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Detailed Project Report (DPR)
On
Compressed air demand controller

Mahle Engine Components (India) Pvt. Ltd.
Indore (M.P)

Prepared for

Bureau of Energy Efficiency
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Disclaimer

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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
GHG	:	Green House Gas
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
NPV	:	Net Present Value
O&M	:	Operation and Maintenance
RE	:	Renewable Energy
ROI	:	Return On Investment
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

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 Mahle Engine Components (India) Pvt. Ltd.
Constitution	Private Limited
MSME Classification	Medium
No. of years in operation	30
Address: Registered Office:	Pithampur Industrial Area, Pithampur, Madhya Pradesh 454775
Industry-sector	Auto components
Products manufactured	Auto components casting
Name(s) of the promoters/ Chairman's	Dr. Jörg Stratmann
Existing banking arrangements along with the details of facilities availed	NA

Brief highlights of the past financial position of the MSME unit

(Rs lakh)

S. No	Particulars	FY 2018 (Audited)
1	Total income	266

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 26,983,200 kWh of electricity per year. The annual consumption of HSD is 27,180 litres. The total energy consumption of the unit during last 12 months is estimated to be 2,345 toe which is equivalent to 1,580 lakh rupees. The total CO_2 emission during this period is estimated to be 22,200 tonnes. Electricity and HSD were considered for CO_2 emission estimation.

The MAHLE Group consists of four business units: engine systems and components, filtration and engine peripherals, thermal management, and aftermarket. Added to this are the mechatronics division and six profit centers, which serve specific market and customer segments. The unit is manufacturing automotive components (camshaft, chilled iron valve tappets casting & finishing). The major source of energy is electricity, consume in the foundry, machining and lighting.

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[1] (Rs. Lakh)	Monetary savings (Rs. Lakh per year)	Simple payback period (years)	Emission reduction (tonnes of CO_2)
Installation of compressed air demand controller	84,714	10.1	4.9	2.0	69.5

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	10.10	10.10	10.10
2	D/E Ratio	-	-	7:3	1:1
3	Project IRR	%	25.23	20.85	22.11
4	NPV	Rs. In Lakh	3.97	2.60	2.99
5	DSCR	-	-	2.10	0.92

[1] Investment including the (i) Demand controller – Rs. 7.75 lakh, and (ii) Installation, Taxes and other misc. cost – Rs. 2.3 lakh

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 Mahle Engine Components (India) Pvt. Ltd.	
2	Constitution	Private limited	
3	MSME Registration No/UAN	NA	
4	PCB consent No.	PCB ID: 18472	
5	Date of incorporation / commencement of business	1983	
6	Name of the Contact Person	Mr Indranil Dhar	
7	Mobile / Ph. No	+91- 98268 29918	
8	Email	indranil.dhar@in.mahle.com	
9	Address: Registered Office	Pithampur Industrial Area, Pithampur, Madhya Pradesh 454775	Owned
10	Factory	Pithampur Industrial Area, Pithampur, Madhya Pradesh 454775	Owned
11	Industry / Sector	MSME/auto components	
12	Products Manufactured	Automotive components	
13	No of hours of operation/shift	8	
14	No of shifts/ day	3	
15	No of days/year	350	
16	Installed Capacity	12,800 MT/Year	
17	Whether the unit is exporting its products (Yes/ No)	Yes	
18	Quality Certification, if any	NA	

2.0 Energy profile

2.1 Process flow diagram

The major steps of process are mould sand preparation, charge preparation followed by melting, pouring, knockout and finishing. The steps are explained below.

2.1.1 Sand preparation plant

The major equipment installed is sand siever, sand mixer and sand transport belts and elevators. Electricity is used to run all rotary machines in sand preparation plant. Fresh sand is mixed with adhesives in sand mixer then it is pressed in mould casing by pressing machine. In casing some amount of burnt sand is reused with fresh sand.

2.1.2 Core preparation and moulding

For core preparation, fresh sand is used. Cores are baked in LDO fired ovens. After hardening of core it is mounted in mould. In mould preparation fresh and burnt sand is pressed by machines which operate on pneumatic in mould casing. Upper and lower half of mould is assembled together and then it gets ready to pouring.

2.1.3 Melting

Melting of charge is done with help of induction furnace. Induction furnace runs on medium frequency three phase electrical supply. Once melt attained required temperature and metallurgy, the liquid melt is poured into the earlier prepared sand moulds using ladles.

2.1.4 Knockout and finishing

Mould is left to cool for certain time, then it follows to a vibrator with grated surface, it knocks-out the sand and the casting is send for finishing, which involves shot blasting and machining job.

The process flow diagram for major product and steel grade casting produced in the foundry is given in figure 2.1.4.

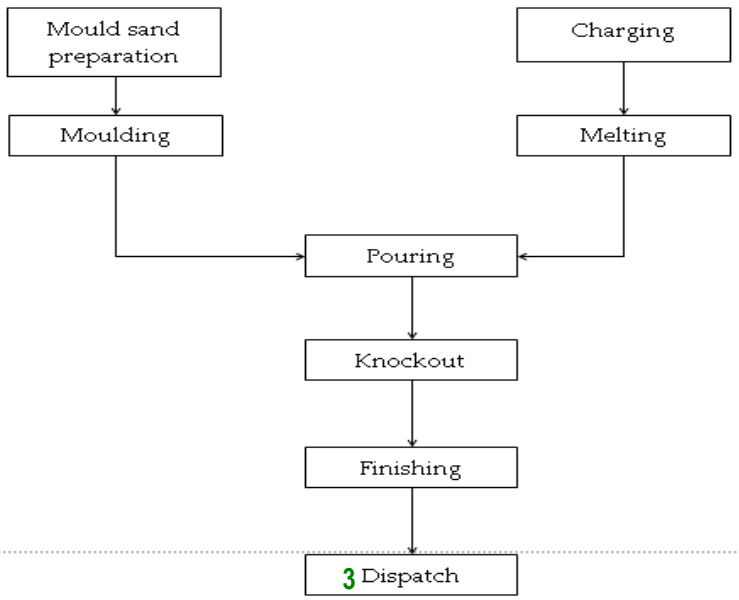

Figure 2.1.4: Process flow chart

2.2 Details of technology identified

The details of the existing technology installed in the unit are given in Table 2.2.

Table 2.2: Details of existing technology

Particulars	Unit	Compressor - 4	Compressor - 5	Compressor - 6	Compressor - 7
Make	-	Chicago Pneumatic	Chicago Pneumatic	KAESER	KAESER
Type	-	Screw	Screw	Screw	Screw
Model No.	-	SS75P	SS75P	CSD 105T	CSDX 140 T
Rated Capacity	M^3/Min	10.59	10.59	2.19 - 9.85	13.74
Rated motor capacity	kW	55.00	55.00	55	75
Operation	-	Standby	Standby	Operational	Operational

2.3 Energy used and brief description of their usage pattern

The unit uses grid power supplied by Madhya Pradesh Paschim Kshetra Vidyut Vitaran Company Limited. 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

2.4 Energy sources, availability & tariff details

The power supply to the facility is from Madhya Pradesh Paschim Kshetra Vidyut Vitaran Company Limited grid @ 33 kV, with 4,750 kVA sanctioned contract demand. The unit 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	For supply at 33 kV
Demand charges	Rs. 530/kVA/month
Energy charges	Rs. 5.0/ kWh

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, kVA	Demand charges (Rs)	Energy charges (Rs)	Monthly bill (Rs)
Oct-17	2,367,500	4,750	0.998	4,808	2,548,240	11,837,500	13,673,318
Nov-17	1,978,100	4,750	0.997	4,768	2,527,040	9,890,500	11,866,862
Dec-17	2,514,800	4,750	0.995	4,784	2,535,520	12,574,000	14,118,604
Jan-18	2,134,000	4,750	0.998	4,816	2,552,480	10,670,000	12,463,389
Average	**2,248,600**	**4,750**	**1.00**	**4,794**	**2,540,820**	**11,243,000**	**13,030,543**
Total	**26,983,200**	**-**	**-**	**-**	**30,489,840**	**134,916,000**	**156,366,519**

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

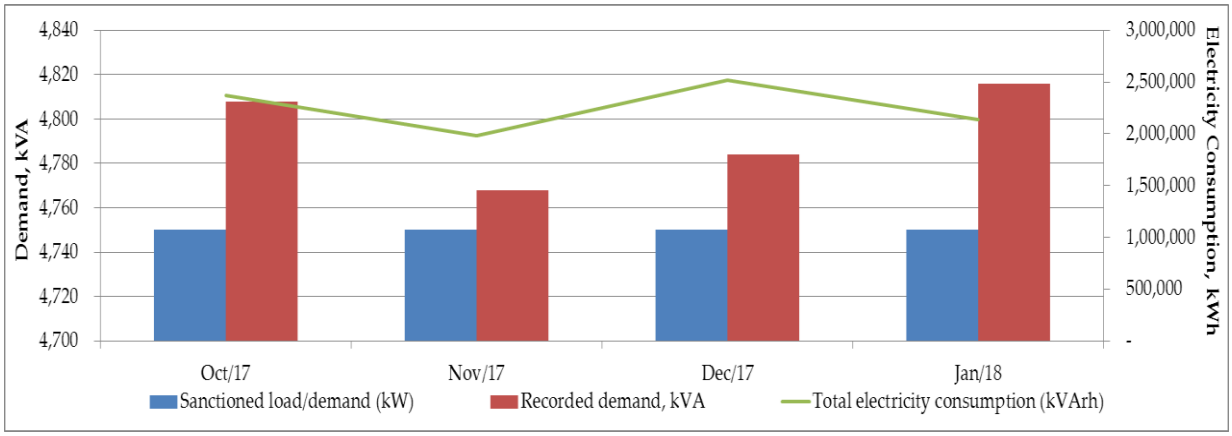

Figure 2.5: Demand pattern and energy consumption profile

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	LDO (Liter)
Consumption unit/year	27,180
Calorific value per unit	9,202
Equivalent toe per year	25.0
Price (Rs per unit)	60.0
Total price per year	1,630,800

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

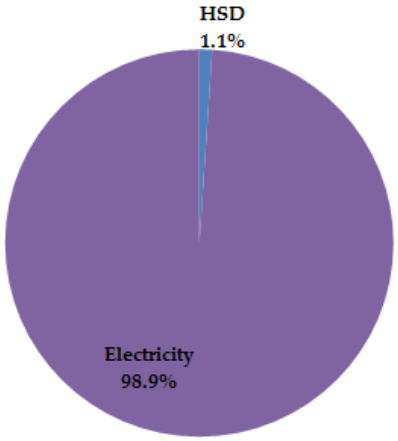

Figure 2.6: Percentage share of various fuel types in the unit

The plant is consuming about 26,983,200 kWh of electricity per year. The annual consumption of HSD is 27,180 litres. The total energy consumption of the unit during last 12 months is estimated to be 2,345 toe which is equivalent to 1,580 lakh rupees. The total CO_2 emission during this period is estimated to be 22,200 tonnes. Electricity and HSD 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 compressed air demand controller

3.1.1 Background

To cater the compressed air requirement of the process house, the plant has installed four air compressors out of which two are in operation and other two has been kept as standby. The design specifications of the compressors installed in the plant is given in table 3.1.1;

Table 3.1.1: Technical specifications of air compressors

Particulars	Unit	Compressor - 4	Compressor - 5	Compressor - 6	Compressor - 7
Make	-	Chicago Pneumatic	Chicago Pneumatic	KAESER	KAESER
Type	-	Screw	Screw	Screw	Screw
Model No.	-	SS75P	SS75P	CSD 105T	CSDX 140 T
Rated Capacity	M^3/Min	10.59	10.59	2.19 - 9.85	13.74
Rated motor capacity	kW	55	55	55	75
Operation	-	Standby	Standby	Operational	Operational

3.1.2 Observations and analysis

During the detailed assessment study of the compressed air system, free air delivery test of the compressed air system was conducted for evaluating the existing performance. Air compressors were operated using load/unload control load/ unload control also known as constant speed control, which allows the motor to run continuously, but unloads the compressor when the discharge pressure is adequate. The loading of the VFD based compressor is estimated to 89%, which is primarily due to difference in set pressure. During the study free air delivery test of the compressed air system was conducted for evaluating the existing performance of the compressed air system. On evaluating with the existing recorded data the following results was found.

Table 3.1.2: Performance analysis of the existing compressed air system

Particulars	Unit	Compressor - 6	Compressor - 7
Operating Pressure	kg/cm^2	5.5	5.5
Run hours	Hours	9	20
Load hours	Hours	8	13.5
Average loading	%	89	68
Total electricity consumption	kWh/Hour	54.5	62.7
Cumulative demand of the plant	%	76%	

The loading/unloading pattern of fixed speed compressor is given in figure 3.1.2.

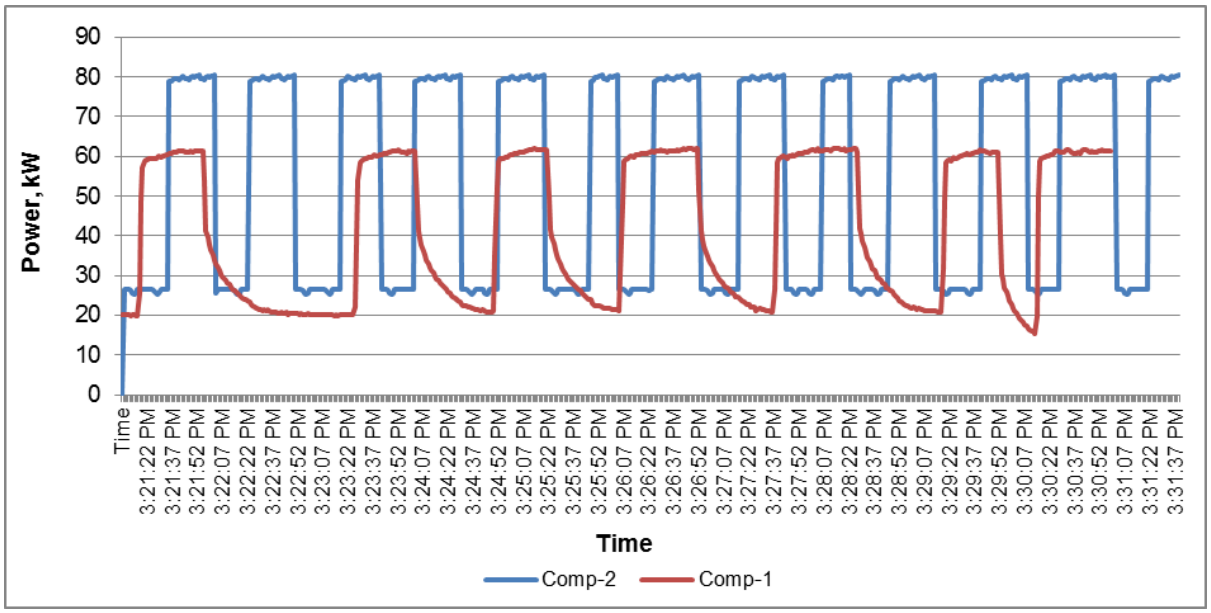

Figure 3.1.2: Loading/unloading pattern of fixed speed compressor

3.1.3 Recommendation

It is recommended to install the compressed air demand management system which will control the flow as per the plant demand as well as operate both compressor in common pressure range. This arrangement is increasing the no-load period of the compressors. In order to reduce this no load operation it is recommended to combine the overall compressed air supply of the plant by inter-connecting the delivery tanks with a common delivery point which will deliver the air through automatic flow controller.

3.2 Cost benefit analysis

The estimated saving in annual operation cost by installation of compressed air demand controller is Rs. 4.9 lakhs. The investment requirement is Rs 10.1 lakh with a simple payback period of 2.0 years. The detailed calculations of the recommended energy conservation measures for DPR are provided in table 3.2.

Table 3.2: Cost benefit analysis for recommended energy savings measures

Particulars	Unit	Compressor - 6	Compressor - 7
Design details			
Make	-	KAESER	KAESER
Type	-	Screw	Screw
Model No.	-	CSD 105T	CSDX 140 T
Rated Capacity	M3/Min	2.19 - 9.85	13.74
Rated motor capacity	kW	55	75
Operation	-	Operational	Operational
Operational parameters (existing)			
Operating Pressure	kg/cm2	5.5	5.5
Run hours	Hours	9	20
Load hours	Hours	8	13.5
Input power - on load	kW	58.85	80.25

Particulars	Unit	Compressor - 6	Compressor - 7
Input power - unload	kW	19.25	26.25
Average loading	%	89%	68%
Total electricity consumption	kWh/Hour	54.5	62.7
Cumulative demand of the plant	%	76%	
Calculated/Analysed parameters (proposed)			
Average loading	%	100	59.5
Total electricity consumption	kWh/Hour	58.9	47.8
Energy saving potential			
Reduction in electricity consumption	kWh/Hour	-4.4	14.9
Cumulative reduction in electricity consumption	kWh/Hour		10.5
Annual operating hours	Hours/year		8,050
Annual electricity saving	kWh/year		84,714
Annual monetary benefits	Rs (in lakh)/Year		4.9
Cost of investment	Rs (in lakh)		10.1
Payback period	Years		2.0

3.3 Pre-training requirements

Not required

3.4 Process down time for implementation

Not required

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 69.5 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
Q-1	• Control air intelligent flow controller	Godrej & Boyce Manufacturing Company Limited. Godrej Electricals & Electronics, Plant - 1, Pirojshanagar, Vikhroli, Mumbai - 400 079, India. Tel.: +91 22 6796 1700 / 1800- Fax: +91 22 6796 1525	• Provide all types of engineering services in the area of electrical, electronics, compressed air technology, bus bar systems, instrumentation, and telecommunication & automation technology	-

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	10.10	3.03	5.05
2	Internal Accruals	-	-	-
3	Interest free unsecured loans	-	-	-
4	Term loan proposed (Banks/FIs)	-	7.07	5.05
5	Others	-	-	-
	Total	**10.10**	**10.10**	**10.10**

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		2	
Annual operating hours	Hrs/year		7,200	

Details	Unit	100% equity	D/E- 70:30	D/E- 50:50
Installed production capacity	tonnes/year		12,800	
Production in last financial years	tonnes/year		-	
Capacity utilization factor	%		-	
Proposed investment (Project)				
Total cost of the project	Rs. (in Lakh)	10.10	10.10	10.10
Investment without interest defer credit (IDC)	Rs. (in Lakh)	10.10	10.10	10.10
Implementation time	Weeks	3.0	3.0	3.0
Interest during the implementation phase	Rs. in lakhs	-	0.04	0.03
Total investment	Rs. in lakhs	10.10	10.10	10.10
Financing pattern				
Own funds	Rs. in lakhs	10.10	3.07	5.1
Loan funds (term loan)	Rs. in lakhs	-	7.07	5.1
Loan tenure	Years	-	5.0	5.0
Moratorium period (No EMI (interest and principal amount))	Months	-	3.0	3.0
Total repayment period	Months	-	60	60
Interest rate	%	-	10.50	10.50
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		4.90	
Total saving	(Rs Lakh/year)		4.90	
Straight line depreciation	%		16.21	
IT depreciation	%		80.00	
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)	10.10	10.14	10.13
Cash flow as annual saving (Rs. In lakh/year)	4.90	4.90	4.90
O&M Expenses for first year (Rs. In lakh/year)	0.51	0.51	0.51
Net Cash flow (Rs. In lakh/year)	4.40	4.39	4.39
SPP (months)	27.58	27.71	27.67
Considered (month)	27.60	27.70	27.70

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	-	2.76	3.05	1.34	1.23	1.20
Depreciation	-	1.64	1.64	1.64	1.64	1.64
Cash outflow	10.10	-	-	-	-	-
Net cash flow	-10.10	4.40	4.69	2.98	2.87	2.83
Discount rate % @ WACC	9.30	9.30	9.30	9.30	9.30	9.30
Discount factor	1.00	0.92	0.84	0.77	0.70	0.64
Present value	-10.10	4.02	3.93	2.28	2.02	1.82
Net present value	**3.97**					
Simple IRR considering regular cash flow	**25.23%**					

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	-	2.39	2.76	1.00	0.99	1.06
Depreciation	-	1.64	1.64	1.64	1.64	1.64
Cash outflow	10.14	-	-	-	-	-
Net cash flow	-10.14	4.03	4.41	2.65	2.64	2.71
Discount rate % @ WACC	10.10	10.10	10.10	10.10	10.10	10.10
Discount factor	1.00	0.91	0.83	0.75	0.68	0.62
Present value	-10.14	3.66	3.63	1.98	1.79	1.67
Net present value	**2.60**					
Simple IRR considering regular cash flow	**20.85%**					

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	-	2.49	2.84	1.10	1.06	1.10
Depreciation	-	1.64	1.64	1.64	1.64	1.64
Cash outflow	10.13	-	-	-	-	-
Net cash flow	-10.13	4.14	4.49	2.74	2.70	2.74
Discount rate % @ WACC	9.90	9.90	9.90	9.90	9.90	9.90
Discount factor	1.00	0.91	0.83	0.75	0.69	0.63
Present value	-10.13	3.77	3.72	2.07	1.86	1.71
Net present value	**2.99**					
Simple IRR considering regular cash flow	**22.11%**					

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	-
Whether product has multiple applications	NA

Items	Remarks
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	2.20	11.57	489.14	-	44.22
		70:30	2.20	11.22	483.15	2.12	46.99
		50:50	2.20	11.32	484.86	0.92	46.16
2	10% reduction in estimated savings	100% equity	2.70	9.33	392.72	-	43.27
		70:30	2.70	9.03	387.14	2.12	46.58
		50:50	2.70	9.11	388.73	0.92	45.58
3	10% rise in interest rates	70:30	2.40	9.92	434.44	2.12	46.81
		50:50	2.40	10.07	436.25	0.92	45.90
4	10% reduction in interest rates	70:30	2.40	10.33	435.60	2.12	46.81
		50:50	2.40	10.37	437.09	0.91	45.90

5.0 Conclusions & recommendations

The IGDPR prepared for the installation of compressed air demand controller 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

Energy conservation measure	Annual energy saving Electricity (kWh)	Investment (Rs. Lakh)	Monetary savings (Rs. Lakh per year)	Simple payback period (Years)	Emission reduction (tonnes of CO_2)
Installation of compressed air demand controller	84,714	10.1	4.9	2.0	69.5

The measure has an estimated investment of 10.1 lakh rupees and can yield a savings of 4.9 lakh rupees per year. The total annual reduction in emission by implementation of recommended measure is estimated to be 69.5 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	10.10	10.10	10.10
2	D/E Ratio	-	-	7:3	1:1
3	Project IRR	%	25.23	20.85	22.11
4	NPV	Rs. In Lakh	3.97	2.60	2.99
5	DSCR	-	-	2.1	0.92

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

Consent Order

M.P. Pollution Control Board
E-5, Arera Colony
Paryavaran Parisar, Bhopal - 16 MP
Tele : 0755-2466191, Fax-0755-2463742

RED-MEDIUM	CCA-Renewal	VALIDITY (A/W): 31/03/2020	CONSENT NO: ***	PCB ID: 18472

NO: /MPPCB/PTH

To,

The Occupier,
M/s. Mahle Engine Components India Pvt. Ltd. (Unit-1),
Plot No. 112 Sector-I, Industrial Area Pithampur,
Dist : Dhar (MP)

Subject: Grant of Consent to Operate under section 25 of the Water (Prevention & Control of Pollution) Act,1974 under section 21 of the Air (Prevention & Control of Pollution) Act,1981

Ref: Your Consent to Operate Application Receipt No. 447034 Dt. 31/10/2017 and last communication received on Dt.06/11/2017.

With reference to your above application for consent to operate has been considered under the aforesaid Acts and existing rules therein. The M. P. Pollution Control Board has agreed to grant consent up to 31/03/2020, subject to the fulfillment of the terms & conditions, enclosed with this letter and-

SUBJECT TO THE FOLLOWING CONDITIONS :-

a. Location: Plot No. 112 Sector-I, Industrial Area Pithampur , Pithampur, Dhar (MP)

b. The capital investment in lakhs: Rs. 6395.00

c. Product & Production Capacity:

Product	Applied CCA Qty/Annum	CCA Qty / Annum
Automotive Components (Camshaft, Chilled Iron Valve Tappets Casting & Finishing)	12800.00 M.T/Annum (Twelve thousand eight hundred metric ton per annum)	12800.00 M.T/Annum (Twelve thousand eight hundred metric ton per annum)

Note:- For any change in above industry shall obtain fresh consent from the board.

The Validity of the consent is up to 31/03/2020 and has to be renewed before expiry of consent validity. Online application through XGN with annual license fees in this regard shall be submitted to this office 6 months before expiry of the consent/Authorization. Board reserves the right to amend/cancel / revoke the above condition in part or whole as and when required.

Enclosures:-

* Conditions under Water Act
* Conditions under Air Act
* General conditions

eSign Sending from UIDAI server
Digitally Sign with Aadhaar

e-Signed On 05/12/2017 01:40:21
(Organic Authentication on AADHAR from UIDAI Server)
TPAV # G156T465WW

ACHYUT ANAND MISHRA
Member Secretary

Consent No:AW-47627,Validity:31/03/2020, Outward No:55960,05/12/2017, TPAV # G156T465WW

Print Dt: 07/11/2017 **e-Signed (Physical Signature NOT requires)** **Page: 1 / 6** **N I C**

Consent Order

M.P. Pollution Control Board
E-5, Arera Colony
Paryavaran Parisar, Bhopal - 16 MP
Tele : 0755-2466191, Fax-0755-2463742

CONDITIONS PERTAINING TO WATER (PREVENTION & CONTROL OF POLLUTION) ACT 1974 :-

1. The daily quantity of trade effluent shall not exceed 17.00 KL/day and the daily quantity of sewage shall not exceed 60.00 KL/day.

2. Trade Effluent Treatment:-
The applicant shall provide comprehensive effluent treatment system as per the proposal submitted to the Board and maintain the same properly to achieve following standards-

pH	Between	5.5 – 9.0	TDS	Not exceed	2100 mg/l.
Suspended Solids	Not exceed	100 mg/l.	Chlorides	Not exceed	1000 mg/l.
BOD 3 Days 270C	Not exceed	30 mg/l.			
COD	Not exceed	250 mg/l.			
Oil and grease	Not exceed	10 mg/l.			

For other parameters general standards of discharge as notified under EP Act 1986 shall be applicable.

3. Sewage Treatment :- The applicant shall provide comprehensive sewage treatment system as per the proposal submitted to the Board and maintain the same properly to achieve following standards-

pH	Between	5.5 – 9.0
Suspended Solids	Not exceed	100 mg/l.
BOD 3 Days 270C	Not exceed	30 mg/l.
COD	Not exceed	250 mg/l.
Oil and grease	Not exceed	10 mg/l.

Industry shall achieve following standards as per MoEFCC Notifications dt. 13.10.2017

pH	Between	6.5 – 9.0
Total Suspended Solids (TSS)	Not exceed	100 mg/l.
BOD_3 Days 27°C	Not exceed	30 mg/l
Fecal Coliform (FC) (Most Probable Number per 100 milliliter, MPN/100 ml.)	Not exceed	1000

4. The effluent shall be treated up to prescribed Standards and reuse in the process, for cooling and for green belt devolvement/gardening within premises. Hence zero discharge condition shall be practiced. In no case treated effluent shall be discharged outside of industry/unit premises.

5. Water meter preferably electromagnetic/ultrasonic type with digital flow recording facilities shall be installed separately for category wise consumption of water as per Water (Prevention and Control of Pollution) Cess Act 1977 for Industrial cooling/boiler feed, mine spray, process & domestic purposes and data shall be submitted online through XGN monthly patrak/statements. The industry/unit shall also monitor the treated wastewater flow and report the same online through monthly patrak/statements.

Sr	Water Code (Qty in klpd - Kilo Ltr per Day)	WC : 132.00	WWG : 77.00	Water Source
1	Cooling Water	42.00	0.000	AKVN
2	Domestic Purpose	70.00	60.000	AKVN
3	Mnfg Process	20.00	17.000	AKVN

6. Any change in production capacity, process, raw material used etc. and for any enhancement of the above prior permission of the Board shall be obtained. All authorized discharges shall be consistent with terms and conditions of this consent. Facility expansions, production increases or process modifications which result new or increased discharges of pollutants must be reported by submission of a fresh consent application for prior permission of the Board

7. All treatment/control facilities/systems installed or used by the applicant shall be regularly maintained in good working order and operate effectively/efficiently to achieve compliance of the terms and conditions of this consent

8. Compilation of Monitoring-
i. Samples and measurements taken to meet the monitoring requirements specified above shall be representative of the volume and nature of monitored discharge.

Consent No:AW-47627,Validity:31/03/2020, Outward No:55960,05/12/2017, TPAV # G156T465WW

Print Dt: 07/11/2017 e-Signed (Physical Signature NOT requires) Page: 2 / 6 N I C

ii. Following promulgation of guidelines establishing test procedures for the analysis of pollutants, all sampling and analytical methods used to meet the monitoring requirements specified above shall conform to such guidelines unless otherwise specified sampling and analytical methods shall conform to the latest edition of the Indian Standard specifications and where it is not specified the guidelines as per standard methods for the examination of Water and Waste latest edition of the American Public Health Association, New York U.S.A. shall be used.
iii. The applicant shall take samples and measurement to meet the monthly requirements specified above and report online through XGN the same to the Board.

9. Recording of Monitoring-
i. The applicant shall make and maintain online records of all information resulting from monitoring activities by this Consent.
ii. The applicant shall record for each measurement of samples taken pursuant to the requirements of this Consent as follows:

(i) The date, exact place and time of sampling
(ii) The dates on which analysis were performed
(iii)Who performed the analysis?
(iv)The analytical techniques or methods used and
(v)The result of all required analysis

iii. If the applicant monitors any Pollutant more frequently as is by this Consent he shell include the results of such monitoring in the calculation and reporting of values required in the discharge monitoring reports which may be prescribed by the Board. Such increased frequency shall be indicated on the Discharge Monitoring Report Form.
iv. The applicant shall retain for a minimum of 3 years all records of monitoring activities including all records of Calibration and maintenance of instrumentation and original strip chart regarding continuous monitoring instrumentation. The period of retention shall be extended during the course of any unresolved litigation regarding the discharge of pollutants by the applicant or when requested by Central or State Board or the court.

10. Reporting of Monitoring Results:-
Monitoring Information required by this Consent shall be summarized and reported by submitting a Discharge Monitoring report on line to the Board.

11. Limitation of discharge of oil Hazardous Substance in harmful quantities:-
The applicant shall not discharge oil or other hazardous substances in quantities defined as harmful in relevant regulations into natural water course. Nothing in this Consent shall be deemed to preclude the institution of any legal action nor relive the applicant from any responsibilities, liabilities, or penalties to which the applicant is or may be subject to clauses.

12. Limitation of visible floating solids and foam:
During the period beginning date of issuance the applicant shall not discharge floating solids or visible foam.

13. Disposal of Collected Solid-
All hazardous waste/sludge shall be disposed of as per the Authorization issued under Hazd & other waste Rules 2016. And/other Solids Sludges, dirt, silt or other pollutant separated from or resulting from treatment shall be disposed of in such a manner as to prevent any pollutant from such materials from entering any such water Any live fish, Shall fish or other animal collected or trapped as a result of intake water screening or treatment may be returned to eaters body habitat.

14. Provision for Electric Power Failure-
The applicant shall assure to the consent issuing authority that the applicant has installed or provided for an alternative electric power source sufficient to operate all facilities utilized by the applicant to maintain compliance with the terms and conditions of the Consent.

15. Prohibition of By pass system-
The diversion or by-pass of any discharge from facilities utilized by the applicant to maintain compliance with the terms and conditions of this Consent in prohibited except :
i. where unavoidable to prevent loss of life or severe property damage, or
ii. Where excessive storm drainage or run off would damage any facilities necessary for compliance with the terms and conditions of this Consent. The applicant shall immediately notify the consent issuing authorities in writing of each such diversion or by-pass in accordance with the procedure specified above for reporting non-compliance.

16. Industry management shall submit the information online through XGN in reference to compliance of consent conditions.

Consent Order

M.P. Pollution Control Board
E-5, Arera Colony
Paryavaran Parisar, Bhopal - 16 MP
Tele : 0755-2466191, Fax-0755-2463742

CONDITIONS PERTAINING TO AIR (PREVENTION & CONTROL OF POLLUTION) ACT 1981 :-

1. The applicant shall provide comprehensive air pollution control system consisting of control equipments as per the proposal submitted to the Board with reference to generation of emission and same shall be operated & maintained continuously so as to achieve the level of pollutants to the following standards:-

Name of section	Capacity	Stack height	Fuel	Control equipment to be installed	PM, SO_X, NO_X mg/Nm3
Induction Furnace	1 T	12	Electricity	Fume Extraction System	PM-50
Induction Furnace	0.5T	12	Electricity	Fume Extraction System	PM-50
Shot blasting	-	12	--	Dust collectors	--
Sand Plant	-	22	--	Dust extraction system	--
D.G. Sets	4x380 KVA	9	HSD-240ltr/hr	Hood Cover, Acoustic Enclosures	As per MoEFCC/CPCB Notification
D.G. Sets	1x1250 KVA	15	HSD-200ltr/hr	Hood Cover, Acoustic Enclosures	

2. Ambient air quality at the boundary of the industry/unit premises shall be monitored and reported to the Board regularly on quarterly basis: The Ambient air quality norms are prescribed in MoEF gazette notification no. GSR/826(E), dated: 16/11/09. Some of the parameters are as follows:
   a. Particulate Matter (less than 10 micron) - 100 µg/m^3 (PM_{10} µg/m^3 24 hrs. basis)
   b. Particulate Matter (less than 2.5 micron) - 60 µg/m^3 ($PM_{2.5}$ µg/m^3 24 hrs. basis)
   c. Sulphur Dioxide [SO_2] (24 hrs. Basis) - 80 µg/m^3
   d. Nitrogen Oxides [NO_x] (24 hrs. Basis) - 80 µg/m^3
   e. Carbon Monoxide [CO] (8 hrs. Basis) - 2000 µg/m^3

3. The industry shall take adequate measures for control of noise level generated from industrial activities within the premises less than 75 dB(A) during day time and 70 dB(A) during night time.

4. Industry/Unit shall provide with each stack port hole with safe platform of 1 meter width with support & spiral ladder/ Stepped ladder with hand rail up to monitoring platform as per specifications given in part-III emission regulation of CPCB. In no case monkey ladder shall be allowed as stack monitoring facility.

5. The industry/unit shall make the necessary arrangements for control of the fugitive emission from any source of emission/section/activities.

6. All other fugitive emission sources such as leakages, seepages, spillages etc shall be ensured to be plugged or sealed or made airtight to avoid the public nuisance.

7. All the internal roads shall be made pucca to control the fugitive emissions of particulate matter generated due to transportation and internal movements. Good housekeeping practices shall be adopted to avoid leakages, seepages, spillages etc.

8. Industry shall take effective steps for extensive tree plantation within or around the industry/unit premises for general improvement of environmental conditions and as stated in additional condition

Consent Order

M.P. Pollution Control Board
E-5, Arera Colony
Paryavaran Parisar, Bhopal - 16 MP
Tele : 0755-2466191, Fax-0755-2463742

GENERAL CONDITIONS:

1. The non hazardous solid waste arresting in the industry/unit/unit premises sweeping, etc. be disposed off scientifically so as not to cause any nuisance/pollution. The applicant shall take necessary permission from civic authorities for disposal to dumping site. If required.

Non Hazardous Solid wastes:-

Type of waste	Quantity	Disposal
Grinding wheel dust	52MTA	Sale to authorized party/As Per CPCB.
Process sand	468MTA	MoEF Guide lines / Others.
STP Sludge	2MTA	

2. The applicant shall allow the staff of Madhya Pradesh Pollution Control Board and/or their authorized representative, upon the representation of credentials:

a. To inspect raw material stock, manufacturing processes, reactors, premises etc to perform the functions of the Board.

b. To enter upon the applicant's premises where an effluent source is located or in which any records are required to be kept under the terms and conditions of this Consent.

c. To have access at reasonable times to any records required to be kept under the terms and conditions of this Consent.

d. To inspect at reasonable times any monitoring equipment or monitoring method required in this Consent: or,

e. To sample at reasonable times any discharge or pollutants.

3. This consent/authorisation is transferable, in case of change of ownership/management and addresses of new Owner/partner/Directors/proprietor should immediately apply for the same.

4. The issuance of this Consent does not convey any property rights in either real or personal property or any exclusive privileges, nor does it authorise any invasion of personal rights, nor any infringement of Central, State or local laws or regulations.

5. This consent is granted in respect of Water pollution control Act 1974 or Air Pollution Control act, 1981 or Authorization under the provisions of Hazardous and other Waste (Management & Transboundary movement) Rules 2016 only and does not relate to any other Department/Agencies. License required from other Department/Agencies have to be obtained by the unit separately and have to comply separately as per there Act / Rules.

6. Balance consent/authorisation fee, if any shall be recoverable by the Board even at a later date.

7. The applicant shall submit such information, forms and fees as required by the board not letter than 180 day prior to the date of expiration of this consent/authorisation

8. Knowingly making any false statement for obtaining consent or compliance of consent conditions shall result in the imposition of criminal penalties as provided under the section 42(g) of the Water Act or section 38 (g) of the Air Act.

9. After notice and opportunity for the hearing, this consent may be modified, suspended or revoked by the Board in whole or in part during its term for cause including, but not limited to, the following :

(a) Violation of any terms and conditions of this Consent.
(b) Obtaining this Consent by misrepresentation of failure to disclose fully all relevant facts.
(c) A change in any condition that requires temporary or permanent reduction or elimination of the authorized discharge.

10. On violation of any of the above-mentioned conditions the consent granted will automatically be taken as canceled and necessary action will be initiated against the industry.

Additional condition:- (if any) :-

The industry shall install & maintain "Outdoor HD Industrial grade IP (Internet Protocol) cameras with Pan-Tilt-Zoom (PTZ) feature, minimum focal length 5X with night vision facility and tamper proof mechanism" at suitable locations to display all emission sources and effluent discharge points and connect the same with Environment Surveillance Centre, M.P. Pollution Control Board Bhopal for remote surveillance .

Consent No:AW-47627,Validity:31/03/2020, Outward No:55960,05/12/2017, TPAV # G156T465WW

Consent Order

M.P. Pollution Control Board
E-5, Arera Colony
Paryavaran Parisar, Bhopal - 16 MP
Tele : 0755-2466191, Fax-0755-2463742

Consent/authorization as required under the Water (Prevention & Control of Pollution) Act,1974 , The Air (Prevention & Control of Pollution) Act,1981is granted to your industry subject to fulfillment of all the conditions mentioned above. For renewal purpose you shall have to make an application to this Board through XGN at least Six months before the date of expiry of this consent/authorisation. The applicant without valid consent (for operation) of the Board shall not bring in to use any outlet for the discharge of effluent and gaseous emission.

For and on behalf of
M.P. Pollution Control Board

Achyut mishrq

(Member Secretary)

eSign Seeding from UIDAI Server
Digitally Sign with Aadhaar

e-Signed On 05/12/2017 01:40:21
(Organic Authentication on AADHAR from UIDAI Server)
TPAV # G156T465WW

Achyut mishrq

ACHYUT ANAND MISHRA
Member Secretary

Consent No:AW-47627,Validity:31/03/2020, Outward No:55960,05/12/2017, TPAV # G156T465WW

Annexure 2: Budgetary offers / quotations

Quotation 1: Godrej Electricals & Electronics

| ELECTRICALS& ELECTRONICS
(ISO 9001, 14001 and OHSAS CERTIFIED)
COMPRESSED AIR SOLUTIONS
Tel: 91-22-6796 2251 To 2259
Fax: 91-22-6796 1410/1525
E-mail: casenet@godrej.com
Website: www.godrej-airsolutions.com

Godrej & Boyce Mfg. Co. Ltd.
Regd. Office : Pirojshanagar,
Vikhroli, Mumbai400079, India
T.: 91-22-67961700/1800
W.: www.godrej.com

QUOTATION NO. : 228/20152016/SQ-SQ01/001147

THE ENERGY & RESOURCES INSTITUTE (NEW DELHI)
Darbari Seth Block, IHC Complex ,
Lodhi Road
-110003 ,

Kind Att. : Mr.Ayan Ganguly

Subject : - Quotation for ControlAIR IFC and Metacenter ICC

Dear Sir,

We would like to thank you for enquiry of ControlAiR IFC and Metacenter ICC .As per your requirement, we are pleased to submit our techno commercial offer for the same.

We trust that our proposal will meet your requirement and looking forward to your favorable acceptance. Please do not hesitate to contact us should you need any further information or clarification we will be happy to be at your service.

Encl: 1) Commercial Offer 2) Technical Literature

Thanks & Regards,

Rohit V. Shetty
Associate General Manager

Contact Details of Concerned Sales Person
Name : Anurag Sharma
Designation : Asst. Manager
Telephone : +91 11 66507191-92
Mobile : +91 9871075522
Fax :
Email : anagesh@godrej.com

ELECTRICALS& ELECTRONICS
(ISO 9001, 14001 and OHSAS CERTIFIED)
COMPRESSED AIR SOLUTIONS
Tel: 91-22-6796 2251 To 2259
Fax: 91-22-6796 1410/1525
E-mail: caseng@godrej.com
Website: www.godrej-airsolutions.com

Godrej & Boyce Mfg. Co. Ltd.
Regd. Office : Pirojshanagar,
Vikhroli, Mumbai400079, India
T.: 91-22-67961700/1800
W.: www.godrej.com

COMMERCIAL QUOTE. : 228/20152016/SQ-SQ01/001147 **DATE :** 30/11/2015

SR. NO.	DESCRIPTION OF GOODS	PRODUCT CODE	UNIT AMOUNT (Rs.)	QTY.	AMOUNT (Rs.)
1	GE-75, 3750 CFM CONTROLAIR	FGOCR0GIFCGE075A	775000.00	1.00 No	775000.00
2	ICC - SX Metacenter ICC for 5 compressors	FGECREGICCMETASX	835000.00	1.00 No	835000.00
				Total	1610000.00
In words: Rupee Sixteen Lakhs Ten Thousand Only				Grand Total	1610000.00

Terms And Conditions :

PRICE QUOTED	Ex-works Godrej & Boyce Mfg. Co. Ltd., Bhiwandi Works.
PURCHASE ORDER	Purchase order to be released in favour of Godrej & Boyce Mfg. Co. Ltd, Godrej - Electricals & Electronics, PI-1, Compressed Air Solutions, Pirojshanagar, Vikhroli, Mumbai - 400079.
PAYMENT	100% along with PO.
DELIVERY	6-8 weeks from the receipt of your firm PO.
EXCISE DUTY	12.5 % (Excise Gate pass will be provided to claim Modvat)
CST	2% (Along with Form'C'). In case "C" Form cannot be submitted, 12.5% VAT is applicable
OTHER TAXES	As Applicable at the time of dispatch.
CHANGES IN TAXATION	If the delay in Supply / Erection and Commissioning is due to reasons beyond the purview of Godrej, the statutory variations in Taxation (Excise Duty, Service Tax, Sales Tax, etc..) shall be payable by the purchaser.
PACKING & FORWARDING	2% Extra
FREIGHT, INSURANCE	At actuals to your account.
VALIDITY	30 DAYS from the date of offer.
WARRANTY	One-year warranty, from the date of delivery of material at your works will be provided against any manufacturing defects. However this does not include parts or products, which have been subjected to misuse or which have been repaired or altered without the company's authorization. This warranty will not cover consumables, rubber, plastic parts, etc...During this period, if any defect is noticed, the same should be brought to our notice immediately. Godrej will investigate such complaints and either repair or replace the components found defective, if the defect is found to be a manufacturing defect. Godrej decision in this regards will be final and legally binding.
CONFIDENTIALITY	The information contained in this offer is privileged information of Godrej and should not be disclosed without taking written consent from Godrej.
FORCE MAJEUR	This offer shall be subject to force majeure conditions like invasion, hostilities, embargoes, strikes, lock-outs, sabotages Civil commotion, and acts of God such as earthquake, fir, flood, etc. In case of any of the majeure conditions take place during the currency of the contract, the delivery period shall be suitably extended by mutual agreement.
ARBITRATION	Any disputes arising out of this offer shall lie within the jurisdiction of the Courts in Mumbai only. In case of arbitration, decision of the sole Arbitrator to be appointed by Godrej will be final.

Annexure 3: Instruments used

Instruments	Model/ Make	Application	Accuracy
Power analysers	Fluke: 435, Krykard ALM 10,	Electrical Parameters Harmonics analysis, power logging	± 0.5%
Thermal imager	875-2/Testo	Surface Temperature & Image	± 2%
Anemometer	Testo: 425, Airflow: TA45	Air Velocity	±(0.03 m/s +5% of mv)