REQUEST FOR EXPRESSION OF INTEREST

FOR

SELECTION OF BENEFICIARY DESIGNATED CONSUMERS

FOR

DEMONSTRATION OF ENERGY EFFICIENCY PROJECT

(DEEP)

BUREAU OF ENERGY EFFICIENCY
Government of India, Ministry of Power

October 2025

EESL
ENERGY EFFICIENCY SERVICES LIMITED
A JV of PSUs under the Ministry of Power

Contents

1. Project Brief

The Bureau of Energy Efficiency (BEE) is keen to implement innovative energy efficiency technologies and deploy large-scale implementation of energy efficiency measures in the PAT industries i.e., the Designated Consumers **(DCs).** Energy Efficiency Services Limited (EESL) has a vast experience in the implementation of large-scale energy-efficient projects through innovative financial models and demand aggregation. In this context, BEE has entrusted EESL with providing support to **PAT industries** for the demonstration of innovative energy-efficient technologies & creating an ecosystem to enable market transformation for such innovative technologies. BEE and EESL with their collaborative approach and expertise have prepared this program to implement innovative technologies and deploy a bespoke package of energy efficiency technologies in PAT industries.

The overall objective of this program is to demonstrate emerging/innovative energy-efficient technologies in the identified PAT sectors and to create a self-sustaining mechanism for their upscaling. Key activities of the project are as below

- Identification of Innovative technologies
- Selection of beneficiaries through REoIs (Request for expression of interest)
- Baseline study & DPR preparation
- Procurement, Installation & commissioning of technology
- Measurement & Verification (M&V)
- Training and capacity building

Emerging technologies, which are innovative in nature and have potential to replicate in the notified PAT industries, which has not been commercialized to the large scale and have potential for energy efficiency improvement or generation will be targeted under the scheme. JTWC has identified the following four technologies for demonstration of the project.

1. Micro Turbine
2. Turbo Blower
3. Energy Efficient Screw Compressor
4. Low Grade Waste Heat Recovery
5. High Grade Waste Heat Recovery
6. Cooling solution from Low Grade Waste Heat Recovery (VAM System)
7. Industrial Automation
8. IE4 Motors with VFD
9. Inlet Air Cooling

Through this request for expression of interest, we are getting the willingness of beneficiary units and collecting the data to assess the suitability of the technology for a demo project. Beneficiary units will be selected through this EoI on the basis of highest contribution in the terms of technology cost from the DCs as per DC selection criteria given in the Section-3.

Finance for project shall be done through the grant support (partially) by BEE and upfront contribution from DC. DCs has to contribute minimum 30% of total technology cost. The DC, who will contribute more will be prefer for selection. A marking matrix will be prepared on the basis of upfront contribution of the DC towards demonstration project as per clause 3. However, for the upscaling project 100% contribution from the DC is required.

This Expression of Interest invites Designated Consumers (DCs) registered under the Perform, Achieve and Trade (PAT) scheme by the Bureau of Energy Efficiency (BEE) to participate in the DEEP programme for demonstrating and upscaling pilot innovative energy-efficient technologies. It is further clarified that the implementing agency will be responsible for activities such as conducting the baseline survey, preparing Detailed Project Reports (DPR) or feasibility studies, and carrying out Measurement & Verification (M&V) studies. However, the procurement and implementation of the pilot energy-efficient technologies during the upscaling phase will fall under the responsibility of the DCs.

1.1 Project Timeline

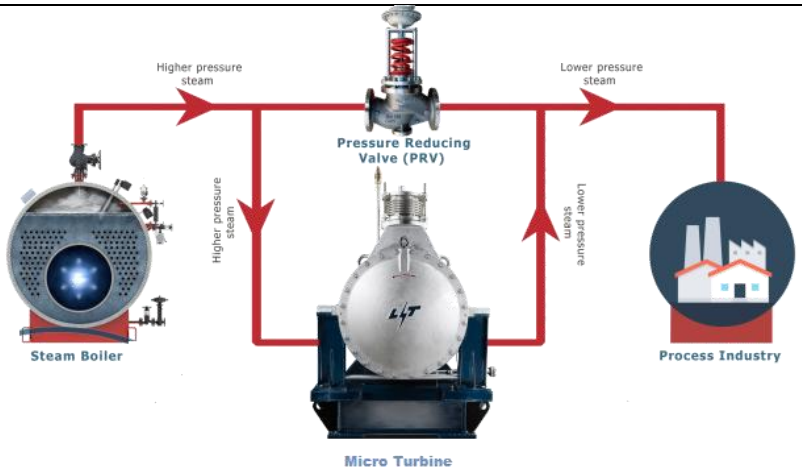
The validity of the "DEEP" project is tentatively upto 31 March 2026 subject to approval from Bureau of Energy Efficiency (BEE).

2. Technology Information

Technical details of approved innovative energy-efficient technologies are given below:

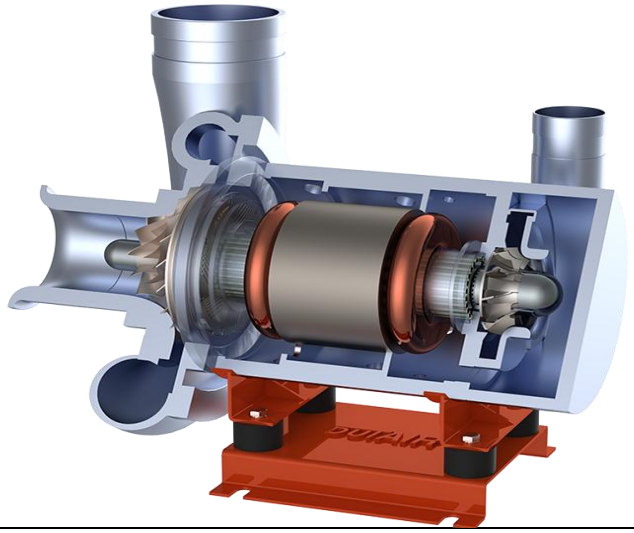
2.1 Micro-Turbine/ Back pressure turbine (HP/MP to LP expansion)

APPLICABILITY IN SECTORS	Textile, Iron & Steel, Petroleum, Pulp & Paper
SUITABILITY	Process plants with PRV/PRDS
BRIEF DESCRIPTION	The unutilized pressure energy in the process plant PRV / PRDS, which is otherwise simply throttled, can be conserved by the installation of a micro-turbine in the steam line to generate power/captive power. In the process, the micro turbine is installed parallel to the PRV and the exit line from the turbine is connected to the process line. The microturbine reduces the steam pressure to the required process (Back) pressure. Microturbine converts this pressure energy to high velocity that gives an impulse to rotate the turbine wheel at a speed of 12000 RPM. This high speed is reduced through a reduction gearbox to 1500/3000 RPM to generate incidental green electric power. Since the system can utilize saturated steam, it becomes highly beneficial for industries using saturated steam.

	 Schematic arrangement
BENEFITS	• Captive power generation, Thermal energy savings, CO_2 reduction • System can also use saturated steam • Wasted pressure energy can be conserved and utilized to generate useful electricity

2.2 Turbo Blower

APPLICABILITY IN SECTORS	Aluminum, Cement, Chlor-Alkali, Fertilizers, Iron & Steel, Pulp & Paper, Textiles, and Thermal Power Plants
SUITABILITY	Turbo blowers are used where there is a requirement of high volume of air flow at low pressure. Turbo blowers achieve higher efficiency in air compression systems up to 1 bar.
BRIEF DESCRIPTION	The anodized aluminum impellers used in the Turbo blower have high corrosion resistance & when combined with air foil bearings due to their low weight, provide excellent control over varying rpm. These bearings are maintenance-free and suitable for high temperatures. Permanent Magnet motors are integrated uncompromisingly into turbo blowers. The speeds between 20,000 and 50,000 rpm provide high energy density. A small turbo compressor in the motor sucks air through the various cooling channels in the motor. A separate outlet expels the cooling air so that its residual heat can also be used in another process.

	
BENEFITS	• Efficiency can be up to 98% • Vibration-free • 45% savings in energy consumption • Size is 1/3rd of regular blower

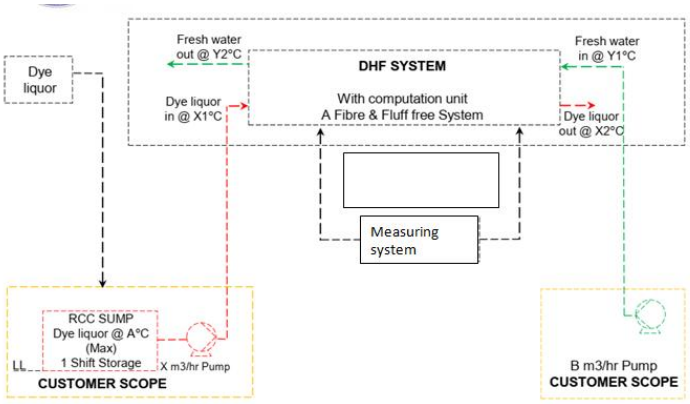
2.3 Energy Efficient Screw Air Compressor System

APPLICABILITY IN SECTORS	Aluminum, Cement, Chlor-Alkali, Fertilizers, Iron & Steel, Pulp & Paper, Textiles, Thermal Power Plants
SUITABILITY	Process Plant and where old and inefficient air compressors are installed
BRIEF DESCRIPTION	Screw air compressor uses two meshing helical screws, known as rotors for compressing the air. It works on the positive displacement principle, there are three stages involved in the process of air compression namely suction, compression and then ejection, the air is initially sucked from the atmosphere and then compressed and gets stored in the compressed air vessel where it gets distributed for various processes. • High EE Motor is directly connected to the screw arrangement of the compressor which actually nullifies the transmission loss of a belt-driven system (3% to 5%). Such a direct drive system actually enhances the overall efficiency of the system. • 30% of the full load power is consumed when the motor starts running in no-load condition after achieving cut-off pressure. To overcome and

	adjust this, in-built VFD helps in varying motor rpm as per varying load conditions. 
BENEFITS	• Reduction in Specific energy consumption from the baseline • Reduction in Maintenance cost • Noise-free operation • lesser breakdowns

2.4 Low-Grade Waste Heat Recovery system

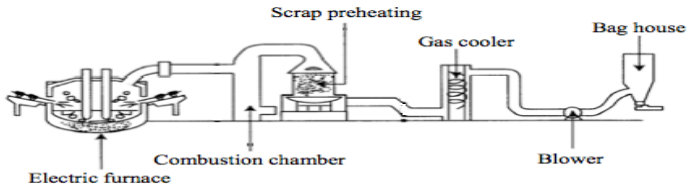
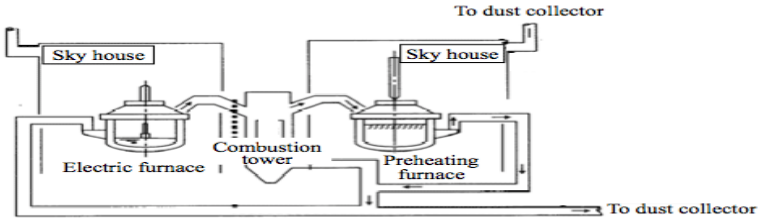
APPLICABILITY IN SECTORS	Aluminum, Cement, Chlor-Alkali, Fertilizers, Iron & Steel, Pulp & Paper, Textiles, Thermal Power Plants
SUITABILITY	Industrial processes e.g., drying, waste heat present in the forms of vapour, fume, exhaust, wastewater and heat; waste heat discharged from furnaces, air compressors, refrigeration systems, boilers etc.
BRIEF DESCRIPTION	Preheating of feed water /air/fuel (DHF-Dip Hydro Formed)-Fiber and Fluff free dye Liquor Heat Recovery LGWH is heated below 100°C and there is no cost-effective solution commercially available and, as 63% of waste heat is at a temperature below 100°C, there is a significant untapped resource. During various industrial processes e.g., drying, heating and combustion, waste heat presents in the forms of vapor, fume, exhaust, wastewater, and heat; and is discharged from furnaces, motors, refrigeration systems, boilers etc. on without further utilization. The temperature of waste heat varies with industrial processes. Waste heat is generally distinguished as high-, medium- and low-grade heat. Compared to medium- and high-grade heat, utilizing and recovering low-grade heat is far more challenging, less feasible and not commonly applied in practice. Dip Hydro Formed (fibre and fluff free dye Dip Hydro Formed liquor heat recovery) An effluent heat recovery, which has been carefully designed catering to actual site parameters. This system effectively handles fluff-based dye liquor ensuring no choking and aptly ensures heat gain from waste energy. Design Parameters for Dye Liquor and Freshwater

	• Flow rate in m³/hr • Inlet temperature in °C • Outlet temperature in ° C  These heat exchangers are specially designed for low-grade waste heat recovery and can raise the temperature of the heat sink from ambient temperature to up to 55°C, thus, reducing the heating requirement of the system.
BENEFITS	• Waste heat is recovered and can be used in low-temperature applications • No strainer is needed for the heat exchanger, and choking is less frequent. • Less cleaning time

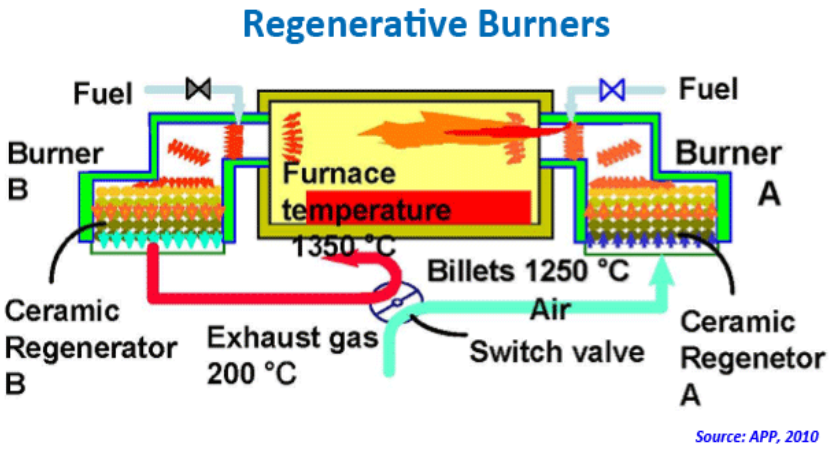
2.5 High-grade Waste heat recovery

2.5.1 Scrap pre-heating in EA Furnace

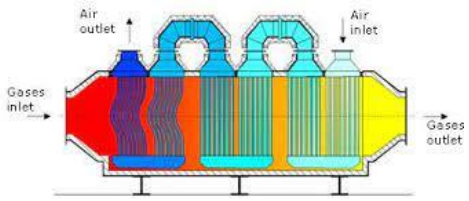
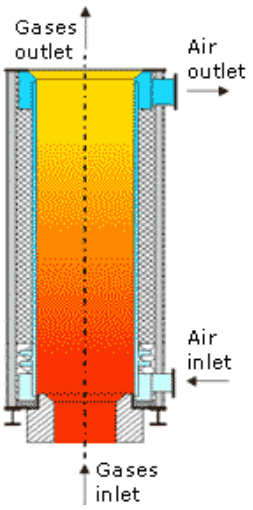
APPLICABILITY IN SECTORS	• Aluminium • Iron & Steel
SUITABILITY	Electric Arc Furnaces in Iron & Steel organizations & Exhaust waste gases from Aluminium melting furnaces can be used for preheating.
BRIEF DESCRIPTION	Scrap preheating is a technology that can reduce the power consumption of an electric arc furnace (EAF) by using the waste heat of the furnace to preheat the scrap charge. Scrap preheating is performed either in the scrap charging baskets, in a charging shaft (shaft furnace) added to the EAF, or in a specially designed scrap conveying system allowing continuous charging during the melting process. Shaft furnace and tunnel furnace systems are modern and efficient preheating. Considering application in the Iron & Steel industry, the use of an EAF, already uses approximately 30 to 40 % less energy than the primary route (blast furnace, DRI kilns). Partial scrap preheating generally saves about 60 kWh/ton, while total scrap preheating saves up to 100 kWh/t of liquid steel (IPPC, 2001). Since lower electricity use leads to lower CO2 emissions the

	technology supports environmental protection.  Bucket-type scrap preheating system  One-power source/2-furnace scrap preheating system Source: NEDO, 2008 Considering application in the Aluminium industry, there is a significant amount of waste heat in the exhaust of an aluminium crucible that can be used for preheating the scrap to 480 to 530 °C and simultaneously preheats the combustion air to 425-480 °C taking into account system heat losses and air leakage. Following table shows the heat content w.r.t scrap temperature: Scrap temperature vs heat content Scrap temperature (°C) — Heat content (kWh/t) 150 — 22 260 — 40 370 — 57 540 — 81
BENEFITS	• Removal of moisture from scrap • Reduced refractory damage • Improved thermal efficiency • Energy and CO_2 savings

2.5.2 Regenerative burners

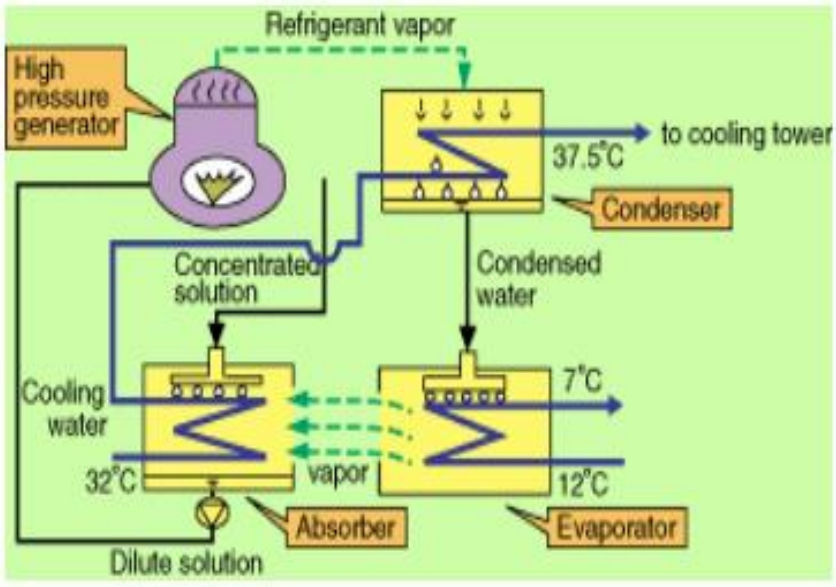
APPLICABILITY IN SECTORS	• Iron & Steel • Aluminium
SUITABILITY	• Heat recovery of furnace exhaust gases and usage in preheating of combustion air
BRIEF DESCRIPTION	The process of regeneration[1] uses a pair of burners that cycle to alternately heat the combustion air or recover and store the heat from the furnace exhaust gasses. When one regenerative burner is firing, the other is exhausting the furnace gasses. Exhaust gasses pass through the regenerative burner body and into a media case which contains refractory material. The refractory media is heated by the exhaust gasses, thus recovering, and storing energy from the flue products. When the media bed is fully heated, the regenerative burner currently firing is turned off and begins to exhaust the flue products. These regenerative burners fire alternately to recover the sensible heat from waste gas[2] for the preheating of combustion air. The systems are capable of obtaining high-temperature preheated air exceeding 1,000°C in a short timeframe, by repeated heat accumulation and combustion. They recover between 85 -90 % of the heat from the furnace waste gases; therefore, the incoming combustion air can be preheated to very high temperatures of up to 10° -150 °C below the furnace operating temperature. Application temperatures range from 8000C up to 1500 °C. Fuel consumption can be reduced by up to 40 %. 
BENEFITS	• Increased combustion efficiency • Low NOx emissions • More than 15% energy reduction is possible. • Reduction in maintenance costs

2.5.3 Recuperators

APPLICABILITY IN SECTORS	• Aluminium • Iron & Steel • Cement
SUITABILITY	• Steel reheat furnaces • Steel heat treatment furnaces • Steel anneal and pickle lines • Steel galvanising lines • Direct reduced iron furnaces • Aluminium melting furnaces • Aluminium heat treatment furnaces • Ceramic and refractory kilns • Waste Incinerators • Any other application where exhaust gasses can be reused
BRIEF DESCRIPTION	In a recuperator, heat exchange takes place between the flue gasses and the air through metallic or ceramic walls. Ducts or tubes carry the air for combustion to be preheated, the other side contains the waste heat stream. Recuperators are classified based on the principle of heat transfer by radiation, convection, or combinations. Recuperators are constructed out of either metallic or ceramic materials. Metallic recuperators are used in applications with temperatures below 1050 deg C, while heat recovery at higher temperatures is better suited to ceramic tube recuperators which can operate with hot side temperatures as high as 1500 deg C and cold side temperatures of around 950 deg C. For maximum effectiveness of heat transfer, hybrid recuperators are used. These are combinations of radiation and convective designs, with a high-temperature radiation section followed by a convective section. Convective Recuperator  Radiation Recuperator 
BENEFITS	• Higher Flame Temperature • Better Combustion Efficiency • Reduced fuel cost by using preheated air in burners • Higher Furnace Output • Lesser emissions

2.6 Cooling options from Waste Heat Recovery

Cooling solutions from WHR (via Vapour Absorption Machine)

APPLICABILITY IN SECTORS	• Cement • Chlor-Alkali • Fertilizers • Iron & Steel • Pulp & Paper • Textile • Thermal Power Plants • Refineries • Petrochemicals
SUITABILITY	• For cooling processes
BRIEF DESCRIPTION	A vapour absorption chiller (VAM3) is a machine to produce chilled water using heat sources such as steam, hot water, and gas. A fluid pair of lithium bromide and water are used in commercial VAM. The refrigerant used is actually water, as that is the working medium that experiences a phase change and causes the cooling effect. The second fluid that drives the process is salt, generally lithium bromide. Heat is used to separate the two fluids, when they are mixed in a near vacuum environment. For low-temperature applications, ammonia-based absorption machines are used that utilize ammonia as a refrigerant and water as an absorbent. These machines use only a small fraction of electricity as compared to the conventional vapour compression chillers. Vapour absorption systems work with non-CFC environmentally friendly refrigerants such as water or ammonia.  Various parts and working of VAM
BENEFITS	• Utilization of waste heat • Optimized electricity consumption • No Noise/vibration due to the absence of compressors • Natural refrigerants which have zero ODP and GWP

2.7 Industrial automation

2.7.1 Online Coal GCV analysers

APPLICABILITY IN SECTORS	• Thermal Power • Iron and Steel • Pulp and Paper • Cement
SUITABILITY	Traditionally, Coal GCV measurement is done using Laboratory tests.
BRIEF DESCRIPTION	Traditionally, Coal GCV measurement is done using a Laboratory test. Laboratory analysis only provides either a "snapshot" or an "average" of coal quality, it does not show the actual variations and by the time the laboratory results are available, thousands of tons of material have already been conveyed. The online Coal GCV Analyser provides real-time data that can then immediately drive decisions at the power plant. This analysis method uses a radioisotope that has a low energy level, can be used for a long time without requiring replacement, has low radiation and is safe and reliable. This analyser finds extensive use in Coal Mining, Coal Washeries, Coal Blending Plants, Coal-fired Power Plants, Coking Plants, steel plants, etc. It is especially suitable for online coal ash analysis on the entire belt conveyor during the coal transportation process. Installation of the machine has given the advantage of feeding close-to-design GCV coal in the Boiler for optimizing combustion. Unscheduled loss of generation on account of coal quality can be avoided. Additionally, it also provides online information on the Slagging index of the coal, so that Boiler slagging & hence long outages can be prevented.
BENEFITS	• Helps in real-time analysis of coal GCV • Helps in feeding close-to-design GCV coal to boiler • Helps in optimised combustion of coal • Reduction in loss of generation due to poor coal quality

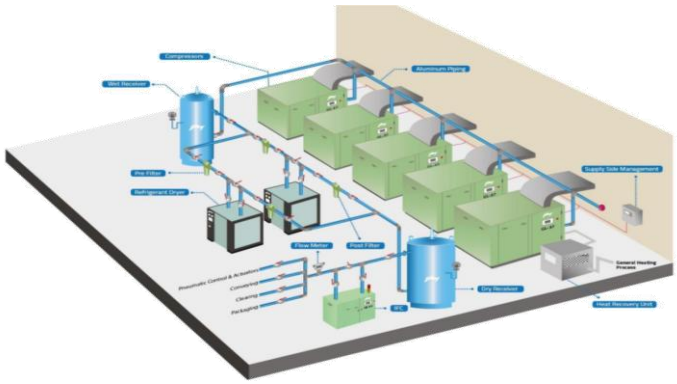
2.7.2 Automatic blowdown control system

APPLICABILITY IN SECTORS	• This can be used across sectors where boilers with manual blowdown is used (Thermal power plant, Pulp and Paper, Textile)
SUITABILITY	Manual blowdown system
BRIEF DESCRIPTION	Boilers generate steam used for heating or manufacturing processes. When steam leaves the boiler, impurities (TDS – total dissolved solids) are left behind to accumulate in the boiler. Accumulation of TDS beyond their solubility limit results in the formation of scale.

	Blowdown is the process of removing water with high concentrations of TDS and replacing it with fresh makeup water with lower levels of TDS, thereby lowering the overall TDS in the boiler. Two types of blowdown: Bottom blowdown – which removes sediment/sludge from the bottom of the boiler; Surface skimmer blowdown – which removes high--TDS water near the surface (6" below the water line). Automated controllers only regulate surface blowdown. 1. TDS can be directly measured by lab tests (costly, time-consuming) or can be approximated by conductivity measurements (inexpensive, quick, reasonably accurate). 2. Two types of surface blowdown: manual and automated Manual Blowdown 1. Involves manually opening a blowdown valve at various times throughout the day; used in conjunction with a hand--held conductivity meter to keep some degree of control over TDS levels. 2. Results in high and low conductivity spikes due to boiler load variances. 3. Conductivity levels above the target maximum lead to the formation of scale. Conductivity levels below the target maximum result in excess water and chemical usage. 4. At best, manual systems err on the safe side and keep TDS too low. Automated Blowdown 1. Uses an automated controller and valves to continuously or intermittently sample the boiler water and then blow down as needed. 2. Types of Automated Blowdown a. Continuous Sampling – Used when steam blowdown requirements exceed 2000 kg/hr. A sample of water is continuously sent across the conductivity probe to drain. When conductivity levels exceed the target maximum, a larger blowdown valve opens and sends more water to drain until the set point is satisfied. b. Timed Sampling (most common) – Used when steam blowdown requirements are less than 2000 kg/hr. A sample of water is intermittently sent across the probe for a predetermined amount of time (interval and duration are adjustable), and the blowdown valve is held open until the conductivity set point is satisfied. Boilers without a blowdown heat recovery system and with high blowdown rates offer the greatest energy-savings potential. The optimum blowdown rate is determined by a number of factors, including boiler type, operating pressure, water treatment, and makeup-water quality. Savings also depend upon the quantity of condensate returned to the boiler.
BENEFITS	● With automatic blowdown, one can avoid high and low conductivity spikes due to boiler load variance. ● Can avoid keeping the TDS too low than what is required ● Reduced operating costs (less feed water consumption, chemical treatment and higher heating efficiency)

	• Reduced maintenance and repair costs (minimised carryover and deposits) • Cleaner and more efficient steam • Minimise energy loss from boiler blowdown

2.7.3 Intelligent Flow Controller (IFC) for Compressed Air Network

APPLICABILITY IN SECTORS	• Cement • Textile • Chemical • Pulp and Paper This can be used across sectors where a compressed air system is used
SUITABILITY	It can be used where the compressed air demand is met from manual control system
BRIEF DESCRIPTION	The fluctuating air pressure is the major problem faced by industries caused due to intermittent use of several pneumatic types of equipment. It begins with the sudden air demand pulling down the pressure at the point of use. The air compressors get to know about it when this air demand travels to the upstream generation side through the distribution network. The control mechanism of the air compressor then starts delivering compressed air in the form of load/unload or VSD. Practically it takes a while for the entire air system to fill up to the required pressure. Thus the compressor operators maintain a higher level of pressure in the air system to minimise the lag in the response time between demand and supply to sustain a sudden demand. Thus more compressors are needed to meet this artificial demand causing waste of compressed air and leading to an energy inefficient system translating into high-energy bills.  IFC model Intelligent Flow Controller (IFC) controls the airflow and pressure being delivered to the plant. It operates at the intermediate point of the compressed air system, i.e. on downstream of Dryers/Receivers and upstream of the main piping distribution system. IFC creates useful storage, which isolates compressors from the demand side peak and trough to provide a stable air supply at optimum pressure. It

	monitors the demand side rate of change of pressure and releases only the required amount of storage air to satisfy the peak demand instead of starting additional compressors. Thus reduction in the mass of air and a reduction in the load period of compressors leads to energy savings.
BENEFITS	● Energy saving from 7% to 20% ● Simple payback period within 1 to 2 years ● Creates useful storage in the compressed air system ● Increases the response time of the system to meet instantaneous demand ● Constant air pressure to pneumatic tools; Reduction in artificial demand ● Reduction in compressed air leaks ● Reduction in compressor's operation & maintenance cost.

2.8 IE4 motors with VFD application

APPLICABILITY IN SECTORS	● All sectors of PAT
SUITABILITY	● Pumps, Fans, blowers, compressors etc., are driven by less efficient (IE1 &IE2) motors
BRIEF DESCRIPTION	The international IEC standard for electric motors (IEC 60034-30-1) classification scheme identifies four levels of motor efficiency; ● IE1 - Standard efficiency ● IE2 - High efficiency ● IE3 - Premium efficiency ● IE4 - Super premium efficiency Indian industries historically have used IE1 motors or non-standardised motors since last many years, and also follows the practice of rewinding of motors many times after failure, but these practices not only increase energy consumption but also increases specific energy consumption. Energy-efficient motors use less electricity, run cooler and provide more mechanical output by consuming less electrical input energy. In the efficiency category of electric motors, IE1 is considered a standard motor. Motors are rated IE1 to IE4 in increasing efficiency as shown in Figure 1.

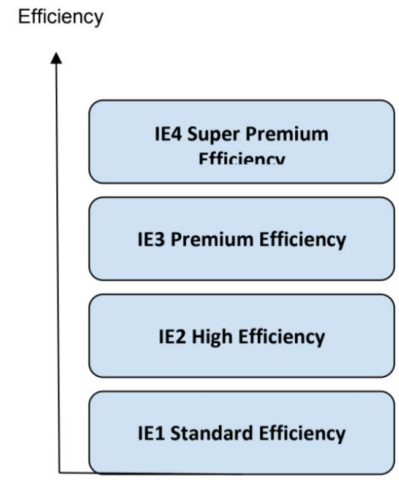
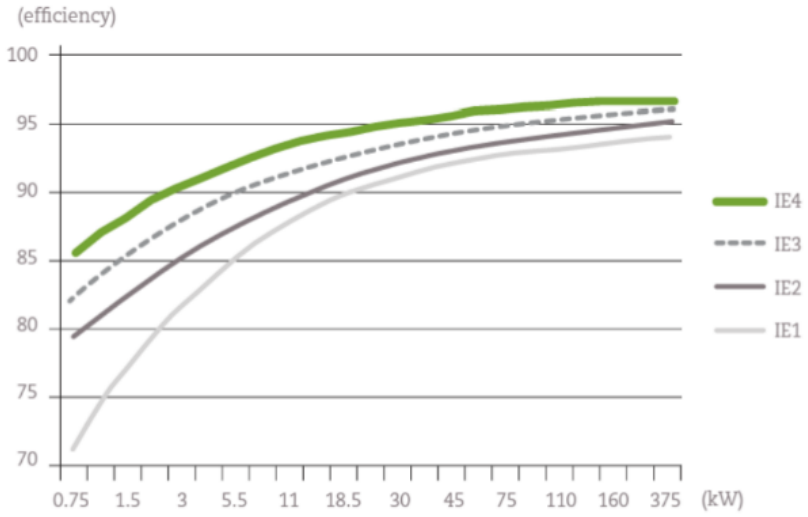


Figure 1: Motor Efficiency Classification

Motor Efficiency Classification

In India, IE2 has been set as the Minimum energy performance standard for motors. Innovation and technology advancements have helped to reduce motor losses and improve motor efficiency. Figure 2 represents an energy efficiency comparison of IE1, IE2, IE3 and IE4 motors (4 poles 50 HZ) at various motor ratings (KW).



Efficiency curves for IE4, IE3, IE2 and IE1 4 pole 50Hz electric motors

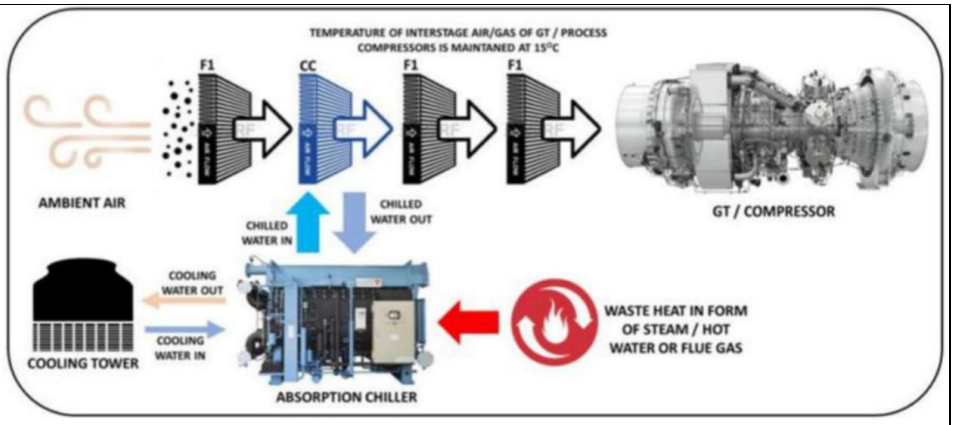
Energy efficient motor pays for itself because, over the life of the motor, the major cost is the running cost of the motor, having a contribution of 97% in the lifetime cost of the motor. Purchase cost contributes to 2% and repair and maintenance cost to 1%. Though the motor can be repaired 2-3 times over its lifetime, if it is done unprofessionally, it results in losses and a reduction in energy efficiency. With a service life of 10-15 years, the payback time for an IE4 motor compared to an IE3 is in many cases less than 2-3 years depending on motor size and operating hours. e.g. a 55kW, 4 poles motor operating 4000 hours a year will have a payback time of 2.5 years.

The super-premium efficiency (IE4) motors come in the size range of 0.37 kW to 375 kW. The load factor of the IE4 motor should be greater than 65% so that the

	advantage of energy savings can be achieved. The benefits of using IE4 motors are maximum in continuous-duty applications such as compressors, pumps, fans, blowers, etc. IE4 motors are also equipped for frequency converter (VFD) duty. By using IE4 motors together with a premium VFD there can be several benefits including better process control, energy savings and a reduced starting current. It can further reduce stress on mechanical equipment and the electrical supply network. The internal efficiency loss caused by heat generation and friction can be as high as 20% in small motors and 4-5% in motors upward of 160 kW. IE4 motors operate with significantly less heating and, as a result, with much lower losses. Lower working temperatures mean less thermal stress on the motor, the motor bearings and the terminals. Motor service life is significantly extended as a result.
BENEFITS	• High efficiency • Less maintenance • Lower operating temperatures • Less thermal stress on the motor, the motor bearings and terminals. • Enhanced motor life • Low operating cost

2.9 Inlet air cooling system

APPLICABILITY IN SECTORS	• In all sectors where Gas Turbines and bigger capacity air compressors are installed
SUITABILITY	• For inlet air cooling
BRIEF DESCRIPTION	Gas turbines and bigger size process air compressors take in filtered ambient air and compress it in the compressor stage. The performance of a gas turbine, its efficiency (heat rate) and generated power output strongly depend on the climate conditions, which may decrease the output power ratings by around 20-25%. In a Gas turbine, after mixing with the fuel in the combustion chamber, compressed air is ignited, leading to a high temperature and high-pressure flow of exhaust gases entering the turbine. As the gas turbine is a constant-volume machine, air volume introduced in the combustion chamber after the compression stage is fixed for a given shaft speed (rpm). Thus the air mass flow is directly related to the density of air, and the introduced volume. $m = \rho V$ Where m is the mass, ρ is the density and V is the volume of the gas. As volume V is fixed, only density ρ of the air can be modified to vary air mass. The density of the air depends on the relative humidity, altitude and temperature. To operate the turbine at ISO conditions and recover performance, inlet air cooling systems are the best.

	 **Inlet air cooling**
BENEFITS	• Heat rate can be improved by 6-8% as per the performance curve of the turbine • With inlet air cooling the air temperature can be maintained at 15 Deg C and as a result • the throughput of the turbine/compressor can achieve ISO condition • Reduction in repair and maintenance cost

3. Designated Consumer Selection Criteria

S. No.	Criteria	Sub Criteria	Qualifying Criteria	Weightage for selection
1.	Percentage Upfront contribution by DC	% of estimated project cost*	Min. 30%	50%
2	Overall contribution	Total contribution (In INR)	INR	50%
If the sum of score of 1 and 2 is same, following marking will adopted for the selection of beneficiary units.				
I	Specific energy saving	Cost basis (toe/Lakh Rs.)	Energy saved per INR lakh of investment	50%
II	Specific emission saving	Cost basis (tCO2/Lakh Rs.)	GHG mitigated per INR lakh of investment	50%

**Estimated project cost includes the cost of equipment and associated accessories, freight, and insurance, unloading, installation and commissioning, etc.*

- Maximum number of technologies that shall be demonstrated in a single DC/group of DC be limited to maximum 2 technologies and project cost not more than INR 200 Lakhs in one single DC/group of DC.

- **The beneficiary industry will be selected through competitive bidding offer whoever get highest marking in evaluation of Expression of Interest.**

4. Objective of the REoI

Objective of REoI is to adopt a transparent mechanism for the selection of beneficiary units for demonstration. As a government organization, BEE and EESL follows norms of transparency in all its engagements.

For the finalization of REoIs EESL will adopt a cafeteria approach to assess the willingness of DCs to implement these energy-saving technologies for those beneficiaries who offer highest contribution. REoIs will also include the information to assess the capacity, saving potential, investment and payback period, organization/sectoral representation etc.

Annexures are attached for technical information to evaluate the above parameters.

5. Evaluation of the REoI

Units will be selected in a transparent manner by a committee comprising members from BEE & EESL.

Evaluation of REoIs will be carried out in 2 stages as detailed below.

Stage-1

Information will be collected from the designated consumers through an online webpage. PMU will compile and analyse the information to evaluate the techno-commercial feasibility of the demonstration. Techno-commercial feasibility report will be shared with DCs to move on to stage 2.

Stage-2

Cost Contribution has to be declared by each DCs based on the techno-commercial feasibility report shared by EESL. DC will be mapped in the DC selection matrix and ranking will be assessed on the basis of highest cost contribution as a buyback offer of the deployed technology. The selection matrix will be put up to the JTWC and BEE for approval. Only 3-4 units will be selected for demonstration wherein financial support from BEE will be available and remaining units will be considered for the upscaling phase of said technology.

If the multiple units have the same ranking for the beneficiary selection for a particular technology, priority may be accorded as mentioned above in clause 3.

6. Commercial terms

6.1 Contribution of the technology cost sharing

Contribution of the technology cost sharing by DCs **(To be filled during second stage REoI after sharing the techno commercial feasibility report)** in

Name of the DC	
	a. INR (in figures)-
	b. INR (in words)-
	c. In percentage _____% of estimated technology cost.

6.2 Payment milestones towards upfront contribution

i. Under Demonstration phase

Payment milestones for cost shared by DCs as agreed in clause 6.1

a) DC has to submit advance Bank Guarantee (ABG) equivalent of 10% of estimated technology cost at the time of signing of the agreement. ABG should be valid for duration till 100% receipt of DC's cost contribution to EESL.
b) 50% of DC's contribution within 10 days from the date of the delivery of equipment at site.
c) Balance 50% of DC's contribution within 10 days from the date of successful commissioning of equipment.
d) ABG will be returned on receipt of 100% amount of DC's cost contribution.
e) All statutory taxes/duties including GST or any indirect taxes or any duties / levies / CESS (including but not limited to labor CESS, construction CESS, workmen compensation CESS) as applicable shall be reimbursed by DC to EESL on actual basis.
f) In case of delay in payment to EESL, a "Delayed Payment Surcharge" shall be applicable on the outstanding amount due to EESL for the period beyond the "Due Date" to the actual date of credit of such dues into EESL bank account. The Delayed Payment Surcharge shall be applicable at the rate of 2% over and above annual SBI MCLR rate on the outstanding amount due to EESL on day-to-day basis (and compounded monthly) for the duration starting from the Due Date to the actual date of receipt of payment against EESL's invoices.

6.3 In Case of Non submission of document by DC

If the selected DC is not able to submit documents along with ABG at the time of signing of agreement within 30 days from notification of EESL, offer will be given to next shortlisted DC. Contribution amount from DC shall be based on actual discovered price of the technology through competitive bidding.

6.4 Exclusion

Minor works not related to energy saving and necessary for the implementation of the Energy Efficiency technology will be under the scope of DC (like civil works, integration with existing system, electrical lining / cabling, Earthing etc.)

7. REoI Format

Interested DC(s) have to download the excel file from the EESL website and fill the Microsoft excel form for the interested technologies available at following link.

Link for downloading the technology excel sheets

Technology No 1: Micro turbine **https://eeslindia.org/wp-content/uploads/2022/06/Technology-1_-Micro-turbine.xlsx**

Technology No 2: Turbo Blower **https://eeslindia.org/wp-content/uploads/2022/06/Technology-3_Turbo-blower.xlsx**

Technology No 3: Screw Compressor with PM motor **https://eeslindia.org/wp-content/uploads/2022/06/Technology-2-_-Screw-Compressor-with-PM-motor.xlsx**

Technology No 4: Low-Grade Waste Heat Recovery **https://eeslindia.org/wp-content/uploads/2022/06/Technology-4_-Low-Grade-Waste-Heat-Recovery-System.xlsx**

Technology No 5: High-Grade Waste Heat Recovery

i. Scrap pre-heating in EA Furnace - https://eeslindia.org/wp-content/uploads/2022/06/Technology-5.1%20HGWHR-Scrap%20PreHeat.xlsx
ii. Regenerative Burners - https://eeslindia.org/wp-content/uploads/2022/06/Technology-5.2 HGWHR-Regenerative Burners.xlsx
iii. Recuperators - https://eeslindia.org/wp-content/uploads/2022/06/Tecnology-5.3 HGWHR-Recuperators.xlsx

Technology No 6: Cooling Solutions from Waste Heat Recovery https://eeslindia.org/wp-content/uploads/2022/06/Technology-6 Cooling solutions WHR.xlsx

Technology No 7: Industrial Automation

i. Online Coal GCV Analysers - https://eeslindia.org/wp-content/uploads/2022/06/Technology-7.1 Online Coal GCV Analysers.xlsx
ii. Automatic Blow Down Controller - https://eeslindia.org/wp-content/uploads/2022/06/Technology-7.2 Automatic Blow Down Controller.xlsx
iii. Intelligent Flow Controller - https://eeslindia.org/wp-content/uploads/2022/06/Tecnology-7.3 IFC.xlsx

Technology No 8: IE 4 Motors with VFD application https://eeslindia.org/wp-content/uploads/2022/06/Tecnology-8 IE4 Motors with VFD .xlsx

Technology No 9: Inlet Air Cooling https://eeslindia.org/wp-content/uploads/2022/06/Technology-9 Inlet Air Cooling.xlsx

Email Technology filled form at email ID - deep@eesl.co.in

In email, the subject shall mention name of the company along with DC registration number_Tech-1/2/3 etc.

For any further queries, the DC may reach at email: - **deep@eesl.co.in** and Sh. Manu Singh Tomar (8882956060)

A. Downloading of EOI formats will be available – W3 October 2025

B. Submission of EOI – From –W3 October 2025 to W2 November 2025

C. Technology Workshop with DCs and Industrial associations –W4 October 2025 and W1 November 2025 and W2 November 2025

D. 2nd stage REOI Release for cost contribution –W3 November 2025 (through emails to the interested DCs)

E. Window for submission of 2nd stage REOI –W3 November 2025 to W1 December 2025

F. Approval from JTWC committee –W3 December 2025

G. Signing of agreement with selected DCs –W4 December 2025 onwards

Cancellation and Termination

1. **Right to Cancel or Terminate:** Energy Efficiency Services Limited (EESL) reserves the right to cancel, withdraw, or terminate this Expression of Interest (EOI) process or any subsequent agreement, in whole or in part, at any stage and at its sole discretion, without assigning any reason whatsoever.
   This includes, but is not limited to, circumstances arising from non-extension or modification of the DEEP project timeline by the Bureau of Energy Efficiency (BEE). Such cancellation or termination shall not confer any right or claim upon any participant, nor shall EESL be liable for any loss, cost, or damage incurred by any party as a result thereof.
2. **Termination for Cause:** EESL may, without prejudice to any other rights or remedies available under law or contract, terminate any agreement resulting from this EOI with immediate effect by providing written notice to the selected participant in the event of:
   - Breach of any terms or conditions of the EOI or the agreement;
   - Failure to comply with applicable laws, regulations, or instructions issued by competent authorities;
   - Misrepresentation or submission of false or misleading information during the EOI or contract period;
   - Insolvency, bankruptcy, or initiation of winding-up proceedings against the selected participant.
3. **No Liability:** EESL shall not be responsible or liable for any claims, losses, damages, costs, or expenses of any kind arising out of or in connection with such cancellation or termination, including, without limitation, loss of anticipated profit, loss of opportunity, or costs incurred in preparation of the EOI response or participation in the process.

Note:

Please note that DEEP project is divided into two phases, phase I is Demonstration and Phase-II is Upscaling-

The EE technologies which have been demonstrated shall be available for upscaling. For demonstration phase the following EE technologies are available for implementation.

1. Micro Turbine
2. High-Grade Waste Heat Recovery
   i. Scrap pre-heating in EA Furnace
   ii. Regenerative Burners
   iii. Recuperators
3. Industrial Automation
   i. Online Coal GCV Analysers
   ii. Automatic Blow Down Controller
4. Inlet Air Cooling

Further, all the nine EE technologies as detailed in the document above shall be available for upscaling.
Please note that a maximum of 04 Designated Consumers shall be selected for the Demonstration phase, following BEE's approval.
The remaining DCs shall be who are not selected for Demo phase may be considered for Upscaling.