National Award for Excellence in Energy Management -2022

Hero MotoCorp Ltd. - Haridwar

Presenter :-

1. Harendra Singh (Section Head Maintenance)
2. Shubham Dhingra(Team Manager Utility)

Mentor :-

1. Haridwar Singh (HOD Plant Maintenance)

Agenda

1. Brief introduction on HMCH - Journey
2. Specific Energy Consumption in last 3 years
3. Information on Competitors, National & Global benchmark
4. Energy Saving projects implemented in last 3 years
5. Innovative Projects implemented
6. Utilisation of renewable energy sources
7. Waste Utilization and management
8. GHG Inventorisation
9. Green Supply Chain Management
10. Team work, Employee Involvement & Monitoring
11. Implementation of ISO 50001/Green Co-rating/IGBC Rating
12. Learning from CII Energy Award 2021 or any other award program
13. Other relevant information

1. Brief introduction on HMCH - Journey

1984 – Journey Started

Hero Honda Motors Ltd. Incorporated – Dharuhera Plant (1st)

1985 – First motorcycle "CD 100" rolled out

1997 – Gurgaon plant inaugurated (2nd)

2001 – HHML-World No.1 2W Manufacturer

2008 – Haridwar plant inaugurated (3rd)

2011 – New Identity - Hero MotoCorp Ltd.

2013 – Most Effective Brand Transition Award by CNBC

2014 – 4th plant & GPC operational at Neemrana, Rajasthan

2015 – 1st overseas plant Operational at Colombia

2016 – CIT Started at Jaipur, Rajasthan

2016 – 5th plant was Made Operational at Vadodara

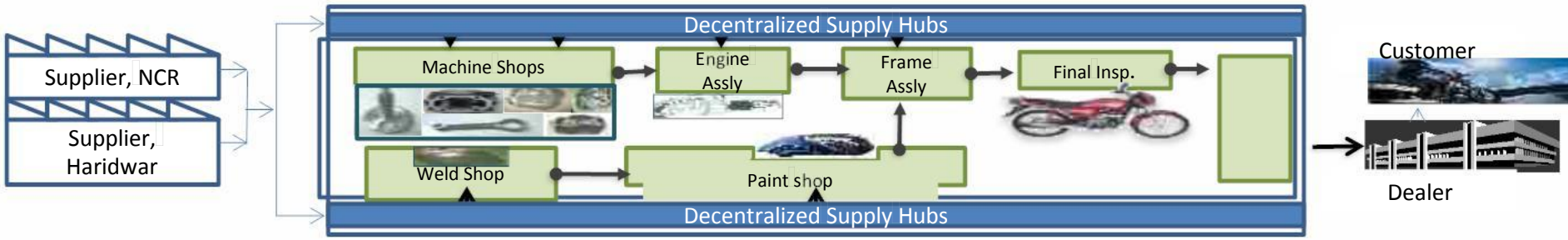
2017 – 2nd overseas Plant started manufacturing at Bangladesh

2018 – Foundation Stone of Chittoor Plant (6th - Andhra Pradesh)

2019 – Start of Hero Tech Centre Germany GmBH

2021 – Milestone of 100 million cumulative Production

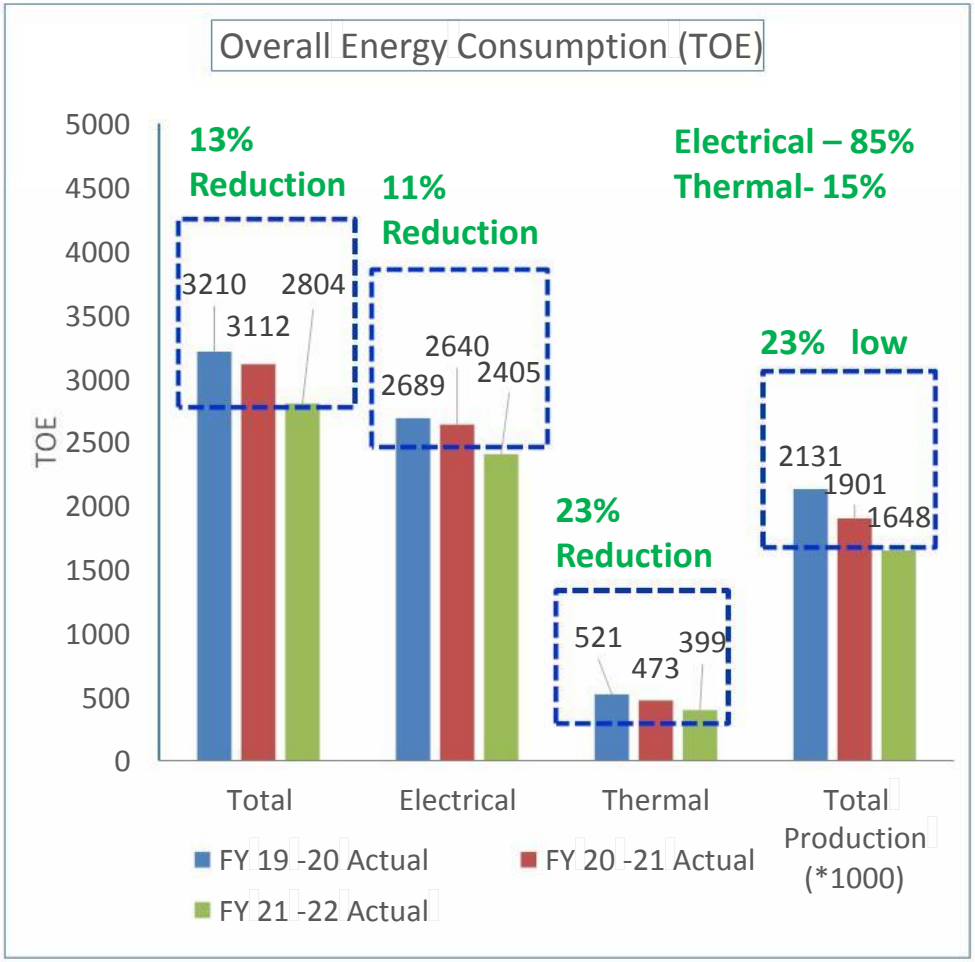
Processes & Major Equipments:

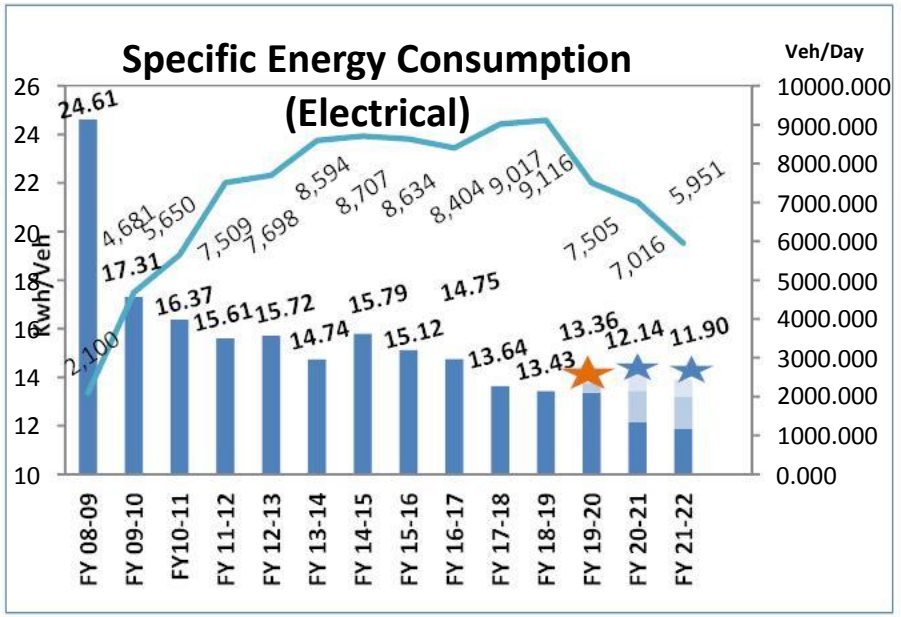


In Haridwar Plant we are making 4 stroke motor cycles of 100cc, 110cc and 160cc.

2. Plant Specific Energy Consumption

2.1 Historical Trend -Electrical





Reason for variations

Factors of variation	FY 18-19	FY 19-20	FY 20-21	FY 21-22
Actual (kWh/veh) (w/o special factor)	13.43	13.36	12.14	11.90
Low Vehicle impact		0.91	1.62	3.15
Higher CC Veh/BS6	0.00	0.40	1.31	1.31
Covid impact			1.07	0.69
Actual kWH/ veh	13.43	14.67	16.14	17.04

Legend

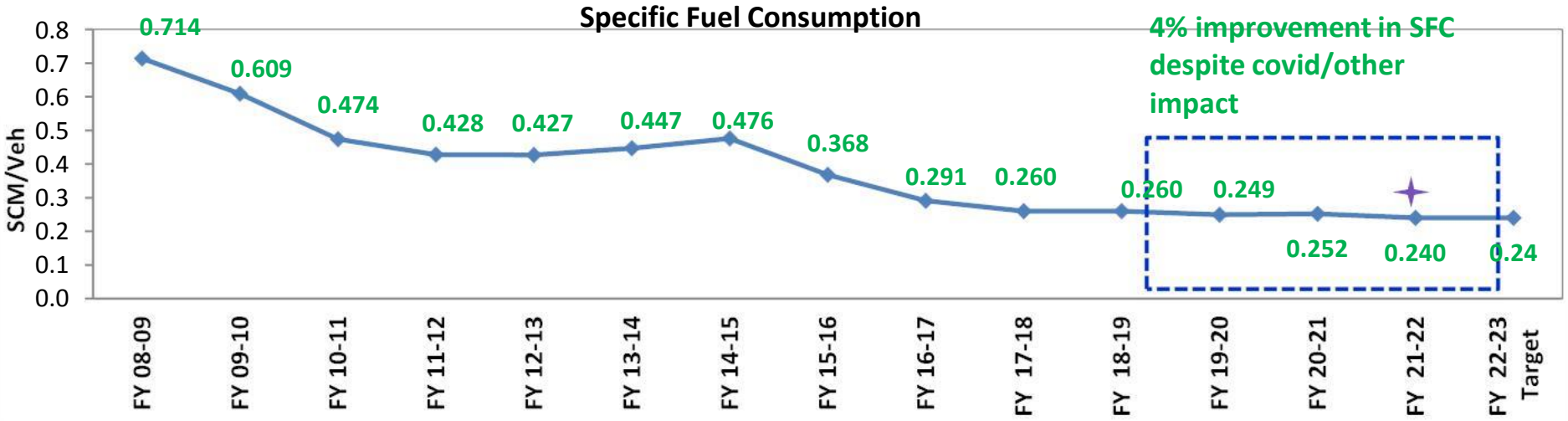
★ installation of new machines and trial for BS6, higher cc production

★ Low Vehicle impact and higher CC production

In Our Journey of Specific Energy Consumption reduction , we have Controlled the over shoot due to covid-19 by Continual improvement & resource conservation. Further our endeavor to achieve SEC target to make Energy Efficient Plant

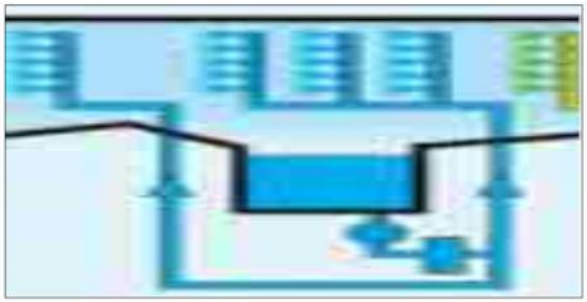
2. Plant Specific Energy Consumption

2.2 Historical Trend -Thermal

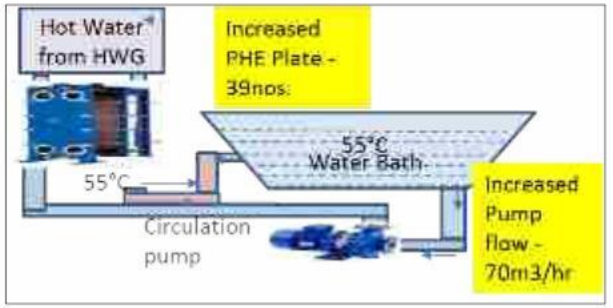


Key Projects contributing to reduction

Heat pump in Hot water generator



Phosphate bath temp. reduction



Hot water Temperature Reduction

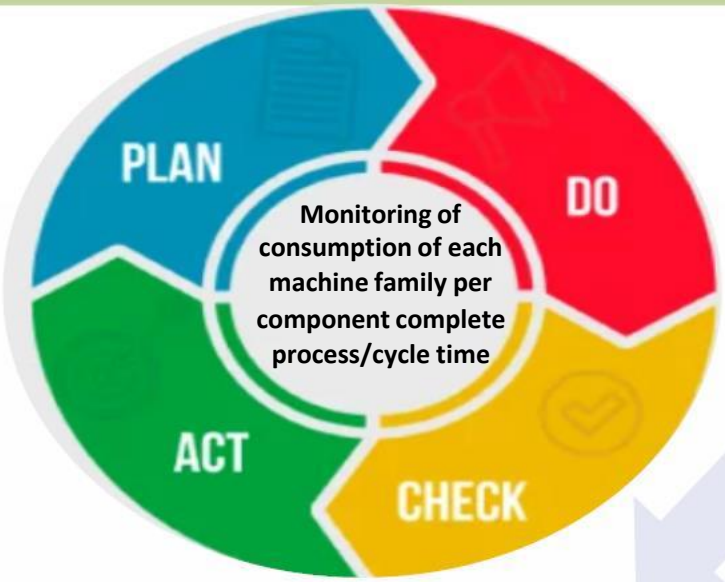
Legend

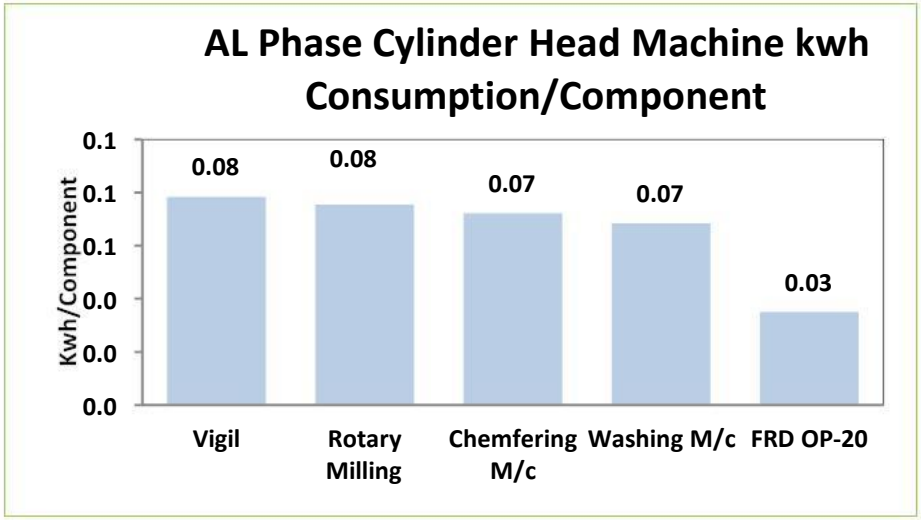
✦ Extensive efforts made in FY 21-22 to bring down SFC under control as new machine addition post BSVI (Washing machines shifted to thermal)

4% thermal energy consumption reduction in last three years by implementation of thermal Energy Saving Projects. In the next journey towards perfection, our focus is on establishment of Most energy efficient plant along with collaboration of Plant Cross function teams

3. External & Internal Benchmarking

3.1 Internal Benchmarking





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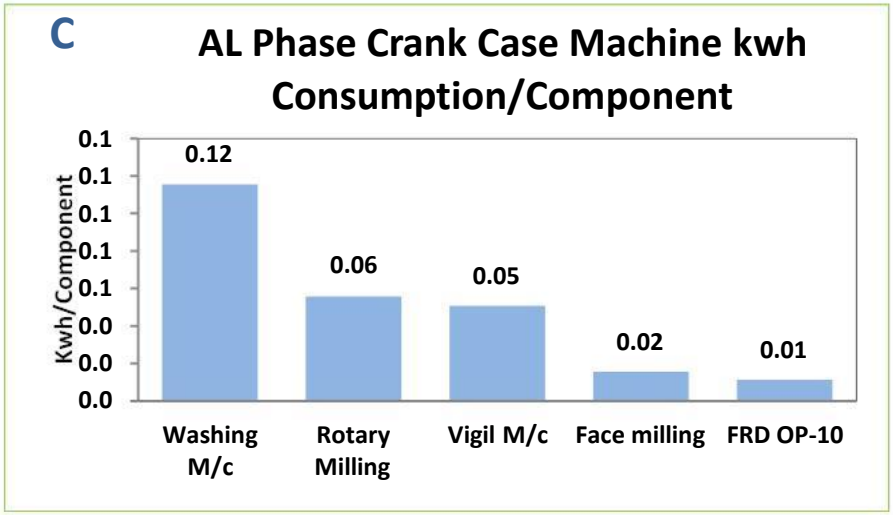
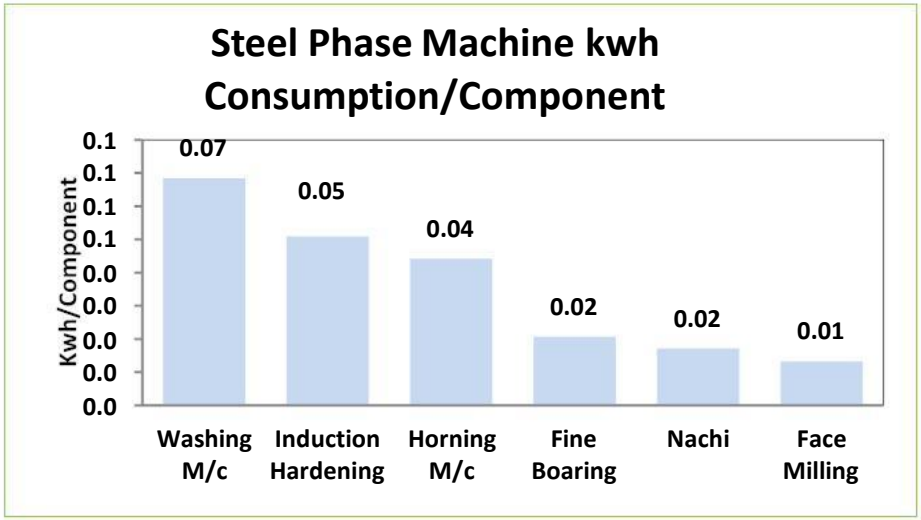
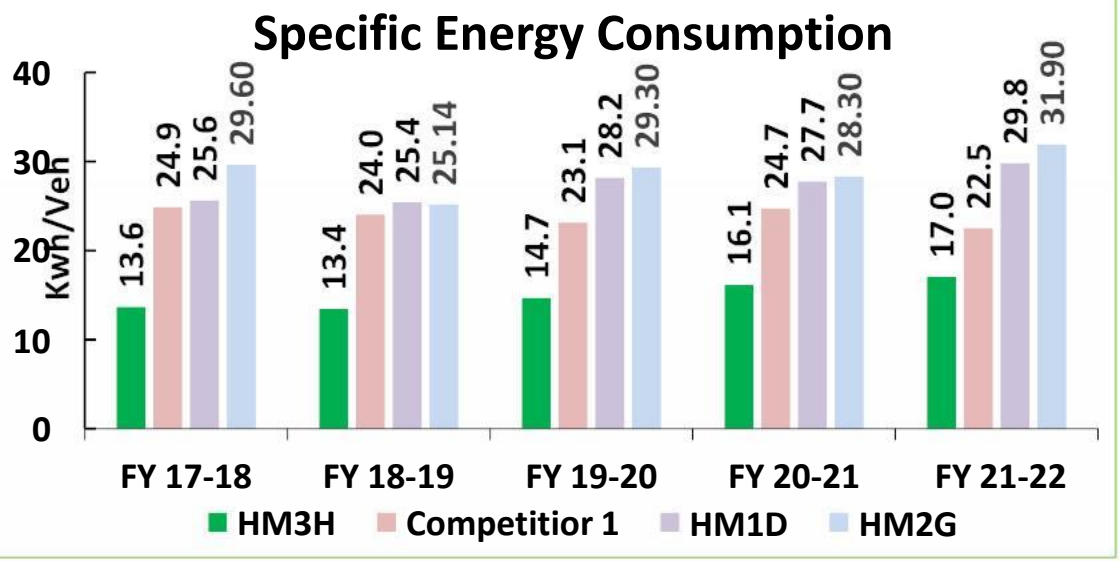
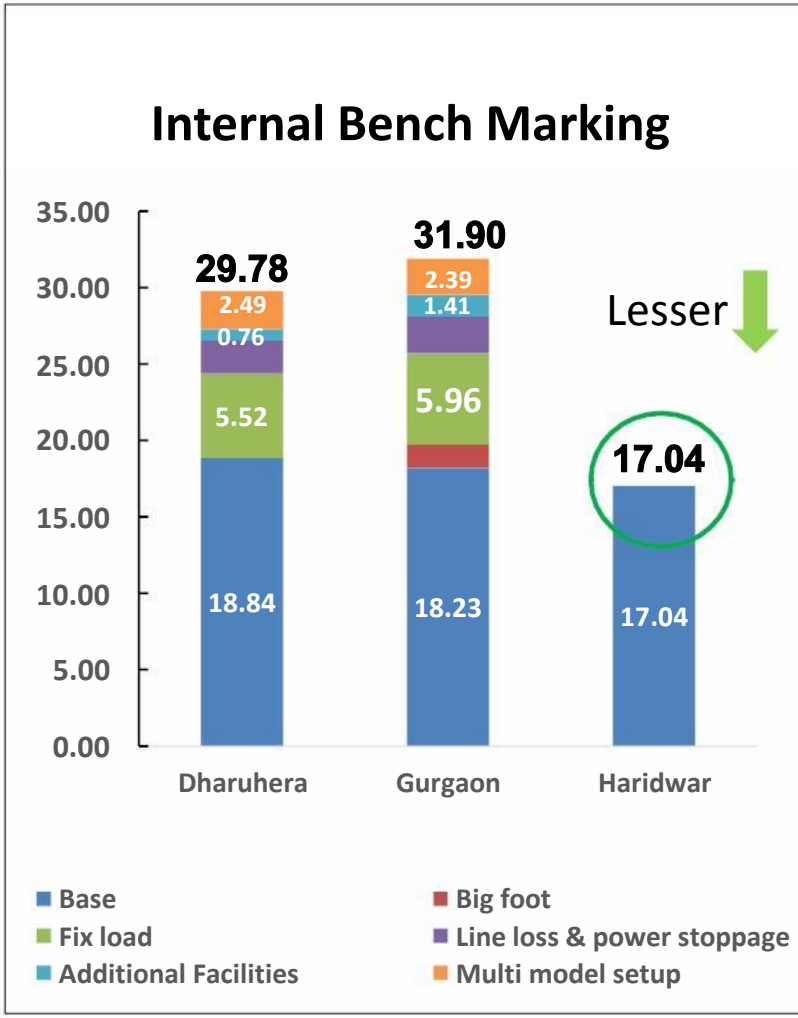


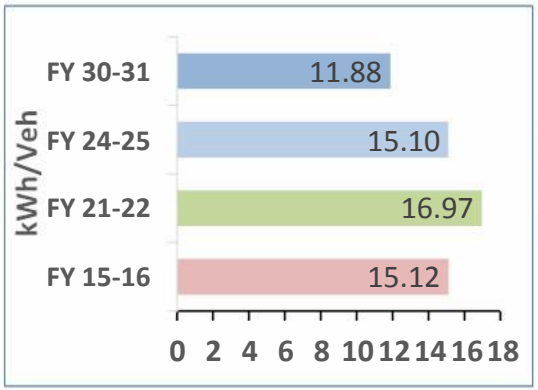


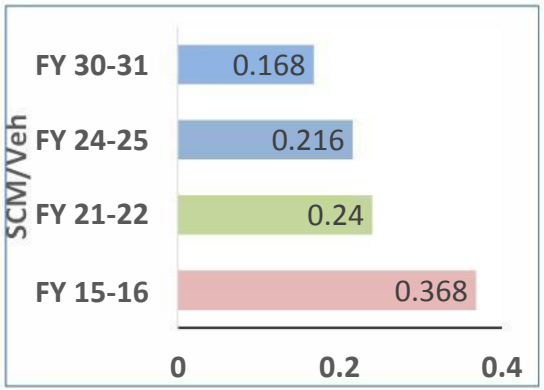
For SEC continual Improvement -Bench Marking done for energy consumption of each & every machine family





Short term and long term Target:-

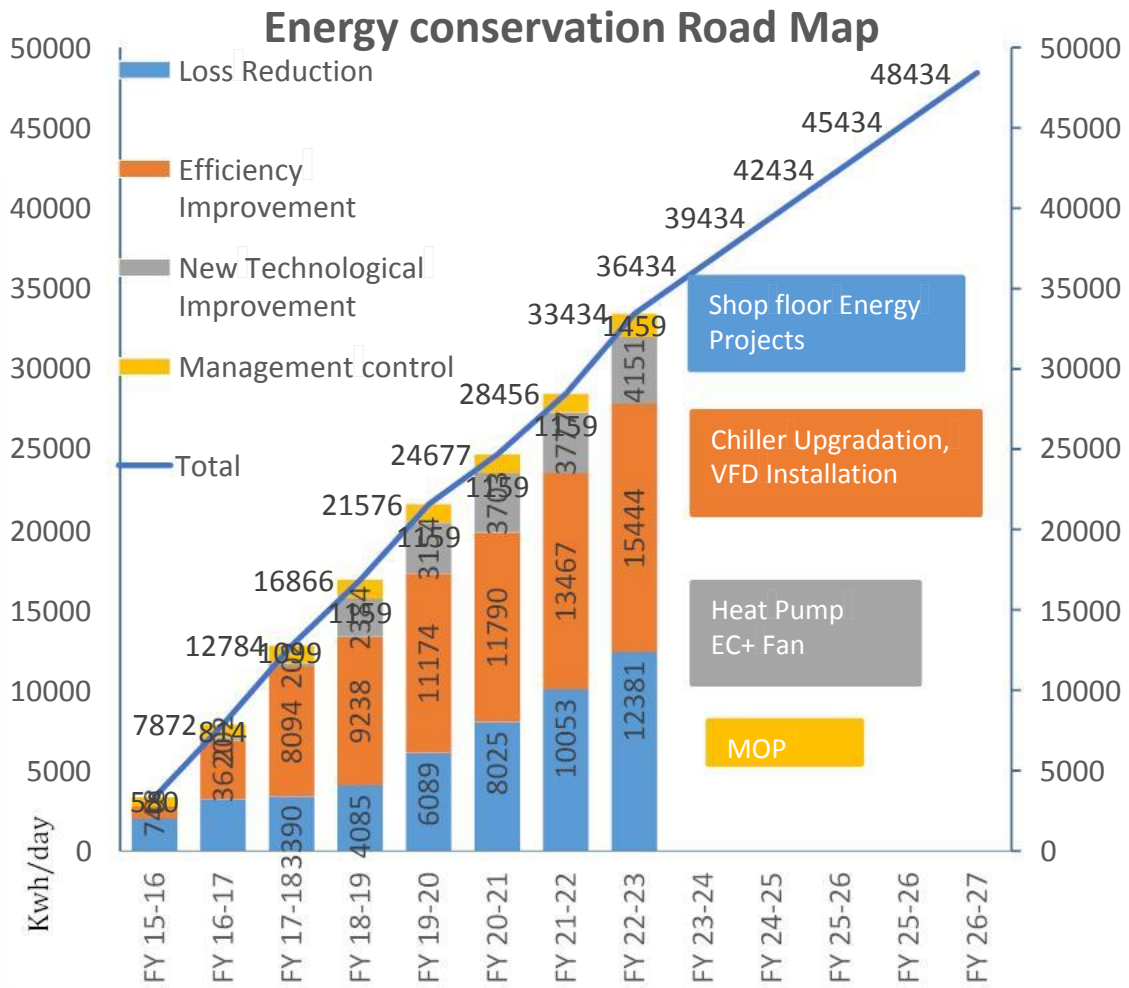




Benchmarking done w.r.t. Competitors and Internal, though we are consuming lesser than them, still we are striving for continual improvement

3 Road Map to achieve Target

3.3 Major Encon Projects Planned



Major Energy Conservation projects	Saving Projects (Million kWh/ Year)
Installation of 27 no's vfd's in FDV 's	0.358
EC+ fan in FDV in steel and Weld shop (Horizontal deployment)	0.253
New Efficient Chiller in Engine Assembly	0.189
Chiller up gradation in Induction Hardening Machines	0.18
SVF controller implementation in Seam welding machines for KWH saving	0.169
Heat Pump for washing machines in Steel Phase	0.152
Automatic Tube Cleaning System in AHP	61 scm

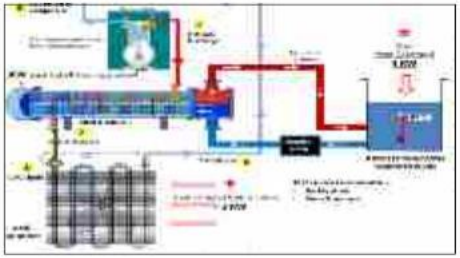
Road map prepared for Energy Conservation and Power & fuel cost reduction to compensate the inflation impact through Methodologies of Loss reduction, Efficiency Improvement, New Technological improvements & management controls

4. Energy Saving projects implemented

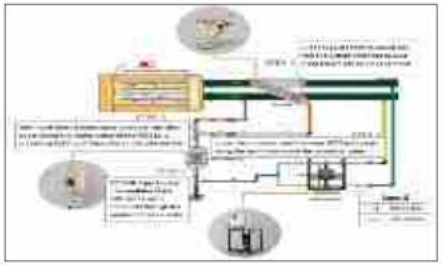
4.1 Project summary

FISCAL YEAR	No. of Energy Saving Projects	Investment in million INR	Electrical Saving (MWh/Yr)	Thermal Savings (Million Kcal)	Thermal Saving (In Rs. Million)	SAVINGS (Elec, Thermal) (In Rs. Million	Impact on SEC (Electrical, thermal)
FY 19-20	17	7	1338	0	0.0	8.7	0.63
FY 20-21	19	6	1433	901	2.9	11.2	0.75
FY 21-22	21	2.4	749	278	2.0	7.0	0.02
TOTAL	**57**	**15.4**	**3570**	**1179**	**4.9**	**28.9**	**1.42**

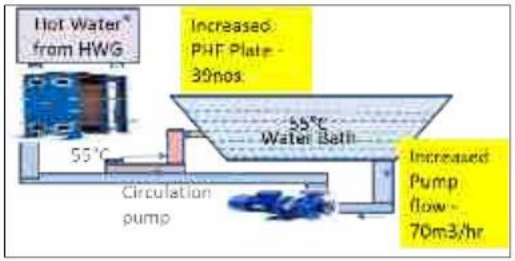
Major Projects of FY 21 ~22



Hybrid Heat Pump



ATC in Chiller



Hot water Temperature Reduction

Total 57 No's projects Implemented and cost saving of Rs 28.9 Million achieved in the last 3 years

4. Energy Saving projects implemented

4.2.With Investment(Electrical)

Top 10 Projects With Investment				
S.No.	Description	Year	Yearly MWh Saving	Investment in Million
1	Plant light conversion to LED	2019-2020	316	2.05
2	Heat exchanger installation in Engine assembly Washing machine and elimination of Heater	2020-2021	271	1.7
3	FDV Up gradation with new technology- EC+ Fans - 3 FDV nos.	2020-2021	216	1.4
4	Heater elimination in Al phase washing machine using heat pump installation	2021-2022	199	1.43
5	Conversion of 5 no's washing machines (Machine No 1,2, 5,6,7) – from electrical type to Natural Gas	2019-2020	190	1.23
6	Elimination of 2 washing machines by increasing the capacity of washing machine with layout improvement	2019-2020	147	0.95
7	Power Factor improvement from 0.991 to 0.995 Through Relay control	2020-2021	130	0.8
8	Base Coat and Top Coat ASU blowers to be replaced with EC fans	2019-2020	117	0.76
9	Automatic Cleaning system (ATC) in EA chilller -Line 1	2021-2022	65	0.47
10	Energy saving in SPM area machines during Non productive hours by minimizing running hours for Hydraulic motor	2021-2022	59	0.43

Total 35 projects have been completed & We have Achieved saving of 1709 MWh in the last 3 years

4. Energy Saving projects implemented

4.3.Zero Investment(Electrical)

Top 10 Projects With Zero Investment			
S.No.	Description	Year	Yearly MWh Saving
1	Power Factor improvement from 0.991 to 0.995 Through Relay control	2019-21	140
2	FA DOL FDV use optimization by stopping extra blowers	2019-21	98
3	Oil heating removal in EA1234 in oil dispenser (pneumatic pump and heater elimination)	2019-20	90
4	Energy saving in SPM area machines during Non productive hours by minimizing running hours for Hydraulic motor	2021-22	72
5	Re-layouting of AARCO and Fume suction Drop of Weld Shop	2019-20	68
6	Pump flow optimization in ACED and SM paint shop area pump	2021-22	66
7	Automatic Cleaning system (ATC) in EA chillller -Line 2,	2021-22	61
8	200 KWH Power saving (CT reduction and pump running hour reduction)	2021-22	49
9	Chiller recirculation pump continue running optimized with temperature sensor relocation	2021-22	47
10	Presently Lacquer ASU DC fans are in 80% open mode, optimization of exhaust and process parameters to reduce it to 60-70% open mode	2019-20	44

Total 19 projects have a saving of 966 MWh in the last 3 years with the zero investment

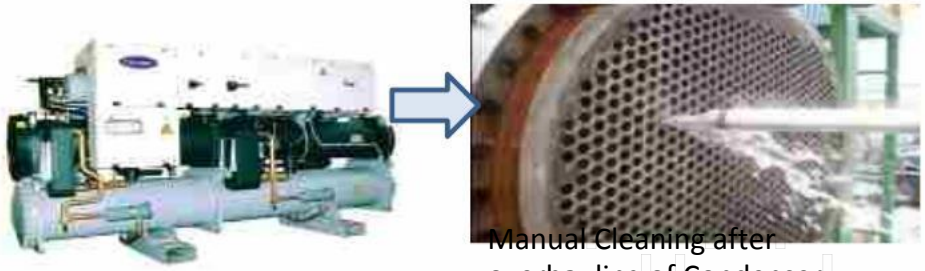
4. Energy Saving projects implemented

4.2.1 Automatic Tube Cleaning System

Automatic tube cleaner (ATC) installation on chiller of Engine assembly to save the energy cost.

Background:

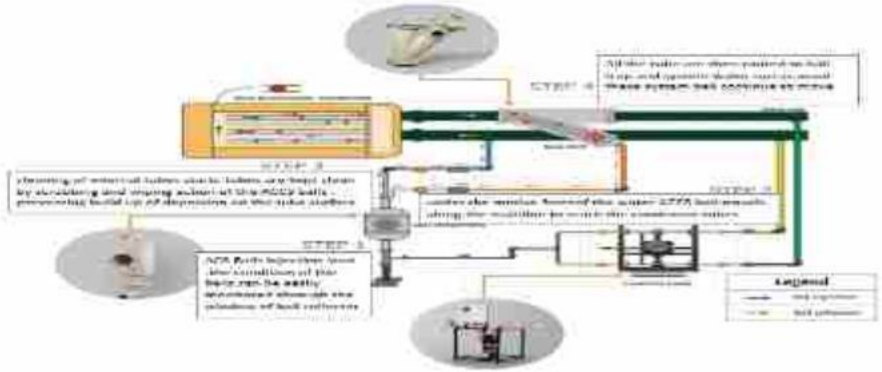
There are 4 Nos chiller installed in engine assembly lines with capacity of 128TR.



Manual Cleaning after overhauling of Condenser

Methodology/Approach Adopted:

Automatic tube cleaner for condenser to remove fouling and scaling and increase heat transfer



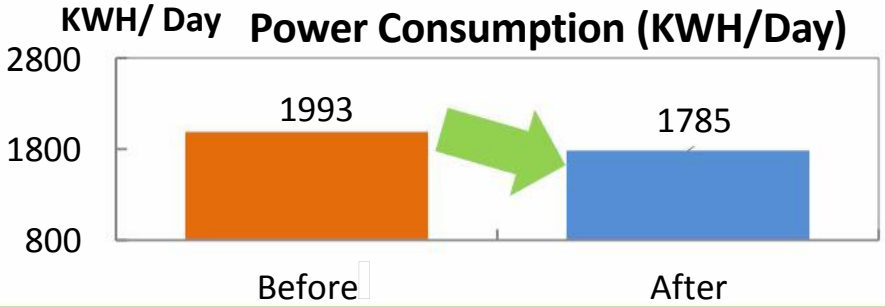
Improvements to be Done:

Automatic condenser cleaning system installation in condenser circuit of chiller

Condenser internal tubes cleaning through injection of ATC balls in chiller circuit.

Results:

- Reduced Energy consumption -10 %
- No shutdown required for on line cleaning
- Extend equipment life (reduce tube corrosion and failure)
- Savings 208 kwh/day



Saving of 208 kWh/day/chiller achieved

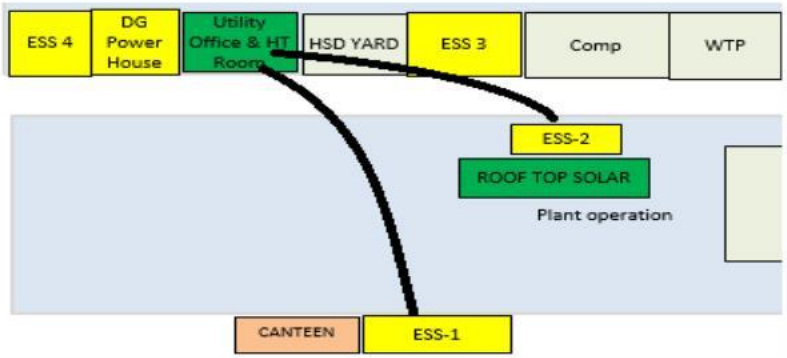
4. Energy Saving projects implemented

4.2.2 Power Factor Improvement through Digitization

Power factor improvement on Sunday/ NWD using auto PF control

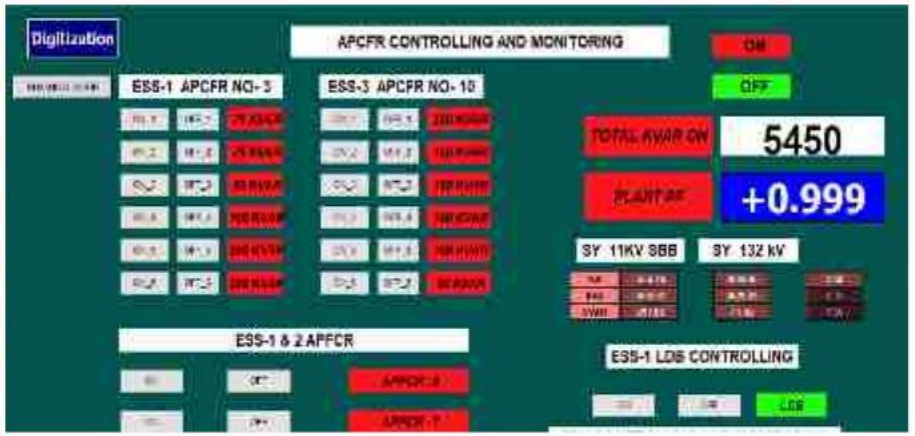
Background:

Before condition: Power Factor used to control after visiting ESS -1 and 2



Improvements to be Done:

After Condition – Remote controlling for 7 Capacitor bank Panel done and single screen created for monitoring and controlling, auto control selection point provided to control the PF

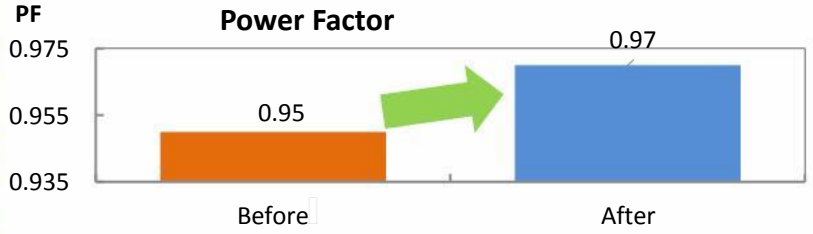


Methodology/Approach Adopted:

Power factor controlling from ESS used to take time which resulted in poor factor.
Multiple times on-off use to perform to maintain PF
Single manpower have to depute to control the power factor

Results:

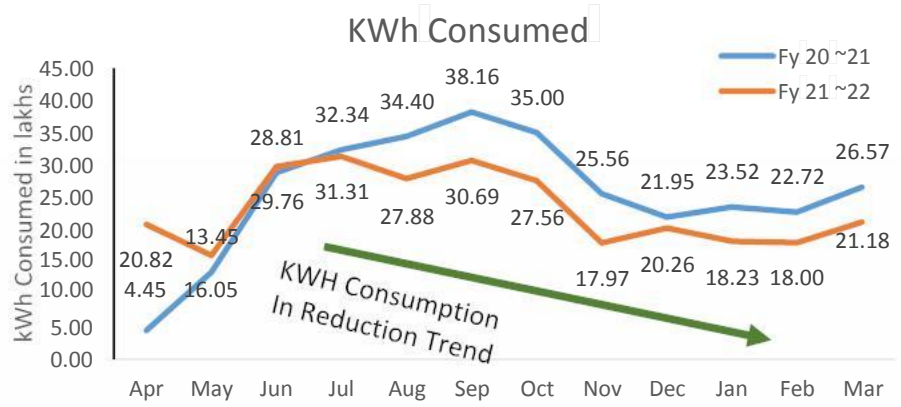
Improved PF saved 74 KVA/Day (Recurring)



Project completed and savings of 74 kVA/Day achieved.

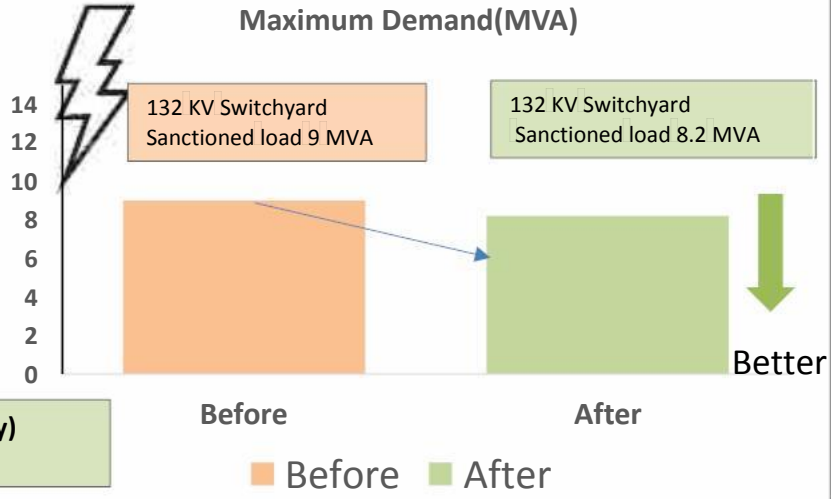
4. Energy Saving projects implemented

4.2.3 Sanctioned Load Reduction



Better

Reduce



Monetary Saving (Yearly)
INR 20 lakhs per year

Projects Contributing to Load Reduction

1. Heater elimination in AL phase WMC using heat pump installation
2. Conventional Light Conversion to LED
3. Automatic Cleaning system (ATC) in EA chiller -Line 1
4. Energy saving in SPM area machines during Non productive hours by minimizing running hours for Hydraulic motor
5. 200 KWH Power saving (CT reduction and pump running hr. reduction
6 EA WMC pump communization from single pump

Maximum demand of the plant reduced from 9.00MVA to 8.2 MVA as many projects implemented

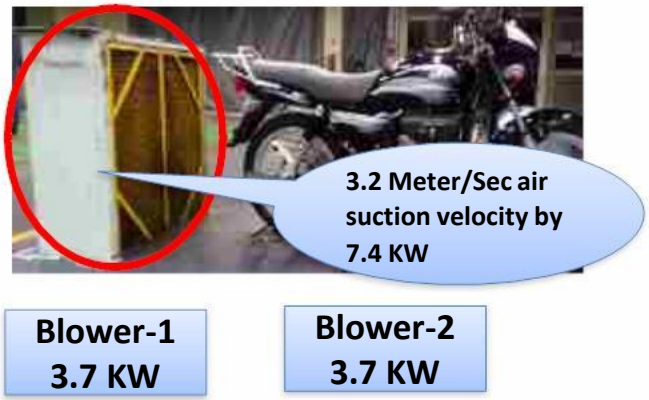
4. Energy Saving projects implemented

4.2.4 Test Bench Energy Reduction

Background

Dynamo test bench equipment (8 nos) is placed in final inspection lines to check the vehicle performance.

One hood type exhaust collection system installed in this equipment to collect the fume of vehicles during testing cycle



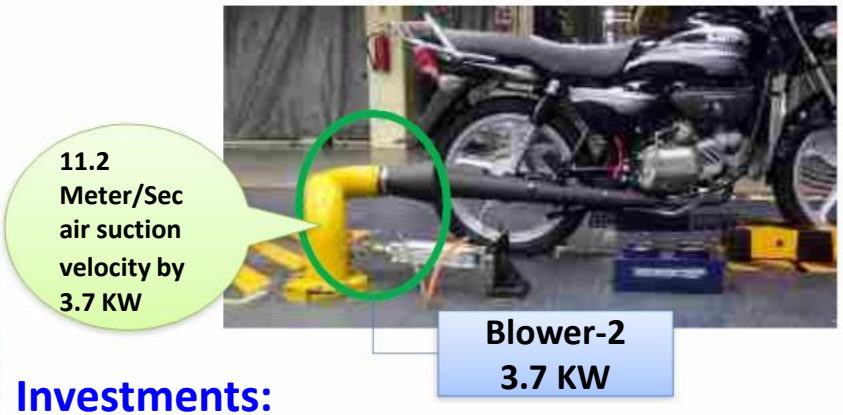
Proposed Scope:

Dynamo test bench exhaust collection system modification in all final inspection lines

Dyno Hood Exhaust Blower power consumption cost Saving								
SN	Machine	Motor KW	Running Hrs/day	Working Days	Actual KWH consumption /Year/Machine	No of M/C	Actual KWH consumption /Year	Saving Rs./year at Rs. 6
1	Dyno hood ext. blower	3.7	16	300	17760	8	142080	852480

Improvements /Kaizens done or Concept:

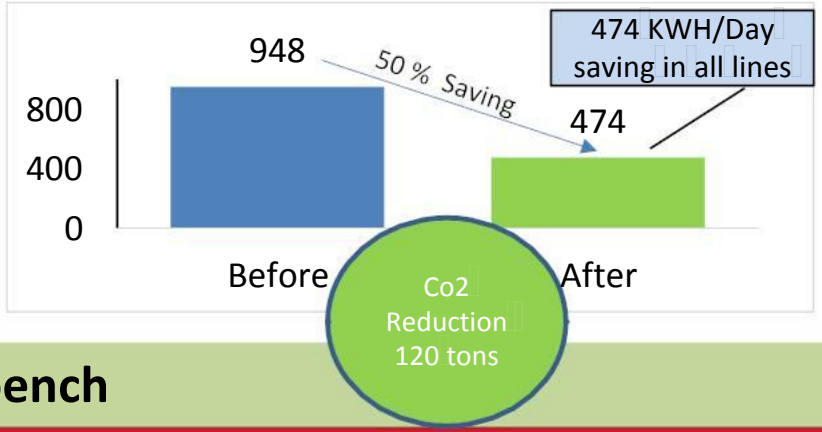
Dynamo test bench exhaust collection system modified by swivel type exhaust collection system to Improve suction capacity to Reduce the power consumption



Investments:

Investment cost – 1.0 Lakhs

Benefits & Results:

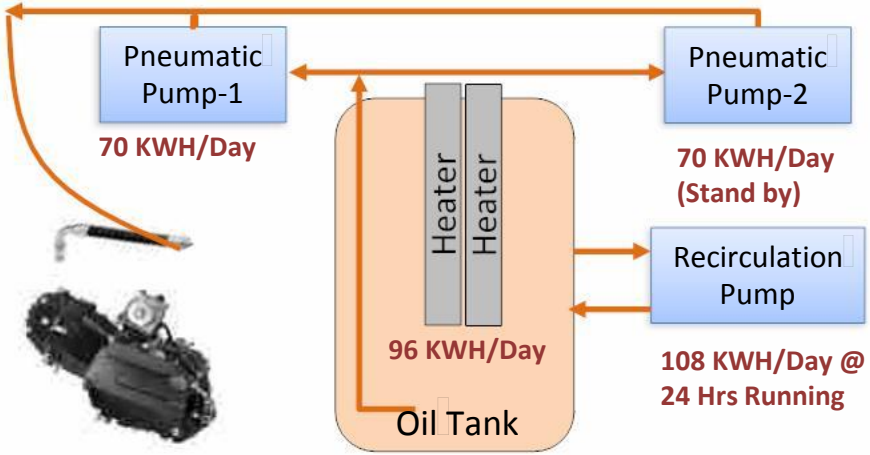


8.52 Lakh rs./year saving through FI Dyno test bench

4. Energy Saving projects implemented 4.2.5 Oil Dispensing heater elimination

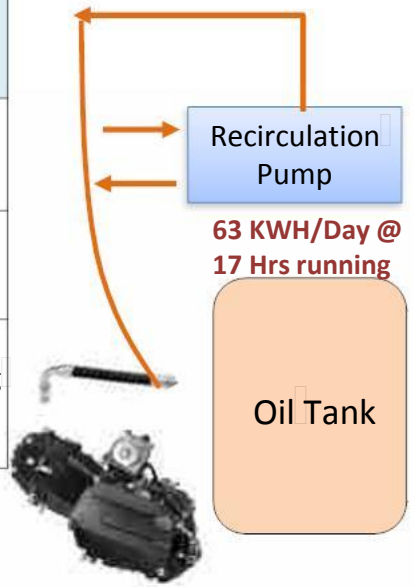
Background

Engine assembly each line having one oil dispensing machine to feed the oil in engines. These 4 Nos machines are operating with electrical energy and pneumatic energy



Improvements /Kaizens done or Concept:

Process	Proposed action
Oil circulation	Oil circulation to be done by 3.7 KW motor with 17 Hrs running
Heaters	Heater elimination
Oil feeding	Pneumatic pump removed and oil feeding with circulation pump by circuit modification



Proposed Scope:

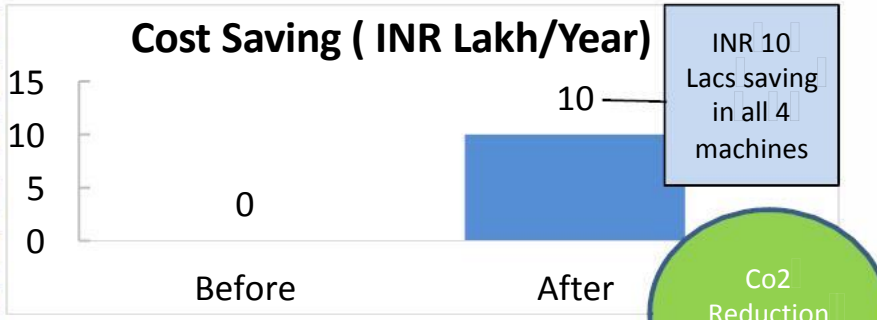
Energy saving in oil dispensing machine through implementation of energy saving idea

Investments:

Investment cost – 1.5 Lakhs

Benefits & Results:

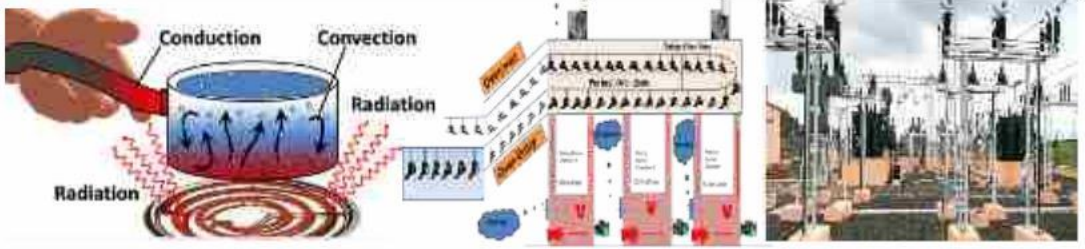
Component	Power consumption (KWH/Day)			
	Current Cons.	Proposed Cons.	Saving/ Machine	Saving in all 4 Machines
Oil circulation pump	108	63	45	122
Heaters	96	0	96	259
Pneumatic pumps	7	0	70	190
Total	**211**	**63**	**211**	**571**



Rs. 10 Lakh saving through optimization of oil dispensing processes

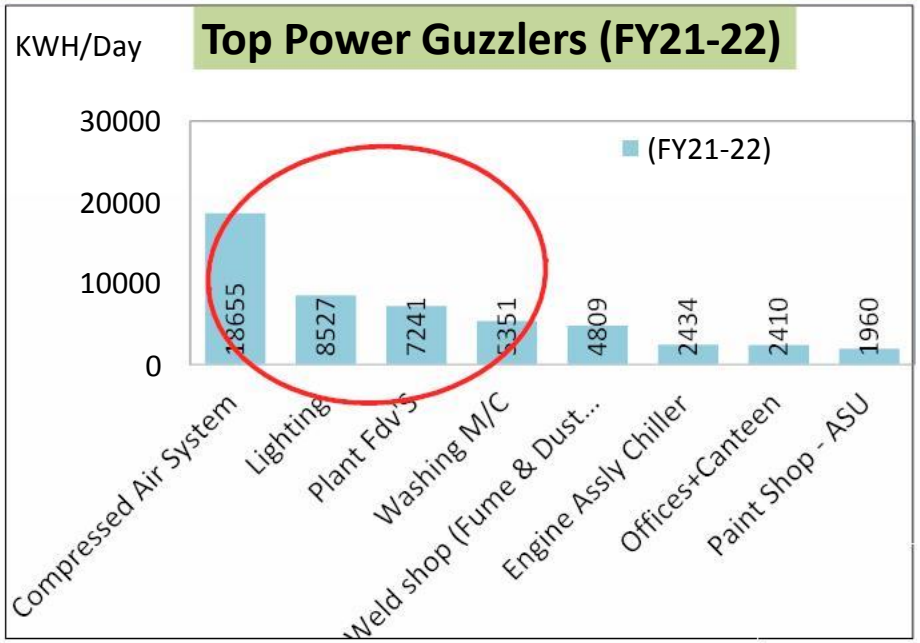
5. Innovative Projects implemented

S. No.	Section	Improvement Project	Resource Saved	Cost Saving(Lakhs)/ year
1	Plant	Washing machines electrical load reduction	Electrical Energy	32
2	Paint Shop	Reduction of radiation loss in paint shop	Thermal Energy	10
3	Machine Shop	Electrical Load Reduction- Machine elimination(6 numbers) by combining of operations	-	44
Total Saving Per Annum				INR 86.0 Lakh



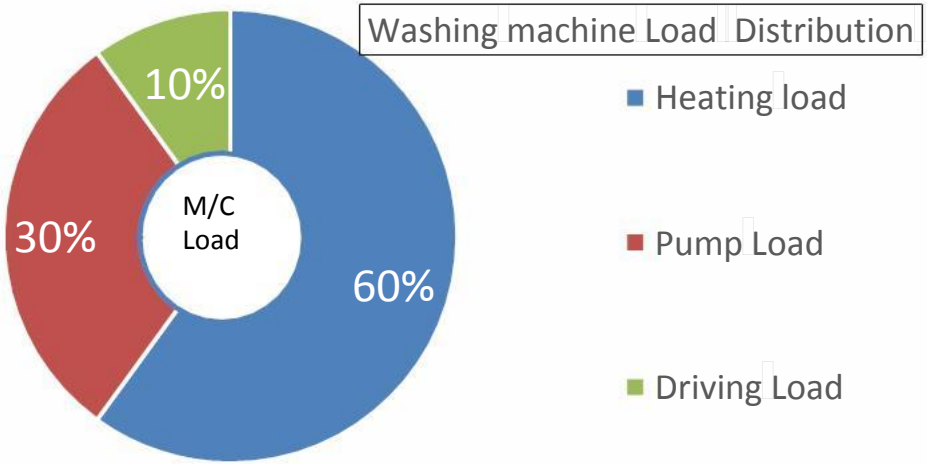
Cost saving of Rs.86. Lakh/Annum from top 3 Innovative Projects

5.1 Washing machine electric load reduction



TOP Power Consuming Areas	Projects to Reduce Consumption
1.Compressor	Load Sharing
2.Lighting	LED Installation Under Process
3.FDV	EC fan installation project taken
4.Washing Machines	-MOP -Heating Electrical load to be reduce

Area of Installation	Quantity
Machine Shop	3
Weld Shop	8
Engine Assembly	5



Washing machine being one of the top energy consuming was chosen for reduction & further data analysis lead to the outcome that heating is the major contributor of the machine

5.1 Washing machine electric load reduction

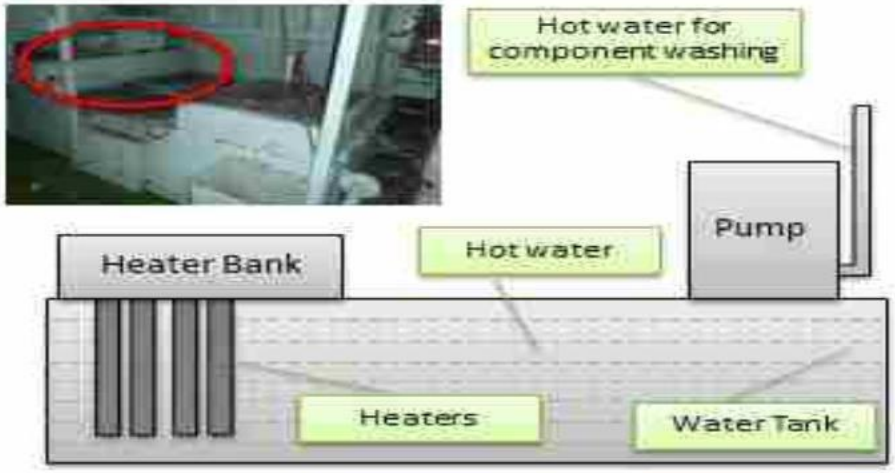
Countermeasure1: Heaters elimination in washing machines of Weld shop & Engine Assembly to save the energy cost

Project Details:

Convectional heaters elimination in washing machine of Weld shop & Engine Assembly through installation of plate type heat exchanger

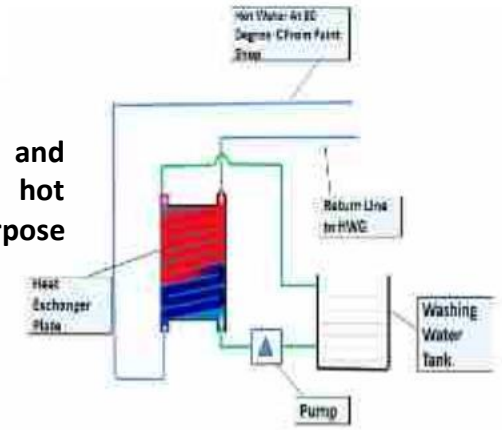
Background:

There are 11 nos washing machines installed in weld shop & engine assembly area Machine shop Washing machine has been selected for horizontal deployment of improvement



Project Concept:

Plate type Heat exchanger(PHE) installation in place of heaters and heat exchanger connected with hot water line for heating purpose through convection method



S. No	Major Activity
1	Concept finalization
2	Approval
3	Ordering
4	Installation & Commissioning
5	Validation

Tangible Benefits:

Energy saving @ 20 lakhs/year
Heater failures phenomena eliminated

Plate Heat exchanger Installed for thermal heating In place of electrical heating & Achieved 20 Lakhs/year energy cost saving through investment of 25 Lakhs in washing machine

5.1 Washing machine electric load reduction

Countermeasure 1 Limitation

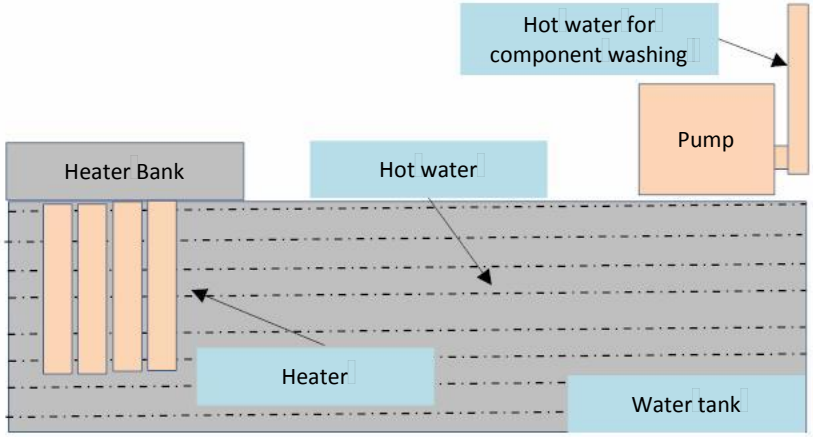
1.Infrastructure of Hot water Line not available for further expansion

2.High Capital Expenditure for expansion(High ROI)

Countermeasure 2-Heaters elimination in washing machines of Machine Shop by installation of Hybrid Heat Pump

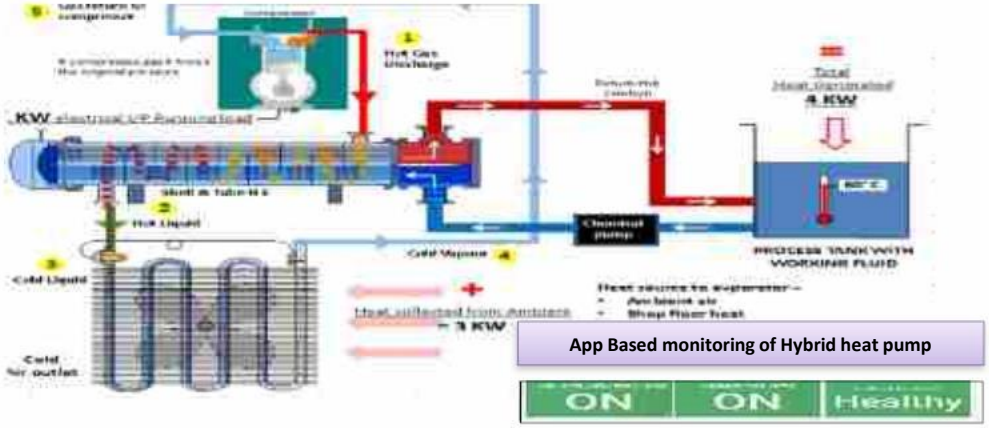
Project Details:

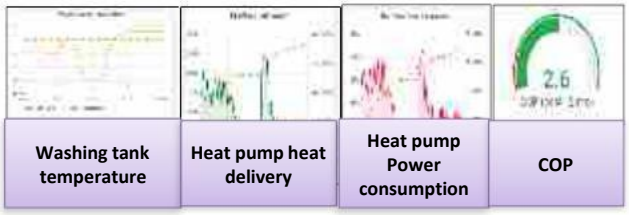
Solvent water heating saving of electrical energy through installation of heat pump



Project Concept:

Hybrid heat pump in washing machine





Machine Shop	Machine Status
Cy Head -01 W/M	●
CC Module-01W/M	●
CC Module-01W/M	●
Cy Head -01 W/M	●

Background:

Washing machine (Cylinder head) Energy Consumption more & Solvent temp. low problem :

1. Electric Heaters used for achieving solvent temp. resulting energy consumption more.

2. Low Temp. problems coming frequently due to heaters failure rate very high

3. Wastage of electrical energy

Tangible Benefits:

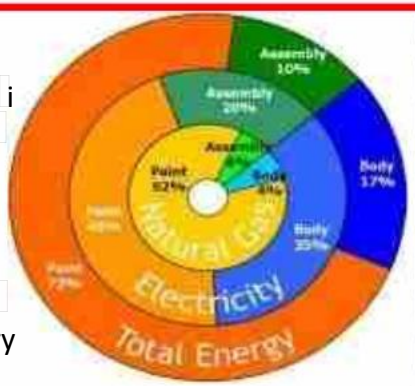
Energy saving @11.3 lakhs/year

As Countermeasure 1 having Constraints to deploy in machine Shop washing machine –So hybrid heat Pump installed & We achieved saving 11.3 lakh through investment 25 Lakh.

5.2 Reduction of radiation loss in Paint Shop

1. Theme Selection

Among all the operation, Paint shop i the major Consumer of total Energy (72%) & of **Natural Gas (92%).**



Paint Shop and Natural Gas Consumption:-

Multiple Bake and dry off Ovens are there in paint shop for curing and dry off of painted fuel tanks/frame bodies/Lid. which is operated on **Natural Gas.**

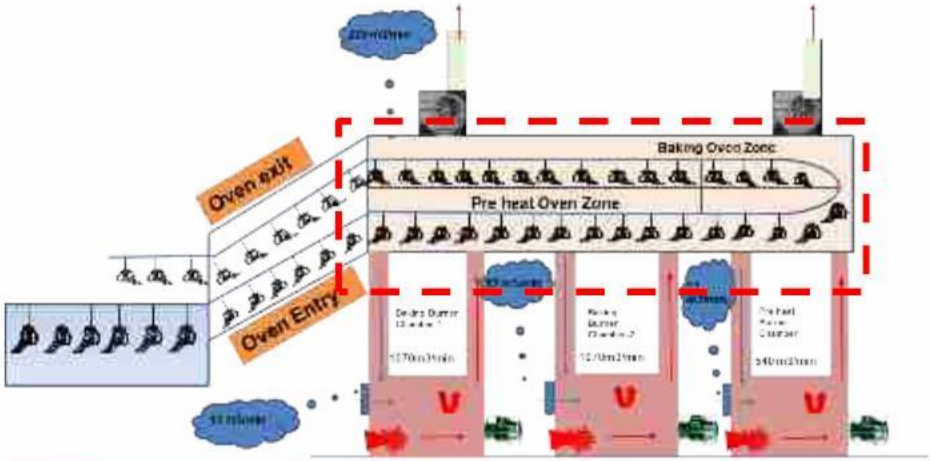
Burner	Set temp	Effective metal temperature (EMT)
Preheat	120° C	160°C/20 min.
Burner-1	185° C	
Burner-2	185° C	

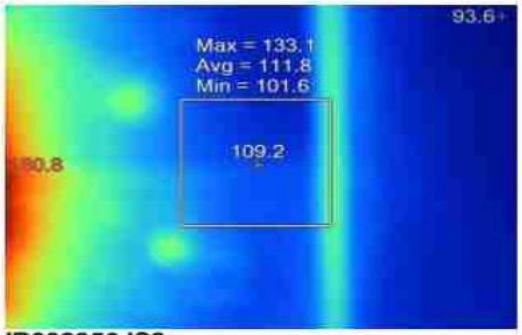
ACED Shop Bake off Oven & heat loss:- There is water base Electrode Cathode deposition In Frame body component painting which takes place in our ACED shop. After painting, these frame bodies are allowed to dry off completely in bake off oven, which basically comprises of 03 chambers, following are the chambered and their set temp.

All these three burners collectively maintain the overall oven temperature 160°C, which is the bare minimum required temp. for drying of painted frame bodies.

Pain Area:- Since there is in-direct heating, air is the carrier of heat from the source to the components. There is **loss of heat through radiation.**

2. Understanding situation & set targets





Thermal Imaging data of ACED Bake off Oven	
Locations	Temperature (° C)
1	44.8
2	50.3
3	41.3
4	69.4
5	70
6	82.6
7	43.7
8	48.1
9	54.4
10	53.38
11	47.8
12	40.7
13	60.16
14	59.3
15	48.3
16	39.6
17	61.5
18	51.8
19	109.2
20	52
21	53
22	33.2
Average	55.2

Summary of Heat Loss For ACED oven			
Average External shell	Ambient	Actual loss	Unit
55.2	30	25.2	°C

Among all operational process, "Paint shop" is the biggest Emitter of CO2. Identification of heat loss areas & get it Fixed, will helps to reduce NG consumption as well as optimizes CO2 emission.

5.2 Reduction of radiation loss in Paint Shop

3.Create a Plan of Action

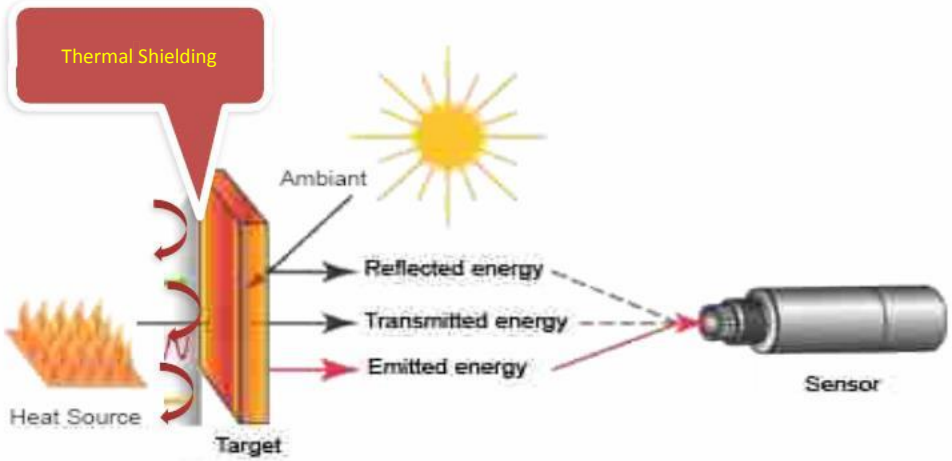
Hero MotoCorp PROJECT - Energy saving Coating		A specialized energy saving coating application on ACED bake off oven's outer & inner surface.					
A)	OBJECTIVE :-	1) To Validate the Idea & identify saving Potential 2) To Freeze the projects for implementation.					
SR. NO	Area	Resp.	Month				
			Jul'21		Aug'21	Sept'21	
			F-1	F-2	F-1	F-1	F-2
1	Assessment of technology and estimate saving potential	Raunak/Rohit/Suresh	▼				
2	Benchmarking with Other companies	Raunak/Rohit/Suresh		▼			
3	Thermal Mapping Ovens & Firing Chambers and Evaluate heat loss.	Raunak/Rohit/Suresh			▼		
4	Justification sheet to be prepare and get it Signed off.	Raunak			▼		
5	Vendor consultation and PO Finalization	Anand/Raunak				▼	
6	Prepare Execution plan	Anand/Raunak/Rohit					▼

5.2 Reduction of radiation loss in Paint Shop

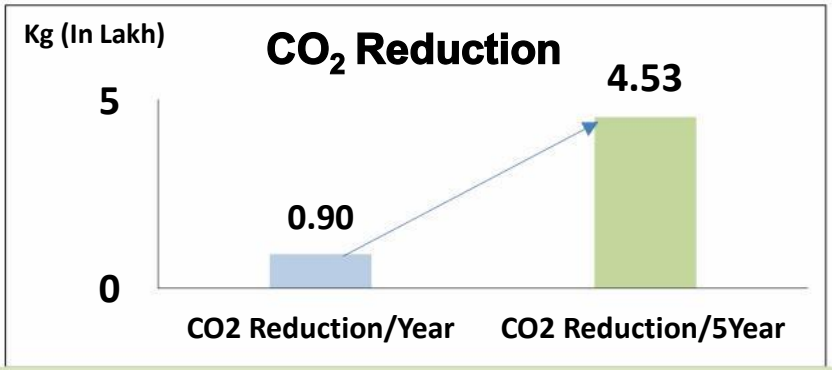
4 & 5 Analyze the factors & implement countermeasures

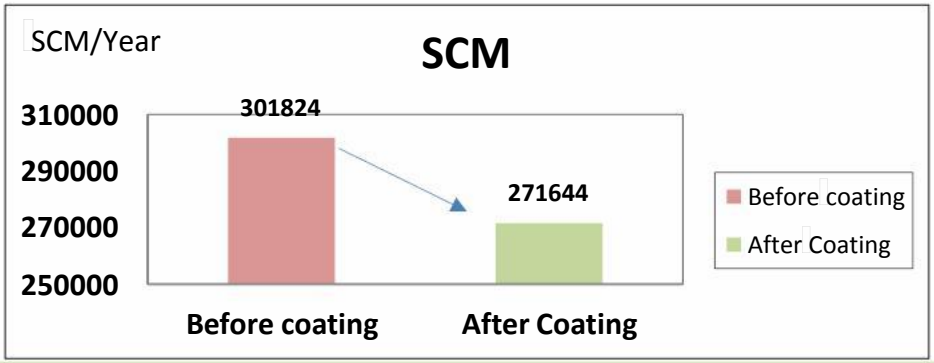
Solution	Feasible/Not	Further Course of Action
Change the oven design to eliminate radiation loss	Not Feasible as it is part of the product processing	
Reduce the temperature to reduce the loss	Not feasible currently but can be easily	
Insulate the Zone	Solution available in the form of insulation/paint	

Paint (High emissivity)Coating done on the oven's inner & outer walls



Results

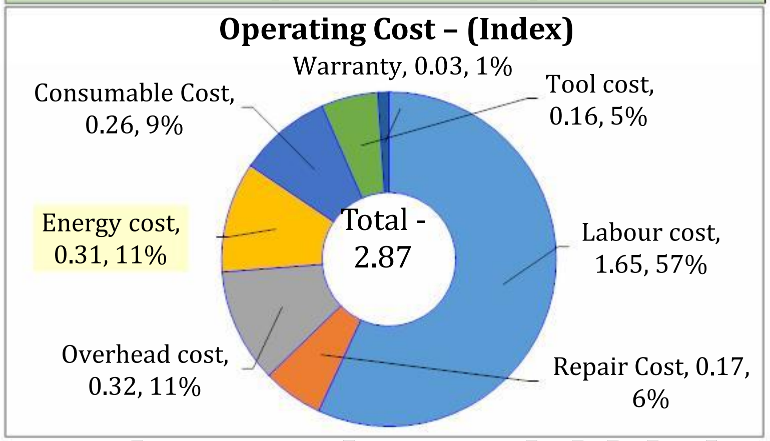




High emissivity paint done to reduce the radiation losses saving 30000 scm/year(@ 10 lakhs/ year)

5.3 Machine elimination(6 numbers) by combining of operations

1.Theme Selection



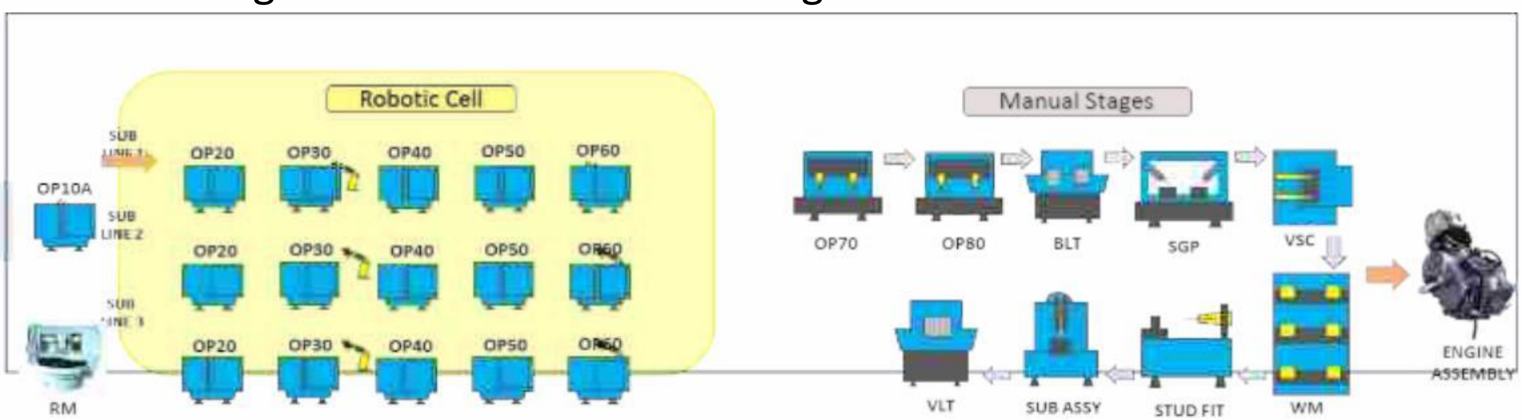
Energy Consumption contributes 11 % of the total cost of manufacturing, same to be analysed further in machine shop

3.Create a Plan of action

Stage	S. No.	What	Why	Who	When	Apr'21	May'21	Jun'21	Jul'21	Aug'21	Sep'21	How
OP70 & Cell	1	Detailed Operation sequence study of Cell	To find Minimum operation sequence time	[illegible]	16-04-21 / 21-04-21							Matrix of operations
	3	Time study of each operational sequence.	To analyse the impact of combining tooling operations and feasibility of performing operation at another machine	[illegible]	21-04-21 / 28-04-21							Through time study.
	4	Finding out machine at which OP80 operation is compatible	To study at which machine OP80 operation can perform	[illegible]	02-05-21 / 15-05-21							Cell fixture drawing study
	5	Study of OP80 operation	To find out how much change in angle required for performing OP80 operation in fixture.	[illegible]	16-05-21 / 31-05-21							Through Component Drawing and Fixture Drawing Study.
	6	Study of Fixture Part Required for Performing the Task	To find out change in Part required for performing the operation into cell area.	[illegible]	01-06-21 / 30-06-21							Through trials, measurement and validation
	7	[illegible]	To Check fixture Parts are ok or not.	[illegible]	01-07-21 / 31-07-21							Through trials, measurement and validation
	8	Study of Cycle time after Shifting of OP80 operation into cell Area	Optimum utilization	[illegible]	01-08-21 / 31-08-21							Through Study of CNC Part program
	9	Finding out the Air Cutting length and Rapid Transfer motion	To find out the longer Paths which can be shortened	[illegible]	01-09-21 / 30-09-21							Through Study of CNC Part program
	10	[illegible]	To achieve the targeted cycle time for this project.	[illegible]	01-09-21 / 30-09-21							Through study of importance of each operation
	11	Implementing of countermeasure on other two machines	[illegible]	[illegible]	01-09-21 / 30-09-21							By implementing the above improvement on machine
	12	[illegible]	[illegible]	[illegible]	[illegible]							By comparing cycle Time with required takt time.

2.Understanding Current Situation& Set Targets

Layout Study



Cylinder head Line consist of Robotic cell operation and manual operation. Further similar operations to be check for exploring the possibilities of productivity improvement

5.3 Machine elimination(6 numbers) by combining of operations

4 & 5 Analyzing the Factors & Developing Countermeasures

Countermeasure 1 : Fixture Modification for OP 70 at CELL OP30

BEFORE

Fig 1. B-axis - 0°

Fixture sub plate parallel to base plate, so wouldn't be able to perform OP70 drain hole operation along with existing OP30 operation

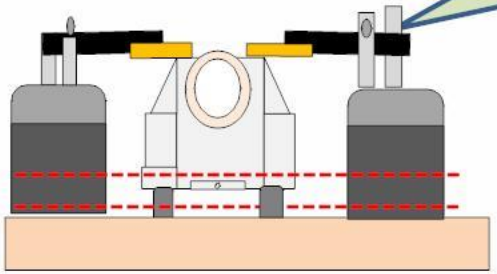
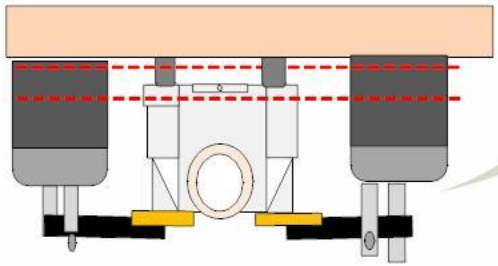


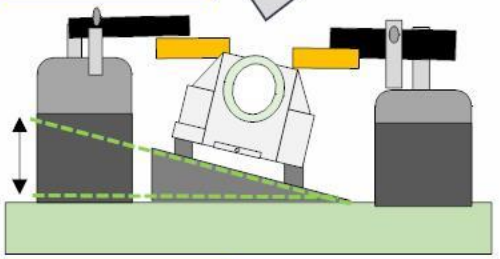
Fig 2. B-axis - 190°



AFTER

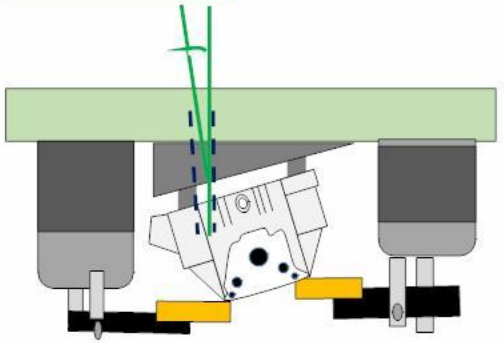
Fixture sub plate at an angle of 7°30' to base plate, now we can perform OP70 drain hole operation along with existing OP30 operation

Fig 1. B-axis - 0°



Drain Hole

Fig 2. B-axis - 190°



Problem

OP70 Drain hole operation couldn't be done at OP 30 Machine

Countermeasure

Modification done by designing sub-plate with and angle of 7°30` from base plate

Benefit

Now OP70 drain hole operation can be performed easily at Cell OP30.

Fixture modification for drain hole operation by in-house designed sub plate at 7°30' on OP30

5.3 Machine elimination(6 numbers) by combining of operations

4 & 5 Analyzing the Factors & Developing Countermeasures

Countermeasure 2 : Fixture Modification for OP 80 at CELL OP20

BEFORE

In existing setup not able to Perform OP80 Exhaust face operation along with existing OP20 operation

Fig 1. B-axis - 0°

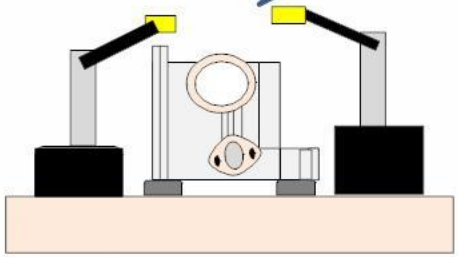
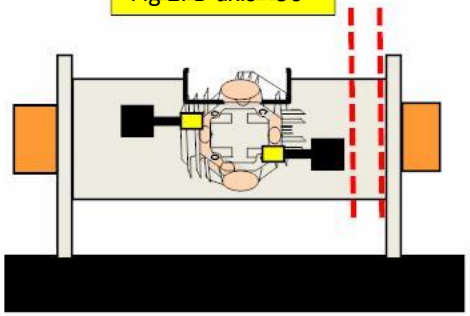


Fig 2. B-axis - 90°



AFTER

Fixture modification done with angle of **30°30' & rest pad height increased** to perform OP80 exhaust face operation along with existing OP20 operation

Exhaust face

Fig 1. B-axis - 0°

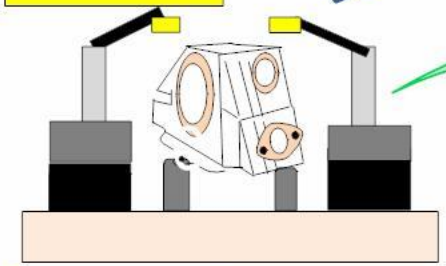
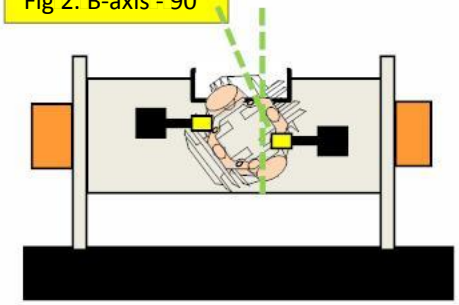


Fig 2. B-axis - 90°



Problem

OP80 operation could not be done at OP 20 Machine

Counter Measure

Fixture Modified for Performing OP80 operation.

Benefits

Operation Can be Done easily at Cell OP20.

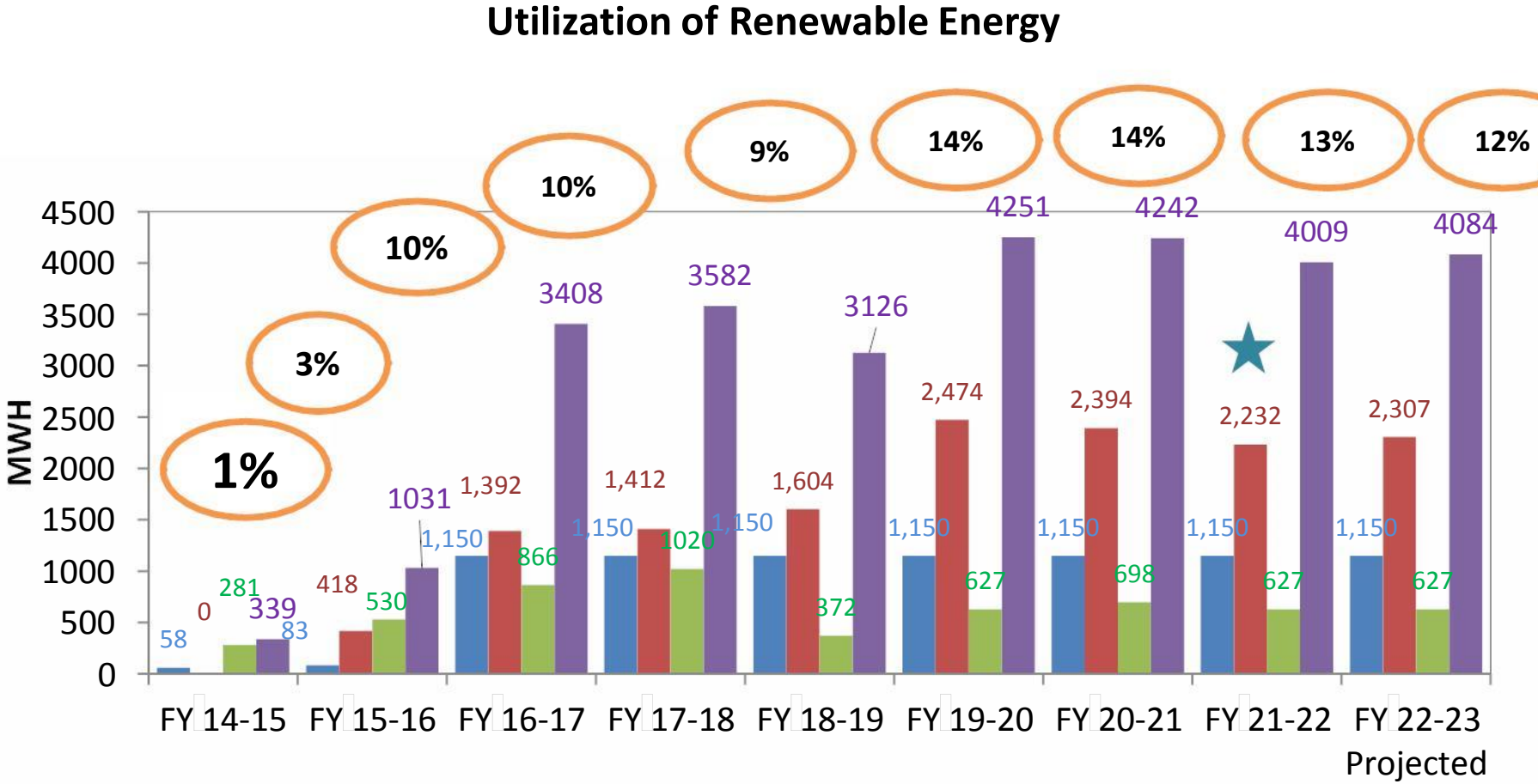
After Implementation of the above Countermeasures 6 machines eliminated & energy & productivity saving of Rs. 44 lakhs/year

6a. Utilisation of Renewable Energy Sources

S.No.	Technology	Type of Energy	Onsite/ Offsite	Installed capacity	Generation (million kwh)	% of overall electrical energy
1	Solar	Electrical	Onsite	2MW	2.4	7.8%
2	Solar	Thermal	Onsite	5KL	0.7	2%
3	Solar (sky Light/Translucent sheet	Light	Onsite	252	0.3	1%
Total renewable energy generation					3.4 M KWH	

3.4 M kWh per year generation from renewable energy sources

6b. Utilisation of Renewable Energy Sources

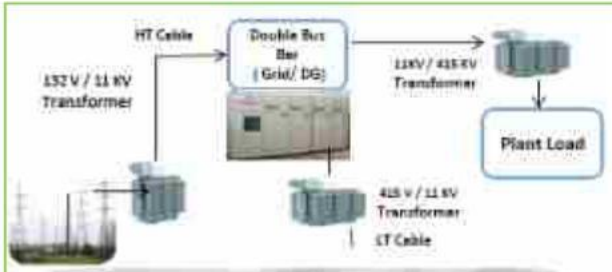


Legend

★ RE iex trading less because of higher market rate

Current Utilization of Renewable Energy - 13%

6b. Utilisation of Renewable Energy Sources



2+1 MW Solar Power Utilization Reduction of 2347 Tons of Co2 in Environment

Flat plate based Solar water Heaters Installed at Roof Top , Saving of 0.80 Lac Kwh/Year

HPMV lights replaced with Sky light/Light pipe Saving of Rs 0.15 Lac /year through New Technology

Natural Air ventilators installed 38 no.

Translucent Sheet in plant roof

Green roof coverage 45000 Sqm

Natural Ventilator,Translucent sheet, Plant green roof initiative saved 1400 kwh/Day

Utilization of Renewable Energy by using Solar Plant, Solar heater, sky light, Natural ventilator, Translucent sheet and green roof

7. Waste Utilisation & Management

S. No.	Year	Type of Waste Generated	Quantity of waste generated(MT/year)	Disposal Method
1	19~20	Food	63.074	Organic Waste Converter
2	20~21	Food	46.742	Organic Waste Converter
3	21~22	Food	54.63	Organic Waste Converter

Food Waste

Organic Waste Converter

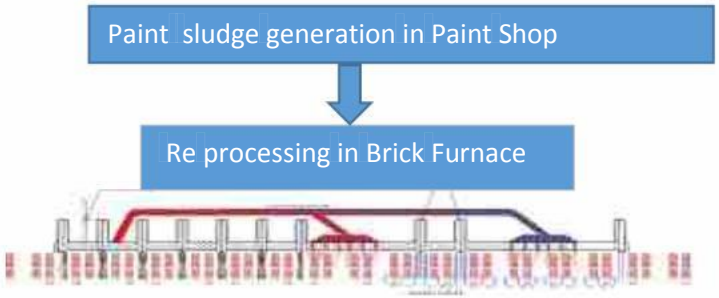
Manure for Plants

Food waste generated from canteen is sent to organic waste converter & is used as a manure in gardening

7. Waste Utilisation & Management

1. Co-processing for Disposal of Paint Sludge

- Plant sludge was being incinerated earlier
- Approx.23000 kg paint sludge generate monthly, which was being incinerated in the one incinerator
- Approx. cost of Paint sludge incineration(before) = Rs. 22/kg
- Current Cost of processing for brick making- Rs. 7 /kg



Co-processing (Rs/Kg)	9.00
Per kg Paint Sludge Incineration Cost	22.00
Saving per kg paint sludge	15.00
Monthly average Paint Sludge generation ((kg)	23230
Monthly Saving by Co-processing (Rs. Lakh)	3.84
Yearly Saving by Co-processing (Rs. Lakh)	41.81

2. Rain water harvesting in plant

Rain lake

Rain water Pit

Layout of rain water harvesting pits

S No	areas	Actual Rain Water Harvested (cubic mts/yr)Ha =Aa*C*R
1	Run off area	129465
2	Roof top area	81644
Grand Total (M3/YR)		211109

2.1 lakh M3/year Rain water harvesting in plant

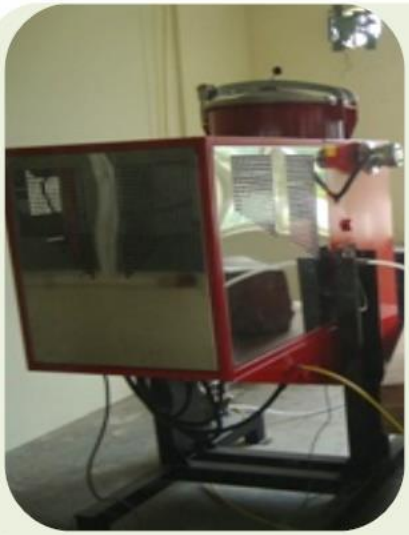
7. Waste Utilisation & Management

Waste Food Energy Utilization

Food Compositing Machine Manure usages in horticulture

Hygienic Disposal of waste: 182 Kg./Day
Manure Generation : 200 Kg./Day

Thinner (Waste) Recovery System



Thinner Recovery unit & its reuse in bell & Gun cleaning Advantage :- Saving of 42 Litres of cleaning thinner per day

In line With Company green policy --Recycling & Reuse of Waste resources based on 3R approach

7. Waste Utilisation & Management

Zero liquid discharge (ZLD) plant and use this water in our process

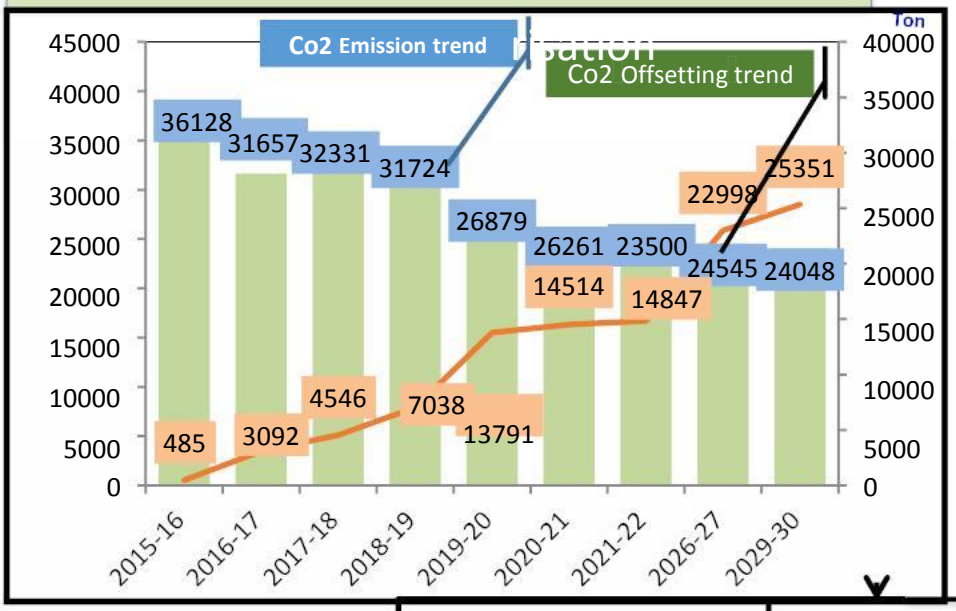
Sr. No.	Description	UOM	Target
1	Water Saving	KL/ Annum	36000
2	Cost Saving	Rs. Lacs / year	2.0

ZLD Plant Operation monitoring through SCADA

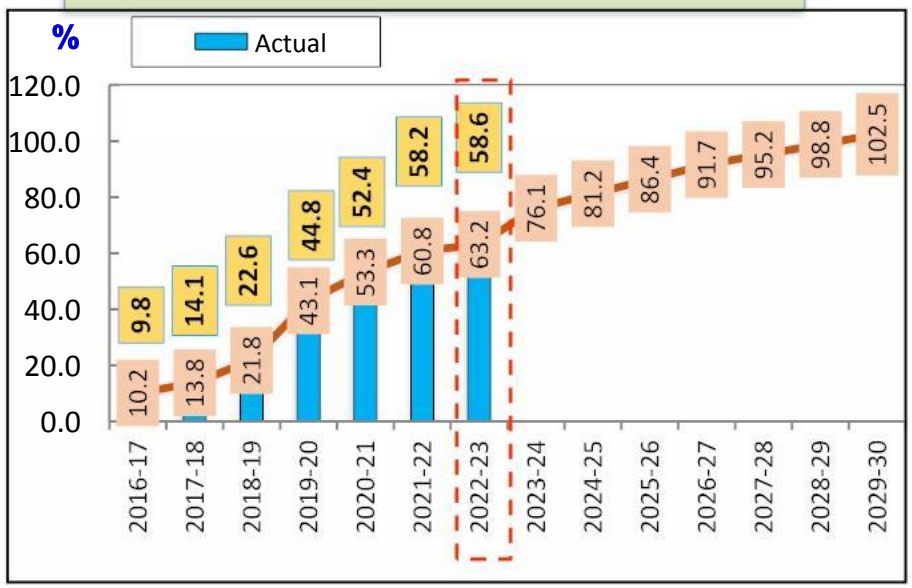
ZLD Plant impact to reduce 200KLD RAW water drawing from ground

8. GHG Inventorization

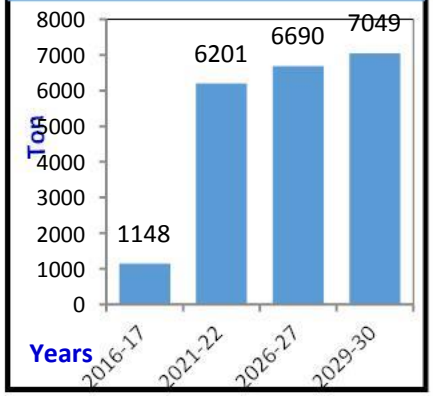
CO2 Emission in Tons Vs CO2 Offsetting Trend till 2030



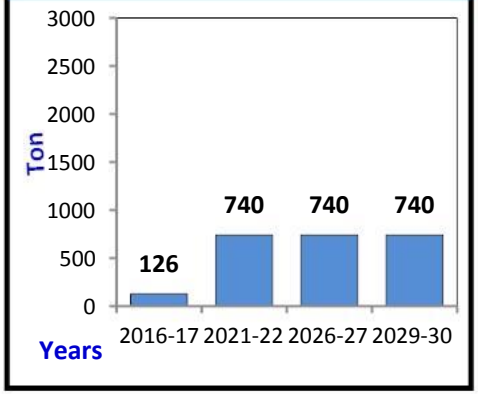
Carbon Neutral Strategy – Present Status



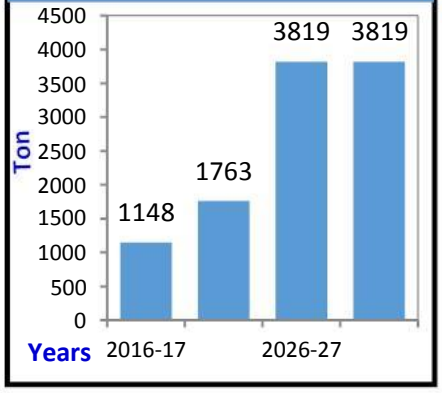
CO2 Offsetting –Energy Conservation



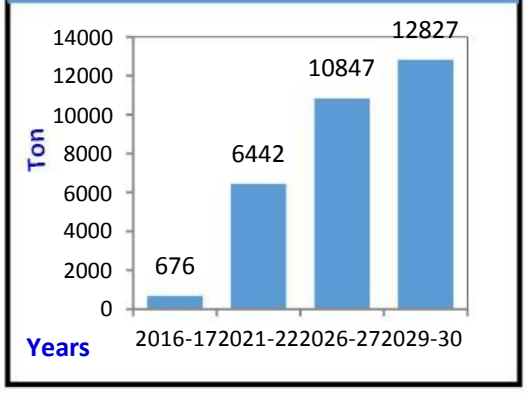
CO2 Offsetting - Fossil Fuel Reduction



CO2 Offsetting – Renewable energy



CO2 Offsetting –Tree Plantation



Carbon Neutral Strategy – Targeting 100% Carbon Neutral by 2030 at HM3H

8. GHG Inventorization

- **285000** trees plantation in Uttarakhand

- 332 villages converted to fully LED lighting

Record for Most Tree Plantation- Uttarakhand

MAXIMUM FAMILIES PARTICIPATING IN A TREE PLANTATION DRIVE

35,217 families planted 2,10,740 trees in 10 Minutes

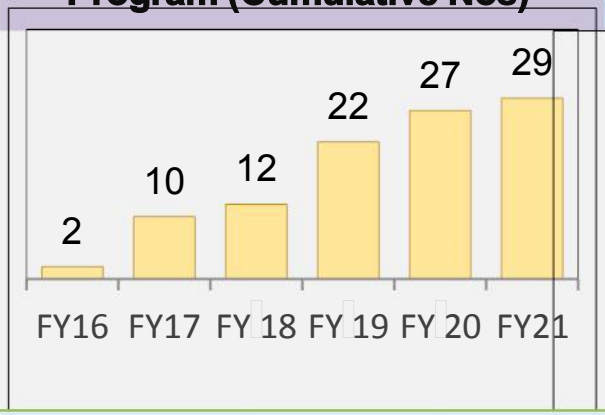
- **560** solar street lights in 4 villages of Uttarakhand

happy earth
A Hero MotoCorp CSR INITIATIVE

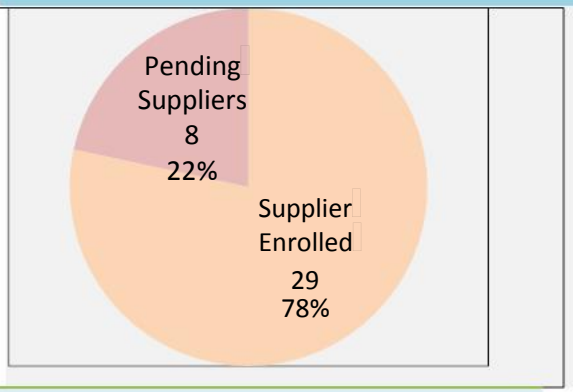
332 Village Lighting Converted in Fully LED & more than 25 Lakh Tree Plantation in Happy earth flagship program .

9. Green Supply Chain

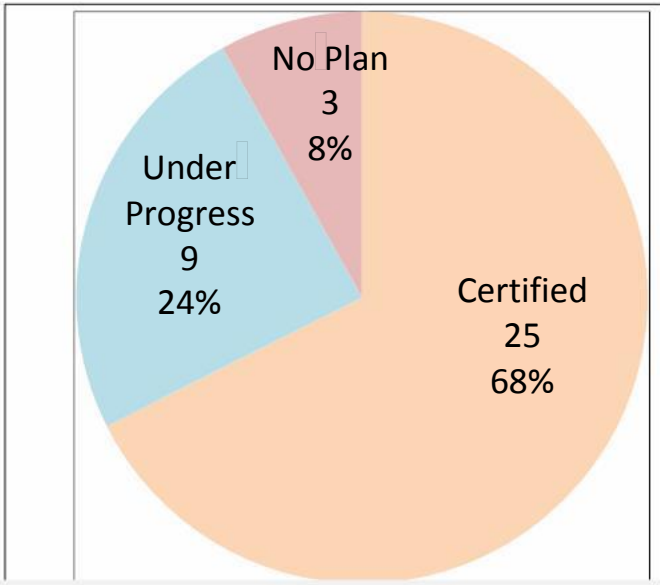
Suppliers Enrolled IN GVDP Program (Cumulative Nos)



% Suppliers Enrolled IN GVDP Program



Establishment of Environmental Management System as per ISO14001



Suppliers Enrolled in GVDP Program

2016-2017	2017-2018	2018-2019	2019-2020	2020-2021
• **Rockman Industries** • **Satyam Auto** • **Munjal Showa** • Meenakshi Polymers • **Nipman Auto** • **AG Industries** • Munjal Auto • **Napino Auto**	• Sandhar Auto • **Lifelong Industries**	• JNS Instruments • Lumax Auto • Suprajit Engineering • Bony Polymers • **Hema Engineering** • **Shivam Auto** • **RICO Auto**	• Jayashree Polymers • Sunmax Auto • Autofit Industries • Micro turner Auto • Bajaj Motors	Sansera Advik

68% UKD based suppliers have developed Environment Management system based as per ISO 14001 & Further 24% are in progress for certifying their EMS system for ISO 14001

Total 29 Suppliers i.e. 78% suppliers of total UKD based suppliers are enrolled in GVDP program.
Out of total 68% are ISO14001 certified.

9. Green Supply Chain

Encon Projects Saving

S. No.	Top Energy Saving Projects	Name of the Associate / Vendor	Annual Savings kWh/year
1	To arrest heat losses from MBF-2 Furnaces by complete brick relining.	TIDC UTL	63,841
2	SPM machines coolant motor Automation	Lifelong India Pvt. Ltd. Haridwar	8,100
3	Replacing conventional lights with LED-CBS ASSEMBLY	Lifelong India Pvt. Ltd. Haridwar	6065
4	Minimize compressors generating pressure setting from 8.2 bar to 7.7 bar	Autofit	5040
5	Reduce Energy Consumption of STP by implementing timer to provide interval for continue running of twin blower.	Autofit	2220
6	Motor capacity reduced from 3 hp to 1 hp in Centrifuge sludge extractor	Lifelong India Pvt. Ltd. Haridwar	1080
7	Bell switch provided in DM water tank to avoid over flow and motor running	Lifelong India Pvt. Ltd. Haridwar	1080
8	Reduction of Leakage current in earth pit.	Autofit	241

Various project implemented at vendor end & Conserved 87000 kWh in FY 21~22.

Saving of Energy Consumption by optimization of compressed air pressure (M/S Autofit)

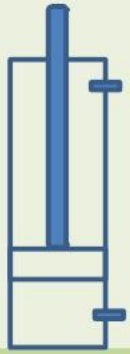
Before

Dia. 32mm
Pressure 8.5 bar

Cylinder of bore diameter 32mm at a pressure of 8.5 bar

After

Dia. 40mm
Pressure 6.0 bar

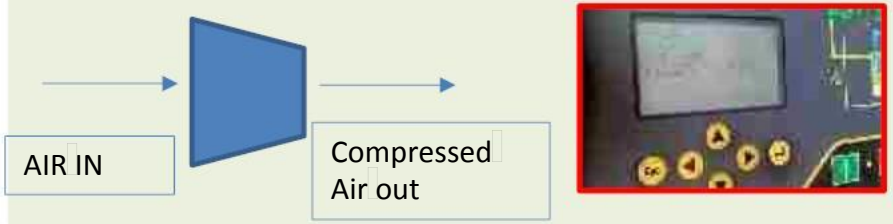


Cylinder of bore diameter 40mm at a pressure of 8.5 bar

Saving of Energy in Compressor by reducing the set point

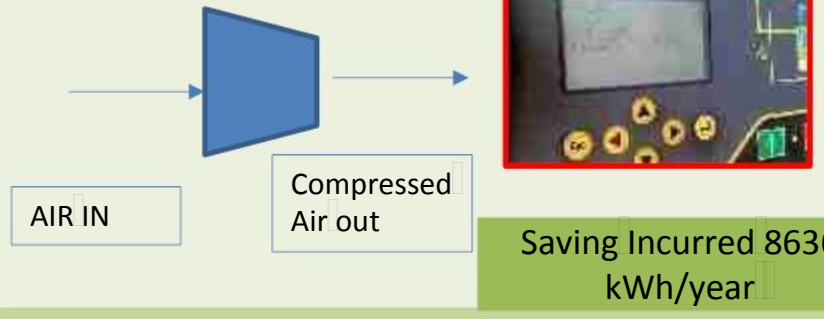
Before

Previous set point 8.5Bar



After

Current set point 7.7 Bar



Saving Incurred 8636 kWh/year

Inline With the our vision create , Collaborate , Inspire- We have Deploy our learning with our Supplier for Energy Saving projects

To Improve operator safety & Power Saving during machine ideal condition (M/S JBM)

Before

Operator can run the machine by single hand Push button , could be bypass of second push button by Holding with other sources (Possibility for wrong practices)

Machine Power on in ideal condition.

After

1) If there is no operation till 5 min. then Robot servo ,air, fan, light of particular station off automatically

Machine Auto-off in ideal condition after 5 Minute.

Energy Saving
46617 kWh / year

To Energy saving in MBF-1 & 2 by arresting heat losses from furnace by brick relining(M/S TIDC)

Before

Skin temp- 120 ◦C

After

Skin temp- 62 ◦C

Energy Saving
63841kWh/year

Projects implemented under GVDP program

9.. Green Supply Chain

9.1 Implementation Of Green Procurement Guidelines

1

Management

- Establishment of basic EMS management system by implementation of ISO 14001.
- Policy Created regarding buying of Energy Efficient Products
- Creation of Environmental Improvement program – Green Vendor Development Program (GPDP)
- Awareness/Learning Session on enhancing Safety , Health and environmental performance.
- Promotion & encouragement for use of advanced & energy efficient techniques while upgrading & buying new equipment.

2

Product

- Single use plastics are banned from usage in all direct and indirect parts
- Compliance with REACH standard and non usage of all banned chemical in all direct & indirect parts
- Buying of energy efficient product for usage in indirect parts category.
- Banned use of asbestos in all kind of direct and indirect material .
- Project under progress for mapping and compiling all data in International Material Data Sheet (IMDS)
- Parts are converted from Plating to powder coating in new model

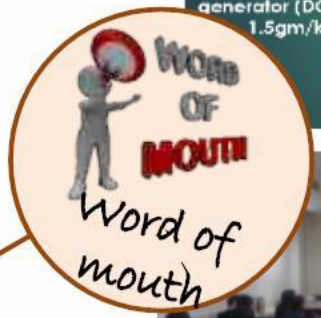
3

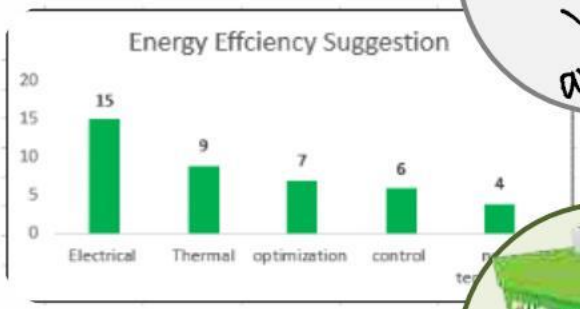
Process

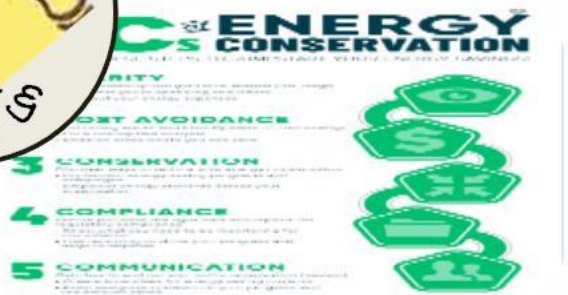
- Developing , maintaining and improving the EMS management system by implementation of ISO 14001.
- Compliance verification of suppliers for meeting all applicable regulatory requirement.
- Conversion of Hex chrome plating to trivalent chrome plating (where possible).

Various actions taken on Management, Product & Process level for meeting the green procurement guidelines.

10.Teamwork, Employee Involvement & Monitoring







Awareness creation and capacity building has been a major focus to develop energy saving culture

10.Teamwork, Employee Involvement & Monitoring

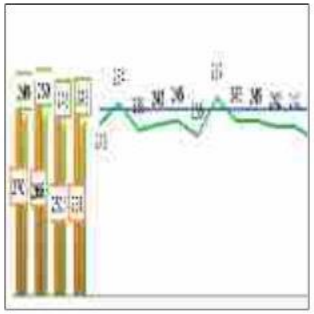
Celebrations

Competitions

Poster competitions and earth hour celebrations being done annually for employee involvement

10. Team work, Employee Involvement & Monitoring

Daily morning review



Daily variance analysis

Daily shop mailers

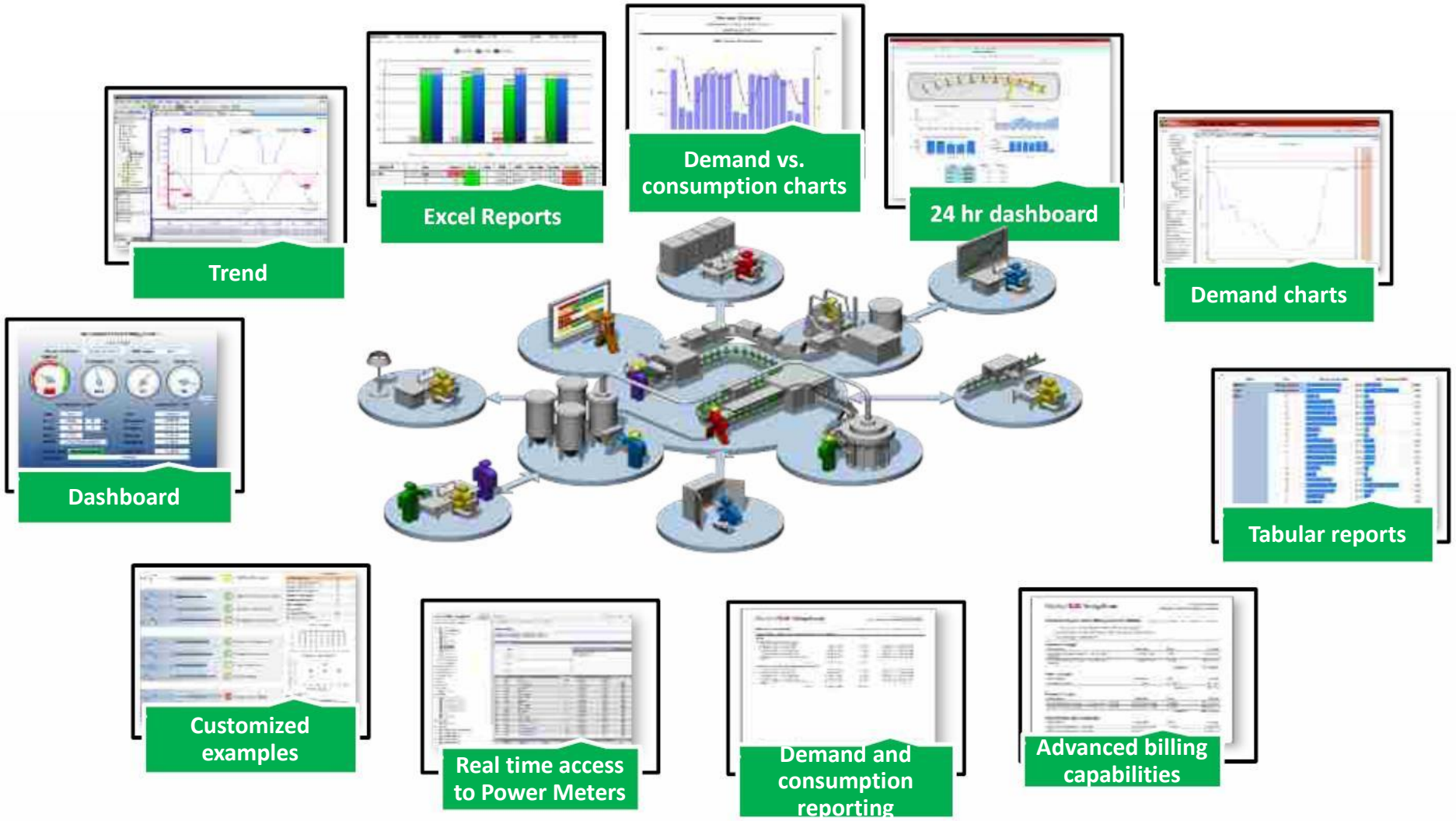
Monthly MIS

Monthly MRM

Review Frequency	Plant head	Head of Department	Energy Manager	Section Head - Area	Energycoordinator
Monthly	√	√	√	√	√
Fortnightly		√	√	√	√
Weekly		√	√	√	√
Daily			√	√	√
Boardreview			√	√	√

Energy Conservation Cell driven from top with involvement of all employees

10. Team work, Employee Involvement & Monitoring IOT

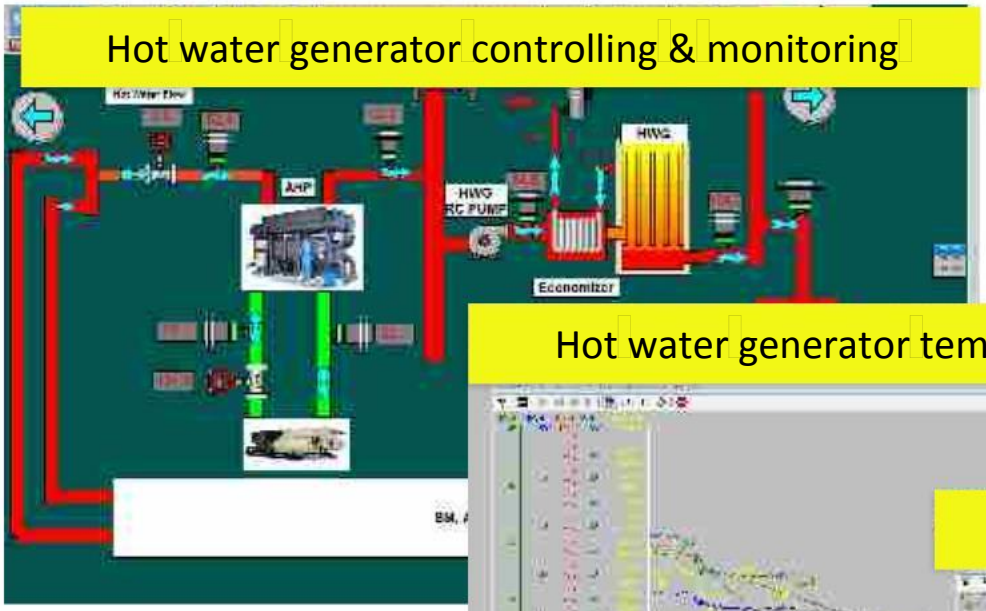


Online monitoring system deployed to identify & analyze abnormalities along with report generation

44

10. Team work, Employee Involvement & Monitoring IOT

Hot water generator controlling & monitoring



Hot water generator

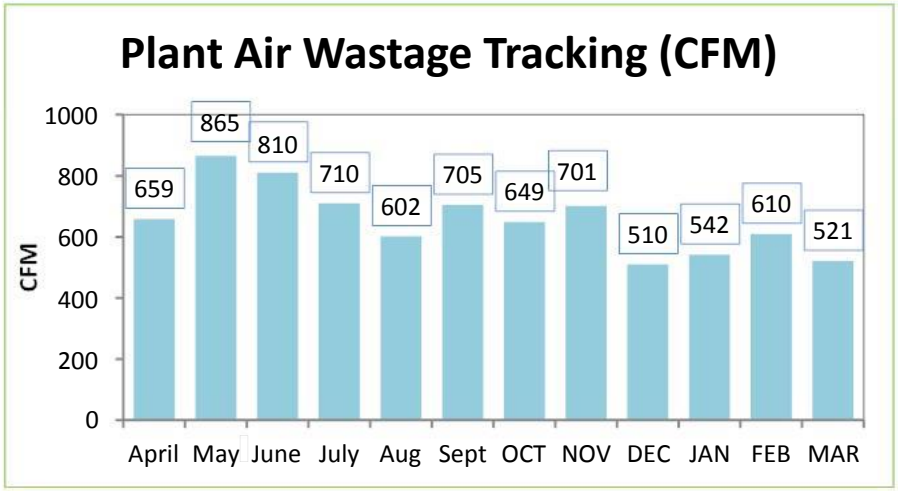
Hot water generator temperature Monitoring

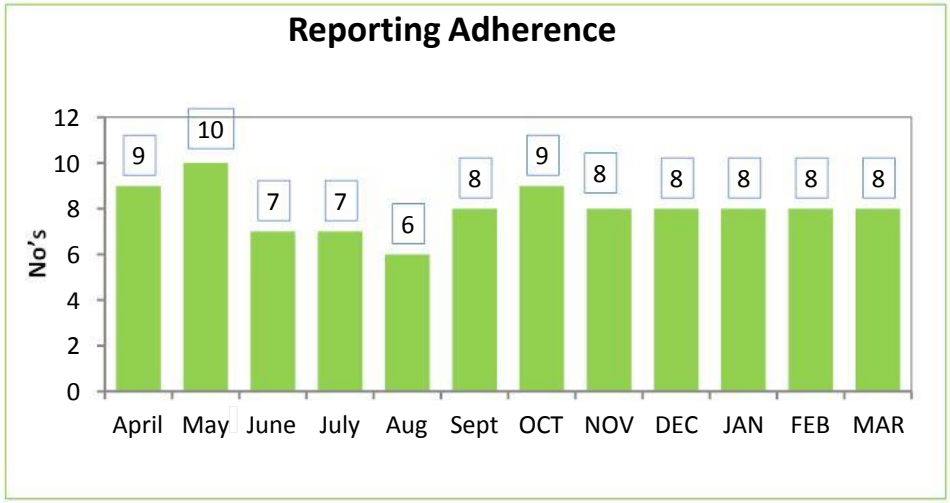
Paint Shop Stages temperature Monitoring

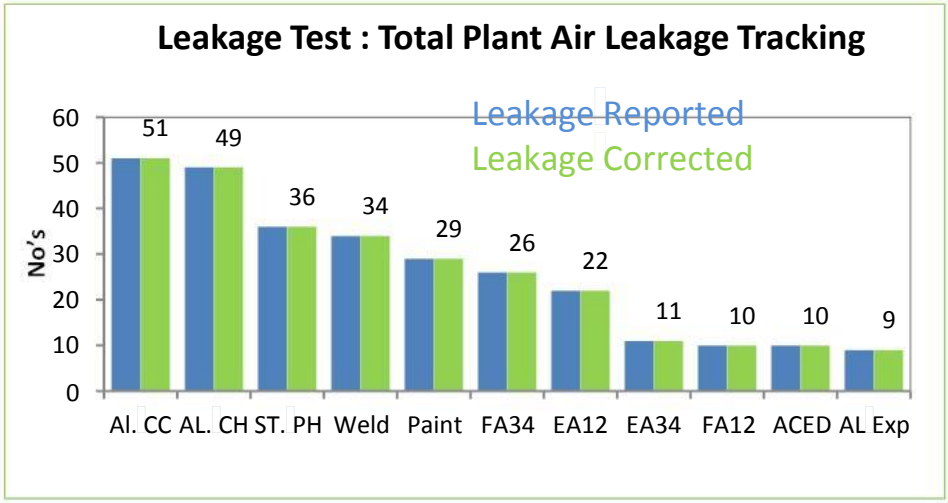
Hot water generator Online monitoring System for better analysis

Air Compressor Efficiency and Air leakages

FAD TEST : Measurement of Efficiency at Source							
S. NO	Compressor	Rated Capacity at 8Kg/Cm2 (CFM)	Rated Input Power (KW)	Avg. pressure (KG/cm2 Bar)	Avg. Actual Capacity as per report (CFM)	Avg Input Power (KW)	Specific Power (KW/ CFM)
1	Centac (NO6-1389)	6018	930	5.7	5569	861	0.15
2	Centac (NO6-1388)	4132	660	5.3	3948	617	0.16
3	Centac (09/555)	2281	400	5.6	2244	342	0.15
4	SL-250WC	1597	250	5.7	1530	257	0.17







Cross Functional projects taken to improve Air transfer efficiency

11 Implementation of ISO 50001

ISO Certification

Hero

ENERGY POLICY

Hero Motocorp – Haridwar Plant

We are committed to promote long term environmental and economic sustainability of our operations through continual improvement of the plant energy performance and energy management system.

We shall strive to:

- Create and establish framework for achieving energy objectives and targets by ensuring the availability of information and necessary resources
- Periodic review of energy performance through an effective energy management system
- Comply with Legal and other requirements related to energy efficiency, energy use and energy consumption
- Reduce specific energy consumption by encouraging use of energy efficient products, services and renewable energy to the extent it is economically viable
- Support design activities that consider energy performance improvement
- Create awareness about energy management system amongst employees, suppliers, dealers and community

We shall communicate this policy to all employees and would make it available to interested parties

Date: 06.08.20
Place: Haridwar

Shakesh Goyal
Plant Head

DNV·GL

MANAGEMENT SYSTEM CERTIFICATE

Hero MotoCorp Ltd.

ISO 50001:2011

Manufacture of Four Stroke Motorcycles

Energy Policy published through out the plant.

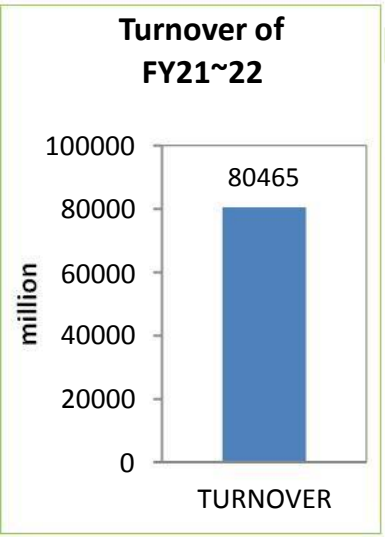
ISO 50001 certified since 2018

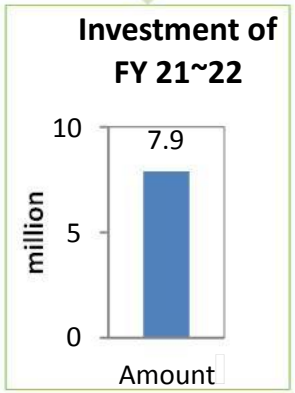
Total Internal Auditors developed – 32 Nos.

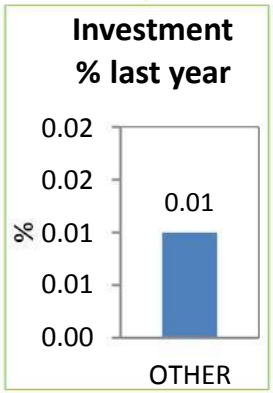
We are certified company for ISO 50001

11.Implementation of ISO 50001/Green Co/IGBC rating

HM3H won "Green Co Gold Rating- Green Company Rating System"







Project Detail	Investment in Crores
Heater elimination in Al phase WMC using heat pump installation	1.2
0.95 MW Solar power plant	4.50
EC fan for Chiller & FDV	0.32
Washing machine upgrade on NG	0.25

We are certified for CII Green Company Gold Rating

12. Learning from CII Energy Award 2021 or any other award program

S.No.	Title of the Project	Brief Description of the project	Reason To Choose
1	Installation of NIFPS system	NIFPS system prevents oil tank explosion or rupture and possible oil fire in the event of minor nature of arcing due to internal faults in Oil filled Power transformer.	To ensure additional safety in oil cooled 132 KV transformer
2	Use of portable compressors	Usage of portable compressors for working on Non working days fro certain areas	Power saving & compressor availability for routine maintenance
3	ATC in Engine Assembly Chillers	Auto Tube cleaner in chillers for cleaning of condensers	To save electric energy
4	To replace conventional blowers with High Efficiency EC Fans in Lacquer Paint shop ASU to save energy	Centrifugal blowers used for conditioned air supply in ASU of Paint Shop which involves high Kwh consumption and also no backup if came in breakdown.	To reduce energy consumption
5	AHP for Hot water Generator	AHP uses comp Cooling Tower water temperature reduction to heat the Hot Water	To increase productivity & save Thermal Power

Many improvement projects idea we got from CII summit over the past years.

13. Any other relevant information (Awards won)

Food Safety ISO 22000:2018 Certification

bsi.

Certificate of Registration

FOOD SAFETY MANAGEMENT SYSTEM - ISO 22000:2018

This is to certify that:

Hero MotoCorp Ltd.
Plot No. 03, Sector -10,
IIE Sidcul
Haridwar 249 403
Uttarakhand
India

Holds Certificate No: **FSMS 755589**

and operates a Food Safety Management System which complies with the requirements of ISO 22000:2018 for the following scope:

Receiving of raw material, Storage, Preparation and Serving of both cooked and uncooked meals (vegetarian only), Snacks, Beverages, Deserts (Hot & Cold serve)
Category- E

For and on behalf of BSI:

Michael Lam - Managing Director Assurance, APAC

Original Registration Date: 2022-01-19
Latest Revision Date: 2022-01-19

Effective Date: 2022-01-19
Expiry Date: 2025-01-18

Page: 1 of 1

..making excellence a habit.

CII National Maintenance Circle Competition 2021

Higher productivity & profitability by adopting World Class Maintenance Practices :
Compete, Learn & Share

Competition Category : Best Case Study on MTBF & MTTR

Theme : Establishment of Zero breakdown In Assembly Lines through TPM Methodology.

Facilitator

Haridwar Singh

Winner –Best Case Study on MTBF & MTTR

Leader	Member	Member	Member	Member	Member
					
Harendra Singh	Manpreet Singh	Brijveer Singh	Shiv Kumar	Anmol Aneja	Manish Tyagi
Frame Plant Maintenance				Production	

Thank You!!

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harendra1.singh@heromotocorp.com
Shubham Dhingra – 8279970208
shubham.dhingra@heromotocorp.com