kirloskar
Oil Engines

Kirloskar Oil Engines Ltd., Large Engine Plant,
A-11/1, MIDC Ambad, Nashik- 422 010.

INDEX

“ENERGY PERFORMANCE REPORT”
For the Year 2021-22

Team: 1) Mr. H R Upadhye – Manager Elect. Maintenance
2) Mr. S H Chavan- Manager Mech. Maintenance

Dear Hon. Assessors,

It gives us immense pleasure to present Energy Performance Report for the year 2021-22

At KOEL Nashik Plant, conservation of energy has been given prime importance in each and every activities and is on priority since many years.
Our product range is varied from higher HP to lower HP. We set our goals, targets & Internal Benchmarks to achieve SEC.
Last few years, our average monthly consumption of electrical units & diesel has shown a downward trend which is the result of our ENCON awareness & efforts for implementation of associated activities. Comparison of the electrical units consumption with total sales figures shows consistent trends.

There is a continuous improvement towards conservation of Energy and Environment throughout the year. Periodic meetings and awareness programs are conducted to minimise the energy consumption.

Various awards & certificates grabbed on this front encouraged us to set new mile stone.

ENCON Team
KOEL, Nashik

Our Products :

- Marine DG set range

  7 kVA To 625 kVA

- Defense DG set Range

  2 kVA To 200 kVA

Electrical Data of the Nasik Plant

1. ELECTRICAL ENERGY.		
1	Incoming Electrical Supply From MSEDCL.	11KV
2	Incoming HT,VCB.	630A,350MVA,11KV,CGL
3	Transformer Capacity. (One)	1500KVA,11KV/0.415KV
4	Incoming LT ACB.	3000A, 415V,L&T.
5	Standby Generator Capacity.	500KVA & 400 KVA,0.8 P.F.,KIRLOSKAR GREEN
6	Sanctioned Connected Load.	490KW
7	Sanctioned Contract Demand.	250KVA
8	Average actual Demand. FY 21-22	171 KVA
9	Average Billed Demand. FY 21-22	171 KVA
10	Average Power Factor. FY 21-22	0.988 Lag
11	Annual Electricity Cons'n (MSEDCL) FY 21-22	3,08,697 kWh
12	Annual Generation On Standby DG Set.	2915 kVAh
13	Cost Of MSEDCL Per Unit. FY 21-22	Rs. 10.877 /-
14	Prompt Payment Discount Availed. FY 21-22	Rs. 31,728/-

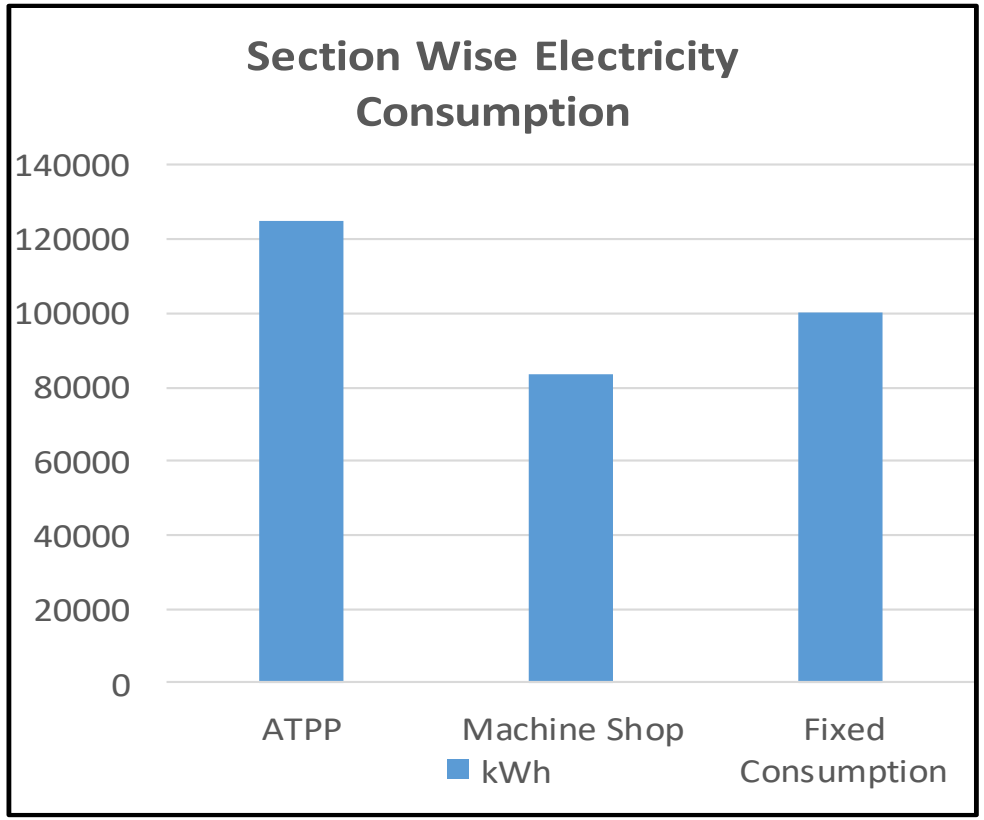
1. Energy consumption- Area specific

Energy Consumption for Production, Office Lighting & New Product Development

Type of consumption	Unit	FY 21-22		
		Production	Fixed Consumption	Remark
Electrical Energy	kVAh	2,08,697	1,00,000	Fixed consumed for canteen, lighting & Transformer losses .
Diesel	Litre	23,224	5,473	Fixed consumed for Improvement project and utility
Compressed Air	kWh	26,255	--	--
Water	Kl	6,860	2,400	Fixed consumption 10 M3 /Day (Eight months) for Plant Gardening .

1.Electricity Consumption : Section Wise Monitoring for the year 21-22

Monitoring Area	Consumption (kVAh)
ATPP	1,25,218
Machine Shop	83,479
Canteen, Lighting Transformer Losses	1,00,000



2. Specific Energy consumption- Production

SEC for Last Five Years

SR.NO	DESCRIPTION.	FY 16-17	FY 17-18	FY 18-19	FY 19-20	FY 20-21	FY 21-22
1	Units Consumed in kVAh (MSEDCL)	4,05,750	4,40,780	4,40,780	3,67,441	2,76,626	3,08,697
2	Total BHP Produced	25,025	38,384	34,827	31,090	25,784	30,948
3	Achievement for the Year (kVAh/BHP)	16.21	9.67	9.21	7.96	6.85	6.74

3.Performance for last three years and Target for next year with benchmark

Types of consumption	Unit	Year 19-20	Year 20-21	Year 21-22	Year 22-23	Benchmark
		Actual	Actual	Actual	Target	
Power	kVAh/BHP	7.96	6.85	6.74	6.54	6.13
Diesel	Ltr/BHP	0.73	0.85	0.75	0.73	0.68
Comp. Air	kWh/BHP	0.82	0.79	0.85	0.82	0.77
Water	kL/BHP	0.21	0.20	0.22	0.21	0.20

- Benchmark taken 9% reduction wrt Actual SEC of year 21-22 .
- Compressed air and water SEC actual increased in FY 21-22 because of newly added production of R550 and K4300 crankcase

4. Savings & Investment for Last Three Years

Sr. No.	Year	ENCON Activities in Nos.	Investment in Rs.	Energy Saved		Saving in Rs.	
				Electrical (kVAh)	Thermal (Ltr./BHP)	Electrical	Thermal
1	FY 2021-2022	5	3,44,000	56,883	0.26	5,68,839	7,30,305
2	FY 2020-2021	9	1,57,100	26,709	0.85	2,99,386	6,22,360
3	FY 2019-2020	12	1,87,539	24,637	0.2	3,12,642	5,18,700

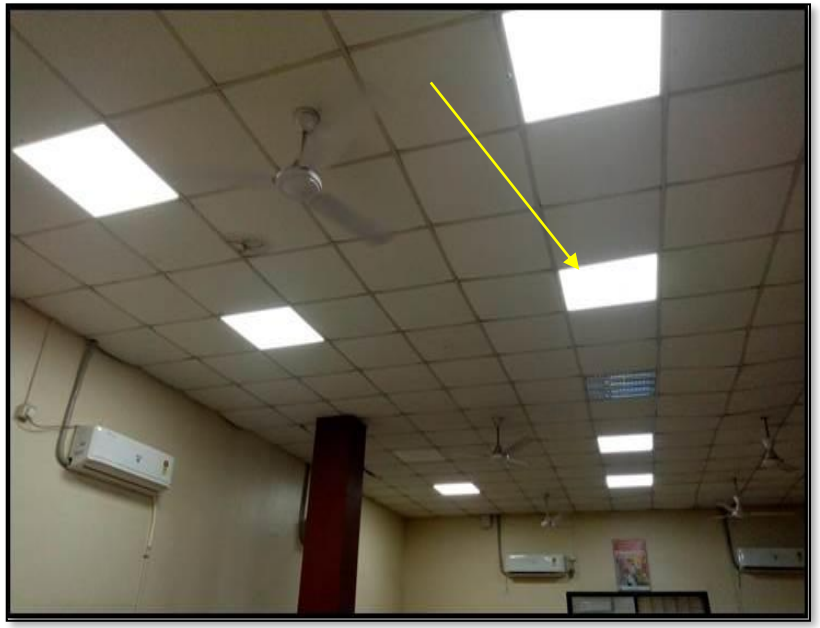
4.Highlights : FY 21-22

ENCON Projects:

Sr. No.	Improvement Projects Description	Investment in Rs.	Units (kVAh) Saved/Year	Saving in Rs./Year	Payback Period in Year
1	Replacement of 72Watt to 40 Watt LED tube lights -110	23,000	13,178	1,31,789	0.2
2	Replacement of 400 watt High bay lamp by 100 watt LED High Bay lamp- 55 Nos.	1,66,000	25,740	2,57,400	0.5
3	Replacement of Office section and cabins 4*18watt lamps by 36 watt LED fixture-120 Nos.	1,43,000	16,174	1,61,740	1
4	Installation of transparent roof sheet in welding shop (36 W 5 tube lights)	10,000	207	2,070	4
5	Overhauling Air Intake valve of CMM compressor for better performance	2,000	1,584	15,840	0.1
	Total	**3,44,000**	**56,883**	**5,68,839**	**0.3**

4.Highlights : FY 21-22

ENCON Projects:



Replacement of 4* 18 W fixture by 36 W LED fixtures (120 Nos.) - Saving ₹ 1,61,740 /- per Yr.

400 W MHL replaced with 100 W LED (55 Nos) in shop floor Saving - ₹ 2,57,400/- per Yr.

4.Highlights : FY 21-22

WATERCON Projects:

Reuse of ETP processed water for gardening with the help of drip irrigation @ 5-6 KL per day

Installation of water saving sprinkler nozzle for water taps - Saving 300 ml water per use

Note:- Now we are using waterless urinals

5. Renewable Energy Source

1. SOLAR LAMPS IN FACTORY PREMISES. TOTAL 9 NOS. 	2.NATURAL AIR: USE OF TURBO VENTILATORS AND TRANSPARENT SHEETS THROUGHOUT FACTORY ROOF. 
3. DAYLIGHT LIGHT PIPE SYSTEM IN SUB-ASSLY & CE AREA. 	4. SOLAR WATER HEATER IN CANTEEN. 

6. Utilisation of waste material

1) **Plastic Waste Management :**

KOEL has finalized the Govt. Authorized recycler for Plastic Scrap

KOEL Nashik, plastic waste is @ 50 kg/month

Plastic recycler converts plastic waste into Granules these are used for Road purpose .

2) **Zero waste discharge plant:**

KOEL, Nashik is a zero waste water discharge plant; with treatment facility for effluent and sewage.

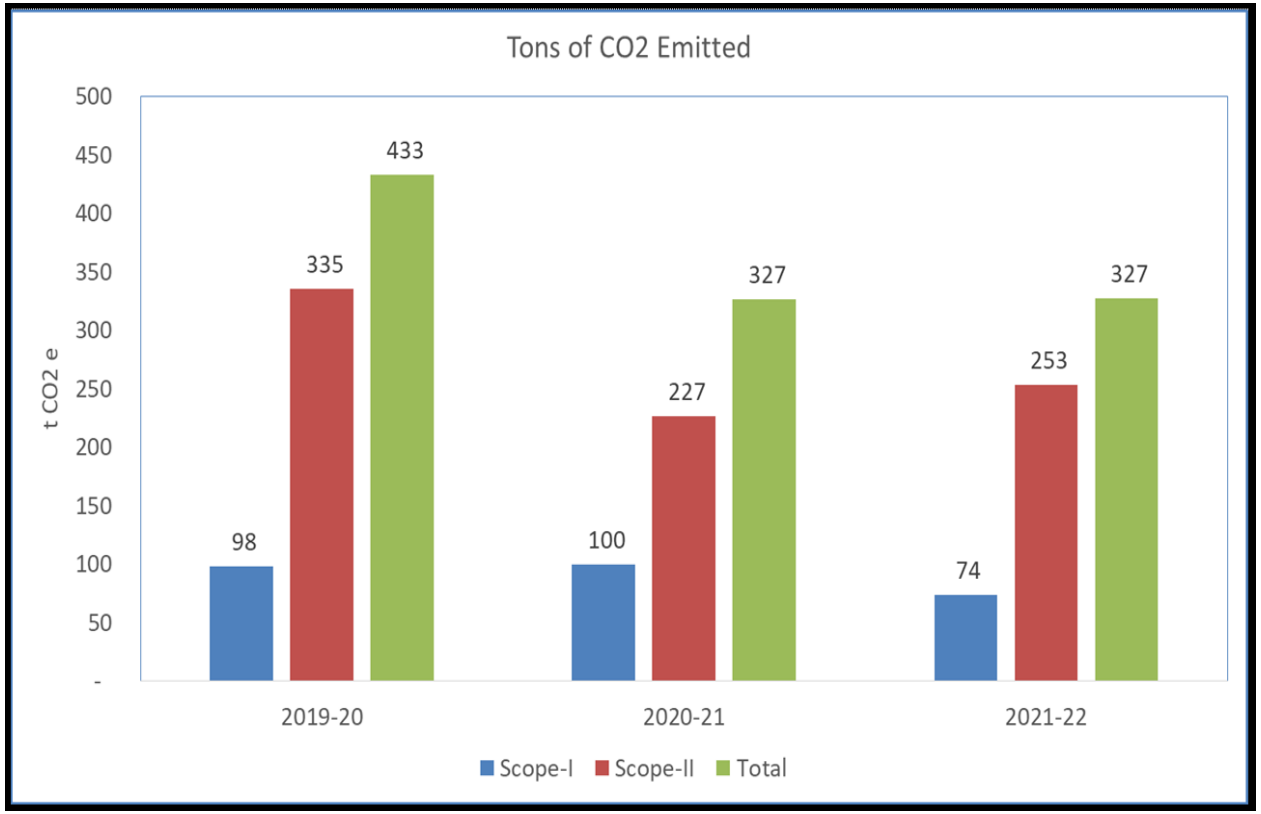
ETP Plant of Capacity 20 m3 /day , all treated water is utilized for Plant Gardening purpose.

Average daily treated effluent is @ 5 m3.

6. Fuel (HSD) Saving

- Thermal saving by optimization in Data logging time by implementation of SCADA system on DV & SL90 Engine testing bed
- Before , manual system takes 15 Min time for Data logging per hour of all parameter for DV engine validation .
- After SCADA implementation, it is possible & happened only in 3 minute.
- Every Engine running hours reduced by 12 minutes .
- Hence , Thermal saving is = 8,115 Ltr/ year

7. GHG Emission



Year	FY 19-20	FY 20-21	FY 21-22
Tons of CO2 Emitted	**433**	**327**	**327**

8.ENCON efforts at Vendors end

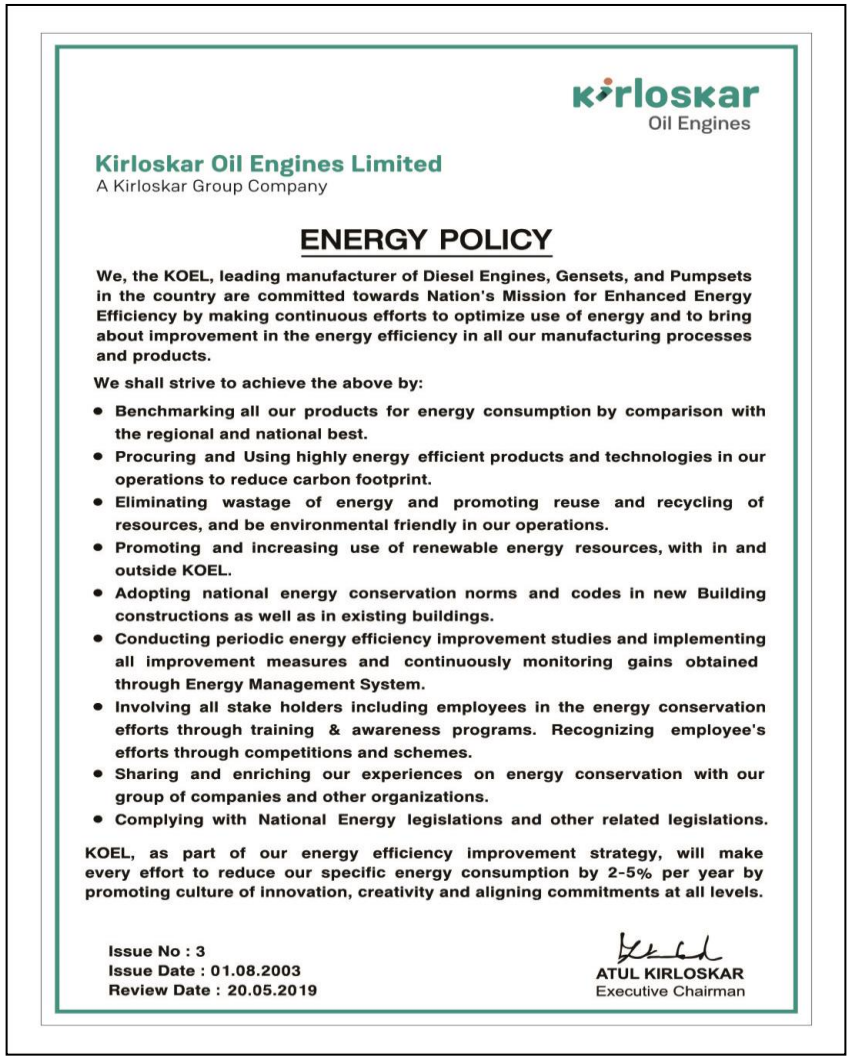
- Following initiatives taken at M/s United Heat Transfer P Ltd. Nashik,

  - Ventilators working on natural draft are fixed on the roof top, which maintains internal temperature & saving electrical energy.

  - Usage of transparent sheet for roofing , reducing consumption of light at shop floor, resulting in saving of electrical energy.

  - All internal lighting are fitted with LED, reducing the power consumption.

9. Energy and IMS policy



Kirloskar Oil Engines

Kirloskar Oil Engines Limited
A Kirloskar Group Company

ENERGY POLICY

We, the KOEL, leading manufacturer of Diesel Engines, Gensets, and Pumpsets in the country are committed towards Nation's Mission for Enhanced Energy Efficiency by making continuous efforts to optimize use of energy and to bring about improvement in the energy efficiency in all our manufacturing processes and products.

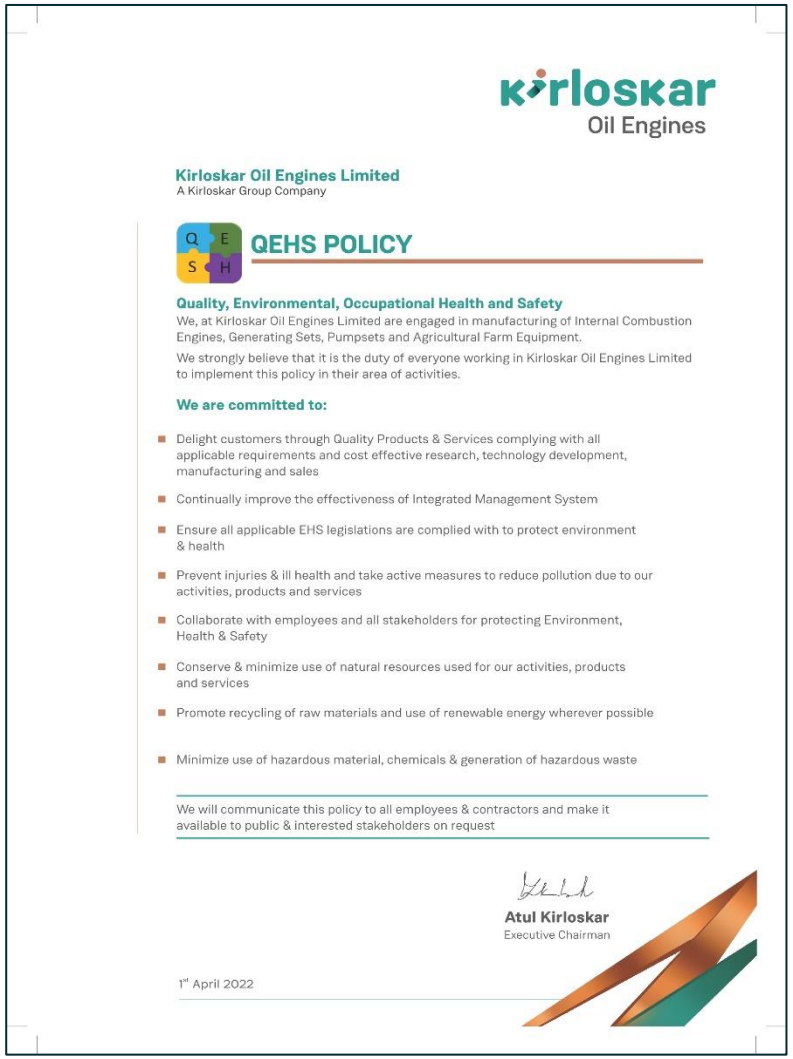
We shall strive to achieve the above by:

- **Benchmarking all our products for energy consumption by comparison with the regional and national best.**
- **Procuring and Using highly energy efficient products and technologies in our operations to reduce carbon footprint.**
- **Eliminating wastage of energy and promoting reuse and recycling of resources, and be environmental friendly in our operations.**
- **Promoting and increasing use of renewable energy resources, with in and outside KOEL.**
- **Adopting national energy conservation norms and codes in new Building constructions as well as in existing buildings.**
- **Conducting periodic energy efficiency improvement studies and implementing all improvement measures and continuously monitoring gains obtained through Energy Management System.**
- **Involving all stake holders including employees in the energy conservation efforts through training & awareness programs. Recognizing employee's efforts through competitions and schemes.**
- **Sharing and enriching our experiences on energy conservation with our group of companies and other organizations.**
- **Complying with National Energy legislations and other related legislations.**

KOEL, as part of our energy efficiency improvement strategy, will make every effort to reduce our specific energy consumption by 2-5% per year by promoting culture of innovation, creativity and aligning commitments at all levels.

Issue No : 3
Issue Date : 01.08.2003
Review Date : 20.05.2019

ATUL KIRLOSKAR
Executive Chairman



Kirloskar Oil Engines

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A Kirloskar Group Company

QEHS POLICY

Quality, Environmental, Occupational Health and Safety

We, at Kirloskar Oil Engines Limited are engaged in manufacturing of Internal Combustion Engines, Generating Sets, Pumpsets and Agricultural Farm Equipment.

We strongly believe that it is the duty of everyone working in Kirloskar Oil Engines Limited to implement this policy in their area of activities.

We are committed to:

- Delight customers through Quality Products & Services complying with all applicable requirements and cost effective research, technology development, manufacturing and sales
- Continually improve the effectiveness of Integrated Management System
- Ensure all applicable EHS legislations are complied with to protect environment & health
- Prevent injuries & ill health and take active measures to reduce pollution due to our activities, products and services
- Collaborate with employees and all stakeholders for protecting Environment, Health & Safety
- Conserve & minimize use of natural resources used for our activities, products and services
- Promote recycling of raw materials and use of renewable energy wherever possible
- Minimize use of hazardous material, chemicals & generation of hazardous waste

We will communicate this policy to all employees & contractors and make it available to public & interested stakeholders on request

Atul Kirloskar
Executive Chairman

1st April 2022

9. Energy Conservation Team

Sr. No.	NAME		DESIGNATION / DEPT.
1	Mr. P.A. Joshi	Guide & Mentor	DGM, Plant Head
2	Mr. H. R. Upadhye	Energy Secretary	Manager, P.E & C.E.
3	Mr. S. H. Chavan	Member	Manager, Plant Engg.
4	Mr. S.M. Koli	Member	Engineer, Plant Engg
5	Mr. V. M. Kulkarni	Member	Manager, Basic Engg.
6	Mr. P. S. Patil	Member	AGM, A.T.P.P.
7	Mr. G. M. Vadnere	Member	Senior Officer, F&C
8	Mr. R. S. Borse	Member	Dy. Manager, P&A
9	Mr. P.N. Bodake	Member	Dy. Manager, M/C Shop
10	Mr. P. M. Kulkarni	Member	Manager, ME
11	Mr. W. T. Patil	Member	Manager, QA
12	Mr. P. R. Yashod	Member	Team Member, ATPP
13	Mr. R. L. Buwa	Member	Team Member, Machine Shop

9. Energy Measurement Activities

Sr.No.	Activity	Frequency	Responsibility
1	Energy Meter Reading.(MSEDCL) & DB	Daily	Electrician
2	Energy Meter Reading.(ETP)	Daily	Operator
3	Review Of Energy Consumption,P.F.,M.D	Daily	Plant Engg. Manager
4	Review Of Implementation Status (ENCON Projects)	Quarterly	ENCON Team LEBG
5	Section -wise water consumption monitoring	Weekly	Maintenance
6	Compressed Air consumption monitoring	Daily	Maintenance
7	HSD Consumption monitoring	Daily	Production

9. Summary - Electricity Bill FY 21-22

Sr. No.	Month	Unit Consumption in kVAh	Avg . P.F.	Billed Demand	Bill in Rs.	Prompt Payment Discount
1	April	19,474	0.988	108	2,09,210	2,046
2	May	16,372	0.988	130	2,06,790	2,046
3	June	29,583	0.991	171	3,31,460	2,991
4	July	24,696	0.988	150	2,72,330	2,530
5	Aug	23,584	0.987	150	2,62,620	2,424
6	Sept	24,724	0.992	150	2,58,950	2,516
7	Oct	26,309	0.983	150	2,78,140	2,637
8	Nov	22,938	0.988	150	2,56,470	2,406
9	Dec	29,709	0.99	150	3,16,060	2,915
10	Jan	26,666	0.985	150	2,89,160	2,915
11	Feb	25,386	0.985	150	2,80,700	2,586
12	Mar	39,256	0.988	162	3,96,080	3,716
	Total	**3,08,697**			**33,57,970**	**31,728**

Avg. Electricity unit kVAh consumption per month : 25,724kVAh

9. Awareness Programs

- Display of Energy Policy at various locations
- Display of Newspaper articles per month , Photos, Presentation etc.
- Sharing of Energy conservation bulletin to KOEL managers on mail per month.
- Awareness among department employees by ENCON Team members.
- Display of Energy Conservation information stickers at appropriate places.
- Competition of Energy Conservation slogans and posters at LE, Nashik.
- Competition of Energy Conservation slogans, posters, poems & projects at K Group level.
- Celebration of National Energy Conservation Day and Week(14th Dec. and 14th to 20th Dec.)
- ENCON prizes based on ENCON theme such as Power Bank, Digital speaker, LED Torch given to ENCON competition winners.
- In house lectures by prominent speakers to all employees.

9. Awareness Programs

Celebration of “Energy Conservation Day & Week” Program details

- Oath Ceremony: Factory Manager delivered the ENCON oath to all employees.
- ‘ENCON WEEK’ display board by team members at the gate.
- ENCON prizes based on ENCON theme such as Power Bank, Digital speaker, LED Torch given to ENCON competition winners.

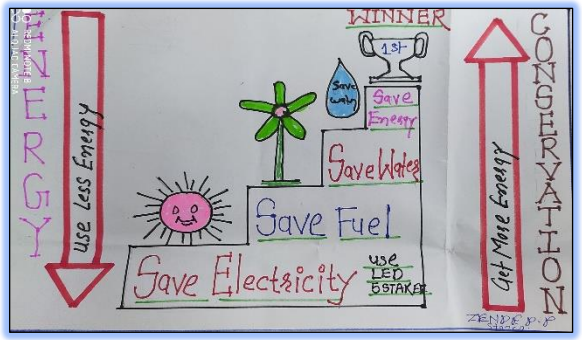
Oath Ceremony

ENCON Week Banner on Main Gate

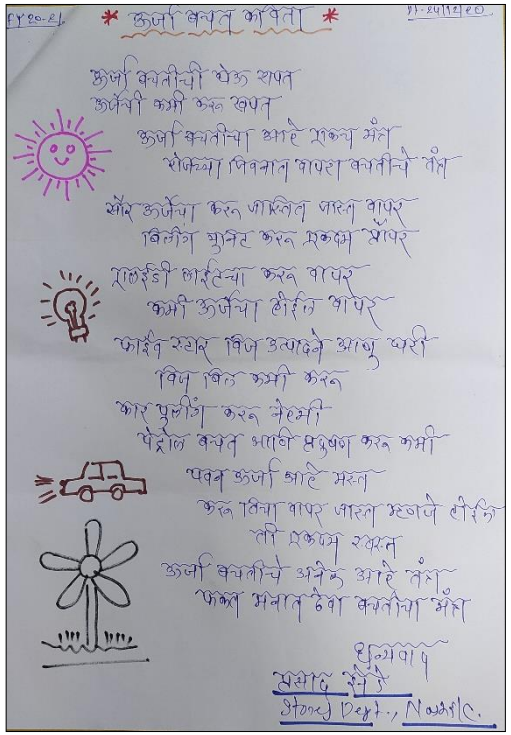
9. Awareness Programs

Competition held for employees - Slogans, Posters, Poems, Projects, Employees participated in the competition , following are some of the examples:

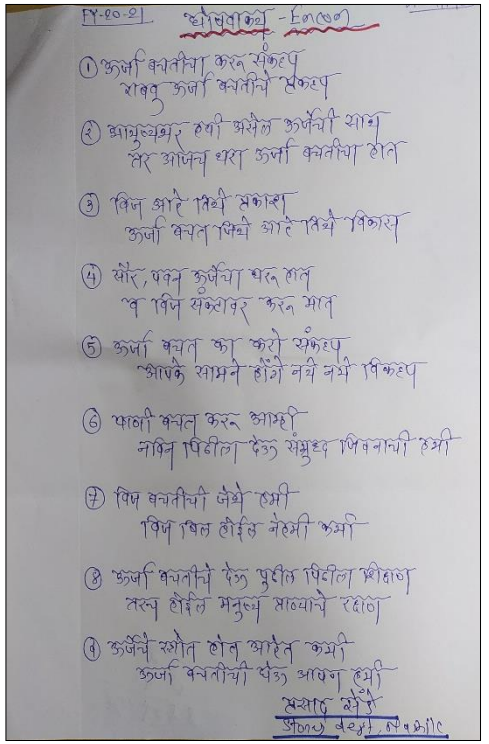
Poster



Poem



Slogan



9. Information sharing

- Sharing of information via E-Mails among employees.
- Circulations of Magazine, Brochure, Leaflets of trainings attended.
- Access of BEE and MEDA web site – www.energymanager.com,www.mahaurja.com
- Information from agencies like Technocrats etc.
- Information sharing within K group companies and others.
- Visit to various sites where ENCON projects implemented successfully , ENCON Team visited to near by companies such as Crompton Greeves, Bosch , Unitech , Siemens etc .

10. Implementation of ISO/Green co Rating

For ISO 50001-In pipeline, will be implemented by end of 2022
Objectives are mentioned in Energy policy.

- Procuring & Using highly energy efficient products & technologies in our operations to reduce carbon footprint.
- Eliminating wastage of energy & promoting reuse & recycling of resources & be environmental friendly in our operations.
- Promoting & increasing use of renewable energy source, within & outside KOEL
- Adopting national energy conservation norms & codes in new building constructions as well as in existing building constructions

11. ADOPTION OF NEW/ ENERGY EFFICIENT TECHNOLOGY

Theme : To reduce the cycle time of machining of crank case cooler cover from Skoda machine(79.68kWh) to Mazak (32kWh) machine.

Machine : Mazak HMC **Area : Machine Shop**

Present Status :

1. Machine of integral cooler cover machining on Skoda machine
2. Cycle time of integral cooler cover machining on Skoda machine is 572 minutes.
3. Power rating of Skoda machine is 79.68 kWh
4. Energy required on Skoda machine for IC cover is 473.94 kWh
5. Energy cost of IC cover on Skoda machine is Rs. 4218/-

Countermeasures :

1. Machine of integral cooler cover machining on Mazak CNC machine
2. Cycle time of integral cooler cover machining on Mazak machine is 575 minutes.
3. Power rating of Mazak machine is 32 kWh
4. Energy required on Mazak machine for IC cover is 306.56 kWh
5. Energy cost of IC cover on Mazak machine is Rs. 2728/-

Benefits :

Total Yearly Saving in kWh =6,862

Total Yearly Saving in Rs. = 61,079/-

Team: Mr. Malode , Mr. P.N. Bodake

11. New energy saving Equipments and Devices

Advantages of new solar street light:-

- **Intelligent control, easy installation and maintenance**
- **Solar street lamps works automatically, does not require any manual intervention, charges during the day and switches on during the night. Since it is a self-powered unit, this light does not depend on grid to power it.**

11. New energy saving Equipments and Devices

Use of inverter type Air-conditioner :- Approx. 35% reduction in energy consumption as compared to normal air conditioner.

Results show that the daily average energy consumption (for an 8-hour operating period) was 13.5 kWh for the standard AC and **8.7 kWh for the inverter type AC**. So, inverter technology can save about **35%** of electricity consumed over a standard air conditioner.

11. New energy saving Equipments and Devices

Use of Dimmer stat for demonstration of Mains failure operation of DG set : Saving of approx. 15 Ltr HSD per DG set

Current Status:

- Presently for demonstration of Mains Failure operation (Under voltage – Over voltage test)of DG set ,additional DG set need to run as mains supply.
  Approx. Diesel required : 10 ltr / DG set

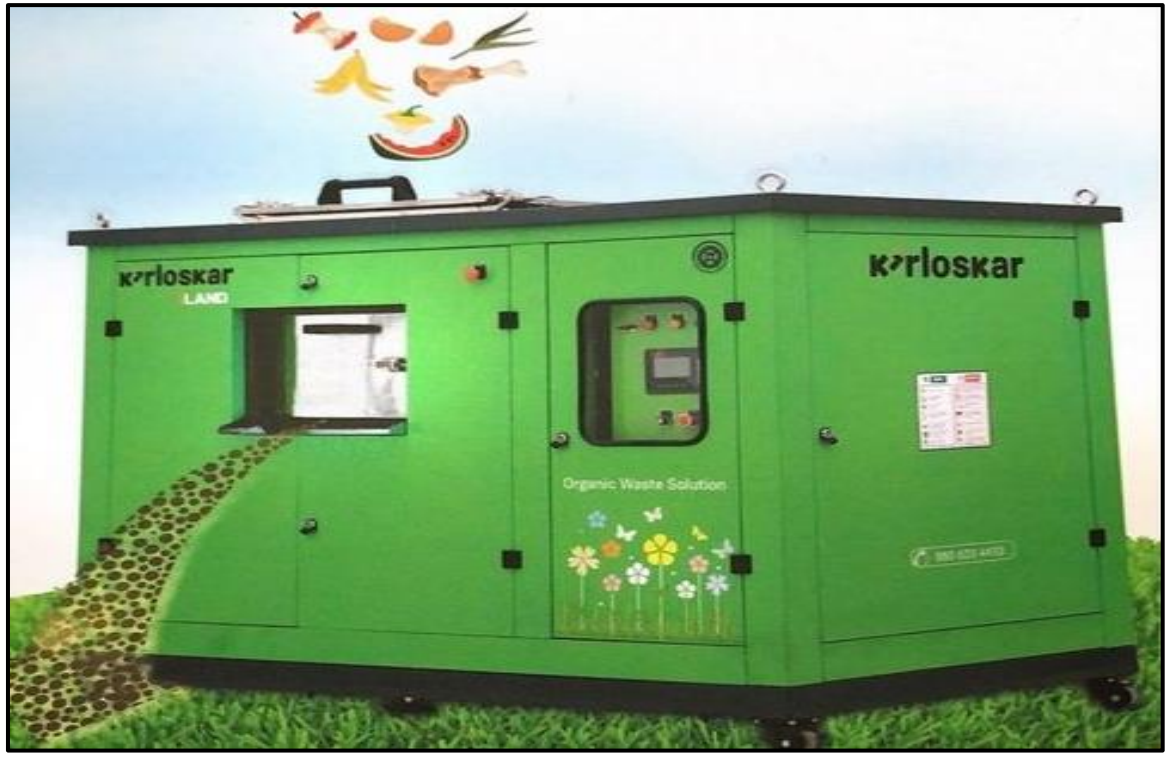
Counter measure:

Mobile trolley mounted Dimmer set with Under Voltage & Over Voltage set up .
Production line HSD saved 10 ltr/ DG set.

11. New energy saving Equipments and Devices

Kirloskar iLand is an innovative Organic Waste Disposal Solution that reduces the volume of organic waste by 80-90% and converts it into garden nutrient.

By using this , we will convert our 15 kg daily food waste and 10 kg garden waste into garden nutrient.



12. Projects Forecasted

Roof top solar plant installation up to 250 kWp Capacity Proposal:

Cost/Rate are in Rs.		Opex rate	Capex Cost
Vendor	Capacity	Tarriff rate	
L1	249 kWp	5.4	1,10,00,000
L2	249 kWp		1,22,30,400

PROJECT PROPOSED SUMMARY

- Solar power plant capacity: 249.6 KWp DC
- The solar power plant will be mounted on the Roof using Aluminum Structure
- Total south facing shadow free area used would be approx.: 1996 m2
- The average energy output calculated in the 1st year would be:
  Annual energy generation – 3,42,540 kWh

Participation & Special Achievements

FY	K Group	MEDA	BEE	CII
2020-21	--	2nd in General Category	--	Energy Efficient Unit
2019-20	--	Certificate of Excellence	--	--
2018-19	2nd Prize	**1st** in SME (13th State Level)	Certificate of Merit	Excellent Energy Efficient Unit
2017-18	2nd Prize	Certificate of Excellence	--	
2016-17	1st Prize	**1st** in SME (12th State Level)	--	
2015-16	2nd Prize	Certificate of Appreciation	--	
2014-15	**1st** Prize	3rd in SME (10th State Level)	--	
2013-14	**1st** Runner up	--	**2nd** in Gen Category	

Thank You

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