

"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).

Installation of Auto Power Factor Controller (APFC) panel to maintain unity power factor in a dairy plant

Objective

Reduce the electricity bill by maintaining unity power factor in a dairy plant

Implementation

Installed an APFC panel to improve the power factor from 0.82 to 1.00 in a dairy plant.

Principle

Power factor (PF) is a ratio of active power (kW) to total power (kVA). It is in the range of 0 to 1. Improving the PF to unity will reduce the maximum demand (kVA) charges and distribution losses. Some electricity boards impose penalty for low PF and provide incentives for maintaining the PF near unity. These penalties could be avoided and incentives could be availed by maintaining the PF to unity with installation of APFC panel with capacitor banks.



Savings

₹ 4,48,752



Investment

₹ 3,00,000



Pay Back

8 months



Unit Profile

Katarwa Cattle feed Plant is a fully automated cattle feed plant of Gujarat with capacity 500 TPD. It was established in 2014 and working under Banaskantha District Co-operative Milk Union Producers Limited.

Benefits

- Reduction in maximum demand and demand charges
- Reduced distribution losses with in plant
- Incentive due to unity PF



Outcomes



Improved PF to unity



₹ 4,48,752 annual cost savings

Cost Economics

P.F incentive per month	₹ 37,396
Annual savings	₹ 4,48,752
Investment cost	₹ 3,00,000
Simple Payback period	8 months



Replication Potential

In all the units with low PF

Calculation



$kVAr \text{ Rating} = kW (\tan \phi_1 - \tan \phi_2)$; $kVAr$ = size of the capacitor needed, kW = average power drawn, $\phi_1 = \cos^{-1}$ (existing PF), $\phi_2 = \cos^{-1}$ (improved PF)

Annual cost saving = Average maximum demand charges per month * % of incentive on demand charges * 12 months/year

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