

“PROMOTING ENERGY EFFICIENCY AND RENEWABLE ENERGY IN SELECTED MSME CLUSTERS IN INDIA”

To develop and promote a market environment for introducing energy efficiency and enhanced use of renewable energy technologies in process applications in the selected energy-intensive MSME clusters, United Nations Industrial Development Organization (UNIDO) in collaboration with Bureau of Energy Efficiency (BEE) is implementing a project titled “Promoting Energy Efficiency and Renewable Energy in selected MSME clusters in India” funded by Global Environment Facility (GEF) and co-financed by Ministry of Micro, Small and Medium Enterprises (MoMSME) and Ministry of New and Renewable Energy (MNRE).

Installing 60 HP screw compressor with inbuilt VFD in a foundry unit

Objective

To minimize the energy consumption in the compressed air system by avoiding unloading of the compressor.

Implementation

Installed a 60 HP screw compressor with inbuilt VFD in place of existing five numbers of 15 HP reciprocating compressors and one 30 HP screw compressor. The total installed capacity was reduced from 105 HP to 60 HP.

Principle

Compressor without VFD operates at fixed speed and capacity. Thus, delivers same amount of compressed air equivalent to its rated capacity. However, varying process conditions and production levels have fluctuating compressed air requirement. This difference between lower actual demand vs fixed output from compressor results in unloading of the compressor consuming idle power. VFD installed screw compressors can speedup and slowdown in response to load. They are the best choice for efficiency when a compressed air load varies throughout the day.

- Offers a constant air flow at all times and guarantees a uniform pressure through out
- Improves the life of the compressor by limiting functioning time
- Reduces the electrical power consumption of the compressor system.

VFD air compressors can reduce the energy consumption by 10-40% compared to modulating compressors.



Unit Profile

Bhagiyam industries is a medium scale foundry unit located at Vellakinar, Coimbatore. The average monthly production of the unit is around 250 MT.

Benefits

- Lesser maintenance needed in screw air compressors compared to reciprocating compressor.
- By using VFD in screw air compressors, the operating pressure in the header and pressure needed for process and machinery can be maintained at required level.
- Reduced leakages as the leakage in the compressed air system is proportional to the operating pressure.
- Unloading pattern is eliminated with inbuilt VFD
- Reduction in plant machinery break downs



Savings

₹ 11,04,000



Investment

₹ 10,00,000



Pay Back

11 Months

Outcomes



1,38,000 kWh of annual energy saving



₹ 11,04,000 of annual cost saving



113.2 T of CO₂ reduction per year (0.82 kgCO₂/kWh)

Cost Economics

Energy savings per month	11,500 kWh
Energy saving per annum	1,38,000 kWh
Cost savings per year	₹ 11,04,000 (₹ 8 /kWh)
Investment cost	₹ 10,00,000
Simple Payback period	11 months



Replication Potential

In all the units with variable compressed air load

Calculation



Energy savings per annum (kWh/year) = (Energy consumption before implementation- after implementation, kWh/day) * no of working days/year

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Unit

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