BEE's National Program
on
Energy Efficiency and Technology Up-gradation in SMEs

Pali Textile Cluster

Baseline Energy Audit Report
Sonu Industries




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InsPIRE Network for Environment

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List of Abbreviations

APH	Air-preheater
BEE	Bureau of Energy Efficiency
BD	Blow Down
BOP	Best Operating Practice
BFW	Boiler Feed Water
CETP	Common Effluent Treatment Plant
CSE	Center for Science and Environment
CRS	Condensate Recovery System
FD	Forced Draft
HP	Horse Power
ID	Induced Draft
kcal	Kilo Calories
kg	Kilogram
kVA	Kilo Volt Ampere
kW	Kilo Watts
MSME	Ministry of Micro Small and Medium Enterprises
RTHPA	Rajasthan Textile and Hand Processors Association
RO	Reverse Osmosis
SEC	Specific Energy Consumption
SFC	Specific Fuel Consumption
SPC	Specific Power Consumption
SME	Small and Medium Enterprise
SO	Sulphur Oxide
TDS	Total Dissolved Solids
TFH	Thermic Fluid Heater
VFD	Variable Frequency Drive

About The Project

The project titled "BEE's National Program on Energy Efficiency and Technology Up-gradation in SMEs" supported by Bureau of Energy Efficiency (BEE), Ministry of MSME and Rajasthan Textile and Hand Processors Association (RTHPA) aims to bring down the energy demand of MSME industries located at different clusters around the country. Pali Textile Processing cluster located at Pali, Rajasthan is one such cluster, which has been selected under the program. The project aims to support the MSME units in Pali to implement Energy Efficient Technologies in the SME units.

There are more than 400 Small and Medium Enterprise (SME) textile processing units operating in the various industrial pockets of Pali. The project aims to initially diffuse energy efficient technologies in selected units in the cluster. These units will act as demonstration units for long term and sustainable penetration of energy efficient technologies in the entire cluster. InsPIRE Network for Environment, New Delhi has been appointed as the executing agency to carry out the following activities in the cluster:

- Conducting pre-activity cluster workshop in the cluster.
- Conducting initial walk through audits in 5 representative units of the cluster.
- Identify and propose BEE on energy efficient process technologies, relevant to the cluster, with highest energy saving and replication potential, and their cost benefit analysis.
- Identify local technology/service providers (LSP) for the above technologies in the cluster
- Identify SME units willing to implement and demonstrate the energy efficient technologies
- Assist BEE to enter into a contract with each of the shortlisted SME units to enable implementation and showcasing of Energy Efficient technology.
- Conduct comprehensive Baseline Energy Audits in the shortlisted SME units wherein these technologies can be implemented and document the findings in the form of a report.
- Develop technology specific case studies (Audio-Visual and print) for each technology
- Prepare Best Operating Practices (BOP) document for the top 5 energy using equipment / process in the industry cluster
- Enumeration of common regularly monitorable parameter at the process level which have impact on energy performance, and listing of appropriate instrumentation for the same with options including make, supplier, indicative cost specifications and accuracy of measurements.
- Carry out post implementation energy audit in the implemented units to verify energy savings as a result of EE technology implementation.
- Verify and submit to BEE all the relevant documents of each participating unit owner indicating his complete credentials, proof of purchasing the equipment, evidence of implementation and commissioning of the EE technology in the unit.

As part of the activities conducted under the energy efficiency program in Pali Textile cluster, detailed energy audits in 11 Textile units in Pali was conducted in the month of March and April'2016. This specific audit report details the findings of the energy audit study carried out at Sonu Industries.

Executive Summary

1. Unit Details

Unit Name	:	**Sonu Industries**
Address	:	E-26, Mandia Road, Pali, Rajasthan- 306401
Contact Person	:	Mr. Ravi Mohan Bhutra, Proprietor (Cell no: 9001420420)
Products	:	Cloth processing (cotton)
Production		50,000 to 80,000 meters of processed cloth per day
DIC Number		080201100168
Bank Details		HDFC Bank, Station Road, Pali, A/c No.: 50200012916612, IFSC Code: HDFC0000710
TIN / PAN No.	:	TIN: 08673252885 PAN: AAAHR9517H
Contract demand		

2. Existing Major Energy Consuming Technology

Wood Based Steam Boiler

- Steam boiler with no provision for pre-heating of boiler feed water and combustion air. Also, the unit do not have boiler feed water treatment facility.
- Prevailing specific fuel consumption is 0.186 kgs of Wood per meter of processed cloth. High TDS in the feed water leads to frequent blow-down of boiler.

Jigger Machine

- A total of 22 numbers jigger machines used for cotton dyeing at elevated temperature (60-80 ^{0}C). Jiggers are not equipped with temperature monitoring and control system.
- Each jigger machine uses 2000-2500 liters of water in each cycle.

3. Proposed Energy Saving Technologies with Cost Economics

Proposed Energy Saving Measures

- Installation of new energy efficient boiler
- Installation of RO system for treatment of feed water to boiler.
- Installation of temperature monitoring and control system in jigger machines

Table 1: *Cost Economic Analysis*

Technology	Estimated Energy Savings (%)	Savings (in Rs)	Investment (in Rs)	Simple Payback period (Months)
New energy efficient boiler	32	77,13,000	10,00,000	1.6
Reverse Osmosis (RO) system in steam boiler	4.4	6,32,194	2,00,000	4
Temperature Monitoring & Control in Jigger Machines (for 10 Jiggers)	5.7	3,28,168	2,50,000	9

Introduction

1.1 ABOUT THE CLUSTER

The Pali textile cluster is one of the biggest SME clusters in Rajasthan having over 350 member industries. The units in the cluster are mainly located in industrial areas namely Industrial Area Phase I & Phase II, Mandia Road Industrial Area and Punayata Industrial Area. Balotra and Bhilwara are other textile clusters in Rajasthan. These clusters also have similar processes and any intervention in Pali would benefit entrepreneurs in these clusters as well. Pollution of nearby river was a significant environmental issue. Center for Science and Environment (CSE) conducted a study to assess the situation behind the environmental issues. The units faced closure for a long time due to legal actions and decided to set up a Common Effluent Treatment Plant (CETP) for redressal the waste water related issues. The CETP is being operational under a trust managed by the entrepreneurs themselves.

Ironically, even though none of the resources required for textile processing is available locally, the textile cluster at Pali has grown despite the odds. The industrial area has no water and all the water required is transported from a distance of over 20 KM. The labour working in the cluster is mostly from outside Pali, at times from as far as Eastern UP and Bihar. Equipment suppliers are all based in Gujarat and Pali does not have enough local service providers or consultants. Even the grey (raw) cloth, dye and chemicals are brought mostly from Maharashtra and Gujarat. Coal or residual pet Wood is also not available locally.

Only resources that are available locally is the entrepreneurship of the people, availability of clear sky for over 340 days in an year and good power availability. Presence of a pool of dye masters to process over 400 shades through colour recipe based on experience is another plus for Pali. Initially, Surat used to be the largest processing center for dyeing but a large portion of the job there got outsourced to Pali due to problems like Pollution, Flood, Plague etc.

1.2 ABOUT THE UNIT

M/s Sonu Industries, Pali, was established in the year 2003 and is engaged in processing of cloth (Cotton) which includes raw cloth (grey) processing, dyeing and finishing operations. The manufacturing unit is located at E-26, Mandia Road, Pali. The unit operation is overseen by Mr. Ravi Mohan Bhutra, Proprietor.

The raw material procured by the unit includes grey (raw cloth) purchased from various sources predominantly from Gujarat and Maharashtra. The unit operates for 8-10 hours per day, presently.

The daily production lies in the range of 50,000 to 80,000 meters of processed cloth per day. The major energy usage in the unit includes wet steam (generated from wood fired boiler) and electricity. The average monthly Wood consumption (derived from reported date of last one year) in the unit is 1,25,000 Kgs. The average monthly electricity consumption (derived from reported date of last one year) is 5,053 kWh. ***Figure 1.1*** depicts monthly electricity consumption vis-à-vis total monthly production of the unit for last one year. ***Figure 1.2*** depicts monthly Wood consumption vis-à-vis total monthly production for last one year.

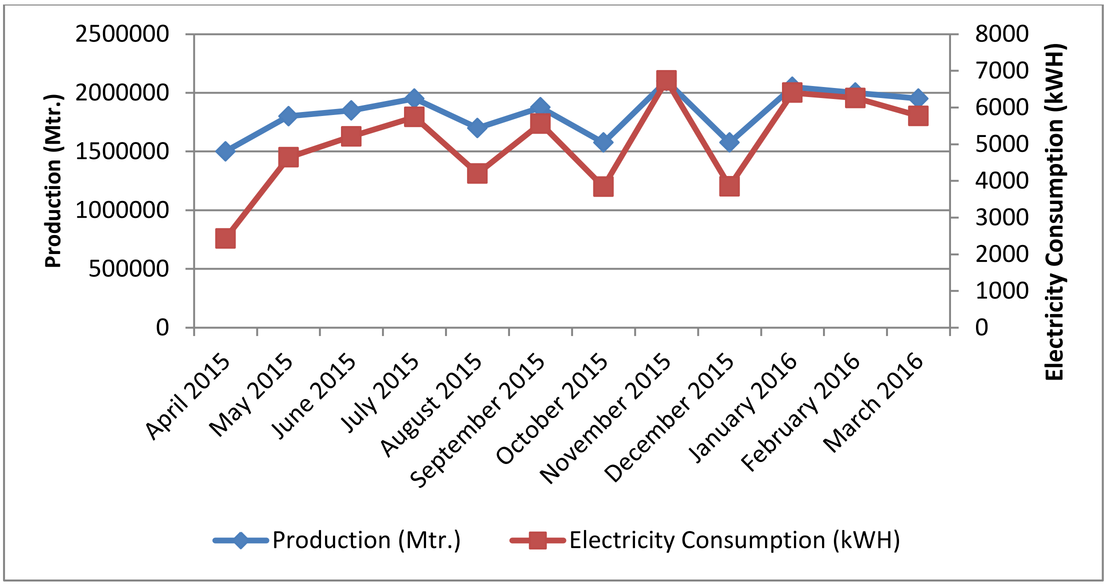

Figure 1.1: ***Monthly variation of production and electricity consumption***

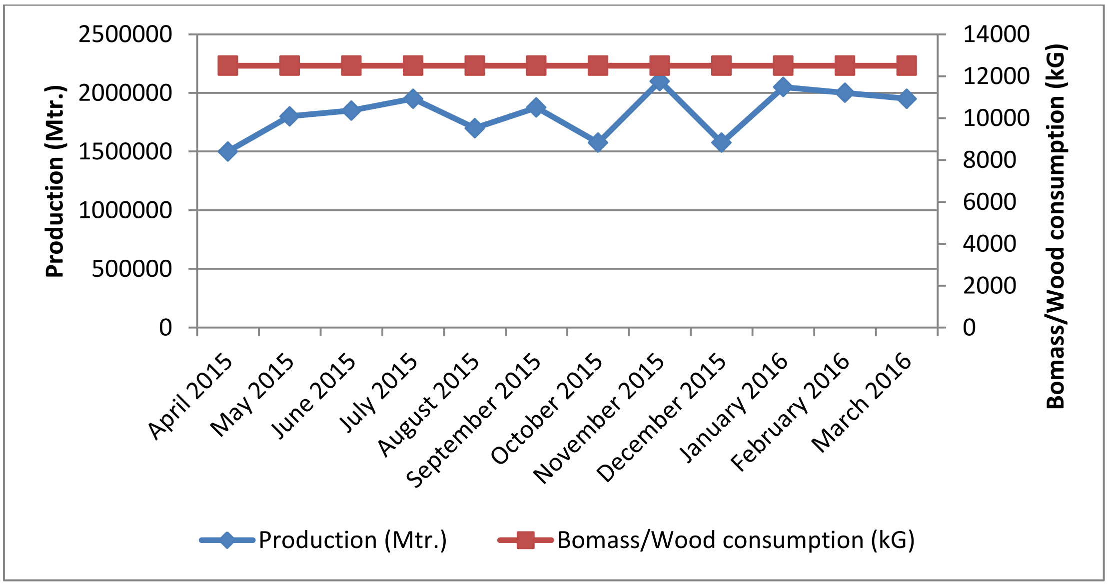

Figure 1.2: ***Monthly variation of production and Wood cosumption***

Figure 1.3 and ***Figure 1.4*** below respectively depicts the variation in specific electrical energy consumption and specific thermal energy consumption vis-à-vis the monthly production for last one year.

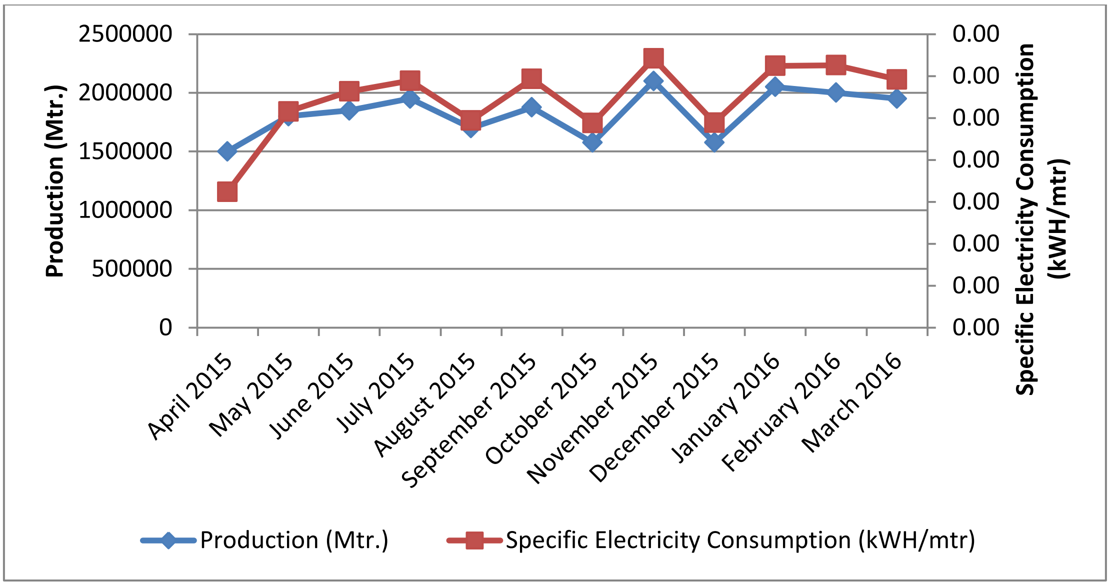

Figure 1.3: ***Variation in specific electrical energy consumption and monthly production***

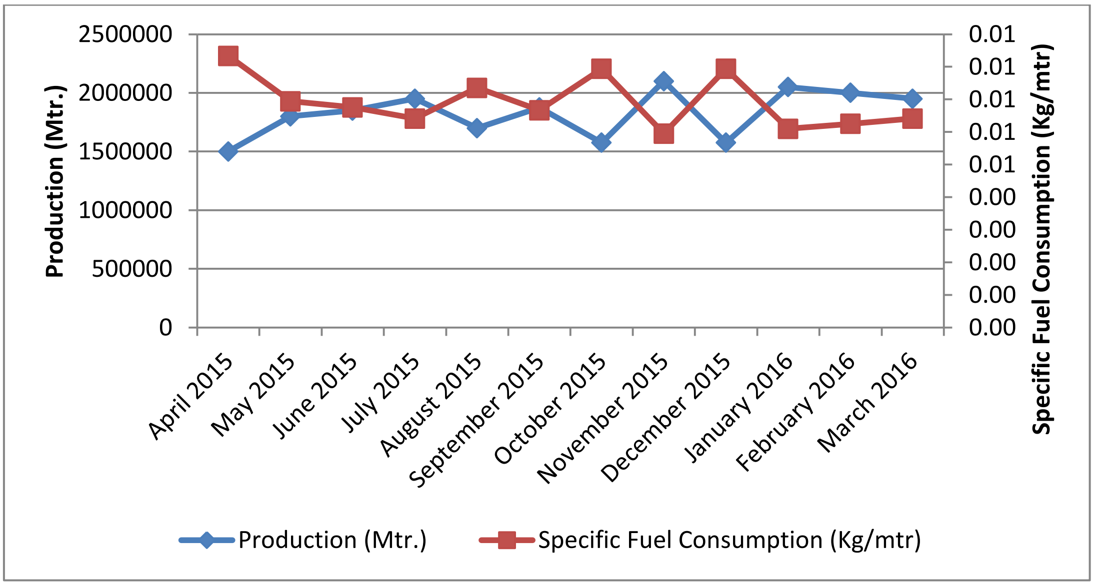

Figure 1.4.: ***Variation in specific fuel consumption (Wood) and monthly production***

According to the assessment of the energy consumption data as reported by the unit (filled in questionnaire attached), the specific thermal energy consumption of the unit varies from 6 kCal/mtr to 11 kCal/mtr over a period of one year with an average of 9.81 kCal/mtr. The specific electrical energy consumption of the unit varies from 0.002 kWh/mtr to 0.003 kWh/mtr over a period of one year with an average of 0.003 kWh/kg. The unit uses Wood/wood as fuel with a calorific value of 3600 kCal/mtr. The total average specific energy consumption (in kcal), based on reported data for one year, is estimated as **12.15 kCal/mtr** of product. The energy consumption pattern for the unit has been summarized below at ***Table 1.1***.

Table 1.1: ***Energy consumption details of Sonu Industries***

SN	Parameter	Unit	Value
1	Name and address of unit	Sonu Industries, E-26, Mandia Road, Pali, Rajasthan-306401	
2	Contact person	Mr. Ravi Mohan Bhutra, Proprietor	
3	Manufacturing product	Processed cloth (Cotton)	
4	Daily Production	50,000 to 80,000 mtr per day	
Energy utilization			
5	Average monthly electrical energy consumption	kWh	5,053
6	Average monthly fuel (Wood) energy consumption	kg	12,500
7	Average specific thermal energy consumption	kCal/mtr	9.81
8	Specific electrical energy consumption	kWh/mtr	0.003
9	Specific energy consumption[1,2]	kCal/mtr	12.15
10	Electrical energy cost[3]	Rs/mtr	0.02
11	Thermal energy cost[3]	Rs/mtr	0.03

Note:

[1]: Specific gross calorific value of wood has been considered as 3600 kCal/kg

[2]: Thermal equivalent for one unit of electricity is 860 kCal/kWh.

[3]: The unit operates for 25 days a month (1 shift of 12 effective hours per day).
Cost of electricity has been taken as Rs 6.50 / kWh
Cost of Wood has been taken as Rs 5 /kg

1.3 PRODUCTION PROCESS OF PLANT

The ***Figure 1.5*** below shows the typical process employed at processing of textile products at Sonu Industries:

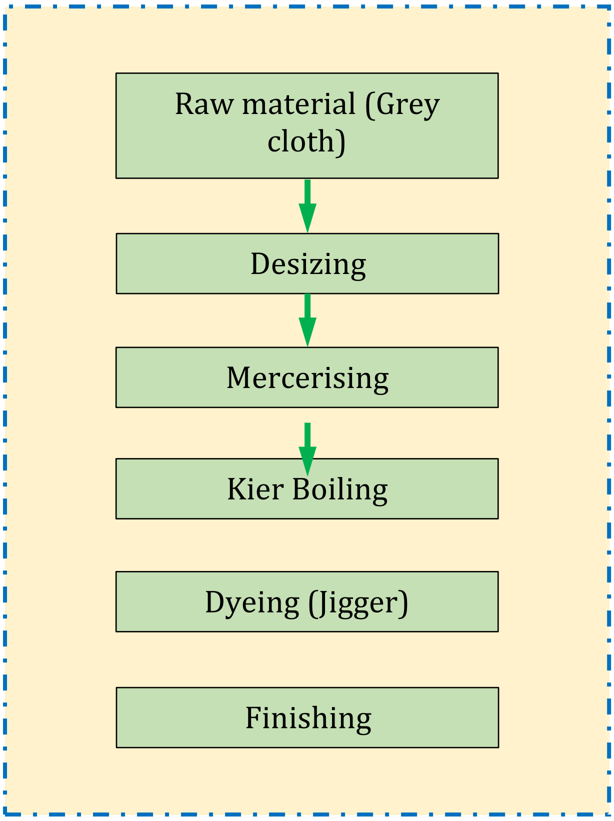

Figure 1.5: ***Production process at Sonu Industries***

1.4 ENERGY AUDIT METHODOLOGY

The primary objective of the energy audit was to quantify the existing energy consumption pattern and to determine the operating efficiencies of key existing systems. The key points targeted through energy audits were determination of specific energy consumption, various losses, operation practices like production, fuel consumption, steam utilization and losses, process temperatures, electrical energy consumptions etc. Pre – planned methodology was followed to conduct the energy audits. Data collected at all above steps were used to calculate various other operating parameters like material processing rate (mtr/hr), specific electricity consumption (kWh/kg), specific steam utilization (kg/kg), etc. The energy audit methodology is depicted in ***Figure 1.6*** below:

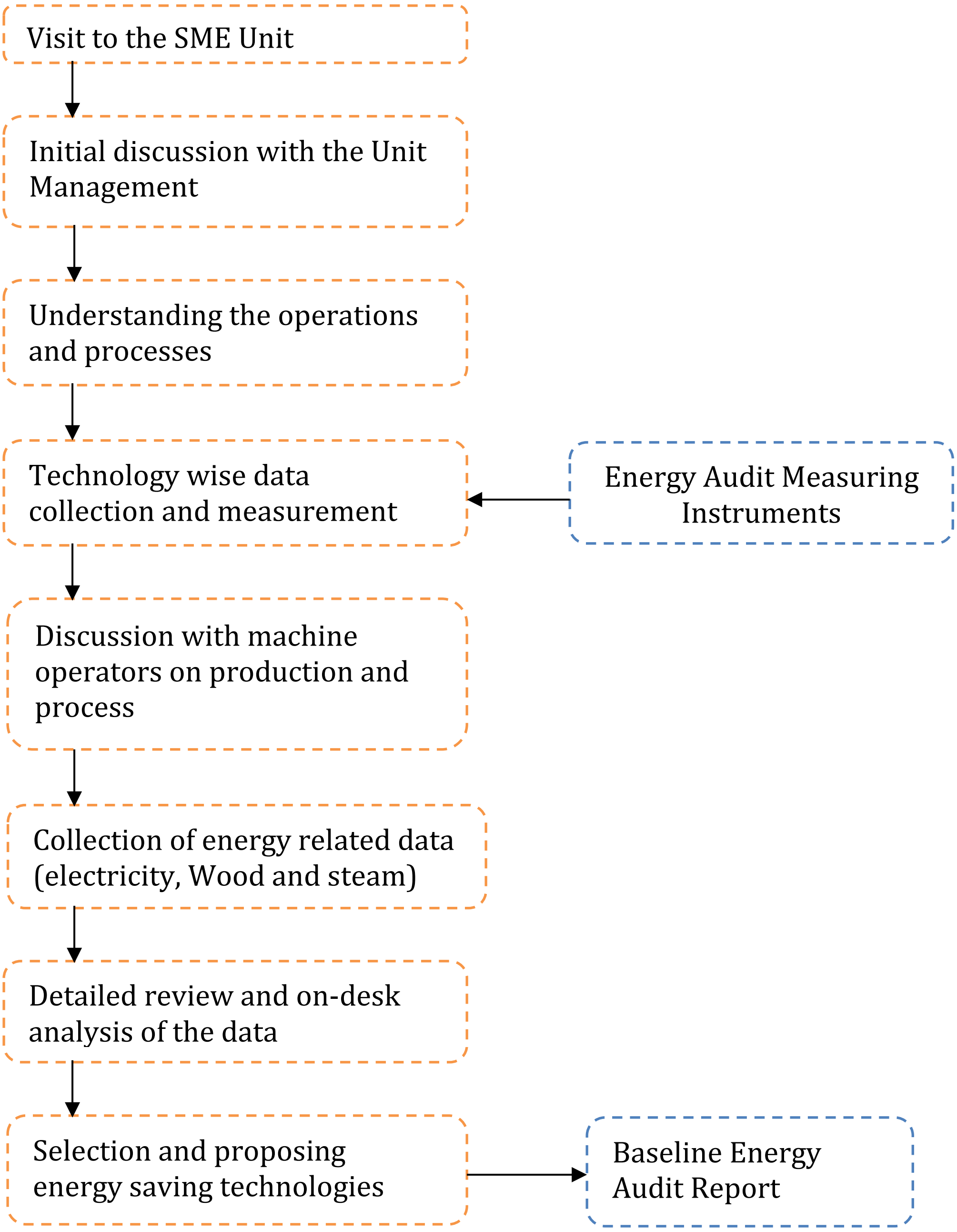

Figure 1.6: ***Energy audit methodology***

1.5 UNIT PHOTOGRAPHS

Caption: Natural drying area at Sonu Industries

Caption: Cotton fabric dyeing using Jigger Machines

Caption: Kier boiling unit at Sonu Industries

Caption: Boiler unit at Sonu Industries

Caption: Caustic processing unit at Sonu Industries

Caption: Finished fabric

Present Process, Observations and Proposed Technology

2.1 INSTALLATION OF NEW ENERGY EFFICIENT BOILER WITH ECONOMIZER

2.1.1 Present Process

Sonu Industries has installed a steam boiler of 2 tonnes capacity to generate wet steam required for the process. Steam is used at a working pressure of 4-5 kg/cm^2. Wood is used as the fuel for the steam boiler. The heating chamber consists of a fluidized bed of Wood wherein air is supplied from bottom. The heat generated by combustion of Wood and air is used to heat water to form steam. The steam generated is used in various processes across the unit. The boiler operates for an average of 12 hours daily.

2.1.2 Observations

The steam boiler operating in the unit is a packaged boiler with fire tube design. Steam is the main agent of energy used in the textile processing unit. Thus, the boiler is the major energy utilizing source in the unit. The existing boiler used at Sonu Industries is old and with obsolete design with no provisions for waste heat recovery. The feed water to the boiler is fed at ambient temperature (35^{0}C) and the stack temperature was observed to be around 180^{0}C. No monitoring is being done towards feeding of Wood and air into the boiler. In order to analyse the boiler performance, a detailed study was carried out in the unit.

The specific fuel consumption of Wood was observed to be around 0.186 kgs of Wood per meter of the processed cloth which is higher in comparison to the values for other units. It was observed that there was a large amount of heat dissemination from the boiler side walls.

The efficiency of the existing boiler was worked out to be 45%. Based on the existing boiler condition and usage, it is proposed for installation of a new energy efficient boiler of 2 tonnes capacity with Wood firing with the following features:

- Modified boiler chamber design for optimum capacity utilization.
- Better refractory and insulation for reduced radiation loss from boiler walls.
- Installation of economizer with provision for boiler feed water preheating.
- Installation of air-preheater for preheating of combustion air.
- Proper monitoring of Wood feed rate and flow of combustion air.
- Provision of dust collector to suit environmental norms.

2.1.3 Conclusion

As per the study conducted in the unit, it is suggested to install a new energy efficient boiler with economizer with Wood firing. The new boiler should have provisions for waste heat recovery for boiler feed water preheating and combustion air preheating.

The installation of the new energy efficient boiler will lead to following benefits:

- Reduced fuel cost
- Improvement in boiler efficiency
- Reduced feed water requirement.
- Reduction in FD/ID fan power usage
- Improved environment

2.1.4 Cost Economics Analysis

The section below provides a cost benefit analysis for installation of new energy efficient boiler in the unit:

Table 2.1: ***Cost Economic Analysis of proposed new energy efficient boiler***

SN	Parameter	Unit	Value
1	**Existing boiler**		
2	Quantity of steam generated per hr (Q)	kg/hr	2000
3	Quantity of fuel used per hr (q)	kg/hr	775
4	Energy input	kcal/hr	2790000
5	Working Pressure	kg/cm²	10
6	Temperature of feed water	°C	35
7	Type of fuel		Wood
8	Calorific Value of fuel		3600
9	Enthalpy of steam	kCal/kg	665
10	Enthalpy of feed water	kCal/kg	35
11	Boiler Efficiency	%	45
12	Annual Fuel consumption	kg/yr.	2790000
13	Annual Fuel cost	Rs/yr.	13950000
14	**New Energy efficient boiler with economizer**		
15	Quantity of steam generated per hr (Q)	kg/hr	2000
16	Boiler Efficiency	kg/hr	60
17	Working Pressure	kg/cm²	10
18	Temperature of feed water	°C	35
19	Type of fuel		Pet-coke
20	Calorific Value of fuel		8200
21	Enthalpy of steam	kCal/kg	665
22	Enthalpy of feed water	kCal/kg	95
23	Quantity of fuel used per hr (q))	kg/hr	231
24	Energy input	kcal/hr	1894200
25	Savings in terms of energy	%	32
26	Annual Fuel consumption	kg/yr.	831600
27	Annual fuel cost	kcal/yr.	6237000

SN	Parameter	Unit	Value
28	Annual cost saving	Rs/yr.	7713000
29	Investment	Rs/yr.	1000000
30	Pay back	months	1.6

*Cost of Wood has been considered as Rs 5/kg and cost of pet coke has been considered as Rs 7.5/kg

As per the detailed calculations done, it is proposed to install a new energy efficient boiler in the unit. The estimated energy saving with the installation is 6237000 kCal annually which can save an amount of Rs. 77,13,000 per year. Thus the cost of the economizer (estimated to be Rs. 10,00,000) can be recouped in less than 2 months.

2.2 BOILER FEED WATER TREATMENT

2.2.1 Present Process:

Sonu Industries has installed 1 number of steam boiler of 2 tonnes capacity. Since, Pali cluster do not have any internal source of water, water to be used in the boiler is sourced from nearby areas. Presently, the unit is not applying any kind of process treatment for the feed water to the boiler. The total dissolved solids (TDS) content in the boiler feed water intends to surplus the maximum permissible TDS of the boiler due to repeated use of water. This leads to frequent boiler blow-down operation of the boiler, where a certain amount of water is blown off and is automatically replaced by feed water thus maintaining the optimum level of total dissolved solids (TDS) in the boiler water. In Sonu Industries, boiler blow-down is carried out at a frequency of 4 hours every day. The frequency of blow-down is predominantly dependent of the high level of TDS in the boiler feed water. During each Blow-Down (BD) operation, a large quantity of energy in the form of steam is wasted into the atmosphere.

2.2.2 Observations

The TDS level of the feed water used for the steam boiler at Sonu Industries was reported to be 500 ppm, which when continuously used intends to surplus the permissible TDS level which is around 2000-3000 ppm. When feed water enters the boiler, the elevated temperature and pressure cause the components of water to behave differently. Under heat and pressure, most of the soluble components in the feed water come out of the solution as particulate solids, sometime in crystalized forms and other times as amorphous particles. When solubility of a specific component in water is exceeded, scale or deposits develop. Deposit in boilers may result from hardness contamination of feed water and corrosion products from the condensate and feed water system. Deposits and corrosion result in localized heating, efficiency losses and may ultimately result in failure of boiler tube and inability to produce steam. In order to avoid deposits or scale formation in the boiler lining, blow-down operation is carried out in the boiler. The process of blow-down involves blowing off a portion of the water and replacing it with fresh feed water.

In case of Sonu Industries, intermittent blow-down operation is practiced at frequency of 4 hours. The blow-down is done with the use of a valve fitted to discharge pipe at the lowest point of the boiler. The blow-down process is carried out for a period of 1-2 minutes. Approximately 1500-1700 liters of water is lost every day in the blow-down operation.

In order to reduce the blow-down operation in the boiler and to maintain the permissible level of TDS, it is suggested for pre-treatment of boiler feed water. This external treatment of boiler feed water can be done in a number of ways. One of the most feasible options is the 'Reverse Osmosis' processes.

2.2.3 Conclusion

In order to maintain the TDS of boiler feed water close to the permissible range, it is suggested to install a revise osmosis (RO) plant in the unit. When solution of differing concentration are separated by a semi-permissible membrane, water from less concentrated solution passes through the membrane to dilute the liquid of high concentration, which is called osmosis. If the solution of high concentration is pressurized, the process is reversed and water from the solution of high concentration flows to the weaker solution. This is known as reverse osmosis. The quality of water produced depends upon the concentration of the solution on the high-pressure side and pressure differential across the membrane. The process is suitable for waters with high TDS.

Installation of the RO system of required capacity can lead to considerable reduction in boiler blow-down, thus leading to a saving in steam. The membrane for RO system can be suitably selected based on the TDS level of the unit.

Benefits of the installation of the RO system are:

- Lower boiler blow-down
- Less make up water consumption
- Steam saving as a result of reduced blow down
- Reduced maintenance downtime
- Increased boiler life
- Reduced fuel cost

2.2.4 Cost Economics Analysis

The section below provides cost benefit analysis for the installation of RO system in the boiler feed water line:

Table 2.2: *Cost Economic Analysis of proposed RO system*

SN	Parameter	Unit	Value
1	Quantity of steam generated per hour	kg/hr	2000
2	Quantity of fuel used per hour	kg/hr	775
3	Quantity of fuel used to generate 1 kg of steam	kg/kg	0.388
4	**Without RO**		
5	Frequency of blow down per month	no.	75
6	No. of blow downs in a year	no.	900
7	Steam lost in each blow down	kg	533
8	Steam lost in year	kg	480000
9	Fuel used to generate lost steam	kg	186000
10	**With RO**		
11	Frequency of blow down	no.	25
12	No. of blow downs in a year	no.	300
13	Steam lost in each blow down	kg	533
14	Steam lost in year	kg	159900
15	Fuel used to generate lost steam	kg	61961.25
16	Annual saving in fuel	kg	124038.8
17	Percentage saving in fuel consumption	%	4.4
18	Annual cost saving in fuel	Rs	620193.8
19	Annual cost saving in terms of make-up water and boiler maintenance	Rs	12000
20	Annual cost savings	Rs	632194
21	Equipment cost	Rs	200000
22	Pay back	months	4

*Cost of fuel taken as Rs 5/kg

The proposed RO system used for boiler feed water treatment will lead to an annual fuel saving of 124038 kg of Wood leading to a monetary saving of Rs 632194. Thus the estimated cost of the equipment i.e. Rs 2,00,000 can be recouped in less than 6 months' time.

2.3 TEMPERATURE MONITORING AND CONTROL IN JIGGER MACHINES

2.3.1 Present Process:

Sonu Industries has installed a total of 22 Jigger machines, running with 3 HP to 7.5 HP motor each. These jigger machines are used for dyeing of cotton cloth at elevated temperature of 60-80 ^{0}C depending on the type of fabric and the dye used. Steam is fed into the system for the required amount of elevated temperature. Once the dyeing process is over, the hot water is drained out of the factory. The temperature requirement for water is different for different grades of dyes and quality of fabric. However, no temperature monitoring system has been installed in the jigger machines. Monitoring and control of temperature of water is done purely based on manual interference.

2.3.2 Observations

Dyeing of cotton fabric is done with the help of a jigger machine. In this process the fabric is rotated in a shallow dip containing hot water. The temperature of the water depends on the type of dyeing agent and the quality of the fabric. Typically a temperature range between 60 ^{0}C to 80 ^{0}C is adopted based on different fabric quality and dye. Steam is used to bring amount the required temperature in the process. In case of Sonu Industries, no temperature monitors is being installed in any of the jiggers. The monitoring of water temperature and its control is purely done by manual interference. A study of the jigger water temperature showed off-shooting of temperature at certain places. Thus, a significant amount of energy in the form of steam required to heat water is being lost due to the absence of temperature monitoring and control system. It is suggested for installation of sensor based automatic temperature control and monitoring system in the jiggers.

2.3.3 Conclusion

In order to maintain the correct temperature profile in the jigger water, it is suggested to install a sensor based temperature monitoring and control system. This system can be used to monitor the temperature level of water in the jiggers and control the flow of steam by a pneumatically operated valve. This will be lead to optimum utilization of steam in the jiggers thus leading to a substantial energy savings.

Benefits of the installation of the temperature monitoring and control system in Jiggers machines are:

- Precision temperature control
- Reduced energy consumption
- Better quality of production
- Savings in terms of feed water to jiggers.

2.3.4 Cost Economics Analysis

The section below provides cost benefit analysis for the installation of temperature monitoring and control system in jiggers. For calculation purpose, it has been assumed that the system is installed in 10 nos. of jiggers.

Table 2.3: *Cost Economic Analysis of jigger water temperature monitoring and control system*

SN	Particulars	Units	Value
1	Temperature observed in Jigger	°C	95
2	Temperature to be maintained	°C	80
3	Machine Capacity	kg	200
4	Steam pressure	kg/cm^2	4

SN	Particulars	Units	Value
5	Steam Enthalpy @ 4 Kg /cm² pressure	kCal/kg	657
6	Liquor Ratio		0
7	Water Capacity	Kg	400
8	Specific heat coefficient (Cp)-water	kCal/kg °C	1
9	Specific heat coefficient (Cp)-fabric	kCal/kg °C	0.5
10	No. of batches per day	nos.	2
11	Saving of steam per batch	kg / hr	11
12	Saving of steam per day (considering 10 hrs. heating period in 2 batch)	kg/day	114
13	Savings of steam per annum	kgs/annum	37648
14	Annual fuel savings	kgs	6563
15	Annual monetary savings	Rs	32817
16	Investment per jigger	Rs	25000
17	General payback period	Months	9
18	Annual fuel savings for 10 jiggers	Kgs	65634
19	Annual monetary savings for 10 jiggers	Rs	328168
20	Investment for 10 jiggers	Rs	250000
21	Pay-back	Months	9
22	Energy savings	%	5.70

* Cost of fuel taken as Rs 5/kg

The proposed temperature monitoring and control system (estimated for 10 units) will lead to an annual fuel saving of Rs 65,634 kgs of coal leading to a monetary saving of Rs 3,28,168. Thus the estimated cost of Rs 2,50,000 for 10 machines can be recouped in less than a year.

Questionnaire

10

Energy Audit – Questionnaire Form

BEE National Programme
On
"Energy Efficiency in SMEs – Pali Textile Cluster"

Name of the MSME unit	SONU INDUSTRIES
Address:	F-26, Mandia Road, Pali - 306401
Ph. No:	02932 - 232420
Name of the respondent	RAVI MOHAN BHUTRA
Designation:	PROPERITOR
Mobile No. / Email id	+91-9001420420 / bhutraravimohan@gmail.com
Unit details	
Year of Establishment	2003
Type of Products	Dyed and Printed Cloth (Cotton)
Installed Capacity	50,000 mtr/day
Operating hrs per day	8-10 hrs/day
Connected Load (kVA or kW please specify)	26 KW
Supply Voltage (Volt)	400 V
Duration of electricity supply	

Annual Energy Consumption/ Production

Financial Year (April to March)	2013-14	2014-15	2015-16
Coke consumed (kg)			
Biomass Briquettes			
(250-300 days/yr) Wood	•50TPD	•50TPD	·50TPD
Cost of coke (in Rs.)			
Electrical units consumed (In kWh)	36570 KWh	42810 KWh	60640 KWh
Electricity charges (in Rs.)	(238522) Rs.	(311447) Rs.	(439615) Rs.
LDO/HSD/ FO consumption (L)			
Fuel Cost (in Rs.)			
Production (Kg)			

Source and Calorific Value of Fuels:

Fuel	Source	Calorific Value (kCal)
~~Coke~~ Wood (Kg)	Jodhpur	3600 kcal/kg
Biomass Briquettes	NA	

For SONU INDUSTRIES

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		Wood		
		HSD (L)	NA	
		LDO (L)		
		FO (L)		
		Electricity (kWh)		

	Monthly Energy Consumption and Production Data					
Month	Production (Kg) (Avg)	Coke consumption (Kg)	Biomass /Wood Consumption 300 days/ Yr. (Kg) (Avg.)	Electricity consumption (kWH)	HSD/LDO /FO (L)	Any other fuel (specify units)
April'15	60,000	NA	0.50 TPD	2430KWH	NA	NA
May'15	72,000		0.50 TPD	4640KWH		
June'15	74,000		0.50 TPD	5210 KWH		
July'15	78,000		0.50 TPD	5740KWH		
August'15	68000		0.50 TPD	4200		
September'15	75000		0.50 TPD	5560		
October'15	63000		0.50 TPD	3840		
November'15	84000kgs		0.50 TPD	6740		
December'15	63000		0.50 TPD	3850		
January'16	82000		0.50 TPD	6400		
February'16	80000		0.50 TPD	6260		
March'16	78,000		0.50 TPD	5770		

Cost variables per Kg of Production		Cost Variable	Cost/ kg of production
		Electricity Cost	Rs 6.5 /KWh
		~~Coke~~ Wood Cost	Rs 5 / kg
		Fuel Cost (LDO/HSD/FO) etc.	NA
		Labour Cost	
		Material Cost	
		Other Cost	

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Process Layout

Raw material (Grey cloth)

↓

Desizing

↓

Mercerising

↓

Kier Boiling

↓

Dyeing (Jigger)

↓

finishing

For SONU INDUSTRIES

Auth. Signatory

जोधपुर विद्युत वितरण निगम लिमिटेड 18001806045

विद्युत उपभोग बिल (उपभोक्ता प्रति)

उपखण्ड का नाम	उपखण्ड कोड	वर्तमान खाता संख्या		शिकायत केन्द्र टेलीफोन नं.	बिल क्रमांक
AEN(CSD-1,Pali)	3204210	0591/0126	0	18001806045	3204210755771

नाम, पता एवं टेलीफोन नं.	बिल माह	पठन तिथि	बिल जारी करने की तिथि	नियत भुगतान तिथि
एम एस सौनू इंडस्ट्रीज ई 26 मंडिया रोड	Mar/2016	01-02-2016 / 01-03-2016	04-03-2016	18-03-2016
	0488/02/07/01		R	URBAN 0
0 320421000501	1.0000		54830.00	

श्रेणी	टैरिफ कोड	आपूर्ति वोल्टेज	मापित वोल्टेज	स्वी. लोड (कि.वा./हा.पा.)	कनेक्टेड लोड (कि.वा./हा.पा.)	कान्ट्रेक्ट डिमांड
MIP	0000XA	400 V	400 V	35.00 HP	35.00 HP	

	मीटर	मीटर की स्थिति	वर्तमान पठन	गत पठन	उपभोग	गुणांक		कुल उपभोग/डिमांड
12642	KWH	OK	43488.00	42911.00	577.00	50/5		5770.00
	KVAH		48037.00	47431.00	606.00			6060.00
	KVA		3.5100		3.5100			35.1000

पॉवर फैक्टर	औसत मासिक उपभोग			मीटरिंग	बिलिंग की स्थिति	बिलिंग डिमांड	मीटर स्वामित्व	कुल उपभोग/डिमांड
0.952	4026	20390			LT REGULAR			5770.00

क्रम सं.	विवरण	बिल राशि (रु.)	क्रम सं.	विवरण	बिल राशि (रु.)
1.	विद्युत खर्च	36062.50	17.	जल संरक्षण उपकर	577.00
2.	स्थाई शुल्क	2450.00	18.	पर्यावरण उपकर	865.50
3.			19.	शहरी निकाय शुल्क	
4.			20.	अन्य	
5.			21.		
6.			22.		
7.	अन्य		23.		
8.	डिमांड सरचार्ज		24.		
9.		-72.13	25.		
10.			26.		
11.			27.		
12.		100.00	28.	पिछले बिल तक बकाया राशि	
13.		-	29.	स्थगित बकाया राशि (चालू माह)	
14.	नियत राशि (क्रम सं. 1 से 13 का योग)	38540.37	30.	नियत तिथि तक देय कुल राशि (क्रम सं. 14 से 28 तक का योग)	42271.00
15.	राज्य सरकार द्वारा वहन राशि		31.	विलम्ब भुगतान सरचार्ज	770.81
16.		2308.00	32.	नियत तिथि पश्चात देय कुल राशि (क्रम सं. 30 से 31 तक का योग)	43062.00

J. V. V. N. LTD., PALI
M/s. Ashak Jain
S. No. 4
15 MAR 2016
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माह उपभोग (यूनिट)	Feb16	Jan16	Dec15	Nov15	Oct15	Sep15
	6260	6400	3850	6740	3840	5560

मोहर
सहायक अभियन्ता