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SARI/ENERGY PHASE III

FINAL EVALUATION

March, 2011

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through Social Impact.

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ACRONYMS

ADB	Asian Development Bank
AIT	Asian Institute of Technology
CASA-1000	Central Asia-South Asia 1000
CEB	Ceylon Electricity Board
COP, DCOP	Chief of Party, Deputy Chief of Party
DABS	National Public Utility for Power
IEA	International Energy Agency
KI	Key Informant
LRC	Lighting Resource Center at Rensselaer, USA
M&E	Monitoring and Evaluation
MOU	Memorandum of Understanding
MW	Megawatt
NEA	Nepal Electricity Authority
NPTI	National Power Training Institute
NREL	National Renewable Energy Laboratory
RCL	Regional Center for Learning
REC	Renewable Energy Certificates
SAARC	South Asian Association for Regional Cooperation
SARI/E	South Asia Regional Initiative for Energy
SMB	Social Merchant Bank
TA	Technical Assistance
TAPI	Trans-Afghanistan Pipeline
USEA	United States Energy Association
USG	United States Government
WB	World Bank
WISER	Women's Institute for Sustainable Energy Research
WRI	World Resources Institute

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INTRODUCTION

From November 8 through December 31, 2010, a four-person team representing Social Impact (SI) and sub-contractor, Management Systems International (MSI), evaluated Phase III of the South Asia Regional Initiative for Energy (SARI/E). The team was composed of David Garner (team leader), Linda Kalver (co-team leader), Senior Energy Analyst Gopinath Iyengar, an Indian national from Bangalore and Devendra Adhikari, Nepalese citizen, also a senior energy analyst. After initial preparations in Washington, D.C. and New Delhi, the team divided into two smaller sub-teams. One team traveled to Sri Lanka, the Maldives, Bangladesh and India. The other traveled to Nepal, Pakistan, Afghanistan, and Bhutan. Typically, the team spent three to five days in each country doing interviews. The teams traveled more than 20,000 air miles in the region, and interviewed approximately 175 stakeholders and key informants. The judgments and conclusions that follow are largely the result of this travel and the interviews.

OBJECTIVES

The objectives of the evaluation were to: (1) determine the overall impact of SARI/E activities; (2) test the continued validity of the program hypotheses; (3) explore the extent to which the program strengthened institutional capacity, promoted dialogues and coalitions, and the formation of regional networks and centers of excellence to influence decision makers; and (4) recommend whether the next phase of SARI/E should be undertaken.

BACKGROUND

According to the International Energy Agency, sixty percent of the people of South Asia have no access to electricity, and between 800–900 million people still depend upon biomass for cooking. Individual countries' *total installed capacity* of grid energy varies hugely across the region. India, for example, has an installed capacity of nearly 160,000 MW, while the Maldives has an installed capacity of only 160 MW. However, when one looks at the consumption of power, India consumes only 566 kilowatt hours per capita, and consumption figures decrease precipitously as one moves out towards the periphery of South Asia. Nepal consumes ninety kilowatt hours per capita; Afghanistan consumes only thirty-eight.

IMPACT (AND OUTPUTS AND OUTCOMES)

What was the impact of activities implemented under SARI/E (Phase III)?

- Cross border energy. Today, sub-regional grids are in the process of being established, gradually, across certain parts of the subcontinent. At least five have benefited from SARI/E's support.
- Clean Energy. NREL has completed important wind and solar mapping exercises in seven countries. This has already facilitated installation of thirty MW wind power plants in Sri Lanka. Other important initiatives involving clean energy include two centers of excellence: one for micro hydro in Nepal, and a second for lighting efficiency in Sri Lanka.
- Regional Markets. In 2008, India established a platform for the short-term sale and purchase of electricity. Under SARI/E's exchange program, power sector officials from Bhutan and Bangladesh recently were oriented to these trade mechanisms in India. They are now exploring the establishment of similar power exchanges in their countries.

- **Training**: SARI/E Phase III trained 1450 trainees (seventeen percent of whom were women) for nearly 10,000 total person-days of training, at a cost of $8.6 million. Cost per participant averaged approximately $6000. The average cost per training day was $900.

CONCLUSIONS

Overall, the impact for SARI/Energy has been significant, particularly for a regionally oriented process-type Program with difficult to measure outcomes or results. One of SARI/E's most significant impacts has been the development of networks among technical personnel working in the energy sectors in South Asia. These individuals now know one another and this network extends across borders. This represents a major step forward.

Are partners meeting their responsibilities under their contracts or grants?

Conclusion: Yes. Partners are fully meeting their contractual responsibilities.

Are partners planning their individual activities with the broader objectives and sub-objectives in mind?

Conclusion: Partners would like to work more closely together. If future project planning systems are modified, they can formulate better work plans addressing larger objectives.

Relevance

Are the original hypotheses upon which the program was designed still valid?

Conclusion: Yes. The original hypotheses remain valid, and relevant.

Does the SARI/E program continue to respond to needs in the region? Has the program positioned itself to take advantage of emerging opportunities to promote greater cooperation in energy and regional stability?

Conclusion: SARI/E remains fully relevant to the needs of the region and has positioned itself to take advantage of emerging opportunities.

In light of current needs and opportunities for regional cooperation in energy, is there a need for an extension of the SARI/E program to meet the program objectives?

Conclusion: Yes, there is a clear need for extending SARI/E to meet program objectives.

Effectiveness

To date, has the program management structure been effective in ensuring maximum coordination of activities under SARI/E so to avoid duplication of effort?

Conclusion: The evaluation found no evidence of duplication of effort among implementing partners, in part because partners are largely working in separate areas. Capacity building or training by a contractor will sometimes overlap with efforts by another contractor who might be responsible for providing analytical and technical support. This is different from duplication.

Are there gaps in coordination that potentially hinder the achievement of results, or which fail to take advantage of synergies among individual activities?

Conclusion: Both the coordination and monitoring and evaluation (M&E) functions can be improved through the use of different organizational modalities. Planning among partners can be

more collaborative. Monitoring and evaluation activities can be expanded to enhance feedback loops.

Efficiency

If possible, determine if results achieved under SARI/E are being produced at an acceptable cost compared with alternative approaches accomplishing the same objectives.

Conclusion: Different service providers provide different kinds of training. The United States Energy Association's (USEA) training costs, for example, typically include substantial international travel, which helps account for the difference in average cost per participant; Tetra Tech's training is done in the region (USEA $7,356 per participant, versus Tetra Tech's $4,817). On balance, the evaluation team concludes that SARI/E costs for training appear reasonable. Training could be carried out less expensively, if more were done virtually, through on-line teaching or video teleconferencing. This could lower costs, but might impact one of the most important collateral benefits of SARI/E training, which involves face-to-face encounters among professionals working in the power sector. This cross-border networking function has provided good value for money to date, and has laid the foundations for possible enhanced regional connectivity under Phase IV.

What alternative approaches exist which could achieve results at greater efficiency and what mechanisms can be recommended for implementing the alternative approaches?

Conclusion: SARI/E can improve its overall planning procedures. Implementing partners can jointly prepare a five-year strategic plan at the beginning of the program, and conduct routine, joint planning sessions. SARI/E -sponsored centers of excellence can expand and improve their outreach using more web-based communications and video teleconferencing. Over time, the WISER Center might move from retail to wholesale service provision, and become an apex body for training key stakeholders. Both Nepal's Regional Center for Excellence in Micro Hydro and the Center for Lighting in Sri Lanka should look for multiplier effects in their outreach efforts, as well as for new ways to market their services and fund their programs. In Phase IV, the need for technical assistance may increase. Addressing the unique needs of each country may require a more tailored approach.

How well have implementing partners worked as a team to coordinate work plans and activities to achieve the overall objectives of the SARI/E program?

Conclusion: Partners report they have not been able to work together as closely as they would like in order to coordinate work plans and activities to achieve overall SARI/E goals and objectives.

Have technical assistance, training, and partnerships been targeted at the appropriate beneficiaries to ensure the greatest impact to advance the policy dialogue to support regional energy cooperation?

Conclusion: One key informant explicitly said that service provision should become "more demand driven, by countries' needs, rather than supply driven by the project." Most TA, training and partnerships targeted government officials and/or technical personnel working in the power sector. This contributed to one of SARI/E's biggest accomplishments: over the past several years, these individuals have established good working relations that now easily reach across international boundaries. As SARI/E moves to Phase IV, it may want to target a higher percentage of policy makers and political leaders, perhaps focusing on harmonization of high-level, cross-border, power-related regulatory and commercial issues that could be important to policy makers.

To what extent have the outputs from technical assistance, training, and other SARI/E funded activities been utilized by targeted beneficiaries?

Conclusion: More than fifty percent of the stakeholders who were interviewed indicated that they had participated in one or more SARI/E events. While participants clearly benefited on an individual basis, and while the sector as a whole also benefited, institutions that SARI/E sought to help sometimes may not have benefited as much as they could. SARI/E IV may need to explore mechanisms that build upon and consolidate training results, perhaps by encouraging countries to form permanent working groups to deal with important issues. SAARC offers one platform to do this. Further, SARI/E IV may need to decentralize its staffing in order to develop a better and more nuanced understanding of individual institutions. Under SARI/E IV, deputy chiefs of party, stationed in the three major regions that compose SARI/E, working under the overall direction of a chief of party, may develop an improved sense of specific institutions, as well as identify key individuals who could benefit from more training.

Have best practices been taken up by additional individuals who received information from targeted beneficiaries?

Conclusion: Virtually every stakeholder who had attended a SARI/E -sponsored event described best practices being taken up and applied in their country. Many described cascading impacts from adopting best practices.

Have SARI/E activities supported or complemented activities sponsored by other donor partners, such as the World Bank and the Asian Development Bank (ADB) in South Asia?

Conclusion: SARI/E activities have supported or complemented activities sponsored by other donors in South Asia, including the World Bank and the ADB. In some cases, they have led other donors into potentially important new activities, like social merchant banking in Nepal.

Measuring program impact requires the existence of good performance monitoring systems at the level of individual partners, as well as at the level of program management. Have systems been established internally for tracking, monitoring, and reporting on results attributable to SARI/E activities and do these systems utilize independently verifiable information.

Conclusion: Implementing partners have put systems into place to measure outputs. The evaluation team found less information that sought to measure results, or impacts. The systems in place allow for outputs to be independently verified, but little emphasis has been placed on establishing systems that independently verify results. Because so many important SARI/E program outputs and results are process-related, or somewhat intangible, it is a significant challenge to define indicators that can measure incremental progress towards longer-term goals.[1] It is an even bigger challenge to determine the relevant proportions that are directly attributable to SARI/E.

Sustainability

Are the results of SARI/E activities sustainable in terms of creating institutional capacity and filling gaps on behalf of the program's key beneficiaries?

Conclusion: Two SARI/E initiatives should become financially sustainable: (1) the Regional Center for Lighting in Sri Lanka and (2) the micro hydro operations in Nepal. WISER has a social and civic agenda centered on women's empowerment. It may not become financially self-sustaining. The biggest gap, however, is institutionalizing dialogue among the countries of the region at the techno-political level. For multilateral exchanges, more work remains to be done. Multilateral forums where countries routinely speak to one another at the technical, policy, and political levels have yet to be

[1] Tangible results such as actual cross-border energy trade are composed of many discrete individual steps that take time to fructify. In many cases, this typically could take 10-15 years.

fully institutionalized. Facilitating such exchanges may become an important informal niche for SARI/E IV.

What evidence has there been of host countries . . . promoting networks and forums and advocating the best practices developed and disseminated under SARI/E? Based on results to date, are these activities likely to engender sustainable development impacts after USAID funding has stopped?

Conclusion: Host countries are actively taking ownership of "best practices" they learn from SARI/E -sponsored programs. To some degree, cross-border activities are commencing on a bilateral basis. These should be sustainable, largely because they are economically critical for the future of South Asia. Without SARI/E, however, there is a chance that larger cross-border dialogue (networks and forums) would diminish, or progress towards cross-border understanding could slow down.

Project assistance completion date (PACD) extension

What is the need for an extension of the SARI/E PACD to meet the overall program objectives?

Conclusion: Interviews with key stakeholders across the region show a strong need for extending SARI/E's PACD, in order to meet the program's overall objectives.

What should be the new timeframe, program focus, and direction under Phase IV?

Conclusion: USAID should look at a five-year PACD extension for SARI/E Phase IV, from 2012 to 2017. SARI/E IV should be orientated toward tangible, practical outputs and results, some of which are described immediately below.

HIGH PRIORITY RECOMMENDATIONS

Overarching Goals, and Sharpening Project Focus

The overarching goal for SARI/E IV should be that all activities should continue to support a South Asian *Regional*[2] Initiative for Energy, and should promote energy security.

Expand SARI/E IV's Advisory Board

SARI/E's Advisory Board should meet twice a year. Membership should include representatives from the Department of State. Suitable national experts in regional energy issues might also be considered for membership. This could become one way to institutionalize further the role of SARI/Energy over time.

[2] "Regional" in the context of SARI/Energy should continue to mean that a project activity impacts upon two or more countries in South Asia. Project or program activities that are unique to one country typically would fall under USAID's bilateral programs, rather than SARI/Energy.

Decentralize Project Staffing

USAID should actively explore decentralization and move part of the project staff outside India. One model would involve three expatriate deputy chiefs of party (DCOP), working under the continued direction of a chief of party (COP). D/COPs would oversee three sub-regions within the larger SARI/E framework:

1. The Northeast, composed of Nepal, Bhutan, Northeast India, and Bangladesh, with a D/COP resident in Kathmandu or Bangladesh (wherever prospects for cross-border program activities are deemed highest in the near to medium term);
2. The South, composed of Southern India, Sri Lanka, and the Maldives with a D/COP based in Colombo; and
3. The West, composed of Pakistan and Afghanistan, with a D/COP to be stationed in Islamabad.

Strategic Plans and Work Planning Sessions

Although implementing partners are working in separate areas, there is a need for them to act synergistically. Partners need to coordinate better, consult frequently and integrate more closely their work plans and activities. Strategic plans, work plans and task orders should be approached holistically. SARI/E IV should hold joint work planning sessions once a year, assembling implementing partners, country coordinators, and other key stakeholders for a two to three day workshop and work-plan development session. Implementing partners should jointly prepare a five-year strategic plan, updated yearly. Annual work plans should also be prepared jointly, showing proposed activities. SARI/E IV should continue to use a task order system to allow programmatic flexibility, but this should be combined with work plans that clearly focus the program on the strategic objectives of cross-border energy and clean energy.

Centers of Excellence

SARI/E IV should continue to support the centers for excellence since they promote cross-border regional linkages and in the longer term may help promote further regional integration. However, the centers should seek enhanced multiplier effects, including things like Web-based virtual training and video teleconferencing reaching out to stakeholders in multiple countries, in order to expand their outreach capacities. Given the huge population of South Asia, it is useful, but inadequate, for the centers to focus on face-to-face training. They need to find ways to take better advantage of social media and other emerging technologies that will expand capacity to reach out to a greater number of potential beneficiaries across the subcontinent.

The Northeast Portion of the Sub-Continent—a Potential Model

Over the next decade, Bhutan, Northeast India, Nepal and Bangladesh will increasingly link their energy networks together, with the Indian grid serving as the glue. This proto-network, for which SARI/E began laying the foundations almost ten years ago, will grow over the coming decade. SARI/E IV should support this development, and the model it may represent for the subcontinent.

Harmonization and Governance Issues for Regional Energy

Over the next decade, Bhutan, Bangladesh, Nepal, and Northeast India will need mechanisms to help them begin to harmonize energy policies. They will need systems to deal with energy-related governance issues, including technical matters, regulatory issues, tariffs, etc. Countries will require technical assistance to put

into place institutional structures to allow meaningful electrical connectivity, and cross-border energy trade. SARI/E IV can design specific task orders to help the Northeast move towards such goals.

Wind Energy

Wind energy is taking off economically in India. SARI/E IV should continue to support the development of wind energy, perhaps through the establishment of teams comprised of specialists in wind energy development. It could sponsor prefeasibility studies, and may need to become involved with policy dialogues relating to rate structures, economic studies, project finance, power evacuation, grid interaction and stability, etc., to help policy makers in countries like Pakistan assess the feasibility of harnessing wind energy. Such a team could become an important roving service delivery mechanism, supporting further developments in wind energy across South Asia.

1. INTRODUCTION

The objectives of the SARI/Energy Phase III Evaluation included the following: (1) determine the overall impact of SARI/E activities; (2) test the continued validity of the program hypotheses; (3) explore the extent to which the program strengthened institutional capacity, promoted dialogues and coalitions, and the formation of regional networks and centers of excellence to influence decision makers; and (4) recommend whether the next phase of SARI/E should be undertaken.

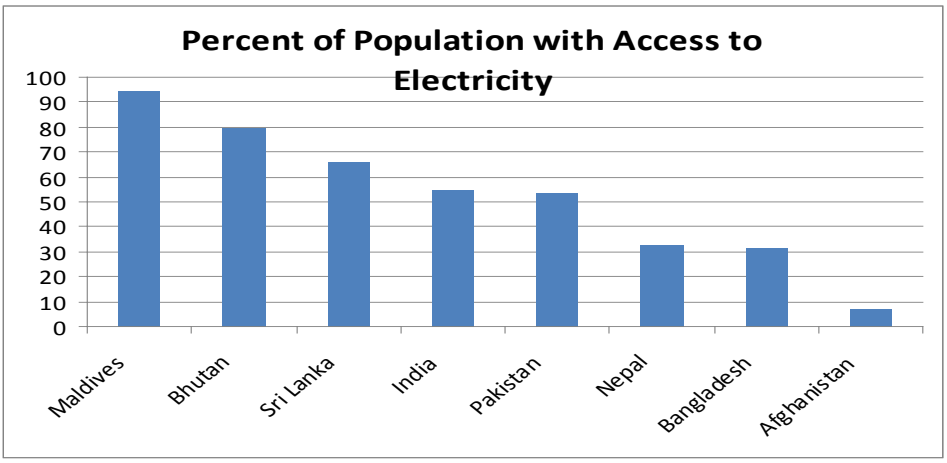
In pursuit of these objectives, from November 8 until December 31, 2010, a four-person team evaluated SARI Energy's Phase III. After a few days of initial preparation in Washington, D.C., where team members interviewed spokespersons for the three, primary implementing partners: TetraTech, USEA and NREL. The team then met in person in New Delhi for the first time and spent a few more days talking with USAID and other key stakeholders, including representatives from Tetra Tech, the only implementing partner with staff on the ground in South Asia. Two members of the team took a brief trip to Udaipur, to visit an Indian vendor involved in training trainees from Afghanistan. After that, the team divided into two smaller sub-teams. One team traveled to Sri Lanka, the Maldives, Bangladesh and India. The other traveled to Nepal, Pakistan, Afghanistan, and Bhutan. Typically, the Team spent three to five days in each country doing interviews and meeting with stakeholders. The team then reconvened in New Delhi to synthesize its findings and consolidate materials for this evaluation report. The members of the team traveled more than 20,000 air miles in the region, visiting all eight participating countries and interviewing 175 stakeholders and key informants. Many of the judgments and conclusions in this report are the result of these efforts. A preliminary debriefing was delivered to USAID on the December 16, 2010.

This evaluation report is organized around the twenty questions that were given by USAID in the initial "Scope of Work for the Evaluation" (See Appendix 7). The methodology follows normal evaluation procedures, generally listing findings (representing statements of fact), followed by conclusions, which are the team's judgments about the findings that address each question raised in the scope of work. The final section of the report includes Recommendations, which derive from the preceding findings and conclusions.

BACKGROUND ON THE SOUTH ASIAN ENERGY SECTOR

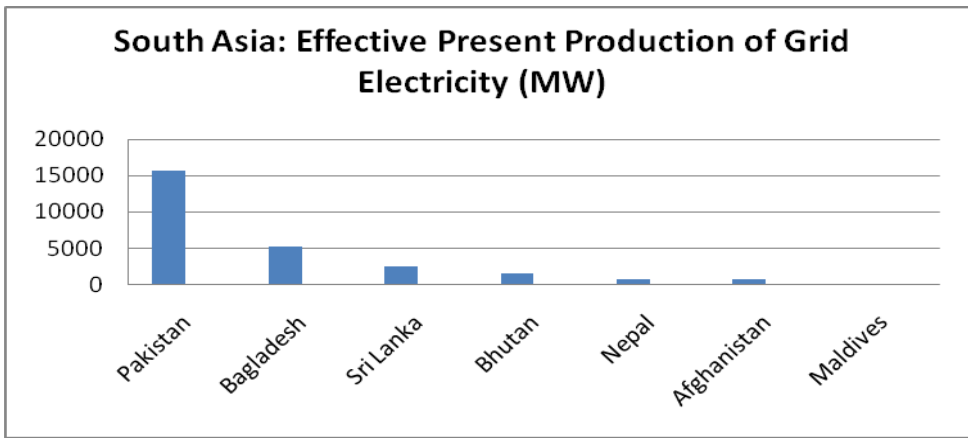
According to International Energy Agency, 60% of the people of South Asia have no access to electricity, while somewhere between 800–900 million people still depend upon biomass for cooking, a family's most basic need for energy. The percentage of population having access to grid-based electricity in each of the eight South Asian countries is shown in Figure 1, below.

Figure 1: Percent of Population with Access to Electricity[3]



Individual countries' *total installed capacity* of grid energy varies hugely across the region. India, for example, has installed capacity of nearly 160,000 MW, while the Maldives has installed capacity of only 160 MW. The countries' annual production of grid energy is shown in Figure 2, ranked from greatest to least. India's capacity is excluded from the graph—to include it would so distort the graph that all other countries' annual capacity would become unreadable.

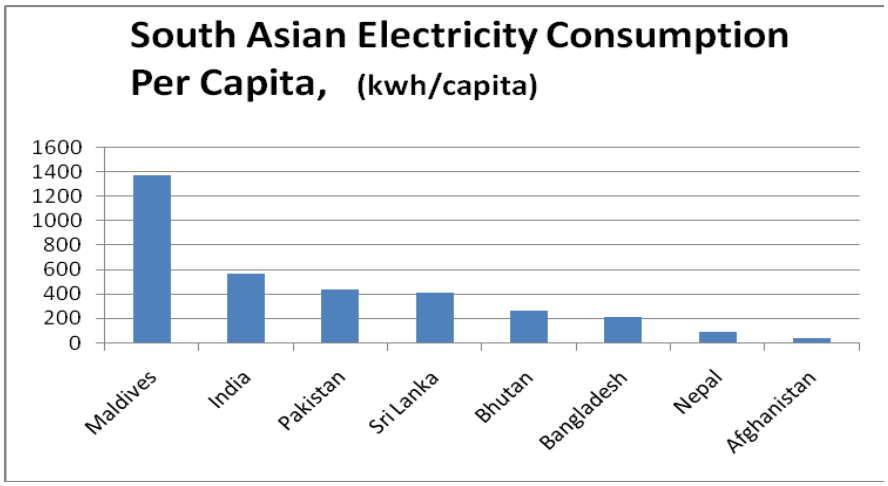
Figure 2: South Asian Countries: Total Installed Capacity of Grid Electric Energy



[3] Primary Source: Earth Trends, an information portal of World Resources Institute (WRI), which cites the International Energy Agency (IEA) in 2006 as the original source of information. Other sources like the ADB and the WB give somewhat different figures. Access to energy is not easy to measure. The evaluation team believes that the WRI/IEA figures are somewhat more reliable. Figures for Bhutan and the Maldives were not available on the Earth Trends web page. We have used data taken from their respective country web pages. The revised figures for these countries are Bhutan sixty-seven percent (ninety-seven percent in urban and fifty-six percent in rural areas as per Bhutan Broadcasting Service, BBS). For the Maldives, the figure is ninety-seven percent (194 out of 199 islands have access to electricity) as per <www.energyrecipes.org>. Today, due to electrification programs in South Asian countries, population with access to grid electricity may have increased by approximately five percent over the past five years, since 2005. To complicate the story further, in Nepal, the estimate of population having access to electricity, including both solar and micro hydro, is now about fifty-six percent.

However, when the actual populations of South Asian countries are analyzed, and one looks at per capita consumption of power, the story is substantially different from that shown in Figure 2. In Figure 3 (below), for example, Maldives is ranked first at 1,372 kilowatt hours per capita, with India consuming only 566 kilowatt hours per capita, because it has such a large population to serve. After India, consumption figures continue to drop precipitously as one moves out towards the periphery of South Asia, with citizens of countries like Nepal and Afghanistan consuming only ninety and thirty-eight kilowatt hours per capita, respectively. To put South Asia's overall consumption of electricity into a somewhat larger context, in the United States, annual consumption of grid electricity is approximately13, 650 kilowatt hours per capita, or more than 25 times India's annual per capita consumption.

Figure 3: South Asian Countries: Per Capita Consumption of grid electricity



The team also sought to look at effective demand for power across South Asia, but there appears to be no reliable methodology for computing such data. Various estimates exist of effective demand by country, but they are not internally consistent. To put demand into context, however, in Afghanistan, where annual total power production (including imports) is about 700 MW, the chairman of the national power utility[4] estimated effective demand already to be about 5000 MW, or more than 700% of power currently available. Similarly, in Nepal, experts working in the power sector said that while annual maximum production (during the monsoon months) was about 800 MW, effective demand for Kathmandu alone was about 1000 MW in the winter,[5] and they suggested that suppressed national demand was about 1800 MW.

According to the Integrated Energy Policy Report released in July 2006 by the government of India's Planning Commission, in order ". . . to deliver a sustained growth rate of 8% through 2031-32 and to meet the lifeline energy needs of all citizens, India . . . needs to increase its primary energy supply by three to four times and, its electricity generation capacity by five to six times of its 2003–2004 levels. India's commercial energy supply would need to grow at 4.3% to 5.1% annually." The report also observes that by the year 2030, Indian power generation capacity must increase to nearly 800,000 MW, from its current, installed capacity of 160,000 MW. In simple mathematical terms, this would amount to adding more than 600 MW every week for the next twenty years and represents an investment of U.S. $400–$500 million per week. Clearly, this is not

[4] Dr Jalil Shams, in an interview with SARI Evaluation Team, Kabul, Afghanistan, December, 2010.

[5] Power production in Nepal actually goes down to about 250 MW in the winter, because most of Nepal's power comes from hydro, which is seasonal, primarily during the monsoon.

sustainable and India will need to look at alternatives that include increased energy efficiency and renewable power development, as well as energy imports from its neighbors.

In the absence of better methods for estimating future demand, at least it is possible to say that effective demand across South Asia already is many times the currently available supply. This represents the overarching justification for SARI/Energy.

EVALUATION METHODOLOGIES

The evaluation team used a mixed-methods approach to evaluate SARI/E. This approach offers a high level of rigor and empirical validity to support evaluation analysis and conclusions. This evaluation required the following steps:

- The team examined project and program documents, reinforced by data from structured key informant (KI) interviews and site visits in the eight countries visited by the team.
- Informal case studies of emerging energy transfers were analyzed to understand the dynamics of this process. This approach provided for triangulation of data points. It analyzed quantitative and qualitative data to identify main causal factors as well as potential constraints.
- Interviews were conducted with at least two members of the team present, including one expatriate and one professional from South Asia. Duplicate notes were taken for all meetings.
- When the two teams were traveling,[6] they remained in daily contact via Internet, and conducted an ongoing dialogue about potential findings and conclusions. Multiple drafts of the evaluation report were circulated as it was being written, with opportunities for all team members to incorporate their comments and observations.
- The team also maintained an ongoing dialogue with USAID project and program staff during the course of this evaluation.
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The balance of this report seeks to answer USAID's specific questions about SARI/Energy, Phase III, taken from the "Scope of Work" found in Appendix 7. The final section of this evaluation includes specific recommendations for how to move forward with SARI/Energy, Phase IV.

IMPACTS (INCLUDING OUTPUTS AND OUTCOMES)

FINDINGS

Section 2 and its subsections below seek to answer the original question posed: **"**What has been the impact of activities implemented under SARI/E, specifically for the Phase III period from FY07-FY11?" Appendix 1 provides one-page summaries of SARI/E impacts by country. Additional impacts are discussed below.

[6] The Northern tier team, composed of David Garner and Devendra Adhikari, traveled to Udaipur and then to Nepal, Pakistan, Afghanistan, and back to Delhi. The Southern tier team of Linda Kalver and Gopinath Iyendar traveled to Sri Lanka, Mali, Kerela, India, and Bangladesh, before returning to New Delhi.

Cross-border movement of energy

Today, sub-regional transnational grids are being established slowly across certain parts of the subcontinent. Some illustrative examples include several mentioned below. The first several examples simply suggest movement—towards transnational interconnections that are in place, are planned or are being discussed—that will gradually link the subcontinent together over the next few decades. The last five, however (underlined), have benefited from SARI/E's support.

Table 1: Status of Selected Cross-Border Projects in South Asia

COUNTRIES	MW	STATUS	NOTES
Bhutan – India	1,000 MW	Operational.	
Bhutan – India	10,000 MW	Under construction.	Construction to be completed by 2020.
Uzbekistan – Afghanistan	300 MW	Completed.	USAID played major role in this project.
Uzbekistan – Afghanistan – Pakistan	2,500–3,500 MW	Under discussion.	
India – Pakistan	500–2,500 MW	Under discussion.	Both governments fully aware.
CASA-1000, Kyrgyzstan & Tajikistan to Afghanistan – Pakistan	1300 MW, of which 1,000 MW would go to Pakistan	Under discussion.	SARI/E played major advisory role to Govt. of Pakistan.
India – Nepal		140 km 400 KV transmission line. MOU signed.	SARI/E prepared the way. WB and Govt. of India are now funding.
India – Sri Lanka Undersea cable	500 MW	MOU signed.	SARI/E prepared way; now under technical study.
India – Bangladesh	500 MW	MOU signed. Under tech study.	SARI/E prepared way; ADB to provide some funding.
Nepal, Bangladesh, India, Bhutan Sub-regional grid			SARI/E has laid the foundations. This may be starting to happen.

Clean Energy

NREL has completed important wind and solar mapping exercises in seven countries. This has already facilitated installation of thirty MW wind power plants in Sri Lanka, with sixty MW under construction. This wind data is now being reviewed by the power sectors of several other countries for possible future actions. In some cases, more detailed studies are being performed in countries like Afghanistan and Pakistan. Other important initiatives involving clean energy include two centers of excellence: one for micro hydro in Nepal, and a second for lighting efficiency in Sri Lanka.

Regional Markets

In 2008, India established a platform for the short-term sale and purchase of electricity under private-sector auspices. There are now two private power exchanges in India, overseeing a trade of 30,000 MWhs/day at very competitive rates. The government of India issues renewable energy certificates (REC) to generators of clean energy, which permits them to trade at competitive rates on the power exchanges. SARI/E was one of the first programs to appreciate the utility of such ventures in supporting the expansion of energy markets in the region. Under SARI/E's exchange program, power sector officials from Bhutan and Bangladesh recently came to India and were oriented to the techniques involved in such trade mechanism. They are now exploring the establishment of similar power exchanges in their respective countries. At the present time, energy trading accounts for one-and-a half to two percent of power generation in India. With cross-border trade among member countries planned through the SARI/E program, however, the power exchanges in India expect to see tremendous growth opportunities for energy markets.

SARI/E III Training

Both Tetra Tech and USEA conducted extensive training during the course of SARI/E, Phase III. The outputs, number of participants, number of training days, cost per participant and per training day, and total costs for the two programs are summarized below. The first table provides an aggregated total for both programs. The subsequent tables provide individual breakdowns by implementing partner.

SUMMARY OF TRAINING COURSES BY TETRA TECH AND USEA					
	PARTICIPANTS	TRAINING DAYS	COST PER PARTICIPANT	COST PER TRAINING DAY	TOTAL COST
MALE	1206	6993	$5,659	$976	$6,824,684
FEMALE	244	2549	$7,449	$713	$1,817,545
TOTAL (or average) as appropriate	1450	9542	$5,960	$906	$8,642,229

TRAINING COURSES BY TETRA TECH					
	Participants	Training days	Cost per participant	Cost per training day	Total cost
Male	635	4711	$4,116	$555	$2,613,804
Female	162	2186	$7,562	$560	$1,225,060
Total (or average) as appropriate	797	6897	$4,817	$557	$3,838,865

TRAINING COURSES BY USEA					
	Participants	Training days	Cost per participant	Cost per training day	Total Cost
Male	571	2282	$7,375	$1,845	$4,210,880
Female	82	363	$7,225	$1,632	$592,484
Total (or average) as appropriate	653	2645	$7,356	$1,816	$4,803,364

Centers of Excellence

Regional Center for Excellence in Micro Hydro, Nepal: This center, still being formed, has not yet formally opened its doors. However, the center expects to see the mountainous parts of South Asia— particularly Afghanistan, the northern parts of India and Pakistan, and probably Bhutan— as potential markets for its services, which will allow the further dissemination of micro hydro technologies across the region.

WISER (Women's Institute for Sustainable Energy Research), located in Kerala, is a center of excellence for women in the energy sector. It nominally opened on March 22, 2010 and came into operation in the last quarter of that year. The Energy Management Center, within the state government of Kerala, India has allotted workspace for its laboratory and offices. WISER, with 200 volunteers, seeks to reach out to women throughout the region through teleconferencing, websites, and other media. It also networks with other women's energy organizations in the region and around the world. The center promotes energy conservation and clean energy, as well as trains women for employment in the electricity sector. It includes an outreach program to women, particularly poor rural women, and conducts training programs in electrical wiring and meter reading. WISER will also facilitate financing for women to establish small businesses that depend on electricity.

Regional Center for Lighting (RCL), Colombo, Sri Lanka. Opened in April 2009, this center has already conducted two programs for participants from the region. RCL has initiated a load research study involving 3,000 households. It has also submitted a proposal to ADB for a program to replace incandescent lamps with CFLs in 2,000 households. The center expects to earn revenue through its laboratory testing facilities and technical services for studies, research, etc. The government of Sri Lanka has allotted it space in the

international convention complex. An office will be ready by January 2011 (for more on RCL, see Appendix 6).

Technical Assistance (TA)

- **Bangladesh:** SARI/Energy facilitated an exchange program for Bangladeshis to visit the India Energy Exchange, followed by exchange programs at the ministerial level. An MOU was recently signed between Bangladesh and India for a 500 MW interconnection. ADB has announced funding for part of the interconnection.

- **Maldives:** SARI/E supported a pre-feasibility study for island interconnection. The study revealed economic and environmental benefits to interconnecting the electric power systems of some of the atolls that make up the Maldives. Tender documents for a pilot program are under preparation.

- **Nepal:** SARI/E provided technical assistance to the Nepal Electricity Authority (NEA) on the various implementation documents now being used for negotiations by Nepal with India on the planned 140 km 400 kV double-circuit transmission interconnection. SARI/E's assistance covered both commercial and legal aspects, but did not involve support for direct negotiations between the two countries.[7] An MOU has been signed, and the World Bank is expected to fund this linkage, with additional funding from the Government of India.

- **Pakistan:** SARI/E provided technical assistance to the Government of Pakistan on the Central Asia-South Asia 1000 (CASA-1000) interconnection from Tajikistan to Pakistan. This involved special investigations and reports prepared by the subcontractor in Pakistan (HB Pakistan) directly to the government of Pakistan.
- **Sri Lanka:** SARI/E's TA in Sri Lanka involved a pre-feasibility study for the undersea hookup between Sri Lanka and Southern India, which has resulted in an MOU signed between India and Sri Lanka for the High Capacity Power Transmission Link. The TA has also resulted in the establishment of the Sustainable Energy Authority under the Ministry of Power, Sri Lanka.

- **India:** India has received no technical assistance. Instead, as India has learned how to become a donor country, it has become a resource for technical assistance for the SARI/Energy project. A list of more than thirty Indian companies and organizations that have contributed to SARI/Energy programs to date is given in Appendix 4.

CONCLUSIONS, IMPACTS

Based on the work done during Phase III, the impact for SARI/Energy overall has been quite significant, particularly for a regionally-oriented, process-type program with difficult-to-measure outcomes or results. The impact around the Subcontinent has varied from country to country. SARI/E, Phase III has been operating longer and it seems to have had somewhat greater impact in countries like Nepal, Bhutan, Bangladesh, the Maldives, and Sri Lanka than countries like Pakistan or Afghanistan.[8] Perhaps SARI/E's

[7] After helping to prepare the ground, SARI/E recused itself from direct involvement in negotiations between the two countries, because of a need to remain neutral among the countries of South Asia.

[8] Although this may change in Phase IV. SARI/E's capacity building of the Afghan power sector, for example, should strengthen DABS, the national public utility for power, and allow it to discharge its technical and commercial operations more effectively. A list of possible initiatives involving Pakistan is given in Appendix 2.

most significant impact has been in the development of networks among the technical personnel working in the energy sectors in South Asia. These individuals now know one another; this network extends across international borders, and this represents a major step forward for South Asia.

Are partners meeting their responsibilities under their contracts or grants?

Findings: The SARI/E evaluation team visited all eight SARI/E countries and interviewed approximately 175 stakeholders. Monthly and annual reports, contracts, and other project documents were reviewed. Partners are all preparing individuals work plans.

Conclusions: These interviews, plus reviews of assorted project documents confirm that Implementing Partners are fully meeting their contractual responsibilities.

Are partners planning their individual activities with the broader objectives and sub-objectives in mind?

Findings: Partners are planning their individual activities within the terms of their own contracts. However, every partner has mentioned that they felt somewhat stovepiped, and would like the opportunity to work more closely with other implementing partners, during the development of annual work plans, for example, in order to better address the broader objectives of SARI/Energy. Partners referred back to SARI/E Phase II, where they felt they had had the opportunity to interact to some degree, but, even here, they indicated that interactions were too limited to permit optimal integration of their separate planning processes.

Conclusion: Partners would like to work more closely together, and would be better able to formulate work plans that address larger objectives if Phase IV's planning systems are modified to allow for this to happen.[9]

RELEVANCE

Are the original hypotheses upon which the program was designed still valid?

Findings: A memo to the files dated February 15, 2006, says the SARI/E program was approved in FY 2000 by ANE "…to promote mutually beneficial energy linkages among the nations of South Asia."

The original MOU between the governments of India and the United States gives a very clear articulation of the hypotheses, as follows:

> Whereas, SARI/Energy encourages regional energy development, cooperation, and expanded trade in energy resources by: (1) facilitating dialogue among key energy players; (2) strengthening the institutional capacity to make decisions in sustainable energy development; (3) fostering private investment in national and trans-national energy infrastructure; and (4) creating and strengthening regional forums, networks, and associations to disseminate best practices and improve cooperation in energy development.[10]

[9] One reason SARI/E III did not have partners meet as often as they had met under SARI/E II was due to the steep reduction in its program budget. Project management believed that they should spend more money on TA and training, rather than on programmatic work that would require its various partners to travel and meet. Perhaps SARI/E IV can resume the practices of SARI/E II in this area.

[10] Sources: "Memorandum to The Files," on the subject of "Program Support Office Determination of SARI/E Program Requirements," dated February 15, 2006, and "Memorandum of Understanding between the Government of the United States

Conclusion: The original hypothesis upon which the Program was designed remains valid, and relevant.

Does the SARI/E program continue to respond to needs in the region, and has the program positioned itself to take advantage of emerging opportunities to promote greater cooperation in energy and regional stability?

Findings: The SARI Team interviewed stakeholders in all eight countries. Essentially, they unanimously report a continued need for SARI/Energy. Stakeholders repeatedly reported that as a consequence of SARI/Energy, they have come to know their counterparts working in similar positions in the energy sectors of neighboring countries, and have developed a much better understanding of the energy situation in neighboring countries. Regulators have gotten to know regulators. People working in power generation know their counterparts. All the countries of the region have begun to appreciate the need for energy security through the development of indigenous energy resources, promotion of energy efficiency, diversification of energy supply, and cross border trade. These are all major issues that SARI/E III has been advocating for the region.

Conclusions: SARI/Energy remains fully relevant to the needs of the region. It has positioned itself to take advantage of emerging opportunities. More significantly, it has helped to cause some of these opportunities to emerge by its continued support for cross-border dialogue, primarily among the technical experts working in the power sector. The cross-border discussion involving the movement of 500 MW between India and Bangladesh is one example; the construction of 140 km of 400 kV high-tension connections between India and Nepal is another. This important dialogue has now laid the groundwork for further, higher-level dialogue among South Asian political leaders and policy makers in the energy sector. SARI/E Phase III has clearly helped to lay the groundwork for further progress under a proposed Phase IV.

In light of current needs and opportunities for regional cooperation in energy, is there a need for an extension of the SARI/E program to meet the program objectives?

Findings:

- In the Northeastern corner of the Indian subcontinent, the team found evidence suggesting that Nepal, Bhutan, Bangladesh and Northeast India are beginning to form what might become a regional power pool over the next few years. This development has the potential to become an important model for the rest of the subcontinent.
- An MOU has been signed between India and Bangladesh for 500 MW of power exchange.
- A "Minute of Meeting" has been signed between Nepal and India in November, 2009 on power trade cooperation involving a 400 kV double circuit 140 km cross-border transmission line between Dalkebar (Nepal) and Muzaffarpur (India).
- The Sri Lanka-to-India undersea connection facilitated by a SARI-funded pre-feasibility study is making progress.
- Some cross-border power movement, from Central Asia (Uzbekistan) into Afghanistan (300 MW), is already happening.
- High-level discussions relating to power movement are going on between or among Uzbekistan, Afghanistan and Pakistan. The evaluation team was told by senior government officials in Kabul, for example, about government-to-government discussions that could involve 2,500 to 3,500 MW of thermal power coming from Uzbekistan and going to and through Afghanistan and on to Pakistan.
- The CASA-1000 dialogue continues.

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of America and the Government of the Republic of India Regarding the South Asia Regional Initiative Energy Program," dated December 12, 2001, page 1.

- The Trans-Afghan Pipeline (TAPI) accords for a 1700 km gas pipeline were signed in December 2010 in Ashkabat, Turkmenistan by the presidents of Pakistan, Afghanistan, and Turkmenistan, and the minister of energy for India. Final pricing agreements between Turkmenistan and India for TAPI gas are scheduled to be negotiated by February 2011.
- There is even some very quiet discussion about a possible power exchange between Pakistan and India. Discussions by the evaluation team with a senior Pakistani energy advisor working with the Ministry of Water and Power in Islamabad confirmed that high-level discussions are happening, involving the possible export of 500 MW from India to Pakistan as soon as next summer (2011) and the possible export of an additional 2,000 MW within the next two years.

Conclusions**:** The SARI evaluation team concludes that there is clear need for an extension of the SARI/E program in order to meet important program objectives. Some important activities are beginning to achieve traction. The platform that SARI/E provides has enabled country officials to exchange views informally on potential opportunities and tactics as they seek to advance cooperation. SARI/E has provided impartial advice, which provides further momentum to such regional energy collaboration. In the future, as the centers of excellence grow and mature, collaborative research among regional stakeholders can be facilitated and strengthened.

EFFECTIVENESS

To date, have the program management structure and the adopted implementing tools (contracts, cooperative agreements and USG inter-agency vehicles) been effective in ensuring maximum coordination of activities under SARI/E to avoid duplication of effort?

Findings: The evaluation team found no evidence of any duplication of effort among the implementing partners.

Conclusions: There is no evidence of duplication, in part because the partners largely work in separate areas. The training work involving both Tetra Tech and USEA, for example, seems to have been entirely complementary, not duplicative. The program management structure to date, and implementing tools involving a contract, a cooperative agreement, and a USG interagency agreement have not lead to optimum coordination between or among the three primary implementing partners. However, this does not seem to be a direct result of the program management structure or the contracting vehicles. The Tetra Tech contract specifically calls for "integrated planning initiatives."[11] In any case, the problem of suboptimal coordination can be addressed through the adoption of some revised planning modalities, explained in more detail below (see recommendation #5).

Are there gaps in coordination that potentially hinder the achievement of results, or which fail to take advantage of synergies among individual activities? (e.g., are training and technical assistance activities coordinated and sequenced so that they benefit from each other?)

Findings:

- Implementing partners expressed concerns about coordination, particularly in the area of planning. NREL repeatedly said that they did not know enough about what the other partners were doing. They felt they were not linked sufficiently into the planning and program design process. Tetra Tech and USEA also expressed a need for improved inter-partner coordination.

[11] "Implementing Partners … will focus on program progress review and planning, (*including development and coordination of the integrated work plan*)…. " PA Government Services Contract, 1 May, 2007, p. C–15.

- The three implementing partners functioned as co-equals. There was no prime-sub relationship. Tetra Tech, the institutional contractor, described itself as actually being slightly below the two knowledge partners, USEA and NREL. In any case, the partners all bring important, different, and complementary skills to the table.
- USEA reported that, now that they host the SARI website, they feel they have a somewhat better understanding of the overall program.
- The M&E functions of SARI/E Phase III were not very robust.

Conclusions: Although implementing partners work in separate areas, they could act synergistically. Partners could coordinate better, consult more frequently, and integrate their work plans and activities. Strategic plans, work plans and task orders could be approached more holistically. Coordination and the M&E functions both can be improved through the use of different organizational modalities. Planning among the partners can be done in a more joint or collaborative manner. Monitoring and evaluation activities can be expanded to provide an enhanced feedback loop on program performance, which could allow for enhanced program integration.

EFFICIENCY

If possible, determine if results achieved under SARI/E are being produced at an acceptable cost compared with alternative approaches accomplishing the same objectives.

Findings:

- The total number of individuals trained under USEA and Tetra Tech's programs for Phase III was 1450, at a total cost of about $8.65 million. The total number of person-days of training under SARI III was 9542; the average cost-per-training day, approximately $900. Approximately seventeen percent of all trainees were women. See Section 2.4.1, SARI III Training, for more detail on overall training costs, and Appendix 8.
- USEA trained more than 650 trainees, for a total of 2654 training days. USEA's average cost per training day was $1800. Most of this training was international, conducted outside the Indian subcontinent (for further details, see Appendix 8).
- Tetra Tech trained approximately 800 trainees, for a total of almost 7000 training days. Tetra Tech's average cost per training day was $556.60[12] (for further details of Tetra Tech's training activities, see Appendix 8).
- For Afghan training, it actually costs less to train Afghans from the national public utility (DABS) in India than it would cost to train them in Afghanistan, because of security issues.
- The three implementing partners were chosen under different procurement systems to carry out different tasks. PA Consulting won a competitive RFP, USEA has a cooperative agreement, and NREL has an inter-agency agreement. Thus, these firms and organizations each have somewhat different cost structures.

Conclusions: While there are differences among the different training service providers, there are also differences in the kinds of training provided. USEA's training costs, for example, typically included substantial international travel, which helps to account for the difference in cost per participant ($7356 for USEA, and $4817 for Tetra Tech). Tetra Tech's training is done locally, in the region, and even for them, costs vary by season, by country, and by hotels that happen to be

[12] As a benchmark, for purposes of comparison, an estimate of the cost per training week (one student for one week) at National Power Training Institute, India (NPTI) is about $860, which includes room and board but not transportation.

available. On balance, without having conducted a financial audit, the evaluation team concludes that the costs for training appear reasonable.

More broadly, the contracting mechanisms employed by SARI/E, Phase III are subject to normal USG procurement rules and regulations. A future project design or a future RFP might result in a different mix of partners, or the choice of a different institutional contractor, either more or less expensive. On balance, the contracting mechanisms chosen for SARI III seem reasonable, and short of trimming the number of training days, or reducing the levels of technical assistance, the evaluation team sees no obvious ways to increase the levels of program efficiency or of training, *so long as the same program or training modalities are employed.* Training could be carried out less expensively, for example, if more training were done through virtual methods like on-line teaching, or through video teleconferencing.[13] This could lower costs, but may also impact upon one of the most important collateral benefits of the SARI training, which is the face-to-face encounters among the various professionals who work in the power sector in South Asia. This cross-border networking function is judged to have provided good value for money to date, and has laid the foundations for possible enhanced connectivity under Phase IV. In the future, SARI may want to explore a mix of different training options, depending on the particular goals a specific training course is expected to meet.

What alternative approaches exist which could achieve results at greater efficiency and what mechanisms can be recommended for implementing the alternative approaches?

Conclusions:[14] In the future, SARI can improve its overall planning procedures. It can have future Implementing Partners prepare a five-year strategic plan, for example, at the beginning of the program, perhaps coupled with a ten-year visioning exercise that seeks to anticipate what may happen to the South Asian energy sector over the coming decade. It can build in routine, joint planning sessions with the implementing partners on a yearly basis. For such an exercise, implementing partners and other key stakeholders should be convened at a neutral location—like Colombo or Kathmandu—for a two- to three-day planning workshop. Some of the scheduled time at such a planning workshop should be left deliberately unstructured, so partners and other stakeholders have ample opportunity for informal discussions of shared common challenges and opportunities. The SARI-sponsored centers of excellence can expand and improve their outreach through use of more Web-based communications. This may involve enhanced websites, as well as expanded distance learning, preferably by using tools like interactive video conferencing.

The WISER Center may want to move from retail to wholesale service provision, and seek to become more of an Apex body for training key stakeholders, who in turn can help multiply the outreach across South Asia. Both the micro hydro center in Nepal and the Center for Lighting in Sri Lanka should look for multiplier effects in their outreach efforts, as well as new and better ways to market their services. They can also look at various ways to raise funds to support their programs. Social marketing techniques may have some utility, and might be worth exploring. Technical Assistance in Phase IV may increase, and may require a more tailored approach to address needs unique to each country.

[13] SARI/E looked at utilizing distance education for utility personnel in the far reaches of Afghanistan. It was found to be feasible to beam programs from one country, with the teacher(s) in virtual contact with students in other countries. The technology for such "distance education" exists and increasingly is being used in India by groups like the Indira Gandhi National Open University. SARI Phase IV may be able to take advantage of such systems. Certainly, the centers of excellence one day may be able to offer such distance education as part of their routine service delivery.

[14] These conclusions are actually recommendations which simply seek to answer the question posed: "*What alternative approaches exist which could achieve results at greater efficiency. . . .*" More discussion of these program implications are found in the recommendations section of this evaluation.

How well have implementing partners worked as a team to coordinate work plans and activities in the interests of achieving the objectives of the overall SARI/E program?

Findings: Partners report that they have not been able to work together as closely as they would like to achieve the overall SARI/E program goals and objectives.

Conclusion: Under SARI/E IV, partners could be encouraged to become more proactive about planning and joint decision making.

Have technical assistance, training, and partnerships been targeted at the appropriate beneficiaries to ensure the greatest impact in advancing the policy dialogue in support of regional energy cooperation?

Findings: SARI/E's invitations for training typically go to governments. Governments, in turn, are supposed to look for appropriate candidates. Often, they merely propose their own candidates from within the government, rather than sending the requests to people in the energy sector to find appropriate technical candidates. The evaluation team heard these reports in Sri Lanka, India (at NPTI) and Nepal. The team also heard concerns about too much heterogeneity or diversity in some classes from some SARI/E trainees. Some of the training programs in Nepal were pulled together very quickly, and may not have had optimum beneficiary attendance. There were repeated requests in almost all countries visited for more carefully focused training and technical assistance targeted to the specific needs of specific institutions. One key informant in Bhutan explicitly said that service provision should become "more demand driven, by countries' needs, rather than supply driven by the project."

Training during Phase III involved both policy formulation and in various technical matters.[15]

Conclusion: During the course of Phase III, most of the TA, training and partnerships targeted government officials and/or technical personnel working in the power sector of various SARI/E countries. This was appropriate for SARI III, and contributed to one of the program's biggest impacts: over the past several years, these individuals have been able to get to know one another, and have established good working relations that now easily reach across international boundaries. While these beneficiaries were the appropriate targets for training during Phase III, as SARI/E moves towards Phase IV, it may become useful to target a higher percentage of policy makers and political leaders, who can lead South Asia to increased levels of connectivity.[16] Furthermore, the project can move beyond the government and ask relevant companies (production, transmission, distribution, etc.) to recommend candidates for technical engineering training.

[15] The team was not able to determine the ratio between policy-related training and technical training but, somewhat impressionistically, policy-oriented training may have been perhaps twenty percent of the total. This ratio can be clarified, and might impact upon strategies for Phase IV.

[16] Some observers have pointed out that the participation of higher-level officials, including political leaders, is a challenge, especially from the bigger countries such as India and Pakistan. This challenge might be met in two ways: (1) targeting critical activities that involve the government of India, and/or Pakistan; and (2) working more closely with SAARC. For example, Afghan Deputy Minister of Energy Mr. Wali Sherzoi's December 2008 visit to Delhi paved the way for high-level discussions with senior officials and political leaders in India and led to SARI III's subsequent involvement in DABS training. Also, a visit in October 2009 by the secretary of ???? from the government of Bangladesh led to a meeting between his counterpart in the Ministry of Power and contributed substantially to the MOU subsequently signed on cross-border trade between the two heads of state when the prime minister of Bangladesh visited Delhi in December of that year. In terms of working more closely with SAARC, in the past, SARI made several overtures to SAARC, but these were always gently brushed off. SARI IV may need to continue such overtures, or find ways to work around SAARC in the near term, until the political winds eventually change direction.

To what extent have the outputs from technical assistance, training, and other SARI/E funded activities been utilized by targeted beneficiaries?

Findings: More than fifty percent of the key informant stakeholders interviewed by the evaluation team in eight SARI/E countries indicated that they had participated in one or more SARI/E events.[17] Everyone interviewed expressed strong appreciation for the training, and in all cases indicated that they had benefited from it. Virtually all stakeholders expressed the view that getting to know their counterparts in other nearby countries was important, and indicated that they valued the opportunity to exchange views and learn from one another. Furthermore, learning also comes from having groups of officials from SARI/E countries visit a region outside the subcontinent, such as South Africa, Europe, or North America, where they can learn how those countries' regional energy markets function. Such settings provide context, structure, and opportunities for exchanges of views.

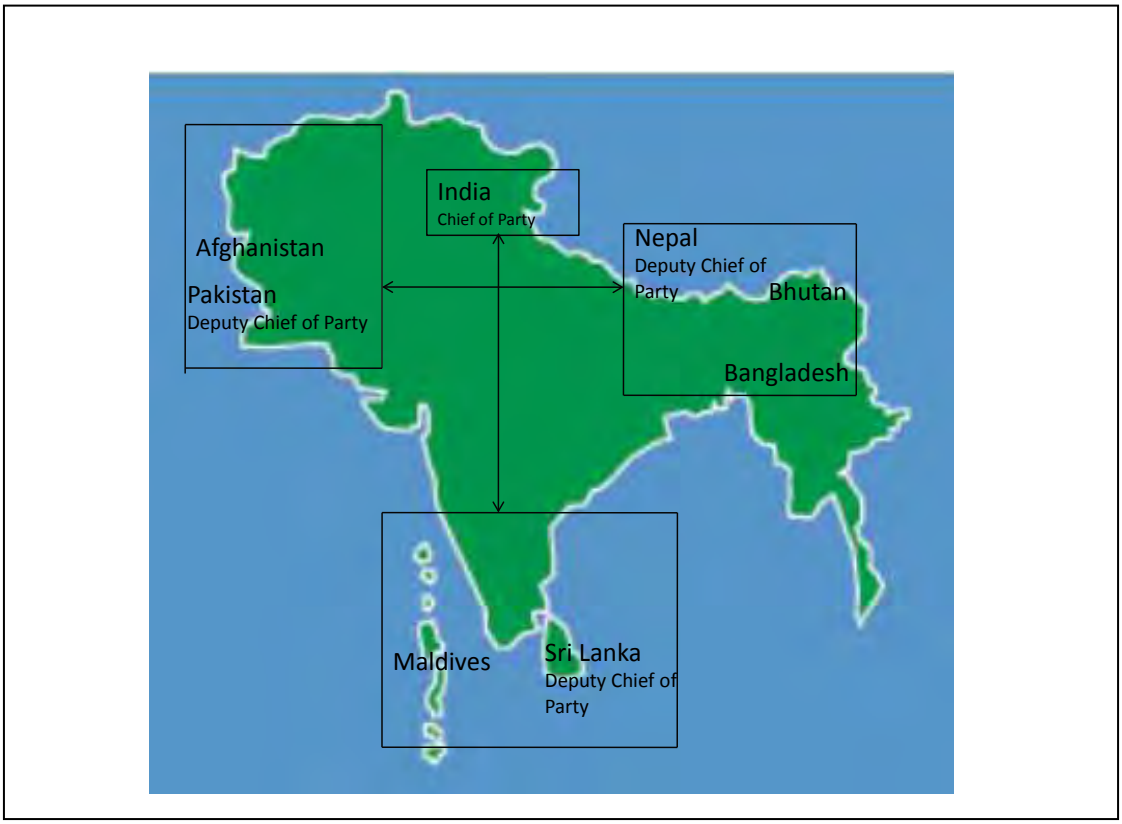
Conclusions: While each appears to have benefited as an individual, and while the sectors as a whole benefited from this training and technical assistance, sometimes the institutions that SARI/E sought to help may not have benefited as much as they might have. For training visits outside of the region, such international travel sometimes provides a setting, a context and a structure for exchanges of views. However, the absence of follow-up mechanisms means that gains made are not always consolidated. SARI/E IV may need to explore mechanisms that allow for more consolidation, perhaps encouraging countries to form permanent working groups to deal with important trans-border issues.

In some cases, for some kinds of training programs, the same individuals were nominated repeatedly. While this may offer some benefits in continuity, there could also be benefits for SARI and for the region from further diversification. Finally, SARI/E IV may need to decentralize its staffing, so that it can develop a better and more nuanced understanding of the individual institutions it seeks to help.[18] Figure 4 shows one possible approach to decentralization.

[17] Interviewees typically did not specify, and often did not seem to know, whether they had attended a SARI/E I, II, or III-era event. Such divisions represent an internal USAID and project-specific framework. Many outside stakeholders are unaware of such project-specific distinctions.

[18] Under SARI/E Phase IV, deputy chiefs of party, stationed in the three major regions that compose SARI/E, working under the overall direction of the chief of party, may be able to develop an improved sense of the needs of specific institutions, and the specific individuals who may best benefit from training. This is discussed in more detail in "Recommendations", Section 8. Specifically, see Recommendation #3.

Figure 4: Possible approach to decentralization



What evidence is there that best practices have been taken up by additional individuals who received information from targeted beneficiaries?

Findings**:** The evaluation team found multiple examples of best practices being taken up by trainees, and of subsequent downstream cascading effects. In Afghanistan, for example, one engineering professor was invited to a SARI-sponsored workshop on renewable energy. When he returned to Kabul, he introduced a course at Kabul University on renewable energy. After some time, more courses were added. Over the past few years, this program has trained approximately 1000 Afghan engineering graduates. These graduates, in turn, have provided the trained manpower for implementing most of the renewable energy programs in Afghanistan. Similar stories were told in Bangladesh and Sri Lanka. In Sri Lanka, the finance director reported that the finance division of the Ceylon Electricity Board (CEB) improved its management information system (MIS) with better reporting systems as a direct result of SARI training. A professor of mechanical engineering from the University of Moratuwa in Sri Lanka has introduced 'Lighting' as a subject in the postgraduate programs at his university after he visited the Lighting Resource Center (LRC) at Rensselaer, USA under a USEA exchange program. Part of the WISER program focuses on the training of trainers. A young Afghan woman, who had attended a program at WISER, told the evaluation team that she is now actively engaged in starting an Afghan women's NGO to train women in more efficient energy usage. A young woman regulator in Bhutan who had been trained at multiple SARI events, and was going off to another one in January, spoke eloquently about how much she had benefited, and how the Bhutanese authorities were applying what she and others had learned, in order to improve power regulations in Bhutan.

Conclusions**:** While the reports are largely anecdotal, virtually every stakeholder interviewed by the evaluation team who had attended one or more SARI-sponsored event told similar stories.

Repeatedly, they described best practices being taken up and applied in their own countries, and they often described a cascade effect. They repeatedly described learning from one another in the context of what works in South Asia. This group learning clearly is one of the major impacts of the SARI program, for which SARI deserves substantial credit.

To what extent have SARI/E activities supported or complemented activities sponsored by other donor partners, such as the World Bank and the Asian Development Bank in South Asia?

Findings: SARI/Energy's support of S3IDF[19] in Nepal directly led to the design and subsequent ADB approval of a technical assistance project, "Increasing Access to Energy in Rural Nepal." The ADB project has been designed to implement S3IDF's social merchant bank (SMB) approach, with an initial focus on an improved water mill program. Much of ADB's documentation for the project draws directly from SARI III's work, and the project would not otherwise have been launched since ADB and other major donors generally are not in a position to underwrite design efforts for innovative, pro-poor clean energy projects. This ADB project is now underway.[20]

Additional Findings**:**

- The India-Bangladesh cross-border cable was stimulated by the SARI program, and is now being partially funded by ADB.
- The 140 km 400 kV double circuit transmission line between Muzaffarpur, India and Southern Nepal, which is an indirect output from the SARI program, is now being funded jointly by the World Bank and the Government of India.
- CASA-1000, if it goes forward, will be funded primarily by the World Bank.
- Based on a SARI/E sponsored project development workshop in October 2010 in Colombo on "Wind Power Take Off in South Asia," the ADB representative announced a $2 million TA facility to finance feasibility studies in the region on grid interactive wind farms. Target countries include Bhutan, Nepal, Bangladesh and Pakistan.
- In Sri Lanka, the World Bank has approached the Regional Center for Lighting as a potential donor to help it establish a lighting certification and testing center for South Asia.

Conclusions**:** SARI/E activities have supported or complemented activities sponsored by other donors in South Asia, including the World Bank and the ADB. In some cases, they have led other donors into potentially important new activities like Social Merchant Banking in Nepal.

Measuring program impact requires the existence of good performance monitoring systems at the level of individual partners, as well as at the level of program management. Have systems been established internally for tracking, monitoring, and reporting on results attributable to SARI/E activities and do these systems utilize independently verifiable information.

[19] S3IDF is an NGO specializing in social merchant banking.

[20] ADB funding for the project is $933,000. The Nepalese government's contribution is USD $170,000. The project also includes a USD $500,000 revolving fund. Details are available at: <http://pid.adb.org/pid/TaView.htm?projNo=43299&seqNo=01&typeCd=2>

Findings: Implementing partners have put systems into place to measure outputs. Data is routinely available on people trained, by specialty, by gender, and by country, for example. There is proper documentation on Technical Assistance and the training that has been delivered. The Evaluation Team found little information that sought to measure cumulative impacts by Partners, or among Partners. The systems in place allow the outputs to be independently verified, but little emphasis has been placed on establishing systems that independently verify or aggregate results.

Conclusions**:** SARI/E is an ongoing, process-type program. Tetra Tech keeps track of many energy indicators by country. USEA has an extensive database of its trainees. Measuring program impact, however, is different from measuring project outputs. For example, we might see a change in fuel mix toward cleaner energy, but it would be unclear how much might be attributed to SARI III training, or how much to the activities of unrelated organizations like NGOs, or simply to changes in the larger economy of South Asia. In addition, because so many of the important SARI program outputs, results and impacts are process-related, or somewhat intangible, it is particularly difficult to define measurable indicators, much less determine the proportion to attribute to SARI. How can systems be designed, for example, to measure the strength or importance of cross-border networking? How much value attaches to the fact that people in the energy sector in neighboring countries now know one another, when they did not several years ago? How much of this networking is directly attributable to SARI? How can these almost intangible issues of attribution be properly decoded and tracked? How can systems be put into place to track the aggregation of results over time? This will represent an important challenge for SARI IV.[21]

An Angel for the Nepalese Power Sector

"SARI/Energy has been an angel for the Nepalese energy sector. A few years ago, the whole sector was stuck. But because of SARI, we've been able to work with our Indian counterparts in the energy sector. SARI laid the foundations. It initiated dialogue when all the countries were in a confused state. Now we are starting to trade energy. This technical dialogue also gives some comfort to our politicians. After we've discussed the technical issues among the professionals [in nearby countries] we can make better recommendations to our policy makers. Energy trades and markets are starting to move ahead. Clean energy has also been donor driven. In villages we are replacing kerosene with solar and biomass. Wind and solar are starting to become grid connected. The Region will need a few years to fully consolidate some of what SARI has done. Now we are initiating some legal reforms here in Nepal. These are all real contributions, and much of this is based upon SARI's work."

—Joint Secretary, Ministry of Energy, Government of Nepal

[21] The key program element with the potential for having the greatest impact is cross-border trade. It can impact energy security, climate change and improve access to energy. However these projects take a long time from concept to commissioning – a project cycle time of 10-15 years is common. In the absence of such an outcome within the PACD of the program, SARI/E IV will need to be creative in establishing verifiable indicators that can be measured and monitored. These indicators should be able to track the contribution of SARI/E to potential cross-border project(s) that are moving along classical project cycles.

SUSTAINABILITY

Are the results and impact of SARI/E activities sustainable in terms of creating institutional capacity and filling gaps on behalf of the program's key beneficiaries?

Findings**:**

Based on extensive interviews around the Region, the evaluation team found SARI/E beneficiaries reporting the following:

- A joint secretary in the Ministry of Energy in Nepal said that, "SARI Energy has been an angel for the Nepalese power sector." [See text box, previous page]
- The Regional Center for Lighting in Sri Lanka expects to be self-sustaining within two years. Revenue comes from the manufacturers or importers who want certification for their products. If demand is sufficient, this could support the organization, and make it self-sustaining. The center has its own business plan and looks for international donors as well as seeking fees-for-service. It also has membership fees.
- Nepal's Regional Center for Excellence in Micro Hydro has drafted a business plan. It appears to be taking on the important role of marketing Nepal's expertise in micro hydro.
- WISER has the following objectives: increased access to energy, energy efficiency, and the empowerment of women. It has expressed ambitions to become self-sustaining. However, the director is paid as a subcontractor to Tetra Tech, and the premises have been donated by the Energy Management Center, an arm of the state government of Kerala. WISER is also seeking other donor funding to sustain its activities.

Conclusions**:** The centers all fill important functions, and each is unique, serving the developmental needs of civil social, business, and market transformation. They enable an individual country to display a technology or best practice to the rest of the region at which they excel. This creates a sense of pride and ownership and enables countries to treat each other as equals, irrespective of the huge disparities that may define their energy sectors.

Two of the initiatives that SARI/E has been supporting largely have a business and market agenda, and thus should become financially sustainable: the Regional Center for Lighting in Sri Lanka and the micro hydro operations in Nepal. WISER, for its part, has a social and civil agenda centered around women's empowerment. It has no current activities that can lead to any meaningful financial income. It can promote energy efficiency and, more significantly, empower women. However, it may not have the potential to become financially self-sustaining, and it probably will have to rely upon donor funding for continuing operations.

The biggest gap, however, is institutionalizing the dialogue between and among the countries of the region at the techno-political level. In some cases, once SARI/E or other groups have helped to break the ice, it appears that individual governments, on a bilateral basis, are sometimes forming permanent working groups to address certain technical issues. For example, such a working group appears to have been established between Bangladesh and India to work on trans-border energy issues. However, more work remains to be done at the more complex level of multilateral exchanges. Multilateral forums, where countries routinely speak to one another at the technical, policy, and political levels, have yet to be fully institutionalized. SAARC exists, and by its own standards, it has been relatively active in the energy sector.[22] For example, it now conducts ministerial-level meetings on energy. Over the next decade, informal bodies may need to be

[22] The most recent ministerial-level meeting on energy was on climate change, held in Bhutan in July 2010. The SAARC energy center in Islamabad is also relatively active, but has not yet achieved much visibility and is constrained by its own internal operating systems, somewhat like the United Nations.

established in various corners of the Indian subcontinent to deal with the harmonization of various issues connected with trans-border power transfers between and among selected countries.[23] Facilitating or nurturing such development might become an important niche that SARI IV can fill, working informally until such a time as SAARC or some other, more formal organization begins to address these matters.

What evidence has there been of host countries taking ownership of the SARI/E program, including promoting the networks and forums and advocating the best practices developed and disseminated under SARI/E? Based on results to date, are these activities likely to engender sustainable development impacts after USAID funding has stopped?

Findings**:**

- In **Nepal** (see text box, above, "An Angel for the Nepalese Power Sector"), the Nepalese government has taken ownership of important technical data and has internalized certain confidence-building measures from SARI/E, and now has signed an MOU (technically a "Minute of Meeting") with India to proceed with the construction of 140 km of 400 kV power transmission.
- In **Afghanistan**, from interviews it is clear that the National Public Utility for Power (DABS) which has been the principle recipient of SARI/E's training is actively internalizing the results of this training and incorporating them into the evolving new institution. Various groups are also conducting further studies on the feasibility of harnessing wind power.
- TA in **Sri Lanka** involved a pre-feasibility study for the undersea hookup between Sri Lanka and Southern India, resulting in an MOU, signed between India and Sri Lanka, for the high-capacity power transmission link. The TA has also resulted in establishment of the Sustainable Energy Authority under the Ministry of Power, Sri Lanka. The Ministry of Power and Energy reports that the Regional Center for Lighting (RCL) will be brought directly under the Ministry with cabinet approval, which allows it to seek donor funding from the World Bank, ADB, etc. To date, thirty MW of wind power has already been constructed, and an additional sixty MW is under construction.
- In the **Maldives**, SARI/E supported a study that confirmed the feasibility of inter-connecting the electric power systems of some atolls. Tender documents for a pilot program are under preparation.
- In **Bhutan**, regulators and others clearly are internalizing and using what they have learned from SARI/E -sponsored training events.
- In **Pakistan**, SARI/E has provided important technical advice to the government that supports its ongoing CASA-1000 negotiations. The government is also assessing the important implications of the NREL wind-power studies.

Conclusion**:** Host countries are actively taking ownership of best practices they learn from SARI/E -sponsored programs. To some degree, cross-border activities are beginning on a bilateral basis (meaning between two countries), and these activities are expected to be sustainable, largely because they are economically critical for the future of South Asia. Without SARI/E, however, there is some chance that the larger, cross-border dialogue (networks and forums) would diminish, or progress towards cross-border understanding could slow down. Continuing to strengthen these

[23] SAARC represents a formal structure for regional governance and cooperation. SARI's comparative advantage rests with its abilities to operate informally, as a bilaterally-funded initiative. The evaluation team expects that over the next decade, a Regional Energy Commission or something like it will need to be established for the four countries of Nepal, Bhutan, Bangladesh, and Northeast India. SARI IV may be able to facilitate movement towards this important long-term goal. It is probably beyond SARI's formal remit and mandate to push formally for this to happen. However, at an informal level, it can lay the groundwork until the governments themselves or SAARC formalize the process.

cross border networks—particularly among the higher policy makers and political leaders—may become an important goal for SARI/E Phase IV.

PROJECT ASSISTANCE COMPLETION DATE (PACD) EXTENSION

The original program framework envisaged that the SARI/E program would be implemented through a two-phased approach. Subsequently the PACD was extended until September 2011 under Phase III of the program.

What is the need for an extension of the SARI/E PACD to meet the overall program objectives?

Findings**:** Key stakeholders across the region expressed a strong need for an extension of SARI/E.

Conclusion: There is a high need for extending the PACD in order to meet the program's overall objectives.

What should be the new timeframe, program focus, and direction under Phase IV?

Recommendation: USAID should look at a five-year PACD extension for SARI/E Phase IV, from 2012 to 2017. The new project itself should seek to look a decade into the future to attempt to anticipate where the South Asian energy sector is going, in order to best position program activities for Phase IV. SARI/E IV should be orientated toward tangible practical outputs and results. These include: (1) increasing energy security through cross-border trading; (2) increasing generation overall through the development of clean and renewable energy sources, including wind and micro hydro mini grids; (3) saving energy through energy efficiency and demand-side management (DSM); and (4) supporting decreases in emissions. A secondary result of these objectives should be increased access to energy, since increased energy availability and security will promote efforts to strengthen the grids (in order to transmit higher loads) and will encourage electric utilities to seek additional customers.

Under Phase III, SARI/E's resources were allocated at a ratio of approximately fifty percent cross border, forty percent clean energy, and ten percent markets development. For SARI/E Phase IV, it might want to review allocation decisions with members of the advisory board, implementing partners, and other key stakeholders. Some observers believe that the need for markets will develop in a significant way only after the physical infrastructure is in place to allow for energy transfers. Monitoring and evaluation systems may need to be augmented.

USAID may also want to explore the growing importance of water and climate change and their potential impact upon South Asia. Trans-border water practices are closely connected with energy usage, as well as population growth, increased agricultural and industrial usage, down- stream flooding, and climate change. These all have significant potential to impact the future energy situation across South Asia.

Further observations about future programming implications are provided below.

GENERAL RECOMMENDATIONS FOR SARI/E PHASE IV

Following the specific requirements of the Scope of Work, this evaluation has sought to assess:

1. The validity of the hypotheses underpinning the strategy**;**
2. The appropriateness of the implementation strategy in reaching the program's objectives;
3. The cost-effectiveness and impact of activities implemented by SARI/E partners;
4. The extent to which the program strengthened institutional capacity;

5. The extent to which the program promoted information-based dialogue and coalitions related to energy sector reform; and
6. The extent to which the program supported the formation of regional networks and centers of excellence for sharing best practices in an effort to influence decision-makers deliberating over energy sector market reforms, cross border trade, and clean energy applications.

The specific findings and conclusions relating to these objectives have been described in the previous sections. This final section of the main evaluation report provides specific recommendations, primarily targeted at a prospective Phase IV for SARI/Energy, that grow out of the findings and conclusions given above. These recommendations are clustered into three categories: (1) higher priority recommendations, (2) secondary recommendations, and (3) tertiary recommendations.

HIGHER PRIORITY RECOMMENDATIONS

1. **Overarching goals and sharpening project focus**. The overarching goal for SARI/E should be that all activities proposed in strategic plans, work plans and task orders should meet the criteria of supporting a South Asian Regional[24] Initiative for Energy and promoting energy security. SARI/E Phase IV should actively seek to target its primary goals: cross-border movement of energy, clean energy, and energy markets. The next phase of SARI/E needs to move beyond targets of opportunity and develop more focused strategies that support the program's larger objectives. To the extent possible, it should continue with its policy of supporting activities that involve two or more countries in the region. If specific requests for individualized training or technical assistance begin to increase, however, then the need to meet an individual country's need will need to be balanced carefully against SARI/E IV's current mandate of addressing regional energy needs.

2. **Expand SARI**/E **IV's advisory board**. SARI/E IV's advisory board should meet twice a year to provide enhanced overall direction to the project. The board's membership should be expanded to include suitable representation from the U.S. Department of State. Suitable national experts[25] in regional energy issues might also be considered for membership. National candidates should be individually selected by mission directors, based on each mission's best judgment about who could add value to promoting a regional energy initiative, or contribute constructive dialogue about regional energy exchanges. These national representatives initially might be given observer status to the advisory board. If the idea of their participation begins to develop traction and legitimacy over time, then sometime in the future it might be possible to turn the guidance and direction of SARI/E over to a board composed entirely of national representatives. This could be one way to institutionalize further the important role of SARI/Energy, as the region moves to higher levels of regional integration.[26]

3. **Decentralize project staffing**: USAID should actively explore decentralization mechanisms that encourage parts of the project to move physically out beyond Delhi. Such decentralization could help encourage host country buy-in and enhance SARI's presence at national levels in individual countries, while continuing to support the overall objectives of regional energy development, consistent with SARI/E's core mandate. It will be important for SARI/E's Phase IV senior

24 "Regional" is defined as involving two or more South Asian countries.

25 One or two International experts in regional energy issues might also be considered for membership.

26 In some cases, senior policy makers might be asked to participate through virtual mechanisms like video-teleconferencing, which will grow in popularity and effectiveness over the life of SARI IV. This mechanism might also be used to bridge some differences between countries like India and Pakistan.

management and advisory board to keep any potential tensions between working at a national and regional levels in suitable balance. One possible model would involve recruiting three expatriate DCOPs, working under the overall direction of a COP, who would continue to reside in New Delhi. The D/COPs would each oversee one of three Sub-Regions within the larger SARI/E framework:[27]

- The Northeast, composed of Nepal, Bhutan, Northeast India and Bangladesh, with a D/COP resident in Kathmandu or Bangladesh, wherever the prospects for cross-border activities are deemed to be higher in the near to medium term;
- The South, composed of Southern India, Sri Lanka, and the Maldives with a D/COP based in Colombo; and
- The West, composed of Pakistan and Afghanistan, with a D/COP stationed in Islamabad.

4. **Resource allocation ratios:** Under Phase III, Tetra Tech estimated SARI/E's resources to have been allocated at a ratio of approximately fifty percent cross border, forty percent clean energy, and ten percent markets development. For SARI/E Phase IV, resources may need to be allocated somewhat differently, based upon the results of the initial Phase IV strategy exercise (see below), and the judgments of the implementing partners, advisory board, and other key stakeholders. Some stakeholders point out that the need for markets will develop in a significant way only after the physical infrastructure is in place to allow for energy transfers.

5. **Strategic plans and work planning sessions**: Although implementing partners work in separate areas, there is a need for them to act synergistically. Partners should coordinate better, consult more frequently and integrate their work plans and activities more effectively. Strategic plans, work plans and task orders should be approached holistically. Implementing partners should prepare a five-year strategic plan, revised and updated yearly. The advisory board should formally approve the strategic plan. Annual work plans should then be prepared, showing proposed activities. SARI/E Phase IV should hold joint work planning sessions once a year, where implementing partners, country coordinators, and other key national stakeholders are brought together for a two-to-three day workshop and joint work plan development session. If Implementing partners are not able to prepare joint work plans (for legal reasons, for example) , then they should be encouraged to prepare parallel work plans that reinforce one another and enhance overall program coordination and integration.[28] These sessions should allow sufficient unstructured time for informal exchanges of information and brain storming about future program directions. SARI/E Phase IV should continue to use a task order system to allow for programmatic flexibility, but this should be combined with annual work plans that seek to focus the program more clearly on strategic goals and objectives of cross-border energy and clean energy. SARI/E should also produce an annual report, prepared jointly by all relevant implementing partners, and written for a general audience. Some copies should be printed for physical distribution to selected audiences around the subcontinent, as well as for virtual dissemination through web pages.[29] The project may want to consider employing a consultant

27 See Figure 4, "Possible Approach to Decentralization" for an illustrative figure showing this proposed structure.

28 This kind of integrated planning was called for in the Contractor's Scope of Work, which said, "Implementing Partners Meeting . . . will focus on program progress review and planning, (including development and coordination of the integrated work plan). . . ." PA Government Services Contract, dated May 1, 2007, p. C–15.

29 The cover for SARI's annual report, 2009 says, "This publication was produced for review by the United States Agency for International Development. It was prepared by PA Government Services Inc." It does not mention the work of other partners, and is written like a U.S. government report for a U.S. government office. It may serve a contractual requirement, but it does not perform an effective outreach function of describing the work of SARI/Energy to a larger, non-US government audience. SARI program management might want to review annual reports prepared by private corporations that help explain to stockholders what it is that their corporation actually does. Some annual reports are better than others, but the best ones often tell a compelling story. SARI/Energy has a compelling story to tell. It should seek ways to tell it that go beyond the

to help with social communications to ensure that SARI/E's annual report is written from SARI/E's regional strategic perspective, and not just mechanically generated to serve the priorities of one or more implementing partners.

6. **Centers of excellence**: The three centers, beginning to leverage local government and other donor support, and are beginning to deliver results. SARI/E IV should continue to support them, since they promote cross-border regional linkages and in the longer term may help promote further regional integration. However, the centers should seek multiplier effects, in order to expand their outreach beyond physical exchanges. Web-based and video teleconferencing outreach approaches should be actively explored and encouraged. SARI/E IV might consider having an organizational or institutional development expert on staff, at least for the first two to three years, who could support the growth and development of centers of excellence and other key, energy-oriented institutions across the region. It may also prove useful to explore social marketing mechanisms to enhance the outreach capacity of the centers. Social marketing for energy-efficient strategies and products might represent an important opportunity.

7. **The Northeastern portion of the subcontinent—a potential model:** During the life of SARI/E IV, the four countries of Nepal, Bhutan, Northeast India and Bangladesh will slowly begin to link their energy networks together, using the Indian grid as the glue to make this happen. At certain times of the year, more than 1,500 MW of power is already being exported from Bhutan to India, and smaller amounts of power are being traded between India and Nepal. Bhutan is on track to export 10,000 MW by 2020. Private sector businessmen in Nepal report that 6,000 MW are "in the pipeline" for potential export to India. A delegation from Bangladesh recently was in Nepal, looking to export 1000 MW through India. This emerging network could constitute an important cornerstone of a SARI/E IV strategy. This network, for which SARI/E began to lay the foundations almost ten years ago, will grow over the coming decade. SARI/E should position itself in Phase IV to support this important emerging [Sub]-regional network, and the model it may represent for the rest of the subcontinent.

Bangladesh to Import 1,000 MW Power from Nepal

Himalayan News Service, Kathmandu, November 24, 2010

"Bangladesh wants to import ,000 MW of power from a hydroelectric plant in Nepal. . . . A seven-member [Bangladeshi] delegation . . . visited Nepal two days ago to deal with . . . transit and import of electricity. According to the Bangladeshi media, the supply of power will start within next two- three years. One of the delegation members said . . . a target has been fixed to generate 3,500 MW power in next two or three years at the initial stage of the project. . . ."

8. **Harmonization and governance issues for regional energy.** Over the next decade, the four countries of Bhutan, Bangladesh, Nepal and Northeast India will need mechanisms to help them harmonize and coordinate energy strategies and policies. They will need systems to deal with energy-related governance issues, including technical matters, regulatory issues, tariffs, etc. Countries will require technical studies and technical assistance to put into place institutional structures that allow meaningful electrical connectivity, and cross-border energy trade. SARI/E IV can design specific task orders to help the Northeast region of the subcontinent to address such goals. SARI/E should use its standing in the region as an important, legitimate, and neutral player to convene seminars,

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standard formats of many U.S. government publications. Implementing partners should be encouraged to work together to write such an annual report.

workshops, and to support future working groups that can enhance levels of international cooperation and coordination among the four countries over the next decade. SARI/E's explicit strategy should involve an incremental systematic approach, helping technical staff of the various agencies in the four countries to come together, build trust, and exchange data and perspectives. Over the next five years, cross-border regulatory issues may become increasingly important. The countries will also require technical assistance and technical studies to put into place informal governance structures. The idea of establishing informal groups that can harmonize the power systems in contiguous countries may serve as a useful organizing principle. SARI/E IV can initiate specific task orders that help the Northeast region move towards such a goal.

9. **Wind Energy.** Wind energy is beginning to take off economically in India. India already captures somewhere between 11–12,000 MW of wind energy, most of which feeds back into various regional grids. SARI/E III laid the groundwork for an expanded emphasis upon wind energy through its important wind energy mapping efforts with NREL. SARI/E IV should continue to support the development of wind energy, perhaps through the establishment of teams that are specialists in wind energy. It can sponsor pre-feasibility studies, and might become involved with a policy dialogues relating to rate structures, economic studies, project finance, power evacuation, grid interaction and stability to help policy makers in countries like Pakistan come to terms with the feasibility of harnessing wind energy. A SWAT team could become a roving service delivery mechanism, to support further developments in wind energy across South Asia.[30] Pakistan could become an important target for such assistance (see Appendix 2).

SECONDARY RECOMMENDATIONS

1. **Mini-grids**:[31] Over the past thirty years, Nepal has developed significant expertise in the area of micro hydro. SARI/E III has now laid the foundations for a center of excellence for micro hydro, which will formally open its doors sometime early 2011. This is an important initiative and under Phase IV, this support should continue. However, individual micro hydro facilities do little to contribute to addressing regional power needs until they connect together. Today, Nepal has a small number of pilot initiatives underway to connect individual micro hydro facilities into mini-grids (see Appendix 3). This represents an important step forward, for individual villages and, potentially, for the larger power needs of the region. Over time, these mini-grids, when situated in places relatively close to appropriate high-tension power lines, can be connected into the growing national grid that is spreading across parts of southern and central Nepal. These larger grids, in turn, are becoming part of the electrical highway that will allow power to flow between countries. SARI/E IV should support experimentation with mini-grids and their connection into the larger emerging national grid across Nepal.

   This does several things. It helps to justify SARI/E's work with micro hydro, because it clearly fits SARI/E's overarching mandate to provide a South Asian REGIONAL initiative for energy. It supports clean energy. It is also important for Nepalese villages (and potentially villages in Northern

[30] The partnership between ADB and SARI/E in advancing wind power projects in South Asia has significant promise in promoting investor/developer and country interests in establishing wind farms in countries like Sri Lanka, Nepal, Bangladesh, Bhutan and Pakistan. SARI/E is being called upon to provide assistance to enable local financing institutions to appraise project proposals, assess risks and negotiate lending terms.

[31] A mini-grid is as an independent network that links together several micro hydro systems, or other sources of power. Mini-grids can operate in an isolated mode and simply connect a few villages together, or in some cases if they are located in the right place, they may be connected to the national grid. A list of eighteen potential mini-grids that merit further exploration in Nepal is given in Appendix 3.

India, Pakistan, Bhutan, and the mountains of Afghanistan, too). Many of these micro hydro systems now installed in a village operate only a few hours a day. However, if connected into mini-grids, which are connected in turn into national grids, these villages could begin operating their micro-systems twenty-four hours a day. Preliminary estimates suggest that small villages using such micro-hydro systems could begin earning revenues of 2–3 million Nepalese rupees per year, which could be used to fund various village development schemes and programs. Thus, micro-hydro systems could become an important revenue source for rural mountain villages, as well as a potential additional source for national- and supra-national-level power for South Asia. However, its implementation period is very long—even longer than cross border trade that involves selective integration of national grids of two neighboring countries.

2. **NGOs and civil society groups.** SARI/E Phase IV should support NGOs and civil society groups to help them understand the energy challenges that confront South Asia. This might involve support for selected Think Tanks that have shown interest and/or expertise in energy-related issues. Some NGOs are concerned with clean energy applications (energy efficiency, renewable energy) and their potentially positive impact on energy security, improving energy access to the under served, and mitigating greenhouse gas (GHG) emissions. Involving selected NGOs in cross-border exchanges or forums as well as training and orientation to key energy issues should be explored. To impact cross-border trade and energy markets, SARI/E should support dialogues with groups such as the South Asia Forum of Infrastructural Regulators.[32] While it will be challenging, over time it could prove useful to work with civil society and other groups to promote the development of broader coalitions, which in turn can promote understanding of energy issues among the general public, and urge policy makers to move forward with programs supporting enhanced connectivity and clean energy.[33]

3. **Journalism training.** Earlier phases of SARI/E worked with journalists to try to orient them to the benefits of using energy more efficiently, the role of clean energy, and the potential for cross-border energy trades. SARI/E IV should resume this initiative, and devote some small percentage of its assistance to working with journalists to promote more public dialogue on the importance of cross-border and clean energy usage. Work with journalists can be linked with the recommendation above (see #2), involving work with civil society and the NGO communities in key countries, or sub-regions of South Asia.

4. **Small-grants program.** During SARI/E Phase III, the small-grants program was somewhat scattered in its approach. For Phase IV, the idea of small grants should be preserved, but the overall number of grants should be reduced and the value or range of prospective sizes should be expanded, along with the expected duration. Grants could be awarded in tranches for longer periods, extending over three years, for example, contingent upon satisfactory performance. They should be awarded strategically. More flexibility should be created for issuing small grants, and they should directly and explicitly support the larger goals and objectives of SARI Energy. They should not become part of a program to make a small number of potential beneficiaries feel good.[34] The dollar range per grant should be expanded, so it extends from perhaps $50,000 to $300,000, depending on the particular purpose for which a small grant was being requested. If Phase IV adopts a more decentralized approach, then the D/COPs should be delegated authority to solicit (and perhaps award) small grants.[35] The D/COPs might also work with the centers of excellence to solicit proposals for small

32 SARI/E IV's plans to establish the South Asia Transmission Users Network (SATURN) represents an important step.

33 USAID for a period of approximately 10 years in the 1990s supported a project called "Implementing Policy Change," or IPC. This project worked with various policy change initiatives, and developed a wide range of intervention strategies, which are amply described on USAID websites. Case studies and other materials are also available from the MSI website.

34 The total beneficiaries of the small grants program under Phase III totaled 53,000, or approximately 0.0035% of the population of the subcontinent.

35 Subject to the normal procurement requirements of grants under contracts, of course.

grants. However, it will be important to avoid fissiparous tendencies. Small grants should continue to serve the larger goals of SARI/E IV. They should not become a tail that wags the dog. The advisory board should keep the opportunity costs of issuing and monitoring small grants in mind when approving annual work plans.

5. **Enhanced project-level indicators.** SARI/E IV should require the implementing partners to propose indicators that go beyond simple output measures. Such indicators, *inter alia,* should seek quantitative as well as qualitative ways to measure progress towards regional energy integration. These indicators **should** be linked with SARI/E's five-year strategic plan, annual work plans, and task orders, and should involve all implementing partners. For **Monitoring and evaluation**, SARI/E IV should build in a more systematic M&E capacity. For example, SARI's senior management and the project's advisory board should commission external monitoring and evaluation activities from time to time during the life of project. Provisions can be built into the institutional contractor's contract so that evaluations could be carried out by external parties through the project's task order system. SARI/E Phase IV should be designed to benefit from improved feedback loops. It should also formulate an enhanced performance management plan (PMP), with inputs from all implementing partners.

6. **Regional Standards**. Standards for improved light bulbs being developed in Sri Lanka should become available to all countries in South Asia. Bangladesh, among others, has expressed a clear need for such standards and for using the Lighting Center of Sri Lanka to conduct product testing. More broadly, South Asia may find a growing need for regional standards for energy products and energy transfers over the next decade. SARI/E IV should keep this potential need in mind as a possible move to promote further regional connectivity.

TERTIARY RECOMMENDATIONS

1. **Additional Kinds of Energy**. While SARI/E has to date looked primarily at the generation and distribution of electrical energy, energy involves more than just electricity. When appropriate, SARI/E IV might consider supporting other kinds of energy development with regional implications. The proposed Turkmenistan, Afghanistan, Pakistan, and India gas pipeline (TAPI) could provide one such possible opportunity.

2. **Trade fairs**. India hosts several national-level trade fairs, where private manufacturers set up booths and show off their wares. Phase IV should take advantage of such trade fairs by sending selected representatives from around the region to attend. Such exercises might be combined with work planning sessions or other mechanisms that promote cross-border learning by SARI/E stakeholders. In some cases, vendors from outside India [for example, Nepalese Micro-hydro] might be encouraged to demonstrate their capabilities at such Trade Fairs.

3. **Commercialize Nepal's center of excellence for hydro power and link it to South Asian markets.** The Center of Excellence for Micro hydro power in Nepal sees South Asia as a large potential market for its services. SARI/E can play a role in linking Nepalese service providers to South Asian markets, including Afghanistan, the northern parts of India and Pakistan, and perhaps certain remote parts of Bhutan. SARI/E III supported the preparation of a business plan for the center. The ownership of this business plan should reside with the host institution, which is a consortium of local institutions.[36] They should be given authority to implement the plan. SARI/E IV should support the process of turning the center of excellence into a real business.

[36] Includes Alternative Energy Promotion Centre, Kathmandu University, Nepal Micro hydropower Development Association, etc.

4. **Work with Asian Institute of Technology**. South Asia is becoming an economic hub where energy issues play an increasingly important role. The demand for human-resource capacity in the energy sector is growing. To address SARI/E's long-term goals, a pool of well-trained experts is a prerequisite. SARI/E IV might consider supporting the establishment of a South Asian center for energy technology, which could become a knowledge hub for the region. Such a center could conduct short- and long-term programs, including on-line diploma, and degree-level courses. For Phase IV, it might also be worth nurturing a long-term relationship with other institutions like the Asian Institute of Technology (AIT) in Bangkok.

5. **Linkages with Central and Southeast Asia.** Since SARI/E is beginning to expand beyond the confines of South Asia, SARI/E IV should include budgetary allocations that support periodic coordination between USG programs that are working in Central Asia and Southeast Asia. The sub-region of Pakistan and Afghanistan, for example, is already engaged with Central Asia through the Northeast Power System (NEPS) in Afghanistan, which currently imports 300 MW from Uzbekistan. If CASA-1000 goes forward, this would expand the linkages between Tajikistan, Kyrgyzstan, Afghanistan and Pakistan. Other, larger projects are being discussed, including the TAPI project, which was recently signed by three heads of state in Turkmenistan earlier in December 2010.

6. **Trans-border water issues and climate change**. USAID might explore the growing importance of water and climate change and their potential impact upon South Asia, building upon their experience with trans-border energy work under SARI/E I, II, and III. Trans-border water practices are closely connected with energy usage, as well as population growth, increased agricultural and industrial usage, increasing urbanization, down- stream flooding, and climate change. These all have significant potential to impact the future energy situation across South Asia, as well as larger geostrategic relationships among countries.

APPENDIX 1: SUMMARIES OF IMPACT OF SARI III, BY COUNTRY

AFGHANISTAN—SUMMARY OF IMPACT

A major part of SARI/Energy's work in Afghanistan has been for capacity building of the power sector. In this regard 197 persons were trained in 12 courses, 3113 person-days of class time. Initially the topics were broad, but continuing work with the stakeholders in Afghanistan steered the course to skills - based training for DABS personnel.

- In Phase 3 of SARI/Energy 246 Afghans participated in 27 workshops, conferences, and courses.
- There were three Small Grants awardede in Afghanistan.
- NREL conducted wind studies in Afghanistan. This initial data is now being refined through further studies some of which are being funded through other bilateral USAID projects.

BANGLADESH—SUMMARY OF IMPACT

The Evaluation Team spent 5 days in Bangladesh and interviewed 40 people in the power sector, academia, the press, and the private sector, concerning the impact of SARI/E-3. Many of the interviewees had directly benefited from the program, primarily from training and exchange programs. In Phase 3 of SARI/Energy, 119 Bangladeshis participated in 18 workshops, conferences, and courses. The trainees spent a total of 589 training days, or a bit less than 5 days per person. There were also five Small Grants awarded in Bangladesh. The electric power sector in Bangladesh is both bureaucratic and politicized. Thus, it is difficult for energy professionals to get their ideas implemented. The national regulatory body, BERC, is relatively new, and tariffs are not generally reflective of real costs. Almost every interviewee had "recommendations" for SARI-4, but these primarily concerned improvements in the power sector of Bangladesh. Most recommendations did promote energy efficiency, and renewable energy. In addition, there was interest in attracting private sector investment, and in trading natural gas. There is a government–owned private institution, IDCOL, which facilitates financing of small private-sector projects in renewable energy.

One notable achievement resulted from an exchange program under SARI III, in which Bangladeshis visited the Indian Energy Exchange. This was followed by exchange programs at the ministerial level. Subsequently an MOU was signed between Bangladesh and India for an interconnection. ADB has announced funding for part of it. The Power Grid Company has recommended that interconnections for natural gas be pursued as well.

DESCO, the distribution company for North Dhaka, credits SARI III with improving their Management Information System. Power Cell, a think tank within the Ministry of Power and Energy (MoPE) was involved in the prefeasibility study by PGCIL for wind power, but they thought that the study was not conducted at sufficiently high altitudes to provide convincing information to investors. They expressed interest in a more comprehensive wind assessment in SARI-4, because they believe that an additional 5 MW of wind power could be connected to the grid. In addition, they expressed interest in solar mapping to explore the feasibility of developing solar energy.

The Team visited two academic institutions. One, Bangladesh University of Engineering & Technology (BUET) has a Center for Energy, which has a laboratory for testing and certifying electrical equipment. This department provided a resource person on energy efficient lighting for a program on women in Dhaka. The organization Grameen Shakti is dedicated to the promotion of women in energy; they provided a resource person for a Women-in-Energy program in Pakistan.

The team interviewed a journalist, who is the founder and Editor of Energy & Power, a fortnightly magazine. He has been involved with the SARI program since 2000, attending workshops and study tours in every phase. He spoke about the need for outreach through print and electronic media. He praised SARI-2 for

introducing a program for energy journalists, which was helpful in networking with journalists from the region. He said that SARI programs have been very useful for constructive dissemination of information, and he has reported much of this in his magazine. His recommendations for SARI-4 focused on expanded outreach, including: (a) reviving programs for energy journalists, in order to curb negative reporting; (b) mobilizing NGOs; (c) educating MPs, ministers, teachers/academicians; (d) including provincial people from NE states of India in forums and discussions; and (e) continuing to publish SARI News.

BHUTAN—SUMMARY OF IMPACT

- In Phase 3 of SARI/Energy 21 Bhutanese participated in 11 workshops, conferences, and courses.
- One Small Grant was awarded in Bhutan
- NREL conducted wind studies, which are now being reviewed.

MALDIVES—SUMMARY OF IMPACT

Maldives has around 200 inhabited islands. The country depends entirely on imported fuels to meet their energy needs. Most power generation is concentrated in Male, the capital city. SARI impacts are given below:

- A submarine cable interconnection prefeasibility study has been carried out in 2009-10 to provide a techno-economic analysis of interconnecting power generation facilities involving different islands. The tender documents are now under preparation to implement some of the recommendations from this study.
- 28 persons from local utilities have attended training over a period of 174 days at a total cost of US$ 114,409. This participation has improved technical awareness on issues concerning power generation, transmission, distribution, and renewable energy technologies.

NEPAL—SUMMARY OF IMPACT

Nepal has been an active participant in the SARI/E Phase III program. SARI III supported Nepal by providing various training opportunities: 77 people participated in various training activities. SARI also supported the establishment of a Regional Center of Excellence in Micro-hydro (RCEMH), and supported 12 small grant projects. The impacts from the SARI/E activities -- some of which are direct and some are indirect – are described below:

- India and Nepal signed a "Minute of Meeting" of stakeholders on power trade cooperation between Dalkebar (Nepal) and Muzaffarpur (India) Cross Border double circuit Transmission Line Project on November 8, 2009 in Kathmandu, Nepal.
- The Regional Center of Excellence in Micro Hydro (RCEMH) was launched in April 2009. AEPC has been promoting mini-grid formation among selected pilot mini/micro-hydro schemes, seeking to make it feasible for them to become connected to the national power grid.
- The government and utility officials indicated that training provided by SARI/E was instrumental in enhancing their knowledge in power trade negotiations and how to enter into a dialogue with their Indian counterparts. The technical professionals felt that they were able to provide better information to politician for decision making in cross border power trade issues because of SARI's on-going support.

- As a part of Small Grant Program, SARI/Energy's support of S3IDF in Nepal directly led to the design and approval of an Asian Development Bank (ADB) TA (technical assistance) project, "Increasing Access to Energy in Rural Nepal" (Project # 43299- 01). The ADB project is designed to implement S3IDF's social merchant bank (SMB) approach in Nepal, with an initial focus on an improved water mill program. ADB funding for the project is USD 933,000. The Nepalese government's contribution is USD 170,000, The project includes a USD 500,000 revolving fund. Much of ADB's documentation for the project draws directly from SARI/Energy's work and the project would not have otherwise been launched as ADB and other major donors are generally not in position to underwrite design efforts for innovative pro-poor clean energy projects. Following a competitive procurement, ADB selected S3IDF to assist it in the ADB project.[37] A total of 12 projects were supported as a part of Small Grants Program, for which a total of US$233,475 was provided. A total of more than 3,000 individuals were direct beneficiaries of the small grants, with an average cost of US $ 73 per direct beneficiary.
- NREL conducted preliminary wind survey studies in Nepal.

PAKISTAN—SUMMARY OF IMPACT

Some activities in Pakistan are on-going as part of SARI/Energy's program. SARI III supported Pakistan through training: -- 23 people attended various training and exchange programs, in addition to those who received training by NREL. Pakistan directly benefited from advisory services related to the CASA-1000 initiative. It also received 2 small grants. Further direct and indirect impacts from the SARI/E activities are described below:
Pakistan received technical, financial, and legal advisory support for its participation in CASA-1000. Under this framework, concessional, power purchase and transmission service agreements were analyzed, a techno-economic feasibility study was prepared, and a final model was drafted.

- A total of US$122,871 was provided for training for 23 participants from Pakistan.
- Pakistan also participated in SAWIE and various Executive Exchange Programs.
- Two projects were supported as a part of Small Grant Program, for which a total of US $43,603 in grants was provided. A total of 200 people were direct beneficiaries of the programs at an average cost of US$218 per direct beneficiary.
- NREL conducted important wind survey studies, which are now under technical review.

SRI LANKA—SUMMARY OF IMPACT

Sri Lanka has benefitted substantially from SARI III. Impacts are briefly described below:

- A prefeasibility study was done under SARI and follow up activities have now resulted in an MOU between the Governments of India and Sri Lanka to undertake a technical feasibility for establishing viability for a high capacity transmission power link (HCTPL).
- The SARI training on software for power simulators for Ceylon Electricity Board (CEB) engineers has benefited both the operation and maintenance of power plants
- The training of CEB's accountants has also improved the Management Information Systems (MIS) in the Financial Departments.

- [37] The ADB project is now underway and details are available at: http://pid.adb.org/pid/TaView.htm?projNo=43299&seqNo=01&typeCd=2.

- The Power Ministry's participation in SARI's clean coal technologies programs helped achieve capacity additions that are helping to meet increased power demands in the country. A 3 x 300 MW coal based power plant has been planned for the western coast and the first phase of 300 MW is likely to be commissioned in 2011. Another 2 x 250 MW + 1 x 500 MW coal based power plants are proposed by NTPC, in India on the eastern coast.
- The wind power resource mapping exercise by NREL carried out under SARI helped the country's public utility understand the implications of grid stability for interconnections. This study has now allowed the utility to install 30 MW wind power plants. Another 60 MW is under construction. The ministry hopes to add 10% additional capacity from renewables. They have initiated a World Bank sponsored technical study to assess the grid's capability to take >90 MW of additional wind power. On the advice of SARI technical experts, the Power ministry has set up a Sustainable Energy Authority (SEA) in 2007 to oversee renewable energy and energy efficiency activities.
- SARI helped set up a Centre of Excellence in Colombo as a Regional Centre for Lighting (RCL) in 2009 under the newly formed Sustainable Energy Authority (SEA). The University of Moratuwa, the only technical university in Sri Lanka is closely associated with RCL and SEA in implementing its activities. The knowledge partner for this venture is the Lighting Research Centre at Rensselaer Polytechnic Institute, New York, USA.
- SARI has provided repeated opportunities to officials in the utilities and other energy experts in the renewable energy sector to network with their counterparts in member countries and receive technical support and advice as needed.
- Tetra Tech trained a total of 246 persons for a total of 1095 person days of training at a cost of US$784,548. In addition, some Sri Lankans have also visited Spain and the Philippines under the USEA exchange program.
- Four projects were approved under the small grants program with USAID contribution of US$66,432 and a matching contribution from the awardees of US$78,784 bringing the total project cost to US$145,216.

INDIA—SUMMARY OF IMPACT

The SARI project is based in Delhi. The institutional partner, Tetra Tech, has an office in Gurgaon, from which it administers activities in the eight SARI countries. India is learning how to be a donor country. As such, it serves more as a resource for technical assistance for the SARI/Energy project than a recipient country. Tetra Tech has identified 33 Indian entities that have contributed to SARI/Energy programs. [See appendix 4.] In Phase III, Indians participated in 10 workshops, conferences, and courses. Sixteen Small Grant Programs were awarded in India.

The Women's Institute for Sustainable Energy Research (WISER) was created by SARI/Energy in partnership with the Energy Management Center of the Government of Kerala, Trivandrum. It is discussed separately in the body of the report.

The Indian Energy Exchange (IEX) was established in June 2008 as a private body to provide a platform for trading electricity; it is also a platform for trading clean energy, from producers that have been certified by the CERC as renewable. It has 725 registered members and is funded by registration fees, annual fees, and deposits, in addition to service charges. It trades about 1.5-2% of the power generation of the country, which represents 85% of the market share of power traded over private power exchanges. It also trades renewable energy certificates (RECs) based on carbon credits, according to requirements initiated by the GoI. It believes that SARI III has increased its business. It looks forward to further increase in business under SARI IV through the development of cross-border training in the South Asia region.

NPTI is a not for profit training center under the Ministry of Power, with its own campus. Under SARI III, NPTI provided training to Afghan students in customized courses, as subcontractors to PA Consulting. They

also provided one course in Afghanistan. They credit SARI with the growth of their facilities. They look forward to further expansion in SARI IV, because they think SARI will do more to promote communications with other South Asian countries.

ELCOMA is an association of lighting manufacturers. Their membership represents about 80% of the lighting market, and they are supported by member dues. They establish quality standards for light bulbs. Lighting accounts for 18% of energy consumption. They credit SARI's thrust in energy efficiency for an increase in the business of their members. In 2005, they sold less than 25M CFL bulbs. In addition to SARI's initiatives, they promoted CFL themselves, using print and electronic media, and they provided guarantees. The result was successive yearly increases of total sales of 300M; they expect to sell 450M this year, which may start to strain their production capacity of 500M. They also credit the regional thrust of SARI, which has resulted in the increase in their percentage of exports of CFL, from 2% in 2005 to 12% currently. SARI has increased the demand for exports to Sri Lanka. Pakistan, too, would like to import bulbs from India, but they are prevented by political differences. Nevertheless, Pakistan has developed an understanding of the importance of quality control.

APPENDIX 2: LIST OF POSSIBLE SARI IV ACTIVITIES FOR PAKISTAN

USAID/Pakistan has proposed a possible buy-in to SARI, to help the Mission handle some of the developmental issues that transcend the geographical borders of Pakistan itself. Such potential activities are important for Pakistan, since securing suitable sources of energy may require the country to reach into Afghanistan and beyond into Central Asia. A preliminary listing of possible initiatives that USAID/Pakistan might find it useful to support through an expanded SARI/Energy Phase IV program is given below.
USAID Pakistan – Possible Buy-ins for SARI Initiatives:

1. Further Wind Resource Assessment to be taken to next step to conduct a bankable study of the Wind Resource Assessment for sites in Excellent Category for Afghanistan and Pakistan. As a background the supply/demand of Electric Power status in Pakistan and Afghanistan.
   - Identify sites most suitable for grid connection with load balancing requirement.
   - Identify the site for off grid development should also be identified. The data is available on NREL homer toolkit for hybrid least cost power generation for off grid communities.
2. Advisory Services for TAPI Turkmenistan, Afghanistan, Pakistan and India gas pipeline. The consultant will verify the gas reserves potential working with GoT and Gasprom. The Advisors will be for Turkmenistan, Afghanistan and Pakistan.
3. Advisory Services for Cross Border Energy Trade between countries. Currently it is CASA-1000 and be prepared for energy export from India to Pakistan moving to a goal of a South Asia – Central Asia Grid.
4. Identify communities for off grid electrification in the contiguous region of Afghanistan and Pakistan.
   - Conduct a study Assessment the Mini/micro Hydel assessment for these communities and have data available in the NREL Homer Toolkit.
   - Identify two communities in each county (Pakistan, Afghanistan) for a pilot. Conduct a series of application workshops to leverage hydel success in Nepal and Solar experience in Bangladesh -- Grameen Shakti.
   - The off grid electrification will run simulations on Homer Toolkit for least cost power options and finalize the optimum mix of wind/solar/hydel or other sources.
   - Conduct Public and Private sector workshops to build capacity in off grid electrification on a sustainable basis.
5. Electric Sector Reform Executive Exchanges and Workshops to familiarize Pakistani Power Sector professionals in Best practices, successes and lessons learnt in South Asia –particularly India. These will be conducted in travel logistic friendly venue – i.e. Dubai.
6. Biodiesel Executive Exchanges and Workshops to familiarize Pakistani and Afghan Public and Private sector personnel in Best practices, successes and lessons learnt in South Asia –particularly India. These will be conducted in travel logistic friendly venue – i.e. Dubai. In addition, provide Advisory services for application to specific region and facilitate application literature and material and equipment found most suitable. Provide a local Biodiesel expertise for assistance in applications
7. Solar Energy Executive Exchanges and Workshops to familiarize Pakistani and Afghan Public and Private sector personnel in Best practices, successes and lessons learnt in South Asia –particularly Bangladesh. In addition, provide Advisory services for application to specific region and facilitate application literature and material and equipment found most suitable. Provide a local solar expertise for assistance in applications.
8. Mini/Micro Hydel Executive Exchanges and Workshops to familiarize Pakistani and Afghan Public and Private sector personnel in Best practices, successes and lessons learnt in South Asia –particularly Nepal. In addition, provide Advisory services for application to specific region and facilitate application literature and material and equipment found most suitable. Provide a local Mini/Micro Hydel expertise for assistance in applications.

APPENDIX 3: ILLUSTRATIVE LIST OF POSSIBLE MINI-GRID MICRO-HYDRO SITES IN NEPAL

SN	District	Number of Sites	Combined Capacity (kW)
1	Bajura	4	259
2	Doti	4	121
3	Achham (Cluster 1)	5	146
4	Achham (Cluster 2)	6	228
5	Bhajhang	10	250
6	Dailekh	5	66
7	Kavrepalanchkow	6	205
8	Sindhupalchowk (Cluster 1)	7	183
9	Sindhupalchowk (cluster 2)	6	84
10	Dolakha	6	183
11	Dhading (Cluster 1)	7	93
12	Dhading (Cluster 2)	4	70
13	Myagdi	10	201
14	Taplejung	6	328
15	Panchthar (Cluster 1)	9	139
16	Panchthar (Cluster 2)	6	206
17	Kaski	3	65
18	Baglung	5	235

APPENDIX 4: A LIST OF INDIAN ORGANIZATIONS WORKING WITH SARI/ENERGY

A list of Indian organizations that have contributed to SARI/Energy programs is given below:

- Andhra Pradesh Central Power Distribution Company Limited (APCPDCL), Hyderabad
- Andhra Pradesh Transmission Company (APTRANSCO), Hyderabad
- Bangalore Electric Supply Company (BESCOM), Banagluru
- BSES Rajdhani, New Delhi
- BSES Yamuna, New Delhi
- Calcutta Electric Supply Company (CESC), Kokata
- Central Electricity Authority (CEA), New Delhi
- Center for Wind Energy Technology (C-WET)
- Central Institute of Rural Electrification (CIRE), Hyderabad
- Central Institute of Mining and Fuel Research (CIMFR), Dhanbad
- Central Power Research Institute (CPRI), Bengaluru
- Electric Lamp and Component Manufacturer's Association (ELCOMA), New Delhi
- Energy Management Center (EMC) of Kerala, Trivandrum
- Essun Reyroyalle, Hosur
- India Electrical Equipment Manufacturer's Association (IEEMA), Delhi and Mumbai
- India Energy Exchange (IEX), New Delhi
- Institute of Coal Management (ICM), Dhanbad
- Institute of Wind Energy Research (InWEA), Delhi
- Kotson Transformers, Ltd., Agra
- Larson and Tubro, Coimbatore and Ooty
- Mercados EMA SA of India, New Delhi
- Moser Baer, New Delhi
- National Power Training Institute (NPTI), Faridabad and Bangalore
- National Thermal Power Corporation (NTPC), New Delhi and Noida
- Power Grid India Limited (PGCIL), New Delhi and Gurgaon
- Power Trading Corporation (PTC), New Delhi
- Punjab Energy Development Agency (PEDA), Chandigarh
- Secure Meters, Gurgaon and Udaipur
- Suzlon Energy, Ltd., Coimbatore and Pondicherry
- Transformers and Rectifiers, Limited, Ahmedabad
- Vijai Electricals, Limited, Hyderabad
- Dakshinanchal Vidyut Vitaran Nigan, Limited, Agra
- Yadav Measurements Pvt Ltd, Udaipur

APPENDIX 5: PEOPLE CONSULTED AND/OR INTERVIEWED

Team 1

	Last Name	First Name	Designation	Organization	Address	Cell Phone	Telephone	Fax	Email
Nepal									
1	Upadhyaya	Anup Kumar	Joint Secretary	Ministry of Energy	Singh Durbar, Kathmandu	977 9841531075	-	-	-
2	Upadhyaya	Deepak Kumar	General Manager	Nepal Electricity Authority	Ratna Park, Kathmandu	-	977-1-4153034	977 -1-4153079	man@man.org.np
3	Pandey	Ram Chandra	Director	Nepal Electricity Authority	Ratnapark, Kathmandu	-	977-1-4153034	977 -1-4153079	rcpandey@mos.com.np
4	Buda	Sher Bahadur	Executive Director	Nepal Micro-hydropower Development Association	Teku, Kathmandu	-	977 1 4231024	nmhda@ntc.net.np	977 1 4231024
5	Devkota	Krishna Prasad	Member Secretary	Nepal Micro-hydropower Development Association	Teku, Kathmandu	-	977 9851013375	977 1 4231024	nmhda@ntc.net.np
6	Koirala	Janak	Treasurer	Nepal Micro-hydropower Development Association	Teku, Kathmandu	-	977 1 4231024	977 1 4231024	nmhda@ntc.net.np
7	Shrestha	Subarna Das	Chairperson	Independent Power Producer Association Nepal	Heritaz Plaza, Kamaladi, Kathmandu	977 98510 49432	977 1 4240975	977 1 4240975	info@ippan.org.np
8	Gangol	Pradeep	Executive Director	Independent Power Producer Association Nepal	Heritaz Plaza, Kamaladi, Kathmandu	-	977 1 4240975	977 1 4240975	info@ippan.org.np

9	Neupane	Apar		Independent Power Producer Association Nepal	`	977 98510 93163	977-1-552 1864	977-1-5539380	Apar.neupane@snpower.com
10	Chaulagain	Narayan	Executive Director	Alternative Energy Promotion Centre	Khumaltar, Lalitpur	977 9851111006	977 1 5539391	977 1 5539390	Narayan.chaulagain@aepc.gov.np
11	Poudel	Bharat	Coordinator	Center of Excellent Micro-hydro, AEPC	Khumaltar	977 9851108540	977 1 5539391	977 1 5539390	Bharat.poudel@aepc.gov.np
12	Ghimire	Dilli	Chairperson	National Association of Community Electricity Users-Nepal	Pulchowk, Lalitpur	9841 506488	977-1-5009152	977-1-5009152	dilli@naceun.org.np
13	Sharma	Puja	Engineer	National Association of Community Electricity Users-Nepal	Pulchowk, Lalitpur	-	977-1-5009152	977-1-5009152	pooja@naceun.org.np
14	Adhikari	Krishan	Senior Correspondence	National News Agency	Singh Durbar	9841212585	-	-	-
15	Timilsina	Netra	TV/Radio Reporter	-	-	-	-	-	-
16	Dawadi	Shiva	Reporter	Rajdhani Daiky	-	-	-	-	-
17	Thapa	Bhola	Dean	Kathmandu University	Dhulikhel	-	977-011-661399	977-011-661443	bhola@ku.edu.np
18	Chhetri	Bhupendra	Head of Department	Kathmandu University	Dhulikhel	-	977-011-661399	977-011-661443	bbs@ku.edu.np
19	Baral	Bibek	Asst. Professor	Kathmandu University	Dhulikhel		977-011-661399	977-011-661443	bivek@ku.edu.np
20	Pradhan	Gyanendra Lal	Executive Chairperson	Hydro Solutions	Syombhu, Kathmandu	-	977-1-4434003	977-1-4672601	gyanendra@hydro-solutions.org
21	Shrestha	Chij Kumar	Director,	World Education	Kathmandu & Bandipur, Nepal				

	Last Name	First Name	Designation	Organization	Address	Cell Phone	Telephone	Fax	Email
Pakistan									
1	Gringer	Jeffrey D.	Economic Officer	Embassy of the United States of America	Diplomatic Enclave Ramna-5, Islamabad.	92-301-8544890	92-51-208-2956	-	gringerjd@state.gov
2	Qazi	Tariq	Ex- Chief Executive	National Transmission & Dispatch Company Ltd.	414 WAPDA house, Lahore	0333-4088111	-	-	-
3	Memon	Muhammad Yousaf	Former Additional Secretary	Ministry of Water and Power	Government of Pakistan, Islamabad	-	-	-	ymemon_pk@yahoo.com y_memon2001@hotmail.com
4	Masud	Jamil (Dr.)	Director	Hagler Bailly Pakistan (Pvt.) Ltd.	39 Street 3, E7, Islamabad 44000	+(92345)85 5 3015	+(9251)26 10200-07	+(9251)26 1 0208-09	jmasud@haglerbailly.com.pk
5	Qureshi	Manzar Naeem	Division Manager, Energy Programs	Hagler Bailly Pakistan (Pvt.) Ltd.	39 Street 3, E7, Islamabad 44000	92 345 300	+(9251)26 10200-07	+(9251)26 1 0208-09	mqureshi@haglerbailly.com.pk
6	Gembol	Michael	Energy Adviser	Power Distribution Improvement Program, IRG www.pdip.pk	Islamabad	92 336 513 5338	-	-	mgembol@pdip.pk
7	Ghanem	Joseph	Energy Adviser	Power Distribution Improvement Program, IRG	Islamabad	92 336 513 5334	-	-	ighanem@pdip.pk
8	Hussian	Syed	Country Coordinator	SARI/E Islamabad	-	-	-	-	sfhussain@dsi.net.pk
9	Masood	Khalid	Retired Senior Civil Serv't, NWFP	Peshawar, Pakistan		<kmasood @kmint.com>			

	Last Name	First Name	Designation	Organization	Address	Cell Phone	Telephone	Fax	Email
Afghanistan									
1	Farouq	Ghulam	Deputy Minister	Ministry of Energy and Water	Darul-Aman Road, Kabul	-	-	-	<gfaruq11@yahoo.com>
2	Shams	Jalil	Chief Executive Officer	Da Afganistan Breshna Sherkat	Chaman Houzouri, Kabul	-	-	-	-
3	Hairam	Gulla Jan	Chief Operating Officer	Da Afganishtan Breshna Sherkat	Chaman Houzouri	-	-	-	-
4	Alami	Mirwais	Chief Commercial Officer	Da Afganishtan Breshna Sherkat	Chaman Houzouri	+93 (0) 786860 000	-	-	Mirwas.alami@dabs.af
5	Wardak	Abdul Rasool	Country Coordinator	SARI/E Kabul	USAID, Kabul	-	-	-	-
6	Abawi	Mehboba	Community Development and Gender Officer	UN/FAO	UN/FAO Ministry of Agriculture	+93 706 169 813	-	-	lwl.afghanistan@yahoo.com
7	Azimi	Ali. M.	Chief of Party	Afghanistan Clean Energy Program	USAID/IRG, Kabul	+93 (0) 797 808 806	-	-	aazimi@acepaf.com.
8	Keith	David	Vice President	Tetra Tech	4601 North Fairfax Drive, Arlington, USA	703 380 2582	703 387 2127	703 387 2160	David.keith@tetratech.com
9	Piawera y	Hayatullah		Tetra Tech		0799340 973	0786 191 146	-	Piawery1@yahoo.com
10	Rahimi	Hosay	Project Manager	Geres (energy NGO) Afghanistan	H# 2 St# 2, Dehbori, Sara-e-Ghazani, Kabul	+93 (0) 700 1387 45	-	-	h.rahini@geres.eu

	Last Name	First Name	Designation	Organization	Address	Cell Phone	Telephone	Fax	Email
Afghanistan									
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13	Arya	Ahmad Saboor	Energy Unit/Head Engineering Department	National Solidarity Program, Ministry of Rural Rehabilitation and Development, Kabul	Tashkilat Street, Darul Aman Road, Kabul	+93 (0)700 281 216	-	-	eng_arya@yahoo.com
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15	Durrani	Nasir	Dep Minister	Ministry of Mines		0700 258 130	NDurrani20@hotmail.com;NDurrani@mom.gov.af		
16	Shariff	Mohammad S.	Associate Prof.	Kabul University	Jamal Mina, Kabul	+93 (0)700 29 32 45	-	-	sharifimohd@gmail.com
17	Neuling	R. Bruce	Economic Officer	Embassy of the United States of America	Kabul	+93 (0) 799 797 538	+93 (0) 700 108 364	-	neulingBX@state.gov
18	Hansen	John F.	Director, Energy and Water Division	U.S. Agency for International Development	East Compound, US Embassy, Great Masood Road, Kabul	+93 (0) 793 550 128	-	-	jhansen@usaid.gov

	Last Name	First Name	Designation	Organization	Address	Cell Phone	Telephone	Fax	Email
Afghanistan									
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20	Krishnan	G. Krish	Senior Energy specialist	U.S. Agency for International Development	1325 G. Street N.W. Suite 400 Washington DC	-	(202) 219 0238	-	gkrishnan@usaid.gov
21	Rahimi	Azizullah	Director	Rural Enterprise and Energy Department	Ministry of Rural Reconstruction and Rural Development	-	-	-	rahimi.azizullah@gmail.com.
22	Assefy	Homayoun	Sardar	Retired diplomat	Karte Char	0799 401 401	0707 401 401		

	Last Name	First Name	Designation	Organization	Address	Cell Phone	Telephone	Fax	Email
India									
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2	Thomas	Mercy K.	Regional Project Coordinator	SARI/E	USAID, American Embassy, Chanakyapuri	-	91 11 2419 8567	91 11 2419 8454	methomas@usaid.gov
3	Bhutad	Amol	Program Management Specialist	SARI/E	USAID, American Embassy, Chanakyapuri	-	91 11 2419 8693	91 11 2419 8454	abhutad@usaid.gov
4	Samal	Chandan K.	Project Development Specialist	USAID	USAID, American Embassy, Chanakyapuri	-	91 11 2419 8038	91 11 2419 8454	csamal@usaid.gov
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8	Soto	M. Erin	Mission Director	USAID,	American Ambasssy,	-	91 11 2419 8400	91 11 2419 8454	esoto@usaid.gov
9	Warfield	Elizabeth	Deputy Mission Director	USAID	American Ambasssy, Chanakyapuri	-	91 11 2419 8400	91 11 2419 8454	-
10	Hajny	Michael	Chief of Party	Tetra Tech	DLF Cyber City, Gurgaon, Haryana	91 9650811660	91 124 4737400	91 124 4737444	Michael.hajny@tetratech.co m
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			Advisor						
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14	Kathuria	Vinita	Manager Outreach and Events	Tetra Tech	DLF Cyber City, Gurgaon, Haryana	-	91 124 4737400	91 124 4737444	Vinita.kathuria@tetratech.com
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18	Joshi	Manish	Manager-Marketing	Yadav Measurements Private Limited	RIICO Bhamashah Industrial Area, Udaipur	-	0294 2650127	0294-2650129	Manish.joshi2@ymllabs.com

	Last Name	First Name	Designation	Organization	Address	Cell Phone	Telephone	Fax	Email
Bhutan									
1	Wagdi	Yeshi	Director General	Depart of Energy, Ministry of Economic Affairs	Post Box 106 Thimpu.	17640974	+975 2 322505 +975 2 323555	+975 2 335122	ywangdi@druknet.bt
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4	Tshering	Nima	Officiating Chief Executive Officer	Bhutan Electricity Authority	-	-	-	-	-
5	Choden	Deki	Chief Tariff Officer	Bhutan Electricity Authority	-	-	-	-	-
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Team II: Sri Lanka, Maldives, Kerala, India, & Bangladesh

Date	Time	Name		Organization	Location
10-Nov	10:00	Mr Mike Ellis	Former COP, SARI/E, Phase III	Tetratech	Arlington, USA
	15:00	Dr Russel DeLucia	Chairman [by phone]	S3IDF	Boston, USA
12-Nov	9:00	David Renne	Program Director	NREL	
		Shannon Cowlin	SARI Project Manager	NREL	
	12:00	John Hammond		USEA	
		Sarah Blandford		USEA	
15-Nov	10:00	S Padmanaban	Director	USAID SARI E Regional office	US Embassy, Delhi India
		Charanshila Lal	Program Development Specialist	USAID/ India	US Embassy, Delhi India
		Amol Bhutad	Program Development Specialist	USAID SARI E Regional office	US Embassy, Delhi India
		Chandan K Samal	Program Development Specialist	USAID/ India	US Embassy, Delhi India
		Mercy K Thomas	Regional Project Coordinator	USAID SARI E Regional office	US Embassy, Delhi India
		Elizabeth Warfield	Dep Mission Director,	USAID	US Embassy, Delhi India
16-Nov	11:00	Ms M Erin Soto	Mission Director	USAID/ India	US Embassy, Delhi India
	13:00	Mr Michael Hanjy	COP, SARI/Energy, Phase III	Tetratech	Gurgoan, Haryana, India
		Mr. Sabyasachi Pattanaik	Sr Technical Advisor, SARI III	Tetratech	Gurgoan, Haryana, India
17-Nov	9:00	Mr John Bruce Wells	Clean Energy Access Advisor, SARI III	Tetratech	Gurgoan, Haryana, India
	12:00	Dr Nandita Mongia	Principal Technical Advisor, SARI III	Tetratech	Gurgoan, Haryana, India
	15:00	Ms Vinita Kotharia	Manager, Outreach & Events, SARI III	Tetratech	Gurgoan, Haryana, India
18-Nov	12:00	Mr Shyam Sujan	Secretary General	ELCOMA	New Delhi, India
		Mr HS Mamak	Advisor	ELCOMA	New Delhi, India
	12:00	Mr JSS Rao	Principal Director	NPTI	
		Ajay Jain	Technical Specialist – Energy Consultant, SARI	Tetra Tech	
		Ms Bhakti Bhowmik	Specialist – Outreach & Events, SARI III	Tetra Tech	
		Ritesth Kumar Singh	Senior Associate, SARI III	Tetra Tech	Faridabad, Haryana, India
19 Nov		Mr SK Choudhary	Director (Corporate Planning)	NPTI	Faridabad, Haryana, India
		Ms Manju	Senior Faculty	NPTI	Faridabad, Haryana, India
	15:00	Mr Rajesh K Mendiratta	Vice President - Business Development	Indian Energy Exchange	New Delhi, India

25-Nov	9:00	Ms Ramani K Nissanka	Director	Regional Centre for Lighting	Colombo, Sri Lanka
	11:00	Mr Upali Daranagama	Additional Secretary (Planning & Development)	Ministry of Power & Energy	Colombo, Sri Lanka
	15:00	Mr Damitha Kumarsinghe	Director General	Public Utilities Commission of Sri Lanka	Colombo, Sri Lanka
26-Nov	9:00	Ms Kamani Jayasekara	Chief Engineer (Transmission & Planning)	Ceylon Electricity Board	Colombo, Sri Lanka
	10:00	Mr WDAS Perera	Finance Manager	Ceylon Electricity Board	Colombo, Sri Lanka
		Mr Tissa Kumara Liyanage	Addl Finance Manager	Ceylon Electricity Board	Colombo, Sri Lanka
	11:30	Mr Chandana Samarasinghe	Director General	SL Sustainable Energy Authority	Colombo, Sri Lanka
		Mr MMR Pathmasiri	Director (Energy Management)	SL Sustainable Energy Authority	Colombo, Sri Lanka
	15:00	Mr Bandula Chandrasekara	Programs Coordinator	Energy Forum	Colombo, Sri Lanka
27-Nov	11:00	Mr Damitha Samarakoon	Programs Manager	Practical Action	Colombo, Sri Lanka
	17:30	Dr Rahula Attalage	Director (PG Studies)	University of Moratuwa	Colombo, Sri Lanka
29-Nov	8:30	Ms Priyanka Dissanayake	CCO SARI/E	USAID/Sri Lanka	Colombo, Sri Lanka
		Ms Salma S Peiris	Sr Program Management Specialist	USAID/Sri Lanka	Colombo, Sri Lanka
	11:00	Mr M Lakshitha Weerasinghe	Chief Engineer (System Operations)	Ceylon Electricity Board	Colombo, Sri Lanka
		Mr J Nanthakumar	Chief Engineer (Operations Audit)	Ceylon Electricity Board	Colombo, Sri Lanka
	13:00	Mr Harin Malwatte	Secretary General	Ceylon Chamber of Commerce	Colombo, Sri Lanka
		Ms Gayathri Gunaruwan	Sr Economist -Economic Intelligence Unit	Ceylon Chamber of Commerce	Colombo, Sri Lanka
	15:00	Dr Tilak Siyambalapitiya	Director	Resource Management Consultants P Ltd	Colombo, Sri Lanka
	16:00	Ms Priyanhti Fernando	Executive Director	Centre for Poverty Analysis	Colombo, Sri Lanka
1-Dec	10:00	Mr Mohammed Rasheed	Chief Executive Officer	STELCO	Male, Maldives
		Mr Ahmed Niyaz	Director	STELCO	Male, Maldives
		Mr Ahmed Iqbal	Senior Engineer	STELCO	Male, Maldives
		Mr Azzam Ibrahim	Senior Engineer	STELCO	Male, Maldives
	11:30	Mr Hussain Niyaaz	Additional Secretary	Min of Foreign Affairs	Male, Maldives
	13:30	Mr Akram	Assistant Engineer	Min of Housing & Environment	Male, Maldives
		Mr Hassan	Project Coordinator	Min of Housing & Environment	Male, Maldives
		Ms Fathima Moosa	1.1.1 Assistant Engineer	1.1.2 Min of Housing & Environment	1.1.3 Male, Maldives

1-Dec		Mr Asif	Environment Analyst	Min of Housing & Environment	Male, Maldives
	15:00	Mr Ali Hassan	Managing Director	Northern Utilities	Male, Maldives
		Mr Ahmed Shamoon	Director (Finance)	Northern Utilities	Male, Maldives
2-Dec	16:00	Prof VK Damodharan	Vice Chairman, EMC	Dept of Power, Government of Kerala	Thiruvanthapuram, India
		Mr KM Dharesan Unnithan	Director, EMC	Dept of Power, Government of Kerala	Thiruvanthapuram, India
3-Dec	10:30	Ms RV Jaya Padma	Regional Director, WISER	Dept of Power, Government of Kerala	Thiruvanthapuram, India
	15:00	Mr Paul Antony IAS	Principal Secretary	Dept of Power, Government of Kerala	Thiruvanthapuram
5-Dec	8:30	Mr Dennis Sharma	Dep Mission Director	USAID/Bnagladesh	Dhaka, Bangladesh
		Mr Mark Visocky	Actg Director, Economic Growth Office	USAID/ Bangladesh	Dhaka, Bangladesh
		Mr AKD Sher Mohammad Khan	CCO SARI/E	USAID/ Bangladesh	Dhaka, Bangladesh
	12:00	Mr Mahboob Sarwar-E-Kainat	Director General	Power Cell, Power Division	Dhaka, Bangladesh
		Mr Amzad Hossain	Director (Commercial)	Power Cell, Power Division	Dhaka, Bangladesh
	13:30	Prof Shahidul I Khan	Dept of Electrical & Electronics Engg	Bangladesh Univ of Engg & Technology (BUET)	Dhaka, Bangladesh
	14:30	Md Abdus Sobhan	Managing Director	Dhaka Power Distribution Company Ltd	Dhaka, Bangladesh
		Mr FM Faridul Hoque	Director (Operations)	Dhaka Power Distribution Company Ltd	Dhaka, Bangladesh
		Mr ASM Seraj Uddullah	Director (Engineering)	Dhaka Power Distribution Company Ltd	Dhaka, Bangladesh
		Mr Mohammad Iqbal	General Manager (CP&S)	Dhaka Power Distribution Company Ltd	Dhaka, Bangladesh
	15:30	Mr Tapos Kumar Roy	Addl Secretary	Power Division, Min of Power, G o B	Dhaka, Bangladesh
		Mr Mohammad Alauddin	Dy Secretary	Power Division, Min of Power, G o B	Dhaka, Bangladesh
		Mr Siddique Zobair	Sr Adviser	Power Division, Min of Power, G o B	Dhaka, Bangladesh
		Mr Md Monwar Hasan Khan	Sr Asst Chief	Power Division, Min of Power, G o B	Dhaka, Bangladesh

6-Dec	10:00	Md Rafiqul Alam	Managing Director	Power Grid Corporation of Bangladesh	Dhaka, Bangladesh
		Mr Md Showkat Hossain	Director (Finance)	Power Grid Corporation of Bangladesh	Dhaka, Bangladesh
		Mr PK Roy		Power Grid Corporation of Bangladesh	Dhaka, Bangladesh
		Mr Mohammad Hussain	Director (Training)	Power Grid Corporation of Bangladesh	Dhaka, Bangladesh
	12:30	Mr Syed Yusuf Hossain	Chairman	Bangladesh Energy Regulatory Commission	Dhaka, Bangladesh
		Mr Md Haronur rashid	Dep Director (Power)	Bangladesh Energy Regulatory Commission	Dhaka, Bangladesh
		Mr Zaved Choudhury	Director (Gas)	Bangladesh Energy Regulatory Commission	Dhaka, Bangladesh
	14:30	Mr Islam Sharif	Chief Executive Officer	Infrastructure Development Co Ltd	Dhaka, Bangladesh
	15:30	Mr Aftab ul Islam	President	American Chamber of Commerce in Bangladesh	Dhaka, Bangladesh
7-Dec	8:45	Dr Ijaz Hossain	Professor, Dept of Chemical Engineering	BUET	Dhaka, Bangladesh
	10:00	Dr Md Hussain Monsur	Chairman	PetroBangla	Dhaka, Bangladesh
		Dr Molla Md. Mobirul Hossain	Director (Operations)	PetroBangla	Dhaka, Bangladesh
		Mr Meer abdul Matin	General Manager (Mine Operation Division)	PetroBangla	Dhaka, Bangladesh
	12:00	Mr Mizanur Rahman	Director (System Planning)	B'desh Power Development Board	Dhaka, Bangladesh
		Mr Al Mudabbir Bin Anam	Sub Divisional Engineer (System Planning)	B'desh Power Development Board	Dhaka, Bangladesh
8-Dec	9:30	Dr M Rezwan Khan	Vice Chancellor	United International University	Dhaka, Bangladesh
	11:30	Mr Abser Kamal	Acting Managing Director	Grameen Shakti	Dhaka, Bangladesh
		Mr Md Ahsan Ullah Bhuiyan	Asst General Manager	Grameen Shakti	Dhaka, Bangladesh
		Mr Md Fazley Rabbi	Senior Manager	Grameen Shakti	Dhaka, Bangladesh
		Mr Rezaul Islam	Head of Technical Division	Grameen Shakti	Dhaka, Bangladesh
	14:30	Mr Mollah Amzad Hossain	Editor	Energy & Power Magazine	Dhaka, Bangladesh
	16:00	Mr Masud Rahman	President	Canada Bangladesh Chamber of Comm & Ind	Dhaka, Bangladesh

9-Dec	9:30	Mr James Ford	Country Director	NRECA	Dhaka, Bangladesh
		Mr Robert O Ellinger	COP, REDP	NRECA	Dhaka, Bangladesh
	11:30	Mr Qudrate Khuda	Director (Finance)	Dhaka Electric Supply Co (DESCO)	Dhaka, Bangladesh
		Mr Md Shahjahan Mia	GM (Operation & Network Control)	Dhaka Electric Supply Co (DESCO)	Dhaka, Bangladesh
		Mr SM Habibur Rahman	DGM (S&D Division)	Dhaka Electric Supply Co (DESCO)	Dhaka, Bangladesh
		Mr Md Shafiqul Islam Choudhury	GM (Incharge) (Procurement & Store)	Dhaka Electric Supply Co (DESCO)	Dhaka, Bangladesh
		Mr Shah Alam	DGM (SE & D) & Project Director	Dhaka Electric Supply Co (DESCO)	Dhaka, Bangladesh
	14:30	Ms Denise Rollins	Mission Director	USAID	Dhaka, Bangladesh
		Mr Naren Chanmugam	Office Director, Economic Growth	USAID	Dhaka, Bangladesh

APPENDIX 6: SUMMARY WRITE UP: CENTER OF EXCELLENCE, REGIONAL CENTER FOR LIGHTING

The Sustainable Energy Authority (SEA) set up under the Ministry of Power & Energy oversees renewable energy and energy efficiency activities. On the advice of SARI technical experts, the SEA helped establish a Center of Excellence in Colombo as a Regional Center for Lighting (RCL) in April, 2009. SARI provided technical help through the Lighting Research Center at Rensselaer, New York, USA.

RCL plans to increase the awareness and affordability of energy efficient, reliable and clean lighting technologies:

- Catalyze regional manufacturing of energy efficient lighting products
- Retrain and educate the necessary workforce to create sustainable lighting

SEA has already identified an area in the international convention complex for use by the RCL. The partition work is under progress and is expected to be ready by Jan 2011. The centre will also house a laboratory to undertake research work related to local needs and to develop new lighting products. The laboratory will also provide assistance in establishing standards for lighting products and issue certificates for products manufactured locally in the region.

The center will conduct capacity building and awareness programs for participants from the region and demonstrate new technologies in lighting applications. One 5-day residential program was conducted with 16 participants from the region. A second program is planned in Jan 2011 at Male, Maldives. A website launched in Sep 2009 provides information to architects/engineers/consumers to contact the centre and utilize its services.

A two-year business plan has been developed and submitted for approval. A proposal has also been submitted to ADB for replacement of incandescent lamps with certified CFLs in 2000 households. A load research is under way in 3000 households. An MOU has been signed with Eco Asia for joint collaboration in lighting activities. The University of Moratuwa, the only technical university in the country is also associated with the RCL to implement its activities. The RCL is likely to come directly under the Ministry of Power after obtaining cabinet approval. The Ministry will also get SAARC expert group approval to get member buy-in.

APPENDIX 7: EVALUATION, SCOPE OF WORK

II. EVALUATION SCOPE

TITLE

Mid-Term Evaluation of the South Asia Regional Initiative/Energy (SARI/E) Program

OBJECTIVE

The overarching objective of this mid-term evaluation is to:

- Determine the overall impact the activity has had;
- Test the continued validity of the hypotheses on which the program was designed;
- Assess the efficacy and cost-effectiveness of SARI/E implementation tools and management structure in meeting its objectives; and,
- Explore the extent to which the program strengthened institutional capacity, promoted information-based dialogue and coalitions related to energy sector reform, and the formation of regional networks and centers of excellence for sharing of best practices in an effort to influence decision-makers engaged in deliberations over energy sector markets reform, cross-border trade and clean energy applications;
- Make recommendations on whether the next phase of the activity should be undertaken.

STATEMENT OF WORK

This scope of work is for an evaluation of the impact of the program, the validity of the hypotheses underpinning the strategy, the appropriateness of the implementation strategy in reaching the program's objectives, and the cost-effectiveness and impact of activities implemented by the SARI/E partners. The evaluation will also explore the extent to which the program strengthened institutional capacity, promoted information-based dialogue and coalitions related to energy sector reform, and the formation of regional networks and centers of excellence for sharing of best practices in an effort to influence decision-makers engaged in deliberations over energy sector markets reform, crossborder trade and clean energy applications. In particular, the evaluation will assess the SARI/E program along the following criteria:

1. IMPACT: What has been the impact of activities implemented under SARI/E, specifically for the Phase III period from FY07-FY11? The evaluation team will conduct a performance evaluation of the partners in implementing their respective scopes of work. Are partners meeting their responsibilities under their contracts or grants? Are partners planning their individual activities with the broader objectives and sub-objectives in mind?

2. RELEVANCE: Are the original hypotheses on which the program was designed still valid? Does the SARI/E program continue to respond to needs in the region, and has the program positioned itself to take advantage of emerging opportunities to promote greater cooperation in energy and regional stability? In light of current needs and opportunities for regional cooperation in energy, is there a need for an extension of the SARI/E program to meet the program objectives, including a discussion of the PACD, funding levels, areas of assistance/ intervention, and program management structure?
3. EFFECTIVENESS: To date, have the program management structure and the adopted implementing tools (contracts, cooperative agreements and USG inter-agency vehicles) been effective in ensuring maximum coordination of activities under SARI/E so as to avoid duplication of effort? Are there gaps in coordination that potentially hinder the achievement of results or which fail to take advantage of synergies among individual activities? (e.g., are training and technical assistance activities coordinated and sequenced so that they benefit from each other?)
4. EFFICIENCY: If possible, determine if results achieved under SARI/E are being produced at an acceptable cost compared with alternative approaches accomplishing the same objectives. What alternative approaches exist which could achieve results at greater efficiency and what mechanisms can be recommended for implementing the alternative approaches? How well have implementing partners worked as a team to coordinate work plans and activities in the interests of achieving the objectives of the overall SARI/E program? Have technical assistance, training, and partnerships been targeted at the appropriate beneficiaries to ensure the greatest impact in advancing the policy dialogue in support of regional energy cooperat ion? To what extent have the outputs from technical assistance, training and other SARI/Efunded activities been utilized by targeted beneficiaries? What evidence is there that best practices have been taken up by additional individuals who received information from targeted beneficiaries? To what extent have SARI/E activities supported or complemented activities sponsored by other donor partners, such as the World Bank and the Asian Development Bank in South Asia? Measuring program impact requires the existence of good performance monitoring systems at the level of individual partners, as well as at the level of program management. The evaluation team will also investigate whether systems have been established internally for tracking, monitoring, and reporting on results attributable to SARI/E activities and whether these systems utilize independently verifiable information.
5. SUSTAINABILITY: Are the results and impact of SARI/E activities sustainable in terms of creating institutional capacity and filling gaps on behalf of the program's key beneficiaries? What evidence has there been of host countries taking ownership of the SARI/E program, including promoting the networks and forums and advocating the best practices developed and disseminated under SARI/E? Based on results to date, are these activities likely to engender sustainable development impacts after USAID funding has stopped?

6. PROJECT ASSISTANCE COMPLETION DATE EXTENSION: The original program framework envisaged that the SARI/E program would be implemented through a two-phased approach. The first phase objective was proof of concept with the second phase following to implement structures and solutions to effect regional energy trade and cooperation. Under the Phase II reauthorization, SARI/E PACD was extended until September 30, 2008. Subsequently the PACD was extended until September 2011 under Phase III of the program. The SARI/E evaluation team should assess the need for extension of the SARI/E PACD to meet the overall program objectives. The team should also recommend the new timeframe and program focus and direction under Phase IV. This scope of work does not include an evaluation of complementary activities funded by other USAID operating units (such as the bilateral Missions), nor those activities funded by other USG agencies.

REPORTS AND DELIVERABLES

1. Draft Work Plan and Pre-Departure Briefings. The evaluation team will develop a draft work plan prior to departure from Washington, DC. The team will meet with USAID and other contractor staff for at least three working days prior to departure for the field.

2. Oral Presentation. The evaluation team will provide an oral briefing of its findings and recommendations to the SARI/E Program Director and relevant staff in the field as well as to the respective country coordinators and other USAID staff at the conclusion of the visits to the various SARI/E participating countries.

3. Draft Report. The evaluation team will present a draft report of its findings and recommendations to the SARI/E Director before return to the United States.

4. Final Report. Ten paper copies of the final report as well as an electronic version in Word shall be submitted within five working days following receipt of comments from USAID and its implementing partners. Ten copies will be provided to S. Padmanaban, Regional Program Director, SARI/E Program, USAID/New Delhi, and two copies will be provided to PPC/CDIE/DI. The final report should include an executive summary of no more than three pages, a main report with conclusions and recommendations not to exceed 20 pages, a copy of this scope of work, evaluation questionnaires used to collect information on each of the program components, and lists of persons and organizations contacted. The final report, with executive summary and electronic files, must be received by the SARI/E Regional Program Director not later than January 15, 2011 in time for distribution at the SARI/E Advisory Board annual meeting tentatively scheduled for early March 2011.

RELATIONSHIPS AND RESPONSIBILITIES

The contractor will work under the guidance and general direction of Mr. S. Padmanaban, Program Director, SARI/E in the field. In the absence of Mr. Padmanaban, the contractor will coordinate their field activities and take day-to-day guidance, where necessary, from Amol Bhutad, Deputy Regional Program Manager, SARI/E, New Delhi. USAID will provide separately for the services of a Results Framework/Performance Monitoring Plan (RF/PMP) expert to assist the team, and specifically to contribute to the Performance Monitoring Plan (PMP) Indicators Annex to this mid-term evaluation, with up to two pages of text summary in the main body of the report. The evaluation team supplied by the contractor is expected to coordinate closely with the USAID RF/PMP expert, and to share information obtained throughout the evaluation period on interim results for incorporation into the PMP Indicator annex.

PERFORMANCE PERIOD

October 2010 through December 2010.

WORK DAYS

It is anticipated that a 4-person evaluation team will work for approx ten weeks for this evaluation, i.e. 1) three days in Washington, DC to read program documents, obtain briefings from USAID and implementing partner staff, and draft the evaluation work plan, and three days of consultation in Delhi; 2) two weeks working in the field that includes one week travelling between countries, one week in New Delhi, and 3-4 working days each in Afghanistan, Pakistan, Bhutan, Bangladesh, Nepal, Sri Lanka and Maldives; 3) 14 days for final consultations and drafting the report in Delhi, including a presentation to USAID of the draft final report, prior to finalization, and; 4) 2 days to finalize the report.

SPECIAL PROVISIONS

DUTY POST

New Delhi, India; Kabul, Afghanistan, Islamabad, Pakistan, Dhaka, Bangladesh; Kathmandu, Nepal; Colombo, Sri Lanka. Thimpu, Bhutan and Male, Maldives

LANGUAGE REQUIREMENTS AND OTHER REQUIRED QUALIFICATIONS

None

ACCESS TO CLASSIFIED INFORMATION

Not Applicable.

Technical Qualifications and Experience Requirements for the Evaluation Team
All team members must have relevant prior experience in South Asia, familiarity with USAID's objectives, approaches, and operations, and prior evaluation/assessment experience. In addition, individual team members should have the technical qualifications identified for their position below:

U.S. Team Leader (Senior Program & Policy Analyst): The Team Leader will be responsible for coordinating evaluation activities and ensuring the production and completion of a quality report, in conformance with this scope of work, and which may become a public document for distribution among the program's key stakeholders, including high-level U.S. government policy makers and officials, host country government officials, private sector and NGO leaders, and other audiences. In addition to proven ability to provide this leadership role, involving a technically and logistically complex program, he/she should have substantial and demonstrated expertise in evaluation techniques involving projects with technical assistance, training, advocacy, and partnership components**.** The Team Leader must have extensive experience with energy sector policy, sector reform, and trade development. Significant SA experience will be highly advantageous. *(LOE up to 55 days)*

Evaluation Methods Specialist: This expert will have deep knowledge of evaluation methodologies and their practical applications. *(LOE up to 55 days)*

Senior Environment, Energy and Natural Resources Analysts: In addition to the Team Leader and Evaluation Specialist, the contractor should propose two additional energy sector specialists that are nationals from two separate countries in the region, with substantial experience and expertise in energy sector issues in SA. Each of the energy sector specialists will be assigned to investigate one of the three thematic program activities: (1) strengthening institutional capacity, (2) promoting information-based dialogue and coalitions related to energy sector reform, and (3) the formation of regional networks for sharing of best practices in an effort to influence decision-makers engaged in deliberations over energy sector reform and cross-border trade. *(LOE up to 50 days for each specialist)*

As a team, the energy analysts shall possess expertise in private sector energy development, as well as the four priority areas of technical assistance of Phase III of SARI/E identified in Section C-1 above, i.e.:

- Cross Border Trade;
- Energy Markets Formation;
- Clean Energy Access; and,
- Afghanistan Power Sector Capacity Building Program

After initial meetings in Delhi, the team is expected to break out into two teams, one team covering Afghanistan, Pakistan, India and Bhutan and the other covering Sri Lanka, Maldives, Bangladesh and Nepal. Each team is to be composed of one U.S. member and one South Asian member. The U.S. team members are to return for their final week to Delhi for meetings with contractors and debriefing with the Mission.

Summary Table: Labor

Labor Category Level Illustrative LOE

Senior Program & Policy Analyst 1 – 55days
Evaluation Methods Specialist 1 – 55 days
Senior Environment, Energy and Natural Resources Analyst 1 -50 days
Senior Environment, Energy and Natural Resources Analyst 1 -50 days

APPENDIX 8: BACKGROUND QUANTITATIVE DATA RELATING TO TRAINING

- TetraTech Training Appendix
- USEA Training Appendix

Nr.	Event Name (August 2007 through September 2010)	Date	Days Trained (days)	City, Country	Number Trained	Person-Days Trained (count)	Course
1	Skills Based Program on Protection Systems	29/11/10 - 10/12/10	12	Ooty, Tamilnadu; and Hoosar, Karnataka	16	192	Training Program
2	Small Merchant Bank Model Workshop		1	Colombo, Sri Lanka	54	54	Workshop
3	Supporting Wind Power Take-off in the SARI/Energy Region	22/09/10 - 24/09/10	3	Colombo, Sri Lanka	32	96	Workshop
4	Metering Systems and Management	15/09/10 - 12/10/10	24	Udaipur, India	15	360	Training Program
5	Ceylon Electricity Board, Siemens Advanced PSA Training	13/09/10 - 08/10/10	20	Schenectady, New York, USA	5	100	Training Program
6	Ceylon Electricity Board, GECE PSA Training		12	Colombo, Sri Lanka	15	180	Training Program
7	Capacity Building Program for Accountants Involved in Restructuring	23/08/10 - 31/08/10	8	Bengaluru, Hyderabad & New Delhi, India	15	120	Workshop / Exchange Program
8	Distribution Loss Reduction	23/07/10 - 07/08/10	12	Hyderabad, India	9	108	Training Program
9	Regulatory & Policy Framework for Market Development for Renewable Energy and Solar Energy Exchange Program	20/07/10 - 23/07/10	4	Chandigarh, India	11	44	Workshop / Exchange Program
10	ADB's Wind Power Structured Consultation	21/06/10 - 25/06/10	5	Manila, Philippines	5	25	Workshop
11	Regulatory & Policy Framework for Market Development for Renewable Energy and Wind Energy Exchange Program	14/06/10 - 17/06/10	4	Chennai, India	10	40	Workshop / Exchange Program
12	Skill Based Development Program on Transformers	07/06/10 - 19/06/10	12	Ahmedabad, India	10	120	Training
13	International Conference on The Smart Grid Vision for India's Power Sector	01/06/10 - 02/06/10	2	New Delhi, India	7	14	Conference
14	Training Program on Metering Technologies and Systems	17/05/10 - 29/05/10	12	Udaipur, India	15	180	Training
15	Light Fair 2010	09/05/10-20/05/10	5	Las Vegas, Nevada, USA	2	10	Fair and meetings
16	Regional Workshop on Micro Hydro Power Projects	20/04/10 - 23/04/10	4	Kathmandu, Nepal	16	64	Workshop
17	Capacity Development Program for the Afghan Women	22/3/10-31/3/10	9	Trivandrum and Bangalore, India	21	189	Training
18	Training of Trainers on Metering Technologies and Systems	08/03/10 - 27/03/10	18	Udaipur, India	15	270	Training
19	Regional Centre for Lighting	16/01/10 - 20/01/10	5	Bentota, Sri Lanka	15	75	Training
20	Advanced Coal Management Program	01/12/09 - 04/12/09	4	West Bengal, India	10	40	Workshop
21	Engineer's Training of Trainers - Operation & Maintenance of Sub-station Equipment	23/11/09 - 19/12/09	24	Haryana, India	15	360	Training
22	India - Sri Lanka Wind Energy Exchange Program	03/11/09 - 06/11/09	4	Chennai, India	8	32	Workshop
23	Power Markets in India	29/10/09 - 31/10/09	3	Mumbai, India	11	33	Workshop
24	Specialization on Operation & Maintenance of Sub-station Equipment	05/10/09 - 10/10/09	6	Haryana, India	27	162	Workshop
25	Micro Hydro Power Workshop	08/09/09 - 11/09/09	4	Kathmandu, Nepal	10	40	Workshop
26	Short Term Specialization on Regulation and Commercialization	08/08/09 - 13/08/09	6	Kabul, Afghanistan	37	222	Training Program
27	6 Months Post Graduation Program in O&M on Transmission & Distribution	03/08/09 - 29/01/10	130	Bangalore, India	7	910	PG Course
28	Short Term Course on Coal Preparation by Central Institute of Mining & Fuel Research	27/07 - 02/08/2009	6	Jharkhand, India	12	72	Training Program
29	Nepal Electricity Authority - Workshop on Transmission Service Agreements	19/07/ - 20/07/2009	2	Kathmandu, Nepal	14	28	Training program
30	Indian Energy Exchange	12/07 - 18/07/2009	6	New Delhi, India	10	60	Training
31	Lighting Research Centre Training After Launch of RCEEEL	1 - 12/06/2009	10	Albany, USA	11	110	Training
32	RCEEL - Regional Centre for Energy Efficient Lighting	27 - 30/04/2009	3	Colombo, Sri Lanka	82	246	Workshop
33	MDRE, Market Development for Renewable Energy Program	15 - 16/01/2009	2	Kerala / India	9	18	Training Program
34	South Asian Women In Energy	17 - 19/11/2008	3	Dhaka, Bangladesh	69	207	Workshop
35	Regional Clean Coal Partnership	16/09 - 19/09/2008	4	Kolkata, India	28	112	Workshop
36	Indian Electricity Market Program	39682	1	Colombo, Sri Lanka	61	61	Training Programme
37	Electricity Market Development Program	18/08 - 20/08/2008	3	Bentota, Sri Lanka	28	84	Training Programme
38	Electricity Market Development Program	12/08 - 14/08/2008	3	Dhaka, Bangladesh	24	72	Training Programme
39	Electricity Market Development Program & Indian Electricity Market	05/08 - 08/08/2008	4	Kathmandu, Nepal	30	120	Training Programme
40	Market Development Renewable Energy (MDRE) Framework	23/07 - 24/07/2008	2	New Delhi / India	3	6	Training Programme
41	Women in Energy	21/4 - 25/4/2008	42	Trivandrum, Kerala / India	42	1764	workshop
42	Global Energy Market Trade Programme	25/02 - 29/02/2008	5	New Delhi / India	28	140	Training Programme
	Afghan Mission Forum	09/12 - 13/12/2007	1	Bangalore, Mumbai / India	3	3	Field Visit and 1 Day Workshop
			450	Total (All Activities 1 thru 5)	867	7143	

SUMMARY COUNT TABLE

Nr.	Event Name (August 2007 through September 2010)	Month Starting	Days Trained (days)	City, Country	Number Trained	Male	Female	Afghanistan	Bhutan	Bangladesh	Pakistan	Sri Lanka	Maldives	Nepal	India	USA	Canada	Germany	Thailand	Total (Row)	% Trained Program wise	Number Trained = Total (Row)?
1	Skills Based Program on Protection Systems	Nov-10	12	Ooty, Tamilnadu; and Hoosar, Karnataka	16	16	0	16	0	0	0	0	0	0	0	0	0	0	0	16	1.8%	yes
2	Small Merchant Bank Model Workshop	Oct-10	1	Colombo, Sri Lanka	54	43	11	0	0	0	0	54	0	0	0	0	0			54	6.2%	yes
3	Supporting Wind Power Take-off in the SARI/Energy Region	Sep-10	3	Colombo, Sri Lanka	32	31	1	2	2	2	4	15	2	2	3	0	0	0	0	32	3.7%	yes
4	Metering Systems and Management	Sep-10	24	Udaipur, India	15	15	0	15	0	0	0	0	0	0	0	0	0	0	0	15	1.7%	yes
5	Ceylon Electricity Board, Siemens Advanced PSA Training	Sep-10	20	Schenectady, New York, USA	5	3	2	0	0	0	0	5	0	0	0	0	0	0	0	5	0.6%	yes
6	Ceylon Electricity Board, GECE PSA Training	Aug-10	12	Colombo, Sri Lanka	15	10	5	15	0	0	0	0	0	0	0	0	0	0	0	15	1.7%	yes
7	Capacity Building Program for Accountants Involved in Restructuring	Aug-10	8	Bengaluru, Hyderabad & New Delhi, India	15	7	8	0	0	0	0	11	2	2	0	0	0	0	0	15	1.7%	yes
8	Distribution Loss Reduction	Jul-10	12	Hyderabad, India	9	9	0	9	0	0	0	0	0	0	0	0	0	0	0	9	1.0%	yes
9	Energy and Solar Energy Exchange Program	Jul-10	4	Chandigarh, India	11	9	2	2	2	2	0	1	2	2	0	0	0	0	0	11	1.3%	yes
10	ADB's Wind Power Structured Consultation	Jun-10	5	Manila, Philippines	5	5	0	0	0	1	1	2	0	1	0	0	0	0	0	5	0.6%	yes
11	Regulatory & Policy Framework for Market Development for Renewable Energy and Wind Energy Exchange Program	Jun-10	4	Chennai, India	10	10	0	2	2	1	0	0	2	3	0	0	0	0	0	10	1.2%	yes
12	Skill Based Development Program on Transformers	Jun-10	12	Ahmedabad, India	10	10	0	10	0	0	0	0	0	0	0	0	0	0	0	10	1.2%	yes
13	International Conference on The Smart Grid Vision for India's Power Sector	Jun-10	2	New Delhi, India	7	7	0	1	2	0	0	0	2	2	0	0	0	0	0	7	0.8%	yes
14	Training Program on Metering Technologies and Systems	May-10	12	Udaipur, India	15	15	0	15	0	0	0	0	0	0	0	0	0	0	0	15	1.7%	yes
15	Light Fair 2010	May-10	5	Las Vegas, Nevada, USA	2	0	2	0	0	0	0	2	0	0	0	0	0	0	0	2	0.2%	yes
16	Regional Workshop on Micro Hydro Power Projects	Apr-10	4	Kathmandu, Nepal	16	14	2	2	2	2	2	2	2	2	2	0	0	0	0	16	1.8%	yes
17	Capacity Development Program for the Afghan Women	Mar-10	9	Trivandrum and Bangalore, India	21	0	21	19	0	0	0	0	0	2	0	0	0	0	0	21	2.4%	yes
18	Training of Trainers on Metering Technologies and Systems	Mar-10	18	Udaipur, India	15	15	0	15	0	0	0	0	0	0	0	0	0	0	0	15	1.7%	yes
19	Regional Centre for Lighting	Jan-10	5	Bentota, Sri Lanka	15	11	4	2	2	2	2	2	2	2	1	0	0	0	0	15	1.7%	yes
20	Advanced Coal Management Program	Dec-09	4	West Bengal, India	10	10	0	4	0	2	0	4	0	0	0	0	0	0	0	10	1.2%	yes
21	Engineer's Training of Trainers - Operation & Maintenance of Sub-station Equipment	Nov-09	24	Haryana, India	15	14	1	15	0	0	0	0	0	0	0	0	0	0	0	15	1.7%	yes
22	India - Sri Lanka Wind Energy Exchange Program	Nov-09	4	Chennai, India	8	8	0	0	0	0	0	8	0	0	0	0	0	0	0	8	0.9%	yes
23	Power Markets in India	Oct-09	3	Mumbai, India	11	11	0	0	0	4	1	3	0	3	0	0	0	0	0	11	1.3%	yes
24	Specialization on Operation & Maintenance of Sub-station Equipment	Oct-10	6	Haryana, India	27	27	0	27	0	0	0	0	0	0	0	0	0	0	0	27	3.1%	yes
25	Micro Hydro Power Workshop	Sep-09	4	Kathmandu, Nepal	10	7	3	10	0	0	0	0	0	0	0	0	0	0	0	10	1.2%	yes
26	Short Term Specialization on Regulation and Commercialization	Aug-09	6	Kabul, Afghanistan	37	37	0	35	0	0	0	0	0	2	0	0	0	0	0	37	4.3%	yes
27	6 Months Post Graduation Program in O&M on Transmission & Distribution	Aug-09	130	Bangalore, India	7	7	0	7	0	0	0	0	0	0	0	0	0	0	0	7	0.8%	yes
28	Short Term Course on Coal Preparation by Central Institute of Mining & Fuel Research	Jul-09	6	Jharkhand, India	12	12	0	3	0	4	0	4	0	0	1	0	0	0	0	12	1.4%	yes
29	Nepal Electricity Authority - Workshop on Transmission Service Agreements	Jul-09	2	Kathmandu, Nepal	14	12	2	0	0	0	0	0	0	14	0	0	0	0	0	14	1.6%	yes
30	Indian Energy Exchange	Jul-09	6	New Delhi, India	10	10	0	0	0	10	0	0	0	0	0	0	0	0	0	10	1.2%	yes
31	Lighting Research Centre Training After Launch of RCEEEL	Jun-09	10	Albany, USA	11	11	0	0	0	2	0	9	0	0	0	0	0	0	0	11	1.3%	yes
32	RCEEL - Regional Centre for Energy Efficient Lighting	Apr-09	3	Colombo, Sri Lanka	82	61	21	2	1	2	2	66	2	3	3	0	1	0	0	82	9.5%	yes
33	MDRE, Market Development for Renewable Energy Program	Jan-09	2	Kerala / India	9	7	2	0	2	0	0	3	2	2	0	0	0	0	0	9	1.0%	yes
34	South Asian Women In Energy	Nov-08	3	Dhaka, Bangladesh	69	20	49	4	2	46	3	2	1	4	4	1	0	1	1	69	8.0%	yes
35	Regional Clean Coal Partnership	Sep-08	4	Kolkata, India	28	28	0	4	0	5	0	5	0	0	11	3	0	0	0	28	3.2%	yes
36	Indian Electricity Market Program	Aug-08	1	Colombo, Sri Lanka	61	55	6	0	0	0	0	59	2	0	0	0	0	0	0	61	7.0%	yes
37	Electricity Market Development Program	Aug-08	3	Bentota, Sri Lanka	28	26	2	0	0	0	0	25	3	0	0	0	0	0	0	28	3.2%	yes
38	Electricity Market Development Program	Aug-08	3	Dhaka, Bangladesh	24	24	0	0	0	23	1	0	0	0	0	0	0	0	0	24	2.8%	yes
39	Electricity Market Development Program & Indian Electricity Market	Aug-08	4	Kathmandu, Nepal	30	28	2	0	2	0	0	0	0	24	3	1	0	0	0	30	3.5%	yes
40	Market Development Renewable Energy (MDRE) Framework	Jul-08	2	New Delhi / India	3	3	0	0	0	3	0	0	0	0	0		0	0	0	3	0.3%	yes
41	Women in Energy	Apr-08	42	Trivandrum, Kerala / India	42	4	38	5	2	4	3	2	2	4	19	1	0	0	0	42	4.8%	yes
42	Global Energy Market Trade Programme	Feb-08	5	New Delhi / India	28	25	3	2	0	4	3	5	4	3	7	0	0	0	0	28	3.2%	yes
Notes:	Afghan Mission Forum	Dec-07	1	Bangalore, Mumbai / India	3	2	1	3	0	0	0	0	0	0	0	0	0	0	0	3	0.3%	yes
			438	Checks	867	679	188	246	21	119	22	289	30	77	54	6	1	1	1	867	100.0%	

SOUTH ASIA REGIONAL PARTNERSHIP PROGRAM OF U.S. ENERGY ASSOCIATION
COOPERATIVE AGREEMENT NO. 386-A-00-04-00195-00 - USEA, OCTOBER 2004 - DECEMBER 2010

	Date	Name of Event	Location	Recipient Countries	Males	Females	Total Participants	Days (length of activity)
1	12/1/2004	Cross-Border Electricity Transmission & Protection	Thimpu, Bhutan	Bangladesh, Bhutan, India, Nepal, Sri Lanka	20	1	21	3
2	1/17/2005	Distribution Utility Best Practices	Hyderabad, India	Bangladesh, Bhutan, India, Nepal, Sri Lanka	19	0	19	3
3	3/21/2005	South Asia Energy Media	Colombo, Sri Lanka	Afghanistan, Bangladesh, Bhutan, India, Nepal, Sri Lanka	25	7	32	5
4	4/18/2005	Electricity Regulation	Washington, DC & Columbus, OH	Bhutan, India, Nepal, Pakistan, Sri Lanka	12	0	12	5
5	6/13/2005	Cross-Border Electricity Transmission & Protection	New Delhi & Mumbai, India	Bangladesh, Bhutan, India, Nepal, Pakistan, Sri Lanka	16	2	18	4
6	6/27/2005	Electricity Regulation	Delhi, India	Bangladesh, Bhutan, India, Nepal, Sri Lanka	15	0	15	4
7	7/26/2005	South Asia Energy Media	Dhaka, Bangladesh	Afghanistan, Bangladesh, Bhutan, India, Nepal, Pakistan, Sri Lanka	35	10	45	3
8	8/1/2005	Distribution Utility Best Practices	Bangkok, Thailand	Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka	40	15	55	3
9	9/19/2005	South Asia Energy Parliamentarians	Washington, DC	India, Pakistan, Sri Lanka	4	1	5	5
10	11/16/2005	South Asia Energy Media	Delhi, India	Afghanistan, Bangladesh, Maldives, Nepal, Pakistan, Sri Lanka	16	3	19	3
11	12/4/2005	Electricity Regulation	Dhaka, Bangladesh	Bangladesh, Bhutan, India, Nepal, Pakistan, Sri Lanka	21	3	24	2
12	12/14/2005	Cross-Border Electricity Transmission & Protection	Kathmandu, Nepal	Bangladesh, Bhutan, India, Indonesia, Nepal, Pakistan	26	2	28	3
13	3/21/2006	Energy Markets	Delhi, India	Bangladesh, Bhutan, Nepal, Pakistan, South Africa, Sri Lanka	17	0	17	2
14	3/25/2006	Energy Markets	Lahore, Pakistan	Bhutan, Nepal, Sri Lanka	5	0	5	2
15	6/26/2006	Energy Markets	Johannesburg, South Africa	Afghanistan, Bangladesh, India, Nepal, Pakistan, Sri Lanka	14	1	15	5
16	7/31/2006	Energy Markets	Sacramento, CA & Portland, OR	India, Nepal, Sri Lanka	9	0	9	5
17	8/14/2006	South Asia Energy Parliamentarians	Washington, DC	Afghanistan, Pakistan	3	1	4	3
18	11/6/2006	Energy Markets	Toronto & Calgary, Canada	Afghanistan, Bangladesh, India, Pakistan, Sri Lanka	15	0	15	5
19	2/26/2007	Energy Markets & Submarine Interconnection	UK & France	Sri Lanka	6	1	7	5
20	3/20/2007	Energy Markets	New Delhi, India	Afghanistan Bangladesh, Bhutan, India, Kazakhstan, Kyrgyzstan, Mongolia, Nepal, Pakistan, Philippines, Russia, Sri Lanka, Tajikistan, Thailand	14	0	14	2
21	5/14/2007	South Asia Energy Parliamentarians	Washington, DC	Afghanistan, Pakistan, Sri Lanka	4	0	4	5
22	5/28/2007	Energy Markets	Leipzig & Cologne, Germany	Bangladesh, Bhutan, India, Nepal, Pakistan, Sri Lanka	13	0	13	5
23	7/16/2007	Energy Markets	New Delhi, India	Bangladesh, Bhutan, India, Nepal, Sri Lanka	14	2	16	5
24	10/29/2007	Energy Markets	Bhutan	Afghanistan, Bangladesh, Bhutan, India, Nepal, Pakistan, Sri Lanka	20	2	22	6
25	4/21/2008	Renewable Energy	California, Colorado, DC	Afghanistan, Bangladesh, Bhutan, Maldives, Nepal, Pakistan, Sri Lanka	12	0	12	10
26	5/5/2008	Energy Markets	Australia	Sri Lanka	4	1	5	5
27	8/5/2008	Energy Markets	Kathmandu, Nepal	Bhutan, India, Nepal	3	0	3	1
28	8/22/2008	Energy Markets	Colombo, Sri Lanka	Bangladesh, Bhutan, Nepal, Sri Lanka	3	0	3	1
29	9/22/2008	Energy Markets	Brussels, Belgium	Bangladesh, India, Nepal, Sri Lanka	8	0	8	5
30	1/12/2009	Distribution Utility Best Practices	Columbus, OH	Pakistan	2	0	2	12
31	3/30/2009	Cross-Border Electricity Transmission & Protection	Kathmandu, Nepal	Afghanistan, Bangladesh, Bhutan, India, Nepal, Pakistan, Sri Lanka	19	0	19	4
32	5/12/2009	Women in Energy - Renewable Energy & Energy Efficiency	Washington, DC	Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka	1	11	12	9
33	6/9/2009	Renewable Energy	Dhaka, Bangladesh	Afghanistan, Bangladesh, Bhutan, Nepal, Pakistan	34	4	38	3
34	6/15/2009	Renewable Energy	Colombo, Sri Lanka	Sri Lanka	10	3	13	2
35	9/21/2009	Electricity Regulation	Albany, NY & Washington, DC	Bangladesh, Nepal, Pakistan, Sri Lanka	8	0	8	5
36	10/19/2009	Renewable Energy	Madrid, Spain	Bangladesh, Bhutan, India, Nepal, Pakistan, Sri Lanka	12	0	12	5
37	2/15/2010	Cross-Border Electricity Transmission & Protection	Botswana & South Africa	Bangladesh, Bhutan, India, Nepal, Pakistan, Sri Lanka	15	0	15	5
38	5/10/2010	Clean Coal & CCS	Pittsburgh, PA & New Haven, WV	Bangladesh, Pakistan, Sri Lanka	3	1	4	5
39	7/11/2010	Smart Grid	Colorado & Utah	Bhutan, India, Nepal	7	0	7	7
40	8/7/2010	Energy Efficiency	Sacramento & San Francisco, CA	Maldives, Nepal, Sri Lanka	4	0	4	8
41	8/23/2010	Renewable Energy	Manila, Philippines	Bangladesh, India, Maldives, Nepal, Pakistan, Sri Lanka	14	0	14	5
42	9/12/2010	Women in Energy - Renewable Energy & Energy Efficiency	Montreal, Canada	Bangladesh, India, Nepal	0	3	3	5
43	10/25/2010	Women in Energy - Renewable Energy & Energy Efficiency	Islambad, Pakistan	Afghanistan, Bangladesh, Nepal, Pakistan, Sri Lanka	5	7	12	5
44	11/30/2010	Smart Grid	Saigon, Vietnam	Bangladesh, Bhutan, India, Nepal, Pakistan, Sri Lanka	12	0	12	3
45	12/6/2010	Renewable Energy	Kandy, Sri Lanka	Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka	12	1	13	4
Total				**45 Events**	**571**	**82**	**653**	**202**
% of Total					**87.44%**	**12.56%**	**Cost Per Trainee:**	
% of Total							**Cost Per Trainee Day:**	