

SMALL AND MEDIUM ENTERPRISES: ENERGY EFFICIENCY KNOWLEDGE SHARING **VOLUME 9 | ISSUE 1 | MARCH 2018**

SAMEEEKSHA

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- **13th Meeting of SAMEEEKSHA**



VISION

SAMEEEKSHA envisages a robust and competitive SME sector built on strong foundations of knowledge and capabilities in the development, application, and promotion of energy-efficient and environment-friendly technologies.



A PLATFORM FOR PROMOTING ENERGY EFFICIENCY IN SMEs

IN THIS ISSUE...

This issue carries, as its theme article, a summary of the 25-year-long TERI–SDC partnership project in India’s MSME sector, which has come to an end in December 2017. The article charts the course of this pioneering project from its genesis in the early 1990s—a time when the Indian MSME sector was struggling to come to grips with the changes and challenges brought about by liberalization of the nation’s economy. It describes how, through an innovative multi-stakeholder intervention model that has come to be known as Research, Development, Demonstration and Dissemination (RDD&D), the project has successfully introduced clean, energy efficient technological solutions in select energy intensive MSME sub-sectors and clusters, as well as built the local-level capacities that are supporting replications on a wider scale. It highlights the fact the project has strengthened TERI’s own technological capacities and helped it establish strong linkages and collaborate with a growing network of MSME stakeholders—public and private, Indian and international—at policy, institutional, financial, technological, academic, and cluster/field levels. SDC’s principles of long-term engagement, flexibility, and innovation have governed the project’s strategies and activities and ensured its successful outcomes.

The project has played a key role in placing energy efficiency at the core of the policies and programs formulated for the MSME sector by the government, and in catalysing a host of initiatives by other agencies and institutions aimed at development of the MSME sector.

SDC was also instrumental in conceptualizing and creating the SAMEEEKSHA knowledge sharing platform. On behalf of all MSME sector stakeholders, SAMEEEKSHA expresses gratitude to SDC for its ground-breaking intervention in the Indian MSME sector, and for supporting the platform since its inception. SAMEEEKSHA also expresses gratitude to Shakti Sustainable Energy Foundation for agreeing to support the platform in the coming years.

SAMEEEKSHA Secretariat



TERI–SDC PARTNERSHIP PROJECT: A PATH-BREAKING INITIATIVE IN MSME SECTOR

The advent of 2018 also brings to an end the 25-year-long partnership project between TERI and SDC. In many respects this project has been a game-changer in the MSME sector. The project's successful outcomes are largely a result of the principles that SDC applies to its funding programs: of long-term engagement with stakeholders, flexibility in strategies, and innovation in activities. Working with SDC has allowed TERI to remain closely and continuously engaged with diverse MSME stakeholders at every level for extended durations; to constantly assess progress and make mid-course adjustments and corrections in plans and targets as and when required; and thereby, to effectively implement the exhaustive and iterative processes of R&D, technology demonstration and adaptation, training and capacity building, and outreach that together constitute the innovative intervention model known as Research, Development, Demonstration & Dissemination (RDD&D).

It is an appropriate moment to look back on this remarkable project, for it provides many useful lessons and insights for future interventions in the MSME sector. In particular, the project experience underlines the huge opportunities that still exist for improving energy efficiency (EE), environmental performance and productivity among MSMEs; the challenges and barriers that continue to thwart initiatives aimed at achieving these objectives; and the ways by which the TERI–SDC partnership project has successfully overcome these challenges through the RDD&D model.

Foundations

The story of the TERI–SDC partnership began in the early 1990s, a time when the Indian MSME sector was just coming to grips with the enormous, disruptive changes brought about by the progressive liberalization of the nation's economy post-1991. It

was a traumatic time for MSMEs. For decades, they had been shielded from the competitive currents of both indigenous and global markets within a state-controlled framework of reserved markets, subsidies, fixed raw material prices, and other protective mechanisms. This protective framework was now being dismantled, and the MSMEs had to find ways to upgrade their technologies, practices and skillsets swiftly and effectively—or else they would perish in the fiercely competitive globalized world. The MSMEs also had to contend with a new challenge: meeting environmental regulations, which were becoming increasingly stringent in India. The Rio Conference in 1992 brought about further awareness on the threats of climate change caused by CO₂ emissions. The MSMEs lacked the information, technical capacities and wherewithal to upgrade their traditional, inefficient technologies, which in most cases depended on low-grade fossil fuels that were high on CO₂ emissions. It was a situation that demanded urgent solutions, particularly considering the vital role that the MSME sector played in India's economy—contributing nearly 40% of the nation's overall industrial output, and providing livelihoods to millions of people.



Divided blast cupola



It was in this backdrop that the TERI–SDC partnership took shape. In 1991, the Swiss Parliament sanctioned a special grant to SDC on the occasion of Switzerland’s 700th anniversary. One of the aims of the grant was to address global environmental problems, and SDC accordingly set up a Global Environment Programme to support developing countries in furthering the goals of the UN Framework Convention on Climate Change. SDC recognized the enormous potential for energy conservation and environmental protection in the Indian MSME sector, and identified TERI—which already had nearly two decades of experience in working in the fields of energy, environment, and natural resources conservation—as an institutional partner for implementing SDC’s energy–environment programs in India.

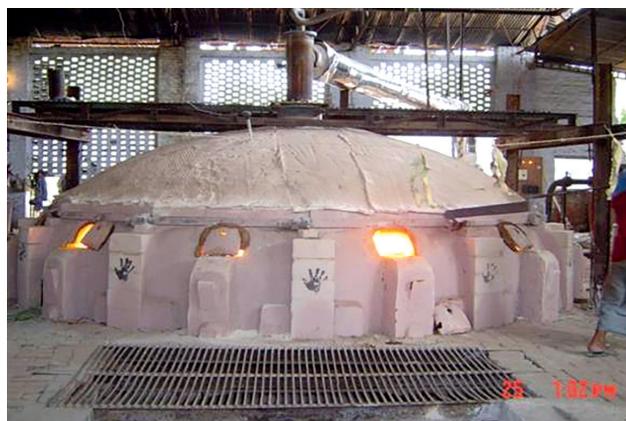
Based on a macro-level study of the MSME sector and on the deliberations during a participatory ‘Screening Workshop’ of MSME stakeholders in 1994, the project identified four energy-intensive MSME sub-sectors/applications for EE interventions:

- Grey iron foundries
- Glass bangle manufacturing units
- Brick kilns
- Silk reeling units and other MSMEs using biomass for heat applications

Over the decade that followed, the project developed and demonstrated EE technologies (EETs) for MSMEs in the selected sub-sectors/applications. In each case, the project adopted a systematic and participatory process in technology development—closely involving industry associations and other cluster-level stakeholders, and pooling the multi-disciplinary competencies of Indian and international experts. The technology development process demanded intensive action research, lab



Fireman working on a Bull's trench kiln



TERI-design recuperative pot furnace for glass melting

and field trials, innovativeness, patience, and long-term engagement at unit and cluster levels. In the process, the TERI team progressively strengthened its own capacities— by way of increased technological knowledge and sharpened skillsets, as well as deeper and broader understanding of the ground realities that pose challenges to the introduction and adoption of new/improved technologies in the MSME sector. Demonstration plants were set up in the selected clusters/regions to showcase the benefits brought by the EETs, in terms of reduced energy costs and increased profits to the MSME units concerned; significant reductions in CO₂ and particulate emissions, enabling the MSMEs to meet the stringent emission norms; and improvements in working environment as well as product quality. (Table 1). During and post-demonstration, the



Biomass gasifier for aluminium melting, Belgaum

project provided operators and other unit-level personnel with training programs on best operating practices (BOP), thus empowering them with the requisite knowledge and skills to extract the maximum efficiency and benefits from the demonstrated EETs.



Table 1. EE technologies developed and demonstrated by the TERI–SDC partnership project

Sub-sector	Demo cluster/ application	Existing technology	Improved technology (EET)	Key benefits
Foundry	Howrah	Conventional cupola	Divided blast cupola (DBC)	<ul style="list-style-type: none"> ▪ Coke savings of 25–65% ▪ Reduced silicon and manganese losses ▪ Melt delivered at higher temperature
		Wet cap, dry cyclone	Venturi scrubber system	<ul style="list-style-type: none"> ▪ SPM emissions brought below 70 mg/Nm³, well within limit of 150 mg/Nm³
Glass	Firozabad	Coal/ NG-fired pot furnace	TERI-design NG-fired pot furnace with recuperator	<ul style="list-style-type: none"> ▪ Energy savings of 25–50%
		Coal-fired muffle furnace	NG-fired muffle furnace	<ul style="list-style-type: none"> ▪ Energy savings of 10–15% ▪ Significantly reduced emissions ▪ Improved working environment
Brick	Eastern U.P	Bull's trench kiln (BTK)	Best operating practices in BTK and downdraft kilns	<ul style="list-style-type: none"> ▪ Energy savings of 5–10% ▪ Improved quality of bricks
			Vertical shaft brick kiln (VSBK)	<ul style="list-style-type: none"> ▪ Energy savings of 20–40%
Biomass-based heat applications	Silk reeling, Karnataka	Direct burning of biomass/ fossil fuels	Biomass gasifier-based heating systems	<ul style="list-style-type: none"> ▪ Energy savings of up to 50% based on biomass; up to 75% when replacing fossil fuels

The project also partnered with grassroots-level NGOs in small (pilot-scale) social action initiatives aimed at the workers in the foundry, glass and brick sub-sectors. Although limited in scope and scale, these social action initiatives helped in improving the workplace environment in the MSMEs concerned, and brought small but tangible improvements in the lives of the workers beyond the workplace as well.

Pillars

During and following the successful demonstrations of EETs, the project focused on establishing and strengthening cluster-level capacities through

ongoing awareness generation and training programs, so that EET replications could take place without entrepreneurs having to seek support from external agencies. In the course of its work, the project established an informal network of partners—entrepreneurs, industry associations, LSPs, fabricators, technicians, masons, machinery and material suppliers, technical consultants, Indian and international experts, NGOs and others. With the progressive replication of EETs, this network too expanded in terms of collective expertise, numbers and reach. Thus, the supportive framework took shape for EET replications to proceed spontaneously, i.e., with minimal support from the project.

“...In 2018, India and Switzerland will celebrate 70 years of formal diplomatic relations, friendship and bilateral cooperation. About one-third of this period has been devoted to promoting energy efficiency in the MSME sector. That’s consistency of purpose!”

— Dr Andreas Baum, Ambassador of Switzerland to India (speaking at the National Summit on Energy Efficiency in MSMEs, 2017)



“What we’ve learned from this partnership with TERI is that the partnership needs to evolve with time, the context, and every institutional situation...we started with programmatic support; we moved into institutional development, and at a certain moment, some technology transfer from India to Southeast Asia and Africa...And today we are more like peers! Today we consider TERI as a very important think-tank in India, and also a global player in energy and climate change policies.”

— Dr Marylaure Crettaz

Head, Swiss Cooperation Office, Embassy of Switzerland, India

In parallel with its technology-related cluster-level activities, the project undertook a multimedia knowledge dissemination campaign, supplemented by site visits and regional/national-level interactions, to spread awareness on the EET interventions more widely—in industry circles, as well as among other stakeholders such as bankers, state development agencies (SDAs), donors, technical consultancies, MSME development institutions, academia, and so on. This campaign sensitized public and private stakeholders on critical issues related to EE in the domains of policy, finance, technology and capacity, and have helped in the development of supportive policies, financing schemes and technical assistance that make it easier for MSMEs in India to adopt EETs.

In the foundry sub-sector, the DBC has been successfully promoted in the Ahmedabad, Coimbatore, Howrah, Nagpur and Rajkot foundry clusters, with TERI providing implementation and capacity building support during and post-replications. Suitably trained LSPs have been established to support replications, with the project providing technical backup support where necessary. As an offshoot of these initiatives, TERI has worked in the Belgaum and Kolhapur foundry clusters under GEF-funded projects implemented by World Bank, with the focus on promoting EETs and BOP in other process areas of foundry that yield relatively lower yet significant energy savings at little or no cost and are thus more readily adopted by MSMEs. This approach has been carried forward successfully in the Ahmedabad, Howrah and Rajkot foundry clusters in the last phase of the TERI–SDC partnership. Also, under a UNIDO-supported project, TERI is providing capacity building support to LSPs in the Belgaum,

Coimbatore and Indore foundry clusters.

In the Firozabad glass cluster, the LSPs established by the project have helped in achieving near-100% adoption of the two EETs introduced by the project: namely, TERI-design recuperative pot furnace and gas-fired muffle furnace. Also, the project has made the local entrepreneurs aware of the immense potential to save energy costs (at relatively low investment) through waste heat recovery. As a result, a large number of innovative locally-designed heat recovery devices have been developed and installed by the LSPs on the ‘auxiliary’ furnaces used for finishing operations in glass melting units.

In the brick sub-sector, the project has intervened at two levels: (1) evolved and disseminated BOP on the existing kiln firing technology, namely, Bull’s trench kiln (BTK); and (2) introduced and made efforts to promote a new EE technology, VSBK, as a community-operated kiln for small-



Promoting VSBK as a community-owned small-scale brick kiln among firemen in eastern Uttar Pradesh



Auxiliary furnace in glass bangle production – Firozabad cluster

scale brick making. The BTK firemen/master-firemen and entrepreneurs have responded well to the recommended BOPs and capacity building initiatives, which are yielding 5–10% reduction in energy consumption. The experience with the VSBK has been mixed: the VSBK's intrinsically rapid heating and cooling cycle hinders its ability to produce good quality bricks from the clay-rich soils of eastern Uttar Pradesh, where the BTK is more prevalent. However, a number of VSBK replications have been achieved in southern Indian states, where this EE kiln has proved capable of producing good quality bricks as compared to clamp kiln technology.

Biomass gasifier systems of different capacities and configurations have been developed and

installed for a wide range of thermal applications such as aluminium melting, chemical manufacture, community cooking, crematoriums, fabric dyeing, food processing, rubber drying, and core baking in foundries. The gasifier systems save up to 75% of energy costs when replacing fossil fuels. Licensed and trained gasifier manufacturers have been established in different parts of India to market the technology and to support replications. A number of gasifier systems have also been installed in other developing countries in Africa and South-East Asia under South–South initiatives, with a trained gasifier manufacturer established in Addis Ababa (Ethiopia).

The project has established TERI's reputation, nationally and internationally, as a strong and reliable partner in research, development and implementation of energy-related projects in the MSME space. It has also progressively strengthened TERI's capacities in domains such as:

- Cluster/sectorial studies on MSMEs; energy mapping
- Diagnostic studies and energy audits to identify EETs
- Financial and technical assistance for implementation of EETs
- RDD&D

Biomass gasifiers for electricity in remote villages

In 2009, TERI and SDC launched the 'TERI-SDC Biomass Partnership' (TSBP). The aim was to build on TERI's two decades of experience in developing and installing biomass gasifier-based systems for rural electrification, and to develop and demonstrate an improved power gasifier technology—one that generates minimal tar, has more user-friendly features, and can be adapted to suit local conditions and needs. The TSBP project has supported collaboration between TERI, Technical University of Denmark (DTU) and Effin 'Art to localize design and performance parameters of two stage biomass gasifier for rural India; and successfully installed and commissioned four 2SG systems in rural areas: two in Odisha, and one system each in Madhya Pradesh and Maharashtra. The 2SG systems require minimal maintenance, generate no wastes, and are easy for villagers to operate with basic training.

Drawing lessons from these four pilot 2SG projects, the implementation model should be scaled up for more villages in India, to support income generating activities and improve electricity supply. The project has taken up policy-level work aimed at creating synergy between utility grid supply and biomass-based decentralized distribution generation (DDG) systems at village level. With the existing business model of supporting rural livelihood activities and household electrification, there is huge potential for introducing and scaling up 2SG technology in other sectors as well as in developing countries such as Myanmar, Bangladesh, Indonesia, Malaysia, Kenya, Burkina Faso and other African countries.



- Awareness generation, capacity building initiatives (for plant personnel, LSPs, equipment fabricators, bankers, policy makers, etc.)

As a result, TERI has been working as knowledge partner/implementing agency in a number of EE initiatives in the MSME sector in association with BEE, EESL, GEF-WB, IFC, IGES, JICA–JST, NTPC, PCRA, REEP, SIDBI, SSEF, UNDP, UNIDO, and other public and private agencies and organizations.

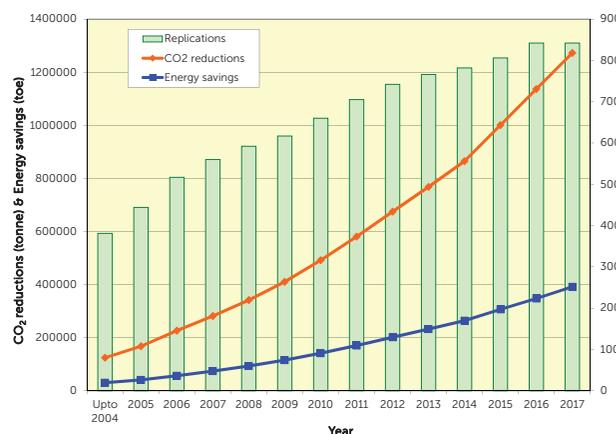
Platform

As a pioneering EE initiative in India’s MSME sector, the TERI–SDC project and its positive impacts have helped place energy efficiency at the core of the policies and programs formulated for the MSME sector by various government agencies at the Union and state levels. The SAMEEEKSHA platform, established by SDC and TERI in collaboration with BEE and Ministry of MSME, provides a forum for the numerous stakeholders in the MSME sector to share and synergize their expertise and experiences, and thereby increase the efficiency of their interventions. The SAMEEEKSHA website already hosts profiles of nearly 100 MSME clusters across the country, including information on technologies in use, energy-related data, and so on. The two National Conferences on Energy Efficiency in MSMEs, organized under the aegis of SAMEEEKSHA in 2012 and 2017, have helped in capturing the key challenges that continue to impede EE improvement among MSMEs in the three overlapping domains of technology, finance and capacity—and in suggesting policies and measures that will help overcome these challenges.

The project has evolved and demonstrated



National Summit on Energy Efficiency in MSMEs (2017)



a unique, innovative and replicable model for effective EET interventions in the MSME sector—the RDD&D model, that in each case mobilizes and synergizes the expertise and resources of a range of stakeholders at policy, institutional, financial, academic, technological, cluster and grassroots levels. With this model, the project has ensured that its EE interventions will be sustained in the long-term, as well as provided a springboard for further initiatives by other agencies to scale up EE. SDC has brought to bear three principles that have been critical to the management, implementation and successful outcomes of this RDD&D project:

- Flexibility
- Innovation
- Long-term engagement

The project has instilled awareness and interest in EE beyond industrial circles to impact a broad spectrum of stakeholders in India as well as abroad—from policy-makers and regulatory agencies to donor organizations and banks/financial institutions; from technology providers and academia to local consultants (LSPs) and NGOs. Through its sustained and synergetic engagements with these stakeholders at every level, the project has helped establish a supportive policy and regulatory framework for promoting EE in the MSME sector; catalysed the launching of a large number of EE initiatives by other agencies and organizations; and helped establish a knowledge-sharing platform for all MSME sector stakeholders.

The SDC–TERI partnership project in the MSME sector has ended. Yet its impacts will endure, and its achievements will be built on in coming years.





EVENT

13th Meeting of SAMEEEKSHA

The 13th Coordination Committee Meeting of SAMEEEKSHA was held in New Delhi on 9th January 2018. The participants included representatives from Ministry of MSME, SDC, BEE, EESL, SIDBI, GIZ, UNIDO, and other financial institutions, implementing agencies, and technical consultancy organizations.

Mr Girish Sethi, Senior Director, TERI welcomed the participants and expressed gratitude to SDC for its support over the decades that has helped the TERI-SDC Partnership (TSP) project achieve significant success. Dr Ajay Mathur, Director General, TERI, expressed satisfaction that for the first time ever, the Union Minister for MSMEs placed his agenda for EE on the table during the National Summit on Energy Efficiency in MSMEs—a sign that the issue of EE has been mainstreamed at policy levels. He suggested that the participants deliberate on how this achievement can be leveraged in future EE initiatives. Ms Marylaure Crettaz, Head of Swiss Cooperation Office and Counsellor, SDC, noted that although the TERI-SDC Partnership in the MSME sector has ended, the engagement between Switzerland and India will continue in diverse fields. She urged the participants to deliberate on how the 'Energy Map' and other products hosted on the SAMEEEKSHA website can be made more relevant and actionable for users.

Mr Abhay Bakre, Director General, BEE, emphasized that the purpose of SAMEEEKSHA will be fully met only if the 'last mile' is covered. He suggested that future meetings of SAMEEEKSHA be also held at cluster level, to enable participation by cluster-level stakeholders. Mr Rene Van Berkel, UNIDO Representative and Head of UNIDO Regional Office in India, suggested that the focus on EE should be expanded to the concept of 'total productivity'. He also underlined the importance of innovation in finding EE solutions. Mr D K Katara, Deputy Director,

Shakti Sustainable Energy Foundation will join BEE and Ministry of MSME in supporting SAMEEEKSHA in the coming years!!!

Ministry of MSME noted that the drive towards EE is a continuous and evolving process.

A round table discussion took place, with the following presentations to guide the discussions.

- SAMEEEKSHA Platform and MSME Summit: an update—Mr Sachin Kumar, Secretary, SAMEEEKSHA and Fellow, TERI
- Achievements under TERI-SDC EESE project— Mr N Vasudevan, Senior Fellow, TERI
- BEE SME Program—Mr Milind Deore, Director, BEE
- BEE- UNIDO- GEF Program— Mr Niranjana Rao Devela, National Technology Coordinator, UNIDO India
- Recent initiatives by SIDBI on Energy Efficiency— Mr Rajiv Kumar, Deputy General Manager, SIDBI

The salient points from the presentations and discussions are summarized below.

- In organizing SAMEEEKSHA meetings at cluster level, the local industry association(s) should be involved in setting the agendas. Also, invitations should be extended to the local Industrial Training Institute (ITI), engineering colleges, etc.
- BEE is contemplating an initiative like PAT to improve the energy efficiency of MSMEs, and invited suggestions from participants.
- Under the TSP project, situation analysis reports have been prepared on two sub-sectors that offer huge scope for promoting EE: (1) agricultural pump sets, and (2) secondary aluminium industry.
- SIDBI has developed two useful tools for MSMEs: (1) a web-based EE assessment tool (already launched); and (2) a mobile App for checking resources efficiency (under beta-testing).

ABOUT SAMEEEKSHA

SAMEEEKSHA is a collaborative platform aimed at pooling the knowledge and synergizing the efforts of various organizations and institutions—Indian and international, public and private—that are working towards the common goal of facilitating the development of the Small and Medium Enterprise (SME) sector in India, through the promotion and adoption of clean, energy-efficient technologies and practices.

SAMEEEKSHA provides a unique forum where industry may interface with funding agencies, research and development (R&D) institutions, technology development specialists, government bodies, training institutes, and academia to facilitate this process.

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