

# *Importance Of Energy Management For Chemical Manufacturers*

## **Q.1 Against the backdrop of volatile energy prices, how important it is for the chemical manufacturers to become energy-efficient?**

Chemical manufacturing is based on the transformation of organic or inorganic raw materials through chemical processes to formulate products. Chemicals generally are classified into two groups – commodity chemicals and specialty chemicals.

Commodity chemical manufacturers produce large quantities of basic and relatively inexpensive compounds in large plants, often built specifically to make one chemical. Since they make essentially equivalent products for general use in everyday consumer goods, sales are typically driven by price. Controlling production costs is crucial, which provides an incentive for energy efficiency improvements. At the same time, commodity plants often run continuously, typically shutting down for only a few weeks a year for maintenance. Thus, there is often a limited window of opportunity in which energy efficiency-related improvements can be made.

Specialty-batch or performance chemical manufacturers produce smaller quantities of more expensive chemicals that are used less frequently. Often there is only one or a limited number of suppliers producing a given product. As sales are based on product performance, controlling production costs may be of less concern than it is for commodity chemical manufacturers.

The chemical industry uses energy both to supply heat and power for plant operations and as a raw material for the production of chemicals, plastics and synthetic fibers. Many small to medium size firms comprise the industry, and are concentrated in areas abundant with other manufacturing businesses.

The chemical industry's prime motivation for energy efficiency is controlling operating and production costs (e.g. fuel and raw material costs) in a competitive, worldwide market. Facility-wide approaches to energy efficiency, such as integrated heat exchanged networks to maximize the use of waste heat, are well established in the industry. While energy consumption in chemical industry has increased in recent years, the sector has reduced energy consumption for heat and power per unit of output. Energy intensity (in terms of fuel consumption per rupee value of shipments) has also decreased.

### **Opportunity Assessment for the Chemical Manufacturing Industry**

Table below ranks the viability of five primary opportunities for improving environmental performance with respect to energy usage (Low, Medium, or High). A brief assessment of the ranking is also provided, including potential barriers.

Opportunity	Ranking	Assessment (Including Potential Barriers)
Cleaner Fuels	Medium	<p>Coal represents a relatively small fraction of the sector's energy consumption, but it is an emissions-intensive energy source. Though natural gas is the most viable substitute for coal use, natural gas price trends are unlikely to make this an attractive opportunity for the industry.</p> <p>A substantial fraction of sector's energy needs are currently met by waste and byproduct fuels, and there are likely opportunities to increase use of alternate and waste fuels without compromising environmental quality (for example, in cases where using waste fuels for energy content reduces total energy consumption by combining energy generation and waste disposal processes). However, hazardous waste permitting requirements may inhibit energy recovery from waste fuels.</p>
Increased CHP	High	<p>The chemical industry meets a substantial portion of its electricity demand through onsite power generation, primarily via cogenerating units that also produce steam. Waste heat reduction and increased waste heat recovery (including the use of waste energy streams in cogeneration) represents a major opportunity for reducing energy losses, particularly for organic chemical manufacturing.</p> <p>New CHP installations also face barriers in terms of utility rates and interconnection requirements if electricity production is expected to exceed onsite demand.</p>
Equipment retrofit/replacement	Medium	<p>Major energy efficiency gains are achievable through retrofitting or replacing steam system equipment (i.e. boilers, pipes, valves, traps, heat exchangers, and preheaters). This is due to substantial energy requirements for process heating. Opportunities exist to reduce water usage and increase energy efficiency by installing more efficient water treatment technologies.</p> <p>The primary barriers to equipment change are capital constraints, particularly in segments of the industry that are hardest-hit by rising energy costs.</p>
Process Improvement	Medium	<p>Process optimization (e.g. waste reduction and improving process yields) is already widely practiced in the industry and likely has additional potential. Process improvement (i.e. using an alternative process or path to produce the same product) may require technological advances or a breakthrough in a new production process, and some areas of R&amp;D offer potential for process improvement.</p> <p>There are likely differences in the viability of process-related opportunities between bulk and batch chemical manufacturing, as batch production processes are typically prescribed by customer requirements. It may also be more difficult to make improvements on continually changing process lines.</p>
R&D	Medium	<p>Energy-savings opportunities that continue to be areas for industry research include membrane separation technologies, improved process control systems, including adjustments to control flooding in distillation columns; and process improvement through catalysis, which lowers the heat input necessary to convert reactant species into products.</p> <p>The sector also promotes research and funding into coal gasification due to its interest in developing less expensive feedstock and fuel alternatives to natural gas. Gasification is the first step in some coal-to-liquids (CTL) processes used to produce synthetic fuels (syngas) from coal. Some of this fuel can be used as feedstock for chemical products, and some can be used to power gas turbines, generating electricity and thermal energy with substantially lower SO<sub>x</sub>, NO<sub>x</sub>, and particulate emissions than coal.</p>

**Q.2. What are your latest offerings (In terms of product) for the chemical manufacturers in India?**

Everest Group has strongly realized and felt the shift of the industry towards energy efficient solutions. The Group stands today as one of the up and coming names in the vacuum industry, a fully integrated and diversified company involved in the Engineering, Evaluation, Designing, Manufacturing, Testing, Execution, Post Sales & Service of Pressure & Vacuum Systems. We aim to build the most cost-effective development firm, through the blending of our world-class 'best practices' with local experience and knowledge. We cater to the needs of local emerging economies.

Everest is the largest producer of Roots Blowers in South East Asia having effective presence in STP & ETP (Waste water treatment) industry, Pneumatic Conveying systems, Aeration systems, Aquaculture etc, to name a few.

The Group has diversified into design & installation of innovative systems for chemical & pharmaceutical industry based on technologies which have low impact on the environment, are energy efficient and have low operation & maintenance costs. The demand for such systems is growing exponentially due to increasing environmental awareness and corporate responsibility.

Everest Group has a lot of experience in sustainability chemistry or green chemistry, cleaner production, clean technologies, eco-efficiency, energy saving, resource saving, environment friendly techniques, etc., like:

- (a) Design & manufacture of solvent recovery systems to curb pollution. These systems not only play an important role by making the process eco-friendly but also recover precious solvents for reuse. Most of the pharmaceutical processes have low boiler solvents which are undesirable if expelled into atmosphere. On installation of solvent recovery system, most of the solvent can be recovered back. The demand of such systems is growing exponentially due to increasing environmental awareness and corporate responsibility.
- (b) Design & manufacture of CPCB approved vacuum systems for waste oil re-refining.
- (c) Design & manufacture of mechanical vacuum boosters for replacement of steam jet ejectors.
- (d) Design & manufacture of SUPERVAC vacuum systems using mechanical vacuum boosters and dry screw vacuum pumps – Dry Pumping Technology.
- (e) Design & manufacture of extended shaft Roots Blowers configuration for applications requiring 100% Oil Free Air like aeration in aquaculture farms, plating lines, STPs, etc.
- (f) Design & manufacture of Low Temperature Thermal Desalination systems for producing potable water ..... and many more.

**Q. 3. Majority of the chemical manufacturers fall in SME category in India. What are the steps you have taken (in terms of cost, suitable technology, marketing strategy etc) in this direction to attract them so that they become energy efficient?**

Everest's core competency lies in custom manufacturing special air blowers and boosters by alloying and cross linking diverse designs to suit specific requirements and import substitutes. It has built an expert technical team that has years of application associated experience and has developed capability to help serve the customers with effective solutions. As the company ably serves the Original Equipment Manufacturers (OEM's), it has gained in-depth knowledge of the critical requirements of OEM applications, in terms of power, space, noise, air flow, vibration, cost and more. With reference to standard models of air blowers and vacuum pumps, the company, through its unique design and engineering expertise, can develop a completely new model, or modify the existing design. The outcome is a custom air blower or vacuum pump that meets the exact requirements of OEM application at the lowest possible cost.

Over the period of two decades, application engineering has been the cornerstone of Everest's success. Its strength has been to work on new application areas and modify existing ones so as to reduce energy consumption, optimize performance and increase process efficiency. On account of many such new developments and applications, the company has carved a niche for itself in the equipment industry, offering customized solutions. Some of the developments include:

- 100% Oil Free aqua series blowers for fish and prawn culture. Modifications have been made to ensure 100% oil free air supply even under worst condition of oil seal failure.
- Development of mechanical vacuum boosters with PTFE seals for nitrobenzene and ortho-nitro benzene vapor handling in solvent recovery application. The use of modified boosters has resulted in process time reduction by almost 50%.
- Development of Dry vane pumps for low capacity, medium pressure applications, which were a long time demand of the small ETP plants.
- Development of SS blowers with special sealing for mechanical vapor recompression for heat recovery resulting in substantial energy saving.
- Engine driven blower package units developed to meet the demand of Indian Railways, which are used for thermit welding of railway tracks.
- Menthol distillation process improved by installation of vacuum booster resulting in higher yield and product purity. The modification received an impressive response and today practically all menthol distillation units have Everest Boosters as an integral part of the plant.
- Use of Everest boosters for waste oil recovery using an environmentally safe technology duly approved by Central Pollution Control Board.

**Q.4. What are the challenges you face while convincing SME players (Chemicals) to go for energy efficient drive? Has the situation improved in the recent past?**

Probably the most important issue for any industry today is better resource utilization, reduction in process time, higher yields & better product quality. The major issue of concern today is low energy consumption per unit of product

produced and this objective is a major decision factor which favours the chance of Everest's Product offerings over any other possible alternative. Innovation is the essence of the world today. Resources and market advantages don't matter much. Intellect and innovation do. There is nothing more powerful than the idea whose time has come. The chemical & pharmaceutical industry in India is also experiencing the same. However, current demand patterns suggest tremendous growth potential.

Convincing SME players to go in for energy efficient alternatives has always been a challenge by itself. However, the challenge persists only till cracking the first one for any application. The others just follow. We work like business partners with our customers. Being an indigenous company we at Everest totally understand the cost effectiveness & price implications faced by customers of a developing nation. Also as compared to our International counter parts, Everest has a high quality manufacturing unit in India & hence enjoys the benefit of having lower cost of production. Our management believes in forwarding these benefits / privileges to our customers, not compromising on quality, performance & services at any time.

We provide customized quality products, maintaining highest level of design and manufacturing standards, sized appropriately to give the most competitive prices and high levels of energy saving to our customer.

Design & Development is one thing which never stops at Everest. It is a continual process. Everest has been in an industrial segment with wide application areas. Our marketing team constantly works on identifying areas where our products can revolutionize process. Having identified a niche, our technical team designs and develops products to suit the requirements. For example, our vacuum boosters have found a niche in vacuum distillation processes in menthol industry where it has provided huge improvements in processing efficiency. At Everest we believe in diversifying our application engineering and earning out of satisfied customers rather than diversifying the product mix itself. Excellence in application engineering has been a key component in the company's growth and profitability.

***Submitted by:***

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