



ENERGY UPDATE

ISSUE 1

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Powering Economic and Social Development through Expanded Access to Modern Energy Services

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ENERGY UPDATE

Is the bimonthly newsletter of the Energy Team, Office of Infrastructure and Engineering, Bureau for Economic Growth, Agriculture and Trade.

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Please **submit articles** on this topic, as well as other topics for the Feature Article section, and your project updates for the Notes from the Field section.

Initial submissions must be 500 words or less in length and include contact information.

The **submission deadline** is **March 20, 2006**. Please e-mail your articles to the Editor, Davida Wood (dwood@usaid.gov).

Articles are accepted for publication from employees of USAID, associated organizations, contractors, and other partners in development.

LETTER FROM THE GUEST EDITORS

This issue of Energy Update highlights USAID's South Asia Regional Initiative for Energy Program (SARI/E), which focuses on building regional cooperation and fostering mutually beneficial energy linkages among eight countries in South Asia - Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka.

Forty percent of the world's poor live in South Asia. The region covers only 4% of the world's land mass but contains over 1.4 billion people, which is more than 20% of the world's total population. These developing nations are experiencing rapid economic growth leading to vast increases in energy demand, coupled with increasingly insufficient energy supplies. Most of South Asia is already grappling with energy shortfalls, and extra-regional petroleum import dependence is high. Significant untapped energy resources exist within the region, and cooperation among South Asian countries could dramatically improve the regional supply-demand scenario. Across the region, approximately half of the population lacks access to modern energy services. An impediment to increasing access to energy is insufficient investment, and a lack of understanding of how harnessing market transformation can stimulate investment, increase economic growth and reduce poverty in the region. Such market transformation involves changing the foundation of the sector from politics to market economics and in improving the effectiveness of government, private sector, and consumer institutions in terms of management practices, technical operations, resource use, and energy consumption.

Many South Asian countries have realized that their economic growth, development, and political stability are critically linked to achieving energy security – the ability to secure clean, reliable and sustainable energy supplies to meet energy needs at reasonable prices. The U.S. Chamber of Commerce has played a pivotal role in the SARI/Energy program in advocating private sector involvement through the South Asia Regional Energy Coalition (SAREC). SAREC is a board of directors-driven organization and networking mechanism through which the public and private sector stakeholders can influence regional energy policy and reform through the region.

In December 2005, key USAID staff, implementing partners, and regional champions gathered in Dhaka, Bangladesh at the SARI/Energy semi-annual meeting. The champions include government officials, utility managers, and private sector representatives; they are key participants who represent their country and its needs, and work within their country to mobilize broader support for the program. There was a sense of optimism and collegiality as participants shared ideas and experiences, encountered old friends and made new contacts, and developed an integrated plan forward.

The SARI/Energy program began in 2000 and will soon enter its third phase. This phase will focus on regional approaches to meet South Asia's energy security needs. The articles which follow are authored by key USAID staff and implementing partners and are organized according to the two major program areas: (1) cross-border energy trade and investment, and (2) increased access to diversified, clean energy supply.

We hope to share with you in this edition of Energy Update the excitement and impact – past and potential – of SARI/Energy, and hope you will enjoy reading about this unique regional energy program.

Ellen Dragotto & Sharon Hsu
Guest Editors, Energy Update
Energy Team
Office of Infrastructure and Engineering

SPECIAL REPORT

THE SOUTH ASIA REGIONAL INITIATIVE FOR ENERGY (SARI/E) – PAST AND FUTURE: THE STRATEGIC IMPORTANCE OF ENERGY SECURITY IN SOUTH ASIA

INTRODUCTION

USAID's South Asia Regional Initiative for Energy (SARI/Energy) is an eight-country program that promotes regional energy security through increased trade, investment and access to clean energy.

SARI/Energy countries include: Afghanistan, Pakistan, India, Nepal, Bhutan, Bangladesh, Sri Lanka and the Maldives.

Energy security - the ability to secure affordable, clean, reliable and sustainable energy supplies to meet energy needs - has become a major policy imperative in the countries of South Asia. As the respective countries have realized that energy security is critical for continued economic growth and development, they have also reached a turning point in their approach and are beginning to look outwards for solutions.

BACKGROUND

The SARI/Energy Program was designed in 1999 and launched in 2000 to encourage regional cooperation in energy development and trade in clean energy resources among South Asian countries. The program was developed jointly by USAID and the U.S. Department of State to improve regional stability and energy security. Over the past five years, the program has focused on building trust and confidence across borders, as well as advocacy for necessary reforms in the energy sector.

SARI/Energy seeks to promote energy security through two principle areas of activity:

1. Cross border trade and investment - through regional markets development
2. Access to clean energy - through regional sharing of working models, practices and projects

Through focused activities in these two areas, SARI/E will seek, over the long term, to achieve:

- Increased regional investment across borders in clean energy resources – including funds flowing from both inside and outside of the region
- Increased development of clean energy resources in the region

- Increased regional trade of energy – strengthening political and economic linkages across borders in South Asia
- Increased amount of clean energy reaching consumers

Accomplishments in these areas will increase regional energy security and foster economic growth.

The program is implemented through five partners: Nexant Inc. for technical assistance and training; United States Energy Association (USEA) for regional energy partnerships; National Renewable Energy Laboratory (NREL) for renewable energy resource assessments; Winrock International for community based small grants program; and U.S. Chamber of Commerce for private sector coalitions.

For more information, visit the SARI/Energy website at www.sari-energy.org

Key Accomplishments to date:

Regional Energy Trade and Investment

SARI/Energy has identified, assessed, or promoted four of the five cross-border energy trades or investments currently under negotiation between India and neighboring countries, including:

1. Indo-Nepal oil product pipeline (memorandum of understanding signed, Joint Venture agreement under negotiation);
2. Power Purchase Agreement between PTC India Ltd and West Seti Hydro Power (Nepal) for 750 MW of electricity exported from Nepal to India; and
3. Power Purchase Agreement between TATA (a leading Indian industrial group) and Power Grid Corporation of Bangladesh for supply of excess energy from a power plant implemented as part of cross-border investment of \$2 billion committed by TATA in Bangladesh.

SARIE – ACTIVITIES AND SUCCESSES

SARIE has been directly responsible for a number of concrete successes in fostering regional cooperation in critical energy related areas. Illustrative SARIE activities that have contributed to these successes are described on the following pages, grouped under two thematic areas:

1. Facilitating cross border energy harmonization through partnerships & peer exchanges
2. Improving electricity access and services

1. FACILITATING CROSS BORDER ENERGY TRADE

SARIE has established regional partnerships and peer exchanges to develop and strengthen long-term relationships among key stakeholders and decision-makers in South Asia. The partnerships have encouraged the development of policies and regulatory and investment infrastructure, and assisted in improving transmission and distribution operations and management both nationally and regionally.

The four articles that follow illustrate partnership efforts that have advanced discussion and resolved issues in regional energy development.

1.1 South Asian Transmission Operators Conclude No Technical Barriers to Regional Trade

The United States Energy Association (USEA) began the South Asia Regional Energy Transmission Partnership in 2001 under the SARIE program. Over the last four years, the Regional Energy Transmission Partnership has served as a vehicle to promote regional cooperation and understanding in transmission operations among the South Asian countries.

The partnership encourages the development of policies to stimulate private sector investment and assists in facilitating the long-term process of rationalizing energy supply and distribution across the region, including the development of cross-border infrastructure and market mechanisms that will be required for electricity trading. Over the past four years, over 130 transmission operators have met to discuss difficulties facing the energy sector and to share best practices to lead to an interconnected grid. As a result, today the region is much closer to reaching their goal of a regional market and increased energy access.

The Regional Energy Transmission Partnership held its eleventh meeting in December 14-16, 2005 in Kathmandu with participants from Bangladesh, Bhutan, India, and Nepal. The focus of the discussions was regional energy trade and potential roadblocks to creating a regional grid. Participants agreed that regulatory frameworks would be a problem in South Asia but concluded that technical operations among the countries were already compatible. The group felt the largest impediment to a regional grid was political not technical, a substantial shift from previous beliefs. This shift is a result of the sharing of best practices and the exchange of national grid codes by India to Bangladesh and Nepal and Bangladesh to Afghanistan through the USEA transmission partnership.

During the December meeting, the group also discussed India's energy market and the Availability Based Tariff (ABT) to regulate frequency and maintain system stability. The Indian market model and ABT is one potential model for a regional grid. The participants also discussed ways to move towards a regional grid. Some of the technical issues they agreed to address in the near future are the plan for interconnections, identification of reliability criteria, design of detailed system studies, establishment of commercial arrangements, creation of similar operating codes, and the formation of legal and institutional arrangements. The December meeting marked the first time all partnership participants concluded that a South Asian regional grid has no technical impediments and began to discuss the roadmap towards regional integration.

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1.2 South Asian Legislators Compare Energy Policies With U.S. Counterparts

Under the aegis of the SARIE program, USEA launched the first meeting of the South Asia Regional Energy Policy Partnership. The partnership's focus is to address the issues of energy and legislation to facilitate optimal, rational use of clean energy for increased access within nations and across borders in South Asia or via foreign direct investment. The partnership involves members from each of the

eight SARI/Energy countries that are elected representatives with a background and interest in energy issues. The partnership activities are supplemented with activities involving energy experts from outside the region.

The delegation for the inaugural meeting met for one week in Washington, D.C. in September 2005 to discuss energy security and regional trade. During the course of the five-day exchange, the South Asian legislators compared their countries' energy policies with the recently passed U.S. Energy Policy Act of 2005 in discussions with the U.S. House of Representatives Energy & Commerce Committee and leaders from the U.S. Department of State (DOS), the Federal Energy Regulatory Commission (FERC), the U.S. Agency for International Development (USAID), the U.S. Department of Energy, the Edison Electric Institute, and the Maryland General Assembly.

During the course of the meeting, the legislators from India and Pakistan discussed plans to hold bilateral site visits to their rapidly expanding compressed natural gas (CNG) transportation facilities. To combat the impacts of ambient air pollution from vehicles, the governments of India and Pakistan have supported the increased use of CNG vehicles. CNG is an established clean fuel used in many other parts of the world.

Also during the course of the visit, the South Asian legislators met with the Maryland General Assembly to discuss the impacts of state energy legislation on local constituents. One recently passed piece of legislation in Maryland established a target of 7½% renewable energy in their supply. The use of renewables has been quickly growing in demand among constituents both in the State of Maryland and in South Asia. The South Asian legislators obtained a briefing and copy of the legislation and hope to use it as a future model in their countries.

The next SARI/E Policy Partnership meeting is scheduled for April 2006 and aims to bring together elected officials from additional SARI/E countries to discuss energy policy and regional energy trade.

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1.3 Peer To Peer Exchanges Provide Opportunities for Sharing Best Practices

SARI/E has provided extensive training to national and local governments on a range of issues from policy formation and regulatory implementation to facilitating cross-border trade and rural electrification programs. In 2005, SARI/E emphasized a new dimension to the program by supporting hands-on peer exchanges in which regional managers and practitioners could provide on-the-job training to their peers from other countries in South Asia.

In one such program, the Butwal Power Company (BPC) of Nepal participated in a peer exchange with Jaipur Distribution Company Ltd., Rajasthan, India. Here, a ten-member delegation of engineers and managers from BPC studied how the Indian distribution company addresses energy management and promotes improved energy efficiency and conservation practices. As a result of this effort, BPC is currently developing an organizational cell devoted to the promotion, implementation and monitoring of demand side management in Nepal. The nascent BPC cell is already involved with load research, developing an energy management awareness program, promoting more efficient lighting on a pilot project basis, and working toward loss minimization in the transmission and distribution system. Butwal Power Company has also developed a policy detailing the organization's commitment to improved energy management practices and formalizing the role and responsibility of the BPC Cell.

In a second peer exchange, linemen from the Power Grid Company of Bangladesh (PGCB), Dhaka received hands-on training from the National Power Training Institute (NPTI) of India. In this intensive three-month training activity, linemen learned hotline maintenance techniques, which will have a direct impact on the overall reliability of PGCB's grid system. Specifically, such training has already helped to curb revenue losses by reducing downtime periods for maintenance transmission lines and substations and helped to lower consumer power outages. The peer exchange has been so successful that PGCB is expanding such training in-house and is acquiring special equipment to provide hotline maintenance on an ongoing basis.

The peer exchange programs provide opportunities to share and acquire knowledge in a practical on-the-job setting. Such practical training provides an important complement to SARI/Energy's policy and regulatory initiatives and provides a vehicle for delivering tangible results to regional stakeholders.

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1.4 Advocacy and Outreach for Cross Border Trade and Cooperation

The U.S. Chamber of Commerce has been a key partner in promoting the SARI/E goal of increasing South Asian energy security through cross-border trade and investment. The U.S. Chamber established the South Asia Regional Energy Coalition (SAREC) – a board of directors-driven organization and networking mechanism through which private sector stakeholders can influence regional energy policy and reform throughout South Asia.

The mission of SAREC is to cultivate and facilitate cooperative relations among South Asia's national and regional business organizations and apex bodies with technical support from the U.S. Chamber of Commerce. The resulting relationships are expected to enhance private sector involvement and effectiveness in the formulation of government policies affecting regional energy cooperation, integration and development.

SAREC receives financial support from USAID through SARI/E. SAREC membership includes chambers of commerce and industry and other business associations. SAREC's board of directors is comprised of leading industry association executives from India (Confederation of Indian Industry and AmCham), Bangladesh (AmCham and Dhaka Chamber of Commerce and Industry), Nepal (Independent Power Producers Association and Confederation of Nepalese Industry), Sri Lanka (Energy Forum Sri Lanka and Ceylon Chamber of Commerce) and Pakistan (Lahore Chamber of Commerce and Industry).

This past year, the U.S. Chamber of Commerce worked through SAREC to create opportunities for business federations to participate in discussions of critical energy policy issues and advocate for energy and power sector reform.

SAREC hosted a regional forum for energy journalists to enhance media awareness of energy issues. At roundtables in Sri Lanka, Nepal and Bangladesh, business leaders met with the media to highlight the socio and economic benefits of regional power trade; the importance of unbundling the state-owned Ceylon Electricity Board (CEB) to promote much needed investment in power generation, transmission and distribution; and the critical role that Foreign Direct Investment (FDI) in the energy sector will play in meeting Bangladesh's infrastructure development goals, improving energy efficiency, and expanding regional energy trade.

These discussions between business leaders and members of the press highlighted the critical role that energy plays in attracting private (local and foreign) investment; and how increased regional energy cooperation can help to support the goal of attracting such investment in the aftermath of the expiration of the Multi-Fibre Agreement and the December 26, 2004 tsunami that affected much of the region.

The media roundtable events generated enormous press coverage for SARI/E, resulting in over 285 articles published by the South Asian media on regional energy cooperation and development, in the past year.

Going forward, SAREC will continue to advocate sound commercial policies that will pave the way for increased investment in the energy and power sectors throughout South Asia.

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Developing a Policy Framework for Pakistan's Energy Diversification Plan

Natural gas plays a key role in Pakistan's energy balance. It currently accounts for 50% of the country's commercial energy consumption and all the gas is supplied from indigenous sources. However, demand for gas is projected to increase substantially and the country's limited recoverable indigenous gas reserves (estimated at about 32 trillion cubic feet in June 2005) will not be sufficient to meet this demand. As a result of this, a gas supply shortage is expected to emerge by 2009/2010 and increase in the following years. In order to address this projected shortage, the Government of Pakistan is actively considering import of Liquefied Natural Gas (LNG). SARI/E is assisting the Government of Pakistan in preparing a LNG Policy Framework that will in the long-term, ensure Pakistan's security of gas supplies, and in the short- to medium-term, address the gas supply deficit that is expected to emerge.

Keeping the Lights On In Afghanistan

A basic feature of daily life in Afghanistan is the lack of reliable power. In Kabul, people receive an average of three hours of grid-based electricity every two days. A vast majority of the population uses diesel generators, kerosene and biomass, to meet its energy needs. To keep the 'lights on', USAID has launched a program designed to keep diesel generators – and the businesses that depend on them – running to full capacity. The USAID Mission in Afghanistan has supplied diesel-generating stations that are providing electricity to over 70,000 households in the cities of Kabul, Kandahar, Qalat, and Lushgagar.

The SARI/E program, in collaboration with USAID/Afghanistan, and the Government of Afghanistan's Ministry of Energy and Water, held a hands-on training session for 20 Afghan personnel in diesel generator set operations and maintenance. The goal was to train Afghan diesel generator operators and technicians so they can assume greater responsibility for day-to-day operations of the generator sets. The training was provided at a center in Pune (India), operated by Cummins – a U.S. based manufacturer of diesel generator sets. The trainees returned to Afghanistan to train others in basic operations and maintenance (O&M), in a training-of-trainers approach to capacity building.

Based on the success of this activity, SARI/Energy has organized a second round of on-the-job training in February 2006, and is developing training programs for other Afghan provinces. The ultimate goal is to help Afghan technicians achieve a level of competency in operating and maintaining diesel generator sets, to ensure a sustained power supply for the Afghan people.

2. IMPROVING ELECTRICITY ACCESS AND SERVICES

The four articles that follow illustrate SARI/E efforts to deliver and adapt successful rural energy service models for local implementation.

2.1 Bangladesh Rural Electrification – A Unique USAID Development Effort

In the 1970s, with less than 3% of the population having access to electricity, the Government of Bangladesh (GoB) decided to accelerate the provision of electricity to rural populations to stimulate economic growth and social development. In 1976, USAID funded a comprehensive study on rural electrification, carried out by the National Rural Electric Cooperative Association (NRECA) and Commonwealth Associates of the United States, confirming the feasibility of rural electrification. As a result, the GoB decided to follow the U.S. cooperative model that successfully electrified rural America. The overall program would be directed by a central agency, the Rural Electrification Board (REB) that would monitor the activities of the rural electric cooperatives, known as Palli Bidyut Samities (PBSs), while the cooperative model would ensure direct participation by the beneficiaries.

In the early phases, USAID was the sole donor in this program, providing commodity support to construct the distribution system for the original 13 cooperatives. Funds were also provided for technical assistance through NRECA. Due to the extent of this initial involvement, USAID is commonly referred to as the "pioneer" of rural electrification in Bangladesh, having invested a total of over \$210 million since the beginning of the program.

The Bangladesh rural electrification (RE) program has become globally recognized and widely admired. Furthermore, the success of the USAID effort and the active, long-standing in-country presence of NRECA have served to encourage other donors to focus on the RE effort in Bangladesh. In effect, USAID has served as an assistance "multiplier."

Expansion of rural power continues to accelerate while system performance remains at a high level. To date, 15 donors have provided over \$1.2 billion in assistance. There are now 70 PBSs in operation with 6.5 million rural connections serving over 40 million people. The number of new rural electricity connections grows by about 2,000 each day, compared to 1,400 three years ago.

In addition to operational success, the rural electrification program has generated substantial socio-economic benefits to poor people in remote areas. A recent study by a prominent Bangladeshi economist states that access to rural electricity has had a significant impact on agricultural and business development, reduced poverty and improved the quality of life for the rural people.

Most Bangladeshis view their rural electrification effort as one of the most significant development initiatives to date. The USAID program's success is due to a number of key elements, in particular the democratic participation of member-consumers and their ownership of the PBSs.

These successes are now posing new demands within the program and continue to shape the overall approach to rural electrification. While USAID initially supported both infrastructure development and technical assistance, the focus has now shifted to improving management and organizational aspects of rural electrification. With the dramatic growth and sheer size of the program, these challenges have become more complex. The Bangladesh power sector as a whole is now undergoing sector reform, including oversight by an independent energy regulatory commission. This new framework requires new approaches with a greater need for technically qualified professional managers who possess strong leadership qualities and the capacity to function independently.

To address these challenges, NRECA, with the support of GoB and other donors, conducted a USAID funded study in 2004 to review current key elements of the program. Based on the findings, a series of strategies and options were developed for Bangladesh policy makers to consider enhancing the operational performance and long-term sustainability of the rural electrification program. This study is another sign of the unique and constantly evolving relationship between Bangladesh, the United States, and NRECA in rural electrification over the past 30 years. Through collaboration between the REB/PBSs, USAID, NRECA and other donors, the United States is pleased to have contributed to this rural electrification effort, which has

provided significant benefits to the rural people of Bangladesh.

The SARI/E program hopes to replicate the successes and best practices of the Bangladesh rural electrification program to other South Asian countries, notably Nepal and India.

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2.2 Community Based Operation and Management of Grid Connected Rural Electricity Systems in Nepal

Participation of local communities in the management and operation of grid connected rural electrification system in Nepal has brought benefits to both the electric utility and rural customers.

Nepal Electricity Authority (NEA), the state owned vertically integrated monopoly, owns and operates the grid connected rural distribution systems in Nepal. Before the participation of communities, as the owner and operator, NEA was responsible for maintaining the system, providing connection to the consumers, and collecting the tariffs. However because of lower power demand and relatively lower revenue generation from the rural areas, the NEA could not commit adequate resources for the management and smooth operation and maintenance of the rural distribution system.

In 2003, in an effort to improve the quality of electricity supplied to the grid connected rural areas, NEA decided to introduce the participation of rural communities in the management and operation of its rural distribution systems. Communities leased the distribution system from NEA at very nominal fee, signed power purchase agreements with NEA, and distributed that power to the consumers. The tasks of providing connections to the consumers, maintaining the system, and collecting tariffs rested on communities themselves. Initially, in the pilot phase, 12 rural distribution units were leased out. The results were very encouraging and now, within the span of two and half years, NEA is in the process of distributing about 200 rural distribution systems to the communities.

The SARI/E program has played a key role in this entire process. SARI/E organized a peer exchange program between NEA and Rural Electrification Board (REB) /Palli Bidyut Samities (PBS) of Bangladesh to sensitize NEA on the benefits of involving the communities in RE supply.

NEA acknowledges that after the involvement of communities in its on-grid rural distribution process, revenues from rural areas have increased significantly. Due to logistical and security constraints, NEA could not set up revenue collection centers closer to rural areas and consumers themselves had to come to NEA's collection centers to pay their dues. Most of the centers were located far away from the villages and it took a significant part of the consumers' day to travel come to these centers. For some customers, the travel costs were sometimes higher than the dues they would pay. Now the community-managed collection centers are located nearby and the consumers can pay their dues more easily. Also, instead of issuing separate bills for individual consumers, NEA can now issue a single bill directly to the community, reducing the workload that it had previously.

Before, even for a minor event such as transformer fuse blowout, the consumers had to wait for NEA's help which usually was very late to arrive. But as the communities took over the system, problems like these are being repaired almost instantaneously. This has increased system reliability and helped NEA in diverting its scarce manpower to other underserved rural areas.

There have also been marked reductions in power pilferages in the rural areas as people themselves are responsible for supervising the system. There has also been a significant increase in people's willingness to obtain access to electricity as retail tariffs can now be customized by the communities to match their local needs.

These benefits have made the communities' participation in the grid connected rural electricity supply system a win-win feature for both NEA and its rural customers.

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2.3 SARI/Energy Small Grants program

The SARI/Energy Small Grants Program is focused on building local capacity of energy and associated sector specialists in various issues of regional energy cooperation and access and spurring cooperative research and outreach on diversified access to energy and harmonized markets. The program aims to foster institutional relationships among non-profit training, research, and advocacy organizations of South Asia that will be sustained beyond the life of the SARI/Energy program.

USAID has awarded almost \$900,000 (in five rounds, over three to four years) of small but strategic grants to energy research and outreach organizations in seven South Asia countries including Afghanistan, Bangladesh, Bhutan, India, Nepal, Pakistan, and Sri Lanka. Together, the grants nurture a regional energy market, capable of delivering clean, reliable and affordable energy.

To date, USAID's SARI/Energy Small Grants Program has supported 38 grant projects to 63 institutions. Understanding the need to increase the number of institutions that are engaged in regional energy issues, the grants focus on building the capacity of local institutions. All of the 63 NGOs and academic institutions implementing the grant projects are located in one of the focal countries. By promoting the engagement of local partners, the program increases the number of institutions able to influence policy in regional cooperation. Half of the projects are being implemented by at least 2 organizations from different South Asian countries, enhancing cross-border relationships and encouraging long-lasting regional energy partnerships.

The SARI/Energy Small Grants Program is implemented by Winrock International, Winrock International India, and the Institute of International Education.

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2.4 Renewable Energy Training in Sri Lanka and the Maldives

Under SARI/E, the U.S. National Renewable Energy Laboratory (NREL) recently completed a study of the wind and solar resources in Sri Lanka and the Maldives, providing maps and databases of the amount and distribution of wind and solar resources. NREL incorporated this resource data into the GeoSpatial Toolkit (GsT), a software application, which allows users to view energy resource data along with other key infrastructure and demographic data, such as population, centers, locations of transmission corridors and highways, and land use and terrain information.

Building on this work, NREL recently provided training to energy decision makers in Sri Lanka and the Maldives on HOMER, a micropower optimization model, which evaluates the optimal (least-cost) mix of on-grid and off-grid technologies (including using solar, wind, microhydro, and diesel resources) for distributed and rural energy applications. Training topics included renewable energy resource assessments; renewable energy technologies; hybrid power systems; and institutional barriers to the implementation of renewable technologies. Several project proposals and concepts emerged from the workshops. NREL workshops facilitated networking and information sharing between participants, who typically included project developers, financial institution representatives, NGOs, government and utility representatives, and university professors and students.

In Sri Lanka, the Colombo-based consulting firm Resource Management Associates (RMA) used HOMER to analyze options for a retrofit project on Eluvaiithivu island near the Jaffna Peninsula in the north. A diesel power plant, operated by the Ceylon Electricity Board (CEB), Sri Lanka's national electric utility, currently provides electricity to 42 of the island's 166 households for seven hours per day. Although electricity consumers pay for their electric service, the CEB operates the power plant at a loss due to the high cost of fuel and generator maintenance. The RMA study found that by installing wind turbines on the island, the CEB could reduce its financial losses by 80% and provide 24-hour power to more of the island's residents. The improved power system also has the potential to power a fish storage facility, which would allow the island's fishermen to sell fish at a more favorable price. Because RMA and CEB staff both participated in the workshop, they were able to collaborate on the study and gain support for the project from CEB management.

HOMER and the GeoSpatial Toolkit are both available for free at:

http://www.nrel.gov/international/analysis_software.html

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Promoting Energy Efficiency

Harmonization of Standards for Household Appliances

One of the most effective and proven tools for improving energy efficiency is the establishment of standards for end-use appliances. With SARI/E assistance, national-level standards committees composed of government agencies, standards organizations, and industry have been established in Bangladesh, Nepal, Sri Lanka and India. SARI/E has also established a South Asian stakeholder forum to develop regional standards for commonly used energy appliances. Forum members include the Bureau of Energy Efficiency of India, Sri Lanka Standards Institution, the Nepal Bureau of Standards and Metrology, and the Bangladesh Standards and Testing Institution. As a first step towards harmonization, the forum will work on performance standards for refrigerators.

A Sustainable Guarantee Facility in Sri Lanka

At present, Sri Lanka electricity consumers are paying one of the highest rates in South Asia for electricity. Energy efficiency measures can counteract and reduce some of the pressures of rising energy costs.

Studies have shown that the net potential benefit from industrial efficiency improvements could result in an annual generation saving of about US \$45 million in Sri Lanka. However, investment barriers, lack of collateral and high interest rates have hindered widespread commercialization and adoption of end-use energy efficiency improvements. In order to attract investment for industrial energy efficiency/conservation projects in Sri Lanka, SARI/E has proposed a "Sustainable Guarantee Facility" (SGF).

The main purposes of the SGF are to make possible bank lending for projects which the banks would otherwise probably not finance, and serve to lower the costs of financing for borrowers as an incentive to pursue energy efficiency projects. As the lack of collateral was the primary barrier for energy efficiency project lending, the SGF provides a loan repayment guarantee to lenders as a collateral substitute.

With this initial investment of US\$0.5 million reserve fund invested by the Government of Sri Lanka, the SGF is expected to support about US\$4.4 million in energy efficiency investments.

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FEATURE ARTICLE

HELPING GEORGIA WEATHER THE JANUARY 2006 ENERGY CRISIS

After the Soviet Union dissolved in 1991, Georgia witnessed a dramatic decline in natural gas and electricity consumption, with usage rates dropping by over 600 and 300 percent, respectively, by 1995. Until recently, there had been a general neglect of energy sector investment, limited maintenance, essentially no rational planning and budgeting, a lack of attention on establishing the appropriate commercial investment and operational incentives, and a weak capacity to fund imports. As a result, energy systems had been incapable of meeting demands, and the poor coverage and service levels contributed to broad scale dissatisfaction, corruption, poor social services, stagnation of the economy, and accelerated destruction of the environment.

The importance of the energy sector in elevating Georgia has become a high priority of President Saakashvili, who has promised reliable 24-hour power to all paying customers in 2006. With the support of USG technical assistance, the Government of Georgia has **coordinated the commitments of international donors**, including the World Bank, the European and German Development Banks, and the Millennium Challenge Corporation, to steer over \$600 million towards new and rehabilitated infrastructure investment. USG assistance also **supported the development of strategic plans** for an addition \$900 million in critical energy sector investments. **Management assistance and operational reforms**, also supported by the USG, have led to improved

commercial discipline and vastly increased sector revenues. For the first time in over a decade Georgians have been experiencing regular access to power, and have reason to expect ongoing improvements. In late 2005, Energy Minister Gilauri announced with pride that, for the first time in decades, the Georgian energy system could take a major shock year without a collapse of the energy system.

Unfortunately, on the morning of January 22, 2006, Georgia's energy network took two solid hits by what appear to be coordinated strikes. Explosions took out both the major gas pipeline and the principal electricity import line that supply energy over the Caucasus Mountains from Russia. To make matters worse, several days later extreme winter weather knocked out the country's major transmission line that brings power to Tbilisi from the country's major hydroelectric facilities in the west. The loss of that power alone was enough to severely hamstring the country. But to add insult to injury the power deficit caused when the line went down in turn caused the country's major natural gas fired generator to "trip off", resulting in damage to the unit that required three days to repair!

What did this mean? In winter, Georgia requires up to 1,800 megawatts of electricity during its peak hours of evening consumption from 8:00 pm to 11:00 pm (note: one megawatt is enough to power approximately 1,000 American homes). Shorter days and cold temperatures increase electricity consumption, mostly for light and some heat. In summer, Georgia can use its vast hydropower reserves to power itself, but in winter, it must also burn natural gas to generate electricity and import power from neighboring countries to make up the difference between production and consumption. Georgia imports almost all of its gas, and the majority of its excess power needs from Russia. It is not difficult to imagine the impact of these four events on Georgia's struggling power network.

But this year was a bit different. Even two years ago the system was so unstable that the loss of either one of Russian gas or electricity imports would have virtually crippled it. USG assistance (including over \$5 Million in equipment and systems) contributed to the better management of distribution assets that helped keep the energy system stable. But the reach of USG assistance goes well beyond such technical improvement. During the crisis, system managers reported how much easier it now is to operate the system due to increased coordination and control whereas in past years - even last winter - orders were ignored, often deliberately or at the influence of local officials. Importantly, this is the first year when surgeries and other forms of health care will be scheduled in the regions as a direct result of improved power supply outside of Tbilisi.

As a result of USG assistance, the Government now understands the value of strategic planning, budgeting, forecasting and investment prioritization. Such knowledge has led to greater diversification of energy imports and improvements in local power production, thereby reducing reliance on Russia. Thus this year's shocks disturbed the network, but the Georgians were able to work around them.

Testament to the increased capacity of the system, by the second night of this crisis (prior to the cut-off of power via the internal transmission line) virtually all of Georgia's electricity consumers were energized, a truly remarkable accomplishment that solidly reinforced the Energy Minister's claims. Donors have witnessed the competence of the Energy Minister, one of very few remaining from original Rose Revolution appointments, increase remarkably over time as he has successfully justified and defended the budgets he has developed.

The Government has been able to finance these investments through revenues from privatizations. But perhaps as importantly, increased resource flows are coming into the system as a result of the improved commercial performance of the major electricity utility, the United Energy Distribution Company (UEDC), which is being assisted under a USG-financed management contract. With these resources, the UEDC has been able to target energy investments that have increased both the reliability of the distribution system and the production capacity of small local power facilities. The UEDC has now initiated direct contracts for electricity imports that increase its access to power in winter. Because the UEDC now knows how much power it is purchasing and is able to bill all customers for power received, collections have increased from a paltry 12% in 2003 to over 70% today. Increased control over distributed power has resulted from effective wholesale and retail re-metering efforts. The Government has enforced consumer obligations to pay for services provided, thereby publicly demonstrating its commitment to ongoing commercial reforms. Indiscriminate consumption has decreased since people now have to pay for what they use, which in turn is helping to stabilize the system.

The USG provides what the Energy Minister deems “critical” assistance to the Government of Georgia, which will enable it to “graduate” from USG and other donor assistance. Much work must still be done to secure the estimated \$1.5 billion in investment needed for Georgia’s energy independence. This includes additional gas and electric transmission, generation, and distribution infrastructure. While reforms in electricity have been robust, attention must now focus on the development of gas and fuel sector components of an overarching strategy for the entire energy sector. Additional efforts must focus on solidifying and capitalizing upon Georgia’s strategic position as an energy transit corridor and reliable regional energy trading partner.

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NEWS & EVENTS

USAID AND GENERAL ELECTRIC SIGN NEW GLOBAL DEVELOPMENT ALLIANCE TO IMPROVE ACCESS TO RENEWABLE ENERGY IN RURAL COMMUNITIES IN INDIA

On January 26th, USAID/EGAT Deputy Assistant Administrator James T. Smith, and GE’s Senior Manager for International Trade and Investment, Timothy J. Richards, announced the India Rural Electrification Program at a ceremony at USAID’s Headquarters in Washington, D.C.

The partnership will span a two-year period and provide up to four communities in India with access to clean energy through GE power generation technologies, which utilize biomass (such as banana leaves), wind, and solar resources. The EGAT/Energy Team and the USAID Mission in India will each contribute \$300,000 to this program. GE and its worldwide network of partners will invest up to \$2.7 million in the pilot projects, including the development of new rural electrification technologies.

Currently 56 percent of India’s 700 million rural residents lack adequate and/or reliable power supplies. GE’s India Rural Electrification Program has the potential to contribute significantly to stimulating economic growth and improving the quality of life in rural India. Experience gained from these pilot projects will help lay the groundwork for rural electrification models that can support the Government of India’s promise of “power for all by 2009”. “This partnership is a milestone in India’s march towards universal electrification. The partnership will help to bring electricity to thousands of people in India,” USAID India Mission Director George Deikun said.

In addition to utilizing the electricity produced from the biomass generators these projects will capture the output heat for drying of agricultural products, cooling of agricultural storage facilities, and for water purification. USAID funds will be used to complete a pre and post project income survey to document the economic benefit of access to modern energy services, to assist with community organization and management of the energy systems, and to build the capacity of the local communities to use the energy for productive uses.

“USAID is proud to work with the General Electric Company to increase access to clean energy services in India. Access to clean energy helps rural communities create new opportunities for employment and income generation. This can help meet a variety of development objectives such as improved health care services, enhanced agricultural productivity, increased access to clean water, and economic empowerment. This program directly supports President Bush’s Clean Energy Initiative, one component of which is the Global Village Energy Partnership which strives to increase access to modern and affordable energy services in underserved areas,” said Smith.

“GE is committed to providing cleaner electric power to rural locations in India,” Mr. Richards said. “We are pleased to work with USAID in rural communities to make these electrification projects successful.” The General Electric Corporation, through its affiliate GE Energy, is one of the world’s leading suppliers of power generation and energy delivery technology. GE Energy provides equipment, service and management solutions across the power generation, transmission and distribution, distributed power, and energy rental industries.

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WORLD BANK PRESENTATION: GLOBAL PARTNERSHIP ON OUTPUT-BASED AID

On February 1st the World Bank made a presentation on Global Partnership Output-based Aid (GPOBA) at USAID's Headquarters in Washington, D.C. The presentation covered the program objectives and examples of OBA projects, and was followed by a discussion on potential collaboration with USAID.

What is GPOBA? The Global Partnership on Output-based Aid (GPOBA) was established in January 2003 by the United Kingdom's Department for International Development (DfID) and the World Bank. Its purpose is to fund, demonstrate and document output-based aid (OBA) approaches to support the sustainable delivery of basic services in developing countries. GPOBA's focus sectors are:

- Water and Sanitation
- Electricity
- Telecommunications
- Transportation

The primary outputs of GPOBA are pilot OBA projects and related activities to identify and disseminate lessons of experience on the design and implementation of schemes involving explicit performance-based subsidies.

What is Output-based Aid? Output-based aid is a mechanism for providing explicit performance-based subsidies to support the delivery of basic services where policy concerns justify public funding to complement or replace user fees. At the heart of the OBA approach is the contracting out of service delivery to a third party -- usually private companies but also possibly public utilities and nongovernmental organizations -- which would operate within a strong performance regime that links payments to results. This approach can sharpen the focus on objectives (for example, targeting the poor), improve efficiency and innovation, enhance accountability for the use of public resources, and create opportunities for engaging private sector know-how and in some cases financing.

GPOBA has initiated the OBAApproaches series as well as a Working Paper series to provide a deeper understanding of the OBA concept, including these two most recent publications: [OBAApproaches: What is OBA?](#) "OBAApproaches: What is OBA?" and OBA Working Paper No. 4: [OBA Working Paper No. 4: What is OBA?](#)

GPOBA has a trust fund to support OBA-type projects. Many World Bank projects are often too large for the trust fund to accommodate or simply use Bank project financing (e.g., IDA credits) to provide OBA-related funding. Thus, GPOBA is quite keen to find other suitable partners, such as USAID, to support mutually agreeable projects.

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CALENDAR OF EVENTS

UN COMMISSION ON SUSTAINABLE DEVELOPMENT WEEK (CSD) – FOCUS ON ENERGY

The fourteenth session of the UN Commission on Sustainable Development (CSD-14) will meet at UN Headquarters in New York from 1-12 May 2006 and focus on the areas of "Energy for Sustainable Development, Industrial Development, Air Pollution/Atmosphere, and Climate Change." For more information, please visit <http://www.un.org/esa/sustdev/csd/review.htm>

WORLD BANK ENERGY WEEK 2006: CLEAN ENERGY FOR DEVELOPMENT

The World Bank Group's Energy Week 2006 will held from March 6-8, in Washington DC. At this event, senior-level energy and finance industry executives, senior donor and developing country government officials, partners, stakeholders and leading-edge thinkers of the energy world will offer new ideas and insights on issues of clean energy development, energy security, energy access and energy sector financing. Online registration can be accessed via the World Bank website at <http://wbln0018.worldbank.org/finance/register.nsf/Energy?openform>