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Cluster: Thangadh
Report ID: TN/05/DPR

Detailed Project Report
On
Energy efficient HT transformer

Dynamic Ceramic
Thangadh (Gujarat)

Prepared for

Bureau of Energy Efficiency
(13/GEF-UNIDO-BEE/LSP/14/4562)

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This document is an output of an exercise undertaken by TERI under the GEF-UNIDO-BEE project's initiative for the benefit of MSME units and is primarily intended to assist the decision making by the management of the intended unit for the proposed technology. While every effort has been made to avoid any mistakes or omissions, GEF, UNIDO, BEE or TERI would not be in any way liable to any person or unit or other entity by reason of any mistake/omission in the document or any decision made upon relying on this document.

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The Energy and Resources Institute (TERI)
New Delhi

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List of abbreviations

BEE	:	Bureau of Energy Efficiency
CO_2	:	Carbon Dioxide
D/E	:	Debt /Equity
DPR	:	Detailed Project Report
DSCR	:	Debt Service Coverage Ratio
EE	:	Energy Efficient
GEF	:	Global Environmental Facility
HSD	:	High Speed Diesel
IDC	:	Investment without interest defer credit
IGDPR	:	Investment Grade Detailed Project Report
IRR	:	Internal Rate of Return
kW	:	Kilo Watt
kWh	:	Kilo Watt Hour
LSPs	:	Local Service Providers
MSME	:	Micro, Small and Medium Enterprises
MT	:	Metric Tonne
NG	:	Natural Gas
NPV	:	Net Present Value
O&M	:	Operation and Maintenance
PCB	:	Pollution control board
PGVCL	:	Paschim Gujarat Vij Company Ltd
RE	:	Renewable Energy
ROI	:	Return On Investment
SCM		Standard Cubic Meter
SME	:	Small and Medium Enterprises
SPP	:	Simple Payback Period
TERI	:	The Energy and Resources Institute
Toe	:	Tonnes of oil equivalent
UNIDO	:	United Nations Industrial Development Organization
WACC	:	Weighted Average Cost of Capital

Executive summary

The overall aim of the GEF-UNIDO-BEE project 'Promoting Energy Efficiency (EE) and Renewable Energy (RE) in selected MSME clusters in India' is to develop and promote a market environment for introducing energy efficiency and enhancing the use of renewable energy technologies in process applications in selected energy-intensive MSME clusters in India. This would help in improving the productivity and competitiveness of the MSME units, as well as in reducing the overall carbon emissions and improving the local environment.

Under the GEF-UNIDO-BEE Project, TERI has been entrusted to undertake Capacity building of Local Service Providers (LSPs) to BEE. The Scope of Work under the project,

- Organizing 4 one-day training/ capacity building workshops for LSPs in each cluster.
- Development of 10 bankable DPRs for each cluster, based on mapping technology needs with capacities of local technology suppliers/service providers, and also replication potential and applications to banks in each cluster.

Brief introduction of the MSME unit

Name of the unit	M/s Dynamic Ceramic
Constitution	Partnership
MSME Classification	Small
No. of years in operation	8
Address: Registered Office:	Navagam Road, Navagam Thangadh, Gujarat - 363530
Industry-sector	Ceramic
Products manufactured	Sanitary ware
Name(s) of the promoters/ directors	Mr Gordhan Bhai C Panara Mr. Durlabhji P Delvadiya Mr. Shantilal M Detroja Mrs. Rasila Ben S Detroja
Existing banking arrangements along with the details of facilities availed	HDFC Bank Limited (CC)

Brief highlights of the past financial position of the MSME unit

(Rs lakh)

S. No	Particulars	FY 2018 (Audited)
1	Total income	348.40
2	Net profit	1.22

A detailed assessment study was undertaken in the identified area with the use of the sophisticated handheld instruments. Energy consumption pattern and production data were collected to estimate the specific energy consumption of the unit. The unit level baseline of the unit was also estimated using the historical data. The plant is consuming about 449,655 kWh of electricity per year. The annual consumption of the NG is 544,718 SCM and HSD is

4,000 litres. The total energy consumption of the unit during last 12 months is estimated to be 513.5 toe which is equivalent to 184 lakh rupees. The total CO_2 emission during this period is estimated to be 1,332 tonnes. Electricity, HSD and NG were considered for CO_2 emission estimation.

The unit manufactures the ceramic sanitary ware. The total annual production of the unit during 2017-18 is estimated to be 27,325 pieces per month.

Accepted/ recommended technology implementation

The recommended technology considered after discussion with the plant personnel for implementation in the unit is given below.

Energy conservation measure	Annual energy saving Electricity (kWh)	Investment (Rs. Lakh)	Monetary savings (Rs. Lakh per year)	Simple payback period (Yrs)	Emission reduction (tonnes of CO_2)
Migrate from LT tariff category to HT tariff category	3,462	8.50	6.63	1.3	2.8

Other benefits

- The proposed project is not expected to bring in any change in process step or operating practices therefore no change expected in the product quality.
- Implementation of the selected technology in the unit may result in reduction in CO_2 emissions.

Cost of project & means of finance

S. No.	Particulars	Unit	100% equity	D/E- 70:30	D/E- 50:50
1	Cost of Project	Rs. In Lakh	8.50	8.81	8.72
2	D/E Ratio	-	-	7:3	1:1
3	Project IRR	%	52.75	46.54	48.28
4	NPV	Rs. In Lakh	9.81	8.30	8.72
5	DSCR	-	-	3.45	4.80

1.0 Details of the unit

1.1 Particulars of unit

Table 1.1: Particulars of the unit

1	Name of the unit	M/s Dynamic Ceramic	
2	Constitution	Partnership	
3	MSME Registration No/UAN	24-008-12-01404	
4	PCB consent No.	PCB ID: 85609	
5	Date of incorporation / commencement of business	2010	
6	Name of the Contact Person	Mr Mahendra Pandya	
7	Mobile / Ph. No	+91-9099021843	
8	Email	-	
9	Address: Registered Office	Navagam Road, Navagam, Thangadh, Gujarat - 363530	Owned
10	Factory	Navagam Road, Navagam, Thangadh, Gujarat - 363530	Owned
11	Industry / Sector	MSME/Ceramic	
12	Products Manufactured	Sanitary ware	
13	No of hours of operation/shift	8	
14	No of shifts/ day	3	
15	No of days/year	300	
16	Installed Capacity	500 MT per month	
17	Whether the unit is exporting its products (Yes/ No)	Yes	
18	Quality Certification, if any	ISO 9001: 2015	

2.0 Energy profile

2.1 Process flow diagram

Manufacturing of ceramic item uses wide range of raw material combination to produce different shape, size and colour. It requires both electrical and thermal energy at different stages of the process to operate the ball mill, casting/moulding, kilns, cutting & finishing machines and utilities such as motors, pumps air compressor etc. Ceramic manufacturing process primarily consists of mould preparation, body material preparation, shaping, drying and firing. Typical process flow chart is shown with figure 2.1.

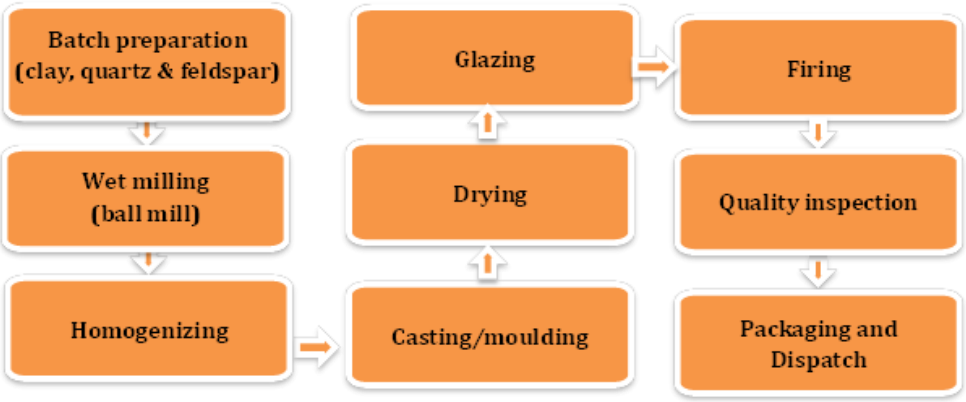

Figure 2.1: Process flow chart

2.2 Details of technology identified

The details of the LT connection in the unit are given in Table 2.2.

Table 2.2: Details of LT connection

Parameters/ Equipment ID	Value
Connection type	LT
Connection category	LTMD
Contract demand	100 HP

2.3 Energy used and brief description of their usage pattern

The unit uses grid power supplied by Paschim Gujarat Vij Company Ltd under tariff category LTMD. Table 2.3 provides the details of energy uses.

Table 2.3: Energy used and description of use

S No	Energy source	Description of use
1	Electricity	Motive power for different drives in different process sections and utilities
3	CNG	Kiln

2.4 Energy sources, availability & tariff details

Different energy sources, availability of listed energy types and their respective tariffs are given in table 2.4.

Table 2.4: Energy sources, availability and tariffs

Particular	LTMD
Demand charges	• For first 40 kW of billing demand Rs. 98/kW/month • Next 20 kW of billing demand Rs. 130/kW/month • Above 60 kW of billing demand Rs. 195/kW/month
Energy charges	Rs. 4.60/ kWh
Reactive energy charges	Rs. 0.10/ kVArh

2.5 Analysis of electricity consumption

Table 2.5: Electricity consumption profile

Month & Year	Total electricity consumption (kWh)	Sanctioned load/ demand (kW)	Power factor	Recorded demand, hp	Demand charges (Rs)	Energy charges (Rs)	Monthly bill (Rs)
Apr-17	44,891	100	0.959	124	20,360	2,06,498	3,38,009
May-17	44,092	100	0.965	129	21,817	2,02,823	3,39,572
Jun-17	48,473	100	0.926	114	17,842	2,22,975	3,64,517
Jul-17	17,140	100	0.981	123	20,095	78,844	1,43,335
Aug-17	39,675	100	0.946	114	17,710	1,86,483	3,02,947
Sep-17	28,500	100	0.939	111	16,915	1,33,950	2,20,886
Oct-17	48,819	100	0.939	119	19,037	2,24,567	3,61,796
Nov-17	29,120	100	0.927	116	18,240	1,36,864	2,26,791
Dec-17	38,200	100	0.930	121	19,565	1,79,540	2,92,602
Jan-18	34,592	100	0.934	117	18,505	1,59,123	2,62,142
Feb-18	44,039	100	0.999	116	18,240	2,02,579	3,22,286
Mar-18	32,114	100	1.000	116	18,240	1,47,724	2,40,385
Total	**4,49,655**	**-**	**-**	**-**	**2,26,566**	**20,81,970**	**34,15,268**

Figure 2.5 presents contract demand, recorded maximum demand and the energy consumption of the unit.

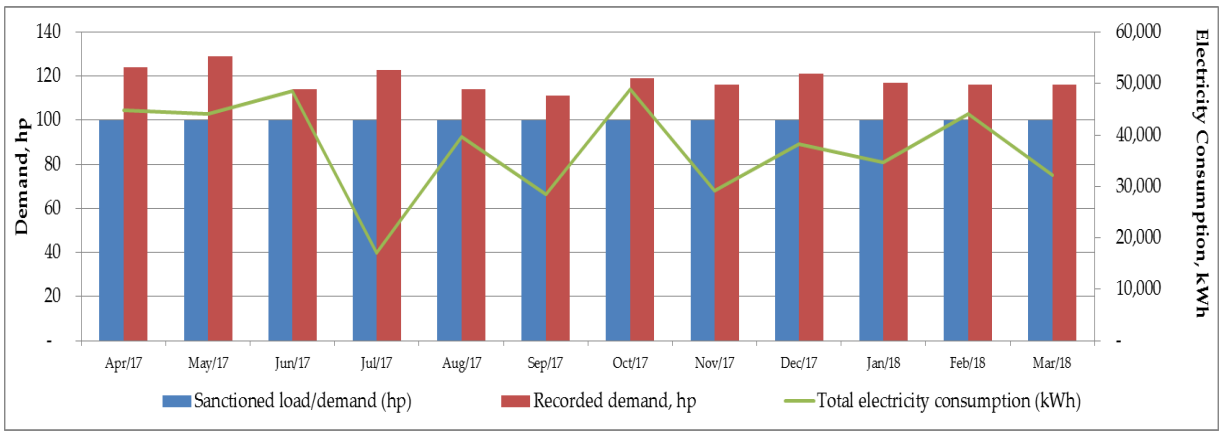

Figure 2.5: Demand pattern and energy consumption profile

2.6 Analysis of other energy forms/ fuels

The analysis of the other fuels/forms of energy used in the unit is given in table 2.6.

Table 2.6: Analysis of other energy/ fuel consumption

Parameters	NG (SCM)	HSD (Litres)
Consumption unit/year	5,44,718	4,000
Calorific value per unit	8,650	9,202
Equivalent toe per year	471	3.7
Price (Rs per unit)	27.1	60.5
Total price per year	1,47,54,243	2,42,000

The share of various energy forms used in the unit is given in figure 2.6.

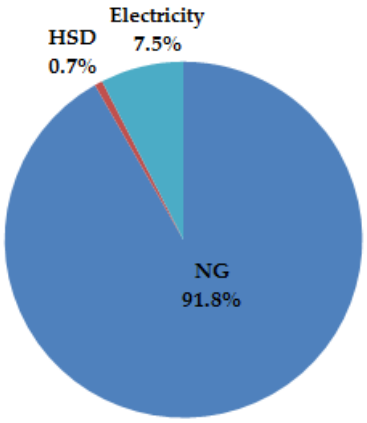

Figure 2.6: Percentage share of various fuel types in the unit

The plant is consuming about 449,655 kWh of electricity per year. The annual consumption of the NG is 544,718 SCM and HSD is 4,000 litres. The total energy consumption of the unit during last 12 months is estimated to be 513.5 toe which is equivalent to 184 lakh rupees. The total CO_2 emission during this period is estimated to be 1,332 tonnes. Electricity, HSD and NG were considered for CO_2 emission estimation.

3.0 Proposed technology for energy efficiency

Based on the measurements, observations/ findings during detailed assessment study conducted in the unit, the following technology has been identified for energy efficiency improvement. The detail is given below.

3.1 Installation of energy efficient HT transformer

3.1.1 Background

The power supply to the facility comes from Paschim Gujarat Vij Company Ltd. (PGVCL) grid under the tariff schedule LTMD with 100 HP sanctioned contract demand. The billing is based on two-part tariff with maximum demand recorded and the energy consumed in kWh. The present tariff structure is given in table 2.2.

Table 2.2: Brief tariff details of PGVCL (Schedule – LTMD)

Description	Value
Present contract demand	100 HP
Minimum billing demand	85%
Demand charges (per kW)	Rs 195
Energy charges (per kWh)	Rs 4.6
PF penalty/Rebate	Rs 0.10 per kVArh

3.1.2 Observations and analysis

The electricity demand of the plant analysed for financial year 2017-18. The contract demand and maximum registered demand of the plant is given in Figure 3.1.2.

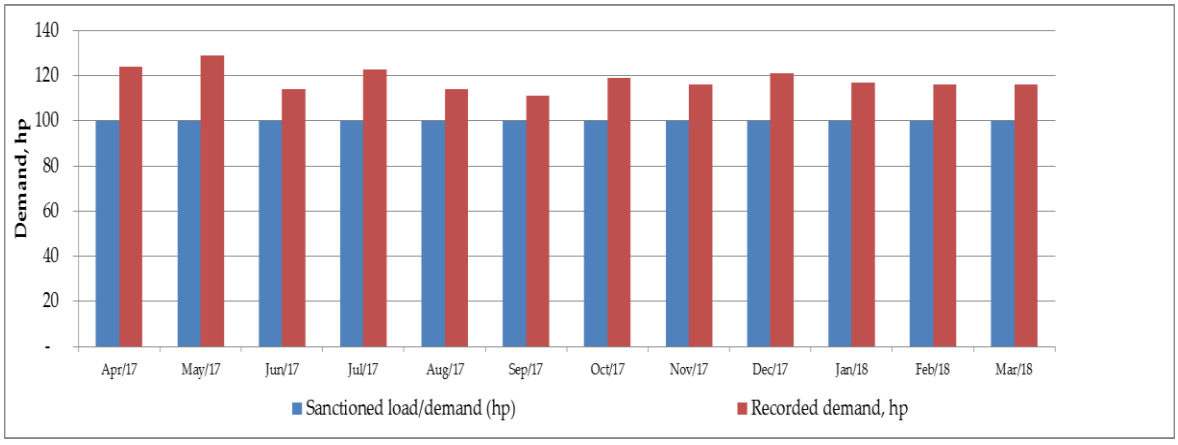

Figure 3.1.2: Contract and recorded demand for financial year 2017-18

The recorded demand of the plant is exceeding the contract demand in all the months of the financial year 2017-18. The average contract demand for the year was 118 HP and maximum demand during the year was 129 HP. Apart from higher electricity charges, there is significant distribution loses due to voltage drop within the plant. The distribution losses in the existing system have been estimated to be 3.64% for given voltage, power factor and cable size. A way to limit these losses is to minimize the voltage drop in cables. A drop voltage less than 1% is suitable and in any case it must not exceed 3%.

Effects of low voltage on electric machines: When an electric motor operates below the nameplate rating, some of the motor's characteristics will change slightly and others will change dramatically. To drive a fixed mechanical load connected to the shaft, a motor must draw a fixed amount of power from the line. Thus, when voltage gets low, the current must increase to provide the same amount of power. An increase in current is a risk to the motor only if that current exceeds the motor's nameplate current rating. When amps go above the nameplate rating, heat begins to build up in the motor. Without a timely correction, this heat will damage the motor.

3.1.3 Recommendation

The unit may install energy efficient HT transformer and migrate to the HT tariff category (HTP-1) with new contract demand 100 kVA to avoid the higher demand charges. The applicable electricity charges under the proposed tariff category will be less than the existing charges under LTMD category. Therefore, it is recommended to install energy efficient HT transformer and migrate from LT tariff category (LTMD) to HT tariff category (HTP-1).

3.2 Cost benefit analysis

The estimated annual savings by changing the tariff category will be about Rs 6.41 lakh. The investment[1] requirement is Rs 8.5 lakh with a simple payback period of 1.3 years. The detailed calculations of the recommended measures for IGDPR are provided in table 3.2.

Table 3.2: Cost benefit analysis for recommended measures

Parameters	Unit	LT	HT
Connection type	-	LTMD	HTP-I
Supply voltage	kV	0.415	11
Contract demand	HP/kVA	100 (HP)	100 (kVA)
Maximum recorded demand	HP/kVA	129 (HP)	97 (kVA)
Total demand charges	Rs/year	2,26,566	1,60,707
Annual electricity consumption	kWh/Year	4,49,655	4,49,655
Annual electricity charges	Rs/year	20,81,970	18,26,274
PF penalty/rebate	Rs/year	13271	(36,525)
Total electricity bill	Rs/year	34,15,268	27,73,331
Average unit charge	Rs./kWh	7.51	6.17
Reduction in annual electricity charges	Rs/year	-	6,41,937
Voltage at main incomer	Volt	418	415
Voltage at load end	Volt	409	412
Power factor at main incomer	PF	0.78	0.99
Total energy loses in distribution network	%	3.64	2.87
Total electricity losses per year	kWh/Year	16,367	12,905
Reduction in distribution losses	kWh/Year	-	3,462
Annual monetary benefits due to reduction in losses	Rs/Year	-	21,371
Total monetary benefits	Rs/year	-	6,63,308
Investment towards up gradation to HT distribution (200 kVA transformer, 400 ampere power distribution panel, APF and other misc.)	Rs.	-	8,50,000

[1] Quotation – 1 has been considered for estimation of investments

Parameters	Unit	LT	HT
Simple payback period	Years	-	1.3

3.3 Pre-training requirements

Not required.

3.4 Process down time for implementation

The estimated process down time required for implementation of recommended measure is estimated to be 3 days.

3.5 Environmental benefits

3.5.1 CO_2 reduction[2]

Implementation of the selected energy conservation measures in the unit may result in reduction in CO_2 emissions due to reduction in overall energy consumption. The estimated reduction in GHG emission by implementation of the recommended energy conservation measures is 2.8 tonne of CO_2 per year.

3.5.2 Reduction in other pollution parameters (gas, liquid and solid)

There is not significant impact on the reduction in other pollution parameters including gas, liquid and solid.

[2] Source for emission factor: 2006 IPCC Guidelines for National Greenhouse Gas Inventories & electricity: CO_2 Baseline Database for the Indian Power Sector, user guide version 12.0, May 2017 (CEA)

4.0 Project financials

4.1 Cost of project and means of finance

4.1.1 Particulars of machinery proposed for the project

The particulars of machinery proposed for the project is given in table 4.1.1.

Table 4.1.1: Particulars of machinery proposed for the project

S. No.	Name of machinery (Model/ specification)	Name of manufacturer, contact person	Advantage	Disadvantage
1	200 kVA, 3 Phase Transformer, 11/0.433 kV With HT Breaker – 400 amp, 11/12/14 kV	Fortune Power Panchayat Nagar Chowk, University Road, Opp. Padmanabh Tower, Rajkot 0281-2577885 9825020420 fortune_power1@yahoo.com	-	-
2	250 kVA, 3 Phase Transformer, 11/0.433 kV Oil cooled, ONAF	Sangam Power and Electrical New PNB ban, Agra, UP	-	-

4.1.2 Means of finance

The means of finance for the project is shown in table 4.1.2.

Table 4.1.2: Means of finance

S. No.	Details	100% equity	D/E- 70:30	D/E- 50:50
1	Additional (Share) Capital	8.50	2.55	4.25
2	Internal Accruals	-	-	-
3	Interest free unsecured loans	-	-	-
4	Term loan proposed (Banks/FIs)	-	5.95	4.25
5	Others	-	-	-
Total		**8.50**	**8.50**	**8.50**

4.2 Financial statement (project)

4.2.1 Assumptions

The assumptions made are provided in table 4.2.1.

Table 4.2.1: Assumptions made

Details	Unit	100% equity	D/E- 70:30	D/E- 50:50
General about unit				
No of working days	Days		300	
No of shifts per day	Shifts		3	
Annual operating hours	Hrs/year		7,200	
Installed production capacity	pieces/year		40,000	
Production in last financial years	pieces/year		27,325	
Capacity utilization factor	%		68%	

Details	Unit	100% equity	D/E- 70:30	D/E- 50:50
Proposed investment (Project)				
Total cost of the project	Rs. (in Lakh)	8.50	8.50	8.50
Investment without interest defer credit (IDC)	Rs. (in Lakh)	8.50	8.50	8.50
Implementation time	Months	6.00	6.00	6.00
Interest during the implementation phase	Rs. in lakhs	-	0.31	0.22
Total investment	Rs. in lakhs	8.50	8.81	8.72
Financing pattern				
Own funds	Rs. in lakhs	8.50	2.86	4.47
Loan funds (term loan)	Rs. in lakhs	-	5.95	4.25
Loan tenure	Years	-	5.0	5.0
Moratorium period (No EMI (interest and principal amount))	Months	-	6.0	6.0
Total repayment period	Months	-	66.0	66.0
Interest rate	%	-	10.5%	10.5%
Estimation of costs				
Operation & maintenance costs	%		5.0	
Annual escalation rate of O&M	%		5.0	
Estimation of revenue				
Reduction in energy cost	Rs. (in lakh)/year		6.63	
Total saving	(Rs Lakh/year)		6.63	
Straight line depreciation	%		16.21	
IT depreciation	%		80.0	
Income tax	%		33.99	
Period of cash flow analysis	Years		5.0	

4.2.2 Payback

The simple payback period on the investments made are shown in table 4.2.2.

Table 4.2.2: Payback

Details	100% equity	D/E- 70:30	D/E- 50:50
Total project cost (Rs. In lakh)	8.50	8.81	8.72
Cash flow as annual saving (Rs. In lakh/year)	6.63	6.63	6.63
O&M Expenses for first year (Rs. In lakh/year)	0.43	0.44	0.44
Net Cash flow (Rs. In lakh/year)	6.21	6.19	6.20
SPP (months)	16.43	17.08	16.89
Considered (month)	16.40	17.10	16.90

4.2.3 NPV and IRR

The NPV and IRR calculations are shown in table 4.2.3.

Table 4.2.3a: NPV and IRR (100% equity)

Particulars / years	0	1	2	3	4	5
				(Rs.in lakhs)		
Profit after tax	-	4.83	3.37	2.78	2.69	2.66

Particulars / years	0	1	2	3	4	5
Depreciation	-	1.38	1.38	1.38	1.38	1.38
Cash outflow	8.50	-	-	-	-	-
Net cash flow	-8.50	6.21	4.75	4.16	4.07	4.04
Discount rate % @ WACC	9.25	9.25	9.25	9.25	9.25	9.25
Discount factor	1.00	0.92	0.84	0.77	0.70	0.64
Present value	-8.50	5.68	3.98	3.19	2.86	2.60
Net present value	**9.81**					
Simple IRR considering regular cash flow	**52.75%**					

Table 4.2.3b: NPV and IRR (D/E- 70:30)

Particulars / years	0	1	2	3	4	5
				(Rs.in lakhs)		
Profit after tax	-	4.46	3.17	2.45	2.44	2.50
Depreciation	-	1.43	1.43	1.43	1.43	1.43
Cash outflow	8.81	-	-	-	-	-
Net cash flow	-8.81	5.89	4.60	3.88	3.87	3.92
Discount rate % @ WACC	10.09	10.09	10.09	10.09	10.09	10.09
Discount factor	1.00	0.91	0.83	0.75	0.68	0.62
Present value	-8.81	5.35	3.79	2.91	2.63	2.43
Net present value	**8.30**					
Simple IRR considering regular cash flow	**46.54%**					

Table 4.2.3c: NPV and IRR (D/E- 50:50)

Particulars / years	0	1	2	3	4	5
				(Rs.in lakhs)		
Profit after tax	-	4.57	3.23	2.55	2.51	2.54
Depreciation	-	1.41	1.41	1.41	1.41	1.41
Cash outflow	8.72	-	-	-	-	-
Net cash flow	-8.72	5.98	4.64	3.96	3.93	3.96
Discount rate % @ WACC	9.86	9.86	9.86	9.86	9.86	9.86
Discount factor	1.00	0.91	0.83	0.75	0.69	0.62
Present value	-8.72	5.44	3.84	2.99	2.69	2.47
Net present value	**8.72**					
Simple IRR considering regular cash flow	**48.28%**					

4.3 Marketing & selling arrangement

The marketing and selling arrangements of the unit are given in table 4.3.

Table 4.3: Marketing & selling arrangements

Items	Remarks
Main Markets (locations)	Pan India
Locational advantages	-
Indicate competitors	Other manufacturing units
Any USP or specific market strength	-

Items	Remarks
Whether product has multiple applications	NA
Distribution channels (e.g. direct sales, retail network, distribution network)	Direct sales
Marketing team details, if any.	NA

4.4 Risk analysis and mitigation

The risk analysis and mitigation for the proposed options are given in table 4.4.

Table 4.4: Risk analysis and mitigation

Type of risk	Description	Mitigation
Technology	The equipment/technology provided by the supplier may not be of high quality, which may result in underperformance.	The equipment/technology should be procured from standard/reputed vendors only.
Market /Product	Demand of the product manufactured by the unit may change resulting in lower capacity utilization.	Regular vigilance/tab on the market scenario by the SME will help in better understanding of new substitute product. The unit may modify the product line based on the emerging market trend.
Policy/Regulatory	Changes in government regulation/policy related to pollution and taxes & duties can affect the viability of the unit.	Local industrial association may play a role in discussing these issues with the relevant governmental bodies on a regular basis, so that any concerns of the unit are brought to their notice.

4.5 Sensitivity analysis

A sensitivity analysis for various scenarios which may affect the return on investment is given in table 4.5.

Table 4.5: Sensitivity analysis

S. No.	Scenario	D/E ratio	Payback period (months)	NPV (Rs lakh)	IRR (%)	DSCR	ROI (%)
1	10% increase in estimated savings	100% equity	14.80	11.52	59.71%	-	26.37%
		70:30	15.40	9.97	53.32%	3.77	35.59%
		50:50	15.30	10.40	55.10%	5.24	32.19%
2	10% reduction in estimated savings	100% equity	18.40	8.10	45.71%	-	22.97%
		70:30	19.10	6.62	39.65%	3.14	32.45%
		50:50	18.90	7.04	41.35%	4.36	28.80%
3	10% rise in interest rates	70:30	17.10	7.90	45.92%	3.38	34.01%
		50:50	16.90	8.43	47.82%	4.70	30.53%
4	10% reduction in interest rates	70:30	17.00	8.71	47.16%	3.53	34.37%
		50:50	16.80	9.02	48.73%	4.91	30.77%

5.0 Conclusions & recommendations

The IGDPR prepared for the installation of energy efficient HT transformer to switch the grid supply from LT tariff category to HT tariff category based on the performance assessment study conducted at unit and the acceptance of the unit management. The brief of selected energy conservation measure is given below.

5.1 List of energy conservation measures

The brief summary of the energy conservation measures are given in table 5.1.

Table 5.1: Summary of the energy conservation measures

S. No	Energy conservation measure	Annual energy saving Electricity (kWh)	Investment (Rs. Lakh)	Monetary savings (Rs. Lakh per year)	Simple payback period (Yrs)	Emission reduction (tonnes of CO2)
1	Migrate from LT tariff category to HT tariff category	3,462	8.50	6.63	1.3	2.8
Total		3,462	8.50	6.63	1.3	2.8

The measure has an estimated investment of 8.5 lakh rupees and can yield a savings of 6.42 lakh rupees per year. The total annual reduction in emission by implementation of recommended measures is estimated to be 2.8 tonnes of CO_2. The financial indicators provided above in the table shows the project is financially viable and technically feasible.

5.2 Summary of the project

The summary of the project is given in table 5.2.

Table 5.2: Summary of the project

S. No.	Particulars	Unit	100% equity	D/E- 70:30	D/E- 50:50
1	Cost of Project	Rs. In Lakh	8.50	8.81	8.72
2	D/E Ratio	-	-	7:3	1:1
3	Project IRR	%	52.75%	46.54%	48.28%
4	NPV	Rs. In Lakh	9.81	8.30	8.72
5	DSCR	-	-	3.45	4.80

5.3 Recommendations

The financial indicators provided above show the project is financially viable and technically feasible. It is recommended that the implementation of the identified the energy conservation measures may be undertaken by the unit.

6.0 Financing schemes for EE investments for MSME sector

Government of India has many schemes to provide concessional finance for EE technologies among MSMEs. Some major government schemes are summarised in table 6.1.

Table 6.1: Major government schemes

Name of the scheme	Brief Description and key benefits
ZED assessment and certification	Assessment process, fee and subsidy are as follows: Online (e-Platform) self-assessment: Nil fee Desk Top assessment : Rs 10,000 per SME Complete assessment : Rs 80,000 ZED rating per SME; Rs 40,000 for additional ZED defence rating; Rs 40,000 for re-rating The rating costs will include cost of Rs 10,000/- as certification cost by QCI. Subsidy for Micro, Small and Medium Enterprises are 80%, 60% and 50% respectively.
Credit Linked Capital Subsidy Scheme (CLCSS) (2000-ongoing)	15% capital subsidy of cost of eligible plant and machinery / equipment for adoption of proven technologies for approved products / sub-sectors for MSE units subject to ceiling of INR 15 lakhs
Credit Guarantee Fund Scheme for Micro and small Enterprises (in partnership with SIDBI) (2000-ongoing)	This scheme was launched by MoMSME and SIDBI to alleviate the problem of collateral security and enable micro and small scale units to easily adopt new technologies. Under the scheme, collateral free loans up to Rs 1 crore can be provided to micro and small scale units. Additionally, in the event of a failure of the SME unit which availed collateral free credit facilities to discharge its liabilities to the lender, the Guarantee Trust would guarantee the loss incurred by the lender up to 75 / 80/ 85 per cent of the credit facility.
Technology and Quality Up gradation Support to MSMEs (TEQUP) (2010-ongoing)	The benefits available to SMEs under TEQUP include—technical assistance for energy audits, preparation of DPRs and significant capital subsidy on technologies yielding an energy savings of over 15%. The scheme offers a subsidy of 25% of the project cost, subject to a maximum of Rs. 10 lakhs. TEQUP, a scheme under NMCP, focuses on the two important issues in enhancing competitiveness of the SME sector, through EE and Product Quality Certification.
Technology Upgradation Fund Scheme (TUFS) (1999-ongoing)	Interest subsidy and /or capital subsidy for Textile and Jute Industry only. 1. To facilitate Technology Up gradation of Small Scale (SSE) units in the textile and jute industries. Key features being: • Promoter's margin -15%; • Subsidy – 15% available on investment in TUF compatible machinery subject to ceiling of Rs 45 lakh; • Loan amount – 70% of the cost of the machinery by way of Term Loan

Name of the scheme	Brief Description and key benefits
	• Interest rate: Reimbursement of 5% on the interest charged by the lending agency on a project of technology upgradation in conformity with the Scheme • Cover under Credit Guarantee Fund Scheme for Micro and Small Enterprises (CGMSE) available 2. To enable technology upgradation in micro and small power looms to improve their productivity, quality of products and/ or environmental conditions • 20% margin subsidy on investment in TUF compatible specified machinery subject to a ceiling of Rs 60 lakhs or Rs 1crore (whichever is applicable) on subsidy amount to each unit – released directly to the machinery manufacturer.
Tax incentives	• Accelerated depreciation is provided to the customers / users of the energy saving or renewable energy devises under the direct tax laws. • Under indirect taxes, specific concessional rates of duty are only available to CFLs and not to all energy efficient products • A further waiver of import tariffs and taxes for EE technology imports are dealt on a case to case basis, meaning higher costs for those imported technologies that are not available in the domestic markets at present.

Two financing schemes have been created by Bureau of Energy Efficiency (BEE) under The National Mission for Enhanced Energy Efficiency (NMEEE) for financing of energy efficiency projects - Venture Capital for Energy Efficiency (VCFEE) and Partial Risk Guarantee Fund for Energy Efficiency (PRGFEE). These funds seek to provide appropriate fiscal instruments to supplement the efforts of the government for creation of energy efficiency market. Highlights of these two schemes are provided in the table 6.2.

Table 6.2: BEE's VCFEE and PRGFEE scheme

Venture Capital for Energy Efficiency (VCFEE)	• This fund is to provide equity capital for energy efficiency projects in Government buildings and Municipalities in the first phase. • A single investment by the fund shall not exceed Rs 2 crore • Fund shall provide last mile equity support to specific energy efficiency projects, limited to a maximum of 15% of total equity required, through Special Purpose Vehicle (SPV) or Rs 2 crore, whichever is less
Partial Risk Guarantee Fund for Energy Efficiency (PRGFEE)	• A PRGF is a risk sharing mechanism lowering the risk to the lender by substituting part of the risk of the borrower by granting guarantees ensuring repayment of part of the loan upon a default event. • Guarantees a maximum 50% of the loan (only principal). In case of default, the fund will: o Cover the first loss subject to maximum of 10% of the total guaranteed amount o Cover the remaining default (outstanding principal) amount on

Venture Capital for Energy Efficiency (VCFEE)	• This fund is to provide equity capital for energy efficiency projects in Government buildings and Municipalities in the first phase. • A single investment by the fund shall not exceed Rs 2 crore • Fund shall provide last mile equity support to specific energy efficiency projects, limited to a maximum of 15% of total equity required, through Special Purpose Vehicle (SPV) or Rs 2 crore, whichever is less
	partial basis upto the maximum guaranteed amount • PFI shall take guarantee from the PRGFEE before disbursement of loan to the borrower. • The Guarantee will not exceed Rs 300 lakh per project or 50% of loan amount, whichever is less. • Maximum tenure of the guarantee will be 5 years from the date of issue of the guarantee

Indian Renewable Energy Development Agency (IREDA), a non-banking financial institution established by the government also extends financial assistance for setting up projects relating to new and renewable sources of energy and energy efficiency/conservation. The detailed financing guidelines for energy efficiency projects are provided in table 6.3.

Table 6.3: IREDA's financing guidelines

Eligible companies who can apply	Private Sector Companies/ firms, Central Public Sector Undertaking (CPSU), State Utilities/ Discoms/ Transcos/ Gencos/ Corporations, Joint Sector Companies which are not loss making.
Minimum loan amount	• Rs. 50 lakh
Type of projects considered for term loans	• Replacement / retrofit of selected equipment with energy efficient equipment • Modification of entire manufacturing processing • Recovery of waste heat for power generation
Incentive available	• Rebate in central excise duty • Rebate in interest rate on term loan • Rebate in prompt payment of loan instalment
Interest rate	• 10.60% to 11.90% depending upon the grading of the applicant with prompt payment rebate of 15 bps if payment is made on / before due dates • Interest rates are floating and would be reset on commissioning of the project or two years from the date of first disbursement. Thereafter, the rates will be reset after every two years. • Rebate of 0.5% in interest rates are available for projects set up in North Eastern States, Sikkim, J&K, Islands, Estuaries. Rebates of 0.5% in interest rates are also available for projects being set up by SC/ST, Women, Ex Servicemen and Handicapped categories involving project cost of upto Rs. 75.00 lakh.
Loan	Upto 70% of the total project cost. Promoter's contribution should be Minimum 30% of the total project cost
Maximum debt	3:1

equity ratio	The project cash flow should have a minimum average Debt Service Coverage Ratio of 1.3
Maximum repayment period	12 years with moratorium of maximum 12 months
Procurement procedures	The borrower is required to follow the established market practices for procurement and shall demonstrate that the quality goods and services are being purchased at reasonable and competitive prices. Wherever the loan is sanctioned against international lines of credit such as the World Bank, Asian Development Bank, KfW, etc., the relevant procedures will have to be followed and requisite documents will have to be submitted by the borrower

Small Industries Development Bank of India (SIDBI) has several schemes and focused lines of credit for providing financial assistance for energy efficiency and cleaner production projects for SMEs. Highlights of some of the major financial assistance schemes/projects managed by SIDBI are given in table 6.4.

Table 6.4: Major EE financing schemes/initiatives of SIDBI

End to End Energy Efficiency (4E) Program	Support for technical /advisory services such as: • Detailed Energy Audit • Support for implementation • Measurement & Verification Financing terms: • Terms loans upto 90% • Interest rate upto 3% below normal lending rate.
TIFAC-SIDBI Revolving Fund for Technology Innovation (Srijan Scheme)	To support SMEs for up-scaling and commercialization of innovative technology based project at flexible terms and interest rate. Preference accorded to sustainable technologies / products. Soft term loan with an interest of not more than 5%.
Partial Risk Sharing Facility for Energy Efficiency (PRSF) Project (supported by World Bank)	Sectors covered: • Large industries (excluding thermal power plants) • SMEs • Municipalities (including street lighting) • Buildings Coverage: • The minimum loan amount Rs 10 lakh and maximum loan amount of Rs 15 crore per project. • The extent of guarantee is 75% of the loan amount
JICA-SIDBI Financing Scheme	• The loan is used to provide SMEs with funds necessary to invest in energy-saving equipment (and some medical equipment) in the form of two-step loans through SIDBI or three-step loans through intermediary financial institutions.

	• Project uses an Energy Saving Equipment List approach • Equipment/machinery with energy saving potential less than 10% is not eligible. • Interest rate: As per credit rating and 1% below the normal lending rate • Separate technical assistance component which is used for wetting of loan applications, holding seminars to raise awareness of energy saving among SMEs and to improve the ability of financial institutions to screen loan applications for energy-saving efforts
KfW-SIDBI Financing Scheme	Coverage a) SMEs for energy efficiency projects b) SMEs and clusters for cleaner production and emission reduction measures, waste management and Common Effluent Treatment Plant (CETP) facilities Interest rate As per credit rating and 1% below the normal lending rate Eligible criteria 3 t CO_2 emission reduction per year per lakh invested List of eligible equipment/technology and potential suppliers developed for guidance

State Bank of India (SBI) has been provided a green line of credit by Japan Bank for International Cooperation (JBIC) for financing of energy efficiency investments. Highlights of the line of credit are given in table 6.5.

Table 6.5: JBIC-SBI Green Line

Key Features

- Amount : USD 90 million
- Repayment Schedule: First repayment on May 30, 2017 and final repayment date May 30, 2025 (equal instalment)

Eligibility Criteria

- Projects contributing to preservation of global environment, i.e. significant reduction of GHG emissions
- Acceptance of JBIC-MRV ('J-MRV") by the project proponent in terms of the numerical effect of the environment preservation. To ensure effective GHG reduction emissions in Green financed projects, JBIC reviews such effects through simple and practical Measurement Reporting Verification (MRV) process both in (a) prior estimation and (b) ex-post monitoring.
- Procurement in line with the "Guidelines for Procurement under Untied Loans by Japan Bank for International Cooperation"

Canara bank has a dedicated scheme for financing EE investment among SME sector as mentioned in table 6.6.

Table 6.6: Canara bank scheme of EE SME loans

Purpose	**For acquiring/adopting energy conservation/savings equipment/ measures by SMEs**
Eligibility	Units under Small and Medium Enterprises Cost of energy for the unit should constitute not less than 20% of the total cost of production Unit should possess energy audit report issued by an approved energy Consultant/Auditor. Borrowal a/cs-ASCC code S1 or S2 during previous review. Current account holders having dealings exclusively with us satisfactorily for a period of last one year
Maximum loan	Maximum Rs 100 lakhs in the form of term loan
Security	Prime: Assets created out of loan Collateral: Upto Rs.5 lakhs – NIL Above Rs.5 lakhs, as determined by the bank
Repayment	Maximum 5-7 years including moratorium of 6 months
Guarantee cover	Cover available under CGMSE of CGTMSE available for eligible loans
Margin	10% of the project cost
Rate of interest	1% less than the applicable rate
Upfront fee	1% of the loan
Insurance cover	Assets acquired and charged as security to Bank to be insured
Special offer, if any	**Grants :** Bank provides 25% of the cost of Energy Audit / Consultancy charges with a maximum of Rs 25000/- to the first 100 units on a first come first served basis which is in addition to the grant of Rs 25000/- being provided by IREDA(First 100 units)

Among the private sector banks in India, Yes Bank is also active in financing of renewable energy and energy efficiency projects. The bank has an MOU with SIDBI for providing funding for EE through PRSF.

Most commercial banks charge interest rate between from 11% to 13% from MSMEs depending upon general criteria such as credit ratings, references, past lending record, balance sheet for last 3 years and so on. Interest rebate is offered for a few customers whose collateral value is around 125% of the loan amount. Further 0.5% concession in interest rate was offered to women entrepreneurs.

Annexures

Annexure 1: Copy of certificates from the competent authorities

DISTRICT INDUSTRIES CENTER,SURENDRANAGAR
(Government of Gujarat)
Behind Collector Office,SURENDRANAGAR,SURENDRANAGAR.
Ph. 02752230465,Fax No. 02752234046(E-Mail : gm-dic-srn@gujarat.gov.in)

No/DIC/SRN/EM/Part-2/ 5171/2012 Form No : 1466

ENTREPRENEURS' MEMORANDUM FOR SETTING UP MICRO, SMALL OR MEDIUM ENTERPRISE

ACKNOWLEDGEMENT FOR PART - II

M/s. DYNAMIC CERAMICS HAS FILED MEMORANDUM FOR A MANUFACTURING ENTERPRISE AT THE ADDRESS NAVAGAM ROAD, At Village : NAVAGAM (THAN), At Taluka : CHOTILA, At District : SURENDRANAGAR FOR THE ITEM/ITEMS INDICATED BELOW AS STATED IN FORM NO. 1466 AND ALLOCATED ENTREPRENEURS' MEMORANDUM NO. AS BELOW

MAIN ITEMS MANUFACTURED
MANUFACTURE OF CERAMIC SANITARY WARES SINKS BATHS WATER-CLOSET PANS FLUSHING CISTERN ETC.

DETAILS OF THE ITEMS MANUFACTURED

Sr. No.	Items Manufactured	Capacity Per Annum Qty	Unit	Initial date of production/ commencement of service
1	SANITARY WARE	300000	bundles	06/06/2011

DETAILS OF PLANT AND MACHINERY AS PER DATE-WISE INVESTMENT(INV in Lac.)

Sl. No.	Investment in Plant and Machinery/Equipments	Date of Investment
1.	100.0000	06/06/2011

NOTE : THE ISSUE OF THIS ACKNOWLEDGEMENT DOES NOT BESTOW ANY LEGAL RIGHT THE ENTERPRISE IS REQUIRED TO SEEK REQUISITE CLEARANCE/LICENCE/PERMIT REQUIRED UNDER STATUTORY OBLIGATION STIPULATED UNDER THE LAWS OF CENTRAL GOVERNMENT/STATE GOVERNMENT/UI ADMINISTRATOR/COURT ORDERS.

DATE OF ISSUE 20/03/2012
NATURE OF ACTIVITY (MANUFACTURING-1,SERVICES-2) 1
CATEGORY OF ENTERPRISE (MICRO-1,SMALL-2,MEDIUM-3) 2
ENTREPRENEURS MEMORANDUM NUMBER (PART - II) 24 - 008 - 12 - 01404

(First two digit = State, Next three digit = District code, sixth digit = Nature of Activity, seventh digit = category of enterprise and last five digit are for Entrepreneurs' Memorandum

DATE: 20/03/2012
PLACE: SURENDRANAGAR

OFFICE SEAL

GENERAL MANAGER
DISTRICT INDUSTRIES CENTER,
SURENDRANAGAR.

To,
M/s. DYNAMIC CERAMICS
DYNAMIC CERAMICS
NAVAGAM ROAD,
NAVAGAM-THANGADH,CHOTILA,SURENDRANAGAR

District Industries Center, SURENDRANAGAR
Govt. of Gujarat)
Behind Collector's Office SURENDRANAGAR
Ph. 02752-[illegible] Fax No. 91752234046(E-Mail : dic-srn@gujarat.gov.in)

No/DIC/SRN/EM/Part-I/ 591 /10 Form No: 306

ENTREPRENEURS' MEMORANDUM FOR SETTING UP MICRO, SMALL OR MEDIUM ENTERPRISE
ACKNOWLEDGEMENT FOR PART - I

M/s DYNAMIC CERAMIC HAS FILED MEMORANDUM EXPRESSING ITS INTENT TO SET UP AN MANUFACTURING ENTERPRISE AT THE ADDRESS SURVEY NO. 241/3 At Village NAVAGAM (THAN), At Taluka CHOTILA, At District SURENDRANAGAR FOR THE ITEM/ITEMS INDICATED BELOW AND THE ACTIVITY IS PROPOSED TO COMMENCE FROM THE DATE:- 12/12/2010 AS STATED IN FORM NO. 306 AND ALLOCATED ENTREPRENEURS' MEMORANDUM NO. AS BELOW

MAIN ITEMS TO BE MANUFACTURED
Manufacture of ceramic sanitary wares sinks baths water-closet pans flushing cistern etc

DETAILS OF THE ITEMS TO BE MANUFACTURED

Sr.No.	Items to be Manufactured	CAPACITY OF MANUFACTURE	
		QTY	UNIT
1	Sanitary Ware	10000	Bndl

NOTE :- THE ISSUE OF ACKNOWLEDGEMENT DOES NOT BESTOW ANY LEGAL RIGHT. THE ENTERPRISE IS REQUIRED TO SEEK REQUISITE CLEARANCE/LICENCE/PERMIT REQUIRED UNDER STATUTORY OBLIGATION STIPULATED UNDER THE LAWS OF CENTRAL GOVERNMENT/STATE GOVERNMENT/UT ADMINISTRATION/COURT ORDERS.

DATE OF ISSUE 25/08/2010

NATURE OF ACTIVITY (MANUFACTURING-1,SERVICES-2) 1

CATEGORY OF THE ENTERPRISE (MICRO-1,SMALL-2,MEDIUM-3) 1

ENTREPRENEURS MEMORANDUM NUMBER (PART - I) 24 - 008 - 11 - 00294

(First two digit = State, Next three digit = District code, sixth digit = Nature of Activity, seventh digit = category of enterprise and last five digit are for Entrepreneurs' Memorandum number)

This acknowledgement is valid for a period of two years from the date of issue

DATE: 25/08/2010
PLACE: SURENDRANAGAR

To,
M/s. DYNAMIC CERAMIC
DYNAMIC CERAMIC,SURVEY NO. 241/3
AT NAVAGAM-THAN,CHOTILASURENDRANAGAR

OFFICE SEAL

Dy.Commissioner of Ind. D.I.C. Govt. of Gujarat SURENDRANAGAR

MANAGER (RM)
DISTRICT INDUSTRIES CENTER,
SURENDRANAGAR.

ISO CERTIFICATE ISO CERTIFICATE

Certificate of Registration

Certificate No. 16201511301-09

This is to Certify that the Management System of the

DYNAMIC CERAMIC

Navagam Road, Navagam, Thangadh 363530
Dist. Surendranagar, Gujarat, India

Has been independently assessed and found to be compliance with the requirements of standard detailed below

ISO 9001:2015

This Certificate Is Valid For The Following Scope

" Manufacture, Supply And Exporter Of All Kind Of Sanitaryware Products "

Initial Registration Date	19 Sep. 2016
1 st Surveillance on or before	19 Sep. 2017
2 nd Surveillance on or before	19 Sep. 2018

Issue Date : 19 Sep. 2016
Valid Until : 18 Sep. 2019

Managing Director
TQS Quality Certification Service

TQS Quality Certification Service,
B 203, Atharv Appertment,Virar Road,Nala Sopara, Mumbai 421 203.
The certificate of Registration remains the property of TQS Quality Certification Service and shall be returned immediately upon request. for more information our website.
For current validity of this certifiction please visit our website.
E : info@isoindia.org.in, W : www.isoindia.org.in

GUJARAT POLLUTION CONTROL BOARD
PARYAVARAN BHAVAN
Sector 10-A, Gandhinagar 382 010
Phone : (079) 23226295
Fax : (079) 23232156
Website : www.gpcb.gov.in

GPCB

In exercise of the power conferred under section-25 of the Water (Prevention and Control of Pollution) Act-1974, under section-21 of the Air (Prevention and Control of Pollution) Act-1981 and Authorization under rule 6(2) of the Hazardous & other Waste (Management, Handling and Tran boundary Movement) Rules, 2016 framed under the E (P) Act-1986.

And whereas Board has received consolidated application Inward ID No 119657., dated 21/03/2017 for the consolidated consent and authorization (CC&A) of this Board under the provisions / rules of the aforesaid acts, Consent & Authorization is hereby granted as under.

CONSENTS AND AUTHORISATION:
(Under the provisions /rules of the aforesaid environmental acts)

TO,
M/S. DYNEMIC CERAMICS
PLOT NO:R.S.NO.241/3,
AT: NAVAGAM (THANGADH)
NAVAGAM (THANGADH)-363530
TAL:CHOTILA
DIST-SURENDRANAGAR

1. Consent Order No.: AWH – 85609 date of Issue: 21/03/2017

2 The consents shall be valid up to 20/03/2022 for operation of industrial plant for manufacture of the following items/products:

Sr. No.	Product	Quantity
1	Ceramic sanitary Wares	500 MT/M or 50000 Nos. /Month

3.CONDITIONS UNDER THE WATER ACT:

3.1 There shall be no discharge of the industrial effluent from the manufacturing process and other ancillary industrial operations as the generated effluent shall be reused/recycled back in the process.

3.2 The total quantity of domestic water consumption from the factory shall not exceed 800 Lit/day. The quantity of sewage wastewater from the factory shall not exceed 550 Lit/day.

3.3 The total quantity of the industrial water consumption for the manufacturing process and other ancillary operation shall not exceed 6200 Lit/day and the quantity of the industrial effluent generation from the manufacturing process and other ancillary operation shall not exceed 500 lit/day. It shall be completely reuse/recycled back into the process.

3.4 Industry shall provide flow meter with fix pipeline system for reuse of treated effluent & also maintain record pertaining to use of water, reuse of treated effluent & made available for inspection.

3.5 Sewage wastewater shall be disposed off through septic tank / soak pit system.

4. CONDITIONS UNDER THE AIR ACT:

4.1 The following shall be used as fuel in tunnel kiln & D.G set.

Sr. No.	Fuel	Quantity
1	PNG	3500 SCM / Day
2	Diesel	25 lit/hrs

4.2 The applicant shall install & operate air pollution control system in order to achieve norms prescribed below.

Clean Gujarat Green Gujarat
ISO-9001-2008 & ISO-14001 - 2004 Certified Organisation

Annexure 2: Budgetary offers / quotations

Quotation – 1 : Fortune Power

Fortune Power

Rajkot, Gujarat, India

SUBJECT: Our offer for your requirement of 200 KVA , 11KV, 433V Distribution Transformer and installation of 400 ampere HT breaker

Dear Sir,

"We thank you for the opportunity extended to us to submit the quote for your valued inquiry. Based on the details furnished by you, We take pleasure in submitting our offer for your kind perusal.".

Estimate

S. No.	Items	Budgetary cost (Rs in lakh)
1.	200 kVA, three phase, 50 Hz, 11 kV transformer with following specifications 1. System voltage (max.) 12 kV 2. Rated voltage HV 11 kV 3. Rated voltage LV 433 - 250 V 4. Line current HV 10.50 A 5. Line current LV 266.0 A 6. Frequency 50 c/s +/- 5% 7. No. of Phases Three 8. Connection HV Delta 9. Connection LV Star (Neutral brought out) 10. Vector group Dyn-11 11. Type of cooling ONAN 12. Tap changing arrangement +2.5 % to -7.5% in step of 2.5 %	Rs. 8.5 lakh (Rs. Eight Lakh Fifty Thousand Only)
2.	HT LOAD BREAK SWITCHES 12/24/36/ KV,400 Amps. 3 P-1G air filled cable box suitable for 3 core XLPE aluminium cables up to 225 sq.mm. & glands suitable for above cables. HT Cable: 3 core x 225 sq. mm XLPE cable LT Cable: 3 ½ core x 185 sq. mm. XLPE cable	
3.	Other fitting, fixture and misc., charges	

We hope our offer would be in line with your requirement and that we will be favoured with your valued order.

For any more information or clarification, please feel free to contact us.....

Fortune Power
(Electrical Contractor - PGVCL)

Quotation – 2 : Sangam Power and Electrical

Sangam Power And Electrical

Near PNB Bank, Agra, Uttar Pradesh

08043699657

250 KVA Three Phase Power Distribution Transformers

Rs 2.55 Lakh/Unit

Product description:

With our years of experience & in depth knowledge in this field, we are engaged in offering a quality-assured array of **250 KVA Oil Cooled Power Transformer .**

Product details:

Power
250 KVA
Phase
Three Phase
Cooling Type
Oil Cooled
Coil Structure
Toroidal
Frequency
50Hz
Cooling Method
ONAF

About us

Established in **2017**, **Sangam Power And Electrical** are a **Sole Proprietorship firm**, involved as the **manufacturing** and **trading** of **Electrical Transformer** and **Distribution Transformer**. All our products are getting widely acclaimed among the large clientele for their exclusive designs, superior quality, and reliability. Apart from this, our ability to maintain timelines as well as quality in the assortment, providing cost effective solutions and assurance to make timely shipment of the orders placed by customers have assisted us positioning our name in the list of top-notch companies of the industry. We also provide **Transformer Repairing Service.**

Annexure 3: Instruments used

Instruments	Model/ Make	Application	Accuracy
Power analysers	Fluke: 435, Fluke: 43B,	Electrical Parameters Harmonics analysis, power logging	± 0.5%
Thermal imager	875-2/Testo	Surface Temperature & Image	± 2%