Area: Application of Gas Turbine in Co-generation Mode in Ceramic Industry

Topic: Saving in total energy cost (fuel consumption cost for spray dryer as well as electricity cost by cogeneration through Gas Turbine.

Problem: In ceramic Industry, raw material is mixed with water in a ball mill and then dried in a spray dryer. Electrical operating load in a typical tiles manufacturing unit is about 1000 KW. Grid Electricity tariff is about Rs. 3.85 /KWh. Plant operates 24 hours and 300 working days. Lignite is used as a fuel to generate producer gas which is fired in the spray dryer. Initial moisture content of input material to spray dryer is about 35 % and the output moisture content of product from spray dryer is about 5 %. Production from spray dryer is 10 T/hr. Lignite consumption is about 570 Kg/hr. Most of the ceramic industries are located at Morbi in Gujarat where natural gas is available. Price of natural gas is about Rs.16/m3 and GCV is 8800 Kcl/m3. Here in such application it is possible to install a Gas Turbine for power generation (1000 KW) and use exhaust of Gas Turbine (400 to 550 deg C) in spray dryer which completely eliminates use of producer gas (lignite) in the spray dryer. Here for co-generation, heat & power ratio can be taken as 20% power and 80% heat. Price of Lignite is 5000 Rs. per MT with GCV of 3500 per Kg.

Need: In ceramic industry, electricity & fuel cost constitutes 30 to 35% out of total production cost. Therefore, it is very important to bring down the energy cost. Use of exhaust of gas turbine will results in reduction/elimination of fuel cost in spray dryer. Thus it also reduces the Green house gas Emissions.

Expected Outcome:

1. Whether the cogeneration route through Gas turbine is technically feasible for this application?
2. Whether is it possible to completely eliminate the use of fuel in spray dryer?
3. Give the calculations in detail?
4. What will be the capital cost?
5. What will be the operation cost in co-generation mode and how much will be savings.