CLUSTER PROFILE
THANGADH CERAMIC INDUSTRIES

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Thangadh ceramic cluster

Cluster background

Thangadh is a large ceramic cluster located in Gujarat close to Morbi ceramic cluster. The cluster is engaged in the production of sanitary wares. The basic raw material, fire clay, is locally available. Most of the wall and floor tile units established earlier in the cluster have now closed down but the sanitary-ware and refractory units are flourishing.

Cluster size and turnover

There are about 225 ceramic units operating in the cluster engaged in the production of sanitary-ware, refractory, wall tile and art tile.

Ceramic units operating in Thangarh cluster

S. No	Type of industry	Units[1]
1	Sanitary wares	161
2	Refractories	45
3	Wall tiles	8
4	Art wares	11
	Total	**225**

The capacity-wise distribution of Thangarh ceramic units is shown in the table below. Some of the large units in the cluster are Anchor Sanitarywares, Deep Ceramic, Porous Tiles, Sunrise Pottery Works, Choice Sanitary Ware Industries, Top Anchor Industries, Choice Traders and Ariston Ceramic[2]. The annual turnover of the cluster is about Rs 150 crores. The cluster provides direct employment to 15,000 people.

Distribution of units – Capacity-wise

S. No	Size	Range (tpd)	Number of units
1	Small	1 – 4	50
2	Medium	4 – 8	100
3	Large	> 8	75

Industry associations

There are two industry associations in the cluster:

- Federation of Ceramic Industries
- Panchal Association

These associations organize cluster-level events and represent the cluster in various government and business forums.

[1] Number of units operating in Thangadh region are taken from Thangadh Ceramic Directory, published recently in 2009

[2] Local GEB *Office*

Technology status and energy use

Kiln is widely used for production of different ceramic units. Natural Gas (NG) and charcoal are widely used as fuel in the kilns. With the availability of NG in last two years, a number of units have already switched over to NG firing. There is significant potential for a large number of units to switch over to NG.

The typical production process of a sanitary-ware unit is given below:

(i) Wet grinding

The raw material is mixed with water in a ball mill for wet grinding to reduce the size of the material. The slip, that is formed, is kept agitated in agitator to homogenize which is then stored in silos. The slip contains around 30-35% moisture which is added in ball mill.

(ii) Moulding

The slip (slurry) is poured into the moulds by a hand held hose. The slip is pumped through hydraulic pump into the mould.

(iii) Drying

The cast wares are then dried in natural environment with the help of ceiling fans.

(iv) Glazing

The dried wares are glazed in several spray glazing booths, where compressed air is used.

(v) Firing

The glazed wares are then fired in the kilns upto a temperature of 1200 ^{o}C where the natural gas or oil is used as a fuel. The output from kiln is inspected before packaging and dispatch.

The major energy consuming centres include raw material preparation (ball mill), spray dryer (for tile units), and kiln. Energy cost accounts for about 30-35% of the total cost of production. The energy usage in the cluster is shown in table.

Energy consumption in Thangarh ceramic cluster (2009)

	Energy consumption per year		
Energy form	Quantity	toe/ yr	Share
Charcoal	5500 t	3,740	11%
Diesel	360,000 lit	306	1%
NG	33 million Sm^3	28,050	83%
Electricity	18 million kWh	1,548	5%
Total		33,644	100%

Energy and environmental performance

The SEC of sanitary ware units vary between 0.074–0.105 toe per tonne. The performance of the cluster calculated in terms of specific energy consumption (SEC) and the emission intensity (EI) are given in table below.

Performance of Thangarh ceramic cluster

Total energy consumption	33,644 toe
Specific energy consumption	0.091 toe/tonne
Total CO_2 generation	0.10 million tonne
Emission intensity	0.27 t CO_2/ t product

Options to enhance energy efficiency

Thangarh ceramic cluster offers good potential for energy saving. Kiln offers significant potential for thermal energy savings. Apart from the kiln, significant energy saving potential exists in raw material preparation section and electrical drives.

(i) Kiln

Kiln is the major energy centre that offers good potential for energy saving. The energy saving options include the following:

(a) Waste heat recovery system

The heat available in the cooling zone can be recovered in a waste heat recovery (WHR) system for preheating the combustion air that would help in improving the thermal efficiency of the kiln.

(b) Improved insulation

The existing status of insulation suggest that it can be improved, which would help in reducing the structural heat losses of the kiln.

(c) Replacing kerosene burner with natural gas burner

Majority of the burners used in tunnel kilns use kerosene burners that reduce the combustion efficiency. Replacing the kerosene burners with natural gas burners would help in improving the combustion efficiency and hence the overall energy efficiency of the kiln.

These energy efficiency options would help in reducing the overall energy consumption by about 15%.

(ii) Use of low thermal mass materials

High thermal mass thermal cars are used generally for moving the products through the tunnel kiln. The dead weight of the refractories is quite high, which are subjected to alternate heating and cooling cycles. Low thermal mass cars would help in reducing these losses. It is estimated that this would help in reducing the energy consumption of tunnel kiln by about 10%.

(iii) Preheating slurry using solar dryer/ heat pump

The slurry which enters the spray dryer can be preheated by solar dryer or heat pump that would help in reducing the energy consumption in the spray dryer by about 5%.

(iv) Energy conservation measures in electrical systems

Raw material preparation is the main area which uses electrical energy. Measures such as use of BEE-star rated energy efficient motors in place of conventional motors, energy efficient

hydraulic pumps, better on-off control systems for agitators, etc would help in reducing the electrical energy consumption by about 15%.

Table below summaries the total energy saving and CO_2 reduction potential in the cluster.

Energy saving and CO_2 reduction potential

Total energy saving potential	8,800 toe/yr
Total CO_2 reduction potential	0.02 million tonne

Reference

1. Situation analysis report – Thangarh ceramic cluster
2. Field visits and discussions with key stakeholders in the cluster