BENGAL FINE CERAMICS LIMITED

Heat Loss Reduction from Furnace by Insulation, Reduced Operation of Burners and Maintained Sager Sizes

SUMMARY OF THE OPTION

Bengal Fine Ceramics Ltd (BFCL) is a medium size producer of ceramic tableware located at Bhagalpur, near Dhaka, Bangladesh. Four furnaces or kilns are fired by 52 gas burners. The company managed to take 8 gas burners out of operation by repairing and installing insulation on some of the furnaces. There we no investment costs (in stock materials were used), annual savings are US$ 2249 and the payback period was immediate. Reduced natural gas consumption was 23,760 NM^3 per year and associated greenhouse gas emissions were reduced by 103 tons CO2 per year.

If the US$ 10,000 investment is made into sager sizing, then the potential natural gas savings are 63,360 Nm3, which is equivalent to 137 tons of CO2 emissions per year! Annual savings would be US$ 6,000 and the payback period would be 1.7 year. Investment costs are the main barrier.

KEYWORDS

Ceramics, Bangladesh, Furnaces and refractories, Insulation, Burners, Sager

OBSERVATIONS

There are four furnaces or kilns in the plant with a total of 52 gas burners to fire the kiln:
- Glost Kiln with 22 gas burners
- Biscuit kiln with 6 gas burners
- Decoration kiln with 12 gas burners
- Shuttle kiln with 12 gas burners

During the energy assessment of the kilns, it was found that
- Insulation of the furnaces is often damaged or missing, resulting heat loss
- The eyeholes of the furances are not insulated at all
- The temperature inside the factory is high

OPTIONS

The following options were proposed for implementation:
- Proper insulation of all furnaces
- Maintain proper sager size
- Reduce operation of burners based on resulting reduced heat loss

As energy losses were reduced through insulation, the plant managed to take 8 burners of the 52 burners out of operation.

However, for only part of the furnaces insulation was improved and sager sizes were not rearranged. The reason is lack of funds to implement this option throughout the factory, as capital was already

committed to other project in the factory for 2004 and 2005 and US$ 10,000 is needed for sager size management. This option will therefore be implemented in phases. In addition, this option is best implemented during a plant shutdown, and due to high product demand by export markets this was not possible before this case study was written.

RESULTS

Results of the partial implementation of this option are as follows:

Financial Benefits:

- Investment: none (in stock insulation materials were used)
- Annual operating costs: none
- Annual cost savings: US$ 4499 (47520 Nm^3 X Tk 5.68/Nm^3 = Tk 269,914)
- Payback period: immediate

Environmental Benefits:

- Annual natural gas savings: 47520 Nm^3 =17 K.Therm
- Annual GHG emission reductions: 103 tons CO2 (= 17 k.Therm X 5.919 tCO_2/K.Therm, using emission factor from the UNEP GHG Indicator, www.uneptie.org/energy/tools)

Other Benefits:

- Improved working conditions because as the heat loss through the furnace wall is reduced, the temperature inside the factory is also reduced

If the US$ 25,000 investment is made into sager sizing, then the potential natural gas savings are 23 K.Therm (63360 Nm3), which is equivalent to 137 tons of CO2 emission per year! Annual savings would be US$ 6,000 (63360 Nm^3 X Tk 5.68/Nm^3 = Tk 359 884) with a payback period of 1.7 year.

FOR MORE INFORMATION

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