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Industrial Energy Efficiency: The next frontier for combating climate change

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S.P Garnaik Executive Director (Lighting) EESL

Editor's note

Dear Reader,

The deteriorating air quality and rising emission levels have caught the imagination of one and all. Throughout the globe, we have seen the emergence of a collective conscience to mitigate the menace of climate change. However, nations have to balance the tightrope of growth and ecological preservation. There is a need for a middle path, which is where sustainable development becomes crucial. Developing sustainably hinges on a nation's energy sector, as energy is a prerequisite for driving industrial growth. This is where energy efficiency becomes immensely significant, especially in the industrial sector.

There are multiple areas of interventions in the industrial sector which can benefit from energy efficiency. Improving the efficiency of industrial utilities in thermal and electrical applications, among others can lead to significant emission reduction and a surge in energy savings.

In this edition of our newsletter, titled "Industrial Energy Efficiency: The next frontier for combating climate change", we explore various nuances of industrial energy efficiency. In "Enabling MSMEs to take the energy efficiency leap", we take a deep dive into the various avenues to propel energy efficiency in India's MSMEs. "Right inference from energy audits can drive industrial energy efficiency" deconstructs the Promoting market transformation for energy efficiency in MSMEs project, funded by Global Environment Facility (GEF) and implemented jointly by Ministry of MSME, Government of India and UNIDO. It underpins the importance of driving key energy intensive MSME clusters in India towards an energy efficient and sustainable future. The article "M&M and EESL sets energy efficiency benchmarks" lays down a precedent and provides a roadmap that can be followed by organisations that are on the lookout for implementing industrial energy efficiency. "Making Energy Efficiency work for MSMEs in India" provides UNIDO's perspective on making the benefits of energy efficiency accessible to India's MSME sector.

This edition of the newsletter also includes key updates on our latest initiatives. This month saw the flagging off of our long-range electric vehicles in Kerala, in partnership with Agency for Non-conventional Energy and Rural Technology (ANERT), along with the unveiling of new public charging stations in the state. We also expanded our global footprint, with EESL's investment in SWAG EV, an emerging e-mobility player to drive the use of electric motorbikes while contributing to increasing power grid flexibility in South-East Asia.

Thus, as global climate action and energy transition efforts gather steam, the role of industrial energy efficiency becomes increasingly pivotal. Interventions that can streamline the energy use in the industrial sector and enable energy and capital savings have to be cultivated and provided the right stimulus to succeed.



René Van Berkel Representative United Nations Industrial Development Organization (UNIDO)

Enabling MSMEs to take the energy efficiency leap

Energy is a lifeline for Micro, Small & Medium Enterprises (MSMEs). When supply falters, production either halts or continues at a high cost of back-up power. On the other hand, inefficient energy use increases production costs and dents competitiveness. With energy costs accounting for up to 50% of operating costs, energy-intensive manufacturing clusters are most vulnerable to energy fluctuations.

On the other hand, energy cost savings can directly increase profit; every MSME can earn more by wasting less energy. This is particularly relevant in today's economically challenging times.

Despite this compelling rationale, many MSMEs have not started pursuing energy efficiency systematically. The list of barriers, or perhaps rather excuses, can seem endless. However, with some MSMEs have been able to achieve energy efficiency, it is clear that none of the hinderances must be treated as showstoppers.

When considering the barriers, one should plan to achieve two desired outcomes: firstly, stopping energy waste and secondly, replacing the wasteful energy guzzlers.

Energy is wasted in many ways. Even LEDs have zero efficiency if left switched on in bright daylight! Less visible, but equally wasteful, are empty conveyor belts, leaking or non-insulated steam pipes, compressor inlets in bright sunlight, to mention just a few. Provided that judicious energy use is being considered, low and no-cost solutions are available in abundance. Most MSMEs do need assistance with energy monitoring to identify such obvious energy losses and solutions to address them.

This has been made possible via cluster-level Energy Management Cells (EMCs) equipped with basic portable devices and knowledge. Working with the Bureau of Energy Efficiency (BEE), UNIDO set up EMCs in 12 clusters. With their support, 345 MSMEs have already invested Rs. 90 Cr and achieved annual cost savings of Rs. 58 Cr and avoided 62,000 tonnes of greenhouse gas emissions annually.

Another aspect to be addressed is cost. Old and energy-guzzling equipment is cheap to procure, but expensive to operate. Efficient alternatives are increasingly available, but the market for their application is distorted. While MSMEs cannot reliably identify the most appropriate and relevant energy efficient technologies, suppliers face high transaction costs to supply and service individual MSMEs due to lack of access to readily available finance.

UNIDO and Energy Efficiency Services Limited (EESL) are working on a three-pronged market transformation strategy to address this need. First, standardizing energy efficient technologies by subsector to take out the guesswork for MSMEs and thereby reducing investment risk. Second, bulk-procuring these technologies to cut costs and mitigate financial needs for individual MSMEs. Third, to finance these technologies off balance-sheets on the basis of EESL's pay-as-you-save model. This approach is being rolled out and evaluated in 10 clusters around the country.

Initial results have been promising and demonstrate reductions of specific energy consumption in the range of 15-40%. Technologies like energy efficient compressors and PLC controls on jet-dyeing equipment in the Surat textile cluster, use of lightweight fibre-reinforced fan blades in the Jorhat tea cluster and the LSU continuous paddy dryer in Vellore rice cluster are just some of the innovative applications of energy efficient technologies at work.



K.G. Shenoy Sr. Vice President (Manufacturing Operations - Automotive Sector) Mahindra & Mahindra Ltd.

M&M and EESL sets energy efficiency benchmarks

Mahindra & Mahindra Ltd., the flagship company of the USD 19.4 billion Mahindra Group, is a mobility products and farm mechanisation solutions provider. At M&M Ltd, we remain committed to challenging conventional thinking and innovatively use our resources to drive positive change in the lives of our stakeholders and communities across the world.

Sustainability has been embedded in our Business Responsibility Reports, a clear indication that sustainability is not a standalone initiative but is a part of our DNA and an essential component of the way we do business. Our sustainability journey has transformed drastically over the years. From simple energy conservation projects implemented at the shop floor to ambitious goals like Doubling Energy Productivity (EP100), Carbon Neutrality by 2040 & adoption of Science Based Targets, Mahindra has made sustainability a vital goal.

Since 2015, we have proactively engaged with EESL as a technology partner to adopt various cutting-edge energy efficiency products in our portfolio. This partnership helped us expand our horizons and embrace new energy efficient technology as and when it becomes available in market. Various flagship programmes that were implemented as part of this partnership, have set industry benchmarks.

Beginning with adoption of energy efficient LED lightings with investment of over Rs 21 crs to the replacement of more than 2 Lakh old lighting fixtures with energy efficient LEDs, EESL has not only helped us procure the best pricing for LEDs but also ensured delivery of the best quality products through excellent project management controls. Parallelly, the LED project was extended to our supplier fraternity and received an overwhelming response as well.

Subsequently, we switched to Induction Motors & Air conditioners, which are major energy guzzlers in the manufacturing industry. Under the Motor efficiency program, M&M replaced nearly 800 motors with premium efficiency motors ie. IE 3 motors. Similarly, nearly 1040 old ACs were replaced with inverter ACs.

All three flagship programmes (LED, Motor and AC) saw a cumulative investment of nearly Rs 30 crs, with mitigated carbon emission of 22000 Tons per annum.

Our journey and enduring partnership with EESL does not end here. In our pursuit of improving our business performance, we are implementing the Trigeneration Project at one of our facilities, which will reap further energy savings along with enabling GHG emission reduction. The Trigeneration project comprises of generation of electricity in a gas fired generator (PNG as input) and utilises its waste heat for both heating and cooling applications.

All the prolonged and sustained efforts have helped M&M achieve its ambitious sustainability goals and in turn received industry recognition and accolades at distinguished forums such as DJSI and CDP Disclosure among others.



R. Rajmohan CEO Development Environergy Services Limited(DESL)



Arindam Mukherjee Sr. Consultant Development Environergy Services Limited(DESL)

Right inference from energy audits can drive industrial energy efficiency

With every step that India takes towards becoming a stronger economy, there is a stiff rise in India's energy consumption. The country's industrial sector is a major driver of growth, accounting for over 45% of total commercial energy consumption. Given that the industrial sector is envisaged to remain the top contributor to the country's GHG emission and pollution related challenges, it is imperative to have a focused approach for energy efficiency (EE) for the sector. While larger industries have taken notable steps in adopting latest state-of-the-art technologies, the micro, small, and medium enterprises (MSME) sector still remains a challenge.

The project titled, "Promoting market transformation for energy efficiency in MSMEs", funded by Global Environment Facility (GEF) and implemented jointly by Ministry of MSME, Government of India and UNIDO, is driving key energy-intensive MSME clusters in India towards an energy efficient and sustainable future. The project, implemented by Energy Efficiency Services Limited, aims at large-scale deployment of 30-35 economically viable technologies across 10 energy-intensive MSME clusters in India through performance guarantee contracts.

In order to drive market transformation, the project has followed a systematic approach and comprehensive methodology for drawing right inferences from energy assessment studies in the targeted clusters.

As a first step, detailed energy audits were carried out in representative units, followed by a survey of around 100 units in each cluster. The outcome of the study was discussed with key industry stakeholders, followed by listing of proven technologies and available local technology suppliers. A detailed benchmarking analysis of available technologies led to short-listing of the most replicable technologies. Standardization of technology specification and executing M&V protocol under performance guarantee contract were key areas for project execution.

The demo project implementation helped set up stepping stones for large scale replication. The tea production cluster in Assam, for instance, is under transformation driven by the project. The systematic assessment of critical energy guzzling equipment of existing units led to the identification of the most replicable energy efficient technologies in the cluster. These technologies are being piloted now and will drive large scale replication in the next stage.









FRP Based Withering FanNGInvestment: INR 6-8InvLakhs/unitLalMonetary Savings: INR 10-12McLakhs / yLalEnergy Savings: 9-10 toe/yEnGHG Emission Reduction:GH90-95tCO2/y10Replication potential: 143Reunitsun

NG Fired Modulating Burners Investment: INR 5-6 Lakhs/unit Monetary Savings: INR 5-6 Lakhs / y Energy Savings: 30-35 toe/y GHG Emission Reduction:

100-105 tCO2/y Replication potential: 44

units

Dryer Automation Investment: INR 6-7 Lakhs/unit Monetary Savings: INR 3-4 Lakhs / y Energy Savings: 1-2 toe/y GHG Emission Reduction: 3-4

tCO2/y Replication potential: 80 units Withering Automation Investment: INR 10-15 Lakhs/unit Monetary Savings: INR 6-8 Lakhs / y Energy Savings: 2-5 toe/y GHG Emission Reduction: 20-25tCO2/y

Replication potential: 75 units

*Replication potential extrapolated based on survey of 100 units.

Besides helping reduce energy bills, the EE measures have several co-benefits that include greenhouse gas (GHG) emissions reduction; productivity improvement; reduction in energy burden; quality improvement; improvement in working environment; and improvement in manpower skills, etc. The technologies being deployed in the cluster have energy saving potential of 5-10% in general.

The project sets an example of driving market transformation through systematic energy assessment in the identified MSME clusters; this could have a much bigger impact if the concept is extended to other prospective clusters.

In Shorts

EESL invests in Bangkok's SWAG EV to catalyse SE Asia market's energy transformation

Energy Efficiency Services Limited (EESL) has invested in SWAG EV, a Thailand-based next-generation electric vehicles company, to drive the use of electric motorbikes while contributing to increasing power grid flexibility. Swag EV's e-bikes use swappable batteries, most of which will be charged by solar power, thereby promoting transformation to healthier cities while fighting climate change.

The e-bike batteries will increase the capacity of the power grid to incorporate a higher share of renewable energy in its energy mix and trigger decarbonization in Thailand.

By leveraging this 'batteries on wheels' concept, EESL is also strengthening the convergence between e-mobility, solar energy battery storage and a more flexible power grid. EESL seeks to use this convergence to provide clean, reliable, and affordable energy, and catalyse an energy transformation in Southeast Asia. This concept is replicable across the world and this project will serve as the basis for implementation in India.

Kerala CM flags off long-range EVs procured by EESL

Shri Pinarayi Vijayan, Chief Minister of Kerala, along with Shri A.K. Saseendran, Minister of Transport, Kerala flagged off a fleet of 50 long-range EVs procured by EESL. The fleet of EVs include 45 Tata Nexons and five Hyundai Konas, which were provided to the state, in partnership with The Agency for Non-Conventional Energy and Rural Technology (ANERT), a Kerala-based government agency working to disseminate knowledge about sustainable energy.

11 Public Charging Stations were also inaugurated to improve the electric vehicle charging infrastructure in the state. These EV Chargers are capable of charging 11 EVs simultaneously and will be functional in Trivandrum and Ernakulam. The EVs shall reduce 2,100 Tonnes of CO2 and save 7.68 Lakh litres of fuel, along with providing monetary savings of INR 5.52 Crore in fuel cost. The EVs were procured through an international competitive bidding facilitated by the Asian Development Bank (ADB).

