

**USAID/INDIA**  
**STRATEGIC OBJECTIVE CLOSE OUT REPORT**

**1. Basic Information:**

SO Name:	<b>Increased Environmental Protection in Energy, Industry and Cities</b>
SO Number:	4
SO period:	FY1994–2002
Geographic Area (Code):	India (386)
Total Cost of SO:	DA \$126,575,000

**2. Principal Implementing Partners:**

Bilateral Projects:

1. Energy Conservation and Commercialization (ECO) - Ministry of Power
2. Greenhouse Gas Pollution Prevention Project (GEP) – National Thermal Power Corporation (NTPC), Industrial Development Bank of India (IDBI), Industrial Credit and Investment Corporation of India, Ltd. (ICICI)
3. Energy Management Consultation and Training (EMCAT) – IDBI, Power Finance Corporation (PFC), Ministry of Power (MOP)
4. Trade in Environmental Services and Technologies/Clean Technologies Initiative (TEST/CTI) – ICICI
5. Financial Institutions Reforms Expansion-Debt (FIRE-D) – Ministry of Urban Development, National Institute of Urban Affairs

Field Support:

USEPA, IIE, AED, IIEC, ICMA

**3. Summary of overall impact:**

This SO focused on global climate change, addressed through reducing greenhouse gases (GHG) in power generation facilities, industry, the transport sector, municipal services and end use efficiencies. By working in multiple, mutually reinforcing sectors, this SO was able to achieve substantial reductions in GHGs and create opportunities for sustainable development at the local level. In addition, catalytic processes were created and networks established to carry this work into the future.

The strategy focused on global climate change issues through reduction of greenhouse gas emissions in power generation utilities, industry, and in the transport sector through improved energy conversion and end-use efficiencies. Key activities included the Greenhouse Gas Pollution Prevention Project (GEP), the Clean Technologies Initiative (CTI) Project, the Energy Conservation and Commercialization (ECO) Project, the Energy Management Consultation and Training (EMCAT) Project, the Financial Institution Reforms Expansion - Debt (FIRE-D) Project, and the South Asia Regional Initiative in Energy (SARI/E) Program. Overall the SO exceeded targets with notable successes in ISO 14001 environmental certification in industry, greenhouse gas reductions, demand side management, and energy efficiency. Beneficiaries of these activities included, at a national level, all Indians who benefit from cleaner air due to clean energy technology promoted under GEP and CTI. In addition, electricity consumers who received better value for service through ECO demand side management and strengthened electricity regulatory bodies were beneficiaries. Under FIRE-D, urban dwellers (particularly the urban poor) benefited from improved water and wastewater infrastructure development and from improved quality and reliability of power supply.

Given the focus on greenhouse gas mitigation, a challenge the team faced was to constructively engage with Indian counterparts given the U.S. position on the Kyoto Protocol. The USAID/India program focused on concrete demonstration activities of clean energy technologies. These activities were showcased while also sharing the message that the U.S. administration supports greenhouse gas mitigation related research, technology transfer, and market-based approaches. A second challenge was created by the transition from SO4 to the proposed new strategy. The proposed new strategy addressed access to clean energy and water through power distribution reform, improving efficiency of the water-energy nexus, and better provision of urban services. The office met this challenge by focusing activities so that they contribute to or pave the way for the restructured strategic objective that began in FY 2003.

**Advancing Regulatory Reforms and Institutional Capacity:** USAID's support for power sector reform was achieved through our work with the electricity regulatory commissions (ERC), collaboration with the Lal Bahadur Shastri National Academy of Administration (LBSNAA) that provides training for Indian Administrative Service (IAS) officers, water-energy policy reform dialogue at multiple levels, and passage of the Energy Conservation Bill by the Indian Parliament.

**Clean Energy and Sustainable Development (Climate Change Initiative):** By the end of the strategy period (FY 2002), USAID helped India avoid a cumulative total of 10.5 million tons of greenhouse gas emissions. This achievement represents a doubling of the target of 5.28 million tons. The exponential growth in this indicator can be attributed to the fact that thermal power plants began to actively pursue the efficiency measures promoted under GEP and the sugar mill cogeneration activities were very popular. The driver was the significant financial savings in coal costs or electricity sale through implementation of these practices. In addition, tremendous benefits to the environment and to human health also were achieved. With an initial investment of approximately \$7 million in sugar mill biomass co-generation, USAID was able to leverage over three times that amount in private investment in this developing technology.

**Clean Energy Technology Development and Commercialization:** USAID's efforts (in association with industry) to promote environmental management systems and build capacity to incorporate clean energy technology have been extremely successful. Fifty-two firms have received ISO 14001 certification against a target of 23. Today, Indian industry is actively pursuing ISO 14001 certification based on work by USAID and other donors. Limited support is being provided for this activity under the current phase of the CTI Project.

**Urban Services:** The future of India is inescapably urban. Cities have emerged as the prime engines of economic growth and generators of national wealth. In fifteen years, more than half the country's one billion people will live in cities. A third of them will be slum dwellers and squatters. Assistance provided by USAID has improved the capacity of municipalities and expanded their access to urban planning and finance tools which allows them to provide enhanced urban water and sanitation services.

In 1992, the 74th Amendment of the Indian Constitution began a process to strengthen municipal governments through improved management and service delivery. Under USAID's FIRE-D Project, City Managers Associations have been formed in nine states (with 48% of India's population) to manage urban growth, mobilize resources, improve infrastructure services and support the development of a market-based urban infrastructure finance system.

An example of FIRE/D impact is the work conducted in the city of Indore, which, with a population of over 1.64 million, is the largest city in the state of Madhya Pradesh. Realizing that population growth would require larger expenditure on services and amenities, the Indore Municipal Corporation focused on strengthening its revenue base and increasing citizens' participation in local governance and service improvement. The revenue department was re-organized to introduce cash collection counters and decentralize many operations in zonal offices. Accounting systems for calculating property taxes, shop rents and trade licenses were improved. A master

data bank was set up to identify illegal electric and water connections and self-assessment of property tax by citizens was introduced. According to the Mayor of Indore, computerization, database creation and simplification of tax-related procedures have helped increase revenue by almost 150% from 1997-2002.

#### **4. Summary of activities/ projects under the SO:**

1. The Greenhouse Gas Pollution Prevention (GEP) activity resulted in improvement of efficiency in thermal power plants and awareness creation among many electric utilities in India. The project successfully started sugar mill cogeneration activities with involvement of private sector. The activity engaged Indian government and private sector officials in awareness creation and capacity building across institutions such as non-governmental organizations (NGO), city governments, academia, financial institutions and private industries on the complex issue of global warming and climate change.

2. The Energy Conservation and Commercialization activity (ECO) - Consumer awareness of energy and water issues, and energy demand management was improved. USAID worked closely with the GOI on energy conservation legislation - 'Energy Conservation Act' which was passed in 2001. USAID helped implement the legislation and assisted in defining the structure and function of the Bureau of Energy Efficiency – the nodal agency for the implementation of the Act. Soon after the declaration, the first government energy audit was the President's house and the Prime Minister's office.

3. The Energy Management Consultation and Training activity (EMCAT) - The project provided assistance for improvement of efficiency in both energy supply and energy end-use. Support was also provided for commercialization of renewable energy technologies. The formation and strengthening of some of the first electricity regulatory commissions was achieved through technical assistance, training, and partnership programs with US institutions. Two thousand people were trained on various issues related to technology management and commercialization of the power sector. Renewable energy projects and institutions were promoted. EMCAT was important in creating a conducive environment for reform in the India power sector. A formal mid-term evaluation of EMCAT was completed during 1996 and a lesson learned workshop was organized at the conclusion of the project in 2004.

4. Trade in Environmental Services and Technologies Clean Technologies Initiative (TEST/CTI) activity - USAID technical assistance under the TEST/CTI activity helped prepare the ground for the spread of Environmental Management Systems leading to ISO 14000 certification in India by increasing the number of firms that meet these standards in selected industrial sectors (textiles, pulp and paper, pharmaceutical, automobile, thermal power, steel and cement). Fifty-two firms achieved ISO 14000 certification under the TEST activity. In addition, USAID supported the Confederation of Indian Industry Green Business Center (GBC) by assisting in the design and certification of a state-of-art building that reflects cost effective energy and environmental management practices and systems.

5. Financial Institutions Reforms Expansion/Debt (FIRE/D) - The activity helped national, state and local governments to develop sustainable, urban environmental services that can be accessed by the poor. FIRE/D promoted innovative financial mechanisms such as municipal bonds and provided municipalities with environmental management tools to assist governments in supporting environmental services such as water and sanitation activities.

#### **5. SO Results Framework:**

This SO feeds into the USAID agency objective: "World's environment protected by emphasizing policies and practices ensuring environmentally sound and efficient energy use, sustainable urbanization, conservation of biological diversity, sustainable management of natural resources".

The intermediate results for the SO were:

IR 4.1 – Increased efficiency and decreased pollution in energy supply and use.

IR 4.2 - Pollution reduced in selected industrial sectors

IR 4.3 - Improved urban environmental infrastructure built and services provided in selected states

The success of the activities of this SO was measured by the following illustrative indicators.

- Carbon dioxide equivalents of greenhouse gas (GHG) emissions avoided.
- Increased number of firms that meet international environmental quality standards in selected industrial sectors.
- Local governments/authorities with urban environmental management tools available to them.

These indicators proved to be relatively simple and easy to quantify. Some issues began to develop regarding obtaining data from power plants on fuel reductions due to USAID-sponsored activities as the utilities thought this information could be used to force a reduction in electricity tariff. Data was eventually obtained.

## **6. Prospects for long term sustainability and threats:**

USAID has actively participated in the energy and environment sectors for many years. Early work focused on infrastructure creation. During the 1960's, USAID financed and helped to build many of India's power plants. Later the focus evolved to promotion of science and technology, and in the 1990's, in response to India's needs and bilateral relations, the approach evolved again to promotion of power sector reform, energy efficiency, market-based approaches, and global climate change.

The new Strategic Objective being implemented during FY03-07 builds on USAID/India's Strategic Objective 04. Four major issues were identified as being of paramount importance when considering energy and environment issues in India. These are power distribution reform, the nexus between water and energy sectors, global climate change, and urban development. It was decided to not explicitly address climate change as an intermediate result, but rather to integrate it within the new SO activities. Additional considerations include the modalities of how and where to attempt to affect change, given USAID's limited resources and the size and complexity of India.

Interest in the USAID approach is high in certain Indian states (Andhra Pradesh, Rajasthan and Uttar Pradesh, for example). Given the size of the country and the sheer scale of the issues facing India's environment and power sector, it makes sense to focus on a few geographic locations, where opportunities exist for good collaboration. This will allow for demonstration of best practices in a way that will facilitate greater impact and for enhanced potential to replicate more broadly as reforms continue to slowly gain ground nationwide. A geographic focus coupled with a responsive partner affects sustainability.

A key to USAID success throughout the world and particularly in India is the ability to forge partnerships for sharing ideas, leveraging resources, and working synergistically. USAID continues to follow this model for success by forming partnerships with the diversity of stakeholders engaged in areas of common interest. Both public and private partners in India and abroad are sought to collaborate on providing improved energy and environmental services. An example of this investment in building a viable partnership to carry forward the work is the GBC, which now serves as an incubator and clearing house of information for "green" businesses and energy efficient technologies.

Over the years, USAID has played a valuable role in several key developments, notably: energy technology development and commercialization, clean coal technologies; strengthening of functional central and multiple state energy regulatory bodies; advancing electrical demand side management and end-use energy efficiency improvements; and introduction of private power, specifically cogeneration. USAID's recent work with private distribution utilities and the reform of State Electricity Boards in Haryana, Rajasthan and Andhra Pradesh and elsewhere has identified urban and rural power distribution issues, illustrated methods to improve delivery efficiency, and introduced new business processes to implement these solutions. USAID's training and energy partnership activities have also provided nascent regulatory commissions and their staff with information and techniques to address issues and resolve problems.

USAID has worked closely with the World Bank, Asian Development Bank, and the British Government's Department for International Development (DFID) over much of the past decade on power sector reform in India. This continued collaboration and ability to leverage resources (intellectual, human, and financial) from other donors will be a very significant aspect of future work.

During these decades of bilateral assistance in the energy and environment sectors, many lessons have been learned. USAID will continue to capitalize on this accumulated experience to better ensure sustainability of activities.

Work on clean energy and water has significantly advanced India's capacity to improve access to reliable and efficient electricity, institute pollution mitigating programs in industry and transport, advance urban water availability, and develop market-oriented approaches to stimulate investments in energy efficiency. USAID catalyzed public-private partnerships yielding unprecedented results, including the Global Development Alliance-supported Green Business Center at Hyderabad, the first of its kind in Asia and the establishment of a highly valued partnership between the US Department of Agriculture's Rural Utilities Service and India's Rural Electrification Corporation will expand electricity access to thousands of Indian villages while providing bankable models for replication.

## **7. Lessons Learned:**

Many lessons were learned during implementation of SO4. The discussion below attempts to delineate these lessons in the broad categories of policy, people-level impact, capacity building, partnerships, environmental friendly business, and team dynamics.

**Policy Level:** Though the U.S. was a signatory to the U.N. Framework Convention on Climate Change (UNFCCC), it did not support the Kyoto Protocol, which grew out of the UNFCCC and set emissions reduction targets and mechanisms for achieving those targets. SO4, led by the Greenhouse Gas Pollution Prevention (GEP) project, was able to achieve some significant and measurable results in avoiding CO2 emissions. These results were documented and disseminated to illustrate the good work the U.S. and India were achieving to address climate change. U.S.-India cooperation was showcased by compiling a compendium of climate change collaboration and through outreach and communication during the Eighth Conference of Parties of the UNFCCC held in New Delhi in October 2002. The consistent message of concrete, on-the-ground results spread by various U.S. Mission departments to and in collaboration with various Indian stakeholders regarding global climate change helped show that the U.S. and India have enjoyed great success in jointly pursuing activities that reduce greenhouse gases. During a time when U.S. climate change policy was being criticized, the results from the USAID/India program were useful to demonstrate that the U.S. was doing a great deal to address climate change.

A "Joint Statement of Cooperation on Clean Energy" was signed between the U.S. and India during the March, 2000 visit of President Clinton to India. For the first time, the GOI publicly recognized Global Climate Change as an important issue affecting India and put forward a strategy to address the issue under a bilateral framework. The joint statement included specific

energy efficiency and renewable energy goals to meet future energy needs. India further agreed to cooperate with the USG in designing market-based mechanisms for reducing greenhouse gas emissions. This statement was possible due to the conducive climate established through GEP and other USAID/India activities.

The ECO project helped support the development and eventual passage of the GOI's Energy Conservation Act, 2000, which, in turn, led to the establishment of the Bureau of Energy Efficiency (BEE). Funds and technical assistance were provided for helping to set up an energy efficient office for the BEE and ECO was able to evolve over time to help the BEE implement its mandate in Maharashtra and Karnataka.

The EMCAT project prepared the ground for power sector reform in India. The training component of this project imparted training to over 2000 people in what reform meant and in how to go about achieving it. This created a conducive environment for policy change.

FIRE (D) Project under SO4 was able to initiate legislative reforms at the state and local government level through development of a model municipal Act. However, to improve water and sanitation delivery in cities and encourage private sector participation, there is a need to develop a regulatory framework for the water and sanitation sector at the state level.

**People Level Impact:** India's economy doubled during the past two decades, hastening urbanization and industrialization. As a result, air pollution from industry and vehicular pollution increased significantly. The human health and economic costs to India of this pollution are enormous. Several activities of SO4 acknowledged this link. These included TEST/CTI, which looked at cleaner production systems in industry, or the India Zero Emission Transportation (IZET) program to replace conventional two-stroke scooters (two-wheelers) and auto-rickshaws (three-wheelers) with electric vehicle technology. SO4 also worked with the U.S. Environmental Protection Agency to promote its Memorandum of Understanding with the Ministry of Environment and Forests. However, much of the focus of SO4 was on policies or technologies. A stronger link could have been drawn to emphasize the results on people.

SO4 activities were able to introduce some new mechanisms for water and sanitation service delivery and increase access for low income urban populations. However, large scale awareness campaigns need to be initiated in coordination with civil society to clearly articulate the need for efficient water and sanitation services from the urban local government.

**Capacity Building:** Capacity building was an important feature in most SO4 activities.

Under EMCAT Project over 2,000 personnel from energy sector organizations were trained on issues related to reform, efficiency improvement, energy supply, as well as energy end use in industrial and other sectors. The training programs with a duration ranging from one week to three weeks were conducted primarily in India with a few U.S. based training courses.

The LBSNAA program provided strategic training at the Indian Administrative Service (IAS) level through development of training modules of energy and environment for various courses conducted at LBSNAA. These modules were tested on a few pilot programs and the feedback received was very positive. The modules have been handed over to LBSNAA for use in their programs both for new recruits and for in-service training programs. This was a relatively low-cost and very strategic approach to embedding ideas and concepts in the minds of key decision makers in India.

The creation of the Center for Power Efficiency and Environmental Protection (CENPEEP) of the National Thermal Power Corporation (NTPC) was a worthwhile institutional investment. CENPEEP was developed to absorb the technical assistance and training from Tennessee Valley Authority, Electric Power Research Institute and other electric utilities on best practices for operating coal fired power plants. CENPEEP disseminated these practices within NTPC plants

and to State Electricity Boards in India by developing heat rate guidelines and conducting performance optimization audits in power plants and through regular class room training. These generation efficiency improvements formed a significant component of the overall Carbon dioxide (CO<sub>2</sub>) avoidance under the SO<sub>4</sub> program and have been recognized throughout India and internationally as world-class practices.

Capacity building of state and municipal officials for improving service delivery has been an important component of SO<sub>4</sub> activities. However, the capacity building at the state level for developing viable water and sanitation projects needs to be intensified followed by capacity building at the municipal level on efficient operation, maintenance, and management of municipal resources.

**Partnerships:** The quality of partnerships and the individuals and institutions that have made up these partnerships under SO<sub>4</sub> have been critical to the success of the objective. Many of these partnerships included both public and private sector representatives.

Under EMCAT, the U.S. Energy Association began the Energy Partnership Program. This program was very important in launching India's electricity regulatory commissions and sharing best practices with utility companies that helped promote reform.

IZET is an example of a successful public-private partnership among USAID, Bajaj Auto Ltd; India's largest two-and three-wheeler manufacturer, and New Generation Motors (NGM), an innovative U.S. technology firm. The Green Business Center which was conceptualized during President Clinton's March, 2000 visit to India is another such public-private partnership among the Confederation of Indian Industry, the Godrej Corporation, the Government of Andhra Pradesh, and USAID.

**Environmentally Friendly Business:** Activity success was bolstered by the fact that environmental protection was linked to economic development. Partners actively pursued activities that were environmentally friendly when they also had a positive impact on their bottom line.

USAID helped India avoid a cumulative total of 10.5 million tons of greenhouse gas emissions over the life of SO<sub>4</sub>. This achievement represents a doubling of the target of 5.28 million tons. The exponential growth in this indicator can be attributed to the fact that thermal power plants began to actively pursue the efficiency measures promoted under GEP because they helped them save fuel costs and provided an environmentally friendly label for them. Sugar mill cogeneration activities were also very popular as they provided sugar mills an added revenue stream from power sales. With an initial investment of approximately \$7 million in sugar mill biomass co-generation, USAID was able to leverage over three times that amount in private investment in this developing technology.

Promotion of environmental management systems and building capacity to incorporate clean energy technology has been extremely successful. Fifty-two firms received ISO 14001 certification against a target of 23. Today, Indian industry is actively pursuing ISO 14001 certification based on work by USAID and other donors. Again, Indian industry wants to protect natural resources, but it becomes even more attractive if it makes good business sense. SO<sub>4</sub> activities tended to reduce energy costs or were important for global marketing purposes where greening the supply chain was gaining prominence.

Financing of projects where fund account reflows were established was an effective and efficient use of resources and helped set the stage for future activities. SO<sub>4</sub> partner financial institutions, such as ICICI, have continued to engage and invest in related activities and have leveraged funds from other donors for this purpose.

**SO4 Team- a success:** One element of the success of SO4 was perhaps due to the subject itself. Energy and environmental issues tend to be cross cutting in nature. They lend themselves to a team approach and towards forging partnerships that tend to carry the activities forward. The team approach transcended USAID offices and linked technical and support offices within the Mission with external partners from the public and private sector. This broad-based approach allowed for activities to be sustained and expanded over time with additional investment from outside of USAID.

#### **8. Evaluations, assessments and studies during life of SO:**

A mid-term evaluation of the EMCAT Project was done during February 1996 and based on the recommendations of the evaluation team, a new component on regulatory reform and restructuring of the power sector was added to the project. Action on the other recommendations made by the evaluation team were also taken and implemented. Further, to define the specific activities to be taken up under the new reform and restructuring component, a study was conducted in March, 1997 by an independent consultant and the report detailed various activities that could be supported under this component. Accordingly, a scope of work for this activity was prepared and technical assistance mobilized for implementation.

A workshop with participation by USAID and key partners was organized at the conclusion of the project to discuss the key outcomes and document the lessons learned. This report will be shared with the various shareholders and could be useful for follow on work or similar work in other countries.

## **APPENDICES**

### **Appendix 1**

**(A List of evaluations and special studies conducted during the life of the SO)**

EMCAT - MSI EMCAT Evaluation Report – February 1996

EMCAT - Project Redesign report, Matthew Addison, March 1997

### **Appendix 2**

**(A list of instrument close out reports prepared for contracts, grants, and cooperative agreements)**

Close-out reports are maintained by Regional Contracting Office, USAID/New Delhi. For any information, please contact Mr. Marcus Johnson, Regional Contracting Officer at e-mail: [mjohnson@usaid.gov](mailto:mjohnson@usaid.gov)

### **Appendix 3**

**(Names and contact point of individuals who were directly involved in various phases of the SO (planning, achieving, and assessing and learning), and who would be good sources of additional information)**

USAID staff:

Robert Beckman

Ram Berry

N. Bhattacharjee

Richard Edwards

Richard Goldman

S. Padmanaban

N.V. Seshadri

John Smith-Sreen

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If you wish to contact any of the above individuals or if you would like any additional information about this SO please contact Mr. John Smith-Sreen at Tel# 2419-8520 or e-mail: [jsmith-sreen@usaid.gov](mailto:jsmith-sreen@usaid.gov)