Honda Motorcycle and Scooter India Pvt Ltd, Narsapura

CII National Award for Excellence in Energy Management 2023

BLUE SKIES FOR OUR CHILDREN

Presented by

1. A Joseph Selvaraj - Div. Head - Plant Engineering
2. Yogesh Agrawal - Dept. Head - Utility
3. Sriram Karikkat - Sect. Head – Environment
4. Kishore N - Team Leader - Environment

HMSI 3F

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Honda Motorcycle and Scooter India-At a Glance

HONDA MOTOR COMPANY, GLOBAL OPERATIONS

Mr. Soichiro Honda
(1906 – 1992)

Honda Motor Co Was Founded In 1948

Honda operates in 150 countries
Total 406 group companies globally

PRODUCTS AND PORTFOLIO

Automobiles

Motorcycles

Power Products

Marine Engines

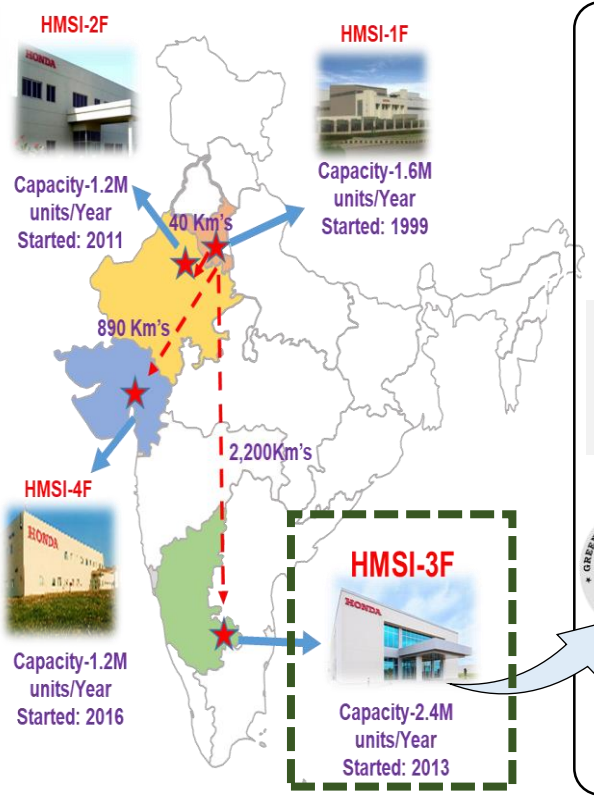
Robotics

Honda jet

Aero Engine

HONDA MOTORCYCLE AND SCOOTER INDIA

Total 4 Factories in India
Capacity 5.5 mil units/year
Associates 24,000 people
Activa Sales 1.7 mil Units/year



Land Area	: 4,81,757 m²
Built up Area	: 2,65,706 m²
Manpower	: 7041
Capacity	: **2.4 Million**
Models	: Activa, SP125, Shine SP, Livo, Dio

- **Won GreenCo Platinum Plus Rating in 2021**
- Won National Water Award from Ministry of Jal Shakti 2019
- Won CII National Award for Environmental Best Practices in 2018, 2019, 2020 and 2021.

Honda Narsapura is located in Kolar, Karnataka.
It is Honda's largest factory globally with a capacity of 2.4 Million vehicles per year

Honda's Commitment for Environment Excellence

Mr. Soichiro Honda
(Founder)

Serve people worldwide with the "joy of expanding their life's potential"

1948 Honda was founded

Honda actively endeavoured to solve Environment problems 1960

World's 1st Automaker to comply with U.S. Clean Air Act

THE Clean Air Act 1970

Released our First Honda Environment Statement 1992

New Honda Environmental Logo
Blue Skies for Our Children 2010

Mr. Toshihiro Mibe
(President & CEO)
2020

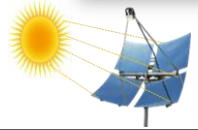
Formulated the Vision as an ideal image of what Honda wants to be

Honda Vision

Water

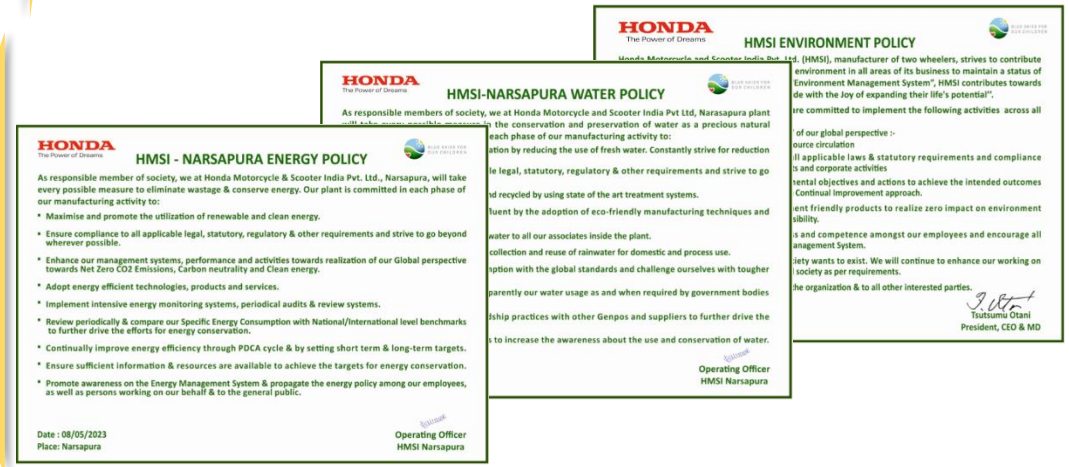
Rain water harvesting & Reuse

Energy



Waste

Co-processing



The Triple Action to Zero propels our Environment initiatives at every stage of lifecycle so as to achieve a liveable & sustainable society

Key policy highlights

Use of renewable energy

PDCA Approach

HONDA
The Power of Dreams

HMSI - NARSAPURA ENERGY POLICY

As responsible member of society, we at Honda Motorcycle & Scooter India Pvt. Ltd., Narsapura, will take every possible measure to eliminate wastage & conserve energy. Our plant is committed in each phase of our manufacturing activity to:

- Maximise and promote the utilization of renewable and clean energy.
- Ensure compliance to all applicable legal, statutory, regulatory & other requirements and strive to go beyond wherever possible.
- Enhance our management systems, performance and activities towards realization of our Global perspective towards Net Zero CO_2 Emissions, Carbon neutrality and Clean energy.
- Adopt energy efficient technologies, products and services.
- Implement intensive energy monitoring systems, periodical audits & review systems.
- Review periodically & compare our Specific Energy Consumption with National/International level benchmarks to further drive the efforts for energy conservation.
- Continually improve energy efficiency through PDCA cycle & by setting short term & long-term targets.
- Ensure sufficient information & resources are available to achieve the targets for energy conservation.
- Promote awareness on the Energy Management System & propagate the energy policy among our employees, as well as persons working on our behalf & to the general public.

Date : 08/05/2023
Place: Narsapura

Operating Officer
HMSI Narsapura

Use of Energy saving equipment's

Use of monitoring systems

PDCA & bench marking is an integral part of our energy policy

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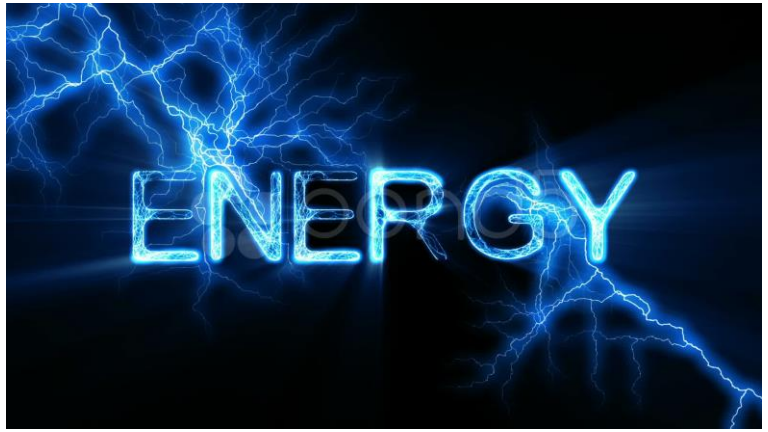
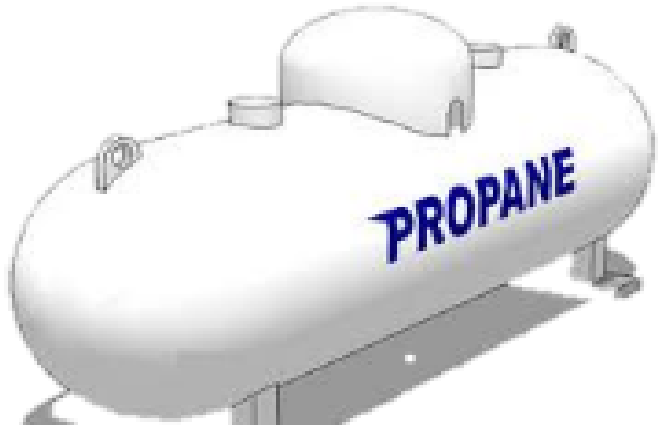
Energy Resources being used in HMSI Narsapura

Energy Scenario in HMSI

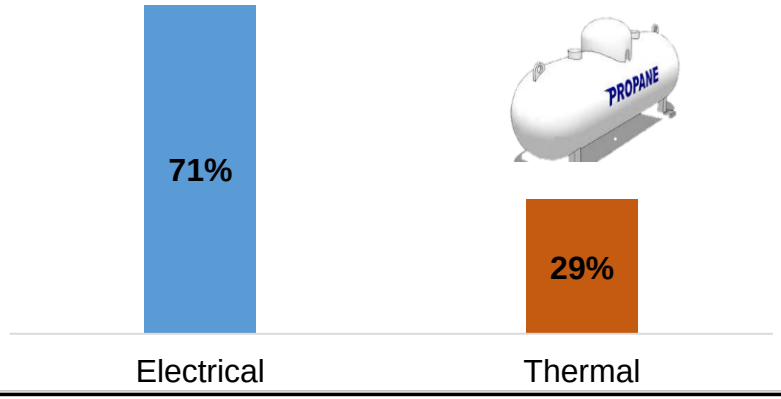


Electrical Energy Scenario

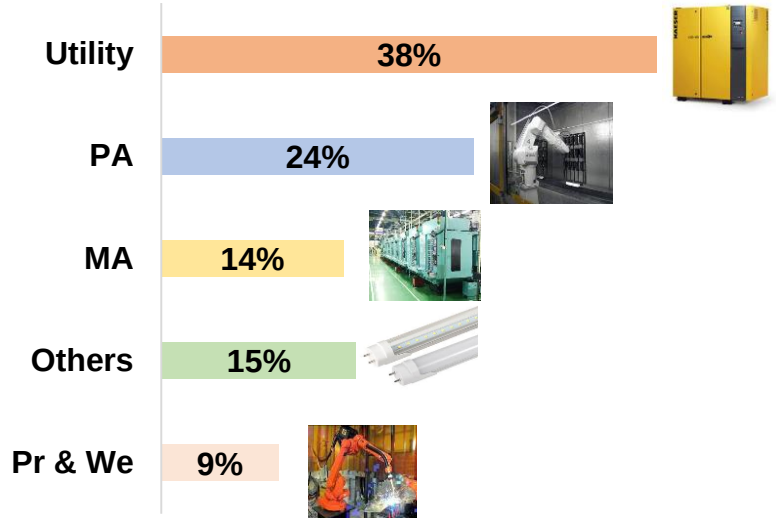
Thermal Energy Scenario



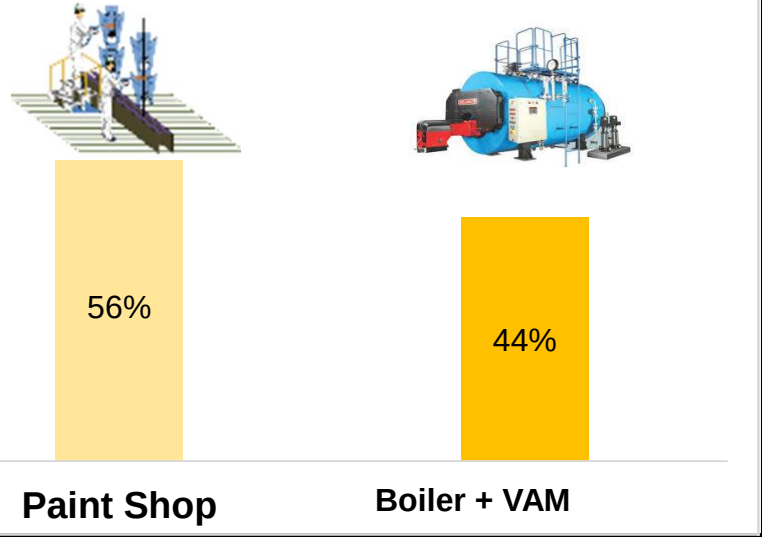
Total Energy usage pattern



Electrical Energy usage pattern

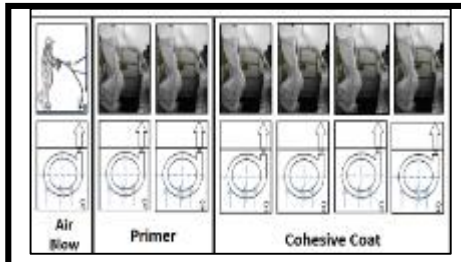


Thermal Energy Usage pattern



Electricity and propane gas are the major source of energy for our factory

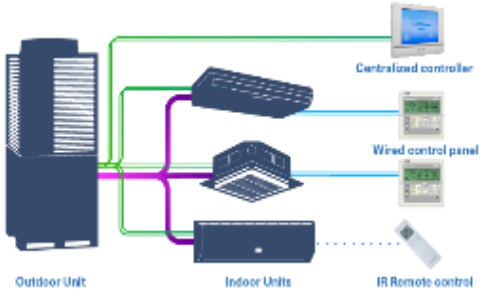
Specific energy consumption-Electricity



Cohesive Painting Technology

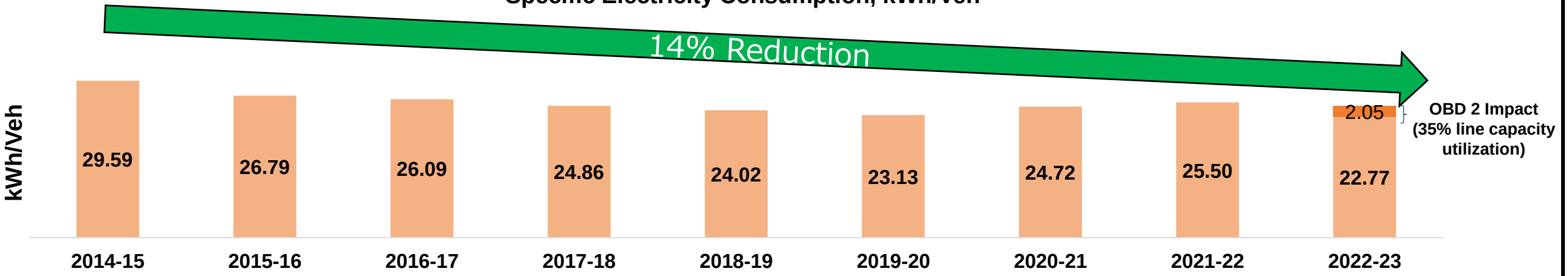
Compressor Heat Recovery for Vaporizer

VAM for Paint Shop



AC BMS

Specific Electricity Consumption, kWh/Veh



Energy Efficiency projects

VFD for major load

EMS system

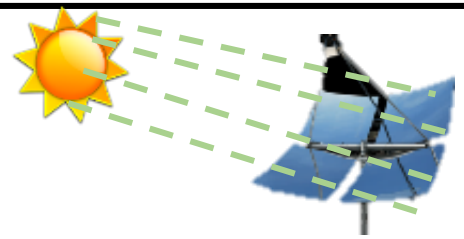
energy Kaizen

Specific Electrical consumption is in reducing trend. Last Three-Year Reduction 7.88%

Specific energy consumption-Thermal

VAM for Paint Shop

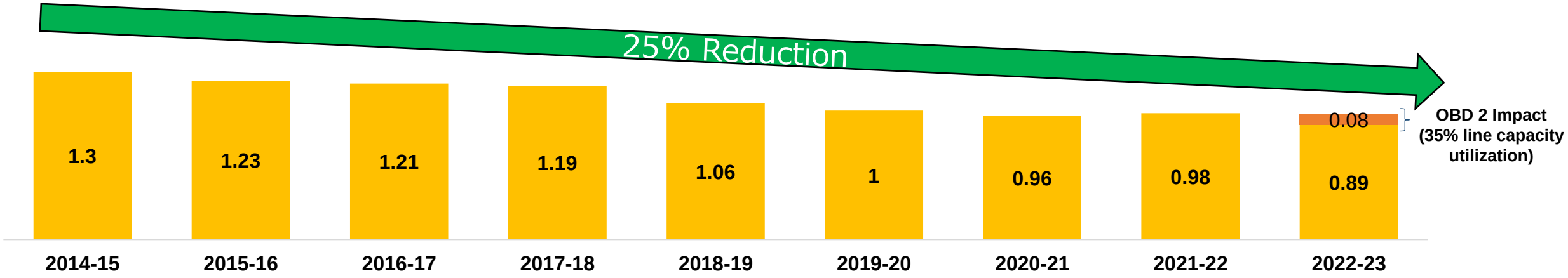
Magnetic Resonator



Solar Dishes

LNG

Specific Thermal Energy Consumption, Kg/Veh



Compressor heat recovery for hot water generation

WHE

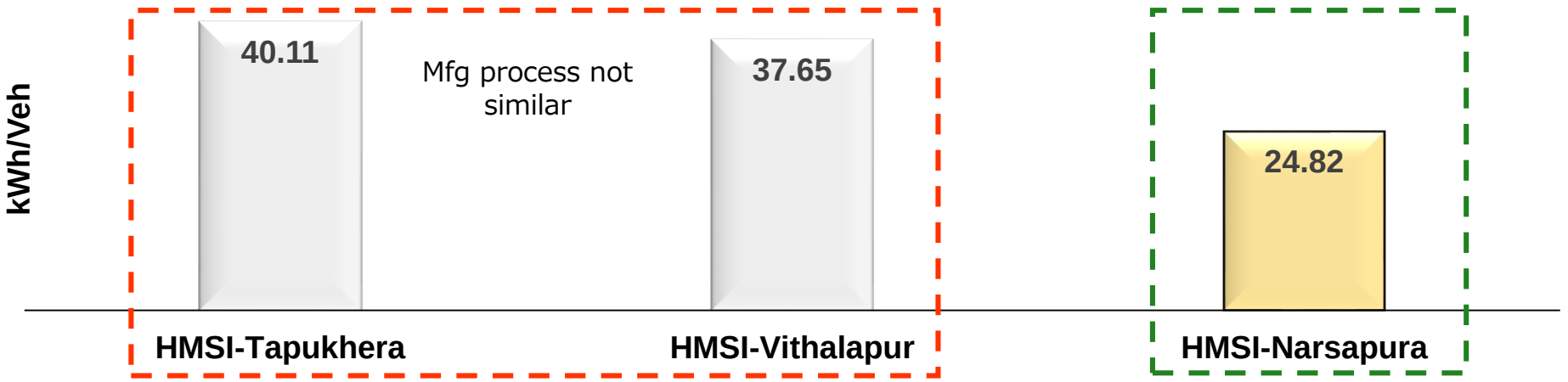
OPTIMIZATION OF MEE & ETP

Hot Water Generator

Specific propane consumption is in reducing trend. Last Three-Year Reduction 7.29%

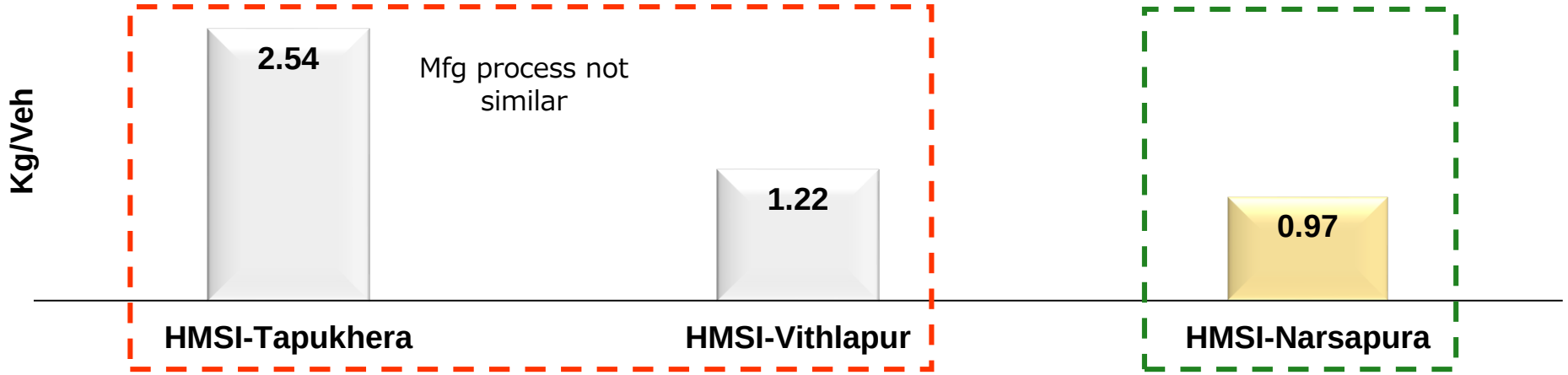
Specific Energy consumption-Internal Benchmarking

Internal Benchmarking – Specific Electrical Energy Consumption



52% Less than the nearest factory

Internal Benchmarking – Specific Thermal Energy Consumption

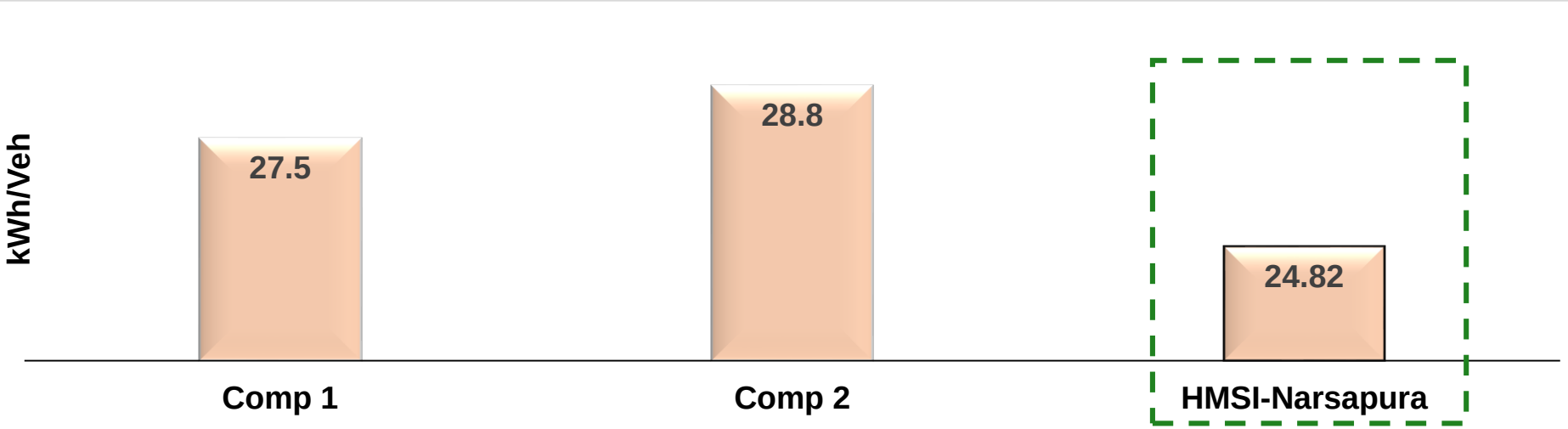


21% Less than the nearest factory

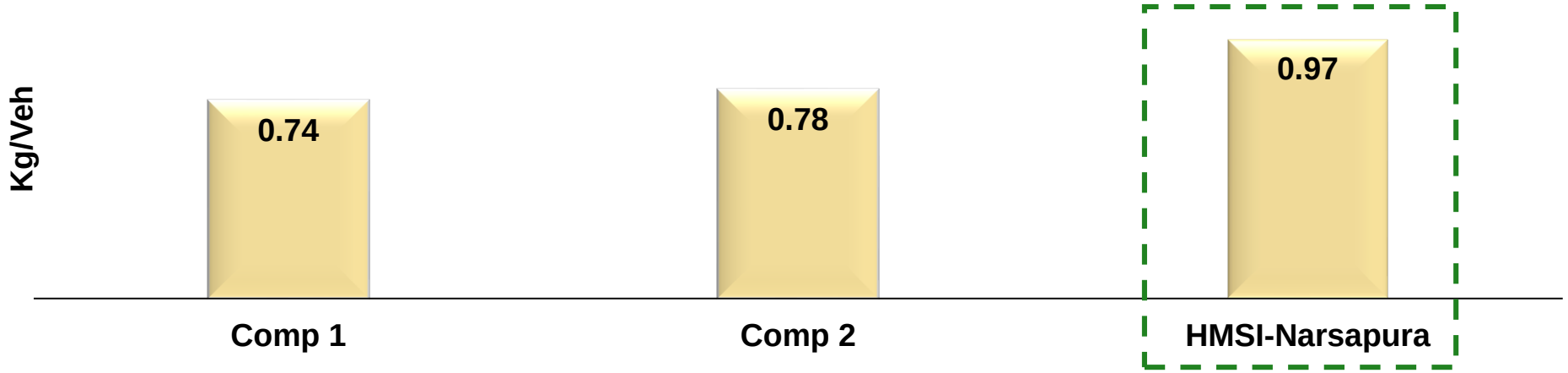
We are benchmark with respect to all the factories of Honda in India

Specific Energy consumption-National Benchmarking

National Benchmarking – Specific Electrical Energy Consumption



National Benchmarking – Specific Thermal Energy Consumption



Our target

Understand the best practises in other factories and strive to be the national bench mark

- No Standard Benchmarks are available for Automobile sector. These are collected from various presentations.

We are striving towards being the national benchmark in both Electrical and Thermal Energy Consumption

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ENCON Projects Without Investment

S. No.	Parameter	Projects implemented	Environmental benefits		Total Investment made (Rs. In lakhs)	Monetary Benefits (in lakhs)	Intangible benefits
			Savings in	Quantity			
1	RE	Third party solar power procurement	Renewable energy, kWh	44000000	0	1078	Through third party solar power procurement by wheeling, power requirement is met 24 x 7 irrespective of seasonal variation as state grid back up is always available.
			GHG emission, tons CO2	35772			
2	EE	Propane saving through heat free treatment technology	Thermal energy, Mill Kcal	290	0	144	Reduced water, energy and equipment efficiency losses in heating process. Insulation from market fluctuations in prices of propane
			GHG emission, tons CO2	724			
3	EE	Energy saving through Cohesive painting technology	Electrical energy, kWh	1973000	0	123	Reduction in VOC emission
			GHG emission, tons CO2	1605			
4	EE	Boiler Pressure reduction from 6 bar to 4 bar	Thermal energy, Mill Kcal	645.3	0	24	Safety improvement with regard to handling of highly dangerous steam
			GHG emission, tons CO2	1611			
5	EE	AHU Frequency Optimization	Electrical Energy, kWh	600000	0	40	Reduced wear and tear in motors and reduced Preventive Maintenance
			GHG emission, tons CO2	436			
6	EE	ACED Pumps & Fans Auto Sequence ON/OFF Operation During empty Mode	Electrical Energy, kWh	3225	0	2.3	Reduced wear and tear in motors and reduced Preventive Maintenance
			GHG emission, tons CO2	2.3			
7	EE	Elimination of Induction Hardening process	Electrical Energy, kWh	2376000	0	159	Reduction in downtime and Repair and Maintenance leading to production loss. Safety risk associated with heating machines has been reduced.
			GHG emission, tons CO2	1725			
8	EE	Elimination of Zero B Welding	Electrical Energy, kWh	934615	0	60	Reduction in space and manpower requirements, reduction in quality issues due to welding, hazard reduction
			GHG emission, tons CO2	698			
9	EE	Energy regeneration from Servo motors	Electrical Energy, kWh	72900	0	5	Increase in energy recovery and utilization of regenerated energy
			GHG emission, tons CO2	54.4			
10	RE	Third Party Wind Power Procurement	Renewable Energy, kWh	650000	0	5.42	Third Party wind power procured during the monsoon season to compensate the Solar power loss
			GHG Emissions, tons CO2	485.55			
11	EE	Third Party BEE Certified Energy audit conducted	Electrical Energy, kWh	1339000	0	92.98	Third Party Energy Audit conducted to check all the high energy intensive equipment efficiency and found out all the equipment are above par
			GHG Emissions, ton CO2	966.76			
Total			**Electrical Energy, kWh**	**51948740**	**0**	**1734.4**	
			GHG Emissions, tons CO2	**44080.01**			

Without Investment, 519.48 Lakh kWh, 44080.01 MT of CO2 and Monetary Savings of 1734.4 Lakhs/Annum have been achieved.

ENCON Projects With Investment

S. No.	Parameter	Projects implemented	Environmental benefits		Total Investment made (Rs. In lakhs)	Monetary Benefits in lakhs	Intangible benefits
			Savings in	Quantity			
1	RE	Installation of solar roof top panels of capacity 7MW	Renewable energy, kWh	8800000	2870	580	Dependency on external agency for power supply reduced
			GHG emission, tons CO2	8330			
2	RE	Installation of 2.5 MW Solar Roof Top Expansion	Renewable energy, kWh	2940000	1108	269	
			GHG emission, tons CO2	2123			
3	RE	Installation of 2.7 MW Wind turbine	Renewable Energy, kWh	7500000	1920	484	
			GHG emission, tons CO2	5415			
4	RE	Installation of 5.4 MW Wind turbine	Renewable energy, kWh	15000000	4140	920	
			GHG emission, tons CO2	10830			
5	EE	Interconnection of compressors through integration of three compressor houses	Electrical energy, kWh	1100000	12.39	72	Compressed air requirement for the entire factory has been optimized by reducing the air pressure
			GHG emission, tons CO2	924			
6	EE	VAM for Paint Shop	Electrical energy, kWh	1181250	490	163	VAM can result in reduction of usage of ODS and GHG Potential Refrigerants currently used in chillers. Further, handling of steam has been eliminated thus addressing safety risks
			Thermal energy, Mill Kcal	2936			
			GHG Emissions, tons CO2	1591			
7	EE	Energy Efficient Direct Coupled Motors	Electrical energy, kWh	3500000	55.23	16.70	Energy efficient technology and Less Maintenance required
			GHG Emissions, tons CO2	253			
8	EE	Replacement of Electric Heaters with hot water	Electrical energy, kWh	2470000	50.14	14.67	Quality improvement in machine shop process and reduction in market complaints of the product
			GHG Emissions, tons CO2	179			
9	EE	Hot Water Generator for Paint Shop	Thermal Energy, Mill Kcal	923	45.6	25.5	
			GHG Emissions, tons CO2	201			
10	EE	Air Dryer Optimization	Electrical energy, kWh	970000	28	65	
			GHG Emissions, tons CO2	725			
11	EE	PT Short process for ABS Parts	Electrical energy, kWh	200000	28	29.6	With the implementation of PT short process, 720 KL/Annum of Water reduction can also be achieved.
			Thermal Energy, Mill Kcal	184.16			
12	EE	Implementation of Auto Booth air balancing concept for two coat to monocoat	Electrical energy, kWh	870000	181.4	55.9	
			GHG Emissions, tons CO2	632			
Total			**Electrical energy, kWh**	**45871292**	**11122.52**	**2933.35**	
			GHG Emissions, tons CO2	**33272.39**			

With Investment, 458.71 Lakh kWh, 33272.39 MT of CO2 reduction and annual savings of Rs. 2933.35 Lakhs has been achieved

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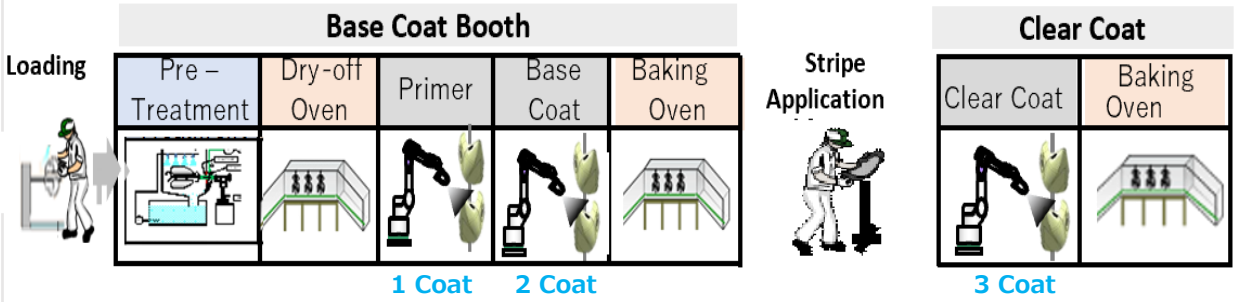
Innovative Project 01: Development of High Gloss Paint

In Paint shop, Paint booths are used for painting application.
All paint booths in 3F are designed with 3 Zone (Primer + Base Coat + Topcoat)
Development of new paint technology for reducing the process manufacturing cost , In-process defects & reduction in VOC matching to the HES quality standards

Background

Base Coat +Over Coat Clear

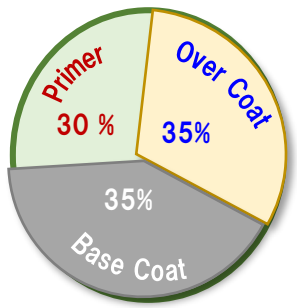


- Base + Clear coat for achieving required quality.

Parameters

Sl.No	Parameters	Test Method	Requirement
1	**Thermal Energy**	-	**< 130 Kg / Day**
2	Gloss	Gloss Meter	> 90 Units
3	Hardness	Wear Resistance	< 25 mg

Current Painting status



Situation Analysis

FRAME PAINTING

BEFORE: CED (Grey) + Paint (Black)

AFTER: ACED (Black)

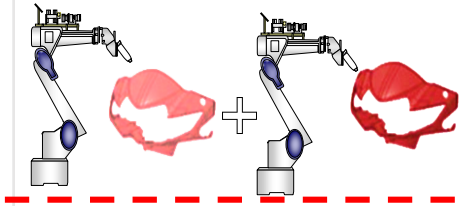
BENEFITS

ENERGY SAVING

23,42,765 kWh / Annum

ABS / SPC PAINTING

BEFORE: Base Coat + Clear Coat



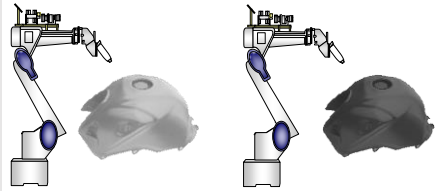
AFTER: Monocoat Metallic

CO_2 REDUCTION

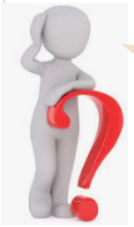
1692 MT / Annum

TANK PAINTING

BEFORE: Base Coat + Over Clear Coat



AFTER:



How Can we reduce the current Process??

Expected Benefits:

ENERGY SAVING

CO_2 REDUCTION

MONEY SAVING

QUALITY GUARANTEE

The challenge is to reduce the energy consumption during tank painting . A New Creative & Innovative / Unique technology is required to achieve Single coat Tank painting process.

Idea Generation

Brainstorming for idea generation

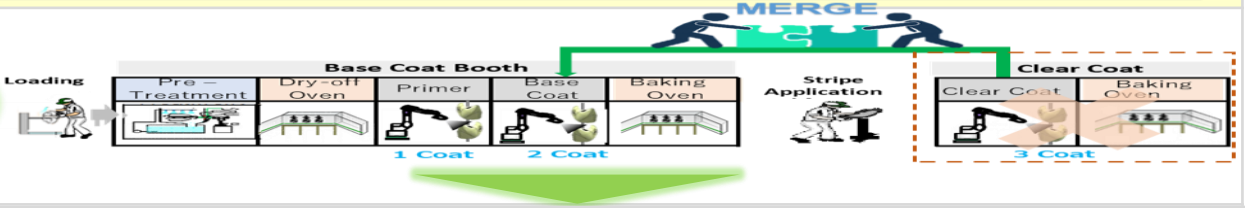
Ingredient X + Ingredient Y + Ingredient Z

Mix XYZ

Idea is to Process Commonization as ABS & Eliminate Clear Coat after Stripe Application

[Concept]
Mixing
Base coat
+
Clear Coat

Proposal – High Gloss Block



Trial and Verification

Plan

Step 01 - Mixing

Item	Before	Status
Pigment	Carbon black	
Resin	Epoxy	●
	Polyester	●
	Melamine	●

Step 02 – Flow and Levelling additive addition

Item	Before	After	Status
Pigment	Carbon black	Carbon black	
Resin	Epoxy	Acrylic Resin B	●
	Polyester	Polyester	●
	Melamine	Melamine	●

Step 03 – Combination Change

Item	Before	After	Status
Pigment	Carbon black	Carbon black	
Resin	Epoxy	Acrylic Resin B	●
	Polyester	Acrylic Resin A	●
	Melamine	Melamine	●

Step 04 – Material Change

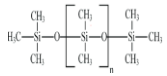
Item	Before	After	Status
Pigment	Carbon black	Carbon black	
Resin	Epoxy	Acrylic Resin B	●
	Polyester	Acrylic Resin A	●
	Melamine	Melamine	●
		UV Additives	●

DO

Base Coat + Over Coat

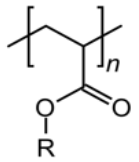
Regular Base Coat Paint + **Clear Coat**

Surface Levelling



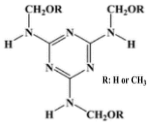
Replace Epoxy Resin → Acrylic Resin B

Gloss Enhancement



Polyester → Acrylic Resin A

Hardness Improve



Melamine → Melamine + UV Additives

Check

	Step 01 - Mixing	Step 02 – Flow and Levelling additive addition	Step 03 – Combination Change	Step 04 – Material Change
Roughness:	Roughness = 5 STD > 5 — NG	Roughness — OK	Roughness = 6.2 STD > 5 — OK	Roughness = 6.2 STD > 5 — OK
Gloss Level:	20°=72 GU STD > 80 GU — NG	20°=72 GU STD > 80 GU — NG	20°=91 GU STD > 80 GU — OK	20°=91 GU STD > 80 GU — OK
Hardness:	'F' Fail STD ='F' PASS — NG	'F' Fail STD ='F' PASS — NG	'F' Fail STD ='F' PASS — NG	'H' Passes STD ='F' PASS — OK

Gap & Action

High energy consumption in Clear Coat and Bake Oven – **450 kWh/Day and 45 Kg/Day**

Appearance to be developed

All Parameters Achieved

Eliminate the use of Clear Coat and oven in turn reducing energy consumption

4 No. of clear coat robots in ABS line, 4 No. of Exhaust fans switched off.

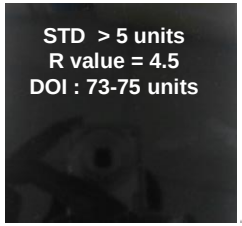
Energy reduction has been achieved by eliminating usage of Bake oven after Clear Coat Process

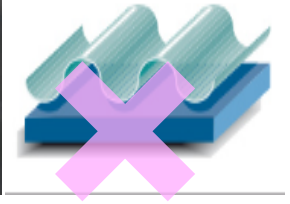
Innovative Project 01: Development of High Gloss Paint

Problem Point

① Surface Levelling NG

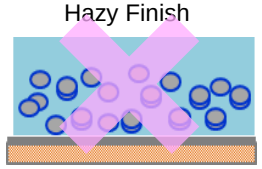
Uneven surface



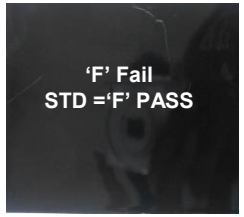


② Gloss NG

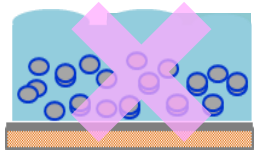
Hazy Finish



③ Pencil Hardness NG

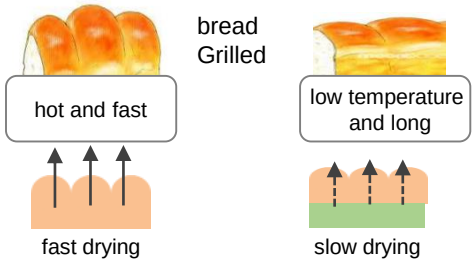


Damaged surface

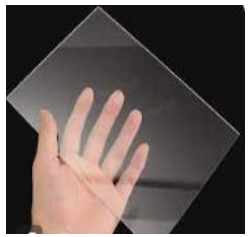


Core Idea

Dry slowly over time



Polyester



Acrylic

HMSI Tapping Over Coat

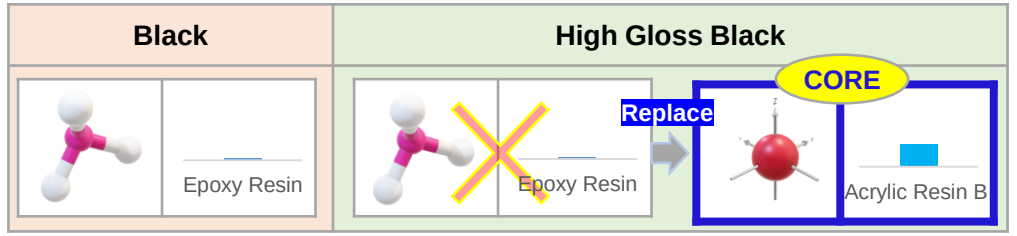
GLOSS	85
LW	26
SW	19
DOI	86
R	4.7

Japan & Thai UV Over Coat

GLOSS	90
LW	7
SW	15
DOI	96
R	6.2

Core technology

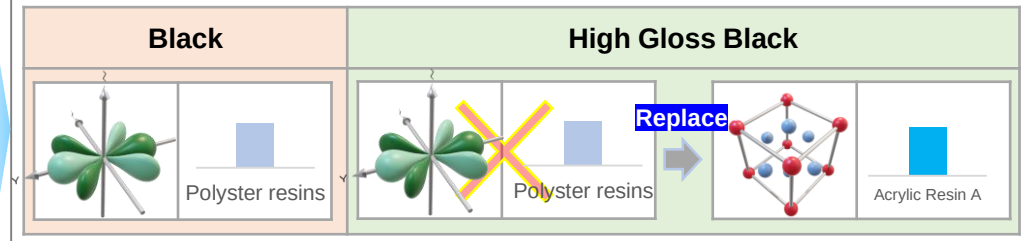
〈 Flow & Levelling Additive addition〉



Even surface

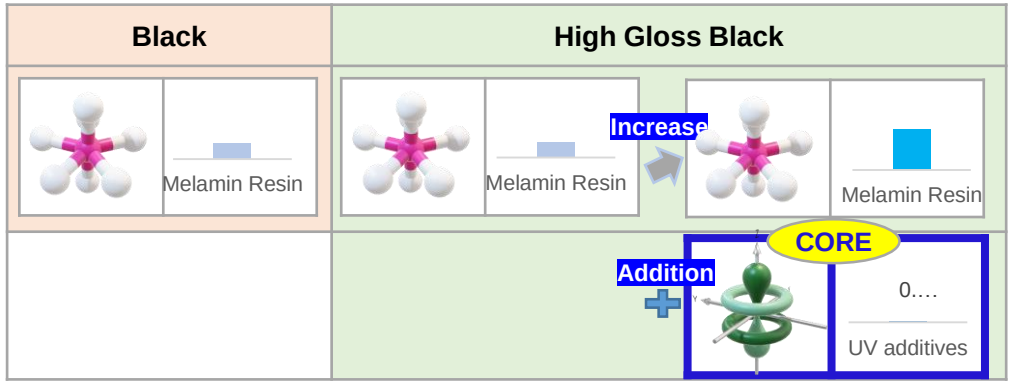
STD > 5 units
R value = 6
DOI : 80-84 units

〈 New Resin System with UV additives〉



Glossy Finish

20°= 91 GU
STD > 80 GU



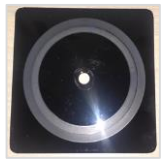
Hardness

'H' Pass
STD ='F' PASS

By changing the chemical property of Paint by Crosslinking with melamine Resin-A, levelling additives & adding of UV additives; new technology-based High Gloss Paint was developed.

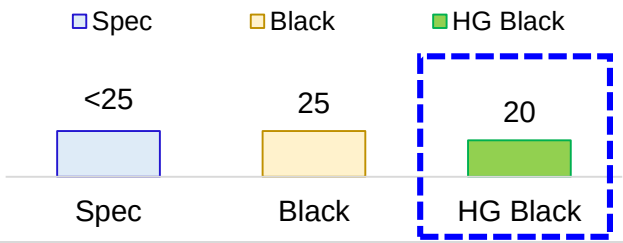
Quality Verification

Quality Test 01 - Wear Resistance Test

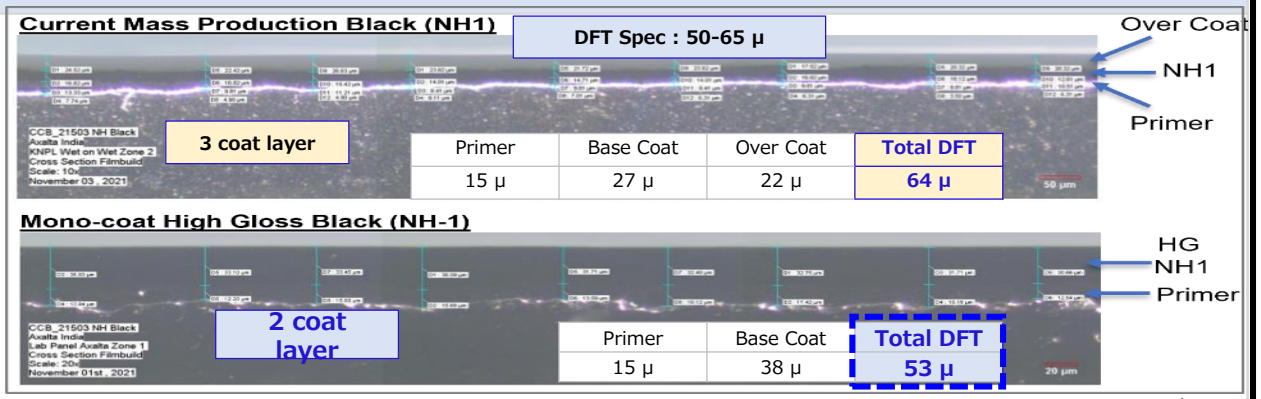


Test Condition:
- 1000 times rubs
- CS – 10 Disc
- 500 gm Load

Black HG Black



Quality Test 02 – Layer wise DFT Comparison



DFT > 50 µ achieved with 2 coat layer (Primer + High gloss Black)

Quality Test 03 – Endurance Test

Vehicle Riding Test

14 Days x
15 km
=> 210 km

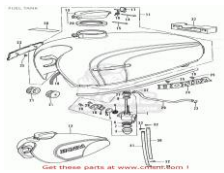
Management Approval

CPO San Approval ☑

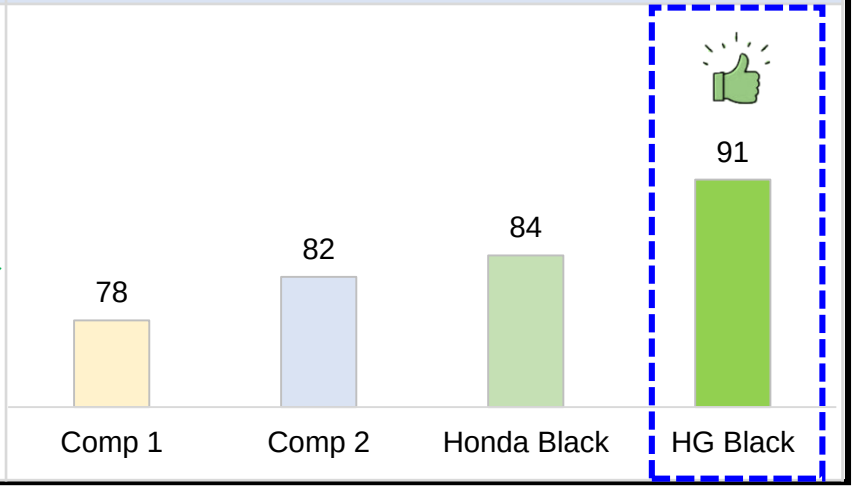
CQO San Approval ☑

Honda R & D Approval ☑

Drawing Approval - AMO ☑



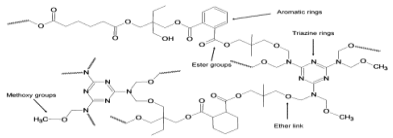
Market Comparison for Gloss Level



Overall Quality Testing confirmed for future sustenance &
Energy reduction also achieved through elimination of clear coat and oven process

Innovative Project 01: Development of High Gloss Paint

Before: Current Paint Composition



Lower Crosslink Density

NH1	
Polyester resin	27%
Epoxy resin	1.3%
Melamine Resin	11%
Carbon Black	1%

Process Time (Hrs)	3.5 Hrs
Thinner Intake	30-60 %
DFT µ	60-70 µ

Process

Clear Coat

Acrylic Polymers → Gloss Finish

Over Coat
Base Coat
Primer
Substrate

Base Coat

Carbon Black Pigments + Polyester resins → Black color

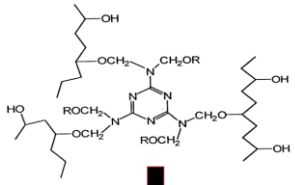
Base Coat
Primer
Substrate

Primer

Polyethylene (plastic) → Corrosive Resistant

Primer
Substrate

After:



Higher Crosslink Density

High Gloss NH1	
Acrylic Resin A	23%
Acrylic Resin B	7%
Melamine Resin	25%
Carbon Black	1.5%
UV Additive	0.8%

Process Time (Hrs)	2 Hrs
Thinner Intake	20-40 %
DFT µ	50-60 µ

Process

Base Coat + Clear Coat

Carbon Black Pigments + Melamine Resins (New) + Acrylic Resin (New) + UV absorber (New) → Gloss Finish + Black Color

Over Coat + Base Coat (New)
Primer
Substrate

Primer

Polyethylene (plastic) → Corrosive Resistant

Primer
Substrate

Benefits

CO_2

39 MT Per Annum

VOC

27 g/m2 of VOC reduction

MONEY SAVING

10.63 Mill / Annum

INVESTMENT

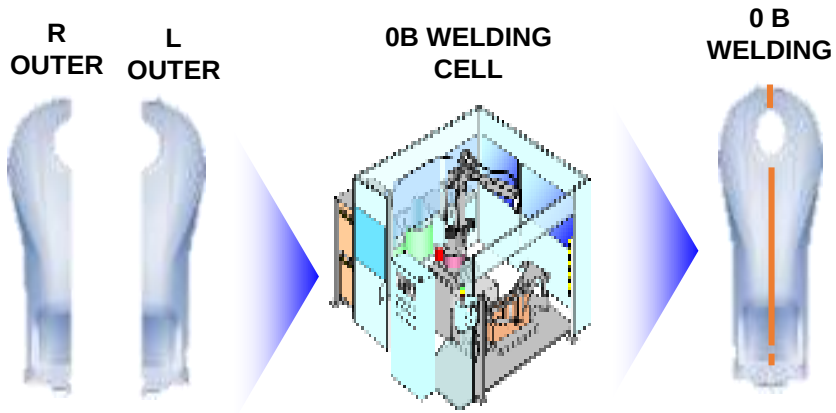
ZERO INVESTMENT

Process time has reduced by 1.5 Hrs resulting in energy reduction and VOC emission reduction through reduction in thinner intake

Innovative Project 02: New Zero B Welding

In two wheeler manufacturing welding process is very important.
Welding is basically done for frame body, fuel tank and front fender.
Zero B welding is used to join two parts of front fender.

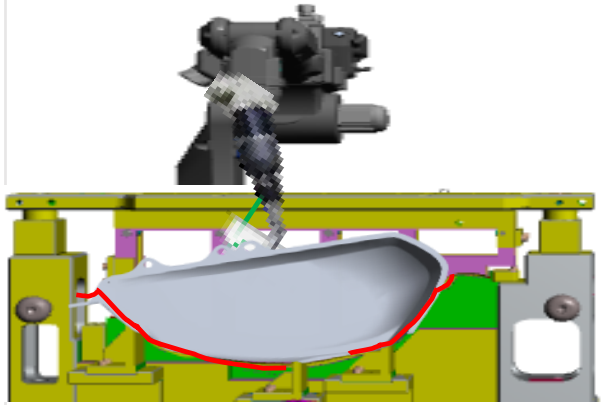
Process Explanation:

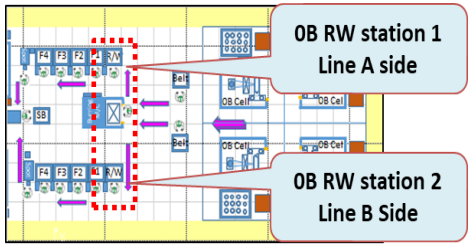


Process Classification

Process – **A Rank**
Appearance – **A class**
Skill required – **Semi skill** (*part handling*)
High skill - (*Robot teaching*)

Welding Methodology:

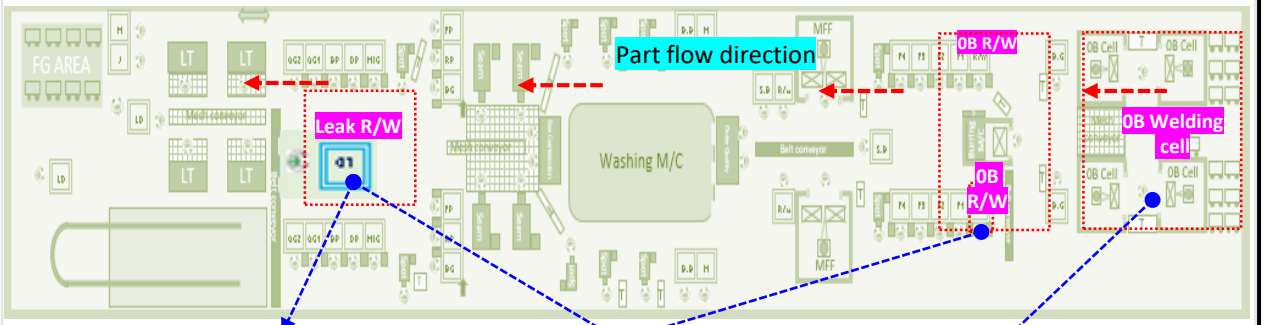




- R Outer & L Outer parts loaded on to Jig.
- 0B jig fixed on Jig holder (No Jig movement with respect to robot movement while welding)
- Robot will do the welding at different angle and orientation.

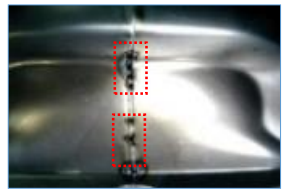
Challenges:

Fuel Tank weld Shop Layout



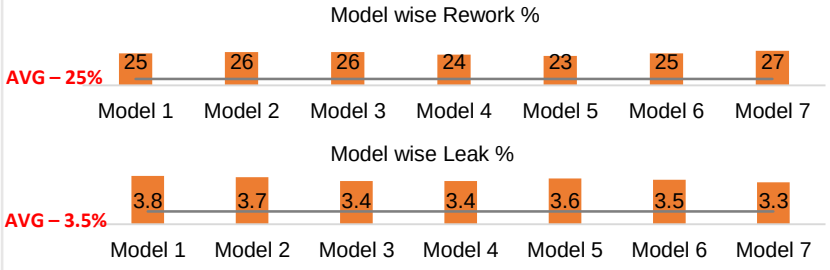
0B Rejection % High

0B Welding & leak rework High



0B welding Burn hole High

Higher Energy Consumption – **2330 kWh/Day Approx.**



Target- 5%

Target- 1%

How to reduce Rework and Leak %

On an average – 25% rework gets generated in old 0'B welding process resulting in higher energy consumption due to rework stations

Need for 0B Welding Modification

- Zero B welding required to join R Upper and L Upper part of front fender and Fuel Tank.
- To eliminate rework after Zero B Welding due to Welding burn hole.
- To eliminate leaks after Zero B Welding.
- To eliminate rejections after Zero B Welding.

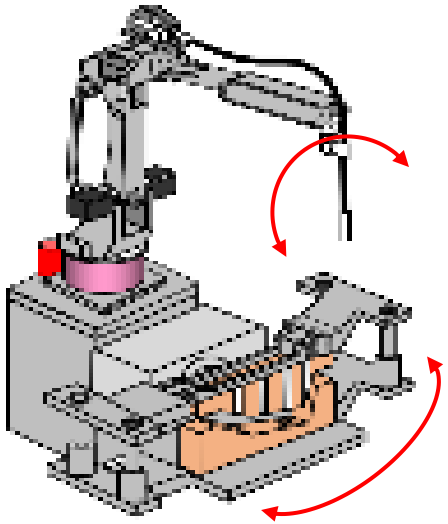
Idea Generation

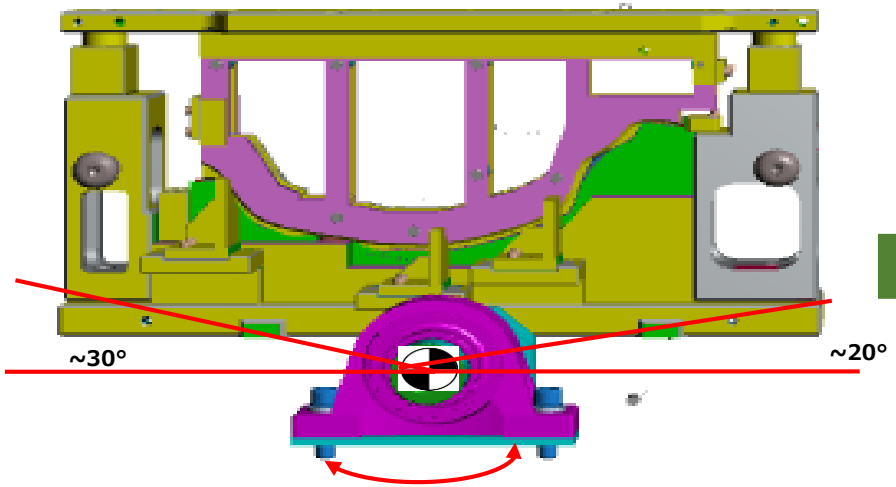
Idea Validation

Idea	Pros	Cons	Judge
Can we make the process manual?	Issues of rework due to robotic welding can be reduced	Manual Welding is time consuming and resource intensive. Manual quality issues arise	X
Can we outsource the process?		Outsourcing the process may affect the quality of the part produced	X
Can we modify the design of the part?	Quality issues can be avoided	Design change is not approved due to it will impact on the sales of the vehicle.	X
Can we modify jig into movable?	By modifying the jig, it is possible to reduce rejections, 0B welding burn holes and also to **reduce energy consumption by reducing rework**	NA	O

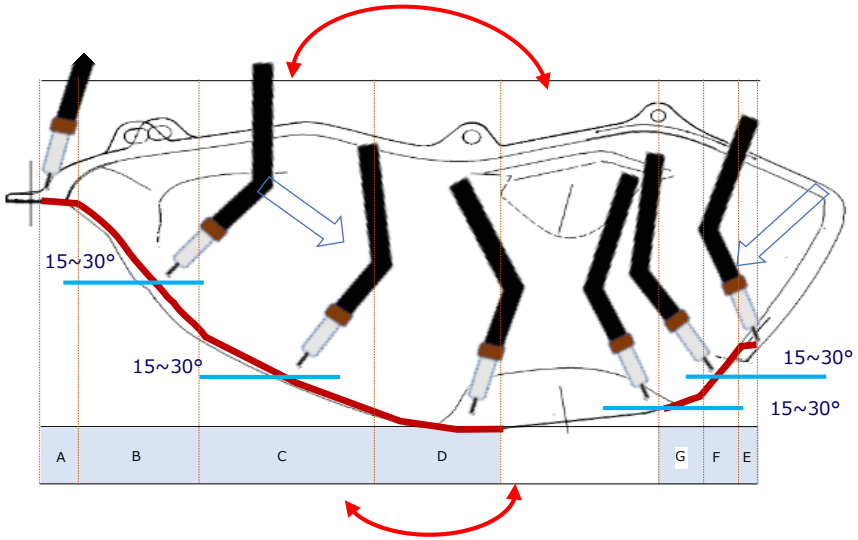
NEW 0'B welding concept, Rotating jig can be implemented with 15~20° jig rotation integrated with robot.

Proposed Idea (Jig modification – Rotating Jig)





Integrated rotation of 0'B jig



Modified Process

Welding methodology:-

- Jig will rotate on Positioner to get defined orientation with 0.01mm accuracy from 0 °to 30°
- Robot will synchronize with jig orientation & welding will be done. (**Horizontal welding).**
- During Jig rotation, all vertical welding will be converted into horizontal welding and welding repeatability will be achieved. **Resulting in elimination of One rework station.**

Parameter	Before	After
No. of Rework Stations	02	01
Energy Consumption, kWh/ day	2330	1165
No. of Manpower	08	02
CO2 Emissions in MT / Annum	436	218

Benefits

3,02,900 kWh of electricity

88 Lakhs / Annum

218.69 Metric Tons / Annum

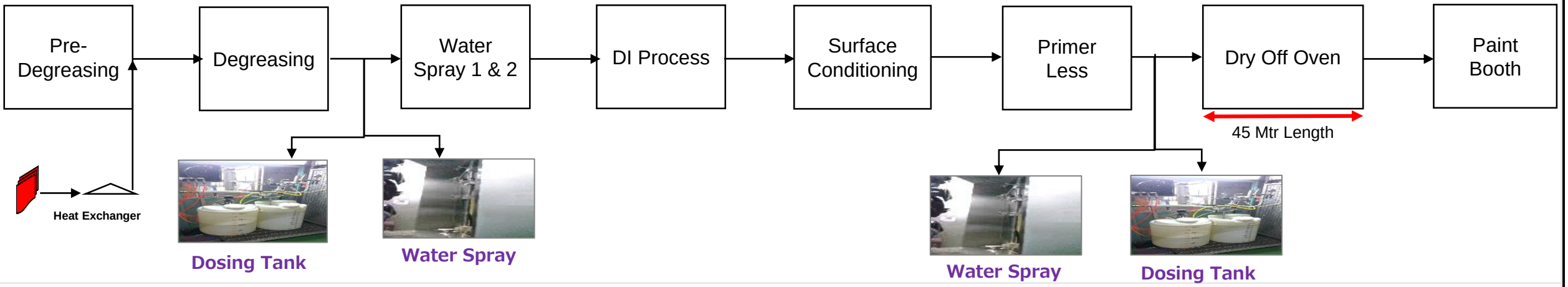
26 Mill INR

With this methodology, rework rate reduced in turn eliminating one rework station leading to Electrical Energy consumption reduction through stoppage of manual welding stations

Innovative Project 03: Introduction of Short Length Oven Process

In Paint shop, Paint booths are used for painting application.
All paint booths in 3F are designed with 3 Zone (Primer + Base Coat + Top Coat)
In Paint Shop, all the parts pass through Pre-treatment, Air blow to remove moisture and dry off oven before pass through paint booth.

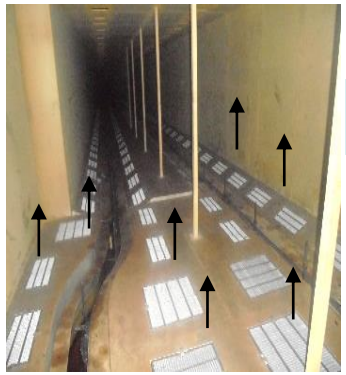
Background

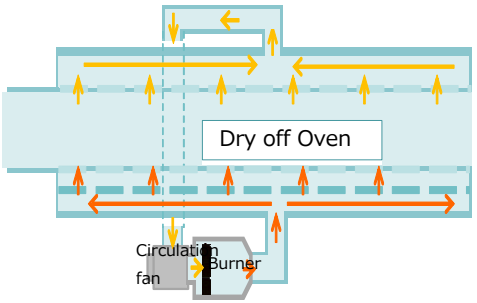


Before Process:

Water Spray Condition

Water layer
Liquid flowing on part





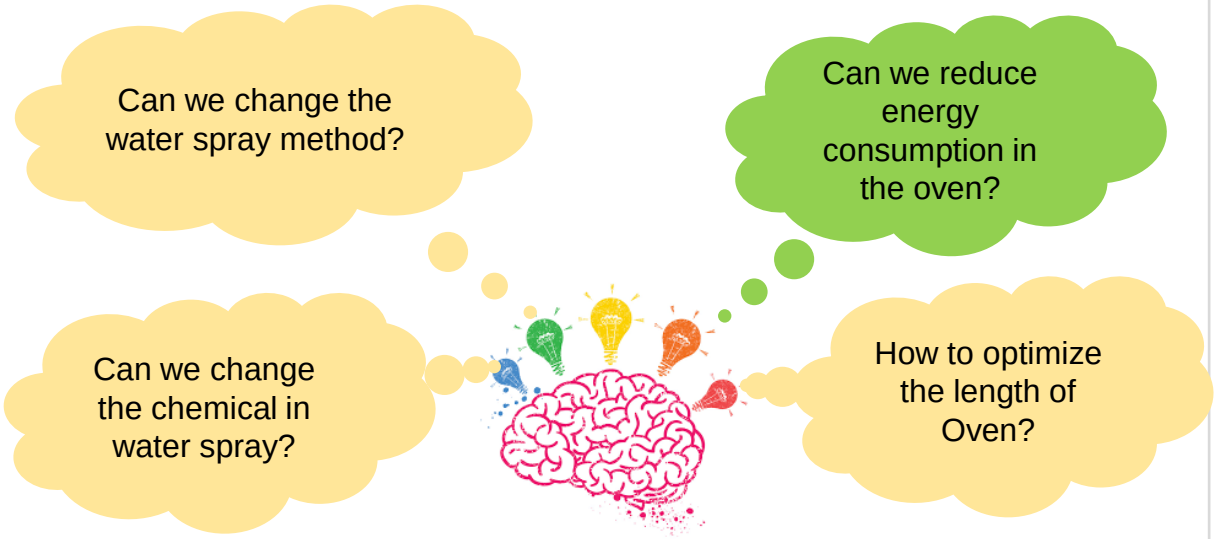
Drying furnace – 70° C for 3o Min

- Air is blown from the bottom of the oven to dry the parts.
- LNG requirement to dry the parts completely is 15 m3/hr.
- Present part drying time in dry off oven is 30 min.
- Drying length of existing dry off oven is 45 mtr.

Accumulation of more water particles on parts due to water spray has resulted in increased length of oven and increased consumption of thermal fuel – LNG

Innovative Project 03: Introduction of Short Length Oven Process

Idea Generation



Idea Validation

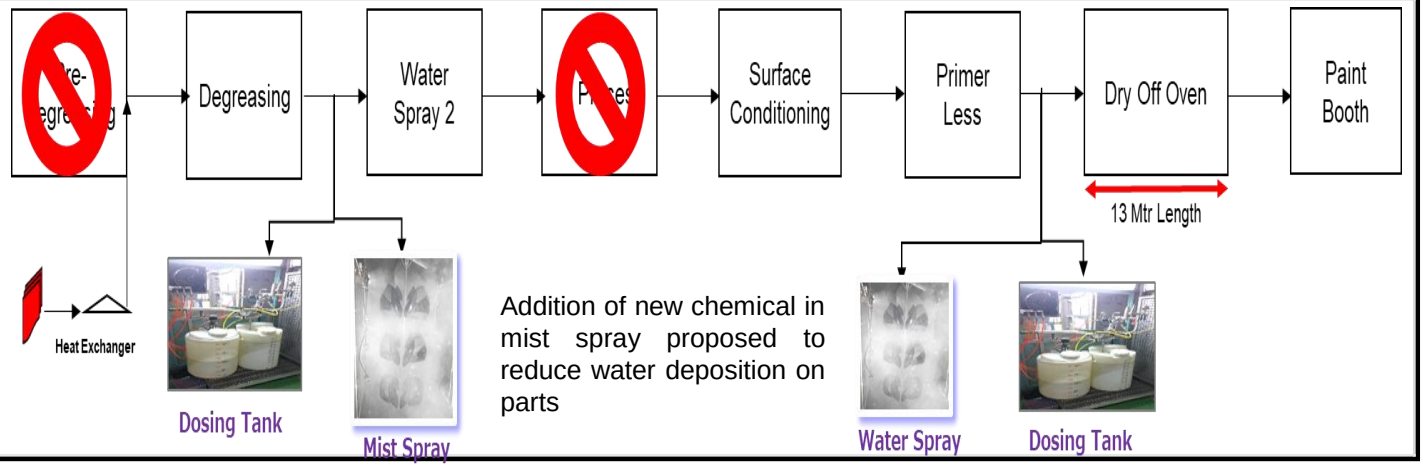
Idea	Pros	Cons	Judge
Can we change the water spray method?	By changing the water spray method, we can reduce water deposition on parts	Water spray is essential to clean the part before painting process	O
Can we change the chemical in water spray?	Changing the chemical may yield result in reducing water deposition on parts		O Trials to be taken
How to optimize the length of Oven?		Length of oven is required for effective drying of parts	O
Can we reduce the energy consumption in oven	Air blow system can be changed from sides instead from below the oven for effective drying, in turn reducing LNG consumption		O

Chemical Trial Results

Sl. No	Chemical Name	Part Cleaning	Surface Cond
01	Chemical 01	O	X
02	Chemical 02	X	O
03	Chemical 03	O	O

Atomizers added in the process to achieve the desired results

Proposed Idea



Addition of new chemical in mist spray proposed to reduce water deposition on parts

Mist Spray in Pre-treatment has reduced Energy consumption due to short length of oven and also reduced water consumption

Innovative Project 03: Introduction of Short Length Oven Process

Current Process

Mist spray condition

Part Condition after Mist Spray

Short length Oven – 13 Mtr Length
Drying furnace – 60-70 ° C for 10 Min

- **Air is blown from both the sides of the oven to dry the parts.**
- LNG requirement to dry the parts completely is reduced to 7 m3/hr
- Present part drying time in dry off oven is 10 min.
- Drying length of existing dry off oven is 13 mtr.
- New chemical introduced which will clean the parts effectively with mist spray.
- Energy reduction (Electricity and LNG) by reducing no. of stages and reduced drying temperature at oven.

Benefits

ENERGY SAVING

156.75 MT of LNG / Annum

CO_2 REDUCTION

467.95 Tons/year

MONEY SAVING

125.44 lakhs/annum

INVESTMENT

150 Lakhs

60 KL / Annum

ROI

14 Months

Horizontal Deployment

Industry	Replication Potential
HMSI Group companies	●
Asia & Oceania Honda Genpos	●
Other industries with ETP	●

Industry	Sharing of practices
HMSI Group companies	●
Other Honda Genpos	●
Other industries	●
Other forums	●
HMSI suppliers	●

Major applicable areas:

- Automobile industry
- Manufacturing units
- Painting Units

Resources Used

In house expertise

Quality confirmation from QC-HO

Project is implemented in all the lines of HMSI Narsapura and will be horizontally deployed in other factories of HMSI

HMSI 3F

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02	Energy data Energy Resources, Specific Fuel Consumption, Internal and National Benchmarking	04-08	1 min
03	Encon Projects Zero Investment Encon Projects and Other Encon Projects	09-10	1 min
04	Innovative Ideas Development of High Gloss Paint, Introduction of Short length Oven in Paint Shop and New Zero B Welding Modification in Weld Shop	11-21	3 min
05	Renewable & Green Energy & GHG Emissions RE Introduction – 37 MW, 2.5 MW Solar Roof Top Panels 2022, 2.7 MW Wind Turbine Installation 2022, 5.4 MW Wind Turbine Installation 2023, GHG Benchmarking	22-27	2 min
06	Green Supply Chain and Capacity Building Green Purchasing Policy, Green Supply Chain activities and Green Supply Chain Road Map	28-34	2 min
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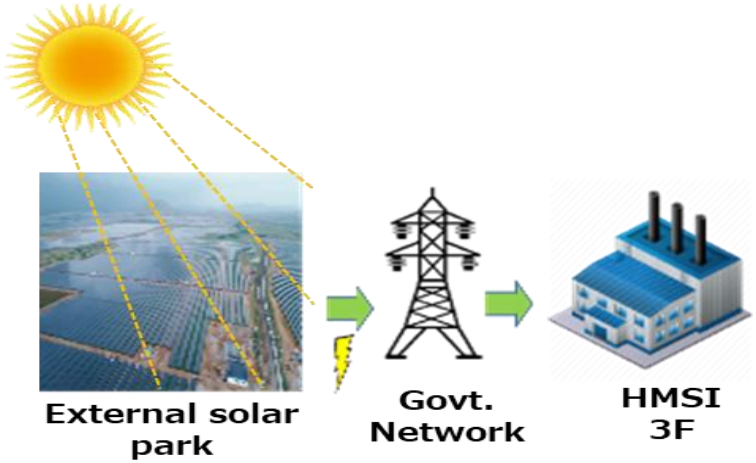
Renewable Energy Introduction- 37 MW

Electrical Energy & Thermal Energy are two main Energy Sources in HMSI
For Scope 2 Emission Reduction → Focus on use of renewal energy
One of the Lowest CO2 Emitting Factory among Asian Genpos

Offsite solar: 17-18



- ❑ Total contract capacity – 44 Mill KWH/annum
- ❑ Contract validity-10 years

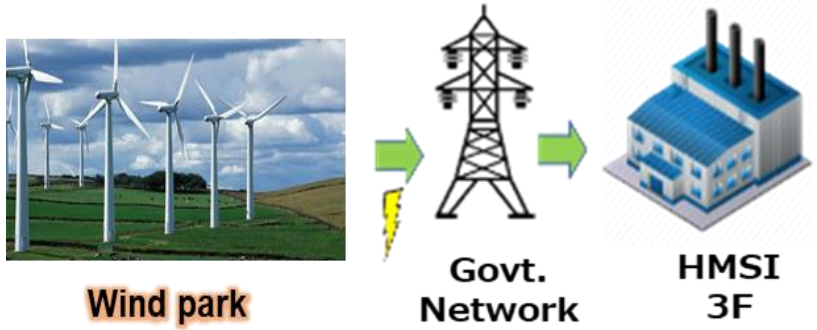
1080 Lakh	37,000 tons	ZERO INVESTMENT

Onsite solar 7MW:18-19

- ❑ Total installed capacity – 7 MW
- ❑ Total units generated – 88 Lakh kWh/annum

580 Lakh	8330 tons	3130 Lakh

Offsite Wind Power: 21-22



- ❑ Total Contract capacity – 30 Lakh kWh / Annum
- ❑ Total Units generated – 6.5 Lakh kWh

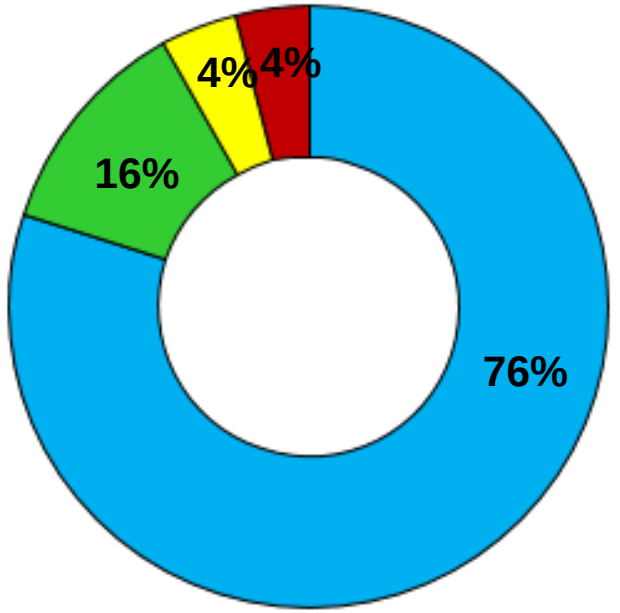
49.50 Lakh	681 tons	Zero Investment

Renewable Energy Utilization started to reduce dependency on Fossil fuel for Electrical Energy and to reduce Scope 2 Emissions

On-site RE Generation-2.5MW Solar Roof top - 2022

0.9 MW Solar Rooftop on Logistics Warehouse

1.6 MW Solar Rooftop on MS Roof



- 2.5 MW Solar Roof Top Installation done on Factory Roof Top.
- The installation of On-site Rooftop solar power plant is completed on Apr 2022

Key project highlights

29.40 lakh KWH

269 lakh Rs/year

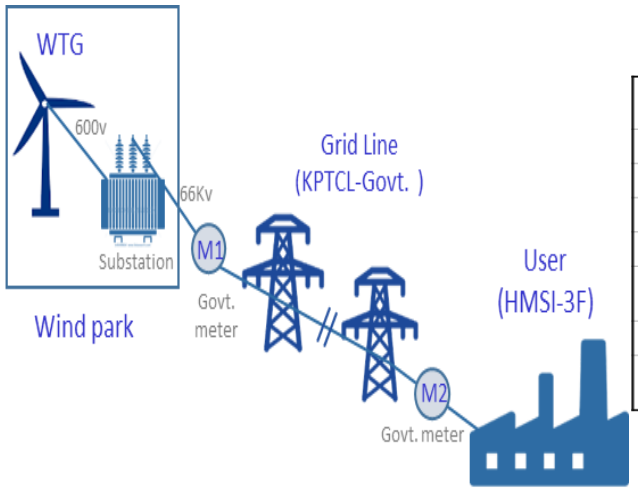
2123 ton/ annum

110.8 Mill Rs

50 Months

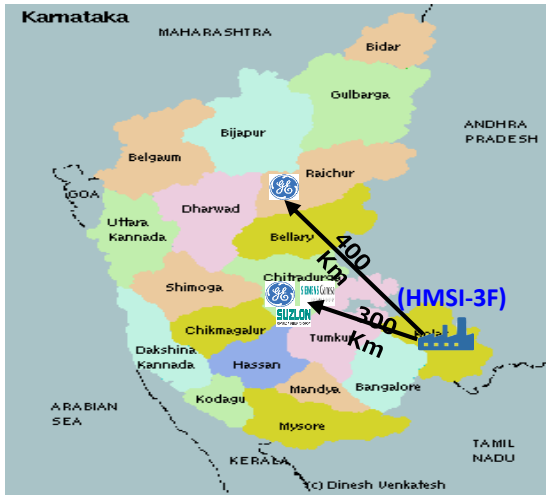
2.5 MW Solar Roof Top Expansion done to reduce fossil fuel based Electrical energy consumption by 95% through utilization of Solar energy

Power Transmission and Utilization



Parameter	Unit	Value (2.7MW)	Value (2MW)
Wind Speed	m/s	7.0 - 7.1	
Turbine Output	kW	1050	728
Plant Availability	%	95	95
System Loss	%	5	5
Wind Probability (P50 / P75 / P90)	%	90	90
Generation Days /Yr	Days	365	365
Total Generation / Annum	Mil kWh	7.5	5.2

Location of Installation



Site Pic-2.7 MW Wind Turbine

- Installation has been done Outside the Factory at Jagalur, Davanagere (approx. 300kms). Power is being utilized through Wheeling and Banking arrangement with DISCOM.
- The installation of Wind Turbine Generator is completed in the month of Jul-22

Key project highlights

75 lakh KWH

480 lakh Rs/year

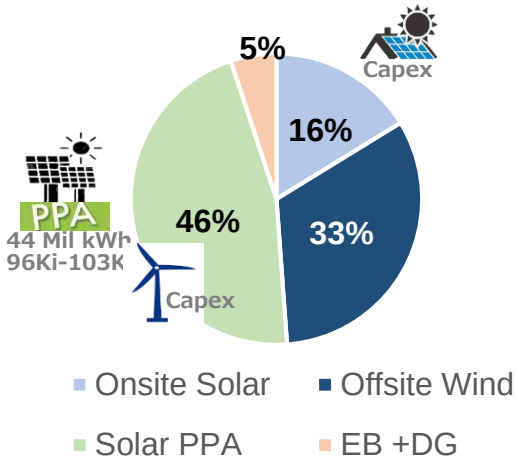
1618 ton/ annum

192 Mill Rs

48 Months

Wind Turbine Installed to generate Energy through utilization of wind and increase utilization of Renewable Energy to 97% of overall electricity consumption

Phase 2: Wind Turbine Installation – 5.4 MW - 2023



Town : Jagalur
Dist. : Davanagere
Turbine :GE-2.7MW X 2 Nos
kWh/Yr: 7.5 Mill kWh/turbine

- **Installation is done Outside the Factory**
- **The installation of Wind Turbine Generator is completed in the month of Aug-23**

Key project highlights

15 Mill KWH

92 Mill Rs/year

3236 ton/ annum

414 Mill Rs

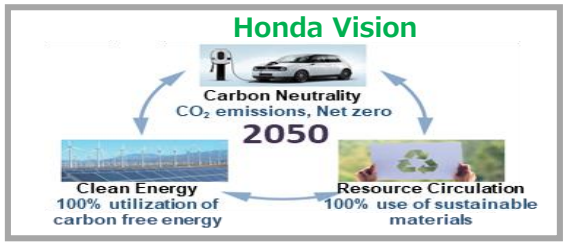
53 Months

5.4 MW Wind turbine installation will further increase renewable energy generation

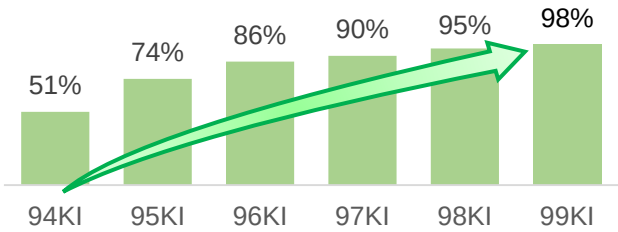
Renewable Energy Usage in Narsapura Plant

Honda Clean Energy Vision

100% utilization of carbon free energy by 2050

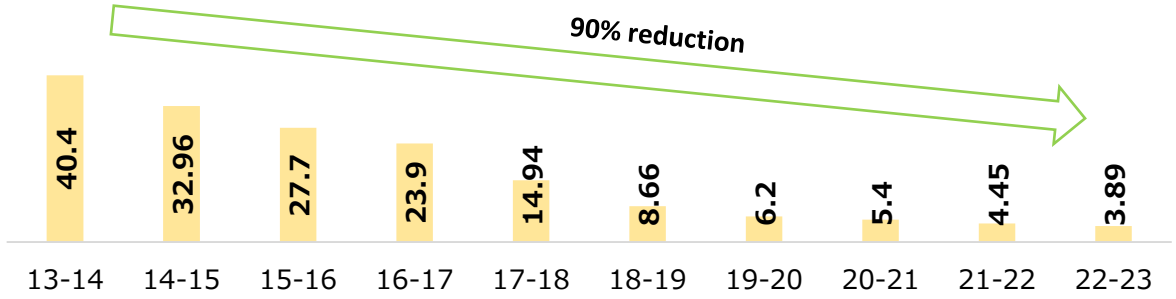


HMSI-3F Renewable Energy Trend

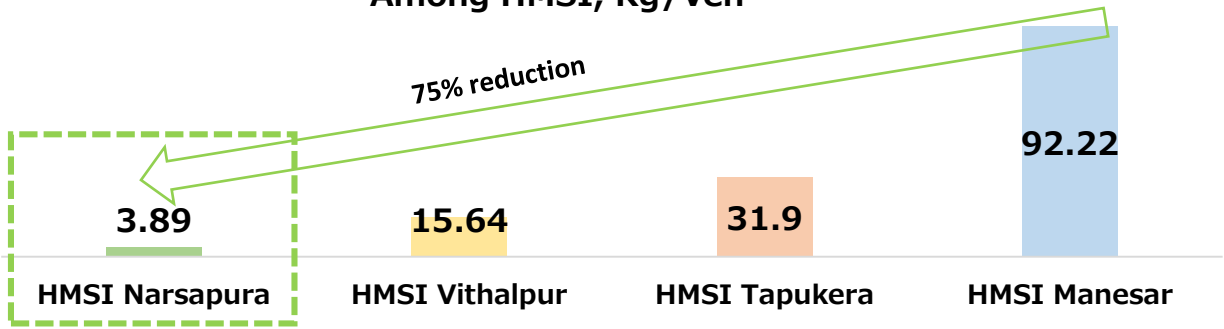


2020 target of substituting 70% energy with RE already achieved
Detailed roadmap is chalked out to achieve the target of 100% RE by 2025

Specific CO_2 Emission reduction Trend YoY

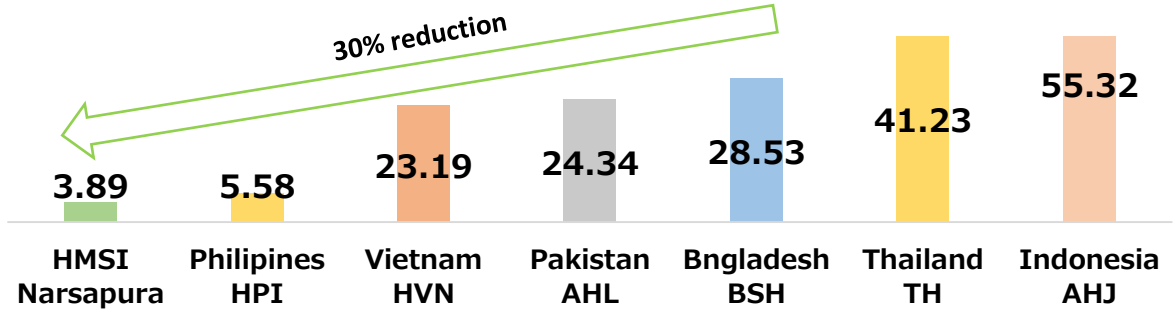


Among HMSI, Kg/Veh



Among Indian Companies, Kg/Veh

Among Asian Group Companies, Kg/Veh



Uniqueness

- **HMSI Narsapura has set a unique example where an industry can transform from highest GHG emissions to lowest GHG emissions through PDCA.**
- **HMSI Narsapura is not only the lowest specific CO2 emitting factory, but also one of the lowest in Specific Utility Costs in the country due to adoption of best practices.**
- **One of the first automobile industries in the country which has installed around 300 No's of Solar parabolic dishes.**
- **Complete elimination of MEE and ATFD Operation through sequential alternatives.**
- Lowest specific propane consumption among group companies with similar configuration.

HMSI-Narsapura is the lowest CO_2 emission factory in India and Asia region

HMSI 3F

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Honda Green Purchasing Guidelines

HONDA

Honda Green Purchasing Guidelines

BLUE SKIES FOR
OUR CHILDREN

December 2001 – First edition
October 2018 – Revised edition

Honda Motor Co., Ltd.

III. Honda Green Purchasing Policy

For Honda, activities to conserve the global environment establish an important pillar in our corporate policies. Our goal is to reduce our environmental footprint through corporate activities

(*1） at every stage in the entire life cycle from resource procurement to design, development, production, transportation, sales, use and disposal stages.

To carry out these activities effectively, we are continuing to take strong measures to reduce our environmental footprint, together with our suppliers. **We are also adding E (Environment) to our supplier evaluation categories**

(*2) of Q (Quality) , C (Cost), D (Delivery) and D (Development) to allow us to more actively encourage purchasing environmentally friendly parts and materials.

For **Honda's environmental initiatives such as GHG emissions reduction, the overall purchasing activities of sharing policies with suppliers and achieving targets together are called Honda Green Purchasing activities.**

<Supplement>
These Guidelines cover **all suppliers for parts, materials, indirect materials, accessories, service parts and logistics**.

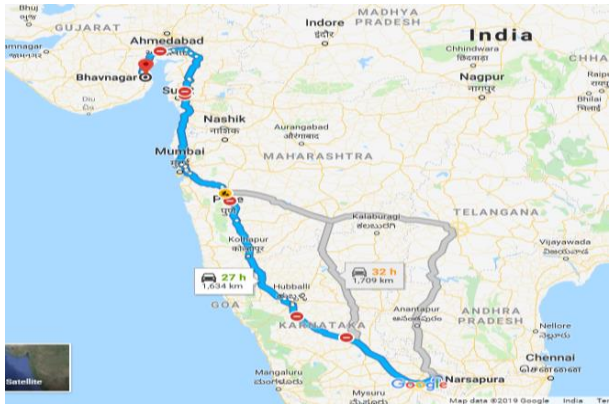
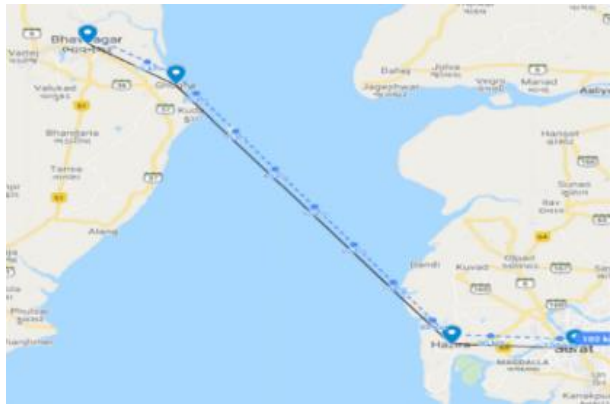
Products refer to completed products of motorcycles, automobiles and power products produced by Honda.

Parts and materials refer to parts, materials, indirect materials, accessories, service parts and logistics purchased by Honda.

(*1) Corporate activities cover all activities related to Honda products including not only first-tier but also sub-tier suppliers.

(*2) The result of activities at each supplier in response to these guidelines may be evaluated.

Environment is considered in suppliers' evaluation and suppliers are enforced to cover all activities related to Honda products including not only first-tier but also sub-tier suppliers

Before: Surface Route	After: RORO Service	Before: Dispatches with Trucks	After: Dispatches with Trailer
			
Destination: Veraval **Distance : 2029 Kms** **Transit Time : 7 Days**	**Destination : Veraval & Bhavnagar** **Distance : 1477 Kms & 1354 Kms** **Transit Time : 6 Days & 5 Days**	**Carbon Emission from truck (97KI to 98KI):** **2394493 Kgs**	**Carbon Emission from truck (97KI to 98KI):** **1798236 Kgs**
Surface Route from HMSI 3F >> Narasapura > Thane > Bhiwandi > Vapi > Navsari > **Vadodara> Ahmedabad > Veraval.**	**New Route from HMSI 3F >>** Narasapura > Thane > Bhiwandi > Vapi > Navsari > **Hazira> (Sea Route) > Ghogha.**	Trucks are used for dispatch of final product. **Truck Capacity – 40 two wheelers**	Trailers are used for dispatch of final product. **Trailer Capacity – 120 two wheelers**

682 Ton / Annum

Zero Investment

82 Lakh / Annum

NA

HMSI Narsapura is the 1st factory to utilize the RORO service. Trailers are used to reduce the emissions as well as to increase the revenue

Truck trip reduction through Logistic Efficiency improvement

Before: 04 Qty / box

No. of trips from supplier to HMSI - 106

After: 05 Qty / box

No. of trips from supplier to HMSI - 85

Truck trip reduction through combining small vehicle to big containers

Before: utilization of small vehicle

After: Utilization of big container

Truck Type	No of trucks / Year	Diesel consumption (in ltr)	Co2 Emission per liter (in kgs)	Co2 Emission (in tons)
32 feet	1,638	1,041,300	2.676	2787
53 feet	273	242,970	2.676	650

2155.3 Ton / Annum

1386 No. of truck trip reduction

642.8 Lakh / Annum

NA

Through Logistic Efficiency improvement, truck trip required for supplying parts has been reduced. Resulting in CO2 Emission reduction

Truck trips reduction through volumetric efficiency increase in spares dispatch

Before:

Utilization of **45 Cubic centimeter** of volume.
Truck trips from supplier end to HMSI - **691**

After:

Utilization of **48 Cubic centimeter** of volume.
Truck trips from supplier end to HMSI - **648**

Before:

Qty / Bin – 550 No.s
Qty of bins usage – 2215 No.s
No. of trips from supplier – 144

After:

Qty / Bin – 760 No.s
Qty of bins usage – 823 No.s
No. of trips from supplier – 84

103 Ton / Annum

103 No. of truck trip reduction

410 Lakh / Annum

NA

HMSI Narsapura is the 1st factory to utilize the RORO service. Trailers are used to reduce the emissions as well as to increase the revenue

Awareness Creation to Suppliers

Green Supply Chain Meet


Supplier Environment Best Practices Award

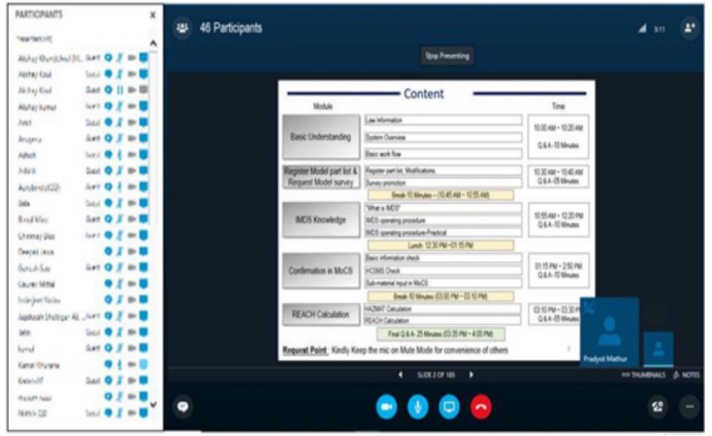
Purpose of Supplier Award

To promote and encourage local suppliers of HMSI – 3F to enhance and improve their environmental performance.

To provide knowledge sharing platform on environment best practices among suppliers


World Environment Day Training


Online training to suppliers



Online GHG Training By Central Team

Greenco Mission

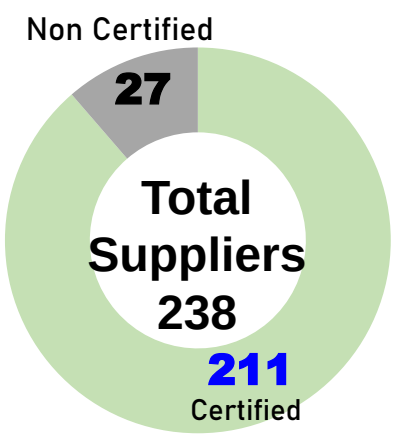


Greenco Training for suppliers & HMSI Associates


Our Supply Chain partners are continuously engaged to ensure sharing of relevant Environmental information for horizontal deployment

Scope 3 Emissions Reduction Roadmap

Green Supplier Chain Meet



ISO 14001 Implementation at supplies

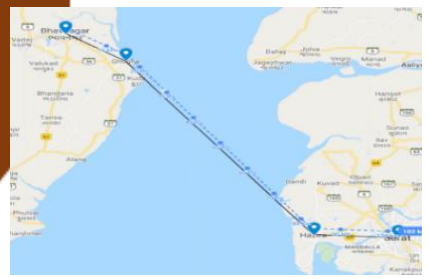
2 Splrs certification Completed

1. **New Swan Multitech**
2. **Minda Rinder India**

RE Introduction Training

Several suppliers have started taking Solar Power through Power Purchase Agreement

RORO, CNG Trucks and Trailers



RORO Service in Downstream activity

BSVI and CNG Trucks

CNG Buses for Employee Commute

Employee Commute Route Optimization

CNG Buses for Employee Commute

EV Introduction

HMSI Narsapura has set strong roadmap to reduce emissions from Scope 03

Mass Tree Plantation-2023

Mass Tree Plantation by HMSI Top Management

Mass Tree Plantation by HMSI Suppliers

Mass Tree Plantation by School Children

Awareness to School Children on World Environment Day

Awareness to School Children by Regional Environmental Officer, Senior Environmental Officer and HMSI Personnel

Awareness creation done in house and to the society through Tree Plantation activity and Awareness session in near by school

HMSI 3F

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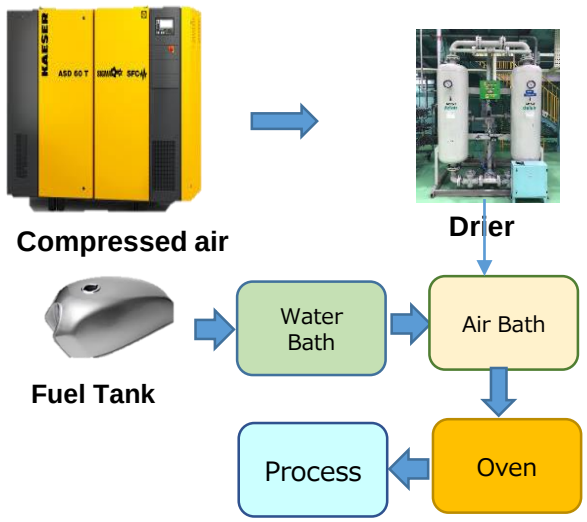
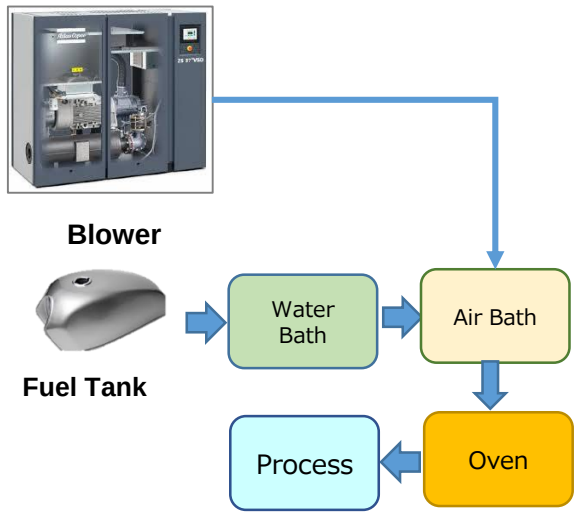
Compressor to Blower replacement in Paint Shop

Before:

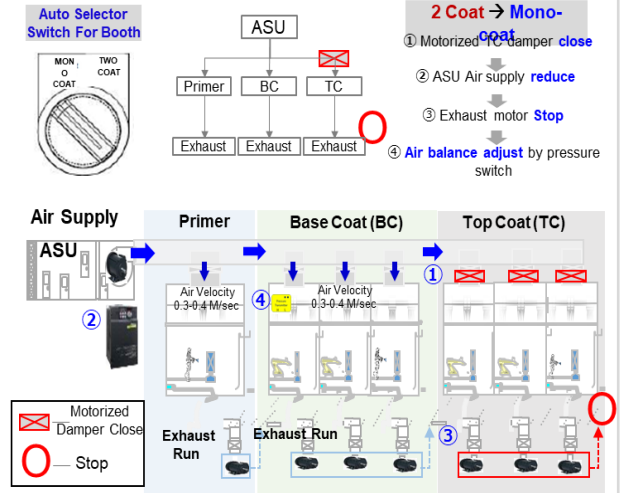


After:

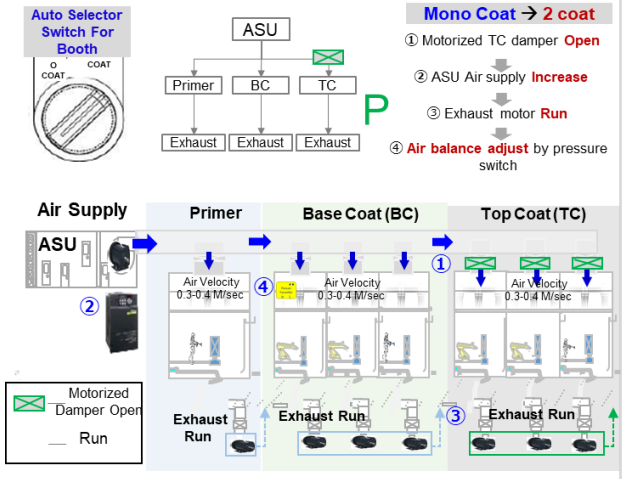


Auto Booth Air Balancing in Paint Shop

Before:



After:



Key project highlights

183.0 Lakh kWh/Annum

122.3 lakh Rs/year

1321.6 ton/ annum

268.4 Lakh Rs

25 Months

Implementation of Decentralized Blower & Auto booth Air balancing in Paint shop to reduce Energy consumption

Energy Efficiency and Energy Saving Measures

VFD Installation in 219 motors

Before:

Main Power Supply → Contractor Control Circuit-PLC → Fan Motors

After:

Main Power Supply → Contactor PLC Control → VFD → Fan Motors

EC Fans installation at Paint Shop ASU

Before:

After:

Key project highlights

137.5 Lakh kWh/Annum

139.43 lakh Rs/year

1468.87 ton/ annum

168 Lakh Rs

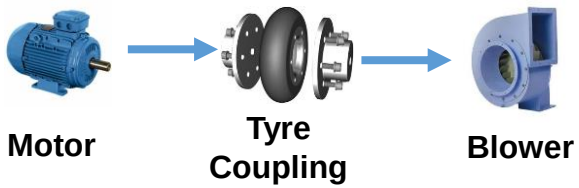
14 Months

VFD and EC fans installation has led to reduction in Plant Energy consumption

Energy Efficient Direct Coupled Motor

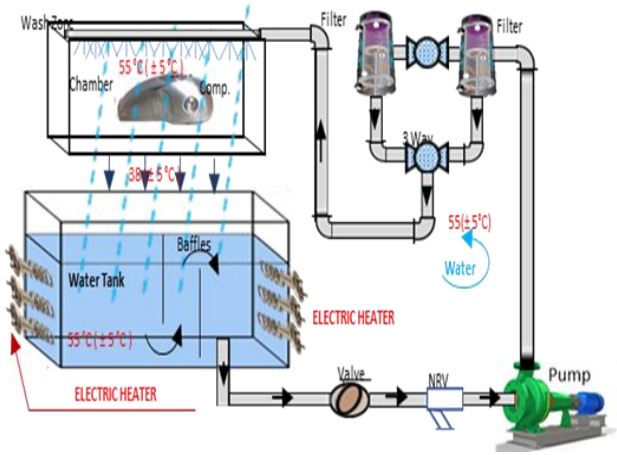
Before:

After:

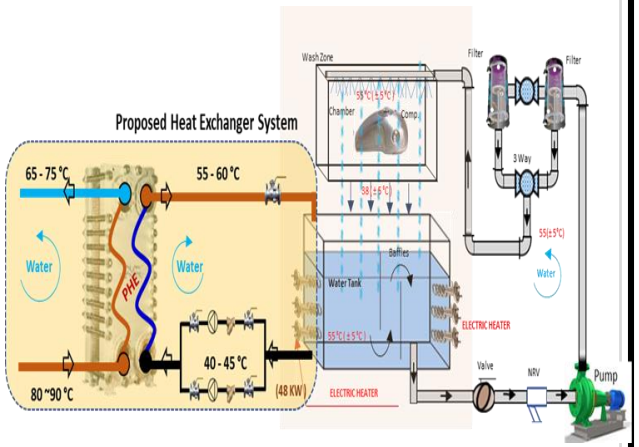


Replacement of Electric Heaters with hot water

Before:



After:



Key project highlights

59.7 Lakh kWh/Annum

30.70 lakh Rs/year

432 ton/ annum

105.23 Lakh Rs

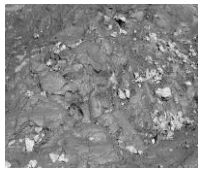
36 Months

Implementation of Direct coupled motor and replacement of electric heaters with hot water has resulted in Energy consumption reduction

Waste Diversion to Co-processing from Landfill and Incineration

Generation of Hazardous waste

Paint Sludge



Other Haz Wastes

Collection at storage area

Transportation

Co-processing at cement industry

- Identified cement industries which have valid authorization for co-processing of wastes. Compatibility of wastes checked and found OK.
- Legal approval for sending all waste to Co-processing was amended.
- Approval for loading multiple wastes taken to solve the issue with transportation.
- Pre-processing of Hazardous waste method explored and sent wastes having low flash point to pre-processing before sending for co-processing.

Benefits:

1972 MT of Co2
Emission reduction

Impact on Env reduction due to
“Zero Waste to Landfill”

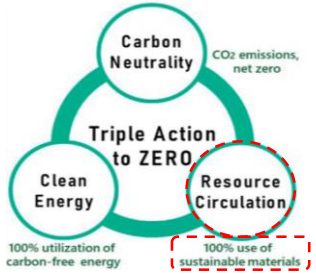
1568 MT of waste diverted
from Landfill & Incineration

08 Lakh Rs
Reduction in Cost

All the applicable Hazardous Waste diverted to coprocessing from Landfill and Incineration. HMSI Narsapura is a Zero Waste to Landfill and Incineration factory

Material & Waste Management

Applicable Vision

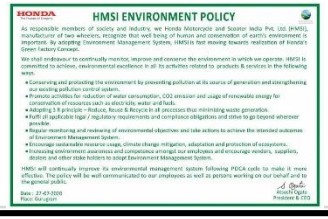


Applicable SDG

Applicable Priority Issues

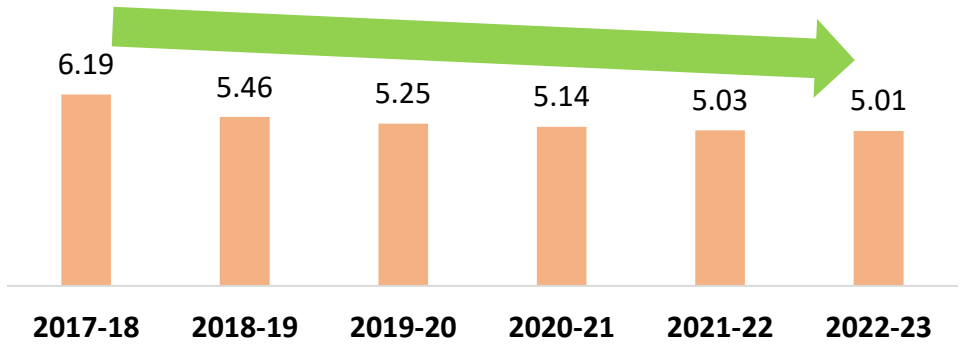
Utilizing resources efficiently

Environment Policy


HMSI ENVIRONMENT POLICY

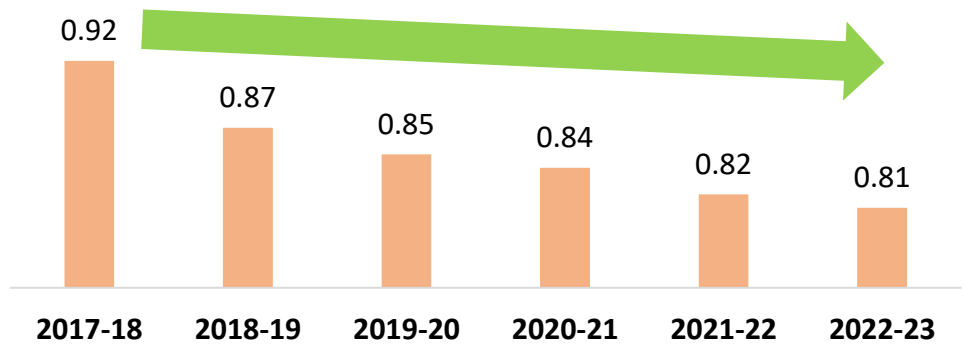
Raw Material Consumption Kg/Veh

19% reduction from 2017-18

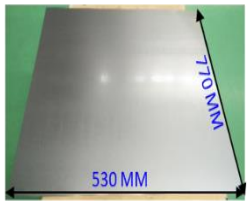


Waste Generation Kg/Veh

12% reduction from 2017-18



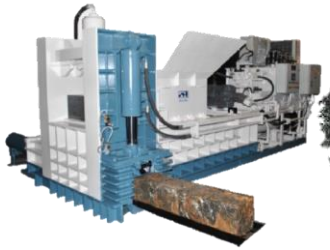
Reduce, Recycle & Reuse



Blank size optimization

Reuse of electrostatic oil
Recycling of packing material

Non-Hazardous Waste Reduction



Loose Sheet metal to Bundle

Loose Chips to Briquette

Reduced Rejection Rate

Hazardous Waste Reduction

Zero Waste to Landfill

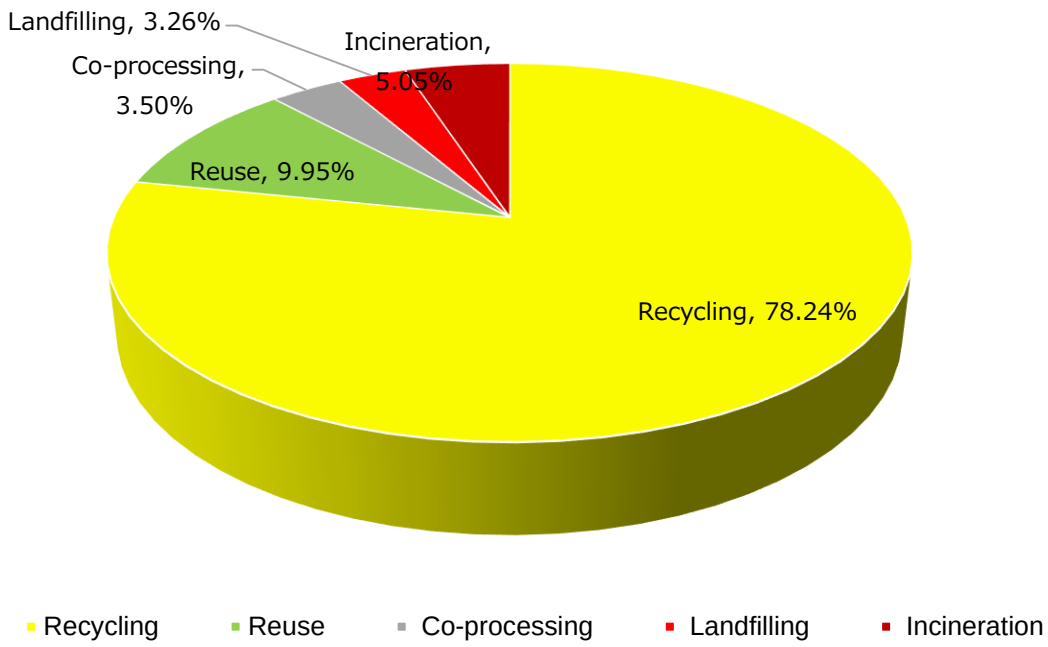
Decanter for ETP Sludge reduction

Reusing of cotton waste

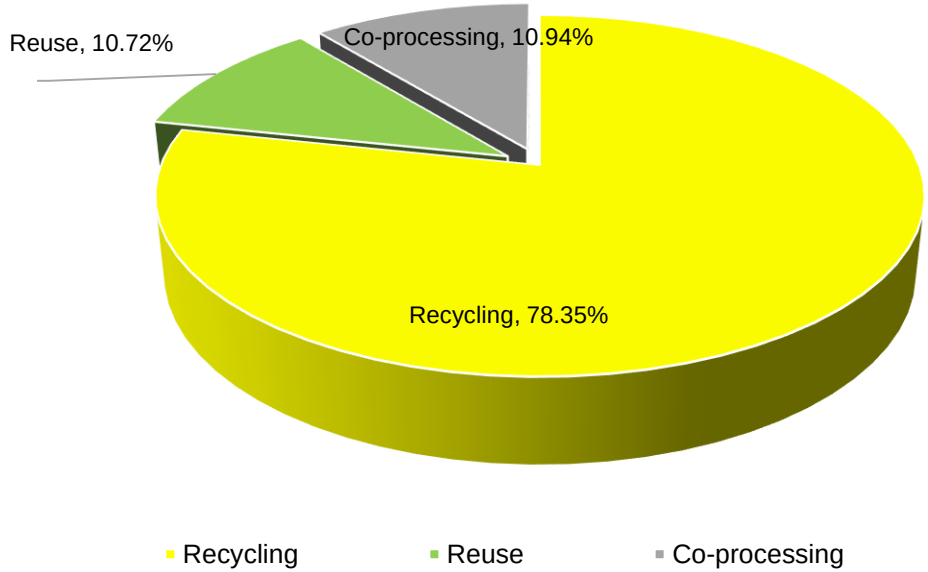
Material Conservation and Waste Reduction has been instrumental in reducing our collective Environmental Footprint

Scenario of Waste Disposal

Before:



After:



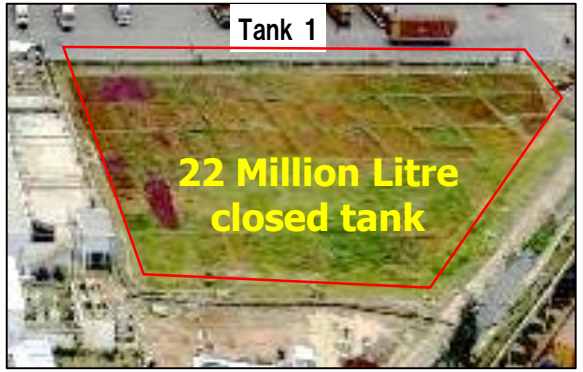
Sl. No	Category	%
01	% of waste to recycling	78.24%
02	% of waste reused in the process	9.95%
03	% of waste sent to Co-processing	3.50%
04	% of waste sent to Landfill	3.26%
05	% of waste sent to Incineration	5.05%
06	Total Diversion of Waste	91.69%

Sl. No	Category	%
01	% of waste to recycling	78.35%
02	% of waste reused in the process	10.72%
03	% of waste toCo-processing	10.94%
04	Total Diversion of Waste	**100%**

Zero Waste to Landfill achieved through diversion of waste from Landfilling & Incineration

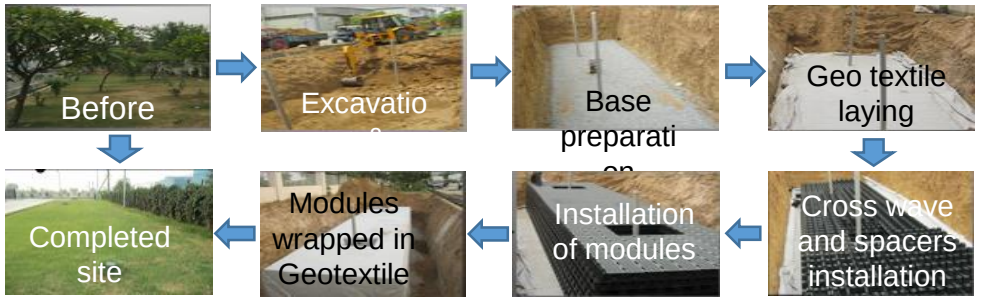
Self Sustenance in Water Consumption through Utilization of 100% Rainwater

100% Rainwater Utilization for factory requirement throughout the year



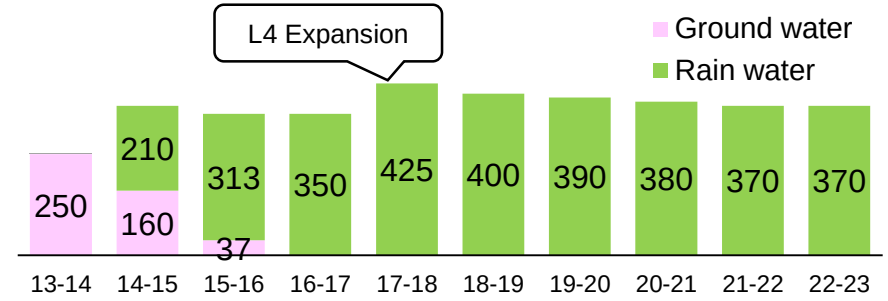
3 Rainwater tanks have been constructed to meet 100% factory water requirement throughout the year

Ground water Recharge through Crosswave Technology



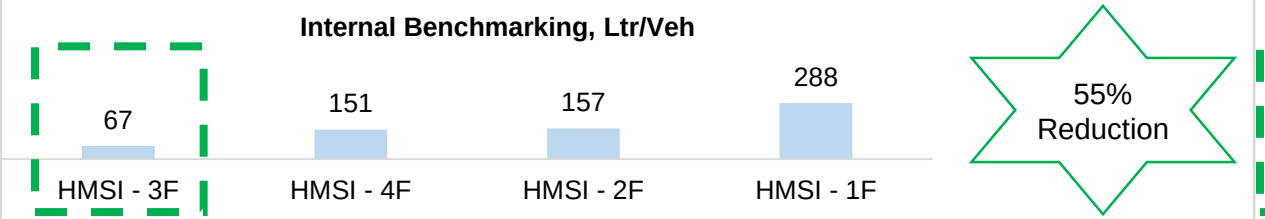
Total Ground water recharging capacity is 318 KL per day

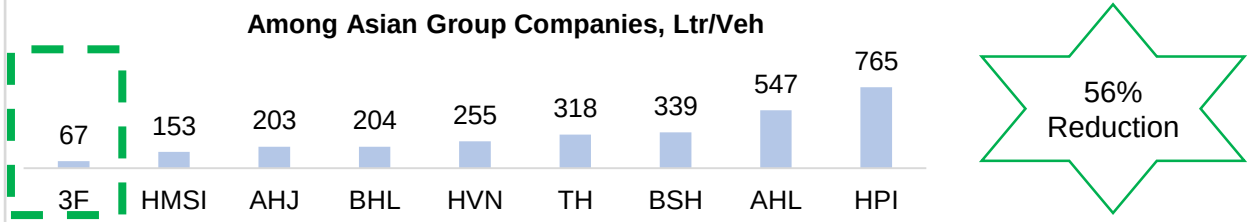
100% Rainwater Usage Trend in KLD



100% factory water requirement is met through Rainwater from last seven years

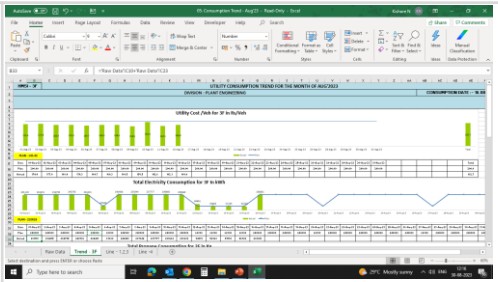
Benchmarking in Specific Water Consumption



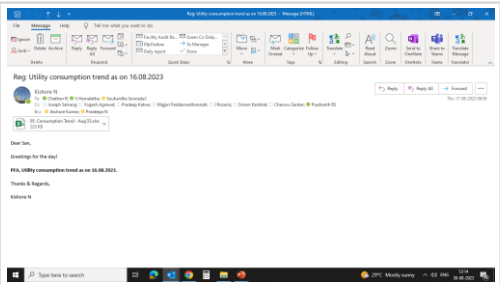


Through Rainwater utilization and Water conservation HMSI-3F has met 100% water requirement through Rainwater collection and usage and has substantially reduced its water consumption to international benchmark levels

Daily morning review



Daily variance analysis



Daily shop mailers

Monthly MIS

Monthly MRM

	Plant head	Finance	Energy Manager	Lead/ Advisor cell	Energy coordinator	Core cell member	Facility member
Monthly consumption report	●	●	●	●	●		●
Monthly variance analysis	●	●	●	●	●	●	●
Daily variance analysis	●		●		●		●
Daily shop consumption			●	●	●	●	●
Board review			●		●		●

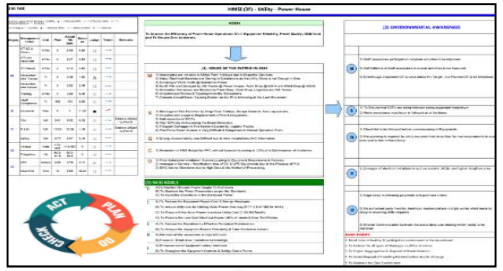
Comprehensive review mechanism in place for energy consumption

1 Situation Analysis

Legal Requirements

Production Capacity

Benchmarking



Corporate ad site level targets

Best Available Technologies

Continual Improvement

2 Target Setting by Self & PPC

Target

3 Budget Preparation 23-24

	April	May	June	July	August	September	October	November	December	January	February	March	Total / Avg
Production Volume	1,65,177	1,58,402	2,00,206	1,95,404	2,15,095	2,31,502	2,21,875	1,83,555	1,13,750	1,51,094	1,48,265	1,50,252	21,34,577
Total Days	30	31	30	31	31	30	31	30	31	31	28	31	365
Working Days	23	20	24	24	23	24	23	19	15	21	22	22	260
Holidays	7	11	6	7	8	6	8	11	16	10	6	9	105

Consumptions

	April	May	June	July	August	September	October	November	December	January	February	March	Total / Avg
Total KWH Con	47,98,470	43,62,371	49,84,678	49,76,678	54,80,029	55,16,982	53,15,868	45,68,388	35,52,389	39,45,967	39,00,429	40,71,547	5,54,73,797
HSD - kWh	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	4,80,000
HSD - Ltr	13,526	13,626	13,526	13,626	13,626	13,526	13,626	13,526	13,626	13,626	13,326	13,626	1,62,816
Bescom	1,99,923	1,78,119	2,09,234	2,08,834	2,34,001	2,35,849	2,25,793	1,88,419	1,37,619	1,57,298	1,55,021	1,63,577	22,93,690
RE-1 (Solar TP)	29,83,590	23,95,896	26,63,841	25,22,646	15,33,636	27,99,687	31,21,220	22,12,999	7,56,359	19,56,987	15,61,386	16,92,088	2,62,00,335
RE-2 (Wind TP)	-	-	-	-	-	-	-	-	-	-	-	-	-
Wind Off-site Capex	5,17,956	7,85,356	10,81,604	12,98,199	26,94,392	14,51,446	10,42,855	13,94,969	18,55,411	8,00,682	11,20,022	10,90,881	1,51,33,772
Solar Roof top	10,57,000	9,63,000	9,90,000	9,07,000	9,78,000	9,90,000	8,86,000	7,32,000	7,63,000	9,91,000	10,24,000	10,85,000	1,13,66,000

Total Power Cost

	April	May	June	July	August	September	October	November	December	January	February	March	Total / Avg
Total KWH Con	-	-	-	-	-	-	-	-	-	-	-	-	-
HSD	11,97,755	12,06,610	11,97,755	12,06,610	12,06,610	11,97,755	12,06,610	11,97,755	12,06,610	12,06,610	11,80,045	12,06,610	1,44,17,338
Bescom	86,51,312	78,45,064	83,98,988	82,47,752	74,35,897	87,75,206	90,22,493	77,44,139	57,74,886	72,03,206	67,69,828	69,81,841	9,28,50,612
RE-1 (Solar TP)	1,52,16,310	1,22,19,072	1,35,85,588	1,28,65,494	78,21,545	1,42,78,403	1,59,18,222	1,12,86,297	38,57,430	99,80,631	79,63,067	86,29,692	13,36,21,710
RE-2 (Wind TP)	-	-	-	-	-	-	-	-	-	-	-	-	-
Wind Off-site Capex	77,693	1,17,803	1,62,241	1,94,730	4,04,159	2,17,717	1,56,428	2,09,245	2,78,312	1,20,102	1,68,003	1,63,632	22,70,066
Roof top tax 0.2p per unit	2,11,400	1,92,600	1,98,000	1,81,400	1,95,600	1,98,000	1,77,200	1,46,400	1,52,600	1,98,200	2,04,800	2,17,000	22,73,200
DG Tax @ 20paise	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	96,000
Wind Off-site Capex tax 0.2 Rs per unit	1,03,591	1,57,071	2,16,321	2,59,640	5,38,876	2,90,289	2,08,571	2,78,994	3,71,082	1,60,136	2,24,004	2,18,176	30,26,754
Total Power cost	**2,54,66,063**	**2,17,46,221**	**2,37,66,892**	**2,29,63,626**	**1,76,10,689**	**2,49,65,371**	**2,66,97,525**	**2,08,70,831**	**1,16,48,920**	**1,88,76,886**	**1,65,17,749**	**1,74,24,909**	**24,85,55,681**

Fuel Cost

	April	May	June	July	August	September	October	November	December	January	February	March	Total / Avg
LNG (Kg)	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	14,400
LNG Rate	98.05	98.05	98.05	98.05	98.05	98.05	98.05	98.05	98.05	98.05	98.05	98.05	98.05
LNG Cost	1,17,660	1,17,660	1,17,660	1,17,660	1,17,660	1,17,660	1,17,660	1,17,660	1,17,660	1,17,660	1,17,660	1,17,660	14,11,926
Propane (Kg)	1,67,921	1,53,481	1,94,041	1,92,025	1,95,712	2,07,184	2,02,489	1,67,391	1,18,512	1,55,210	1,56,937	1,55,914	20,66,817
Propane Rate	69.25	69.25	69.25	69.25	69.25	69.25	69.25	69.25	69.25	69.25	69.25	69.25	69.25
Propane Cost	1,16,28,559	1,06,28,580	1,34,37,347	1,32,97,701	1,35,53,032	1,43,47,461	1,40,22,391	1,15,91,805	82,06,984	1,07,48,299	1,08,67,854	1,07,97,066	14,31,27,078
Propane + LNG Cost	**1,17,46,219**	**1,07,46,240**	**1,35,55,007**	**1,34,15,361**	**1,36,70,692**	**1,44,65,121**	**1,41,40,051**	**1,17,09,465**	**83,24,644**	**1,08,65,959**	**1,09,85,514**	**1,09,14,726**	**14,45,38,998**

Utility Cost

	April	May	June	July	August	September	October	November	December	January	February	March	Total / Avg
Total Utility Cost	**3,72,12,282**	**3,24,92,461**	**3,73,21,899**	**3,63,78,987**	**3,12,81,380**	**3,94,30,491**	**4,08,37,576**	**3,25,80,296**	**1,99,73,564**	**2,97,42,845**	**2,75,03,263**	**2,83,39,635**	**39,30,94,679**
Utility Cost / Veh.	225.29	205.13	186.42	186.17	145.43	170.32	184.06	177.50	175.59	196.85	185.50	188.61	184.16
Power Cost / Veh.	154.17	137.29	118.71	117.52	81.87	107.84	120.33	113.70	102.41	124.93	111.41	115.97	116.44
Fuel Cost / Veh	71.11	67.84	67.71	68.65	63.56	62.48	63.73	63.79	73.18	71.92	74.09	72.64	67.71
kWh / Veh.	29.05	27.54	24.90	25.47	25.48	23.83	23.96	24.89	31.23	26.12	26.31	27.10	25.99
Propane / Veh	1.02	0.97	0.97	0.98	0.91	0.89	0.91	0.91	1.04	1.03	1.06	1.04	0.97
LNG / Veh	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01

4 Budget Submission to PPC

	April	May	June	July	August	September	October	November	December	January	February	March	Total / Avg
Production Volume	1,65,177	1,58,402	2,00,206	1,95,404	2,15,095	2,31,502	2,21,875	1,83,555	1,13,750	1,51,094	1,48,265	1,50,252	21,34,577
Total Days	30	31	30	31	31	30	31	30	31	31	28	31	365
Working Days	23	20	24	24	23	24	23	19	15	21	22	22	260
Holidays	7	11	6	7	8	6	8	11	16	10	6	9	105

Consumptions

	April	May	June	July	August	September	October	November	December	January	February	March	Total / Avg
Total KWH Con	47,98,470	43,62,371	49,84,678	49,76,678	54,80,029	55,16,982	53,15,868	45,68,388	35,52,389	39,45,967	39,00,429	40,71,547	5,54,73,797
HSD - kWh	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	4,80,000
HSD - Ltr	13,526	13,626	13,526	13,626	13,626	13,526	13,626	13,526	13,626	13,626	13,326	13,626	1,62,816
Bescom	1,99,923	1,78,119	2,09,234	2,08,834	2,34,001	2,35,849	2,25,793	1,88,419	1,37,619	1,57,298	1,55,021	1,63,577	22,93,690
RE-1 (Solar TP)	29,83,590	23,95,896	26,63,841	25,22,646	15,33,636	27,99,687	31,21,220	22,12,999	7,56,359	19,56,987	15,61,386	16,92,088	2,62,00,335
RE-2 (Wind TP)	-	-	-	-	-	-	-	-	-	-	-	-	-
Wind Off-site Capex	5,17,956	7,85,356	10,81,604	12,98,199	26,94,392	14,51,446	10,42,855	13,94,969	18,55,411	8,00,682	11,20,022	10,90,881	1,51,33,772
Solar Roof top	10,57,000	9,63,000	9,90,000	9,07,000	9,78,000	9,90,000	8,86,000	7,32,000	7,63,000	9,91,000	10,24,000	10,85,000	1,13,66,000

Total Power Cost

	April	May	June	July	August	September	October	November	December	January	February	March	Total / Avg
Total KWH Con	-	-	-	-	-	-	-	-	-	-	-	-	-
HSD	11,97,755	12,06,610	11,97,755	12,06,610	12,06,610	11,97,755	12,06,610	11,97,755	12,06,610	12,06,610	11,80,045	12,06,610	1,44,17,338
Bescom	86,51,312	78,45,064	83,98,988	82,47,752	74,35,897	87,75,206	90,22,493	77,44,139	57,74,886	72,03,206	67,69,828	69,81,841	9,28,50,612
RE-1 (Solar TP)	1,52,16,310	1,22,19,072	1,35,85,588	1,28,65,494	78,21,545	1,42,78,403	1,59,18,222	1,12,86,297	38,57,430	99,80,631	79,63,067	86,29,692	13,36,21,710
RE-2 (Wind TP)	-	-	-	-	-	-	-	-	-	-	-	-	-
Wind Off-site Capex	77,693	1,17,803	1,62,241	1,94,730	4,04,159	2,17,717	1,56,428	2,09,245	2,78,312	1,20,102	1,68,003	1,63,632	22,70,066
Roof top tax 0.2p per unit	2,11,400	1,92,600	1,98,000	1,81,400	1,95,600	1,98,000	1,77,200	1,46,400	1,52,600	1,98,200	2,04,800	2,17,000	22,73,200
DG Tax @ 20paise	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	96,000
Wind Off-site Capex tax 0.2 Rs per unit	1,03,591	1,57,071	2,16,321	2,59,640	5,38,876	2,90,289	2,08,571	2,78,994	3,71,082	1,60,136	2,24,004	2,18,176	30,26,754
Total Power cost	**2,54,66,063**	**2,17,46,221**	**2,37,66,892**	**2,29,63,626**	**1,76,10,689**	**2,49,65,371**	**2,66,97,525**	**2,08,70,831**	**1,16,48,920**	**1,88,76,886**	**1,65,17,749**	**1,74,24,909**	**24,85,55,681**

Fuel Cost

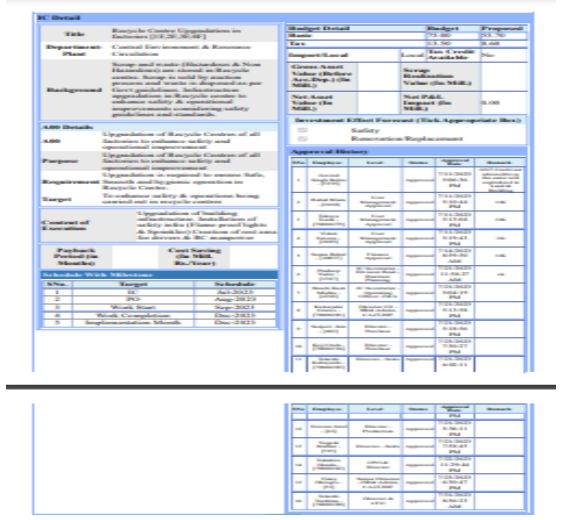
	April	May	June	July	August	September	October	November	December	January	February	March	Total / Avg
LNG (Kg)	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	14,400
LNG Rate	98.05	98.05	98.05	98.05	98.05	98.05	98.05	98.05	98.05	98.05	98.05	98.05	98.05
LNG Cost	1,17,660	1,17,660	1,17,660	1,17,660	1,17,660	1,17,660	1,17,660	1,17,660	1,17,660	1,17,660	1,17,660	1,17,660	14,11,926
Propane (Kg)	1,67,921	1,53,481	1,94,041	1,92,025	1,95,712	2,07,184	2,02,489	1,67,391	1,18,512	1,55,210	1,56,937	1,55,914	20,66,817
Propane Rate	69.25	69.25	69.25	69.25	69.25	69.25	69.25	69.25	69.25	69.25	69.25	69.25	69.25
Propane Cost	1,16,28,559	1,06,28,580	1,34,37,347	1,32,97,701	1,35,53,032	1,43,47,461	1,40,22,391	1,15,91,805	82,06,984	1,07,48,299	1,08,67,854	1,07,97,066	14,31,27,078
Propane + LNG Cost	**1,17,46,219**	**1,07,46,240**	**1,35,55,007**	**1,34,15,361**	**1,36,70,692**	**1,44,65,121**	**1,41,40,051**	**1,17,09,465**	**83,24,644**	**1,08,65,959**	**1,09,85,514**	**1,09,14,726**	**14,45,38,998**

Utility Cost

	April	May	June	July	August	September	October	November	December	January	February	March	Total / Avg
Total Utility Cost	**3,72,12,282**	**3,24,92,461**	**3,73,21,899**	**3,63,78,987**	**3,12,81,380**	**3,94,30,491**	**4,08,37,576**	**3,25,80,296**	**1,99,73,564**	**2,97,42,845**	**2,75,03,263**	**2,83,39,635**	**39,30,94,679**
Utility Cost / Veh.	225.29	205.13	186.42	186.17	145.43	170.32	184.06	177.50	175.59	196.85	185.50	188.61	184.16
Power Cost / Veh.	154.17	137.29	118.71	117.52	81.87	107.84	120.33	113.70	102.41	124.93	111.41	115.97	116.44
Fuel Cost / Veh	71.11	67.84	67.71	68.65	63.56	62.48	63.73	63.79	73.18	71.92	74.09	72.64	67.71
kWh / Veh.	29.05	27.54	24.90	25.47	25.48	23.83	23.96	24.89	31.23	26.12	26.31	27.10	25.99
Propane / Veh	1.02	0.97	0.97	0.98	0.91	0.89	0.91	0.91	1.04	1.03	1.06	1.04	0.97
LNG / Veh	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01

5 Meeting with Operating Head

6 Budget Approval



Target Setting is done and it is been approved by Board of directors

HO

1F

Energy Representative

2F

Energy Representative

3F

Energy Representative

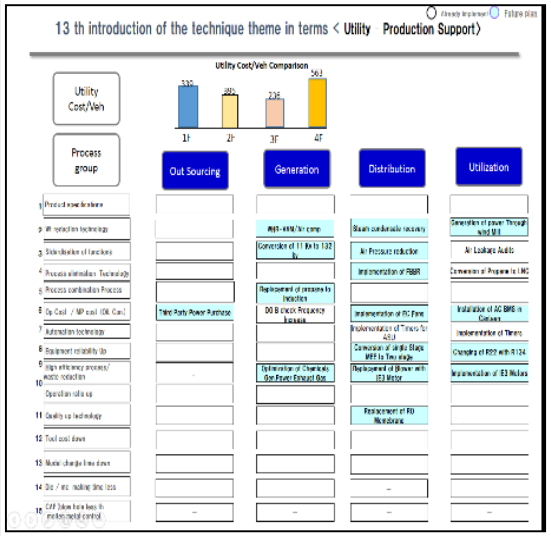
4F

Energy Representative

Synergy Meeting

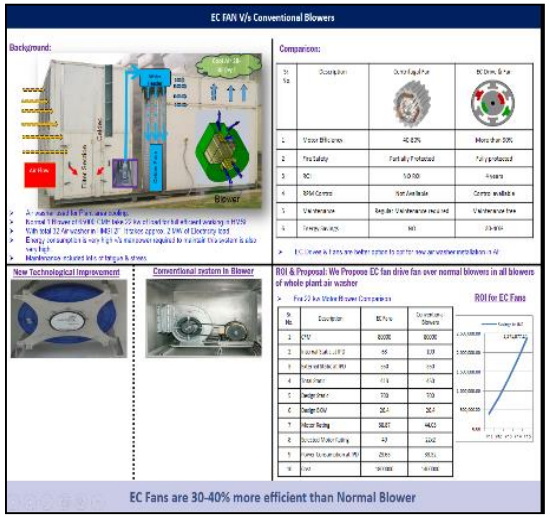
Cost Down Initiatives

Themes Discussion

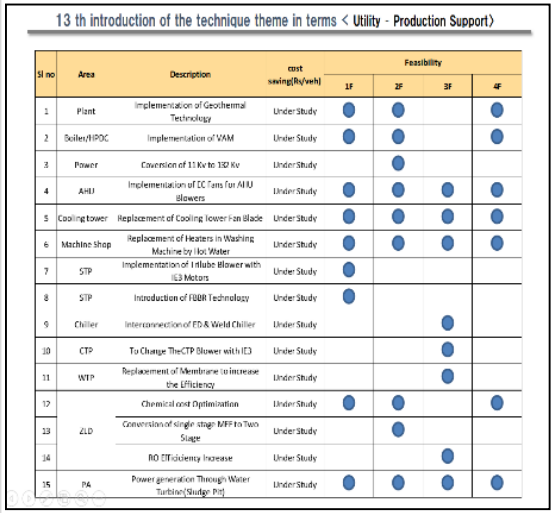


Feasibility Study

Applicable Themes



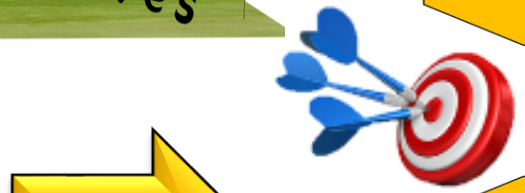
Summary of Themes



Final Submission

Cost Down Initiatives are discussed among all four Plants & data is shared till Directors

Purpose of Kaizen Activity



Evaluation Method

Monthly Kaizen
Idea Sharing: Associate

Monthly Kaizen
Checking of Kaizen Implement ability: Section Head

Monthly Kaizen
Filling of Kaizen Form: Associate

Monthly Kaizen
Genba: Section Head

Monthly Kaizen
Evaluation of Kaizen form by conducting Genba: Department Head

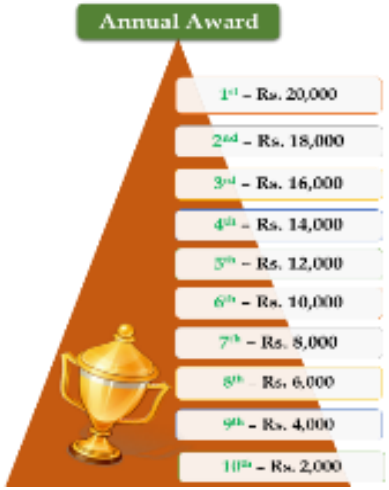
Half Yearly Evaluation
Evaluation of Kaizen Form: Cross Functional Committee

Half Yearly Evaluation
Selection of Top 10 Kaizens in each Half: Cross Functional Committee

Annual Evaluation
Annual Convention: Presentation to core steering committee

Annual Evaluation
Finalization of Top 10 Kaizens of the Plant: Core Steering Committee

Awards



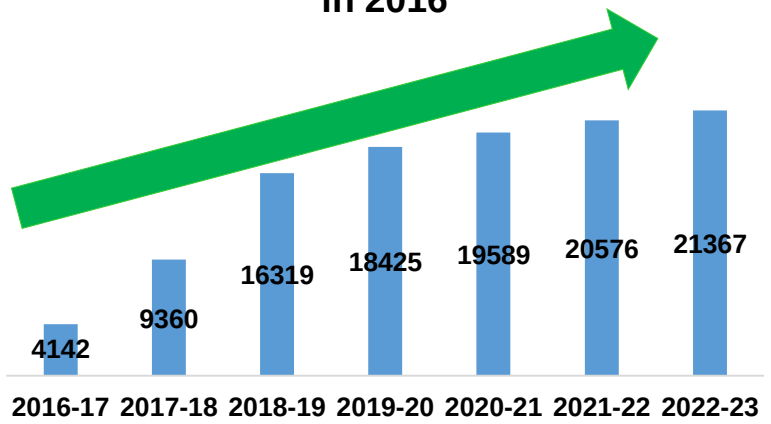
Recognition

1st prize winners will participate in

World Kaizen Convention

Kaizen Participation

Kaizen system started in Narsapura factory in 2016



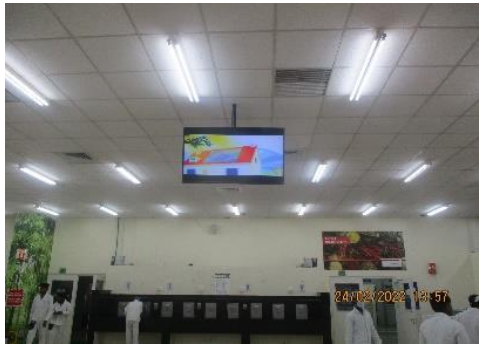
Kaizen is a part of our daily work routine

Energy Conservation Week Celebration – Apr'23

Purpose of Energy Week Celebration

- To create Awareness among associates and suppliers about Energy conservation
- To create Awareness about switching to renewable energy from non renewable energy.

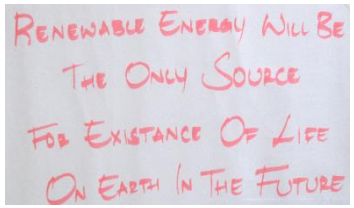
Glimpses of Energy Week Celebration



ENERGY WEEK ACTIVITY SCHEDULE - APRIL - 2023

Sl. No	Activity	17-Apr	18-Apr	19-Apr	20-Apr	21-Apr
1	Energy week banner display at all gates	✓				
2	Poster competition - Associate	✓				✓
3	Poster competition - Family	✓				✓
4	Slogan Competition - Kannada	✓				✓
5	Slogan Competition - English	✓				✓
6	Energy Conservation Scrap Model	✓				✓
7	Energy conservation commitment by signing on banner	✓				
8	Quiz competition			✓		
9	My Contribution towards Energy Conservation	✓				✓
10	EMS Co-ordinators self audit related to energy wastage	✓				✓
11	Environment Team Genba Audit(Air Leakage, Energy Waste)	✓				✓
12	Best Energy Co-Ordinator.	✓				✓
	PREPARED BY		CHECKED BY		APPROVED BY	APPROVED BY

Activities conducted during Energy Conservation Week



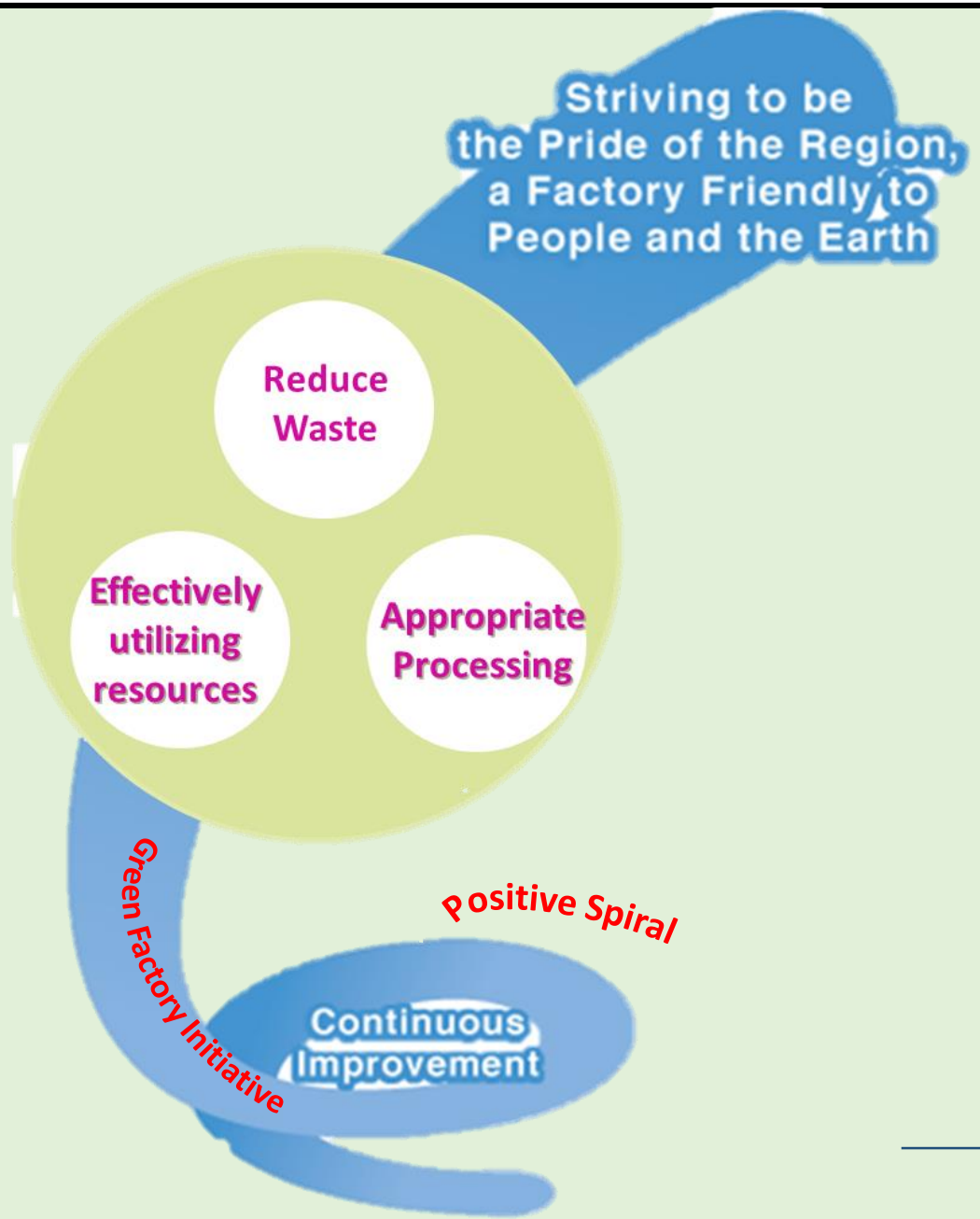
Total 1350 Participants in Energy Week Awareness Programmes

HMSI 3F

Table of Contents

	Contents	Slides	Time
01	Introduction & Energy Management Honda Global and HMSI presence, Honda's Environment journey, Honda's Commitment for Energy Excellence, Honda Motor's 2050 vision, HMSI Policies	01-03	1 min
02	Energy data Energy Resources, Specific Fuel Consumption, Internal and National Benchmarking	04-08	1 min
03	Encon Projects Zero Investment Encon Projects and Other Encon Projects	09-10	1 min
04	Innovative Ideas Development of High Gloss Paint, Introduction of Short length Oven in Paint Shop and New Zero B Welding Modification in Weld Shop	11-21	3 min
05	Renewable & Green Energy & GHG Emissions RE Introduction – 37 MW, 2.5 MW Solar Roof Top Panels 2022, 2.7 MW Wind Turbine Installation 2022, 5.4 MW Wind Turbine Installation 2023, GHG Benchmarking	22-27	2 min
06	Green Supply Chain and Capacity Building Green Purchasing Policy, Green Supply Chain activities and Green Supply Chain Road Map	28-34	2 min
07	Major Improvements, Review Mechanism, Employee Engagement Major Improvement themes, Performance review mechanism, employee engagement events	35-46	1 min
08	Way Forward Positive Spiral, Long terms energy and Environment Improvements	47	1 min

Way forward-Net Zero Energy and Carbon Negative



Scope 1 & 2 Emission Reduction

Thermal Energy Elimination

- Electrical Induction oven at paint shop -Sep'25

Renewable Energy

- 5.4 MW Wind Turbine -Aug'23
- 15 MW offsite solar -Oct'26

Scope 3 Emission Reduction

Supplier Emissions reduction

- Supplier RE Utilization -Nov'25
- Supplier CO2 benchmarking -Dec'24

Upstream activities

- CNG based trucks -Jan'26

Products

- Introduction of EV -May'24

Employee Commute

- CNG buses for employee commute -Dec'24
- EV buses for employee commute -Jan'26

Let’s make a better tomorrow for our Future Generation……

THANK YOU

It is in our hand to protect our beautiful earth

Contact Details : Kishore N
Ph. No: 7259083337, E Mail: kishore.n@honda2wheelersindia.com