Bajaj Auto Limited
Chakan Plant

National Award for Excellence in Energy Management- 2022

Team Members

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Manufacturing Locations

Chakan Plant -

- *Tries and tests various new concepts.*
- *Manufacturing of High-Performance bikes.*

Waluj MC Plant -

- *Manufacturing of 2-wheelers*
- *Caters to the major export needs.*

Waluj CV Plant -

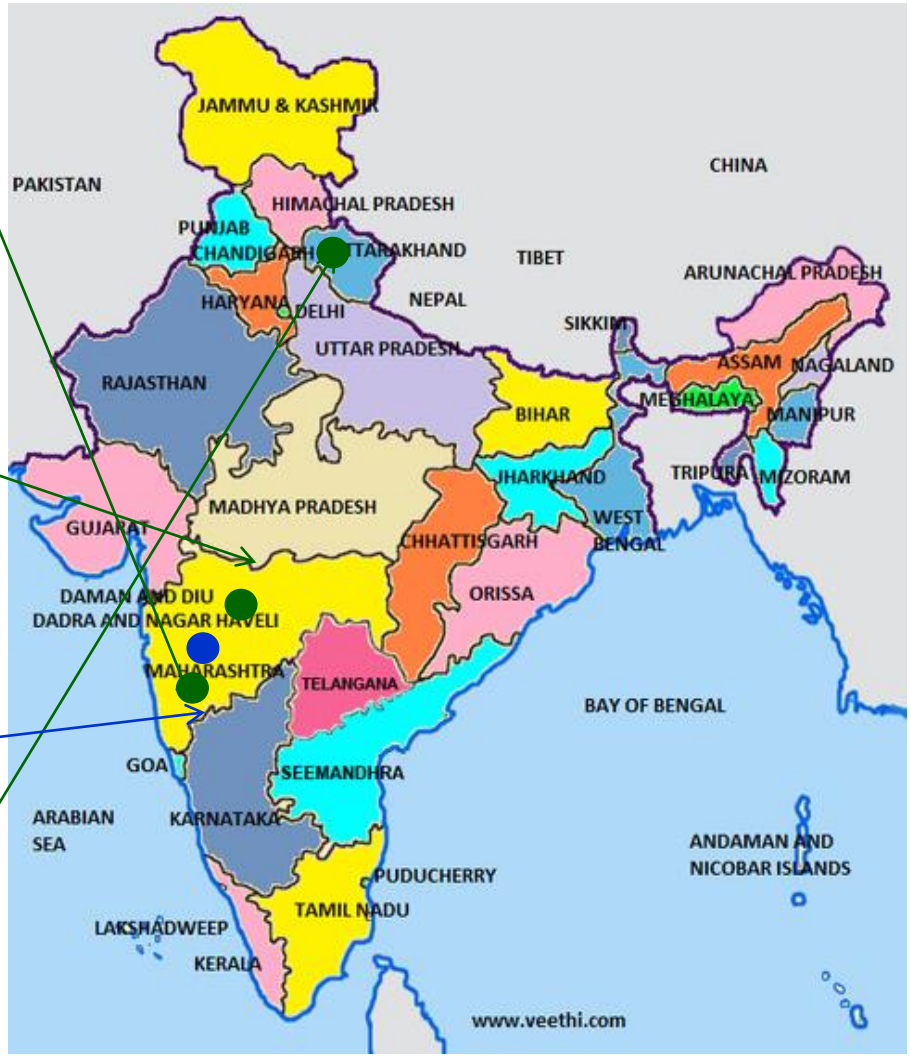
- *Manufacturing of 3-wheelers & parts thereof.*

Bajaj Auto Ltd - Corporate Office

Akurdi, Pune

Pantnagar Plant –

- *Plant and its vendors in the same premises.*
- *Plant produces Discover, CT & Platina range of motorcycles.*



Chakan Plant -

- *Turnover- 8413 Crores*
- *0.011 % Investment on Energy Projects*

Company Vision , Mission & TPM Journey

Vision

VISION

Bajaj Auto Ltd. (BAL) intends to be one of the world's leading motorcycle manufacturers whose competitive versatility permits it to participate across the spectrum of global markets ranging from the least developed to the most sophisticated.

BAL seeks, over time, to be No.1 or No. 2 in all such markets as also to achieve and sustain a significant presence in niches such as intracity transportation and urban mobility, the skills for and cost structure of which are synergistic with its motorcycle business.

In all of its aforementioned businesses, BAL will continue to demonstrate its industry leading profitability.

Rajiv Bajaj
Managing Director

Date : 23rd February 2018

"The Prime Mover – Towards Excellence"

Mission

MISSION

BAL's 'Front End' is centred in its strategy to differentiate its brands.

All BAL brands must be among the top 2 brands in their category in all the markets that BAL competes in.

TPM guides BAL's 'Front end' to continuously improve its core competence in sales and service and to thereby enable its dealers & distributors to continuously improve their performance.

Similarly, BAL's 'Back End' is guided by TPM to continuously improve its core competence in design, development, engineering, and manufacturing.

All other functions are also guided by TPM to continuously improve.

Rajiv Bajaj
Managing Director

Date : 23rd February 2018

TPM Policy

TPM POLICY

BAL will specialise its brands through its strategy of differentiation.

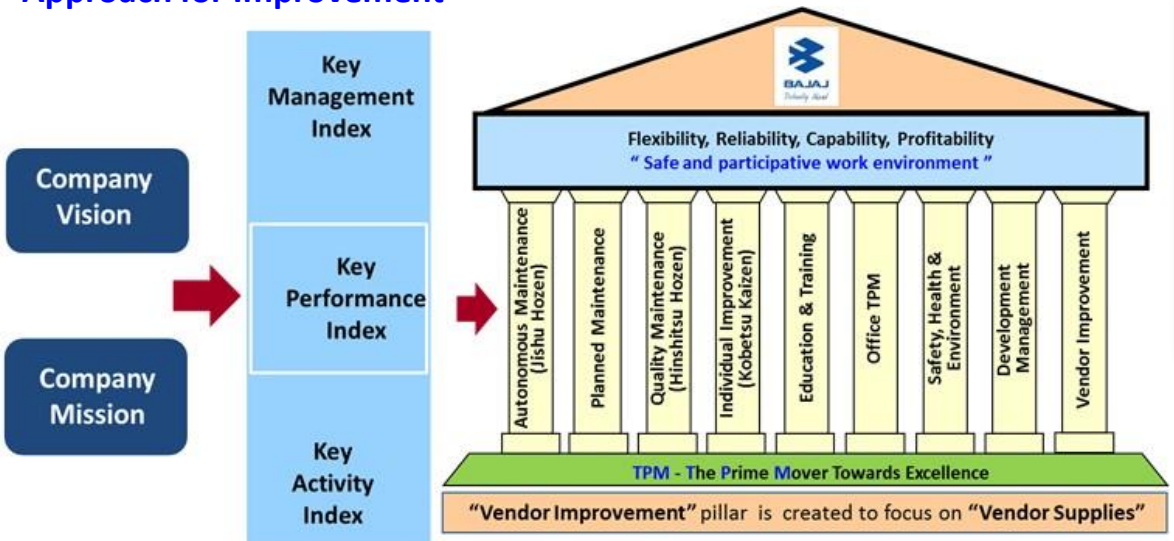
BAL will also improve its core competencies in all its functions, as also across its supply chain, including its suppliers and dealers.

BAL has adopted TPM, The Prime Mover towards excellence, to provide a holistic, structured and quantifiable methodology for deeper and wider continuous improvement in an integrated manner that's aligned with BAL's business vision.

Rajiv Bajaj
Managing Director

Date : 23rd February 2018

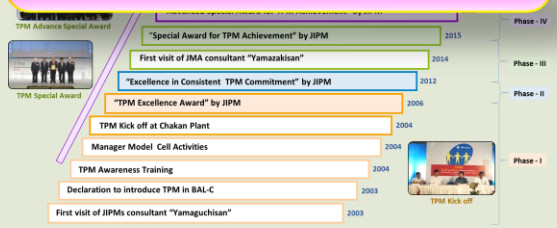
Approach for Improvement



TPM JOURNEY

2023 : Practicing for "World Class Award"

Achieved special award for TPM Achievement by JIPM



ISO 9001 | ISO 14001 | ISO 45001

ISO Certification

Total Vendors : 128

Production Processes

Total Number of Equipment : 712

Vendor Input (Semi-finish)

Machine Shop

Aluminium Shop

Steel Shop

Machining of Engine Parts

Vendor Input

Engine Assembly

Assembly of Engine

Vehicle Assembly

Assembly of Vehicle

Domestic Dispatch

Export Dispatch

Paint Shop

Painting of Parts : Petrol Tank & ABS Parts

Vendor Input (Semi-finish)

Specific Energy Consumption

Absolute Energy consumption & Saving

Year	Elect. Saving (Lacs Kwh)	Thermal (Fuel) saving M Kcal	Elect. Consumption Lacs Kwh	Thermal (Fuel) Consumption M Kcal	Elect. Saving %	Thermal Saving %	Actual vehicle	Equivalent vehicles
2019-20	9.64	142	159.1	2361	6.00	6	849960	2062775
2020-21	6.22	49	165.2	2410	3.70	2.0	846346	2309722
2021-22	4.7	71	184.5	3895	2.54	1.82	852669	2434154

ABS painting process started in house from Jan 2021

Pulsar- 150 (First model in Chakan plant)
Considered as base mode for equivalent vehicles calculations

Specific energy consumption & saving

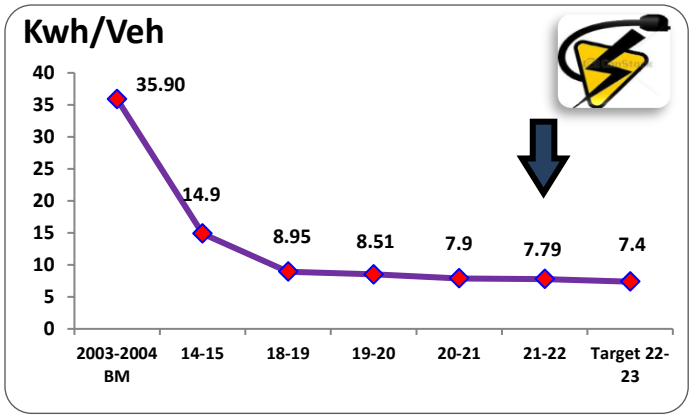
Energy	Unit	Energy consumption			Target
		2019-20	2020-21	2021-2022	2022-2023
Electricity	KWH/Veh.	8.51	07.90	07.79	7.40
PNG	Kg / veh	0.163	0.160	0.158	0.155
Water	m^3 / veh	0.06	0.05	0.04	0.035

% Specific energy consumption Reduction

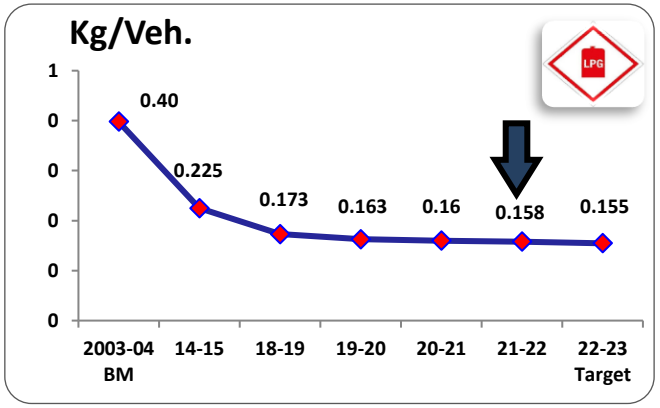
S.no	Energy	In Last 2 Years (up to March 21)	In last year (2021-2022)
1	Electrical (Kwh/Veh)	12%	1.4%
2	Fuel (LPG) (Kg/Veh)	08%	2 %
3	Water (Cu.m /Veh)	31%	20.0%

Energy Consumption Trend

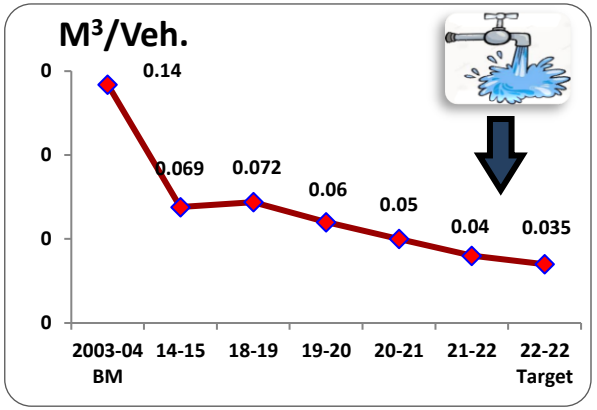
Plant level SEC trend



Electrical Power Consumption



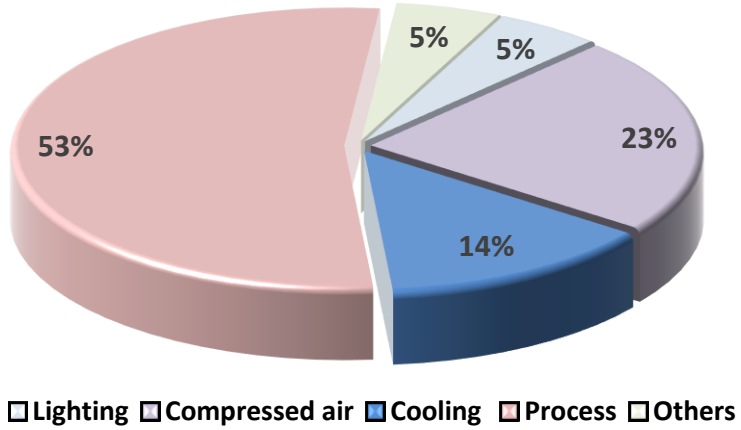
PNG Consumption



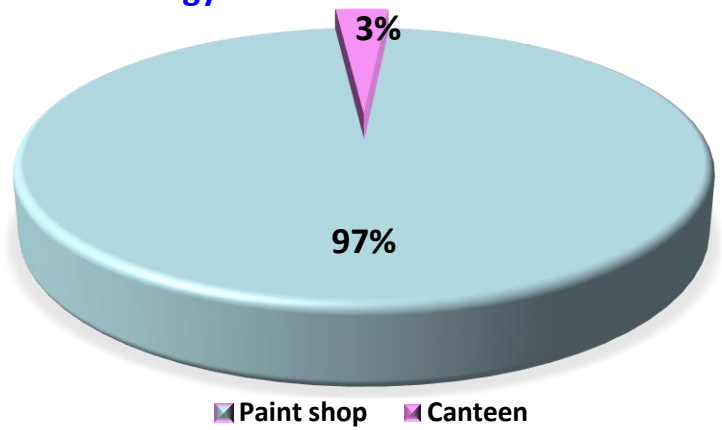
Water Consumption

Process wise energy consumption

Electrical Energy



Thermal Energy



Energy Consumption-Benchmark & Methodology

Specific Energy Consumption-Benchmark

Sr.	Energy	BAL Chakan	Nearest competitor 1 (Hero MotoCorp)	Nearest competitor 2- (Honda Motorcycle)	Global
1	Electrical (Kwh/Veh)	7.79	27.5	28.88	NA
2	Fuel (CNG) – Kcal/ veh.	1970	9566	10222	NA
3	Water (Cub.Mtr/Veh.)	0.04 (Water Positive)	NA	NA	NA

- **Specific Energy is calculated per equivalent vehicle. Considering our Pulsar 150 as base model.**
- **We have started process wise energy consumption monitoring from 2022-2023**
- **Target - Min 5 % Reduction in specific energy consumption wrt last year**

Energy conservation methodology

Audit

To identify areas of energy conservation potential (Internal & External)

Weekly / Monthly data through Pie charts & brainstorming

Analysis

To identify equipment & Processes where energy conservation is possible

Daily/weekly KWh, pressure, flow, volume etc. recording through bar charts, graphs

Action Plan

Activities for individual equipment with time frame

Resource planning & activity charts

Implementation

Action for procurement & implementation

6W2H Way Activity Charts

Evaluation

To analyze plan V/S Actual

Gap Analysis & countermeasures

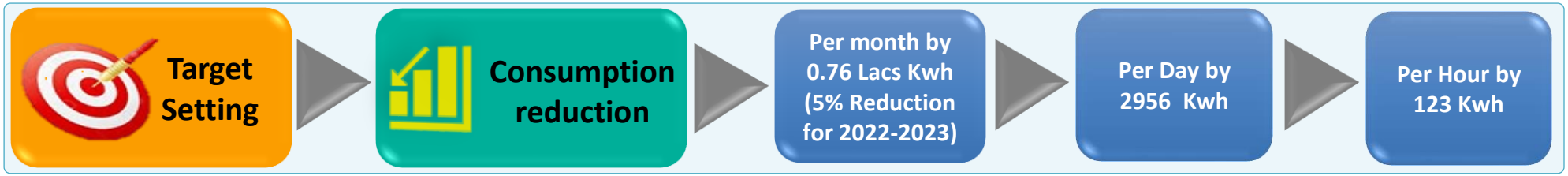
Sustenance

To Monitor the results

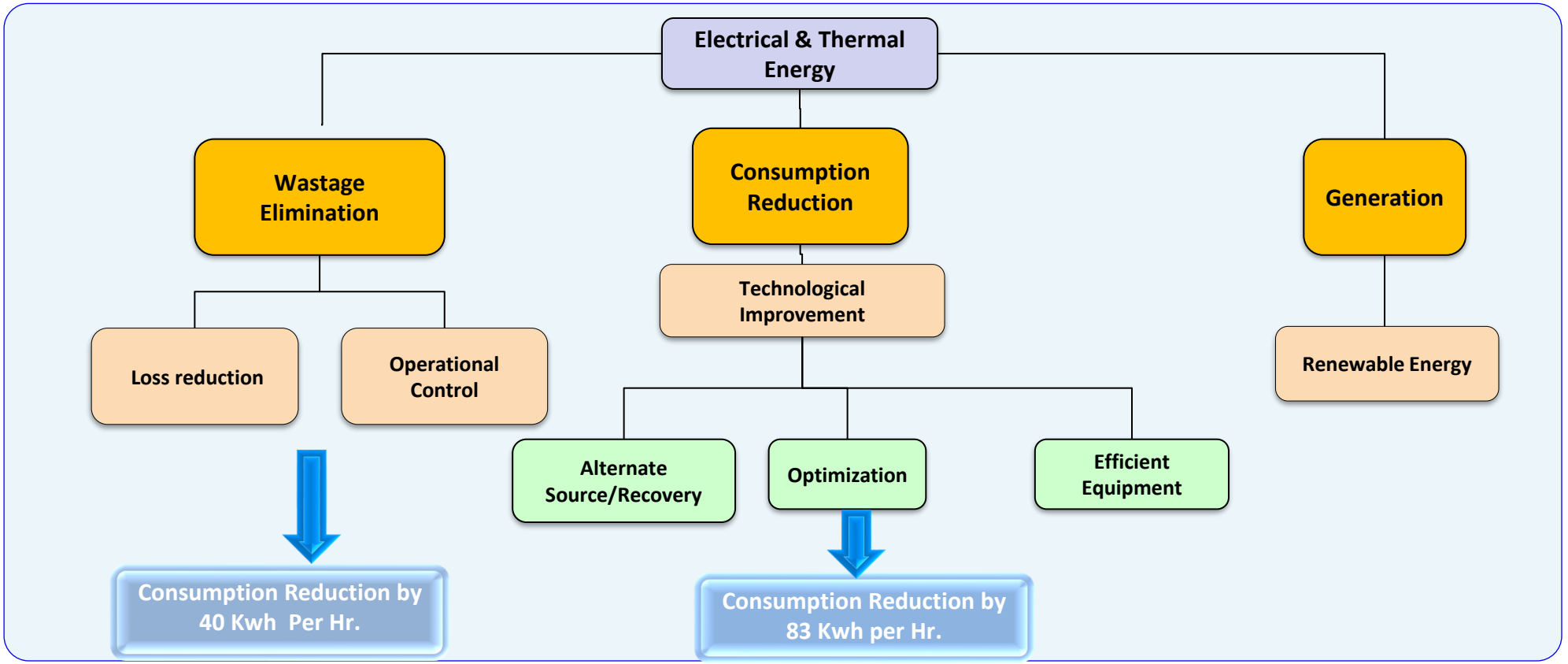
Internal & External Audits

Road map to Achieve Target

To achieve specific Electrical energy consumption per vehicle 7.40 KWH in FY 22-23



Energy Conservation Idea



Major ENCON projects – FY 22-23

Major ENCON (Electrical) projects – FY 22-23

S.No.	Title of Project	Before (KW)	After (KW)	Annual Electrical Saving, Million kWh	Annual Electrical Cost Saving Rs Million	Investment (Rs million)	Payback months
1	Cooling System – Use of heat resistive sheets	07	01	0.129	1.02	1.6	19
2	Process Change - Crank case washing process change. Use of one washing machine instead of 2 machines.	59	49	0.072	0.624	0.3	6
3	Use of renewable energy Source - Use of heat pumps for cylinder head & crank case washing machines. 4 machines	76	53	0.169	1.473	1.2	10
4	Advanced tech. - Use of DC brushless motors.	12.4	9.5	0.018	0.156	0.2	14
	Total			**0.92**	**8.0**	**12.3**	**17**

Target - Fix Load reduction – 0.29 Millan KWH (43 KWH / Hr.)

Target - Variable Load reduction – 0.63 Millan KWH (83 kwh/Hr.)

Major ENCON (Thermal) projects – FY 22-23

S.No.	Title of Project	Before CNG in KG	After	Annual Thermal Saving, Million Kcal	Annual Thermal Cost Saving Rs Million	Investment (Rs million)	Payback months
1	Canteen gas Buner to convert to induction heating	10 Kg/ Day	52 KWH/ Day	2.3	0.228	0.1	5
2	Use of Low temperature Chemicals for Paint shop pretreatment process	66.7 Kg/Day	22.7 Kg / Day	101	1.056	1.5	18
8	Paint sludge to be sent for reprocess instead of burning in inclinator.	40 Kg/ Day	21Kg/ Day	43.89	0.52	0.8	16
	Total			**197**	**1.8**	**2.3**	**NA**

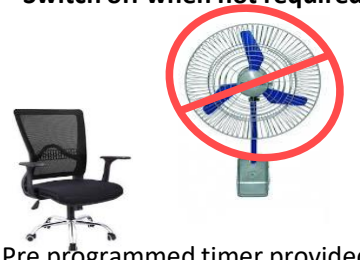
Energy Saving Projects in last 3 years

Summary of energy saving projects in last 3 years

Year	No of energy saving projects	Investments (INR Million)	Electrical saving (Million KWH)	Thermal saving (Million Kcal)	Saving (INR Million)	Impact on SEC (Electrical Kwh /Veh.,
2019-2020	73	3.166	0.964	56.80	7.23	0.44
2020-2021	46	2.7	0.365	85.90	2.95	0.60
2021-2022	58	4.25	0.470	98.50	4.089	1.1

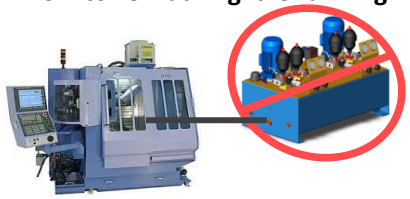
Examples - Wastage Elimination (Visible Loss elimination)

Switch off when not required



Pre programmed timer provided to switch of the fans after tea breaks

Switch off during idle running

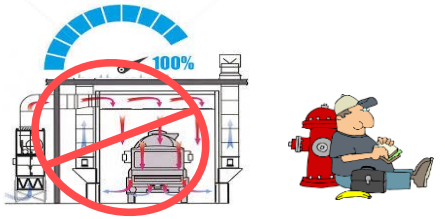


Timer for auto switch off Hydraulic pump motor when machine is idle

Optimise usage

Auto control with photo electric sensors for lighting control

Reduce load during idle time

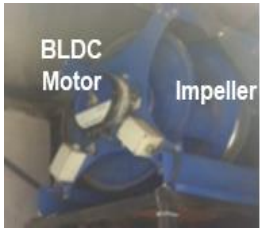


Ventilation system with reduced load of 20 % during break times

Sr.	Loss area	Actions for wastage reduction	Activity	Saving (Yr.)	HD (Nos.)
1	Lighting	Auto control of conveyor tube lights	Interlocked tube light supply with conveyor ON condition	0.1 Lkwh	12
2		Light intensity-based operation of the shop & streetlights	Provided photo electric sensors to avoid working of lights in daytime	0.37 Lkwh	12
3	Comfort cooling (Fan)	Switch off fans after break / recesses times	Provided preprogrammed timers to switch off fans after break time	0.01 Lkwh	900
4	Idle running of Hydraulic Pump	Auto stop for power pack pumps during machine idle condition	Timer based interlocking with auto cycle for hydraulic pumps in machines.	0.02 L Kwh	107

Energy Saving Projects in last 3 years

Examples- Consumption Reduction – Blower & Pumps

Area	Before	After	Saving (Yr.)	Inves. (Rs. Lacs)	HD (No)
Paint shop	**AC Induction motor blower.** • Indirect drive - V belt • **Blower**- 15000 **CFM** • **single motor 15 KW** • 6226 Kwh /month 	**BLDC motor blower.** • BLDC motor has 90% efficiency. • lightweight fan , Improved fins • 4080 Kwh /month 	0.26 L Kwh	4.5	2
EV & Export shops	**Air circulators at shop floor** 	Lower ambient at shop floor. Heat resistive sheets at roof 	**0.35 L Kwh/ Yr**	**Rs. 12 lacs**	
Paint shop	**• Hot water circulation pump with gland cooling water** • 25 HP pump • Gland cooling pump - 5HP 	**• Hot water circulation pump without gland cooling water** • Pump with mechanical seal. • Cooling water circulation pump eliminated. 	**0.18 L Kwh**	**3.5**	**6**

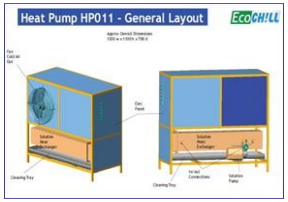
Energy Saving Projects in last 3 years

Examples- Consumption Reduction – Lighting

Area	Before	After	Saving (Yr.)	Investment (Rs. Lacs)	HD
Conveyors	 **Conventional tube lights on assembly** conveyors . Use of 360 X 80 W Tubes	 **LED lights on assembly conveyors** Use of 360 X 46 W LED Lights	**0.59 L Kwh/ Yr.**	**14.4 Lacs**	**4 Conveyer**
Machine Task Light	 **Use of 36 W Tube light at 1 Meter Height**	 **•Use of 16 W LED light at 1 Meter Height** – 180 Fittings	**0.175 L Kwh/ Yr**	**0.9 Lacs**	**3 Shops**
Street Lights	 **•150 Watt CFL lamps** • 650 Nos. Lamps • Connected Load – 97.5 Kw • Consumption 3.55 L Kwh/Yr	 **•72 Watts LED lamps**- 100 Nos • **89 Watts LED lamps**- 150 Nos • Connected Load – 3.75 Kw • Consumption -0.648 L kwh/Yr	**0.306 L Kwh /Yr**	**1.55 Lac**	**All street lights**
Shop Lights	**•120 watts LED lamps** • 750 Nos. Lamps • Connected Load -90 Kw • **Consumption- 3.24 L Kwh/Yr.**	**•80 watts LED lamps** - 750 Nos. Lamps Connected Load – 60 KW •Consumption - 2.16 L KWH/ Year	**1.08 L kwh /Yr**	**13.5 Lacs**	**8 shops**

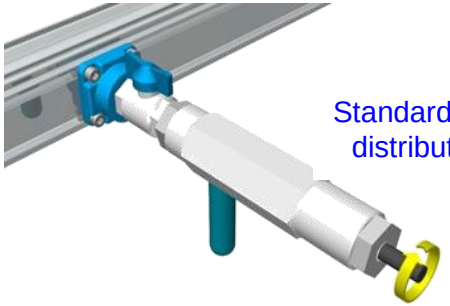
Energy Saving Projects in last 3 years

Examples- Consumption Reduction- Method Change

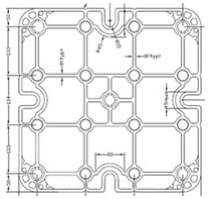
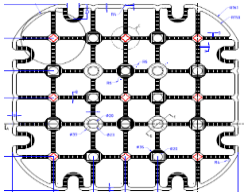
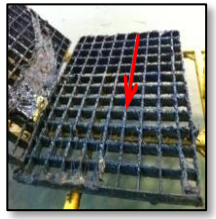
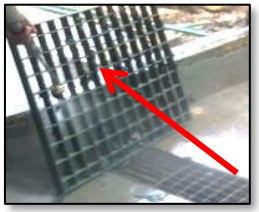
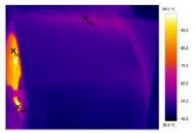
Area	Before	After	Saving (Yr.)	Investment (Rs. Lacs)	HD (No)
Machine shop	**Electric Heater** for Water heating of washing machine Energy consumption 1.02 L Kwh /yr. 	Heat Pump for water heating of washing machine Energy consumption 0.61 L Kwh /yr. 	**0.41 L kwh**	**7.5**	**2**
Paint shop	**Reciprocating chiller 30 TR** • Air cooled reciprocating compressor • COP of the compressor is low • Energy consumption • 864 Kwh /Day 	**Scroll chiller 27 TR** • Water cooled scroll compressor • COP of the compressor is high • Energy consumption • 528 Kwh/Day 	**1.2 L kwh**	**8.5**	**3**
Assembly	• **Multiple 30 inch air circulators** comfort cooling • 350 Watts air circulators 30 Nos - 10.5 KW 	• **Single HVLS 24 feet air circulators** comfort cooling • 1.5 K Watts air circulators 	**0.43 L Kwh**	**3**	**20**
Production shops	• Air supply unit used for comfort cooling • Centralized ARP with 100HP motor 	•Spot coolers used for comfort cooling •Breeze air spot coolers used With 2 HP blowers 	**1.08 L Kwh**	**16**	**12**

Energy Saving Projects in last 3 years

Reduction of Compressed Air Consumption Per Vehicle

Sr No.	Idea	Implementation
1	•Air Leakage data collection through audits from shops •Air leakage data through FAD tests. • Efficient usage of compressed air • Shut off valve during non working hours	 Automatic Shut off Air (when not in use)
2	• providing localized compressors • Separation of air headers for Low pressure & High pressure requirement • Rerouting & Resizing of compressed air headers • Use of Air Boosters for High pressure application • Use of Aluminium pipes for air distribution in assembly shops	 Standardization of Air distribution system
3	•Use of Electrical operated tools	DC tools   Precision Electric Screw driver Kilews Electric Tools

Examples - Wastage Elimination

Idea	Before	After	Saving	Investment
Fixture Weight Reduction	 Stacking tray weight- 7.5 KG Manufacturing by Sand casting	 Stacking tray weight- 3.5 KG Manufacturing by Investment casting	**120 Ton/Year**	**08 Lacs**
Grating Modification	 Paint booth Grating cleaning by burning in oven Total no. of gratings = 208 Cleaning frequency = Weekly	 Teflon coated Paint booth Grating cleaning by high pressure water jet - Burning is eliminated	**19.68 Tons/Yr**	**6.8 Lacs**
Magnetic resonator	 Paint Baking Oven : Low combustion efficiency of burner PNG required for one burner / Hour – 11.5 Kg	 **Magnetic Resonator** Polarized fuel easily attracts the air, improving specific area of contact between air and fuel. It enhances combustion efficiency. PNG required for one burner / Hour – 11.15 Kg	**9.8 Tons/Yr**	**8 lacs**
Thermography Audits	  Loss due to Hot air leakage from Ovens	 Scheduled Thermography audits & corrective actions – Points identified : 13 Loss : 42451 K Cal /Hr	**17.70 Tons / Yr**	**6 Lacs**

Examples - Wastage Elimination through Micro level Analysis

Case Study 1

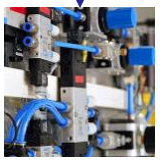
Hidden loss reduction in CNC machines & SPMs

Methodology

- Monitor energy consumption trends for one equipment
- Assembly wise electrical load mapping
- Mapping of equipment cycle time & mode wise energy consumption stratification
- Identify loss elements during each mode
- Idea generation - Set targets and execute action plan
- Monitor results
- Sustenance action

Equipment level Energy Mapping

Assembly level Energy Mapping



Pneumatic

Hydraulics

Tools

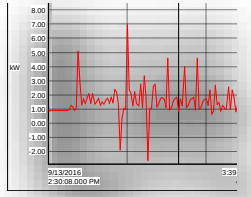
Electronics

Cycle Time level Energy Mapping

Emg. Off

Non Cutting time

Cutting time



Innovative projects implemented

Scope identified through micro mapping

S. N	Scope	Equip. / Part	Part/ Accessories	Kaizen Theme	Kaizen Idea	Result	Res.	Target Date	Status
1	Parameter optimization	Boring, Honing ,MTD SPM	Spindle With VFD	Energy Consumption reduction	Spindle Speed Optimization based on Process requirement & Cycle time	Energy Cost Saving for cutting cycle.	RVK	30.07.21	C
2	Operation sequence change	Crank case bush press	Hydraulic motor	Running time optimization	Cycle / operating sequence to changed	Pump running time reduction	RVK	20.01.22	Case Study C
3	Power loss	Makino , VF2,	Chilling Units for oil & coolant	Electrical Energy Consumption Reduction	Chilling Units Piping Coating to avoid heat loss	Energy cost reduction	RVK	25.8.19	C
4	Process change	Crank case leak test	Hydraulic pump	Pump running time reduction	Pump running time reduction by process optimization	Power consumption reduction by 18 KWH / Day	RVK	25.11.21	Case Study C
34	Process Change	Fine boring cylinder block	Coolant unit	Process change (Dry boring)	Wet boring to be to be elimination	Coolant unit elimination	RVK	25.10.20	Case Study C

Innovative projects implemented

Kaizen Example 1 Pump running time reduction by changing operation sequence

Case Study 1

Theme : Hydraulic pump running time optimization.

Before

Problem: 1. Sequential activity. Inside fixture heating start after outside part load & inspection.

- 2. Sequential activity done to avoid delay in bush pressing after heating

Hydraulic Pump running time 53 sec.

Power consumption – 63 KWH/ Day

Sequential of activity after loading the part on outside fixture

ACTIVITIES	BEFORE TIME BREAKUP (sec)
PART UNLOAD (OUTSIDE)	6
PART LOAD (OUTSIDE)	7
BUSH INSPECTION AND LOAD (OUTSIDE)	8
O1 BORE INSP.(OUTSIDE)	8
O1 BORE HEATING (INSIDE)	25
BUSH PRESSING IN O1 BORE	7 7
Pump running time	53 Sec

Inside part heating start After first three operations on outside part.

Root cause :

Pump running time 53 Secs – Heating start command late by 15 sec.

Energy saved by changing operation Method

After

Idea : inside part heating start to be given early.

Sequential activity of outside component loading & inspection to be taken parrel with heating.

Heating to be started in such a way that pressing due will be immidiately after heating

Power consumption 45 KWH/Day

Countermeasure :

Logic changed- Heating started immidiately after unloading outside component.

ACTIVITIES	AFTER TIME BREAKUP (sec)
PART UNLOAD	6
PART LOAD	7
BUSH INSPECTION AND LOAD	8
O1 BORE ID INSPECTION	8
O1 BORE HEATING	25
BUSH PRESSING IN O1 BORE	7
TOTAL TIME	38 Sec

Iinside component heating started immidiately after 1st operation

Result

Power consumption reduced by 18 KWH/Day.

Innovative projects implemented

Process Change – Processing time optimization

Case Study 2

Before

Problem: Sequential cycle for leak test paths.

Oil paths leak test cycle start sequentially

ACTIVITIES	BEFORE TIME BREAKUP (sec)
PART UNLOAD	10
PART LOAD	10
PART CLAMP	5
BLOCKAGE TEST	14
LEAK TEST PATH 1	15
LEAK TEST PATH 2	20
LEAK TEST PATH 3	20
PART DECLAMP & CYCLE END	5
PUMP RUNNING TIME	99 Sec

Sequential activities at leak testing

Energy saved by changing operation Method

After

Idea : To start leak testing cycle **parallel for all testing paths**

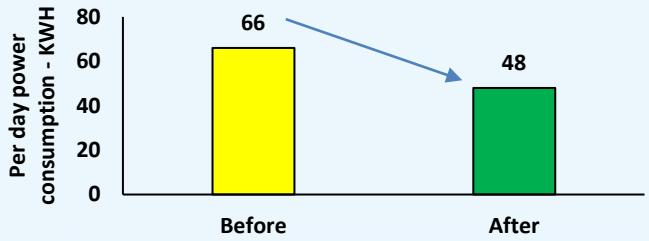
New Concept 1st time implemented

Oil paths leak test cycle start simultaneously

ACTIVITIES	AFTER TIME BREAKUP (sec)
PART UNLOAD	10
PART LOAD	10
PART CLAMP	5
BLOCKAGE TEST	14
LEAK TEST PATH 1	18
LEAK TEST PATH 2	21
LEAK TEST PATH 3	25
PART DECLAMP & CYCLE END	5
PUMP RUNNING TIME	69 Sec

Parallel activities Started For leak testing

Result



Countermeasure :

- **Air fill time increased** to reduce the turbulence.
- **Oil & water path air filling start simultaneously by modifying PLC Ladder diagram**

Kaizen Example

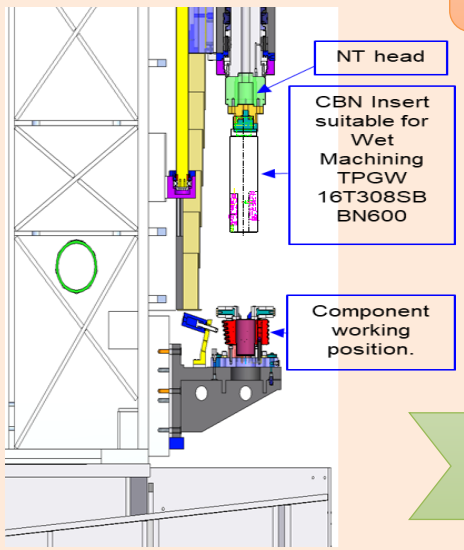
Case Study 3

Theme : Energy Consumption reduction by Changing Fine boring process (Technology upgradation).

Before

Problem: Coolant required for Cylinder Block Fine Boring Operation (Wet machining) resulting in…

1. **Coolant Unit power consumption – 39600 KWH /year/machine.**
2. **Cutting oil consumption- 188 Liters per machine per year.**
3. Less tool life
4. Honing coolant contaminates due to mixing of coolant used during fine boring.

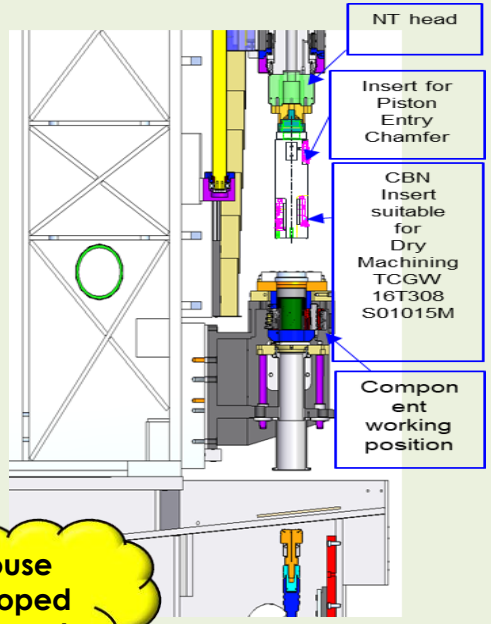


Energy saved by changing operation process

Tool : Change in technology

After **Process Change- Wet boring to dry boring..**

1. New spindle & fixture developed suitable for dry boring operation Fixture with air nozzles inside for boring dust flushing
2. Boring dust suction by using suction blower.
3. CBN inserts changed to suit dry machining.



In house developed Equipment

Issues :

Due to wet machining Power consumption was more 132 KWH/Day.

Countermeasure :

New spindle & fixture developed suitable for dry boring operation by technology upgradation.

Result

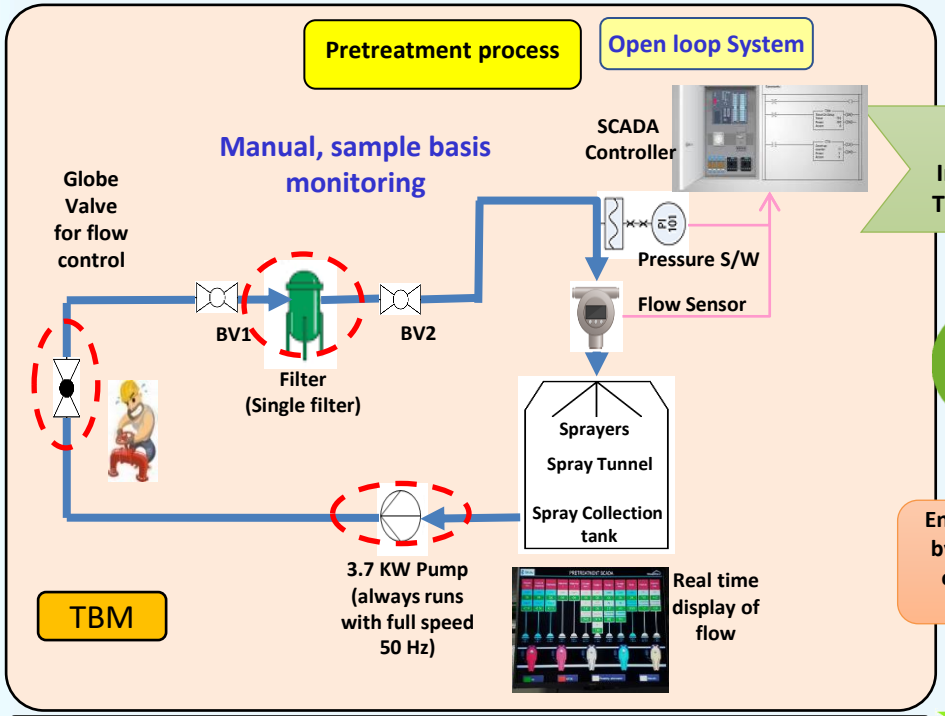
- **Electrical power consumption reduced to 23400 KWH/year / Machine**
- **Cutting oil consumption eliminated**

Benefits

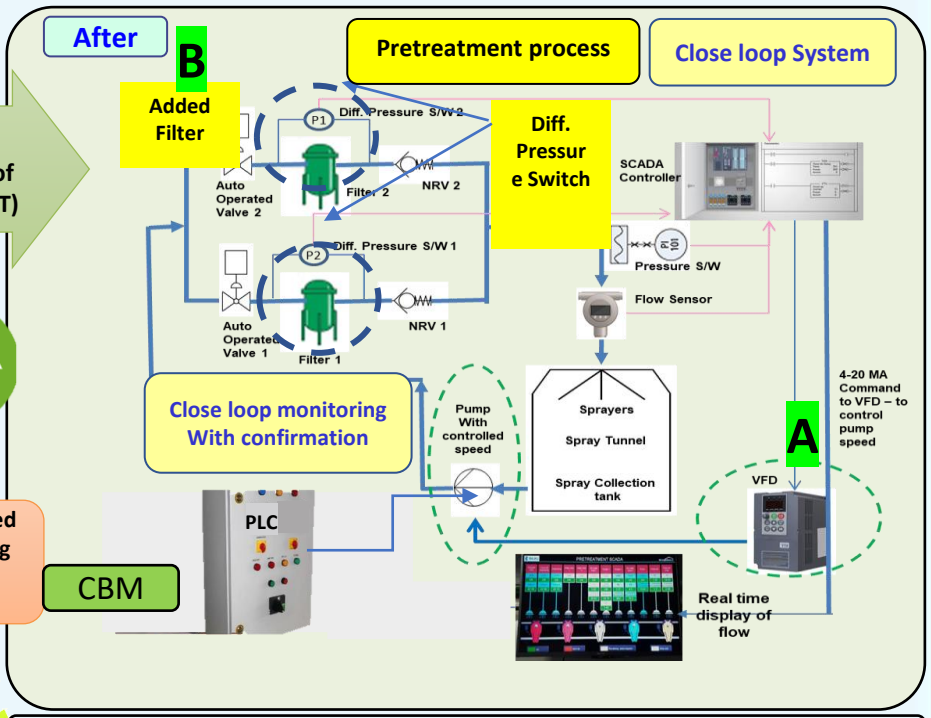
- Honing coolant contamination eliminated – Oil sump life increased
- Boring bar tool life increased from 400 to 3000 Components.

Kaizen Example

Theme : Energy Consumption reduction through IoT at Pretreatment Process



Tool : Internet of Things (IoT)



Energy saved by changing operation process

Issues :

Energy Consumption is more due to 3.7 KW Pump always runs with full speed 50 Hz (Manual, sample basis monitoring)

Result

- **Power saving 6030 KWh / Year**
- **Electrical Power Cost Reduced by Rs. 48K**

Countermeasure :

A – VFD installed to regulate spray pump speed. (40-45Hz)
B – 2 Filter units installed in Parallel with auto changeover

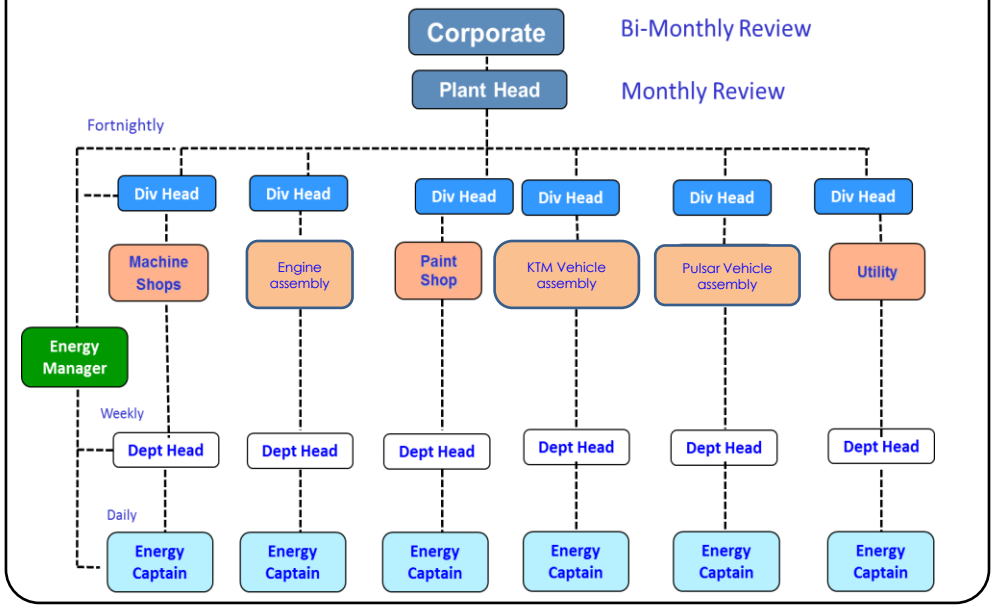
Benefits

- Reduction in Carbon emission by 5032 Kg/ year

Teamwork – Flow chart

Company Vision/Mission → ***Plant Vision/Mission*** → ***Divisional Target*** → ***Shop Level Target***

Teamwork employee Involvement & monitoring



Review Mechanism

- **Level 4** – Energy Captain (Daily)
- **Level 3** – Energy Manager (Weekly)
- **Level 2** – Divisional head (Fortnightly)
- **Level 1** – Plant head (Monthly)

Cost Reduction- KK Pillar

Technical Improvement PM Pillar

Energy Manager-

Environment Improvement Energy - SHE Pillar

Encon Projects → **Budget Allocation** → **Execution & Monitoring** → **Management Review**

Utilization of Renewable Energy Sources

Roof top Solar system – Inhouse captive type

Last three years generation details

Year	Technology (Electrical)	Type of energy	Onsite / Off site	Installed Capacity (MW)	Generation (Million KWH)	% of overall electrical energy	Carbon Emission Reduction (Tones of CO_2e / year)	Electric Bill Saving (Rs. Lacs/year)
FY 19-20	Electrical	Solar	Onsite	1.97	2.25	11.63	1906	84.48
FY 20-21	Electrical	Solar	Onsite	1.97	2.10	12.58	1762	78.11
FY 21-22	Electrical	Solar	Onsite	1.97	2.3	14.9	1901	84.66

Shop Roof Top – Solar Plant
Phase 1 & 2
Installed Capacity – 1.97 MW

Solar Expansion plan – 2022-2023
Shop Roof Top – - Phase 3- Plan- 818 KW

Additional Examples – Renewable energy utilization.

Idea	Particulars	Photo	Saving Rs. Lacs	Investment Rs. Lacs
Solar energy for power generation	Solar Photo Voltaic Power Plant -20 Kw for horticulture & nursery		32.5 L Kwh/ Yr	24.5 lacs
Use of Solar water Heating System	Solar heater to preheat make up water of washing machine / canteen		3396 Kg/ Yr	11 lacs
Use of natural light	Transparent sheets installed in roof for all the shops. Qty- 138 Nos.		0.141 L Kwh/ Yr	1.10 lacs

Waste Utilization and Management

Waste generation & disposal details

Type of waste generated	Qty. 2019-202	Quantity 2020-2021	Quantity 2021-2022	Disposal method
	MT/Year	MT/Year	MT/Year	
Paint	181.08	164.61	210.49	Disposal through Authorized re Processor
ETP Waste	17.8	17.9	18.6	Disposal through MEPL (MPCB Authorized)
Waste containing oil	79.1	33	79.3	Disposal through MEPL (MPCB Authorized)
Discarded containers	14867 Nos.	16582 Nos.	84082 Nos	Sell to Authorized re processor
Batteries	6.0	4.3	5.6	Disposal through authorized recycler

Details of waste utilization activities

SN	Waste utilisation description	Saving per Year	Investment (Rs. Lacs)
1	Waste paint sludge sending for reprocess instead of burning in inclinators.	30 T / Year	9.75
2	Waste coolant - Water separation & reuse of water through ETP.	2.2 Lac Liters	2.5
3	Use of ETP treated water for process through RO Plant	4500 KL	13.5

Waste food to Compost

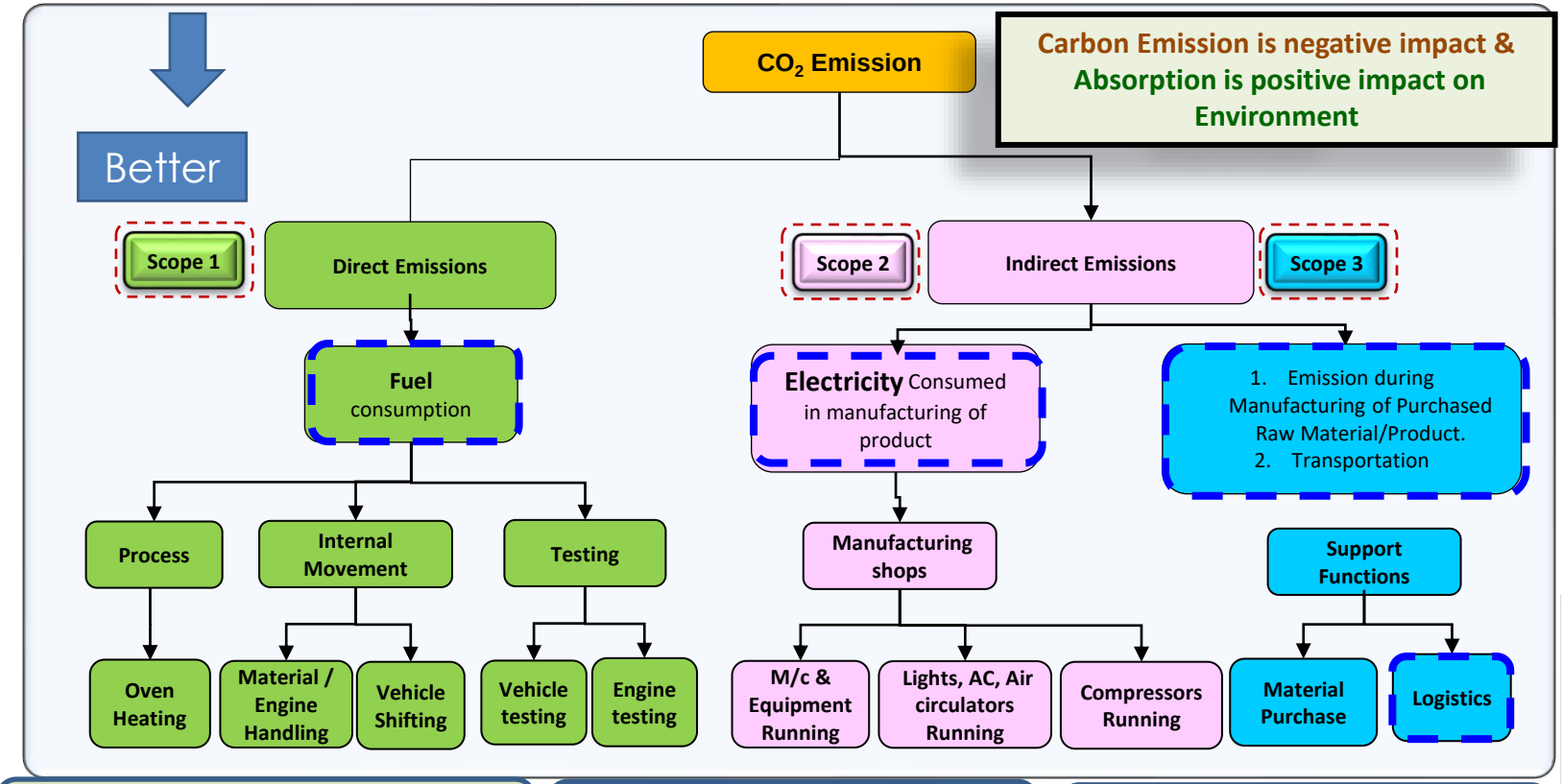
- **Input- Waste Food**
- **Output – Organic Manure**
- **Processing in 24 Hrs.**

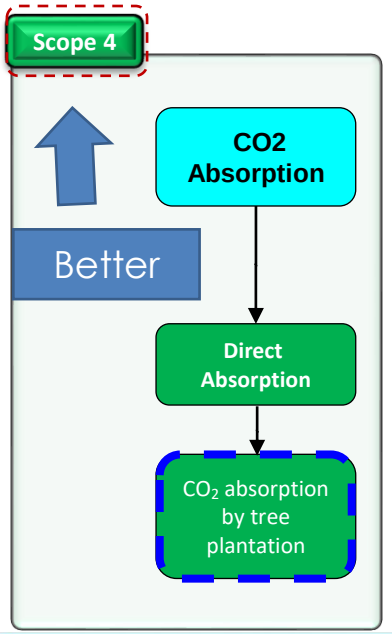
Future Plan- 2022-2023

Bio-Gas generation from Food waste - Target 80 KG per day

Carbon Footprint Reduction

Approach : To reduce the Emission & Increase the Absorption





Scope 1- To reduce use of PNG by using

1. Use of Low temperature chemicals for pretreatment in paint shop
2. Paint shop over temperature band optimization
3. Alternate heat source for canteen cooking

Scope 2- To reduce use of electrical power by

1. Use of renewable energy sources
2. Use of advanced energy saving technique
3. Micro level mapping of energy consumption & corrective actions.

Scope 2- To reduce use of electrical power by

1. Following green purchase policy for supply chain
2. Use milk run system for vendors parts

BAJAJ — THE WORLD'S FAVOURITE INDIAN

Sustainability

Mission Statement

Bajaj Auto Ltd. manufacturer of automobiles, is committed towards creating & preserving a cleaner environment.

We will align our sustainability actions across the entire value chain, including product development, plant operations and the supply chain.

Towards this, we will continually strive to reduce the impact of our Operations, on the environment through sustainable practices and responsible use to resources.

We will be " Distinctly Ahead" in creating the benchmarks for resource conservation, maximising use of renewable energy and pollution prevention, during the complete Product realisation cycle.

Date : 2nd May, 2016

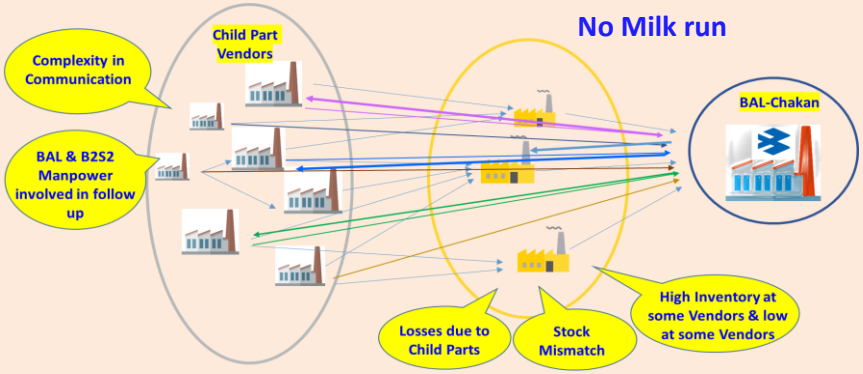
Pradeep Shrivastava
Executive Director

Kaizen Example

Theme : Carbon footprint reduction by reducing material flow transportation

Before

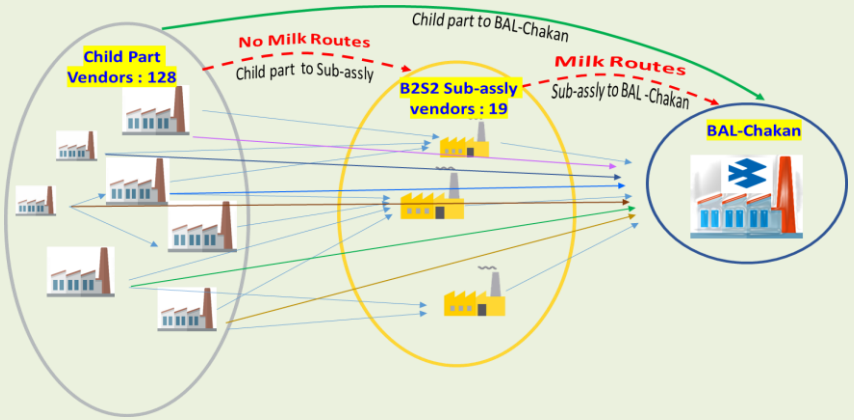
1. Child part Received from @128 vendors processed at @19 B2S2 vendors and delivered to BAL Chakan. Multiple transportation movement
2. Distance travelled **1800 kms/day**



Tool : Milk run

After

1. Child part Received from @63 vendors processed at @9 B2S2 vendors and delivered to BAL Chakan.
2. Distance travelled 400 kms/day



Issues :

Travelling Distance more.

Countermeasure :

Expand Milk run at B2S2 vendor

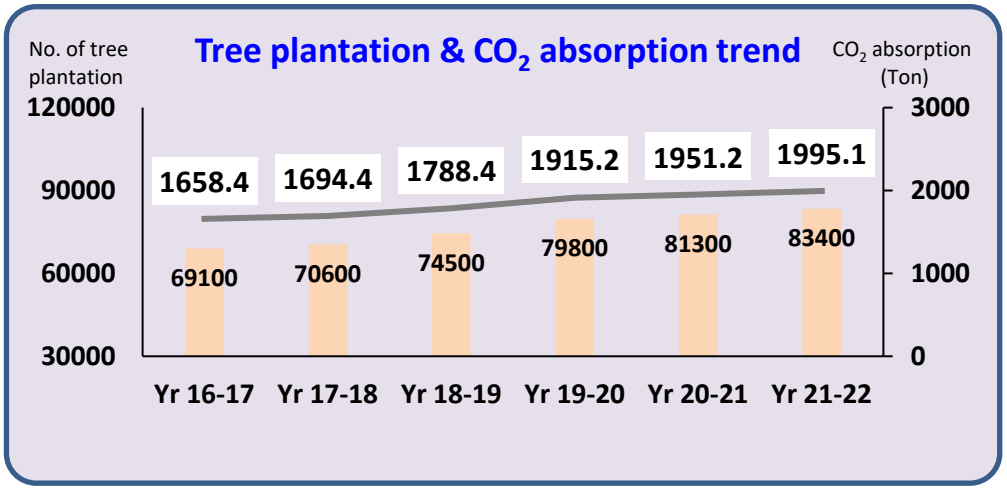
Result

- **Carbon Footprint reduction from 17 tones / month expected to 4 tones/ month.**

Benefits

- Less transportation movement

CO2 Absorption : Tree Plantation



Average Tree CO_2 absorption : 24 Kg/Tree/Year

Tulsi

Peepal

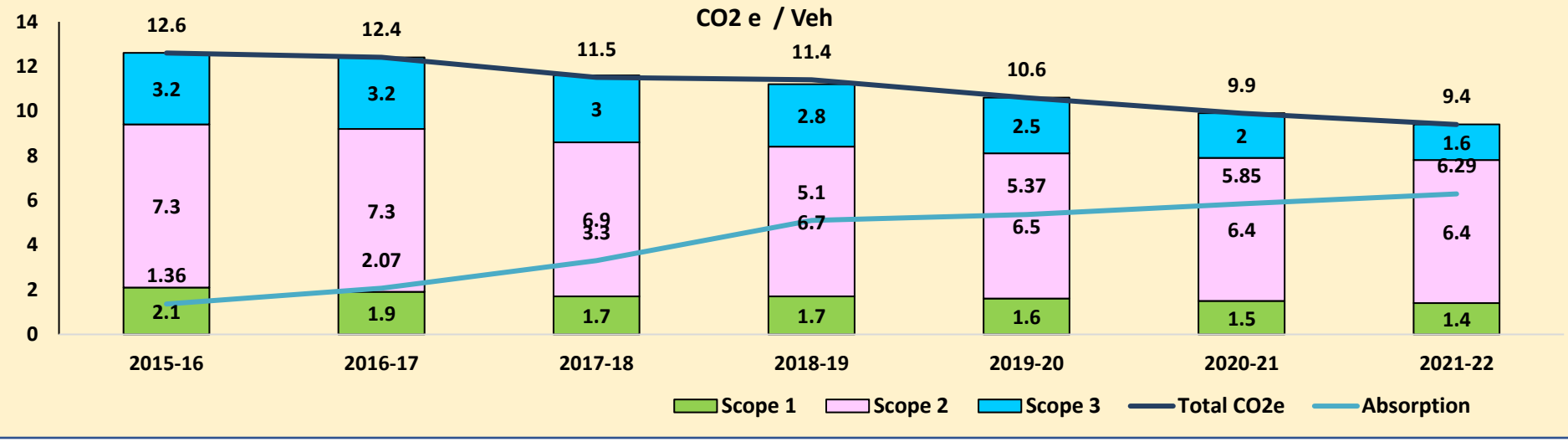
Banyan

Our Focus is on plantation of those trees which are absorbing more CO_2

74 % area is under green cover

More than 83,400 trees planted

Overall Result : Carbon Emission



Methodology - Implementation of ENCON initiatives at Vendor's end

Formation of Vendor TPM Cell → Inputs to Vendor on TPM Philosophy → Handholding on Loss Reduction (16 type of Losses) → Practical Training at Learning Centre - BAL → Help to Identify Improvement Projects → Consultation from Company Experts for Implementation → Sharing of Improvements across the Bajaj Auto Vendor Association → Appreciate the Improvements

Green Purchasing Policy

As per policy, BAL worked with BAVA to develop a road map for green procurement.

The road map specifies targets on environmental parameters such as,

- ISO/OHSAS certification,
- Greenery plantation,
- Reduction in Energy consumption
- Non Conventional Energy
- Reduction in Water Consumption
- Reducing Packaging material
- Hazardous waste management (Zero Discharge)

BAL helps & guides vendors with internal as well as external consultant for improvements in Green Initiatives.
Progress is monitored through Cluster meetings

D V RANGANATH
VP (Materials)

Bajaj Auto Vendors Association

Promoting Renewed Partnership

Green Supply Chain Management

Energy conservation activities at Vendors

- Our Energy consumption has reduced through various initiative within plant
- We have also initiated Energy conservation & optimization activities at our vendor places
- Sharing our best practices to our vendors for improvement through vendor Pillar & BAVA
- Horizontal deployment of Kaizen at vendor end.

List of Kaizens at vendor.

S.n.	Name of vendor	Product / Process	Per unit Energy consumed		% Saving	Inputs / projects provided to the vendor/ associate
			Before	After		
1	Endurance B20 Mahalunge Chakan	Machining Aluminum	8000 KWH/ Day	5800 KWH / Day	28%	Compressed air pipe lines changed used 6 inch line instated of 3 Inch . Use of reservoir at local level.
2	Endurance B20 Mahalunge Chakan	Painting	1200 Units / Day	680 KWH per days	44%	Use of VFD compressor & air booster at paint booth.
3	S.M.Auto Engineering Pvt.Ltd. SMA 310 B	Swing arm/Robotic Cell	30 KWH	17 KWH	57%	Robot servo motor made off when robot is in home position more than 10 Min.
4	M/s FVMT Chakan M/S Varroc, Chakan	Input Shaft thread softening (Pulsar / KTM)	0.0625Kwh/ Component	0.0385 Kwh/ component	38 %	Softening process from Induction heating to Infrared heating
5	Super Auto India Ltd, Pune	HPDC/ Machining	45000 KWH	42500 KWH	5.5%	Solar Installation. For generation of electricity 600KW.(HPDC 4 Machines, VMC-33, CNC36,Leak Testing -11,Assembly -04, Washing Machine-03.)
526	M/s. GB Rubber	Molding	30 KWH	19KWH	37%	Sather insulation sheet used for (m/c 19 ~ 25 jingle. m/c 5 ~ 8 100ton. m/c 27,37 ~ 42. 100-ton bharaj) to avoid heat loss.

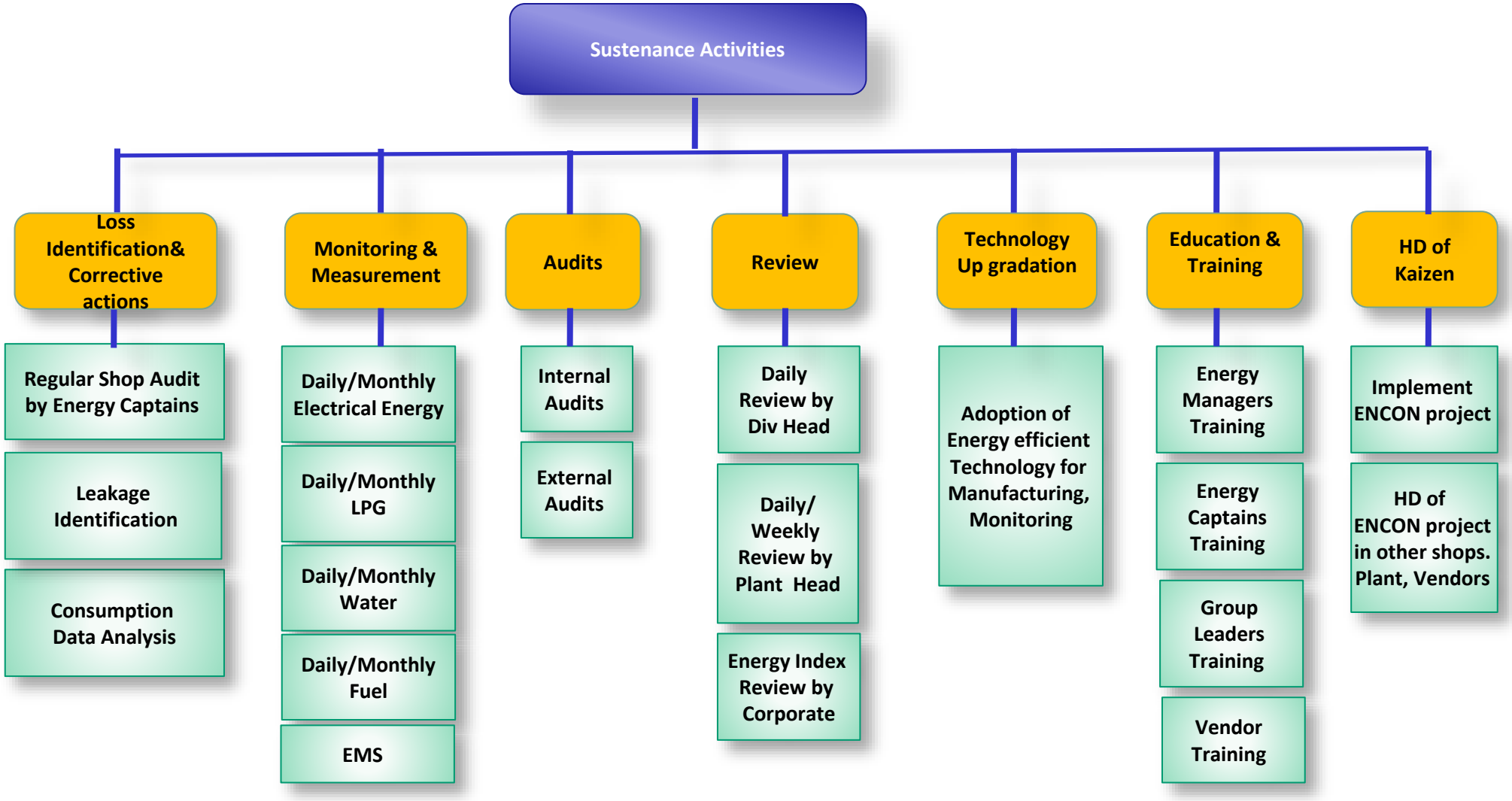
Similar ENCON projects 526 are implemented across 37 Vendors. In last one year .Average % improvement achieved is 23%

Learning from CII energy award

Learning & H.D . Status

Sr. No.	Learning topic	What's different in CII Competition	Scope in our plant	Expected saving Millan KWH / Year	Plan	Status
1	Heat Pump	Its results are more gigger than expectations	Washing machines 24 Nos.	0.64	2 Machines completed.	04 Nos planned in 2022-2023
2	BLDC motors.	It was new concept	Paint shop blowers & pumps.	0.32	12 nos. completed.	6 Nos planned in 2022
3	DC Tools for assembly Lines	Unexpected power consumption	Vehicle & engine assembly lines	0.28	52 Nos installed	12 Nos planned in 2022
4	IE05 motors	Further consumption reduction possible	Pump house , Paint shop, Utility equipment's ,	0.088	Paint shop- Completed for 5 Nos	10 Nos planning in process.
Expected total saving per Year				**1.2 Millan KWH / Year**		

Sustenance


Sustenance Activities
Loss Identification& Corrective actions
Regular Shop Audit by Energy Captains
Leakage Identification
Consumption Data Analysis
Monitoring & Measurement
Daily/Monthly Electrical Energy
Daily/Monthly LPG
Daily/Monthly Water
Daily/Monthly Fuel
EMS
Audits
Internal Audits
External Audits
Review
Daily Review by Div Head
Daily/ Weekly Review by Plant Head
Energy Index Review by Corporate
Technology Up gradation
Adoption of Energy efficient Technology for Manufacturing, Monitoring
Education & Training
Energy Managers Training
Energy Captains Training
Group Leaders Training
Vendor Training
HD of Kaizen
Implement ENCON project
HD of ENCON project in other shops. Plant, Vendors

Rainwater Harvesting

Rain Harvesting : Ground recharge

Sustainable Development

Rain water Pond No. 1

Rain water Pond No 2

Rain water Pond No. 3

Rain water pond capacity 83500 Cub M

Rain Water Harvesting Ponds Capacity

	Pond No. 1	Pond no 2	Pond no 3
Length meters	74	10	25
Width meters	50.25	10	50
Depth meters	22	60	10
Total volume Cu meters	**65000**	6000	12500

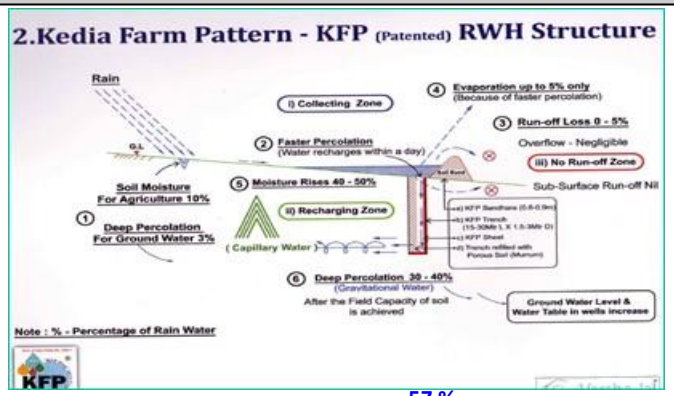
Category	Process + Domestic	Garden	Through Rain water DAM	Through Ground Recharge	
				Qty.	Tgt. date
Water Lacs KL	1.6	0.80	0.83	2.6	Comp.
Total Process + Garden	2.4		3.4		

Annual Consumption	2.4 Lakh Kl

Annual ground Recharge Capacity	1.0 Lakh KL

This water available for Farmers /Society

Ground Water Recharge



We, at Chakan Plant ,giving more to ground through recharging rainwater than we consume

This makes us

WATER POSITIVE

Awards & Accolades

Green Manufacturing awards

EHS

1st Rank winner of the machinist super shop floor & 1st prize in green manufacturing - 2022

EHS

1ST Rank winner of the machinist super shop floor & 1st prize in green manufacturing - 2021

Other awards

Paint Shop

CII- TPM Circle competition Gold award winner – 2021

Aluminum Machine Shop

CII- TPM Circle competition Premium award winner - 2021

Aluminum Machine Shop

CII- Jury Champion award – Winner Champion of champions 2021

Paint Shop

CII- Jury Challenger award winner in Challenger Trophy - 2022

Vehicle Assembly

CII- Super Challenger award winner in Challenger Trophy - 2022

Steel Machine Shop

Gold medal award in productivity improvement & case study manufacturing - 2022

Conserve for Today…
Preserve for Tomorrow….
Reserve for future Generation….Also
Reduce + Reuse + Recycle Renewable

Thanks !!!