CLUSTER PROFILE

SURAT TEXTILE CLUSTER

Background

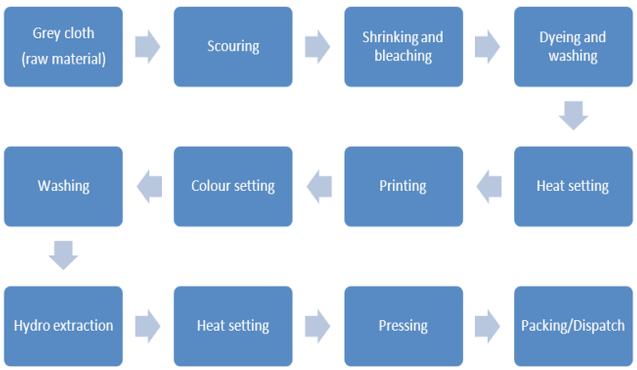
One of the largest textile manufacturing clusters in India is located in Surat (Gujarat).The Surat cluster accounts for over 18% of the total manmade (synthetic) fibre exports and 40% of manmade fibre production in the country. The products primarily comprise synthetic sarees & dress materials and cotton dress materials. There are about 400 textile processing units in the cluster, operating over 600,000 power looms and providing employment to around 12 lakh workers. Of the 400 units in the cluster, around 330 are integrated units with facilities for both dyeing and printing, while the remaining70-odd units have only dyeing facilities. The cluster units have formed an association—South Gujarat Textile Processors Association (SGTPA)—which addresses various issues of the units and provides a common platform for constructive and mutually beneficial interaction and decision making.

Profile of Surat textile cluster

Unit category	*Production capacity (metres/day)*	*Number of units*
Small	Less than 50,000	146
Medium	50,000–100,000	168
Large	Above 100,000	86
	Total	400

Technology status and energy use

The primary raw materials used in textile manufacture are grey cloth, polyester yarn, and various chemicals like soaps, caustics, and dyeing and bleaching agents. Grey cloth usually contains many coloured impurities like minerals, waxes, proteins, and so on, which are removed by scouring, bleaching and shrinking. The fabric is then dyed and printed to get the finished products. Scouring is usually carried out in 'soflina' machines, while bleaching and shrinking are carried out in drum washers. Dyeing is mainly carried out in jet dyeing machines and jigger machines. Printing is usually carried out by mechanized screen printing processes, i.e. flatbed printing or rotary printing. After printing, the fabric is passed through looping machines, hydro extractors and 'Stenter' machines that dry the fabric, enable the colours to set properly and restore the fabric's width.



Process flow in a typical textile unit

The units use both electricity and thermal energy in their processes. Electricity is primarily drawn from the grid, and used to operate pumps, fans, drives and for lighting. As grid electricity is relatively expensive, some units have installed natural gas based generators to meet part of their electricity needs. Thermal energy is mainly obtained from lignite, imported coal and natural gas which are readily available, given Surat's proximity to the port of Hazira (about 25 km away). Coal and lignite are primarily used as fuel in boilers for steam generation, and NG is used in machinery like Stenter machines (for heat setting) and loop machines. The energy cost represents about 12–15% of total manufacturing cost.

Annual energy consumption in Surat textile cluster			
Fuel	*Quantity*	*Energy consumption (toe)*	*Share (%)*
Coal/ lignite	2.3 million tonnes	943,400	73
Natural gas	315 million Sm^3	283,200	22
Electricity	726 million kWh	62,400	5
	Total	1,289,000	100

The total energy consumption of the Surat textile cluster is about 1.29 million tonnes of oil equivalent (mtoe). The average specific energy consumption (SEC) of the textile units in Surat cluster is 0.4 toe per 1000 metres.

Options for energy saving

There is significant scope for improving the energy performance of units. Some best operating practices include improved steam trap management system, improved insulation of steam, hot water and condensate lines. An energy saving potential of about 110,000 toe has been identified in the Surat textile cluster through the adoption of best operating practices and the best available technologies. Some of the energy efficiency options identified for Surat textile cluster are given below.

Energy efficient steam turbine

Options for energy efficiency in Surat textile cluster			
Energy efficiency option	*Investment (Rs lakhs)*	*Annual saving (Rs lakhs)*	*Payback period (years)*
Stenter machine – Adopt energy efficient systems	95	12.2	8.0
Stenter machine – Install variable frequency drives (VFD)	0.4	0.5	0.8
Jet machine – Incorporate waste heat recovery (WHR) system for hot water drain	6	10.2	0.5
Boiler – Include on-line flue gas monitoring system and control	5	5.5	1.0
Condensate recovery – install pressure powered pumping packaged unit	5	2.4	2.0
NG based cogeneration system	100	27.8	3.6
Steam based cogeneration system	350	78.7	4.4
Tri-generation using micro turbine technology	40	26.4	1.5

Compiled by TERI from the 'Manual on energy conservation measures in textile cluster, Surat, Gujarat' under the BEE-SME Programme, 2010-11