

Case Study

Kolkata fabric bleaching and dyeing company saves 72.72% energy – thanks to A.T.E.!**Background**

A fabric dyeing company based in Kolkata saved almost 72.72% on electricity when they replaced their old aeration system with Sulzer venturi jet aerators in their effluent treatment plant (ETP).

Challenges

The Kolkata dyeing company has a 1500 KLD ETP to treat the wastewater generated at various stages of the manufacturing process.

Their ETP tank had a venturi jet aerator system installed to produce an effective air-water mix for optimum aeration and suspension of solids. The aerators perform a dual role: supplying oxygen from ambient air; and providing agitation to keep the contents of the tank in a suspended state.

For the plant capacity of 1500 KLD with a tank size of 17 m x 8.5 m x 3.5 m, the company had installed six venturi jet aerators of 5.5 kW each. This system was designed to run all six jet aerators together to produce the required air and oxygen supply to the ETP. There was no backup – which means, a high amount of energy consumption with all the six pumps running together – 2,89,080 kWh per year, costing Rs 24,57,180/- per year! Also, as there was no pump on standby, the breakdown of even one pump would lead to inefficient mixing and aeration in the tank.

Solution

The management wanted a solution that would reduce their energy consumption, provide better mixing ratios, and reduce ETP downtime.

AQUATREAT ENGG. PVT. LTD., Kolkata along with A.T.E.'s engineers studied the problems and suggested a cost-effective and energy-efficient solution.

A.T.E.'s engineers replaced the old, inefficient venturi six-jet aerator system with Sulzer's venturi jet aerator system consisting of one active pump and two pumps on standby of 9 kW each. The system proposed by A.T.E. consisted of two operational aerators, with one aerator on stand-by. However, one Sulzer venturi jet aerator was sufficient to mix and aerate the tank as well as the six old venturi jet aerators did before, meeting both the total air requirement of 300 - 320 m³/hr and total oxygen requirement for keeping the residual DO of AT to 1.8 – 2.0 mg/l.



Sulzer venturi jet aerator

Result

Energy saving: As only Sulzer venturi jet aerator is operational at any given time, this resulted in huge saving in energy:

Energy consumed with six 5.5 kW venturi jet aerator/year	Energy consumed by one Sulzer 9 kW venturi jet aerator/year	Total energy saving/year
2,89,080 kWh	78,840 kWh	2,10,240 kWh

At a cost of Rs. 8.5/unit, the operational cost was reduced by Rs 17,87,040/year.

MLSS* ratio with six venturi jet aerators	MLSS ratio with one Sulzer venturi jet aerator	Increase in MLSS ratio
4500 (avg.) mg/l	5500 (avg.) mg/l	1000 (avg.) mg/l

*MLSS – mixed liquor suspended solids

The new system also boosted the MLSS ratio by 22.22% in the aeration tanks. This means that the biomass consumes higher percentages of organic pollutants at a time.

The downtime was eliminated as if one jet aerator stopped working, the standby aerators could take over. This reduced maintenance work as well.

Additional Benefits

The Sulzer venturi jet aerators supplied by A.T.E. provide more than adequate mixing and aeration at a very low noise level, with no aerosol formation, and no sedimentation on the bottom, thus minimising environmental effects.

Sulzer aerators are easily installed, stand-alone or portable with an optional fixed installation.

The customer was delighted with the incredible results – 72.72% energy saving and better ETP performance!