if not better. Such issues will require greater knowledge sharing, practical mechanisms for risk mitigation, and the realization that trade-offs are inevitable as it may not always be easy to reconcile the divergent requirements of the credit user and the credit provider. These then are the challenges that practitioners are required to address.

Breakout Session

The aim of the breakout session held as part of SAPW was to identify practical solutions to address the paucity of financing for village energy businesses and consumers in South Asia. Participants were requested to draw upon their experiences to discuss the central issues that impinge on credit delivery, with special attention to lessons learned in their respective country contexts, and also in the international arena. The recommendations that follow

summarize the views expressed at the breakout session as well as those that emerged during other workshop sessions.

Principal Lessons Learned and Good Practice Approaches

Recommendations for Credit Providers

Market segmentation

One of the main barriers faced by private entrepreneurs and consumers is access to credit facilities for energy investments. Entrepreneurs setting up energy businesses or rural cooperatives setting up community-based power projects need long-term loans to finance project assets and short- to medium-term loans for working capital. On the other hand households in remote locations need consumer financing through instruments such as finance leases and easy purchase schemes to obtain electricity services through stand-alone solar home systems. Therefore the types of financial institutions and the financing instruments offered would vary with the target market segment.

Cost of capital

Customer service and financing at the doorstep are seen as critical success factors to scale-up rural energy access. Doing business in remote locations with a scattered population increases transaction costs and thus pushes up the cost of capital. However, rural end-users are willing to pay more for their electricity supply as long as it is reliable, better than what they use presently (for example kerosene), and safe. This dispels a popular notion that micro credit has to be cheap, and prompts the hypothesis that the mere access to credit through a willing and able financial intermediary is more important than the absolute interest rate charged.

One way of minimizing financing costs is to work with existing micro finance institutions (MFIs) that already have a rural client base. These clients are usually "members" of a credit society affiliated with the MFI. While this approach is popular, the downside is that it does not help a non-member who only wants financing for energy services.

Standardizing procedures for credit appraisal, loan documentation, and delivery, particularly for small, repetitive loans, will not only fast track credit processing, but also reduce transaction costs.

Lending terms should be standardized to send clear, consistent, and transparent signals to the market. Special or concessionary terms should also be gradually phased out while firms recognize the need for continued support to serve the poorer segments or specific developmental goals.

Outreach

Collateral requirements for small loans should be simplified and standardized, and limited to project assets and perhaps joint personal guarantees.

Structuring the repayment terms to meet the cash flow patterns of consumers is another aspect that improves credit access. Farmers, for instance, have seasonal income, unlike wage earners. Such flexibility in meeting users' needs is essential for rural outreach.

Larger financial institutions, including development banks, can improve their rural outreach by strengthening their links with rural MFIs and NGOs.

Risk mitigation

The main forms of risk in rural lending are the credit risk, liquidity risk, interest rate risk, and the operational risk. Innovation in designing risk-sharing mechanisms as well as adopting risk-mitigating strategies and practices are thus necessary for sustainable operations. Risk should be borne by those who can manage it best. For example, in the consumer financing of solar home systems a tripartite relationship between the MFI, customer, and solar dealer provides a stable risk-sharing arrangement although the loan, taken in isolation, is a transaction between only the first two parties. Thus risk sharing includes a whole host of features such as quality assurance, after-sales service, warranty arrangements, and training schemes involving parties who are even outside the loan transaction.

Training for lenders

Lending institutions both large and small need to be trained on rural energy systems. Not only should they understand the benefits and limitations of the various technologies, but they should also be in a position to structure risk-sharing schemes with other stakeholders. Through this process lenders begin to accept rural energy as a 'normal' bankable business.

Recommendations for Credit Users

Training for borrowers and consultants

Rural communities need training on basic technology, financial management, and business skills to successfully implement projects and service their loans. Such training may be provided by existing agencies or through project consultants who prepare individual projects. For community-based projects, lenders look for managerial capability and cohesiveness of the borrowing entity in addition to pure technical and financial viability of the investment project. Equally important is a genuine stake in the investment

project, usually demonstrated by way of a cash equity contribution coupled with manual work in lieu of payment. Understanding the lender's mindset is thus important for successful loan negotiations. The project preparation consultant on the other hand needs a sound knowledge of the technical, financial, and marketing aspects; the consultant should also be versed in the application of participatory approaches for social mobilization and have a sound understanding of local customs, norms, and culture.

ESCO model

The energy service company (ESCO) model could be used to deepen the market by increasing affordability through soft credit and strong after-sales service. This in turn could enhance the consumer confidence, leading to better establishment of alternative energy products. However, a pure fee-for-service model has not always been successful, particularly in a culture where ownership is as important as use. Throughout rural areas in South Asia, owning an asset is considered a social symbol, so many may want to have a system rather than pay a charge to receive just the service. Therefore it is important to match delivery models to local conditions.

Recommendations for Donors and Government

Operating environment

For interventions to be successful the operating environment should be demand-driven and commercially oriented, while enabling relevant stakeholders to overcome technical, financial, and institutional barriers. Government should be a facilitator, but be hands off. Commitment by government is very important, and this should be visible through clearly articulated policy goals regarding renewables and the creation of a level playing field for all technologies. The design of interventions should take a holistic view, and not just address credit access in isolation. The introduction of a new industry requires scale-up of capacity building initiatives for practically all stakeholders, including project developers, financiers, and end-users.

Flexibility in design

Donors and governments should realize that it is seldom possible to design a perfect project from scratch, more so in a new market. Hence the project design should provide adequate leeway for incorporating changes in the future based on implementation experience.

Industry associations

Industry associations should be encouraged. These associations may represent a technology sector, supplier group, project developers, or even consumers. Through a process of constituency building they are in a position to mainstream rural energy businesses and make them acceptable for bank financing. Industry associations are in a position to mitigate credit risk by requiring members to adopt defined quality standards and providing supplier and user training in a systematic manner. Consumer education and training, which lead to satisfied customers, are key factors for good credit recovery.

Subsidies

Subsidies are necessary to defray high initial costs until the market scales up. However, they should not kill local industry. Subsidies should be measurable, output-based, and phased out gradually. Capital subsidies serve as equity and thus reduce the quantum of debt financing required for a project, while not disturbing the value of the project assets used as collateral. This improves the security cover on the loan. Continuity of both incentives and policies is also important. Incentives should be available for a reasonable period and then progressively withdrawn based on market conditions.

Project preparation

Pre-investment financing for the preparation of small rural projects is necessary, but the issue here is who should bear this cost. Often rural communities cannot afford such services provided by consultants, and these costs should therefore be subsidized or paid for by a third party. Project preparation services include feasibility studies, community mobilization, society formation and training, loan negotiation, and project implementation assistance. A well-designed investment project prepared by a competent consultant lays a solid foundation for project success. It also provides the degree of comfort that a lender would expect on a loan that has, in practical terms, little or no security cover. Although project preparation costs may form a significant part of the total project cost, it can be progressively reduced through training programs and capacity building exercises targeting prospective consultants drawn from local level NGOs, firms, and entrepreneurs.

Guarantee funds

A partial credit guarantee fund will help in mitigating the credit risk of lenders and encourage them to finance this sector. This should be regarded as a supplementary measure, and not as a tool for inducing reckless lending through weak project formulation and credit appraisal.

Theme 4
Role of Energy for Improvements in Economic Situation and Quality of Life of Households and Enterprises

Veena Joshi, Swiss Development Cooperation, India

Basis for Discussion

At the outset, the 15 participants identified the "challenge of scale-up" as that of extending access of modern energy services to remote areas and poorer households in a sustainable manner at a rate faster than that achieved so far. The group resolved to discuss the specific topic of "improvement in economic situations and quality of life in rural areas" by addressing the many challenges associated with scaling up (e.g., greater number of energy services, deepening the benefits to poorer households in a community, introducing productive uses, and linking among practitioners).

The group recognized that access to modern energy services would redefine what well being has meant to the communities of users at the household and the enterprise level. Increasing access to rural areas was also seen as an opportunity to dismantle the energy services model structured around supply of grid electricity. For example, limited interventions like promotion of solar photovoltaics for lighting and entertainment brought in the joy of having light and being connected to the larger world, such as through television and increased educational opportunities.

The Process

The following three issues were explored during the breakout session:

- The principal lessons and good practice approaches used by practitioners in addressing the issues and questions;
- Major remaining challenges in scaling up rural energy services; and
- Recommended actions to overcome such challenges: by the practitioners, by governments, and by donor community.

The group addressed these issues by looking into their own experiences and listening to those of others. In groups of four to five, the participants narrated stories that related to changes in livelihoods and small enterprises. The community of practitioners was encouraged to reflect on: what, other than energy services, was essential; what seemed to be missing; and whether practitioners interface with the community successfully or unsuccessfully.

As each participant relayed his/her story, others were asked to note "what struck me most." The same subgroups then continued the discussion on "what struck me the most;" subsequently the groups were asked to identify best practices and challenges. The ways to deal with the challenges were finalized in the group plenary.

The Stories

A number of participants sent in the text of their stories, which they relayed during the breakout session. A sampling of these stories is featured below to convey a sense of the experience base on which the group built its perspective to deal with the scaling up challenge.

Overall, there was a sense of disconnect between the aspirations of the communities of users and the offer from the community of practitioners or the governments. While access to electricity appears to define the benchmark of access to modern energy services, some of the stories point to the possibility of redefining this benchmark.

i) ***Aspiration and Offer:*** Manju Giri, Bhutan

Situation: Phobjikha is a beautiful valley in Bhutan and is the winter home for the endangered black-necked cranes. The place is accessible by motor roads, but has no access to grid-based electricity.

Offer: RSPN, an NGO, has initiated an Integrated Conservation and Development Program (ICDP) there with the aim of preserving the valley as a winter habitat for the black-necked cranes, and developing the area into a model village for bio-diversity conservation. RSPN's attempt to introduce weaving as an income-generating activity and use solar sets to light homes has not, however, succeeded.

Aspiration: Though the villagers can purchase solar sets for themselves, they are concerned that if they do, the government will not provide high-quality grid electricity. It is a common understanding among women's groups in these communities that grid electricity would be an indispensable benefit in terms of economic productivity and improved health, sanitation, and education conditions. Grid extension, it is believed, would reduce communities' expenditure on LPG and kerosene as well as ease the pressure on forest resources in general. Hence, the reluctance to consider alternatives like solar appliances.

ii) *Power of Sun in the Night* *(Narrative by a housewife):* Indrani Hettiarchchi, Sri Lanka.

Situation: I live with my family in a remote village in Karuwalagaswewa in Puttalam District. My husband is employed and we have three children. My eldest daughter is studying for her GCE Ordinary Level Examination. Our area is so underdeveloped that we do not enjoy any of the facilities available to the privileged people in the city in the past. My children did their homework in the night by the aid of a bottle lamp, especially my eldest who studies late into the night. I used to watch over her with anxious care so that she would not fall asleep with the bottle lamp close by.

Ever since I visited Shayama (Somawathi's little daughter) at the General Hospital, I have felt depressed. Not even an enemy of mine should ever have to suffer that way. That pretty child is totally scarred from burns caused by a kerosene oil lamp accident. She is in so much pain. I used to wonder what if this happens to my daughter or to my other children. Since our village is situated in such a remote place, I was afraid that never in our lifetime would we enjoy grid electricity—a safe and better method of lighting.

Intervention: However, things changed dramatically. My husband came home one day with news of a lighting system that he had heard of, something to do with the power of the sun. It seems that some people from a light company had made inquiries at the Sunday *Pola* as to whether anyone would be interested in using solar power. Perhaps this was the answer to our problems. As promised, SELCO (the light company) people came to our house. They said that a seven-light system would be ideal. An initial payment of Rs.2000 and the balance to be paid on the date the panels were fixed. No! That would definitely not suit people like us. However strong the need was, we simply could not afford such a high investment. But there was a way out. The company could arrange for credit through Sarvodaya-SEEDS, where they give loans for setting up solar home systems. Next thing we knew, we had a brand new solar panel on our roof fixed there by SELCO, with which we signed an agreement to pay monthly installments, fixed at Rs.1300. The SEEDS' officer checked our monthly income, and suggested a reasonable payback scheme. Now, we have light in the night, thanks to the sun's power during the day.

Benefits: The relief is indescribable. My children study for longer hours—I have peace of mind that they will not be harmed. My husband gets up early to go to work, and I prepare our meals before dawn. I even milk the cows with the help of solar light. By doing this, I have time to cultivate my little vegetable plot so that we not only have fresh vegetables but also sell the surplus.

iii) Energy, Livelihoods, and Elephants: Leonard Tedd, Sri Lanka.

Situation: In rural Sri Lanka there is a severe problem at the interface between elephant and human populations. Herds of elephants roam the dry zone for food and water. When they move across the agricultural land the impact on farmer livelihood is significant as crops get trampled or pulled up and even houses are demolished as the mass of pachyderm blunders on through. Many farmers own guns, and understandably to protect their crops, houses, and families they shoot at the animal to scare it off. A small bullet or some shot pellets will rarely kill an elephant, but the metal will remain in their flank for years. They say elephants never forget, and consequently these animals frequently attack on sight and are feared like the cobra.

Intervention: One of the unexpected outcomes of the early research of the ITDG wind energy program was that a light, hung outside a house, that could keep the elephants away from houses and crops. This has a direct impact on reducing threats from the external environment.

Potential: Another way in which energy, livelihoods, and elephants are all intertwined in rural Sri Lanka is that separation of cultivation and conservation to protect both humans and elephants from each other can be humanely achieved with solar electric fencing. In rural areas there is an emerging niche for this application.

iv) Resourceful Entrepreneur: Bangladesh.

One entrepreneur, who makes furniture in rural Bangladesh, bought a SHS (17 watt) in 1996. He used to stop his work after dark but with the SHS, he extended the work by three hours employing two apprentices. Using the power from the SHS, he also installed a carrom-board for the village youth to play with and charged a game fee. The carpenter increased his income from making additional furniture, and also made money from the game. The apprentices are also earning a higher salary than before. The innovative entrepreneur was able to diversify his productive activities and better his economic position.

Conclusions

The conclusions of the group work largely emerged from the experience base of the group and focused on the roles of communities of users and practitioners.

Lessons and good practices

The benefits of extending the hours of the day seem to be a valued quality-of-life indicator. Additional study hours, increased safety, and extra work hours are

the key benefits. Improved connectivity and entertainment possibilities through TV are highly appreciated and desired. Increased livelihood options are an evident benefit. The niche for an appropriate energy service package seems to exist despite skepticism around the decentralized energy services option. The practitioners identified many ingredients that make up good practices, which are listed below:

- Not just electricity, but other energy services including improvements in traditional services, also bring about desirable changes in the quality of life;
- Projects based on exclusively on 100% subsidies distort markets and prevent development of private entrepreneurs;
- Willingness and ability to design energy and associated services to suit the requirements of the community of users;
- Patience and competence to ensure people's participation and ownership of the community as a whole; and
- Willingness to educate the users regarding limitations of technology that lead to a limited service compared to their expectations.

The deliberations then focused on the desirable arrangements/roles among actors as part of best practice approaches. The sense was that greater cohesion needs to exist among the industry actors. The role of the NGOs was seen to be an intermediary or a networker among users, producers/practitioners, and bankers. The need for capacity building, particularly in the communities of users, and especially of women, was highlighted. It was felt that the arrangements among the stakeholders should allow the communities of users to own and manage the energy services in the rural areas.

Remaining Challenges in Scaling up

The most important challenge is in grasping the reality of remote communities of rural and dispersed population living in close proximity to nature. The level of natural endowments and access to resources has a clear impact on the lifestyles of communities. Energy interventions need to be custom-designed to reflect this component of communities and to address the environmental sustainability.

For such targeted interventions to emerge, it is imperative that the interface between the communities of users and practitioners be based on trust and transparency. The challenge to the practitioners is to incorporate the role of the user community in end-use identification, design, and delivery. The elements of this role would include a common understanding on culture and mindset, awareness about the design, and what is needed to deliver, among other things. The longer-term sustainability issues need upfront and mature discussions on finance, subsidy, means to enhance purchasing power, and the tariff structure. In

essence, it is an exercise in building a different perspective on quality of life. In building such a perspective, the trade-off between energy and environment needs to be mediated with the communities.

There is also a challenge involved in dealing with the perception gap between mainstream visions of poverty reduction generally promoted by the political system and what is feasible on the ground in a project frame. For example, it is important to clearly define who the poor are and how the grid extension is positioned vis-à-vis decentralized energy services, and who has access to what services.

The other set of challenges for the practitioners relate to the market environment they have to operate in, for instance, non-availability of capital to expand/respond to markets, and want of funds to conduct pre-feasibility studies. Lack of coordination among different agencies at different levels and across levels continues to be a barrier for scaling up in any meaningful manner. The last but not the least is the human resource challenge of the remote rural locations. Finding good people and equipping them to do multiple tasks should be a high priority.

Dealing with Challenges

Discussions under this category dealt with "who should deal with what challenge?"

Practitioners have a major role to play in building the interface with communities of users in remote rural areas in addressing the local challenges. They can facilitate design, ownership, and management of the energy services package keeping in mind the longer-term sustainability and growth needs. They can also promote collaboration mechanisms at the execution level.

Governments have a responsibility to initiate and support public-private partnership mechanisms that are mutually complementary and support scaling up of energy services to the remote rural areas and to the poorer sections of society where these services are not accessible today.

Donors should concentrate on reducing the transaction costs of financing to communities to increase efficiency in delivering services.

Theme 5
Influence of Subsidies and Fiscal Measures on Scale-Up

Hari Sharan, Desi Power, India

Approach

This breakout group consisted of 11 participants, who were given 10 minutes each to write about their experiences on subsidies, especially with regard to the following issues:

- Penetration and effectiveness
- Impact on marketization
- Impact on poverty
- How to scale up

Observations from different countries

In addition each participant also verbally presented his views to the group, giving details of the situation in his country with specific case experiences, and his conclusions and recommendations.

i) ***Argentina:*** Byron Chiliquinga, OLADE.

For providing rural electricity services, Argentina follows a concessionaire model. When a distribution concession is requested from a company to work in a rural area where the population has no access to power, a concession is given to serve concentrated markets, generally urban areas, as well as rural isolated populations. Hence, the area of service of the company covers both populations—urban and rural. The tariff that the company receives for the power to isolated populations is approximately the same as the one for the concentrated markets. The rural populations, however, only pay a portion of the tariff, as the local government provides a subsidy. There is no cross-subsidy; what exists is a target for two different populations with two different schemes of service, with government intervening on behalf of the rural, isolated consumer.

ii) ***Nepal:*** Govind Nepal, ITDG.

Subsidies in Nepal started with the micro hydro program. The implications of continued subsidies for scaled-up programs have not been dealt with yet. A subsidy for remoteness (transport subsidy) could help increase the geographical scaling up.

If a subsidy on connection costs existed, e.g., for household wiring, it could increase the demand for electricity. The demand is limited because the market for non-subsidized energy technologies has not developed. The subsidy is not geared to the end-users.

iii) *Nepal:* R S Shresta, Winrock International.

Subsidies are available for all renewables in Nepal, mainly in the form of direct cash subsidy and import duty exemption. In most cases, an intermediary who checks the installation does quality assurance; the certification acts as the trigger for releasing the subsidy.

Despite the existence of subsidies in Nepal, there has been minimal penetration of the market, particularly to poorer segments. There is an obvious need to target the subsidies appropriately to reach the poor as well as to ensure that consumers have a sense of ownership even with the subsidy. This is not all, however. The poorest often cannot cover the capital cost of products, even with the subsidy component. Therefore, effective credit schemes are imperative for true penetration to occur.

In some situations, there are excessive subsidies that are detrimental; Nepal's biogas program is an example of this. Huge subsidies also exist for fossil fuel; subsidized kerosene is used, among other things, for heating swimming pools in Kathmandu.

iv) *Nepal*: Adam Friedensohn, Himalayan Light Foundation.

Subsidizing "remoteness" could be a method of increasing services to the poor. Remoteness is the main gap between the "richer of the poor" and the "poorest of the poor."

Donor projects that lead to product dumping, forcing the local industry out of the loop, should be discontinued. Many donors impose their modalities on host countries without coordinating with the private sector, which proves detrimental to the latter.

There is a need to decrease or remove subsidies on hard solar equipment, and instead provide a tax reduction for raw materials for solar technology to encourage full-scale, local industries. Encouraging local sources of supply will also ultimately help keep costs down.

v) *India*: Pavankumar Siddhi, Sungrace.

Subsidies often go directly from the government to the beneficiaries without any link to industry. For example, solar water pumping systems cost US$

5,000 and end users get a subsidy of US$4,000. Some 3,000 pumps will be installed every year, but this will not create a sustainable market. Existing subsidies are not useful, but instead are used to gain political mileage. Furthermore ineffective subsidies could actually kill market development.

It is important to note that 90-95 percent of the subsidised solar systems go to middle-income groups as the poor cannot access them even with a subsidy.

vi) *India:* V. Ramasubramanian, Sahyadri.

A donor-funded hydro project was focused in six northern Himalayan states, despite strong potential in South India. The project involved poor project selection, earned a bad name for the technology, and ultimately the subsidized systems failed. Now it is difficult to sell micro hydro plants in the hilly regions where subsidies were active. A revolving fund would be more effective than direct subsidies as there is little evidence of impact on the poor from the subsidized projects.

vii) *Philippines:* Bert Dalusung, PEI.

There is a target of 100 percent electrification of villages in the Philippines, under the ERAP "O ILAW" Program. However, this benefits only 10 to 20 houses per village, strengthening the elite in each village. The benefit is limited because only a few get the systems.

Photovoltaic (PV) manufacturers are the main beneficiaries of the subsidy programs, not local sellers or service providers. This focus on solar systems also results in discrimination against other clean energy sources. Finally, many donors push their technologies and ideas, and have different requirements, which are sometimes incompatible with local needs.

viii) *Sri Lanka* : B. M. Dharmadasa, Uva Provincial Council .

The government now provides a block grant to the Provincial Council for solar electrification. Formerly all grants were designated for grid extension only. The Provincial Council then issues subsidies for the poorest only (the customer should earn less than US$25 per month). Approximately 70 percent of the 120,000 families fall into lower income category of US$1 per day. There are 8,000 SHSs in poor households in the Province. There is a flat rate per SHS. Suppliers and moneylenders deliver the system and the receipt is certified (price, system rating, number of CFLs). The minimum size is 20 W. The Rural Development Society has a government officer attached to it to provide coordination and demonstration for customers.

For Micro Hydro Power, 25 percent of the capital cost is provided as a subsidy, plus support, training, and technical inputs. The cost is around Rs. 70, 000 per kW.

Other Discussion Points

Penetration and effectiveness

- Subsidies are justified in the name of the poor, and with the goal of providing incentives to increase quality and coverage to reach the largest group. They are not, however, reaching the poor and therefore are proving an ineffective mechanism.
- Capital subsidies are not reaching the end user; interest subsidies are proving more effective in reaching the end user. Interest subsidies do, however, have the potential to distort the financial markets, and, given the fungibility of the money, may not reach the targeted population. On the other hand, capital subsidies have the potential to bring the cost down, making systems more sustainable in the long run.
- Many programs organized by government are policy-driven, with no consultation of the end user, and no service backup.
- Programs organized with private sector participation are market-driven, based on market needs, and are likely to lead to good service backup.

Marketization / Impact on products

- The equipment prices have not been tangibly reduced.
- The investment cost subsidy has an effect on the prices of energy services.
- It helps the volume of sales to increase, which can reduce price. If carefully monitored, the quality will also improve.
- Subsidies need to be phased out gradually based on the market requirement.

Impact on Poverty

- Impact on poverty has not been achieved so far; there may be a few exceptions.
- Any subsidy initially will reach only the rich; it takes time to reach the poor.
- Most subsidy programs are stopped by the time they start reaching the poor.

Impact on scaling up

- Scaling up would mean increase of area coverage, population coverage, and quantity of services. Subsidized programs limit the scaling up at times.
- Subsidies should be applied to greater volumes by reducing the value of subsidy per unit gradually.
- Market forces should be allowed to decide the requirements.

Conclusions

- Subsidies should continue, but should be designed with specific goals in mind. Targeted subsidies are needed if you want to reach the poorest of the poor.
- Volume can bring quality; increased quantity from subsidy could therefore improve quality.
- Subsidies should promote a community-driven, bottom-up approach. It is essential that the grassroots enterprises and communities affected are fully involved.
- A donor code of conduct is required to prevent dumping.
- A code of conduct is needed for various other stakeholders, too—government officials, industry, users, etc.
- A rural energy fund is required for each country, which should also handle the subsidies, but should be managed by autonomous banking institutions and not government departments.

Theme 6

Ensuring Customer Satisfaction: Product and Service Quality and Consumer Education

Lalith Gunaratne, LGA and Energy Forum, Sri Lanka

Background

Commercial marketing of grid and off-grid decentralized technologies requires promoters to focus on "customer satisfaction."

Project promoters are faced with several challenges with regard to customer satisfaction. First, considering that many communities have never seen the technologies, there is a considerable awareness-raising and relationship-

building effort required, which entails developing customer confidence by providing quality components, installation, and after-sales service. Second, micro financing adds further pressure; if the system is faulty, the customer will not repay the loan. Third, in most mini grid projects, a community cooperative will pay for the service. The collective ownership makes for greater accountability, hence the need for project promoters and consultants from outside the community to ensure that projects are designed to satisfy the community's needs. Finally, unsatisfied customers could keep enterprises from expanding as existing customers are the biggest marketers for further sales.

Clear and enforced product and procedures standards are the lynchpin for successful marketing and penetration of off-grid technologies. Government has begun to play a role in this sector by financing off-grid initiatives, such as province-based programs in Sri Lanka, but standards are not yet widely developed or enforced by officials. Who and how the sector can be regulated to ensure customer satisfaction remain open for debate.

Questions for the Breakout Session

The aim of the breakout session was to *discuss how to ensure consumer satisfaction through product and service quality and consumer education.* Participants were asked to draw upon their experiences to discuss the issues related to standards of components and installation (finding the optimum standards at a reasonable cost) and how this should be regulated. The following questions served as the basis for discussion:

i) What should be the tradeoff between the cost and quality of systems based on the current level of affordability in the marketplace, willingness to pay, and the cost of the system? This would apply to any off-grid renewable energy system (i.e., solar PV, micro hydro, etc.).

ii) How should standards be regulated and what role should the government play (for instance, in light of the new push to establish policies to incorporate off-grid and grid-based electrification under one umbrella)? How should this be different for decentralized systems like solar PV and mini grid systems like micro hydro?

iii) Off-grid energy market requires the use of the latest techniques of "relationship marketing." Consumer education is a part of this process as end-users have to participate in the process from the time they pay and manage the system on their own (as opposed to the utility model). This has often been criticized as the reason for the wide gap between the grid and off-grid electrification. Would a fee-for-service system be more appropriate in the context of providing consumers a better service?

Initial Presentation

A brief presentation of the solar PV market development process in Sri Lanka was provided at the start of the session to highlight the challenge between meeting standards and affordability. The presentation is as follows.

In the late 1980s two companies were selling solar PV systems at the retail level. Systems were sold on a component-by-component basis providing the customer with flexibility, at relatively low cost. When, however, the World Bank/GEF-assisted ESD project (Energy Services Delivery) was launched, not only was a system component standard established, ESD also required the installation of a full system with the balance of system including a battery. Therefore, the ESD project standard did not allow an old battery to be retained or the use of the popular electronic charge indicator, a cheaper option preferred by most users.

The only alternative to the ESD model was to install a high-quality and higher-cost charge controller (US$50-75 for US or German made units). Customers did not, however, see the benefit of such a high cost unit, which would still reduce the use of their systems. Nevertheless the vendors felt that a charge controller would be useful to reduce the level of system management in which the user had to be involved. It was agreed among the vendors that the charge controller should be made available at a lower cost.

Eventually a compromise was reached with ESD project developers, which involved lower cost Chinese and Indonesian batteries receiving standards approval. This made it possible for vendors to add a charge controller at a reasonable additional cost. The availability of micro financing at this time also enabled a greater number of customers to obtain the standard approved full-system.

A parallel may also be drawn with micro hydro standards. If the normal CEB standard used for grid extension was applied to village level off-grid hydro projects, ESD funded projects would not have been affordable. As such, a special standard was developed to find a compromise between the normal standard and no standard at all. This standard ensured that basic safety and quality standards were met and provided some flexibility for the developers.

Report on Discussion: Consumer Satisfaction

An attempt was made to keep the discussion technology neutral. It was also agreed that the end-users should not ultimately have to worry about the technology, but only the service benefits of electricity.

The group defined *consumer satisfaction* as "providing sufficient electricity to meet the needs of people." These needs differ from household to household. However, generally in rural areas, kerosene or an automotive battery is used for lighting and television, to operate five to 10 lamps, run a TV, and a radio. These are deemed basic needs and they have to be met as a first step.[4] Currently, householders who cannot access the grid must get involved in the provision of electricity if they wish such services. Whether it is to purchase a solar PV system or develop a micro hydro project, the household has to be involved with the entire process—including the decision to pay for it, installation, maintenance, and repairs. Those connected to the grid, on the other hand, have only to pay the bill at the end of the month. It was pointed out that rural people with the grid generally have poorer service with many regular outages, so they are affected either way.

A rural household not only has to pay a premium price for a small PV system or the price associated with a micro hydro project, but has to bear the risk of the system operating well and depend on the vendor or the project developer to provide this service. Only with certain infrastructure and safeguards in place can the end-user's risk be minimized. Therefore, it was concluded that *Product and Service Quality and Consumer Education* was a key component of off-grid energy market development process, to reduce the risk to the end-user.

Based on the considerations outlined above, the underlying theme for this session was agreed as ***Minimizing Risk to End-Users.***

A few small group discussions were conducted to generate a list of issues affecting end-users and service providers.

Group Discussion Outcomes

End-User Issues

- Techno-social integration through mobilization of community.
- Who decides what satisfaction is at the community level .
- Community aspirations vs. offer (always inadequate and expensive).
- Dominance of "supply push" regime (where technology is pushed through marketing methods) .
- Precarious legal status of consumer cooperatives.

[4]An Energy Forum study on poverty and energy (done for the Center for Poverty Analysis in 2002) showed that the richer households in rural areas were not satisfied with the amount of power available from a typical 40 Wp solar PV system after a few months of use. However, the lower income households were satisfied.

Solar PV is meeting an immediate need for electricity in rural areas, where other sources are not available or viable. It was generally considered by the participants that solar PV is dominating this sector as it is the most visible, and the resource is not site-specific as long as there is adequate sun. Private sector-based solar PV dissemination processes, however, will not solve all the rural energy problems. Currently solar PV is promoted based on a "push" strategy, but relying solely on the market will only lead to servicing of the richer people in rural areas. Because of low power availability, income-earning capability using a small, solar PV system is minimal and therefore the prospects for change and further penetration are limited. It is important to note that micro hydro-based mini-grids, with greater power available for end-users, have more potential for income generation.

The group grappled with the issue of making rural energy provision technology-neutral and moving it away from the current "push" strategy. More feedback is needed from off-grid communities on their satisfaction of current services and must be factored into rural energy policy development. Registering this feedback is particularly important in light of subsidy design so government subsidies help create a level playing field.

Service Provider Issues

- Inadequate flow of information or misinformation from utility, government, politicians.
- Overuse of systems (i.e., PV, micro hydro).
- End-users not following guidelines.
- Recovery of loans (MFIs).
- Systems having components supplied by different vendors resulting in varying quality.
- Quality standards specified by donors are component-oriented and not process-oriented.
- Political interference.

Private sector and NGOs dominate the off-grid energy service provision area. Their motives are divergent, with profit being the main motive of the private sector and social service being the motive of NGOs. There are, however, private sector players and NGOs who operate in between these two poles in the rural energy market. Most off-grid promoters recognize the importance of customer satisfaction. The private sector's long-term success depends on providing a good service. In the NGO sector, Electricity Consumer Societies (ECSs), which operate numerous micro hydro projects, are owned and operated by the community and therefore are faced with constant pressure to meet consumer satisfaction.

- In Sri Lanka, the Energy Services Delivery project (ESD) and the new Renewable Energy for Rural Economic Project (RERED) have built-in equipment and installation standards and a verification process, tied to GEF grants. This is, however, limited only to this project and its duration.
- IDCOL administers the World Bank project in Bangladesh, and is establishing the program with stringent quality standards, with the motto "better to be safer than sorry" rather than risk customer service problems at the inception of a project. The quality of service received by consumers could decide the fate of the project.

The issue is how can this system of standards and verification processes become a part of the mainstream system of the off-grid energy delivery process after the World Bank programs are over? This has to be addressed by the central and provincial/state governments.

Technology-Specific Issues

Micro Hydro

- Donor-imposed conditions on specifications may be too high and adds to costs.
- Seasonal resource makes for poor capacity utilization.
- Government approvals are cumbersome.

Micro hydro in Nepal is becoming mainstreamed as the government leases out off-grid projects to the private sector to operate and sell electricity to consumers.

Such is not the case in Sri Lanka. The Electricity Act states that no entity other than the Ceylon Electricity Board (CEB) can generate and sell electricity to consumers. Others can only do it with permission from the chief electrical inspector who sits inside the CEB, but it is not an easy or short process to obtain this permission. The over 200 off-grid micro hydro projects, which have been developed in Sri Lanka, first with grant funds and now with commercial funds through the ESD and RERED projects, have bypassed this Act. These projects are operating as cooperatives, which charge a membership fee and not an electricity tariff. While these projects are held up to the ESD and RERED project standards and verification process, there is some cause for concern with regard to equipment and service quality. If, for instance, a person is electrocuted by a project, who would be liable based on the project's extra-legal status? These are issues that need to be addressed by the government, as more and more projects are completed.

Biogas

- Skills of promoter/installer are not up to standards.
- Poor end-user acceptance and inadequate training.

- Poor maintenance.
- When there is subsidy there are misdirected motives (promoters are only interested in the subsidy).
- Difficult to monitor systems.

Biogas is very popular in India, Nepal, and Bangladesh, but is yet to catch on in Sri Lanka. This is because biogas promotions have not happened in Sri Lanka through mainstream government-sponsored activities. When the government has introduced and sponsored these projects, some sort of an institutional arrangement has to be established to ensure good standards.

Biomass

- Supply chain issues (who, when, where, what, and how much)—oversupply/undersupply of feedstock.
- Storage of biomass (i.e., 1 MW needs 40 tons per day).
- Tariffs—linking to price of feedstock vs. market price vs. electricity tariff.
- Maintain energy plantations to ensure supply.

There are many successful biomass-to-electricity projects in India. A good example is the West Bengal Renewable Energy Development Authority (WBREDA) mini grid projects in the Sundarban islands. One system, for instance, provides high-quality service to 800 consumers through a 500 kW modular unit. WBREDA has invested heavily in the system quality as well as operations management area. There is a permanent presence of a representative of the gasifier supplier who ensures that the system has very little downtime. Biomass supply has been consolidated to ensure year-round supply from the community's plantations. There is also sufficient storage capacity to keep fuelwood during the wet season. All these safeguards are in place to ensure good customer service. To replicate this process will be costly, but that is the price that needs to be paid to ensure that customers' needs are met. Other countries in the region can learn from these lessons.

Common Suggestions on Scaling Up

- Mobilize community with the use of existing grassroots level organizations (local government, NGOs, CBOs, etc.).
- Relate awareness campaigns to rural life.
- Recognize and utilize local competencies.
- Donors should support R&D for appropriate technologies.
- Train consumers in different choices and specific appropriate technologies.
- Support regional sharing of knowledge of good practices.
- Develop strategies to mobilize the participation of the poor.

- "Be safe than sorry" while establishing standards to minimize risk to end-users.
- Maintain flexibility in the standards as projects evolve.
- Integrate off-grid energy with grid extension in the energy sector restructuring process—be transparent.
- Decentralize the planning and implementation processes—build capacity at the local/ provincial level.
- Integrate energy with government policy for poverty alleviation and development.
- Foster public-private partnerships to ensure required services at a reasonable cost.
- Make the energy services technology neutral and location-specific.
- Integrate energy service delivery with local developmental objectives.

Conclusion

The theme of SAPW was how energy supply could be scaled-up through available technologies. It was clear from the group discussions that the current approach has been a fragmented one. The private sector and the NGOs have only scratched the surface in filling the void in electrification. There has been little coordination between the governments and these promoters to date. Governments throughout South Asia have concentrated largely on grid-based electrification, but the financial state of utilities will not allow this to continue because of high costs. Therefore there needs to be a movement toward public-private partnerships to scale up. Electricity services to rural areas, whether grid or off-grid, can be provided at a minimal risk to the end-user and be technology-neutral. Rural customers, like in urban grid-connected areas, should enjoy the benefit of good customer service without having to worry about the technology and its peculiarities, which poses significant challenges, as it requires many diverse actors to come together through the integration of systems, delivery mechanisms, financing, and policies. Finally, if rural energy service is to have an impact on the livelihoods and income generation, rural development policies should look at all the infrastructure requirements in a coordinated manner.

Annex 4

Workshop Presentations

Inaugural Address: Honorable Karu Jayasuriya, Minister for Power and Energy, Government of Sri Lanka

Good morning, ladies and gentlemen, Mr. Miguel Bermeo Estrella, Ms. Dominique Lallement, Mr. Anil Cabraal, and Mr. Venkat Ramana, distinguished participants, ladies and gentlemen.

Let me at the offset say that it has been a great privilege and honor to be associated with you this morning. When the invitation was extended, I accepted that invitation with great pleasure because this is a subject that interests very much the government of Sri Lanka and me personally. So therefore, we are very honored indeed that the GVEP selected Sri Lanka as the venue for a meeting that has been receiving the highest priority of the government of Sri Lanka.

It is my duty first to thank the UNDP, The World Bank, and Winrock for making this event a success. I hope that today's deliberations will make it very interesting and especially the delegates from nearby countries, when you go back, that you will go back with a certain amount of satisfaction. That you were able to come to a country and see for yourself what has taken place as a very sincere effort on the part of the government and the Electricity Board to give electricity to people in the rural areas. Because I have personally seen how a village transforms when rural electrification is given. In a way we feel very sad that Sri Lanka is an independent nation for 55 years, but still, close to 40 percent of the population is without electricity and relying on bottle lamps. So it is within this context that the government of Sri Lanka thought that we should give the highest priority for rural electrification. Practically every week we go around the country, doing these rural connections, and that is how I told you that I personally witness the change that takes place in the villages.

People long for electricity. They don't ask for jobs. They don't ask for grants or assistance. Some of them even don't ask for houses. They say, give

us electricity because electricity completely changes their way of life. I have seen when I go to villages, the first day itself, it is not only the bulb that lights. A few days later, electrical equipment comes in. The television, the fan, refrigerator, and then a few weeks later, we can see new small rice mills, other factories coming up, and the village awakens. And then when you go to those places after a couple of months, you can see even computers in some of the houses. So we as politicians get a lot of mental satisfaction by seeing the transformation.

So it is in this context that the government is so keen that we should pursue rural electrification to the best of our ability. Probably you are aware that the northern part of this country was subject to a civil war. And there was heavy damage in that part of the country. During the last 11 or 12 months, we have been able to light up more than 80,000 houses even with all the destruction that had taken place. When we go there, we have seen how happy the children are, how happy the parents are when they see the electricity once again after 20, 30 years. So therefore today's meeting I believe is a very special occasion, and today's discussion is also to deliberate on the subject of mini and off-grid power systems, and consider the ways and means by which we in the region can help the poor to uplift their living standards.

At this occasion, I wish to mark my sincere appreciation once again to the UNDP and World Bank for their valuable contribution in the field of renewable energy, particularly in the mini and off-grid systems during the recent past. And also I should mention the UNDP-funded renewable energy project that just concluded, which helped capacity building in the mini-hydros, wind-power, and biomass technologies in this country.

Mini-hydro has a long history in this country. It started during the time of the British plantation companies in the early 1900s and those mini-hydros used to power some of the tea factories and the rubber factories. But it became very popular in recent years as this project provided technical assistance and expertise to reach technologies advanced and connected to mini-hydros. I was informed that designing of appropriate turbines, water-flow measurements, and even calculation of economic costs are some of the knowledge transfers that have taken place in the field of mini-hydros during the last two to three years. With the funds provided by the World Bank, the village or micro-hydros became very popular. And I would like to congratulate the World Bank and some of the Sri Lankan associations and NGOs that were very successful in launching of micro-hydro projects in several villages. We all know that these village hydros brought a tremendous social impact as I explained to you earlier, into the needy villagers' lives— the small villages of about 25 to 30 households, who enjoy electricity for the first time in their lives, because of the village hydros.

I made it a point to attend the inauguration of this workshop because I am personally interested in non-conventional types of energies that have multiple benefits as far as rural communities are concerned. If I may mention a few—the small power system like micro-hydros give the rural population an immediate access to electricity. This creates momentum for participatory development efforts because the village families get together and form a society, work together, hoping for mutual benefits, and they become self-sustained in their electricity requirements. This helps empowering of rural people to construct, innovate, manage, and mobilize resources so that they become more confident of their own abilities and self-determination. This is what we are trying to achieve in the long run because every citizen in the country should be able to stand on his own feet. With the excess electricity, or with the power not used in the daytime, village family members should be able to generate some means of income by way of tiny cottage, small industries, or service outlets. This could provide an array of opportunities for income generation and social development, resulting in an improved standard of living. If some rural training and communication centers could be combined to facilitate vocational training centers, then we can see that rural poor communities will help themselves to uplift their living standards, health care, and many more social amenities so that electricity would play an enabling role in the rural economy.

We are drawing serious attention to social benefits such as these because harnessing electricity from indigenous resources of this country has several benefits. If these free and environment-friendly resources can be better used, it would conserve our environment, without emissions, or any other polluting fear, while helping rural populations to uplift their living standards. We always encourage small and medium investors to enter into these opportunities and contribute productively into the development efforts of the country.

I am also aware of some of the problems that potential investors are still confronted with in terms of off-grid systems. We have only a single grid in the Ceylon Electricity Board (CEB) power system, where off-grid systems do not have the opportunity to transmit their electricity to the national grid and earn any income from the CEB. I also came across problems such as electricity poles. I have requested the CEB to give priority to village hydro societies when they dispose of used poles. I must also say that the CEB is going through a transformation, and we are in the process of unbundling, which will, we believe, result in a completely reorganized institution, more dynamic in decision making, trimmed down, and more efficiently run. This exercise we hope to complete before the end of the year.

I also consider that this particular workshop would help individuals and organizations presently engaged in rural electrification projects using mini and off-grid power systems to improve their present practices by way of exchanging

ideas. Although the technologies are mature systems, still there are problems, which need inputs from the experiences gained and practices adopted in different countries in different situations. Therefore the lessons learned from each situation would definitely provide better solutions to similar problems. We all know that if a group can think together and deliberate in a forum like this, it becomes a huge knowledge-building exercise, so that you may discover a pool of technologies, new practices, which may ultimately help you to reach your policy goals and objectives.

So as I said before, I hope that the outcome of this workshop will be another success story, a new endeavor, which all of us should be able to share and benefit from. On our part, in the government of Sri Lanka, as I said at the start, we have a dream. The dream is that during the tenure of the current government, we achieve 85 percent electrification through the national grid. It's a very ambitious target. It requires a lot of time, money, energy, and commitment. But we are determined to go ahead with this project, and renewable energy is playing a wider role. We are looking at wind power. We are looking at solar power. We are looking at mini-hydros, micro-hydros. And we are looking at dendro in a significant way.

So with these few words, ladies and gentlemen, I wish today's deliberations a success, and I thank you for the courtesy of your attention.

Dominique Lallement
WB-ESMAP, USA

Global Village Energy Partnership

OVERVIEW

- Brief Background
- Part I: Partners and Governance
- Part II: The Technical Secretariat
- Part III: Delivering the Partnership Services
- Part IV: Going Forward

Global Village Energy Partnership:

A Call for Action, Accountability, and Results

GVEP seeks to put in place a 10-year implementation-based partnership to reduce poverty and enhance economic and social development through the accelerated provision of modern energy services to those unserved or underserved.

The Path to the Partnership

FROM TALK
1. Village Power (1990-2000)

⬇

TO DESIGN
2. Incubation (2000-2002)

⬇

TO ACTION
3. Implementation (2003-2012)

VALUE ADDED FROM THE PARTNERSHIP

- Existing Rural Energy Programs
- GVEP Services = multiplier
- Outcomes with GVEP

The Demand for Partnership Services: Results from Participatory Assessment

- Heating/Cooking
- Lighting
- Power
- Productive Uses Multisector
- All inclusive Rural & Peri-urban
- Multiple Technologies/Multiple Sources

GVEP Products and Services

Action Plans
- *Political Commitment; Policy Framework; Multi-sector Demand Assessment*

Capacity Development
- *Entrepreneurial Services; Consumer Organization Support; Cross Sector Linkages*

Financing Facilitation
- *Info on Funding Sources, Seed Capital, Local Banker and Microcredit Training, Funding Mobilization, and Access*

Knowledge Management
- *Databases, partners, TA sources, Best Practices, Lessons Learned, Dissemination*

Results and Impact Monitoring and Evaluation
- *Information on Contribution to Service Delivery for health, water, schools, SMEs, ICT, agri, households*

The Partners

- 156 organizations committed to GVEP Statement of Principles
- Partnership is open
- New partners keep joining

Distribution by type of organization
- Private sector: (56) 36%
- NGOs: (75) 48%
- Governments: (20) 13%
- Multilateral Organizations: (5) 3%

Partners: Distribution by Region

41 countries represented
- North America: 51 (33%)
- Africa: 31 (20%)
- Europe: 38 (24%)
- South Asia: 18 (12%)
- East Asia: 8 (5%)
- LAC: 7 (4%)
- Middle East: 3 (2%)

Who are the Partners? Some examples

NGOs (75)
OLADE, Energy Management Centre-Kerala, AFREPEN, ENDA, KITE, Pakistan Energy, and Environment Management Centre

Governments & public org"ns (20)
Ethiopia, France, Ghana, Italy, KFW, Mexico, Netherlands, Philippines, Tanzania, UK, US

Private Sector (56)
BP, CIRAD, IT Power, ORMAT, RAPS, Stean & Associates, PSL

Multilateral (5)
EU, FAO, UNEP, UNDP, World Bank

WORKING TOGETHER: Partnership Governance

156 partners – provide resources and activities for increasing modern energy service delivery
Board (12 individuals from 12 organizations)—provide oversight to TS and facilitate resource mobilization
Technical Secretariat (8 individuals from ESMAP, USAID, UNDP, DFID, WB)—provide services, facilitate resource mobilization, and partner coordination

The Technical Secretariat

ESMAP/WB (Washington)
- Coordinator (part-time), 1 full-time consultant, 1 part-time consultant, secretarial support

UNDP (New York)
- 1 part-time staff, 1 part-time consultant

DFID (London)
- 1 full-time staff

USAID/Winrock (Washington)
- 1 part-time consultant

Technical Secretariat: 3-year Work Program

January 6, 2003: Technical Secretariat Retreat
Track 1: Country/state/local action plans developed by multilateral stakeholder dialogue with partners
Track 2: Cross-cutting activities in support of service lines, e.g., training of financial intermediaries
Track 3: Unsolicited/solicited proposals to help implement energy services

Implementing the Partnership

8/31/02	Launch—Johannesburg
23/10/02	Addis-Ababa Regional Workshop (6)
02/04/03	Dakar Regional Workshop (7)
02/15/03	Board Appointed
04/11/03	LAC Facilitators Training
04/23/03	Pre-investment Fund Workshop
04/03	E-Dialogue for practitioners
10/02-present	Newsletter, webpage, project profiles
11/02-present	Follow-up in 7 African countries
May 13	Board meeting in Washington
06/03	Sri Lanka Practitioners" Workshop, India workshop, Africa facilitators training
07/03	Cameroon and Bolivia Regional Workshops

African Workshops: 13 countries 78+120 participants

Phase I: Workshop Preparation: with partners

Phase II: Workshop: From PRSPs to Action Plans—Knowledge Sharing

- understanding demand (sector work groups)
- supply options (sector work groups)
- drafting action plans (country work groups)

Phase III: National consultations and finalization of actions/investment plans

- increase in energy service delivery
- follow-up started in 7 countries

Pre-Investment Workshop—Berlin

Objective: consult on the need for a GVEP pre-investment fund

Berlin April 23-24, 2003; 38 participants from Asia, LAC, Africa, Europe, N America; many GVEP partners

Outcomes

1. need for pre-investment funding, but not for a new fund
2. strong call for looking at the whole continuum from idea to investment to servicing the investment
3. strong call for risk mitigation for the whole continuum, not just for investment/operating phase, and for all actors
4. markets need to grow on their own strengths and not on subsidies

Pre-Investment Workshop—Berlin (cont.)

5. financing; plenty of financial resources available, including substantial grant funding and liquidities on domestic markets but:
   - pre-investment facilities difficult to access in some parts of the world
   - where available, does not generate large number of deal flows, e.g., issues of thresholds
   - investment financing not always available
6. funding mechanisms: need to be country-specific and country-managed

Pre-Investment Workshop: Possible Role for GVEP

- To disseminate the knowledge on a typology of best practice
- To identify sources of funds and local service providers, to help access pre-investment funding
- Can help build on successes (e.g., results from DFID research on energy and rural livelihoods in Nepal, Sri Lanka, Ethiopia, and Uganda)
- Can help close the gap in pre-investment and investment financing, by creating a virtual "brokerage house" for interested parties who can accelerate deal flows
- Strong call for clear guidelines, speedy processes, and flexibility from financiers

Project Reviews

Sample of proposals received to date:

- Multifunctional platform expansion
- India-AP/Tribal: proposal to set up solar energy systems to cover 14 villages covering the remote, primitive tribal Chenchu core area
- Gorlove turbine: small hydropower project in Central America
- Somali Solar Energy Company: request to help start company
- Local Energy Launch Pad (LELP): type 2, seeking additional funding to conduct services

Possible Criteria

- Source of proposals – partners only; country has/not an action plan
- Initial screening - <$50K; 1 year; not technology
- Does proposal meet criteria of partnership statement of principles and one/all of service lines

Funding I: through TS ("000)

Source	Allocated	Committed/ Disbursed	Balance Available
TOTAL	1,950	1,158	792
ESMAP TFs (UK, Sweden)	655	377	278
WB	60	41	19
UNDP	200	50	150
UNF	35	35	0
DFID	60	50	10
USAID/ Winrock	250	170	80
ESMAP	690	435	255

Funding II: Pledged ("000)

Germany—ESMAP ($250)
Germany—UNDP ($250)
Norway—ESMAP ($250)
Norway—UNDP (% of $2.5 million)
UK—ESMAP ($600)
UNF—UNDP ($350)
Canada—($1,000)
France—Euro ($100)
Netherlands and USAID: Paul and Griff will tell us[[OK? Ed.]]
TOTAL: $1.9-3.3 million

Scaling Up: A 3-track resource flow

1. Incremental resources mobilized by and channeled through the technical secretariat
2. Incremental or re-directed resources mobilized by individual partners for activities supported by the goals of the partnership
3. Incremental large-scale investment and financing resources into energy service development

Moving Forward: Towards Results

Expected Results	CY 2003-05	CY 2003-2012
Countries with energy-poverty plans/programs	20	35
People with increased energy access	75 million	400 million
New communities with increased energy access	10,000	50,000
Trained entrepreneurs and consumer organizations	5,000	15,000
Investment in energy-poverty projects/programs	$5 billion	$50 billion
Documented quality of life improvements and links to MDGs	TBD	TBD

Special Address: Miguel Bermeo-Estrella, UN Resident Coordinator/UNDP Resident Representative for Sri Lanka

Good morning, everyone. Honorable Minister, members of the presidential table, participants in the workshop. First of all, a warm welcome to Sri Lanka. I know that it is for the Minister primarily to do, but UNDP would also like to extend this welcome to you to have a pleasant stay in Sri Lanka.

I have been asked to say a few words about UNDP and its work in the area of energy, and indeed I will try to be as brief as I possibly can. First of all, many of you know well that UNDP focuses on six thematic areas. These include: poverty reduction, democratic governance, sustainable energy and environment, crisis management, ICT for development, and HIV/AIDS. Sustainable energy, therefore, is one of the thematic pillars of UNDP for achieving poverty reduction and sustainable development goals as set by the millennium declaration.

In 2001 UNDP launched a thematic trust fund on energy for sustainable development to mobilize resources and promote coherence across UNDP in its approach to energy issues. The energy thematic trust fund has been designed to fully complement the Global Environment Facility (GEF), building on UNDP's existing track record and as a means to help in fact integrate GEF programs in a better way. Together, these funds are addressing a full range of sustainable energy activities.

UNDP's activities at the upstream level focus on the policies needed to support energy options for sustainable development, addressing economic, social, and environmental goals simultaneously. Downstream activities, on the other hand, concentrate on integrated energy solutions to address poverty and promote sustainable development. UNDP focuses within these broad areas on four priority segments related to energy, or the so-called service lines. These are: strengthening national policy frameworks, promoting rural energy services, promoting clean energy technologies, and increasing access to finance and energy.

In Sri Lanka, UNDP has played an important role in promoting sustainable energy practices. The Minister kindly alluded to the work we have done in the area of renewable energy as well as on energy capacity building. The projects have continued to promote the expansion of the use of renewable energy in the country and increased the knowledge of methodologies for energy efficiency, to reduce the need for additional fossil fuels and the associated greenhouse gas production. This activity has assisted in building up also the professional capacity of the renewable energy industry, and has also encouraged private sector investments. It has also served to identify several energy options such as fuel switching, energy efficient technologies, loss reduction, energy conservation,

capacity of the renewable energy industry, and has also encouraged private sector investments. It has also served to identify several energy options such as fuel switching, energy efficient technologies, loss reduction, energy conservation, and greenhouse gas mitigation. In addition to the four priority areas mentioned, UNDP also conducts advocacy and analysis on energy trends and its linkages with development and promotes South-South and North-South knowledge exchanges, thus continuing to expand the international dialogue on these important issues.

At the national level, UNDP also likes to support local authorities in convening and implementing stakeholder consultations to bring together sectoral planning authorities, consumer groups, and representatives of industry to improve energy and development outcomes. UNDP, in trying to advance its agenda in these areas, maintains partnerships with a variety of institutions; among the strategic partnerships established are the Global Network on Sustainable Energy and the Global Village Energy Partnership. GVEP is a good example of the linkages we have been building up with the World Bank over the years. Another good example of that partnership is ESMAP, the Energy Sector Management Assistance Programme. We are very hopeful in the UNDP that it will become an even more important means in looking at sustainable energy policies.

The main theme of this workshop has to do with sharing practices or learning from each other. I think that is indeed a very practical, viable way of advancing such a complex agenda. I also noticed in the program description that discussions are to be had on the relations with the market both on the supply as well as the demand side. I couldn't agree more with the remarks made by the World Bank representative about the importance of engaging the private sector as early as possible in such endeavors.

I remember, some 20 years ago, as a young UNDP officer posted in Pakistan, we were very enthusiastic in engaging in this project. I was trying to come up with some kind of energy bank, looking at different renewable energy sources—biomass, solar, wind, etc. And there were indeed very interesting prototypes that were put in place, and there were indeed a lot of villages that benefited form such a project. As I said, there was a lot of enthusiasm on the part of government and on the part of UNDP.

I'm afraid if we go back to Pakistan today, that example perhaps didn't go as far as we were hoping at that time. And I think the main reason may have been issues of cost. A lot has happened over these 20 years in reducing the cost of such technologies, especially in the area of solar energy, but I think still we have some ways to go to really make this a day-to-day reality in the thousands and thousands of villages around the world. So the relationship with

the private sector, I think, is a crucial one. And I would encourage discussions to focus on that dimension as well.

Another point for us in UNDP of course is the crucial linkage with poverty. I don't want to belabor the point. I think the Minister was quite eloquent in his words about the crucial importance of energy in poverty eradication by addressing a number of needs in any village. I know from experience working with the Minister how committed he is to these issues and the strides that Sri Lanka is currently making. We'd like to say that Sri Lanka also has a lot to offer in this dialogue in these few days, and I wish you all success on that.

Thank you very much.

Venkata Ramana P, Winrock International, USA

Online Consultation

Best Practices and Scale-up Challenge

Questions for Consultation

- To scale-up existing successful schemes or projects to reach those under and unserved by modern energy services on a sustainable basis, what critical changes need to occur?
- What best practices and principal lessons have emerged from experiences to date that could be replicated elsewhere?

Policy issues

- Subsidies to be phased out, but only gradually (high divergence)
- Need to have standard policies across technologies to encourage investment
- Educating policymakers" comprehensive approach to energy service delivery (national strategies)—would this lead to centralization or decentralization?

Financing issues

- Direct donor funds to SME/NGOs, not to governments
- Financing for pre-feasibility/feasibility work
- Avoid duplication/competition in donor funding
- Bankers" training for RE lending
- Finance as part of a complete service package
- Range of financing instruments

Technology issues

- Move beyond electrical technologies (efficient tools, pedal pumps, animal energy)
- Tech training to consumers, suppliers, O&M
- Quality of energy services with enforceable feedback loop
- Standardization of equipment

Consultation highlights

- Wide participation
- Several examples of best practices/ profiles
- Continuing debate on some issues—subsidy, government role, renewable vs. rural, etc.
- Reemphasis on gender and equity as universal concerns in rural energy
- Some seemingly obvious conclusions are not so obvious
- Strong appreciation of the consultation forum

Workshop Themes

- Policies reforms
- Access to financing
- Energy for socioeconomic development
- Subsidies and markets
- Consumers and products
- Solutions for scale-up

Harish Hande, SELCO, India
Experience on Solar Financing

Ingredients of Rural Solar Business

- Financing at the doorstep of the user
  - Financing cuts down the initial high-cost barrier.
- Service at the doorstep of the user
  - Helps build confidence in the user regarding the technology.

Ingredients of Rural Solar Business

- Types of Financing
  - Third-Party Financing
    - Commercial Banks
    - Rural Banks
    - Farmers Cooperatives
    - Micro Finance Institutions
  - SELF Financing
    - Lease to own systems
    - Own collections agents
  - Fee-for-service

Third-Party Financing

- Regional Rural Banks
  - Loans provided to rural households
  - Wide networks in Rural India
- Commercial Banks
  - Loan provided to all types of customers
- Commercial Leasing Companies
  - Have opened branches in rural areas as over the years their solar portfolio has increased

Bank Finance—India

- Banks have gradually gotten very interested in lending for Solar Lighting Systems
  - Some started treating it as consumer goods
  - Some started to realize that solar can be another loan portfolio for them
- Increased awareness among banks led to
  - Better business for solar companies
  - Increased number of "solar" entrepreneurs/businesses in rural areas
- Policy Changes
  - From capital subsidy to interest subsidy
- New Financial Schemes
  - UNEP Program with Syndicate and Canara Bank

Finance—Vietnam

- Local rural banks are more interested in lending to agriculture and solar systems are considered as a luxury
- Loans have moved at very slow rates
- Credit constrained by allocations from central bank of Vietnam to the local banks

Finance—Sri Lanka

- Grass-roots financing for SHS has been a great success via SEEDS
- Private finance companies have also entered the fray—FIs can make money in SHS business
- Financing is now considered a product in Sri Lanka

Experience

Positives
- Led to doorstep financing
- Better credit evaluation methods
- Timely loan approval process

Negatives
- Costly awareness programs
- Initial programs take time to build up
- Multiple loans by consumers delay solar loans (even leads to refusal)
- Repayment from FIs to companies

Typical Loan details

- Down payment—15-25%
- Loan Principal—75-85%
- Period—1-5 years
- Rate of Interest—12.5% to 22%

Typical Problems from Bankers' Point of View

- Poor Customer Selection
- High Costs of Collection
- Poor Quality Systems
- Poor After-Sales Service

M. Saiful Alam, Rural Electrification Board, Bangladesh

Complementary Role of Grid and Off-grid Rural Electrification—Bangladesh Perspective

Outline

- Country Profile
- Present scenario of Bangladesh Power Sector
- Current structure of power sector
- Govt. visions
- Steps taken for rural electrification
- Policy issues
- Rural electrification through
  - Grid expansion
  - Off-grid systems

Country Profile
People's Republic of Bangladesh

Capital:	Dhaka
Area:	147,570 km^2
Population:	130 Million
Income:	$315/capita
GDP Growth:	5.16%

Present scenario of Power System

Installed Capacity	
Total:	4710 MW
BPDB:	3420 MW
IPP:	1290 MW
Generation Capacity:	3750 MW
Peak Demand:	3406 MW
Transmission Lines (230 & 132 KV):	3764 km
Grid Substation Capacity (132/33 KV)	6585 MVA
Distribution Lines:	193,196 km
System Loss (T&D):	29.60%
Consumers:	6.54 Million
Access to Electricity:	38%

Per Capita Energy Generation: 136 kWh

Current structure of Power Sector

Generation
- BPDB
- IPP
- RPC

Transmission
- BPDB
- PGCB

Distribution
- BPDB
- DESA
- REB
- DESCO

Current Structure of Power Sector

Owner & Regulator: Government (Power Division)

Generation
- Bangladesh Power Development Board (BPDB)
- Independent Power Producers (IPPs)
- Rural Power Company Ltd. (RPC)—A mixed sector

Current Structure of Power Sector (contd.)

Transmission:
- BPDB
- Power Grid Company of Bangladesh Ltd. (PGCB)

Distribution:
- BPDB
- Dhaka Electricity Supply Authority (DESA)
- Dhaka Electric Supply Company Ltd. (DESCO)
- Rural Electrification Board (REB) through Rural Electric Cooperatives called Palli Bidyut Samity (PBS)

Government's Vision

Long-term goals for the power sector

- To make electricity available for all.
- To ensure reliable and quality supply of electricity.
- To provide electricity at a reasonable price.
- To make the sector financially viable.

Rural Electrification Board (REB)

Separating Rural Electrification (RE) functions from Power Development Board, REB was created in 1977 to
- Speed up RE program
- Improve socioeconomic condition for rural people;
- Provide infrastructure for rural development;
- Increase opportunities for income generation employment & agriculture product;
- Enhance poverty alleviation
- Minimize disparity between rural & urban areas

RE Program (Grid Expansion)

No of PBSs organized: 67

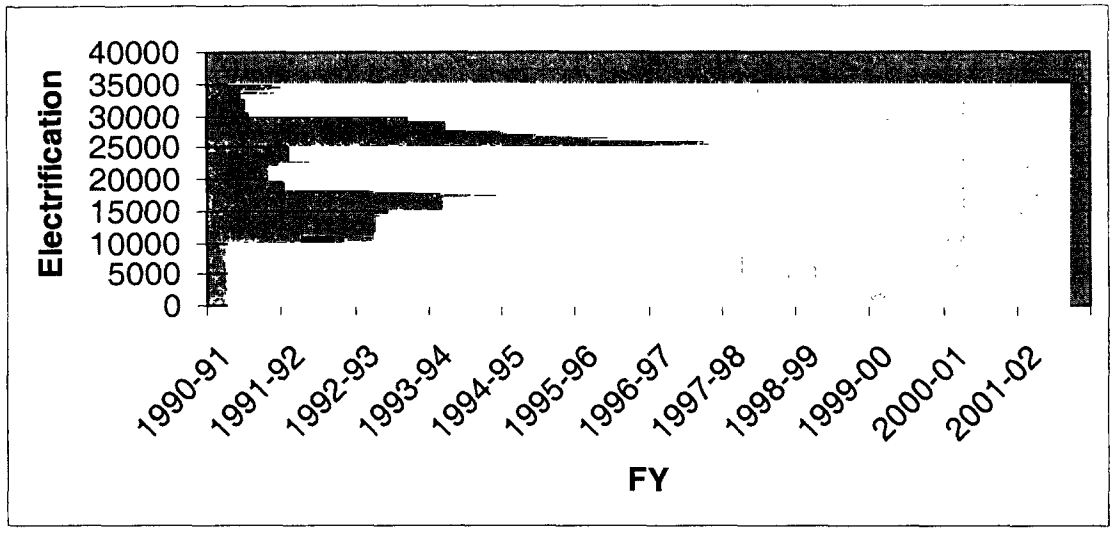
No of PBSs commercially operating: 67

Distribution lines constructed: 15,245

Average collection of bills: 98.19%

Average system loss: 16.00%

Average system loss of 61 PBS: 13.48%



Year-wise Village Electrification

Achievement of RE Program

	Nos	% total
Thanas electrified	424	84%
Village electrified	38,000	44%
Consumers	4.60 million	
Access to Electricity	4.00 million	
40% of rural population		
30% of total population		

Impact of Rural Electrification

- Impact on agriculture
- Impact on industry
- Poverty alleviation
- Family planning
- Import substitutions
- Education
- Impact on environment because of rural electrification
- Migration of people from rural areas
- Reduction of social crimes
- Rural women

Policy Issues

- To meet the basic needs of a growing population, govt. declared "National Energy Policy—1995"
  - Priority has been given to rural electrification
  - Demand for rural areas is to be met by a mix of commercial fuels & alternative resources
  - Rural Electrification through Grid Expansion & Off-grid system
- To formulate, coordinate, and develop policy and to carry out all activities related to renewable energy, Renewable Energy Development Agency (REDA) is to be formed
- Government has taken steps to approve "Renewable Energy Policy." Fiscal incentives and other facilities have been proposed
- To accelerate RE program through installation of independent small power plants, a Small Power Generation policy has been approved
- National Implementation Committee (NIC) has been formed to implement the PREGA program of ADB

Alternative Energy for Rural Electrification (off-grid)

Remote, coastal, island, and hill tract areas where grid expansion is expensive can be electrified by utilizing following resources

- Solar
- Wind
- Biomass
- Wave
- River Current
- Wind Solar Hybrid
- Tidal
- Mini-hydro

Status of Solar Energy

- REB implemented a PV pilot project on an island to supply electricity to about 1,000 consumers

- Local Government Engineering Department (LGED), Bangladesh Council for Science & Industrial Research (BCSIR), Grameen Shakti, Rahimafrooz Bangladesh Ltd., and Bangladesh Rural Advanced Committee (BRAC) are working to implement solar energy projects

Status of Wind Energy

The BAEC with the assistance of REB installed anemometers at

- Patenga
- Cox's Bazar
- Companyganj
- Sandwip
- Hatia
- Kutubdia
- Khepupara

LGED installed 7 anemometers at

- Patenga
- Cox's Bazar
- Teknaf
- Char Fession
- Kuakata
- Kutubdia and
- Noakhali

Prospect of Solar Energy

- The period of bright (i.e., more than 200 watts/m^2 intensity) sunshine hours in the coastal region of Bangladesh varies from 3 to 11 hours daily

- The global radiation varies from 3.8 kWh/ m^2/ day to 6.4 kWh/m^2/day

Prospect of Wind Energy

- Wind speeds ranged from 4.2 to 8.1 m/s
- Averaged 6.5 m/s at 20m
- Winds are strongest from March to October
- Exceed 5m/s at 20m for over 6000 hours per year (cut-in speed of large wind turbines is about 4m/s)
- Preliminary estimate of net output from a 500 kW wind turbine with a 40m hub height is 1200 MWh/year at Patenga

Status of Biomass

- Three types of Biogas plant are used
  - Floating-dome type
  - Fixed-dome type
  - Bag type
- First biogas plant in Bangladesh was installed at Bangladesh Agriculture University (BAU) in 1972. Plant requires the dropping of 3-4 head of cattle
- Institute of Fuel Research and Development (IFRD) is working to promote Biomass energy. IFRD developed a cost optimized Biomass plant in 1982
- BRAC in collaboration with BCSIR installed 1,200 biogas plants in 53 districts
- LGED installed Biogas plant in
  - Kurigram in August 1992
  - Muslim Mission at Faridpur in August 1992
  - Amgram village, Uttar Hogla, Madaripur as a model "Ecological Village"
  - Ganaktuly of Dhaka city using human waste as raw materials

Status of Mini-hydro

- Assessment of low head hydro-power potentials in Bangladesh has been undertaken in recent years
- 23 sites of hydro-power plant ranging in capacity from 10 kW to 5 mw have been located in the flat plains with available capacities for 6 months (June to October)
- No plant has yet been installed
- Potentials for producing 10 GWh of electricity annually

Status of Tidal Energy

- The tides at Chittagong, southeast of Bangladesh, are predominantly semidiurnal (with variation)
- Maximum during the south-west monsoon
- EEE department of BUET, Dhaka attempt to assess the possibility of tidal energy in the coastal regions
- Average tidal range within 4-5 meters
- Amplitude of the spring tide exceeds 6 m
- Tidal energy might be a good alternative source for Kutubdia island where about 500 kW power could be obtained

Status of Wave Energy

- No attempt to assess the prospects
- Wave heights recorded by a wave rider buoy and correlated with wind data
- Maximum wave height of over 2m
- The wave period varies between 3 to 4 sec for waves of about 0.5 m and about 6 sec for waves of 2m
- Severe cyclonic storms and storm surge of up to 15m have been reported

Status of River Current

- Number of rivers, canals, streams, etc. are about 230
- Total length of 24,140 km
- Different size boats are the main carriers of people and goods from one place to another
- Boatmen usually use the water-sails to run their boats against the wind direction
- But until now no research has been reported to utilize the energy of river current properly

Status of Wind/Solar Hybrid System

The best sunshine hours occur during the periods of the worst wind speed hours and vice versa. There is a good prospect for wind-solar hybrid energy system with diesel/storage backup in such coastal islands

Thank You!

Pavan Kumar Siddhi, Sungrace Energy Solutions, India

Simple Lighting Services

Changing lives of the poor

Project ***Micro financing of solar lanterns to rural poor***

Target 7,000 rural families

Location 100 villages of Kolhapur district, Maharashtra, India

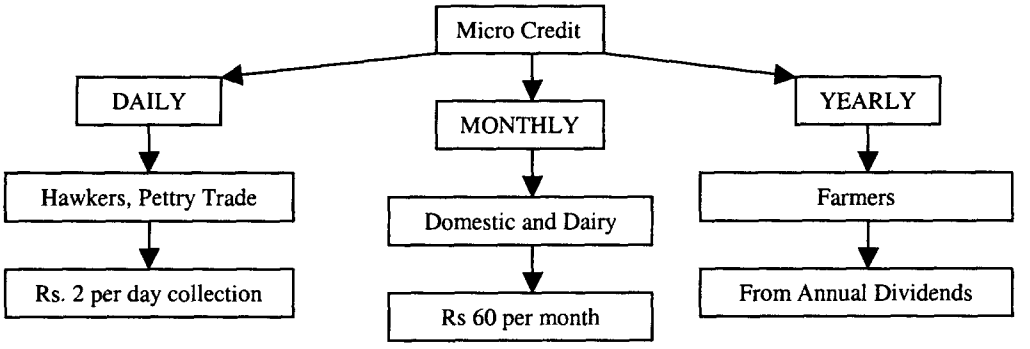
Project Partners

- Wahan Dharak Rural Banking Cooperative
- Sane Guruji Rural Teachers Cooperative

Project Funding

- World Bank
- Indian Renewable Energy Development Agency

SCHEMES OFFERED



Product

- 400 Lumens of illumination
- 3 hours of daily usage
- White LED-based night lamp
- Sufficient back-up for non-sunny days
- Safe—no fire accidents
- No fuel cost—replaces kerosene
- Portable
- Minimum maintenance

User Profiles

• Domestic	1,900
• Farmers	1,200
• Petty shops	900
• Dairy	800
• Cottage industry	700
• Night schools	100
• Hawkers	500
• Others	500

Project Strengths

- Micro credit schemes at lower interest
- Combined with regular financing scheme of societies
- Product and service at doorstep of customer
- After-sales service facilities even in remote villages
- Timely collection of money
- Collection agents trained in minor maintenance

Case Study 1

Profession: Patroli Making (leaf plates)
Family size: 6
Working members: 4
Production of plates before: 300 per day
Production with lantern: 500 per day
Extra income: Rs 100 (total Rs 250/day)
Extra hours: 3

Very satisfied. Wants one more lantern

Case study 2

Profession: Hawker (snacks)
Name: Madhukar Powar
Earlier income: Rs 80 per day
Peak business hours: 5:00-9:00 p.m.

Earns extra income of Rs 30 per day
Able to attract more customers
Stopped using petromax lamp
Snacks no longer have kerosene smell

Case study 3

Profession: Night school teacher
Name: Jyothi Kamble
Student strength: 20
Hours: 7:00-9:30 p.m.

Decrease in dropouts
Congenial atmosphere
Better performance by children
No fire hazard

Case Study 4

Profession: Farmer
Name: Nandu Chawan

Convenient to work at night and early morning in all seasons
Portability is very convenient
No fear of snakes and scorpions
No day-to-day running cost

Case Study 5

Profession: Housewife
Name: Shobha kut

Performing household duties without hindrance
Cooking food in hygienic conditions
No fear of fire hazard
Night lamp is very useful

Case Study 6

Profession: Basket Weaving
Family size: 8
Working members: 4
Production before: 12 per day
Production after: 16 per day
Extra income of Rs 60 (total Rs 240)
Extra business hours: 3
Recommending lantern to neighbors

Case Study 7

Profession: Blacksmith
Name: Kishore Lokhande
Number of furnaces: 3
Workers: 6
Extra income of Rs 120 per day (total Rs 460)
Increase in business hours: 3

Case Study 8

Profession: Chappal (shoe) maker
Family size: 6
Working members: 2
Production before lantern: 8-10 pairs
Production after lantern: 12-14 pairs

Extra income of Rs 80 per day (total Rs. 280)
Extra hours: 3
Happy about no recurring expense

Toward Commercial Lending....

I Phase (2,500 lanterns) → 5 Wp module → Rs.3650 → 10 year loan → 2.5% interest rate

II Phase (2,000 lanterns) → 5 Wp module → Rs 3200 → 5 year loan → 5% interest rate

Present → 8 Wp module → Rs 3200 → 5 year loan → 7% interest rate

Success Factors
Identification of healthy cooperative society
Availability of soft funding
Adopting a micro credit mechanism
Schemes to reach clients at doorstep
Utilizing existing infrastructure and resources
Generating constant demand for a cost-effective service
Consolidation of individual customers under one roof for soft funding

Lessons Learned

Society to distribute systems for their members only
Suppliers to use existing collection system for after-sales service
Schemes should add on to existing programs
Product should have direct contribution to income generation and quality of life

Support Requirements

- Continue soft loans for a few more years
- Infrastructure support for ESCOs

Making Solar Affordable to the Poor

The Sungrace Way

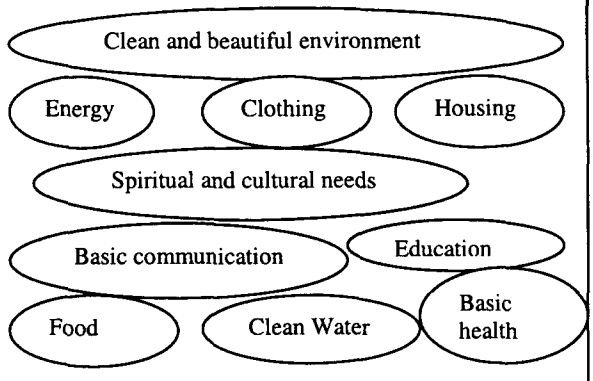
Indrani Hettiarchchi, SEEDS, Sri Lanka
Financing Village Energy Products and Services

SEEDS (Guarantee) Limited

Mission

Eradication of poverty by promoting economic empowerment for a sustainable livelihood

Poverty is non-availability of *basic needs*



SEEDS Operation

Outreach—In 21 Districts out of 24

More than 500,000 clients in 3000 villages

Solar Project—More than 18,000 client families

Village Hydro—7 villages—More than 1,000 families

Considerations in Designing Financing Product for the village

- ***Acceptability***

Year	Average monthly sale
1999	10
2000	50
At present	800

	Value Rs. m.	US $ m.
2001	110.65	1.14
2002	229.573	2.37
2003	358.791	3.70

- ***Affordability***

Borrower Profile

Farmers	56%
Business	9%
Govt. Employees	8%
Employed in forces	6%
Others	21%

- ***Simplicity***

Total service at the doorstep

- Lending
- Recovery
- Purchasing the equipment
- Servicing

- ***Sustainability***

Requirements are

- Satisfied clients—demand/supply
- Uninterrupted funding sources
- Reasonable margin

- ***Portfolio Quality***

Repayment on due date

Yes—85%
No—15%

- ***Credit Assessment***

- First-hand information on income
- Repayment to match the cash flow
- Family income accounted
- Market information collected
- Biannual/monthly repayments

- ***Risk Mitigation***

- Equity upfront—20%
- Ownership of SHS with SEEDS
- Power to repossess
- Guarantors to effect peer pressure
- Warrantees
- Guaranteed after-sales service
- Contributory risk assurance fund

- ***Rural Culture***

- Inability to complete simple loan documents
- Reluctance to furnish information
- Mistrust of new technology
- Disliking being indebted
- Nondisclosure of real income

Stage I *Introductory Phase*

Popularizing the technology by building awareness through fixing 100 SHS in temples and community centers

Lending through the existing village banking model. Indirect intervention not successful

Stage II *Pilot Phase*

- Survey to assess the market
- Operations from two districts
- Total service concept—Sales, Marketing, and After-sales service
- Changing from SSS. Lending to individual
- Lending 400 SHS fixed
- Low Productivity, Poor Profitability
- Poor cost recovery
- Weak lending product designing
- Too long payment periods

Stage III *Commercialization Phase*

- Specialization on financial intermediation
- Partnership with solar supplier companies
- Service to 20 districts
- Financed over 18,000 clients
- Total Investment US$7.28m

Special features to make the system popular

- Buyback arrangement on receipt of grid power
- Refund of the down payment
- Upgrading for extra power
- Additional loans for purchase of batteries

Fruitful Partnership with Solar Companies

- Governing document—MOU
- Product quality assurance
- After-sales service arrangement
- Guarantees/Warranties
- Removal on non payment
- Refurbishing and Reselling

Rapid expansion (Value/Volume)

Use new collection systems

- Deposit in Sarvodaya Societies
- Appoint Agents
- Convert individual clients into client groups & the leader to collect
- Use Solar companies to collect

Future

- Design modifications to accommodate more volume
- Improve on group concept
- Multi-skilled field officers and village-based technicians to maintain the SHS on service agreements and do loan collections
- Strategies to cover the damages from natural disasters

Village Hydro—An ideal community energy project

A village electricity consumer society

Main mission – Electrify the homes

Strategy - Cooperation/self help project on build/own/operate basis. Promotion of economic activities

Unresolved issues

Long-term sustainability of the project

- Volunteerism
- Main power line maintenances
- Ownership of assets
- Government policy

Financing village energy products and services is to be designed and carried out as a service-oriented program and it could be operated as a commercial venture

Asoka Goonawerdene, Energy Forum, Sri Lanka

Energy Forum is a nonprofit organization promoting renewable and decentralized energy technologies

Members of the forum

- NGOs
- Private Sector
- Government Institutions
- The utility
- Research Institutions
- Universities
- End-users
- The Energy Forum serves as a network hub in the rural energy sector

Two million households in Sri Lanka have no access to grid electricity

Electrified	60%
Non-electrified	40%

Renewable Energy in Sri Lanka

Solar Home Systems	25,000
Biogas plants	1,000
Micro Hydro Plants	130
Wind power—grid	3 MW
Wind power—off-grid	2.5 kW
Household wind turbines	250

The approximate cost comparison Installation costs

Micro-hydro	$2,000/kW
Dendro	$2,500/kW
Bio-gas	$2,500/kW
Wind	$3,000/kW
Solar PV	$10,000/kW

Energy Forum played a role in supporting the establishment of the Energy Services Delivery Project (ESD) in 1997

- to include the private sector
- to include Village Hydro
- target was 32,000 SHS and achieved 22,000

Deviations from the Original ESD Project

- SEEDS qualifying as PCI (civil society intervention)
- Contributions from provincial councils (Public Sector intervention)—Establishment of Federation of Electricity Consumer Societies (Civil Society)
- NGO activists qualifying as VHS developers (Civil Society)

RERED Project

- Phase II of ESD project
- Will provide off-grid energy technologies to 100,000 households
- But this will cover only 5% of the off-grid households

Off-grid Energy Services

It is mainly private.

We are trying to develop partnerships to include public institutions and civil society organizations into the process to cater to a

Potential Role for Private Sector

- To provide technology
- To provide energy services for a fee
- To provide after-sales services for a fee (Service Companies)

Potential Role for Public Sector

- To develop a master plan incorporating grid extension and off-grid ET
- To link potential end-users with civil society organizations and private sector
- To establish one-stop shop for clearances
- Monitoring the after-sales services

Potential Role for Civil Society

- To provide micro financing
- To mobilize the community and organize the end-users
- To conduct R&D
- Monitoring the after-sales services

Energy Forum Objectives

- To enable sharing of resources
- To create a better policy environment
- To enhance the capability of member organizations

A **recent study** of EF investigated the relationship between energy and poverty alleviation focusing specifically on the perspectives and requirements of the rural poor.

Select Findings from the Study

- Having electricity for domestic lighting during evening and to watch TV is a basic need
- Off-grid community has indicated higher priority for electricity
- Wealthier people with decentralized energy are not satisfied with the available energy supply
- Employment opportunities in
- electrified villages
  - Welding shop
  - Carpentry
  - Vehicle repair
  - Rice mills
  - Cereal grinding mills

Energy Forum Board of Directors

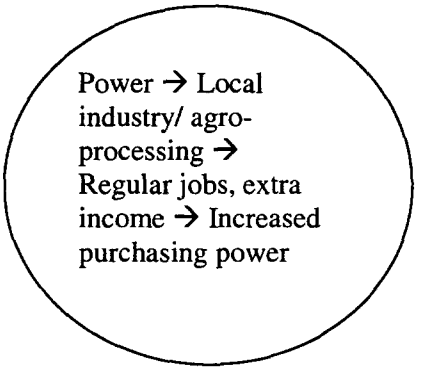
- Lalith Gunaratne—Director, LGA Consultants (Pvt) Ltd
- Ranil Senaratne—Director, Fentons (Pvt) Ltd
- Shavindranath Fernando—Deputy General Manager, Ceylon Electricity Board
- Ranjith Wijeratne—Independent Consultant
- Sanjeewani Munasinghe—British Council
- Priyantha Wjiesuriya—Former President, Solar Industrialists Association
- Sunith Fernando—RM Associates

Hari Sharan, DESI Power Ltd., India

Decentralized Energy Systems India

EmPower Partnership Projects

DESI Circle of Rural Development



Economic, Social, and Financial Results

DESI Power Plants/Services

- Assured load
- Assured biomass supply
- Quality power
- Profitable business

The centralized power sector has failed the villages

Centralized and decentralized sectors should have their own frameworks to function as equal partners side by side

An even playing field should be created for the decentralized power sector

Centralized power sectors should serve primarily the industrial, infrastructure, and urban sectors

Decentralized power sectors should serve the rural and peri-urban areas

Employment and Power

EmPower Partnership for Village Development

Joint and simultaneous implementation

DESI Power for energy services with renewables. Cluster center for support services

Village partner: Enterprises for local value addition and job creation

Public and private investors,

Economic, Social, and Financial Results—The Village

- Regular employment
- Higher farm input
- Better health
- Empowerment: increased capabilities

Increased local sustainability

Economic, Social, and Financial Results —Banks and Investors

- Reliable borrowers
- Reduced risks
- Increased and profitable business
- Assured ROI

Economic, Social, and Financial Results —The Government

- Reduced power losses
- Reduced financial losses
- Fewer budgetary requirements
- Improved village economy
- Increased rural productivity
- Less migration to cities

Economic, Social, and Financial Results —The Environment

- Lower local pollution
- Lower energy losses
- Lower CO_2 emissions

Increased sustainability: local and global

Cluster Centers

A total capacity of 1 MW in contiguous villages

Responsibilities

- Site selection and project development
- Training and refresher courses
- Technical and managerial support
- Performance audit

Self-supporting extension service fees

Plants Built by DESI Power in India

Project	*Location*	*Commissioning year*	*Rating kW_e*
DESI Power Orchha	Orchha, Madhya Pradesh	1996	2 x 50 Dual Fuel
Badadhara	Badadhara, Orissa	2000	1 x 36 DF
BOVS	Baharbari, Bihar	2001	1 x 24, 1 x 50 DF
MVIT Phase I	Yelahanka, Bangalore	2002	2 x 50 DF
MVIT Phase II	Yelahanka, Bangalore	2002	1 x 120 DF
GB Engineering	Trichy, Tamil Nadu	2002	1 x 120 DF
WSD Varlakonda	Kolar, Karnataka	2002	1 x 50 DF
GB Food Oils	Trichy, Tamil Nadu	2002	1 x 120 DF
VIT	Vellore, Tamil Nadu	2002	1 x 100 DF
WERE/UNDP/GEF	Assembo Bay, Kenya	Dispatched 2002	1 x 50 DF

Performance of Orchha Plant
(kWh generated)

1996	30,000
1997	69,000
1998	73,000
1999	73,000
2000	69,500
2001	73,000
2002	70,000

PERFORMANCE OF ORCHHA PLANT (RUNNING HOURS)

Year	Plant	Gasifier
1996	1950	1200
1997	2450	1600
1998	2400	2200
1999	2100	1400
2000	2000	2000
2001	2700	2850
2002	2300	2250

Performance of Baharbari Plant in 2002 (kWh)

January	650
February	1,150
March	1,000
April	1,450
May	575
June	200
July	0
August	100
September	300
October	0
November	375
December	750

Performance of Baharbari Plant in 2002 (Running hours)

	Plant	*Gasifier*
January	100	0
February	135	22
March	115	0
April	125	60
May	60	50
June	25	22
July	0	0
August	18	15
September	38	35
October	0	0
November	85	80
December	105	38

Performance of MVIT Plant in 2002-03 (kWh/month)

September	11,000
October	14,000
November	9,000
December	29,000
January	3,8000
February	23,000
March	37,000
April	36,000

Performance of MVIT Plant in 2002-03 (Running hours)

	Plant	*Gasifier1*	*Gasifier2*
September	230	220	
October	300	250	
November	175	60	85
December	425	220	190
January	620	450	180
February	480	240	200
March	520	330	200
April	510	300	220

PARTNERS IN BAHARBARI PROJECT

DESI Power Cluster Center—Provides services

BOVS Village Enterprises—Water supply; Agro-processing; Small industries; Fuel supply and processing; Agro forestry; Workshop

Funding Agencies—DESI, BOVS, Dutch

Triple Bottom Line Performance of Baharbari

Machines/ equipment	Economic performance		Social Performance			
	Rs.	ROI %	Direct jobs	Rs. / job	Jobs for women	Other
Briquetting Machine	450,000	6	2.1	210,000	Yes	Health benefit
New pumps	400,000	17	1.1	360,000	Yes	Higher yield
Old pumps	50,000	51	1	50,000	Yes	
Paddy processing	1,500,000	8	5.5	270,000	Yes	No arduous pounding
Fisheries	150,000	15	1	150,000		
Tree planting	250,000	3.5	1.5	170,000	Yes	
Power plant	3,000,000	10	5	600,000	Yes	
Other services	500,000	10	2	250,000	Yes	Lighting, TV
Total	6,300,000	9.8	19	330,000		

Triple Bottom Line Performance of Baharbari			
Machines and Equipment	Ecological Performance		
	Reduction of Local Pollution	Reduction of CO_2 Emissions	Cost of Saving Emissions
Briquetting Machine	Yes	Yes	
New pumps	Yes	Yes	
Old pumps	Yes	Yes	
Paddy processing	Yes	Yes	
Fisheries			
Tree planting	Yes	Yes	
Power plant	Yes	Yes	
Other energy service units	Yes	Yes	
Total Project		6 tons/yr/kW	$ 4-10 per tCO_2

Next Phase
Commercial Demonstration in 20 Villages

Baharbari Cluster	6 projects
Orchha Cluster	6 projects
Varlakonda Cluster	6 projects
Coimbatore Cluster	2 projects

Investment for 20 Projects

Unit Rating	50 kW_e	100 kW_e
No. of units	10	10
Cost of plants	24 m Rs	32 m Rs
Cost of micro enterprise	15 m Rs	20 m Rs
Training	3 m Rs	3 m Rs
Cluster management	6 m Rs	6 m Rs
Total Investment	48 m Rs	61 m Rs

Possible Funding Sources

MNES subsidy for biomass gasifier power plants; MoP/MNES subsidy for off-grid electrification; ***Local equity; Bank loan for power plant; Seed money and loan from development banks for micro enterprise; Private sector grants; CDM/CER sales***

Economics of Biomass Gasification Power Plants			
	Unit	Pure Gas Mode	Dual Fuel Mode
Gasifier Rating	Kg/h	65	65
Engine rating in pure diesel mode	KVA	110	82.5
Engine rating in gas fuel/ dual fuel mode	KW	55	50
Capital cost (after subsidy)	Rs. Million	13.5	16.3
Equity	%	70	70
Dividend on equity	%	10	10
Loan	%	30	30
Interest rate	%	13	13
Repayment period	Years	10	10
Average load	KW_e	40	40
Diesel price	Rs / liter	22	22
Total CO_2 saving	Tons/year	125-250	90-170

Annex 5

Online Consultation

The online consultation was held during the last two weeks of April, two months before the South Asia Practitioners Workshop (SAPW) in Sri Lanka. The main objectives of the consultation were to debate and identify the issues that are important in tackling the challenge of scaling up village energy services, and develop themes to be discussed at SAPW. As the starting point of this dialog, participants were asked to respond to two primary questions:

i) To scale-up existing successful schemes or projects to reach those under and unserved by modern energy services on a sustainable basis, what critical changes need to occur?

ii) What best practices and principal lessons have emerged from your experience to date, that could be replicated elsewhere?

There were 40 responses to the first question, and 26 for the second. Respondents included rural entrepreneurs, government officials, nongovernmental organizations (NGOs), equipment suppliers, academics, donors, and financial institutions. These responses ranged from brief comments to detailed project profiles. Based on their direct experiences in the field, the respondents came up with a number of lessons and suggestions on what needed to be done to scale-up the village energy services, which are summed up below. The full text of the online consultation is published independently as an ESMAP Technical Paper.

Scale-up considerations

- There is a need to maintain technology neutrality in designing interventions, unlike in the past when there was too much push for Solar PV. A rational application of RE technologies should be promoted matching the specific requirements.
- Emphasis should be on energy rather than electricity, and it is possible to link up non-electricity RE technologies with economic development.

- While community participation is a desirable goal and a prerequisite for sustainable projects, it is important to understand the intra-community dynamics and address those in project implementation.
- While shifting from traditional to modern energy services, there is a danger that women may become dis-empowered. It is critical to prevent this gender bias by consciously dealing with it.
- It is high time to bring non-energy practitioners (from health, education, agriculture, small industry, ICTs, etc.) into the village energy services delivery framework so integrated planning and implementation could occur.

Policy issues

- There is a need to develop or revisit the national and regional energy policies to ensure reflection of energy-poverty linkages, clear endorsement of off-grid energy solutions, and development of a framework that would encourage public-private partnerships and offer appropriate incentives.
- There should be a clear endorsement for private sector involvement and there should be an enabling regulatory regime that would encourage the private sector through clear incentives to enter the rural energy sector.
- Many developing countries lack clear legal framework to enable off-grid projects to become mainstream energy solutions. The new policies should clearly lay down the legal framework.

Financing and subsidies

- Donors should not dump funds and exercise undue influence over project implementation. Rather, resources should be channeled directly through local entrepreneurs and NGOs.
- Subsidies are necessary to scale-up in view of the low purchasing power of the rural poor, but they should be tapered off gradually by improving the economic situation through focus on productive uses of energy.
- There is need for innovative financing mechanisms like guarantee funds to mitigate the risks associated with RE sector, so that micro finance institutions (MFIs) and banks can offer financing in this field.

Economic development and quality of life

- Integration of energy services with productive uses that lead to income generation is imperative if off-grid solutions are to be accepted by the local communities of users.
- Local institutions such as self-help groups of India should be actively involved in village energy programs to empower communities as well as initiate income-generating activities.

- It is necessary to educate the policymakers and politicians so that energy development policies and programs are not hampered by short-term considerations.

Ensuring customer satisfaction

- Developing and implementing strict quality standards in equipment and maintenance is critical for long-term sustainability. There should be rewards and penalties to maintain standards.
- Multi-level capacity building for different stakeholders, especially the practitioners and consumers on the ground, is important.
- Providing adequate information on programs and technologies is important to ensure against unrealistic expectations and consequent disappointment.
- Credit delivery mechanisms should be easily accessible to consumers to keep the response time and transaction costs low.

As can be seen from the themes covered at SAPW and the deliberations that took place, the online consultation was useful in identifying the key issues. Finally, it should be noted that the Global Village Energy Partnership is maintaining this online forum to encourage information exchange among practitioners.

Annex 6

Field Visit

Site 1. Micro Hydro Power Project at Tantirikanda, Deraniyagala

Project Design, Consultation, Construction, & Maintenance	**ENCO (PRIVATE) LTD.** 92/A G. H. Perera Mawatha, Rattanapitiya, Boralesgamuwa, Sri Lanka Tel: 01-817815, 074-301833, Fax: 074-301833
Project Ownership	Tantirikanda Grameya Viduli Balasakthi Paribogika Samithiya (Tantirikanda Electricity Generating & Consumer Society)
1. Designed generation capacity	7.5kW
2. Location Province District Divisional secretariat	 Sabaragamuwa Kegalle Deraniyagala
3. Access to site	About 20 km from Deraniyagala on Deraniyagala—Avissawella Road
4. Water source	Magal Ganga (Branch of Kelani Ganga)
5. River catchment/sub catchment	Peak Wildness Forest reserve
6. Annual Average Rainfall (27	3688 mm (measuring station—

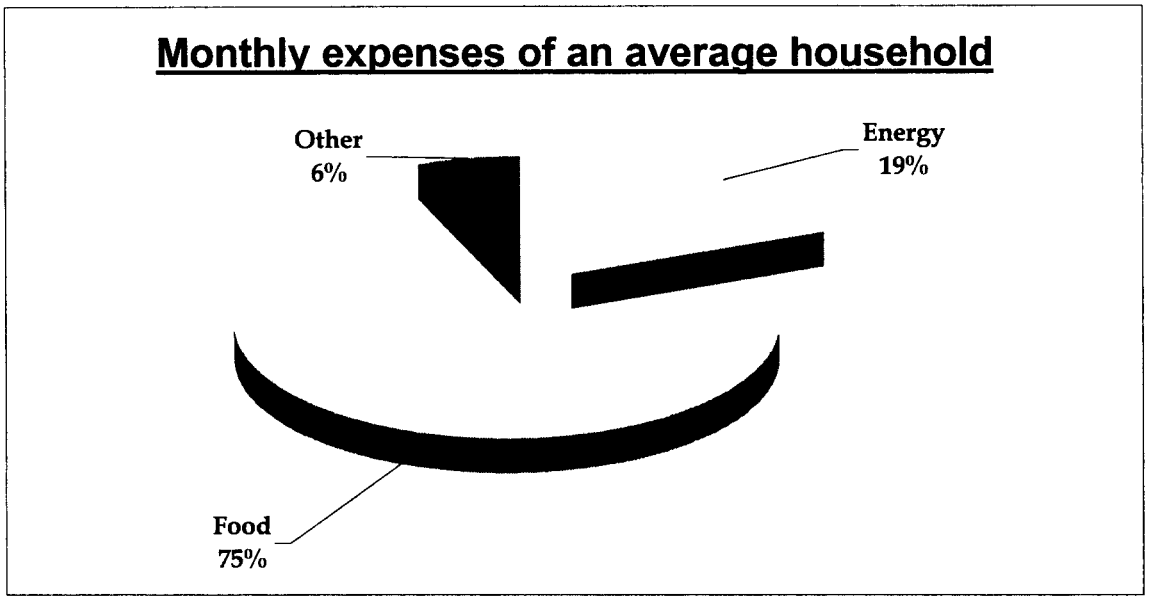
yrs.)	Miyanawita)
7. Catchment area to diversion point	0.8 esq.
8. Design Flow	24 lit./ Sec.
9 Gross head	47m (approx.)
10. Penstock Diameter	110 mm
11. Penstock Type	PVC type 400
12. Power House	Open-air power house on right bank of river 2m x 2.5m
13. Type of Turbines	Multi-jet Pelton wheel
14. Turbine Design efficiency	80%
15. Generator	Induction, 7.5kW ,400 V,3ph.
16. Controlling	Single ph.,7.5 kW IGC
17 .Output	230v Single ph.

Socioeconomic Aspects

A survey was done in the village to get the socioeconomic information of the consumer households. This was done using a fill-in survey questionnaire given to each household and analyzing the information they provided. After gathering the information, it was possible to develop a social profile of the electricity consumers.

Number of households	50 Households (237 People)
Number of employed	69
Number of unemployed	141
Number of students	51
Income source	Small-scale tea planters, estate workers, farmers
Average monthly income	Rs. 2,000 (US$20)

The following graph shows the percentage of income spent on basic needs of an average household per month.



According to these survey results all of 60 potential electricity consumer households have an average monthly income of Rs. 2,000 (US$20). An average household expends Rs. 375 (US$3.8) per month for their energy requirements. Presently all 63 households use firewood for cooking and kerosene for lightning. Most of the villagers use wet batteries for operating TV sets and radio/cassette recorders. Lifetime of a wet battery costing around Rs. 3500 (US$35) would be about two years. Price of a wet battery and difficulty in getting it charged has limited its usage. Kerosene lamps are popularly used for lighting even though they sometimes cause accidents. Students' nighttime studying is limited because of improper lighting conditions. Villagers are shut from the outside world because listening to the radio and watching TV has become expensive for most of them.

Getting electricity to the village from national grid has been a dream of the villagers, but it won't be realized in the near future. However, being a village blessed with natural streams and mountainous geography, it was possible to implement a hydro-power project to supply electricity for the village.

FINANCIAL PLAN

Description	*Rs (1US$ is approx. Rs. 100)*
Total Project Cost	1,186,500
GEF grant for 7.5 kW Micro Hydro Power Project (7.5 X US $400 X Rs.85.00) to Tantrikanda Village Electricity Consumers' Society	255,000
Less: Finance by the Village Consumer Society Manual labor, raw material at their disposal	275,000
Bank loan taken to the Consumer Society (From DFCC bank)	300,000
Balance financed by (Terra People Association, Saga Japan)	356,500

SUMMARY OF PROJECT COST

Description	Rs.
1. Designing/ Supervising/ Project implementation/ Testing & Commissioning	300,000
2. **Civil Construction:** • Weir Intake 9.0 m x 0.40 m x 1.25m • Penstock Supports 36 nos • Penstocks 160 m • Powerhouse 2.5 m x 3.5 m • Tail race. 0.5 m x 2.5 m	125,000
3. **Mechanical**: • Turbine Fabrication • Manifolds • Valves And Pressure gauge	155,500
4. **Electrical**: • Generators	276,000

• Controllers • Switchboards & Generator Cabling • Powerhouse Electrical work	
5. **Transmission Line/** • Distribution network • 7/3.40 Aluminum conductors • 50mm2 Bundle Conductors • Service wire • Professional Service	295,000
6. Land/ Compensation/ Mitigation of environmental impacts	25,000
7. Secretarial work	10,000
Total Project Cost	**1,186,500**

The Consumer Society has to settle this installment through monthly electricity bills collected from village electricity consumers. For example, to settle a bank loan of Rs. 800,000 (@ 16 percent interest per annum), a consumer has to pay Rs. 360 (US$3.6) as his monthly electricity bill. This is equivalent to an annual sum of Rs. 4,320, which is a considerable portion of their annual income. If the loan has to be increased to Rs. 1,265,000, which includes the balance of Rs. 465,000, then the monthly consumer bill would be Rs. 570, which most could not afford. This makes the repayment of the bank loan be a problem, thus financing institutions may not be willing to provide required financing assistance in terms of bank loan to the project.

Hence a loan of Rs. 800,000 for 60 households is the maximum affordable amount. Under these circumstances, a bridging grant of Rs. 465,000 from GEF was essential to implement this project. GEF Grant was released only after commissioning the project successfully. The venture received some grants from volunteer organizations and the balance of the money could be invested by the company as a loan to the Society with mutual understanding. The loan was released only upon progress of the project.

Under these circumstances, the initial grant played a major role in getting the project off the ground.

Site 2. Micro Hydro Power Project at Kambili Oya Gollahina

Project Design, Consultancy, Construction, & Maintenance	**ENCO (PRIVATE) LTD.** 92/A G. H. Perera Mawatha, Rattanapitiya, oralesgamuwa, Sri Lanka. Tel: 01-817815, 074-301833, Fax: 074-301833
Project Ownership	Gollahinna Electricity Generating & Consumer Society
1. Designed generation capacity	22 Kw
2. Location	Deraniyagala Divisional Secretariat, Kegallede District, Sabaragamuwa Province
3. Access to site	About 20 km from Deraniyagala on Deraniyagala–Avissawella Road.
4. Water source	Kambili Oya (Branch of Kelani Ganga)
5. River catchment / sub catchment	Peak Wildness Forest reserve
6. Annual Average Rainfall (27yrs)	4686 mm (measuring station – Maliboda)
7. Catchment area to diversion point	1.0 sq.km
8. Design Flow	50 lt/ Sec.
9. Gross head	36m (approx.)
10. Penstock Diameter	225 mm
11. Penstock Type	PVC type 1000
12. Power House	Open air powerhouse on right bank of river 4m x 3.5m
13. Type of Turbines	Multi jet Pelton wheel
14. Turbine Design efficiency	80%

15. Generator	Induction , 22 kW, 400 V
16. Controlling	Single ph., 22 kW IGC
17. Output	230v Single ph.

Social Aspects

A survey was done in the village to get the socioeconomic information of the consumer households. This was done using a fill-in survey questionnaire given to each household. Analyzing the information they provided, a social profile of electricity consumers was developed.

Number of households	70
Number of people employed	82
Number of people unemployed	76
Number of students	74
Income source	Small-scale tea planters, estate workers, farmers
Average monthly income	Rest 2800 (US$28)

Each household pays Rest. 325 per month for electricity service comprising Rest. 190 toward loan, Rest. 100 toward Society savings, Rest. 25 for the operator and the membership fee of Rest. 10. The Society funds are saved in an interest-bearing account, and are used to contribute to funerals of community members and other community needs. Fifty plastic chairs were purchased to be used for funerals, and rented out for parties and festivities. The community had also built its own primary school and temple hall.

The two sawmills pay Rest. 500 per month each; no electric meters are used in any facility. The payment was negotiated between the mill owners, who are members of the Society, and Society management with concurrence from the membership. The fee was fixed based on an assessment of the ability to pay.

Before the micro hydro plant, the community used kerosene for lighting and the cost was about Rest. 300-400 per month per family. About 10 households owned black-and-white televisions operated using car batteries recharged at Deraniyagala town. Recharging is once a month when the battery is new, and twice after it becomes old (costing Rest. 100 per charge and Rest. 100 for transport each time). Average battery life was 1.5 years.

Main benefits from micro hydro are lighting, TV, and radio for households. Many households own TVs now, some even color TVs. No cottage industries came up. But people are happy with this investment. Ten to 15 new households requested connections but the current plant couldn't meet the requirement. The Society is considering a smaller micro hydro plant to meet the additional demand.

Observations from Field Visit

- The community has clearly benefited from the micro hydro power in several ways: i) reduced expenses for kerosene, battery charging, and gen-set operation; ii) high-quality lighting and access to information and entertainment; iii) enhanced community cohesiveness; iv) increased savings for community needs; and v) some productive applications.
- The continued viability of the scheme will depend on the successful management of the Society, good technical and financial management, and community cooperation. Special attention must be paid to ensure that Society capabilities continue to be strengthened.
- Pre-investment support from ESD/GEF was critical for the project development. Continued involvement of project developer or a similar entity will be beneficial in terms of sustaining the technical and management capacity of the Society. However, funding sources have to be looked for to continue such involvement.
- When the loan is fully repaid, the monthly collections are likely to drop by 60 percent for each household. It will be important for the Society to motivate the members to ensure adequate funds are held in reserve for spares, repairs, and other contingencies. Insurance coverage should be retained even after the loan is repaid, after determining appropriate fees.

Annex 7

Participant Feedback

More than half of the workshop participants responded to the formal questionnaire given out to provide feedback on the various aspects of the workshop.

Overall Usefulness

More than 80 percent of the participants felt that the workshop was useful to extremely useful (4 or 5 on a scale of 1-5). The average response to this question was 3.8, with the median being 4. The relevance of the workshop to participants' current and future work, and to the village energy activities of their organization and country, was also rated by 83 percent of them to be very high. Most participants felt such a forum was timely.

Specific Benefits

In terms of the usefulness of the specific information provided at the workshop, about 57 percent of the participants provided a high rating. However, just about 35 percent of the participants indicated that the information provided was new to them. This is not entirely surprising given the fact that most of the participants are direct practitioners of village energy programs, who regularly deal with the issues discussed at the workshop. Further, many of the project profiles submitted by the participants were not perused at the time of the evaluation.

The apparent anomaly between the high overall usefulness and low specific usefulness can be explained by the fact that most participants highly valued the contacts and interactions with the others. The breakout sessions, which provided an opportunity for more informal exchanges among participants, were identified as the most instructive part of the workshop. This manifestation of workshop being used as a forum for exchange—one of the principal objectives of the workshop—contributed to the overall positive feedback, with more than 70

percent of the respondents assigning a rating of four or five to the question of whether they developed useful contacts to continue working on the issues.

Online Consultation

The month-long online consultation held before the workshop, which served as one of the bases for determining the workshop themes, was recognized as a highly useful exercise, as articulated both at the close of the consultation and in the post-workshop evaluation. However, around 40 percent of the participants noted that the degree of information related to the workshop objectives that they received before attending was insufficient. This suggests that such online consultations need to be conducted in a more focused fashion to derive very specific outcomes and strive for more active involvement of the participants.

Next Steps

Participants identified in their evaluation that the primary obstacles to scale-up were commitment on behalf of national policymakers and access to finance. These themes were reiterated throughout the workshop and during both the pre- and post-workshop consultations. Most participants recommended that GVEP play a proactive role in overcoming these barriers, including hosting multi-stakeholder consultations and increasing knowledge management and dissemination efforts at global and national levels.

Shortcomings

A number of participants identified felt that the time allocated for discussion was not sufficient and thus did not allow many issues to be covered in depth. This has been indicated as a possible reason for relatively low usefulness of the specific information provided. The length of the workshop, namely three days (two days of consultation and one day field trip), was, however, deemed adequate. Therefore, it is important to design such workshops in an even more focused way, perhaps by concentrating on a few chosen topics rather than attempting to cover a wide range.

Conclusion

Overall there was a sense that the South Asia Practitioners Workshop (SAPW) provided an opportunity for the participants to obtain a broader cross-country perspective of issues, and to understand good practices and constraints about off-grid energy service provision. SAPW also offered a unique platform for practitioners to come together, exchange experiences, and develop valuable professional relationships. The practitioners recognized the need for broader

consultation with beneficiary communities on one hand, and with policymakers on the other. In this regard, the objectives of the workshop have largely been achieved.

Joint UNDP/World Bank

ENERGY SECTOR MANAGEMENT ASSISTANCE PROGRAMME (ESMAP)

LIST OF REPORTS ON COMPLETED ACTIVITIES

Region/Country	*Activity/Report Title*	*Date*	*Number*
	SUB-SAHARAN AFRICA (AFR)		
Africa Regional	Anglophone Africa Household Energy Workshop (English)	07/88	085/88
	Regional Power Seminar on Reducing Electric Power System Losses in Africa (English)	08/88	087/88
	Institutional Evaluation of EGL (English)	02/89	098/89
	Biomass Mapping Regional Workshops (English)	05/89	--
	Francophone Household Energy Workshop (French)	08/89	--
	Interafrican Electrical Engineering College: Proposals for Short- and Long-Term Development (English)	03/90	112/90
	Biomass Assessment and Mapping (English)	03/90	--
	Symposium on Power Sector Reform and Efficiency Improvement in Sub-Saharan Africa (English)	06/96	182/96
	Commercialization of Marginal Gas Fields (English)	12/97	201/97
	Commercilizing Natural Gas: Lessons from the Seminar in Nairobi for Sub-Saharan Africa and Beyond	01/00	225/00
	Africa Gas Initiative – Main Report: Volume I	02/01	240/01
	First World Bank Workshop on the Petroleum Products Sector in Sub-Saharan Africa	09/01	245/01
	Ministerial Workshop on Women in Energy	10/01	250/01
	Energy and Poverty Reduction: Proceedings from a Multi-Sector And Multi-Stakeholder Workshop Addis Ababa, Ethiopia, October 23-25, 2002.	03/03	266/03
Angola	Energy Assessment (English and Portuguese)	05/89	4708-ANG
	Power Rehabilitation and Technical Assistance (English)	10/91	142/91
	Africa Gas Initiative – Angola: Volume II	02/01	240/01
Benin	Energy Assessment (English and French)	06/85	5222-BEN
Botswana	Energy Assessment (English)	09/84	4998-BT
	Pump Electrification Prefeasibility Study (English)	01/86	047/86
	Review of Electricity Service Connection Policy (English)	07/87	071/87
	Tuli Block Farms Electrification Study (English)	07/87	072/87
	Household Energy Issues Study (English)	02/88	--
	Urban Household Energy Strategy Study (English)	05/91	132/91
Burkina Faso	Energy Assessment (English and French)	01/86	5730-BUR
	Technical Assistance Program (English)	03/86	052/86
	Urban Household Energy Strategy Study (English and French)	06/91	134/91
Burundi	Energy Assessment (English)	06/82	3778-BU
	Petroleum Supply Management (English)	01/84	012/84
	Status Report (English and French)	02/84	011/84
	Presentation of Energy Projects for the Fourth Five-Year Plan (1983-1987) (English and French)	05/85	036/85
	Improved Charcoal Cookstove Strategy (English and French)	09/85	042/85
	Peat Utilization Project (English)	11/85	046/85
	Energy Assessment (English and French)	01/92	9215-BU
Cameroon	Africa Gas Initiative – Cameroon: Volume III	02/01	240/01
Cape Verde	Energy Assessment (English and Portuguese)	08/84	5073-CV
	Household Energy Strategy Study (English)	02/90	110/90
Central African Republic	Energy Assessement (French)	08/92	9898-CAR

Region/Country	*Activity/Report Title*	*Date*	*Number*
Chad	Elements of Strategy for Urban Household Energy The Case of N'djamena (French)	12/93	160/94
Comoros	Energy Assessment (English and French)	01/88	7104-COM
	In Search of Better Ways to Develop Solar Markets: The Case of Comoros	05/00	230/00
Congo	Energy Assessment (English)	01/88	6420-COB
	Power Development Plan (English and French)	03/90	106/90
	Africa Gas Initiative – Congo: Volume IV	02/01	240/01
Côte d'Ivoire	Energy Assessment (English and French)	04/85	5250-IVC
	Improved Biomass Utilization (English and French)	04/87	069/87
	Power System Efficiency Study (English)	12/87	--
	Power Sector Efficiency Study (French)	02/92	140/91
	Project of Energy Efficiency in Buildings (English)	09/95	175/95
	Africa Gas Initiative – Côte d'Ivoire: Volume V	02/01	240/01
Ethiopia	Energy Assessment (English)	07/84	4741-ET
	Power System Efficiency Study (English)	10/85	045/85
	Agricultural Residue Briquetting Pilot Project (English)	12/86	062/86
	Bagasse Study (English)	12/86	063/86
	Cooking Efficiency Project (English)	12/87	--
	Energy Assessment (English)	02/96	179/96
Gabon	Energy Assessment (English)	07/88	6915-GA
	Africa Gas Initiative – Gabon: Volume VI	02/01	240/01
The Gambia	Energy Assessment (English)	11/83	4743-GM
	Solar Water Heating Retrofit Project (English)	02/85	030/85
	Solar Photovoltaic Applications (English)	03/85	032/85
	Petroleum Supply Management Assistance (English)	04/85	035/85
Ghana	Energy Assessment (English)	11/86	6234-GH
	Energy Rationalization in the Industrial Sector (English)	06/88	084/88
	Sawmill Residues Utilization Study (English)	11/88	074/87
	Industrial Energy Efficiency (English)	11/92	148/92
Guinea	Energy Assessment (English)	11/86	6137-GUI
	Household Energy Strategy (English and French)	01/94	163/94
Guinea-Bissau	Energy Assessment (English and Portuguese)	08/84	5083-GUB
	Recommended Technical Assistance Projects (English & Portuguese)	04/85	033/85
	Management Options for the Electric Power and Water Supply Subsectors (English)	02/90	100/90
	Power and Water Institutional Restructuring (French)	04/91	118/91
Kenya	Energy Assessment (English)	05/82	3800-KE
	Power System Efficiency Study (English)	03/84	014/84
	Status Report (English)	05/84	016/84
	Coal Conversion Action Plan (English)	02/87	--
	Solar Water Heating Study (English)	02/87	066/87
	Peri-Urban Woodfuel Development (English)	10/87	076/87
	Power Master Plan (English)	11/87	--
	Power Loss Reduction Study (English)	09/96	186/96
	Implementation Manual: Financing Mechanisms for Solar Electric Equipment	07/00	231/00
Lesotho	Energy Assessment (English)	01/84	4676-LSO
Liberia	Energy Assessment (English)	12/84	5279-LBR
	Recommended Technical Assistance Projects (English)	06/85	038/85
	Power System Efficiency Study (English)	12/87	081/87
Madagascar	Energy Assessment (English)	01/87	5700-MAG
	Power System Efficiency Study (English and French)	12/87	075/87

Region/Country	*Activity/Report Title*	*Date*	*Number*
Madagascar	Environmental Impact of Woodfuels (French)	10/95	176/95
Malawi	Energy Assessment (English)	08/82	3903-MAL
	Technical Assistance to Improve the Efficiency of Fuelwood Use in the Tobacco Industry (English)	11/83	009/83
	Status Report (English)	01/84	013/84
Mali	Energy Assessment (English and French)	11/91	8423-MLI
	Household Energy Strategy (English and French)	03/92	147/92
Islamic Republic of Mauritania	Energy Assessment (English and French)	04/85	5224-MAU
	Household Energy Strategy Study (English and French)	07/90	123/90
Mauritius	Energy Assessment (English)	12/81	3510-MAS
	Status Report (English)	10/83	008/83
	Power System Efficiency Audit (English)	05/87	070/87
	Bagasse Power Potential (English)	10/87	077/87
	Energy Sector Review (English)	12/94	3643-MAS
Mozambique	Energy Assessment (English)	01/87	6128-MOZ
	Household Electricity Utilization Study (English)	03/90	113/90
	Electricity Tariffs Study (English)	06/96	181/96
	Sample Survey of Low Voltage Electricity Customers	06/97	195/97
Namibia	Energy Assessment (English)	03/93	11320-NAM
Niger	Energy Assessment (French)	05/84	4642-NIR
	Status Report (English and French)	02/86	051/86
	Improved Stoves Project (English and French)	12/87	080/87
	Household Energy Conservation and Substitution (English and French)	01/88	082/88
Nigeria	Energy Assessment (English)	08/83	4440-UNI
	Energy Assessment (English)	07/93	11672-UNI
Rwanda	Energy Assessment (English)	06/82	3779-RW
	Status Report (English and French)	05/84	017/84
	Improved Charcoal Cookstove Strategy (English and French)	08/86	059/86
	Improved Charcoal Production Techniques (English and French)	02/87	065/87
	Energy Assessment (English and French)	07/91	8017-RW
	Commercialization of Improved Charcoal Stoves and Carbonization Techniques Mid-Term Progress Report (English and French)	12/91	141/91
SADC	SADC Regional Power Interconnection Study, Vols. I-IV (English)	12/93	-
SADCC	SADCC Regional Sector: Regional Capacity-Building Program for Energy Surveys and Policy Analysis (English)	11/91	-
Sao Tome and Principe	Energy Assessment (English)	10/85	5803-STP
Senegal	Energy Assessment (English)	07/83	4182-SE
	Status Report (English and French)	10/84	025/84
	Industrial Energy Conservation Study (English)	05/85	037/85
	Preparatory Assistance for Donor Meeting (English and French)	04/86	056/86
	Urban Household Energy Strategy (English)	02/89	096/89
	Industrial Energy Conservation Program (English)	05/94	165/94
Seychelles	Energy Assessment (English)	01/84	4693-SEY
	Electric Power System Efficiency Study (English)	08/84	021/84
Sierra Leone	Energy Assessment (English)	10/87	6597-SL
Somalia	Energy Assessment (English)	12/85	5796-SO
Republic of South Africa	Options for the Structure and Regulation of Natural Gas Industry (English)	05/95	172/95
Sudan	Management Assistance to the Ministry of Energy and Mining	05/83	003/83
	Energy Assessment (English)	07/83	4511-SU

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	Power System Efficiency Study (English)	06/84	018/84
	Status Report (English)	11/84	026/84
	Wood Energy/Forestry Feasibility (English)	07/87	073/87
Swaziland	Energy Assessment (English)	02/87	6262-SW
	Household Energy Strategy Study	10/97	198/97
Tanzania	Energy Assessment (English)	11/84	4969-TA
	Peri-Urban Woodfuels Feasibility Study (English)	08/88	086/88
	Tobacco Curing Efficiency Study (English)	05/89	102/89
	Remote Sensing and Mapping of Woodlands (English)	06/90	--
	Industrial Energy Efficiency Technical Assistance (English)	08/90	122/90
	Power Loss Reduction Volume 1: Transmission and Distribution SystemTechnical Loss Reduction and Network Development (English)	06/98	204A/98
	Power Loss Reduction Volume 2: Reduction of Non-Technical Losses (English)	06/98	204B/98
Togo	Energy Assessment (English)	06/85	5221-TO
	Wood Recovery in the Nangbeto Lake (English and French)	04/86	055/86
	Power Efficiency Improvement (English and French)	12/87	078/87
Uganda	Energy Assessment (English)	07/83	4453-UG
	Status Report (English)	08/84	020/84
	Institutional Review of the Energy Sector (English)	01/85	029/85
	Energy Efficiency in Tobacco Curing Industry (English)	02/86	049/86
	Fuelwood/Forestry Feasibility Study (English)	03/86	053/86
	Power System Efficiency Study (English)	12/88	092/88
	Energy Efficiency Improvement in the Brick and Tile Industry (English)	02/89	097/89
	Tobacco Curing Pilot Project (English)	03/89	UNDP Terminal Report
	Energy Assessment (English)	12/96	193/96
	Rural Electrification Strategy Study	09/99	221/99
Zaire	Energy Assessment (English)	05/86	5837-ZR
Zambia	Energy Assessment (English)	01/83	4110-ZA
	Status Report (English)	08/85	039/85
	Energy Sector Institutional Review (English)	11/86	060/86
	Power Subsector Efficiency Study (English)	02/89	093/88
	Energy Strategy Study (English)	02/89	094/88
	Urban Household Energy Strategy Study (English)	08/90	121/90
Zimbabwe	Energy Assessment (English)	06/82	3765-ZIM
	Power System Efficiency Study (English)	06/83	005/83
	Status Report (English)	08/84	019/84
	Power Sector Management Assistance Project (English)	04/85	034/85
	Power Sector Management Institution Building (English)	09/89	--
	Petroleum Management Assistance (English)	12/89	109/89
	Charcoal Utilization Prefeasibility Study (English)	06/90	119/90
	Integrated Energy Strategy Evaluation (English)	01/92	8768-ZIM
	Energy Efficiency Technical Assistance Project: Strategic Framework for a National Energy Efficiency Improvement Program (English)	04/94	--
	Capacity Building for the National Energy Efficiency Improvement Programme (NEEIP) (English)	12/94	--
Zimbabwe	Rural Electrification Study	03/00	228/00

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China	County-Level Rural Energy Assessments (English)	05/89	101/89
	Fuelwood Forestry Preinvestment Study (English)	12/89	105/89
	Strategic Options for Power Sector Reform in China (English)	07/93	156/93
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	Improving the Technical Efficiency of Decentralized Power Companies	09/99	222/99
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Fiji	Energy Assessment (English)	06/83	4462-FIJ
Indonesia	Energy Assessment (English)	11/81	3543-IND
	Status Report (English)	09/84	022/84
	Power Generation Efficiency Study (English)	02/86	050/86
	Energy Efficiency in the Brick, Tile and Lime Industries (English)	04/87	067/87
	Diesel Generating Plant Efficiency Study (English)	12/88	095/88
	Urban Household Energy Strategy Study (English)	02/90	107/90
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	Improved Space Heating Stoves for Ulaanbaatar	03/02	254/02
Myanmar	Energy Assessment (English)	06/85	5416-BA
Papua New Guinea	Energy Assessment (English)	06/82	3882-PNG
	Status Report (English)	07/83	006/83
	Institutional Review in the Energy Sector (English)	10/84	023/84
	Power Tariff Study (English)	10/84	024/84
Philippines	Commercial Potential for Power Production from Agricultural Residues (English)	12/93	157/93
	Energy Conservation Study (English)	08/94	--
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	Rural Electrification and Development in the Philippines: Measuring the Social and Economic Benefits	05/02	255/02
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	Energy Assessment (English)	01/92	979-SOL
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Thailand	Energy Assessment (English)	09/85	5793-TH
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Vanuatu	Energy Assessment (English)	06/85	5577-VA
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	Priority Investment Program (English)	05/83	002/83
	Status Report (English)	04/84	015/84
	Power System Efficiency Study (English)	02/85	031/85
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	Lighting Efficiency Improvement Program Phase 1: Commercial Buildings Five Year Plan (English)	10/94	--
	Clean Fuels	10/01	246/01
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	Power System Loss Reduction Study (English)	07/83	007/83
	Status Report (English)	01/84	010/84
	Industrial Energy Conservation Study (English)	03/86	054/86
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	Energy Assessment (English and French)	03/84	4157-MOR
	Status Report (English and French)	01/86	048/86
Morocco	Energy Sector Institutional Development Study (English and French)	07/95	173/95
	Natural Gas Pricing Study (French)	10/98	209/98
	Gas Development Plan Phase II (French)	02/99	210/99
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	Electric Power Efficiency Study (English)	09/88	089/88

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	Energy Efficiency Improvement in the Cement Sector (English)	04/89	099/89
	Energy Efficiency Improvement in the Fertilizer Sector (English)	06/90	115/90
Tunisia	Fuel Substitution (English and French)	03/90	--
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	Renewable Energy Strategy Study, Volume II (French)	11/96	190B/96
Yemen	Energy Assessment (English)	12/84	4892-YAR
	Energy Investment Priorities (English)	02/87	6376-YAR
	Household Energy Strategy Study Phase I (English)	03/91	126/91
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	National Energy Plan (English)	12/87	--
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	Recommended Technical Assistance Projects (English)	09/85	--
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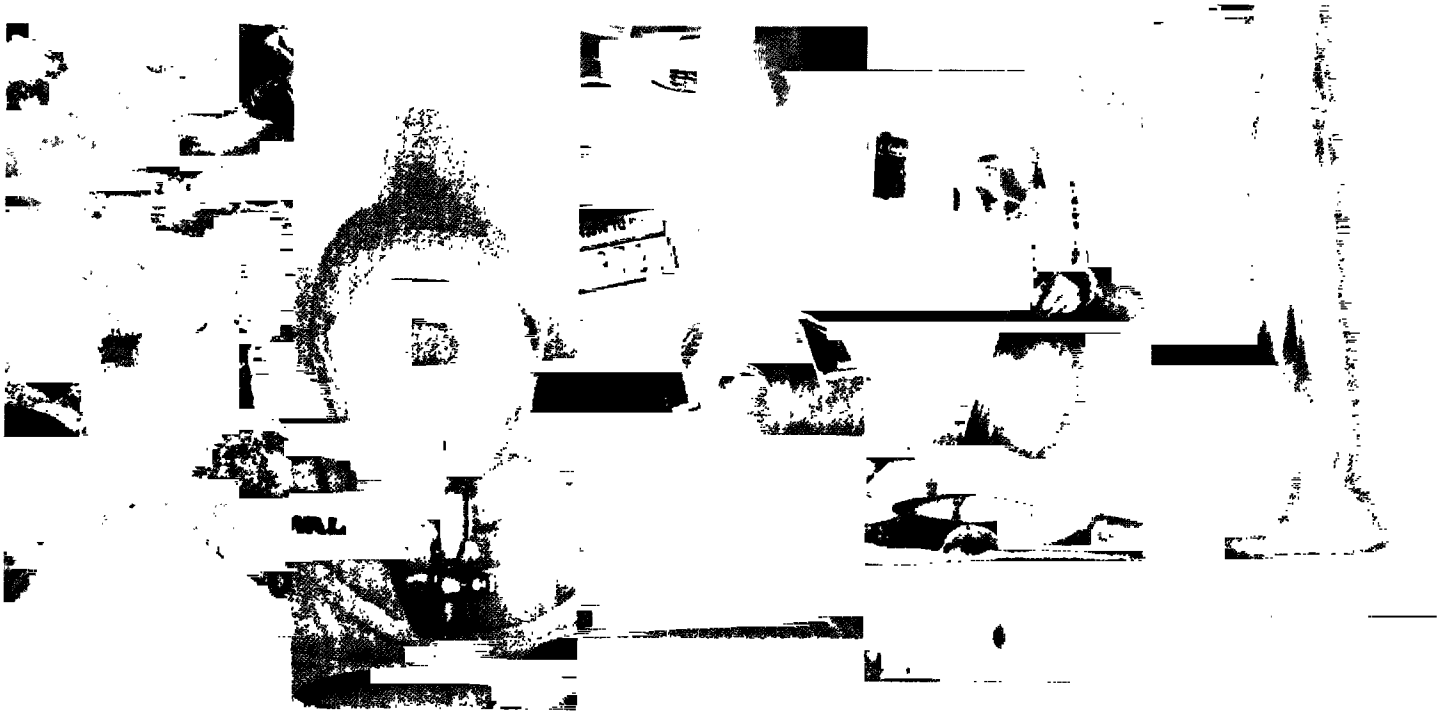

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