HMSI 3F

Honda Motorcycle and Scooter India Pvt Ltd, Narsapura

CII National Award for Excellence in Energy Management 2021

BLUE SKIES FOR OUR CHILDREN

Presented by

1. M V N Purushottam Sarma - Div. Head - Plant Engineering
2. Ch. Sankar - Sec. Mgr. - Facility Operation
3. Sriram Karikkat - Sec. Mgr. - Environment

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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

Automobiles

Motorcycles

Power Products

Robotics

Honda jet

Aero Engine

HONDA MOTORCYCLE AND SCOOTER INDIA

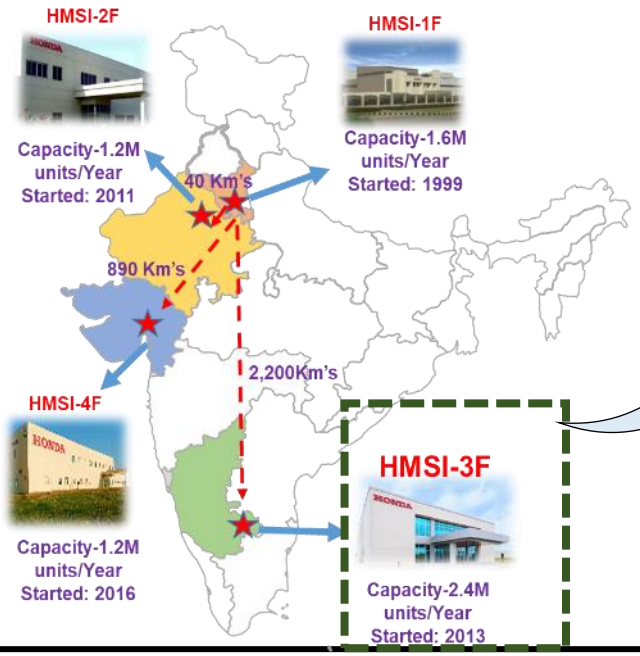
OVERALL HMSI

Total 4 Factories in India

Capacity 6.4 mil units/year

Associates 24,000 people

Activa Sales 2.4 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 Most Innovative Project and Most Useful Project Award at CII Environment Best Practices Award 2018, 2019 and 2021
- Won Excellent Energy Efficient Unit and Innovative Project at CII National Award for Energy Excellence 2018 and 2019

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

1970

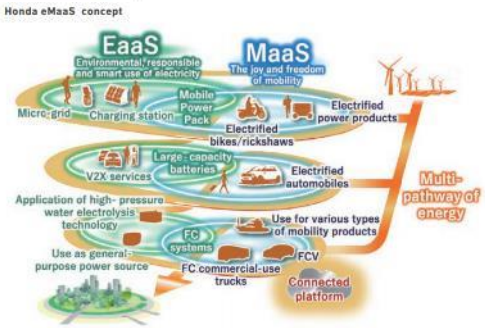
THE Clean Air Act

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

Carbon Neutrality
CO_2 emissions, Net zero
2050

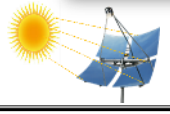
Clean Energy
100% utilization of carbon free energy

Resource Circulation
100% use of sustainable materials

Water

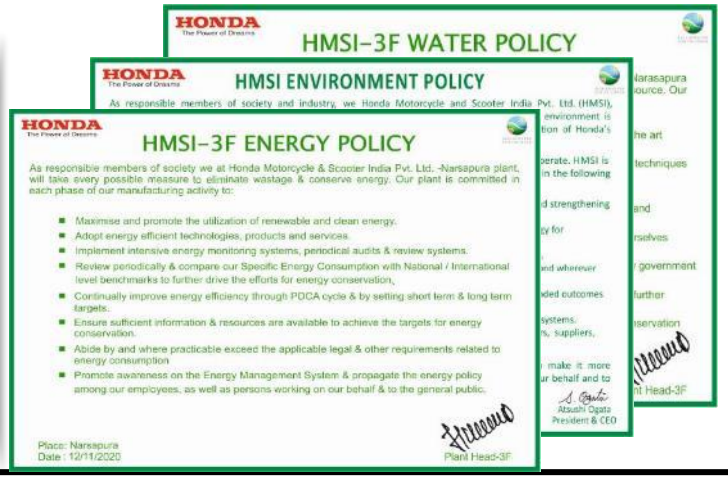
Rain water harvesting & Reuse

Energy



Waste

Co-processing



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

Key policy highlights

Use of renewable energy

HONDA
The Power of Dreams

HMSI–3F ENERGY POLICY

As responsible members of society we at Honda Motorcycle & Scooter India Pvt. Ltd. -Narsapura plant, 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.
- 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.
- Abide by and where practicable exceed the applicable legal & other requirements related to energy consumption
- 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.

Place: Narsapura
Date : 12/11/2020

Plant Head-3F

Use of Energy saving equipment's

PDCA Approach

Use of monitoring systems

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

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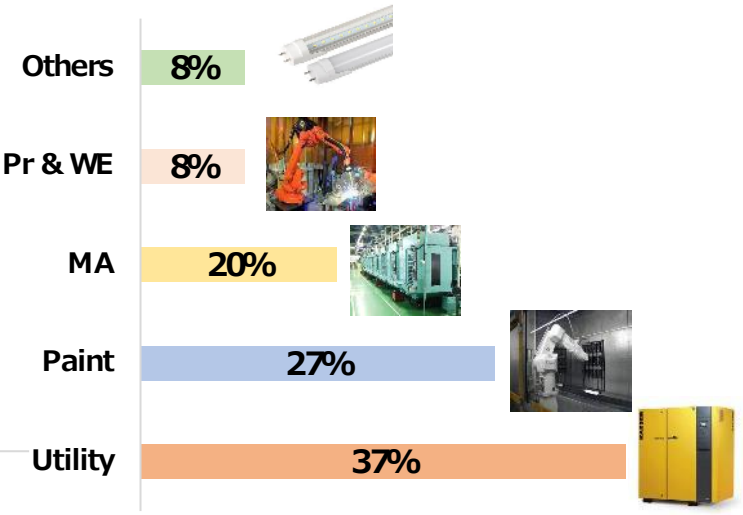
Energy Resources being used in HMSI Narsapura

Electrical

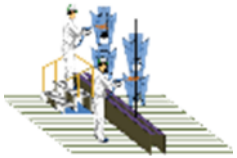
Thermal

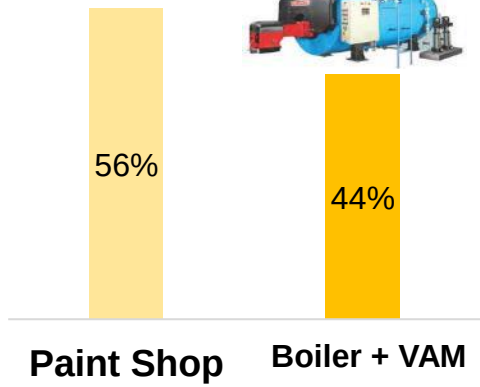
Total Energy usage pattern

Electrical Energy usage pattern



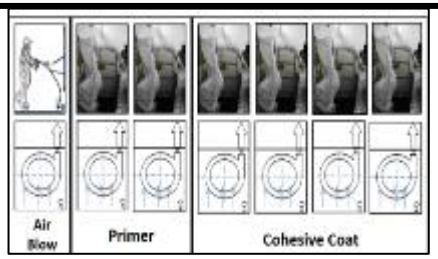
Thermal Energy Usage pattern





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

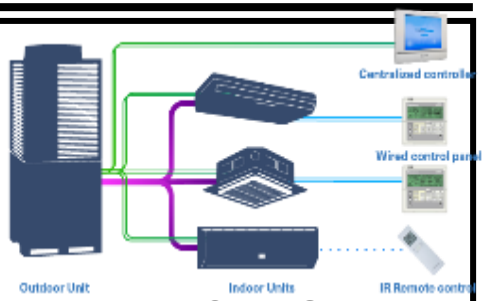
Specific energy consumption-Electricity



cohesive painting technology

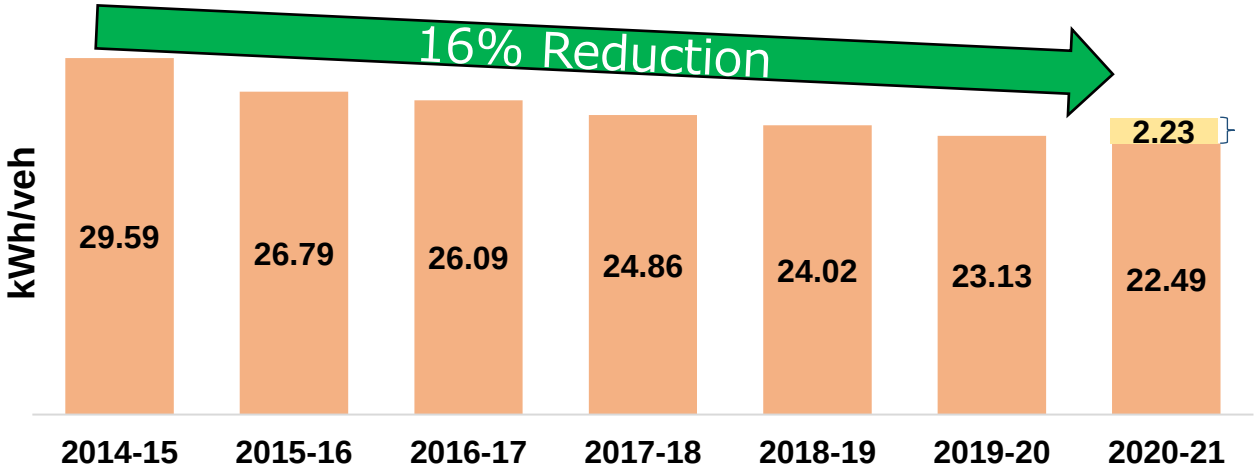
Compressor heat recovery for Vaporizer

VAM for Paint



AC BMS

Electricity kWh/Veh



COVID impact

Due to COVID impact kWh/Veh has increased

VFD for major load

VFD for major load

EMS system

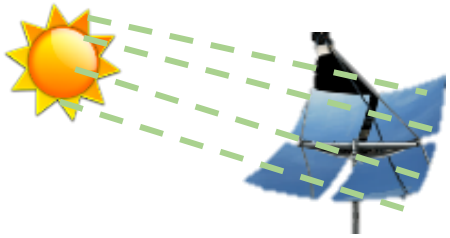
energy Kaizen

Specific Electrical consumption is in reducing trend. Last three year reduction is 9.5% excluding COVID impact

Specific energy consumption-Propane

VAM for Paint Shop

Magnetic Resonator

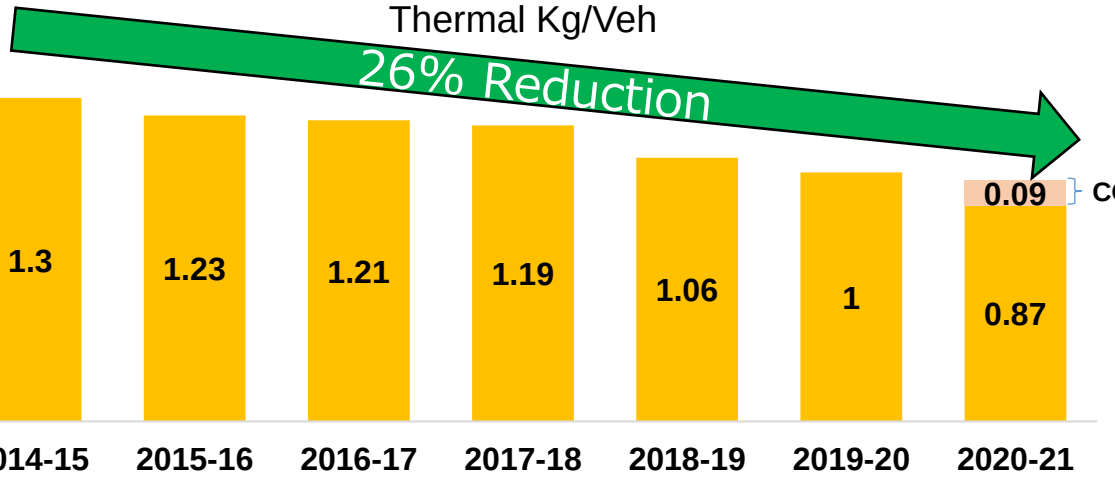


Solar Dishes

NATURAL GAS

LNG

HWG



3 year reduction 9%

Compressor heat recovery for hot water generation

WHE

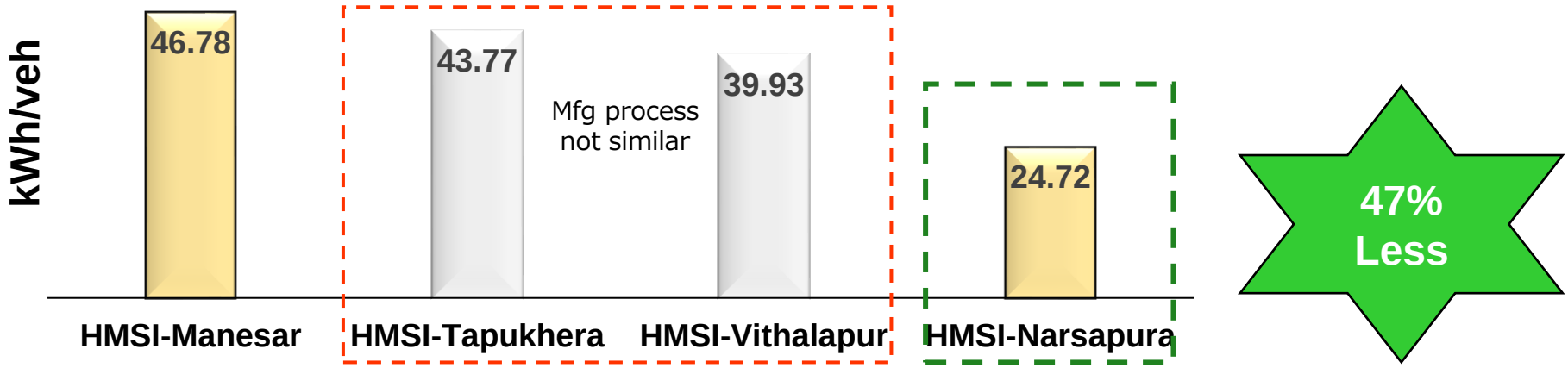
OPTIMIZATION OF MEE

OPTIMIZATION OF ETP

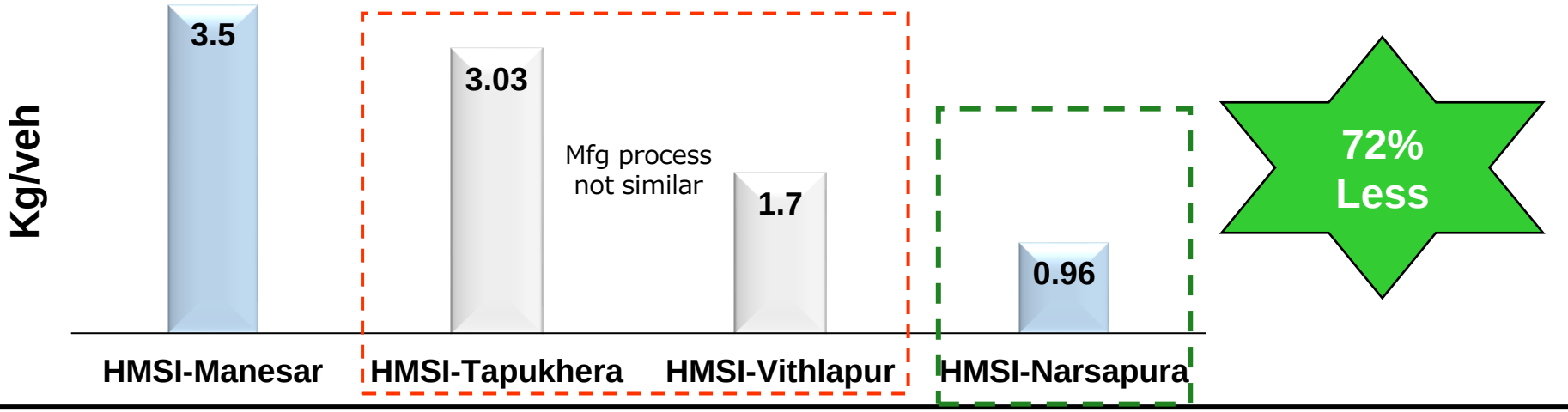
Specific propane consumption is in reducing trend. Last three year reduction is 19.33%

Specific Energy consumption-Internal Bench marking

Specific Power consumption



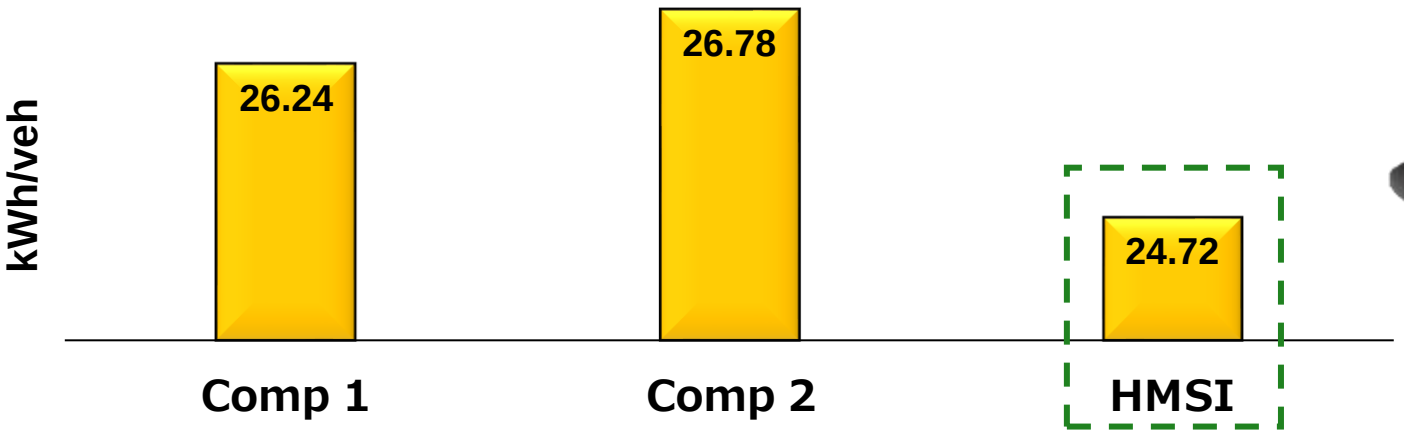
Specific Propane consumption



We are bench mark for all the HMSI factories in India

Specific Energy consumption-National Bench marking

Specific Power consumption



Our target

Specific Propane consumption

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 bench mark

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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
			GHG emission, tons CO2	54.4			
Total					**0**	**1636**	

Without Investment Savings – 1636 Lakhs/Annum

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	8330			
2	RE	Hot water generation through solar dishes	Renewable energy, kWh	146000	250	134	Sope 3 emission reduction on propane transport. Impact reduction due to market rate fluctuation and fossil fuel dependance
			GHG emission	681			
3	RE	Waste heat Evaporator in ETP	Thermal energy, Mill KCal	102000	250	100	Waste water treatment is a Legal Compliance which is a 24 X 7 requirement. Through solar sludge drying, the risk of dependency on a single fossil fuel for wastewater treatment is reduced
			GHG emission, tons CO2	607			
4	RE	Solar solution for sludge drying	Thermal energy, Mill KCal	55000	30	55	Improvement in safety wrt handling of propane
			GHG emission, tons CO2	317			
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	Installation of EC Fans	Electrical energy, kWh	222750	75	15	Less Maintenance intensive as the technology is electrically controlled
			GHG Emissions, tons CO2	162			
8	EE	Power Factor Improvement to 0.99	Electrical energy, kWh		29.5	12	Fixed charges has been reduced in Electricity bill
			GHG Emissions, tons CO2				
9	EE	Robotic Washing Machine in Machine Shop	Electrical energy, kWh	1117292	83.1	75	Quality improvement in machine shop process and reduction in market complaints of the product
			GHG Emissions, tons CO2	811			
10	EE	Installation of VFD in Paint Shop	Electrical energy, kWh	142560	2	1.0	Reduced wear and tear of the motors and less preventive maintenance required
			GHG Emissions, tons CO2	104			
11	EE	Hot Water Generator for Paint Shop	Thermal Energy, Mill KCal	923	45.6	25.5	
			GHG Emissions, tons CO2	201			
12	EE	Air Dryer Optimization	Electrical energy, kWh	970000	28	65	
			GHG Emissions, tons CO2	725			
Total					**4091**	**1297**	

With Investment of 4091 Lakhs/Annum, annual savings of around 1297 Lakhs achieved

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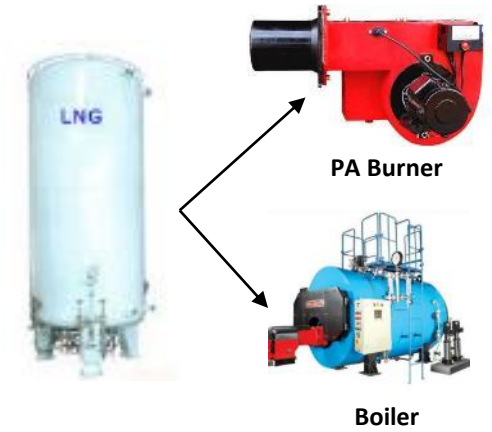
Innovative Project 01 – Elimination of Boiler usage

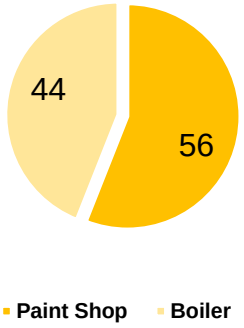
Honda Narsapura is having two Paint Shop consisting of three Electro Deposition lines (2 ACED & 1 CED)
High temperature hot water (80°c) is required for ED process

Thermal Energy Usage Pattern

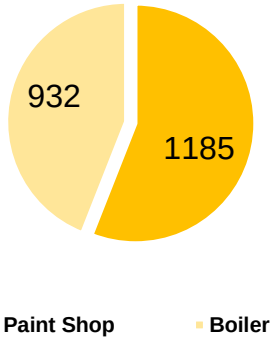
Thermal Energy Application



Thermal Energy Consumption in %

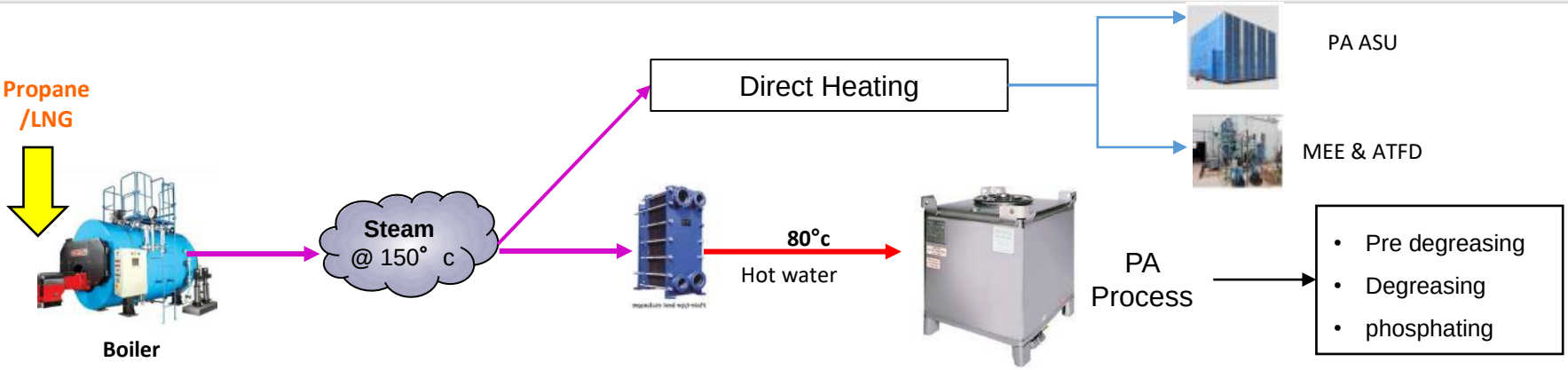


Thermal Energy Consumption / Annum in MT



- All the steam requirement of HMSI 3F is met through 3 boilers installed.
- 2 boilers run and generate steam and one boiler will be on stand by.
- 64 MT of steam consumption per day.
- 270 Kg/day of thermal fuel consumption.

Areas of steam usage

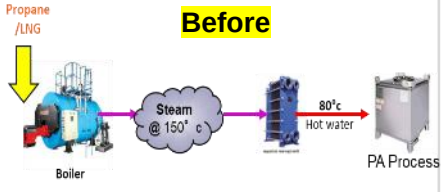


Hot water is generated by boiler steam (use LNG)

Step 1: Reduction Recovery & Reuse of Thermal Energy

Usage of renewable energy in replacing thermal energy requirement

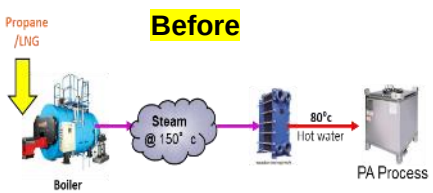
Waste Heat Recovery from Air Compressors



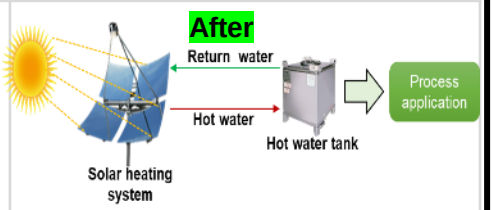
- Total Heat requirement: 99 Million Kcal/Day

- Total Heat requirement replaced: 19.2 Million Kcal/Day

Installation of Solar dishes

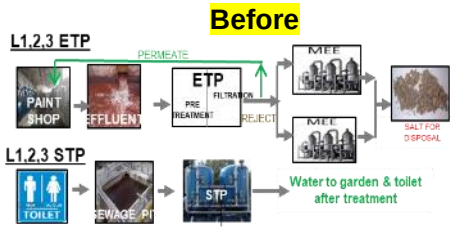


- Total Heat requirement: 79.8 Million Kcal/Day

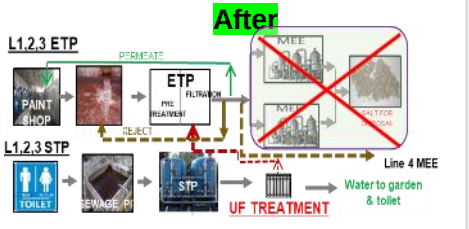


- Total Heat requirement replaced: 4.8 Million Kcal/Day

Reduction of steam through optimization of MEE

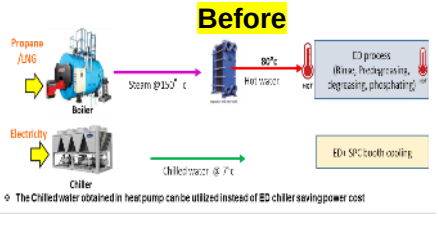


- Total Heat requirement: 75 Million Kcal/Day

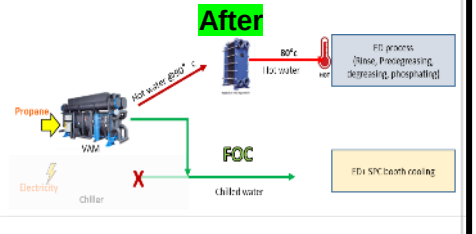


- Total Heat requirement replaced: 30 Million Kcal/Day

Reduction of steam consumption through installation of VAM

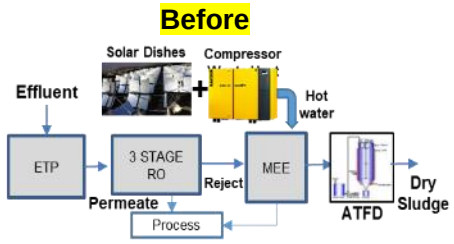


- Total Heat requirement: 45 Million Kcal/Day

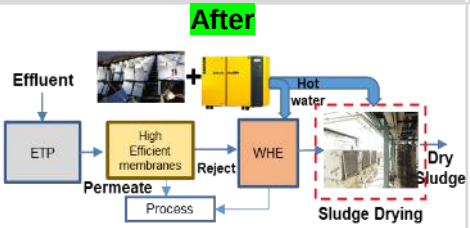


- Total Heat requirement replaced: 17 Million Kcal/Day

Replacing steam with new technology: Rochem membranes, WHE & sludge dryer



- Total Heat requirement: 28 Million Kcal/Day



- Total Heat requirement replaced: 8 Million Kcal/Day

Steam Savings

79 Mill Kcal/Day

126.3 Mill Rs/Annum

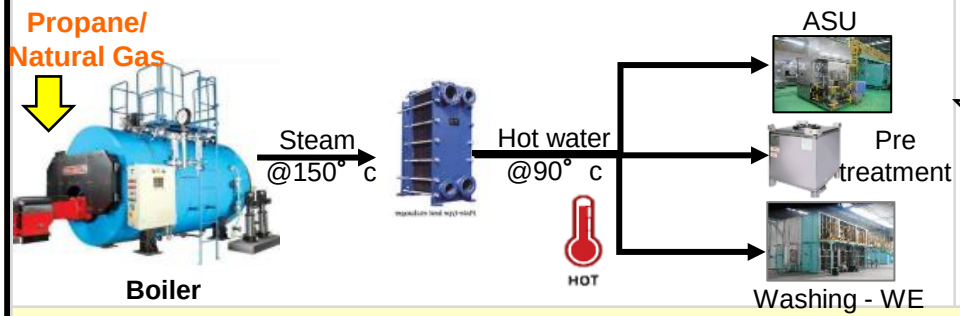
172.5 Mill Rs/Annum

Total heat requirement of the factory is 99 Mill Kcal/day. Out of which 79 Mill Kcal/day has been replaced with various Technological initiatives

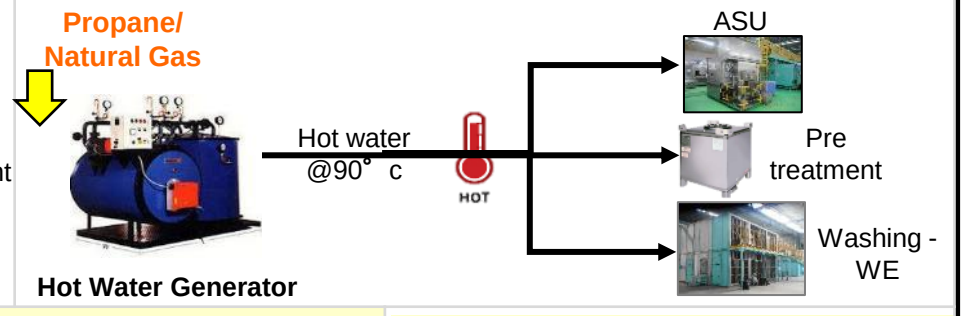
Step 2: Elimination of Boiler through hot water generator

HMSI 3F is having 3 boilers (2 running & 1 standby) which generates steam by using LNG as fuel
Hot water (90° c) required for pretreatment is made through steam from boilers.

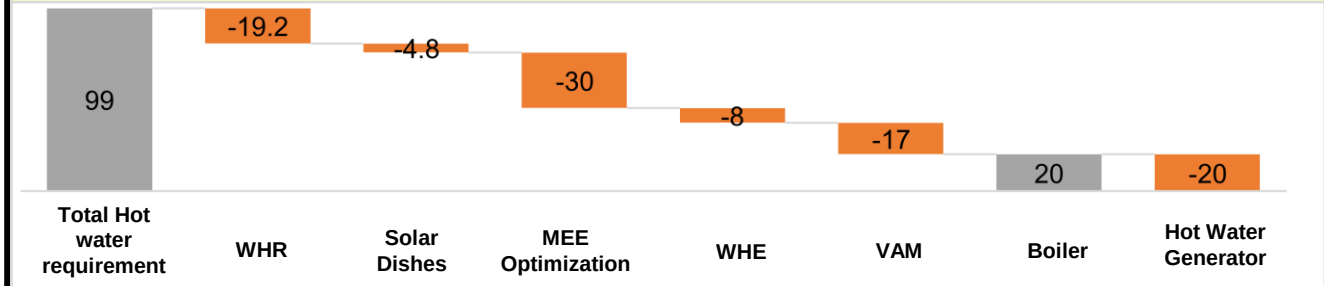
Before: usage of Boiler for hot water generation



After: Elimination of boiler for hot water generation



Thermal Load Breakup in Mill Kcal/day



Highlights of the project

ENERGY SAVING

71 tons LNG per annum

MONEY SAVING

25.5 lakhs Rs / Annum

STEAM

Elimination of usage of steam inside the shop floor

INVESTMENT

45.6 Lakhs Rs / Annum

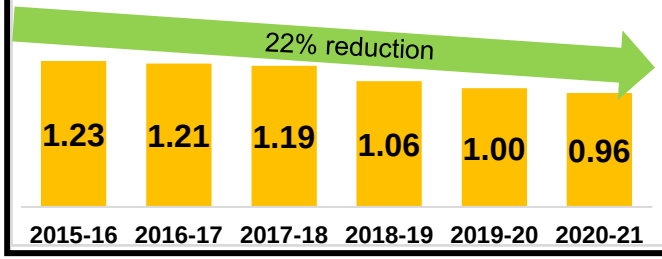
CO_2 REDUCTION

201 Tons / Annum

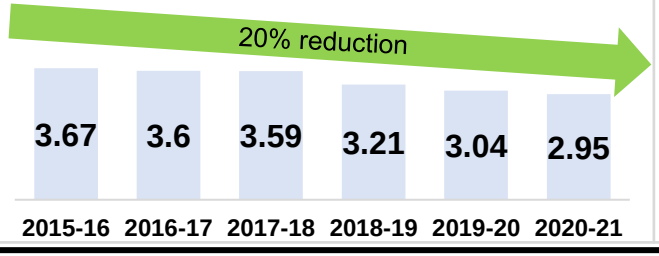
ROI

20 Months

Fuel Consumption Kg/Veh



Thermal energy, CO2 Kg/Veh



20 Mill Kcal/day of heat requirement is met through conversion of existing boiler into hot water generator

Innovative Project 02: Air dryer optimization in Paint shop

HMSI Narsapura is having 3 compressor houses and 14 compressors through which compressed air is supplied to whole factory.
One major area of compressed air consumption is paint shop where compressed air is used for robotic painting

Present condition

Compressor House

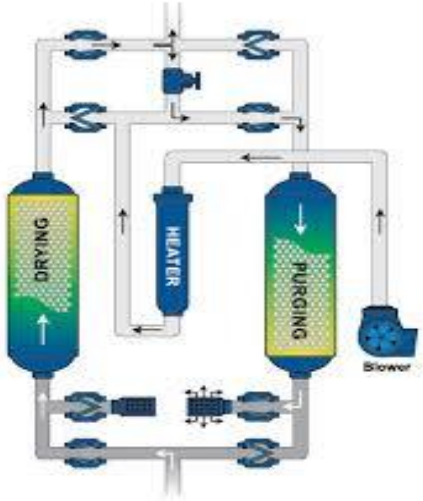
PA Desiccant Dryers

Robotic Painting

- Robotic painting process require dry compressed air (zero moisture content) for painting process.
- Any contaminants in the air will affect the paint quality and damages the painting equipment's.

Process requirements

Air dryer Timer based control



- Currently 11 desiccant air driers are used for robotic painting process.
- The desiccant air driers undergo time-based regeneration cycle to expel the absorbed moisture.
- Purge air is discharged every 5 mins during regeneration cycle

Challenge

Huge amount of compressed air loss due to purging

Energy wastage due to air loss

Zero tolerance towards affecting paint quality

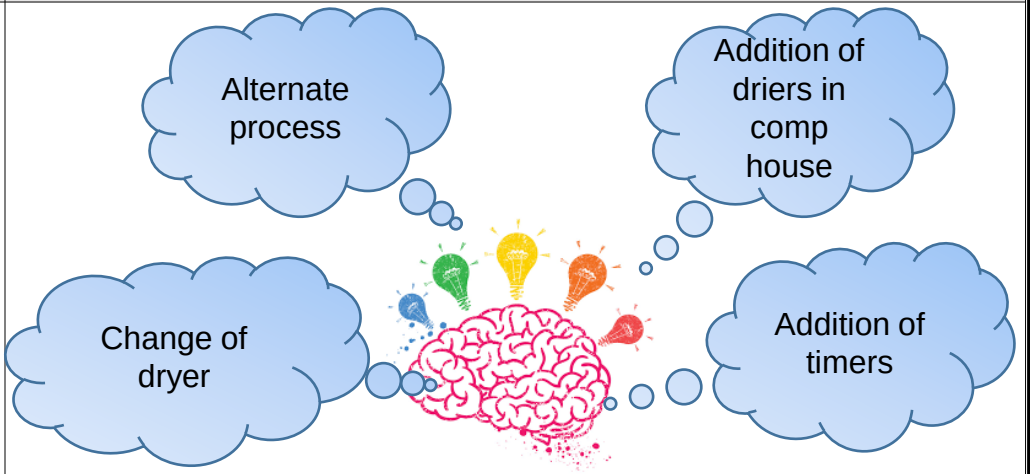
Current time-based regeneration cycle was highly energy consuming due to huge amount of compressed air loss during purging

Air dryer optimization in Paint shop

Need for regeneration cycle

- Robotic painting requires dry compressed air. Any moisture in the air will affect robot efficiency.
- Chances of part failure due to the presence of moisture
- Moisture in the air will affect the quality of painting.

In-house Idea generation



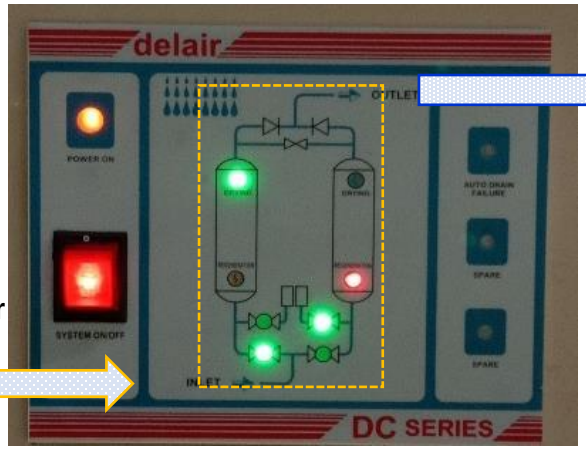
Idea validation

Idea	Pros	Cons	Judge
Addition of driers in compressor house		Drier addition is high investment. Dew point requirement at paint shop is -60^{0}C	X
Reduction of frequency of regeneration through change in timer setting		Chances of affecting paint quality resulting in production loss	X
Change of drier from desiccant drier to refrigerant/membrane drier		High investment and risk of not meeting quality requirements	X
Alternate process Dew point based regeneration cycle	Purging time can be increased and air energy loss can be reduced.		O

Usage of alternate process was judged as successful to achieve the targets
Trials were taken by changing frequency of purge cycle from time based to dew point based regeneration

Air dryer optimization in Paint shop

Proposed idea (Quality-based regeneration cycle)



Moist air IN

Dry Air Out to Process

Resources used

In house expertise

Quality confirmation from QC-HO

Current process

By installing dew point meter, regeneration time has been increased

- In the revised process, dew point meter has been added in the system.
- Increase in the regeneration cycle frequency from every 5 mins to every 35 mins.
- Compressed air loss reduction and energy savings.

Benefits

ENERGY SAVING

9,70,000 Kwh of electricity

MONEY SAVING

65.18 lakhs/annum

CO_2 REDUCTION

725 Tons/year

INVESTMENT

28 Lakhs

ROI

5 Months

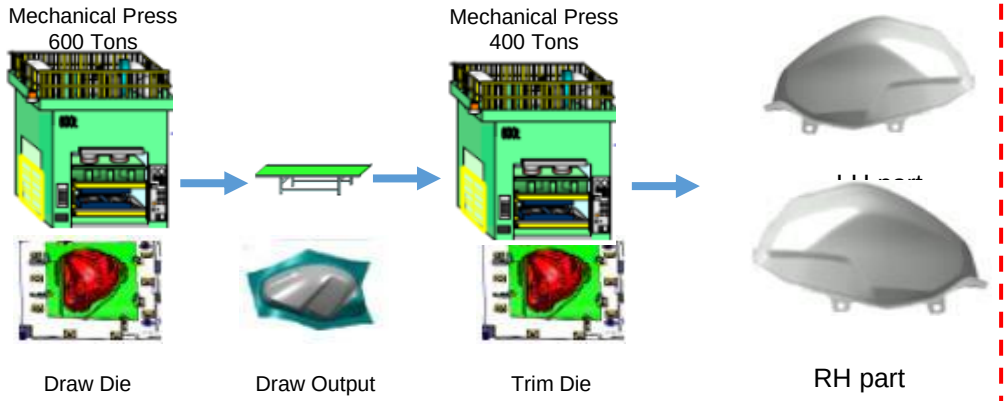
All driers have been converted from time based to quality-based regeneration. Project horizontally deployed to all other Honda factories

Innovative Project 03: Elimination of Zero B Welding in front fender

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.

Present condition

Press Shop Process



Weld Shop Process

Challenges:

- High utility cost due to more operations involved in weld process.
- High manpower requirement to meet the requirement of production.
- Space constraints as more machine required in the weld process.
- More dust, fumes due to more weld process involved.
- More material movement i.e press shop – weld shop – paint shop
- Consumption of welding consumables and gas is more.

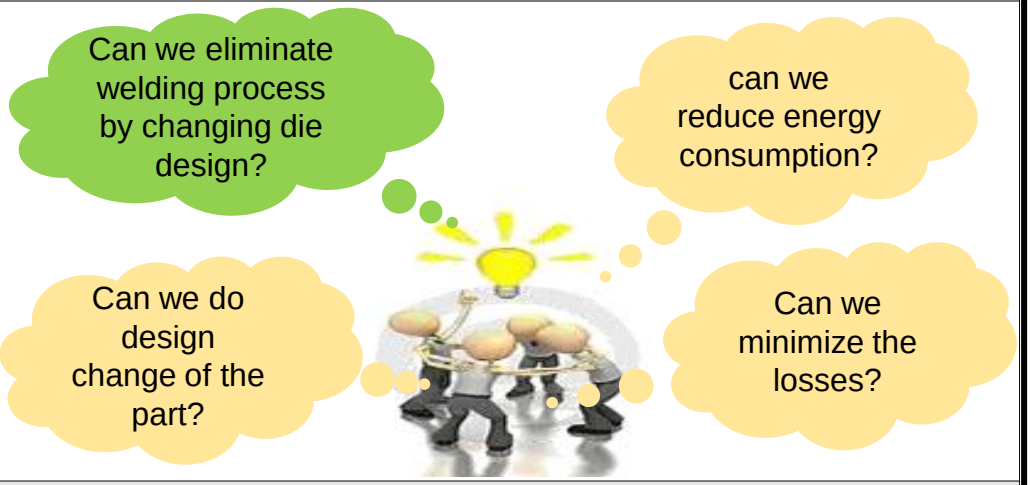
Energy consumption is more due to more welding process involved in the current process

Elimination of Zero B Welding

Need for Zero B Welding

- Zero B welding required to joining left & right part of front fender of KWPM model.
- To improve aesthetic of the vehicle
- Single shot deep draw is very challenging.

In-house Idea generation



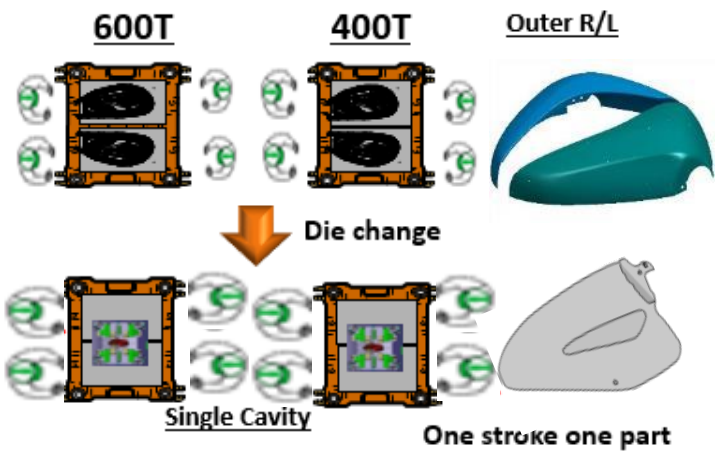
Idea validation

Idea	Pros	Cons	Judge
Can we reduce energy consumption by changing robot welding to manual		Quality of the welding is utmost important as it would affect sales of the vehicle	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?		Design change is not approved due to it will impact on the sales of the vehicle.	X
Can we eliminate welding process with changes in die?	By modifying the die, it is possible to produce the front fender in press shop itself and Zero B welding can be eliminated completely.		O

Without changing the design of the part, die modification done to eliminate Zero B Welding of front fender

Elimination of Zero B Welding

Proposed idea (Elimination of Zero B Welding)

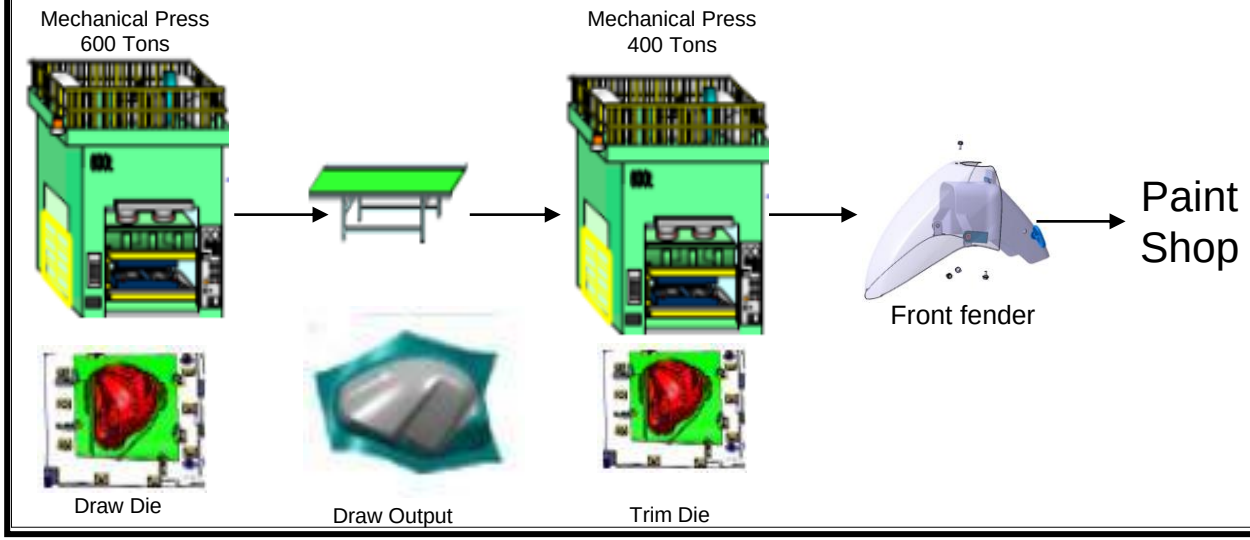


Challenges and countermeasure

Challenges	Countermeasure
Appearance of the front fender can not be changed by Honda R&D due to huge sales demand of the vehicle and risk of negative market feedback	Without changing the design of the part it is possible by changing die
Draw depth of the die is more approx. 230mm.	For more deep draw gas springs can be used and can be implemented
Single shot deep draw is very challenging	Management support extended for trials and success in Narsapura factory

Current process

Press Shop Process



Benefits

9,34,615 kWh of electricity

60.75 lakhs/annum

698 Tons/year

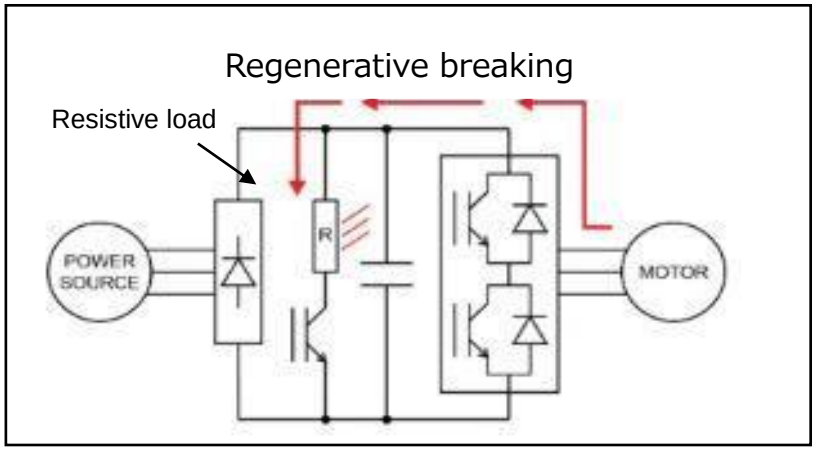
0 Lakhs

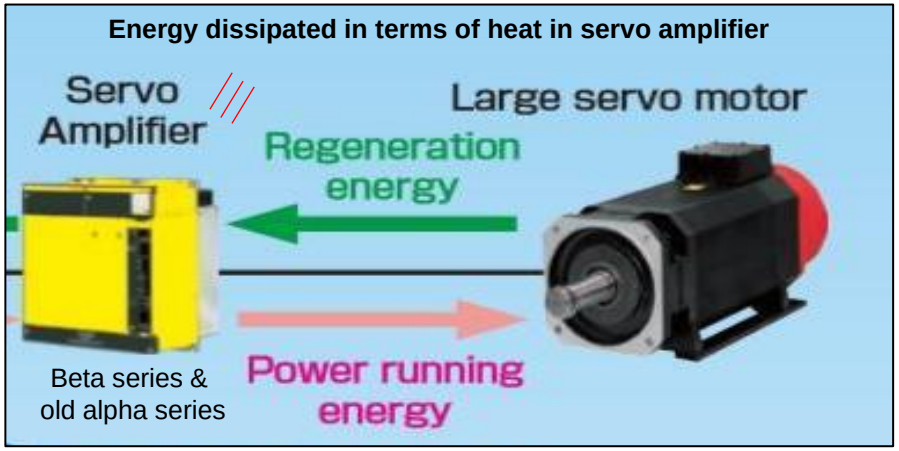
5 Months

Press Shop modification done for deep draw operation and welding process eliminated. Project horizontally deployed to all other Honda factories

In CNC machines, the energy regenerated by motors wasted in terms of heat dissipation which can be reused for operations to reduce the energy consumption

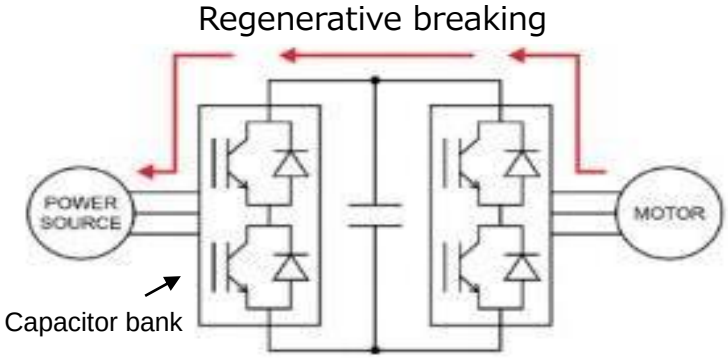
PRESENT CONDITION :

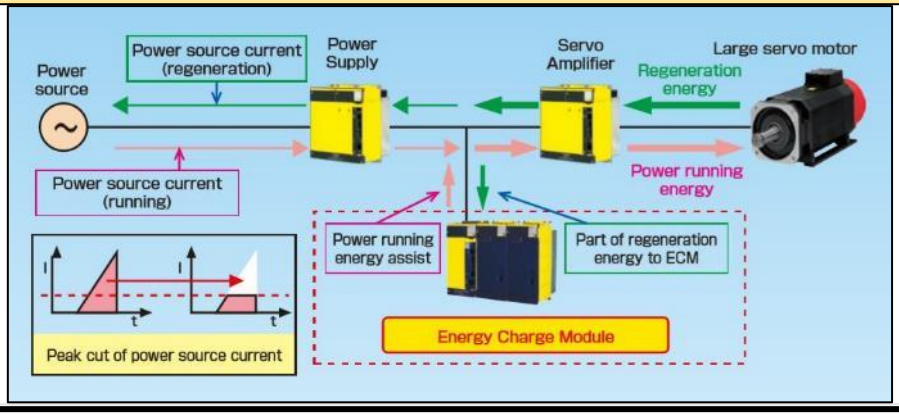




- The servo motors are continuously accelerating and decelerating as the axis change direction during machining
- During **accelerating** the motors draw energy from electrical system and during **decelerating** their kinetic energy is converted back into electrical energy ,historically **dissipated as heat in a resistive load**

ADVANCED CONCEPT DEVELOPED BY FANUC IN ALPHA I SERIES DRIVES TO REUSE THE REGENRATIVE ENERGY

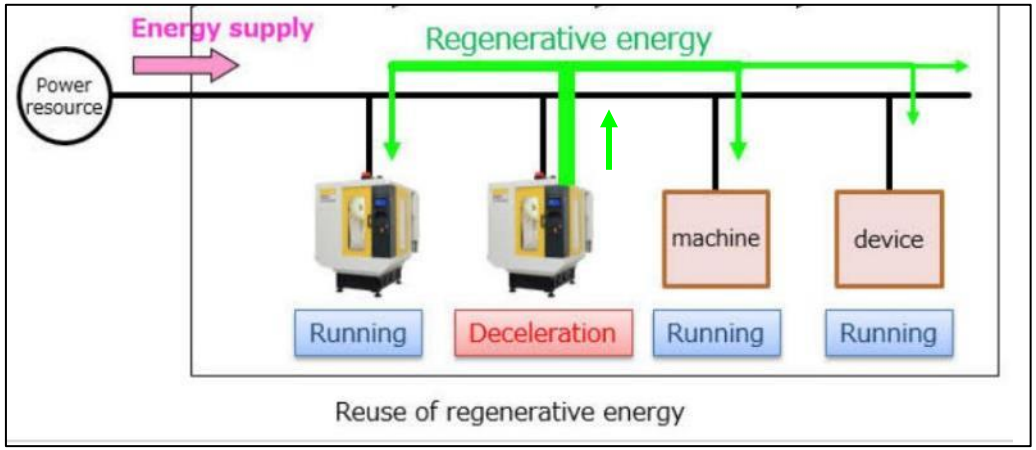




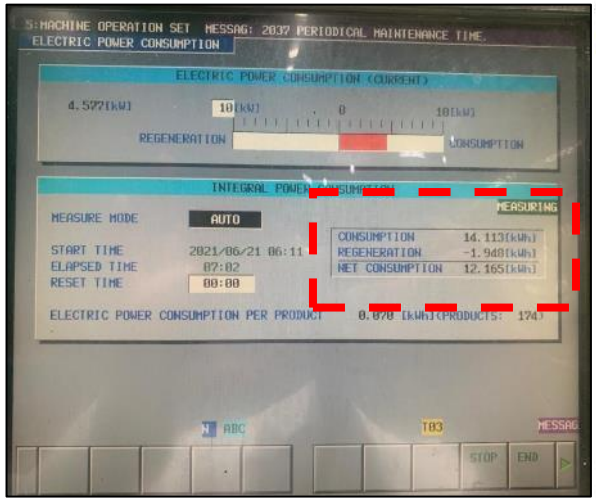
Power regenerated during decelerating stored in capacitor bank and used during accelerating

ENERGY SAVING CONCEPT IN HMSI:

- During BS6 Modification for **New robo drill machines** incorporated the energy saving concept .

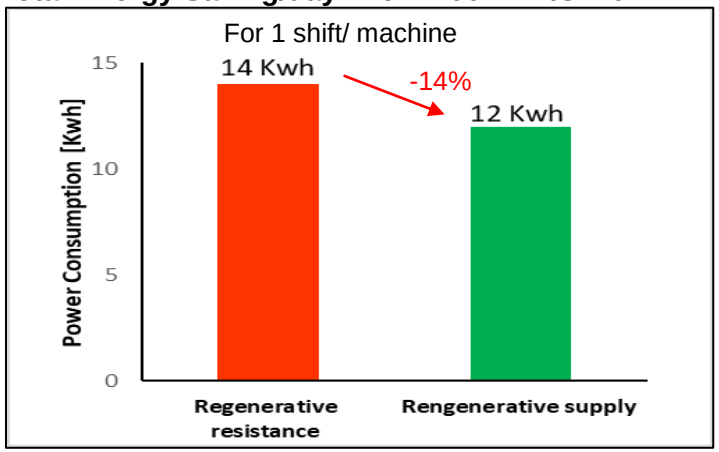


Energy consumption and saving display in machine through regenerative method



- All new robo drill machines have energy Saving through regenerative method during decelerating

Total machines : 45 Nos
Energy Consumed /shift /machine : 14Kwh
Regenerative Energy utilized : 2 Kwh
Total Energy Saving/day : 45*2 =90Kwh /shift



Benefits:

72,900 Kwh of electricity /annum

54.4 Tons/year

5 lakhs/annum

Through the above concept, with these new drives, the energy generated through regenerative system is been reused

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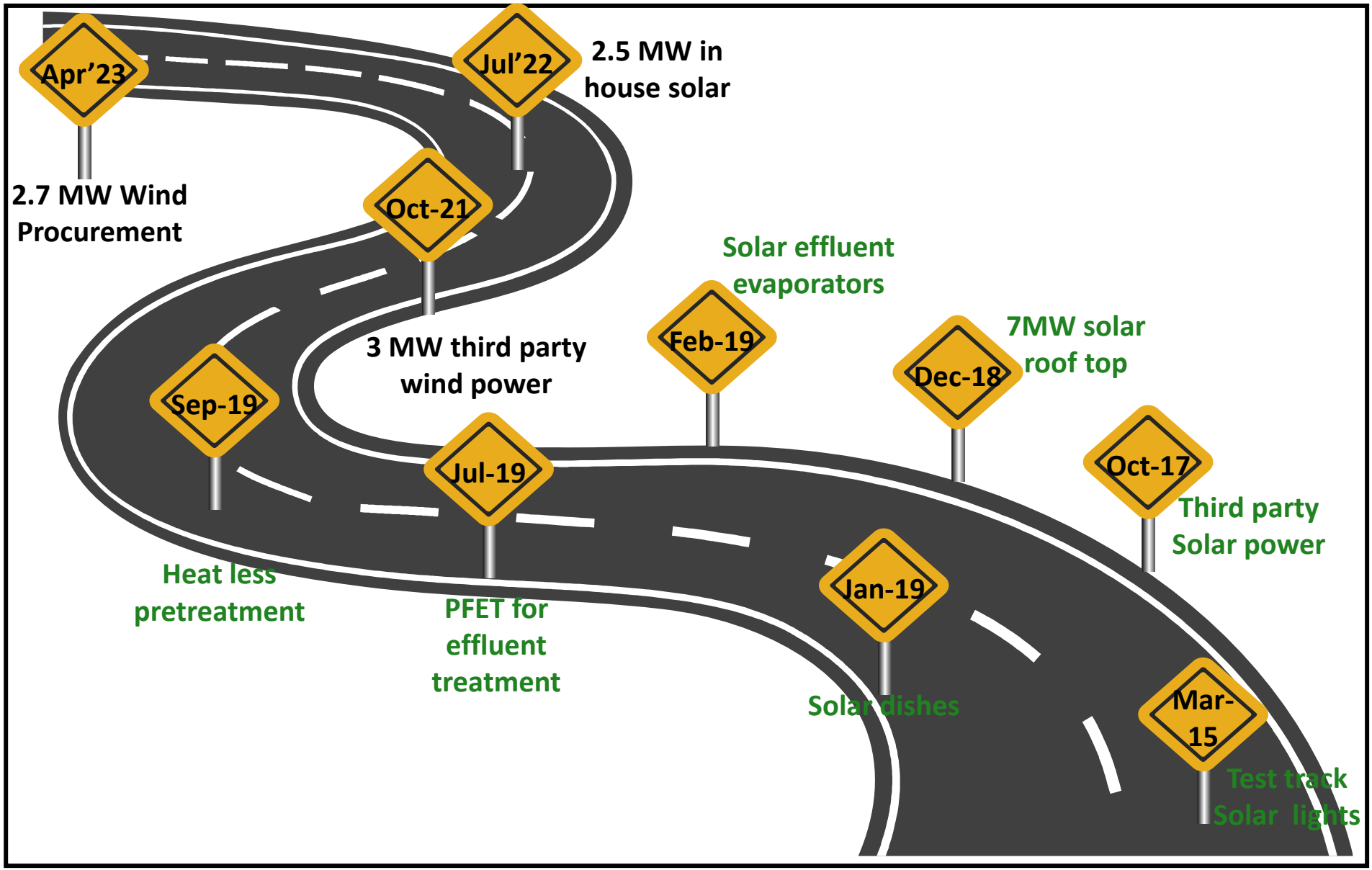
Renewable Energy Usage in Narsapura Plant



2020 target of substituting 70% energy with RE already achieved
Strong road map available to achieve the target of 100% RE

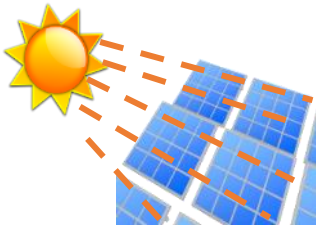
Renewable Energy Usage in Narsapura Plant

- Third party solar power purchase to meet Plant Power requirement
- The agreement is for a period of 10 years
- Plant located ~200 KM away from factory
- Plant Capacity is around 40 MW

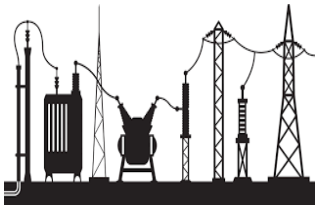
Site Photos

OM Copy

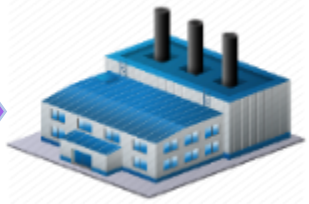
PPA Signing



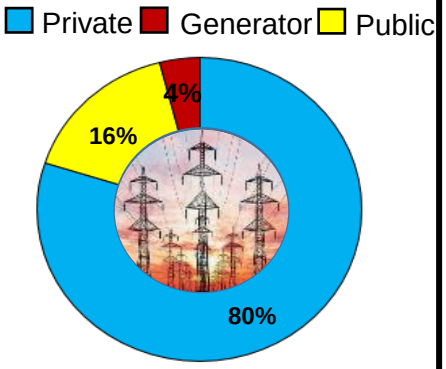
40 MW Plant



Govt. Network



HMSI 3F



440 lakh kWh

1078 Lakh Rs/year

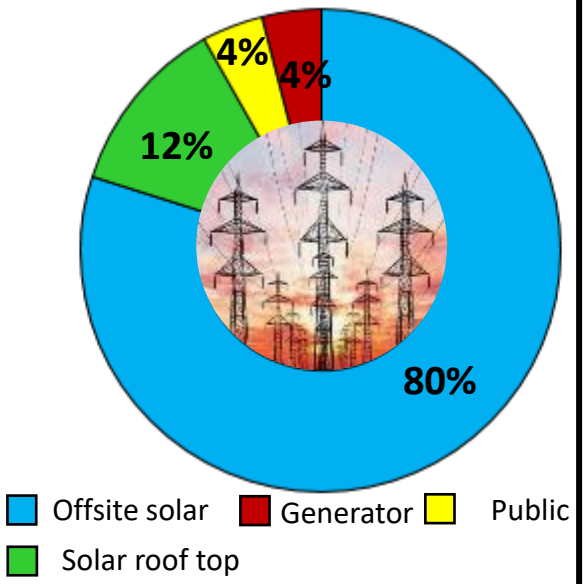
37,000 ton/ annum

Zero

-NA-

This is Zero Investment project. Overall 440 Mill kWh from solar energy to meet 80% power requirement

On-site RE Generation-7MW solar roof top plant



- **7MW Solar Roof Top Installation done on Factory Roof Top.**
- **The installation of On site solar power plant was completed in Dec 2018.**

Key project highlights

88 lakh kWh

580 lakh Rs/year

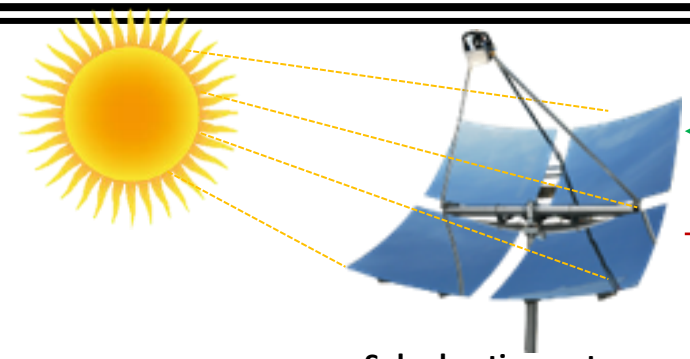
8330 ton/ annum

287 lakh Rs

59 Months

7 MW solar rooftop to meet 12% of total electrical requirement

Hot water generation through Solar energy



Thermal energy utilization

- Total **300 numbers of dishes** are installed in the factory , which is been distributed in Four Locations .

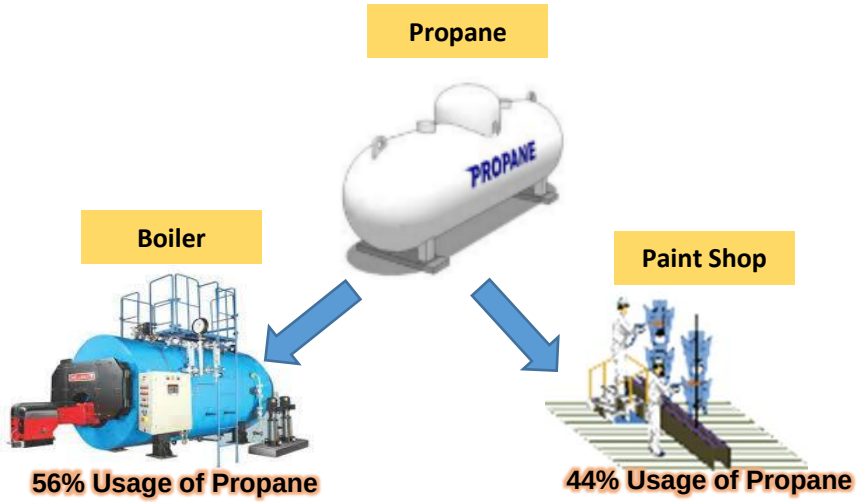
Key project highlights

ENERGY SAVING	MONEY SAVING	CO_2 REDUCTION	INVESTMENT	ROI
292,000 kg	134 Lakh Rs/year	681,000 kg/annum	280 Lakh Rs/year	25 months

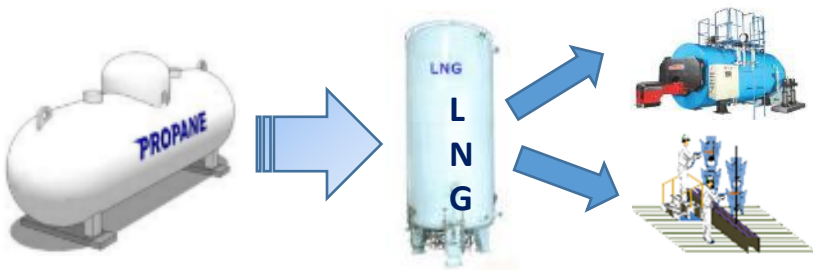
Propane cost has been reduced by implementing Solar Dishes in Factory

Conversion of Propane to LNG

Background & Situation Analysis



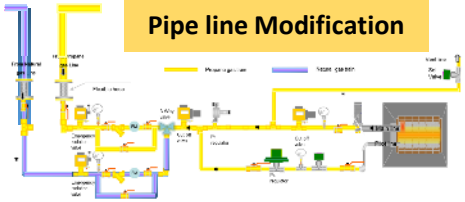
Proposal



❖ Calorific Value of LNG is more compared to Propane.

❖ Greener ,cheaper & Safer fuel compared to propane

Pipe line Modification



Site Photos

Installation of Yard & SCADA

❖ Separate Lines are laid in Shop floor for LNG usage (1300 mtrs).

❖ Burner Modification has been done.

Benefits

Investment	700 Lakhs
Saving	280 Lakhs
ROI	30 months

158 Tons of propane/annum | **283 lakhs/annum** | **739 Tons/year** | **700 Lakhs** | **30 Months**

Continuous cost reduction initiatives taken to reduce utility cost.

Propane Heating→ LNG Heating

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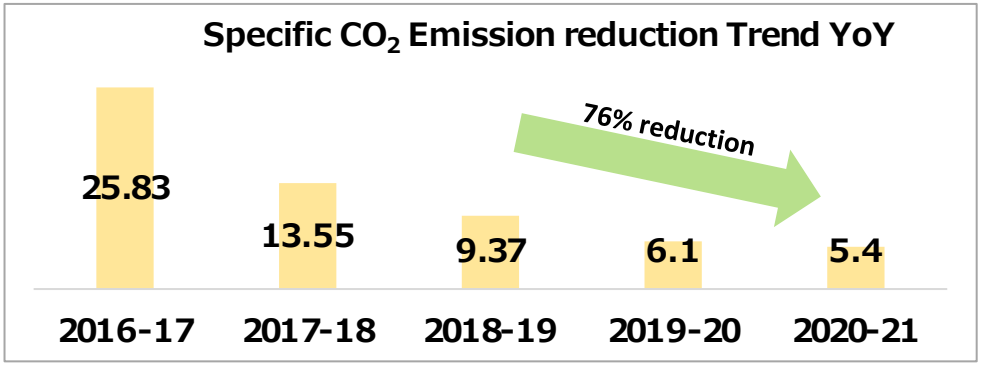
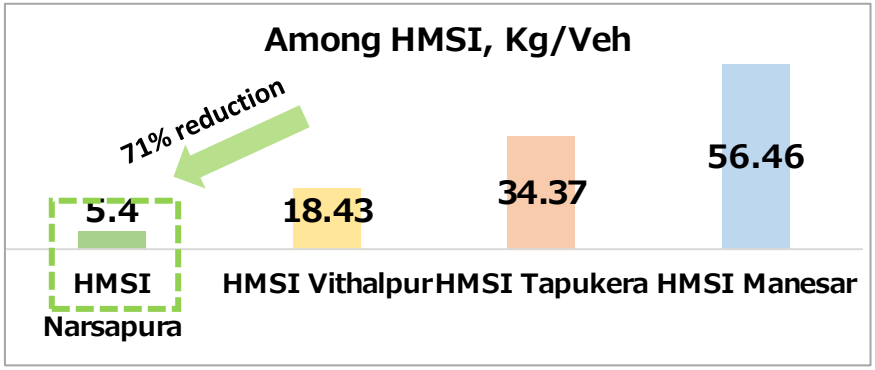
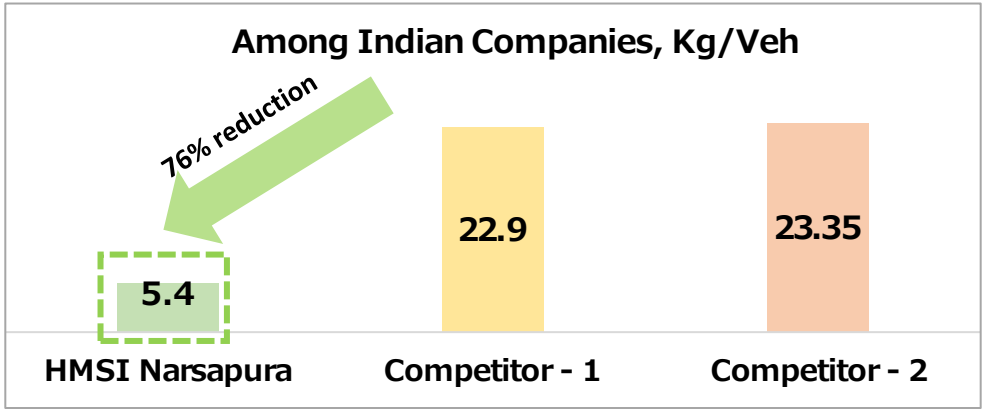
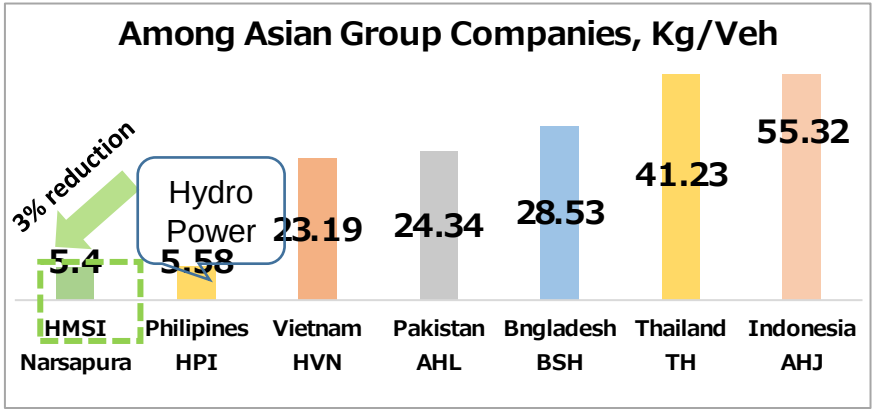
Benchmarking – CO_2









Uniqueness

- **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.**
- **Implementation of Hot water generator to generate Hot water to eliminate boiler**
- Lowest specific propane consumption among group companies with similar configuration.
- One of the lowest specific CO_2 emissions among Asian Group companies.
- Easy to design and maintain and good reliability since last 3years.

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

Green Purchasing Policy

Honda has separate Green Purchasing policy which mainly focusses on purchasing Environmentally friendly materials

II. 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 over the entire life cycle of our products, from product development to purchasing, production, administration, transportation, and to sales and recycling.

To carry out these activities effectively, we are continuing to take strong measures to reduce our environmental footprint in each area, together with our suppliers. We are also adding E (Environment) to our supplier evaluation categories (*1) of Q (Quality), C (Cost), D (Delivery) and D (Development) to allow us to more actively encourage purchasing environmentally friendly parts and materials.

Below is a list of the individual areas in Honda green purchasing activities.

- Environmental management activities to ensure environmental control for products (parts and materials) and corporate activities
- Corporate activities (*2) to supply these products (parts and materials) (Development, Purchasing, Production, Administration, Transportation, Sales, Recycling)
- Products (parts and materials, etc.) purchased by Honda

Collectively, these are referred to as the areas of our environmental activities.

For each area, the overall purchasing activities of sharing policies with suppliers and achieving targets together are called Honda green purchasing activities.

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

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

IE4 Motors

Green Purchasing Policy has been strictly implemented to ensure sustainable procurement

CO_2 Reduction Activity Status

❑ CO2 Reduction HM JPN Guidelines

Objective:

*Reduce the **Global Warming** through energy saving initiatives*

Target Area :

Global Honda CO2 reduction Target 1% Per Year

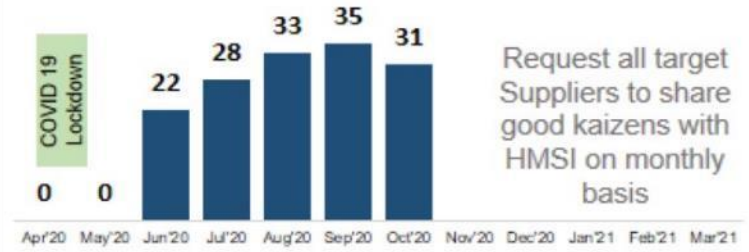
Reduction Result (CO_2 Gentani %)

Year	91ki	92ki	93ki	94ki	95ki	96ki	97ki
No. of Splrs	46	49	52	55	57	60	59
Honda tgt.	-	1%	1%	1%	1%	1%	1%
HMSI tgt.	-	1%	1%	4%	4%	4%	4%
Actual	Base data	4%	4%	6%	8%	14%	Result in 98ki

❑ 97ki Activities Schedule

S.No	Activity	Status	Tgt. Date	Remark
1	Target Splr identification & discussion with HCIL & HSPP ▪ Registration of tgt. Splr in Slim office ▪ CO2 reduction target setting based on last year performance	Completed	Apr-Jun'20	60 target splrs selection done based on last year Pur. Amt
2	Energy Consumption data collection from 60 Splrs & analysis ▪ Collection of Splrs sales amount to Honda -96ki ▪ Supplier GHG self assessment ▪ Suppliers Scope 1 (HSD, Coal etc.) data collection ▪ Supplier's scope 2 (electricity) data collection ▪ Supplier's Logistic & Supply chain data collection ▪ Upload data in Slimoffice Portal	Completed	Jul - Sep'20	All the data are uploaded in Slimoffice
3	97ki CO2 Reduction activities at 59 tgt. Splrs (target Min. 1% with comparison of 96ki) ▪ Monthly energy data monitoring ▪ Kaizen implementation on the basis of Loss reduction, efficiency Up & new investments ▪ Horizontal deployment of HMSI mfg. Kaizens	U/progress	Mar'21	Kaizen categorization & Monthly Kaizen receiving record
4	Supplier rating for Env. Award during Splr convention ▪ Rating calculation based on ASH & HMSI Criteria ▪ Step 1 : Selection of Top 10 suppliers (Tgt. Oct'20) - Done ▪ Step 2 : Genba evaluation at the selected Top 10 splrs & select Best splr	U/progress		Selection of Best Supplier for Env. Award

❑ Splrs kaizens receiving status



❑ Examples of CO2 Reduction Kaizens

❑ Replacement of Motor

CO2 Redn: 122 Ton / Year

❑ Energy Efficient Compressor

CO2 Redn: 305 Ton / Year

❑ Water level Controller

CO2 Redn: 109 Ton / Year

Improvement:

- *Plan : Horizontal Deployment b/w Splrs & HMSI Mfg to improve Kaizen quality*
- *Verification / Effectiveness check of new Implemented Splrs Kaizens*

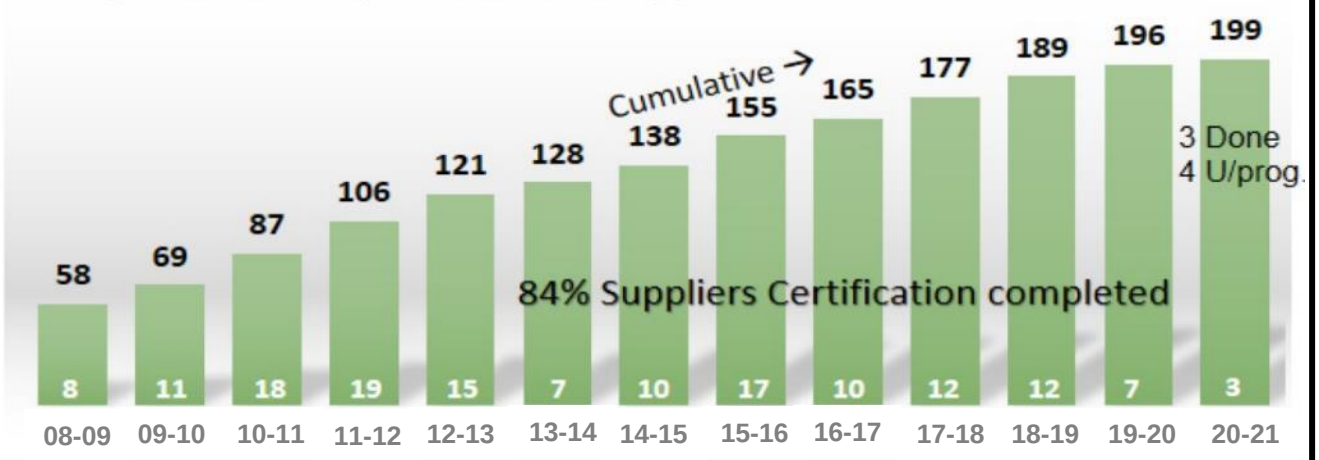
CO_2 Reduction activities are in progress as per ASH / HM Japan Guidelines

EMS certification of Suppliers

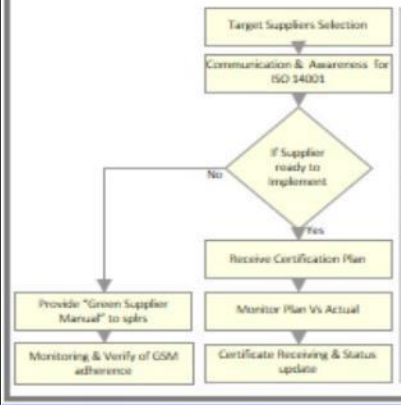
❑ EMS Certification status

❑ EMS certification history & certified Suppliers

Target : Minimum 7 splrs certification every year



❑ Activity process



❑ 2020-21 Activities Schedule

Activity	97ki								
	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb
Splrs Certi. plan	▼								
Support to Splrs	▼								
Implement verification	▼	—	—	—	—	—	—	▽	
Follow up for cert.	▼	—	—	—	—	—	—	—	▽
Receive certificates	▼	—	—	—	—	—	—	—	▽
Report to Top Mgmt.						▽			▽

❑ 2020-21 Target Suppliers and Certification Status

Plan : 7 Splrs
Actual : 3 Splrs

1) **Modern Automotive**
2) **Mahindra CIE Auto**
3) **Lincoln Helios India**
4) **Exedy Clutch** – tgt. Jan'20
5) **ASK A1** - tgt. Mar'21
6) **Jagdish Elect.** – tgt. Mar'21
7) **A K Automatics** – Mar'21

Major Benefits

- Resource loss reduction and energy conservation
- Reduction in environmental liability & Hazardous chemical contamination in parts
- Minimization of harmful impact on associates, society & environment

Yearly targets are set to achieve ISO14001 certification to supplier companies

Dealer : Environment Week Celebration – June'2020 and 21

HMSI participation and kickoff (5th June-11 Jun'20)

Creative Designs

HMSI Banner

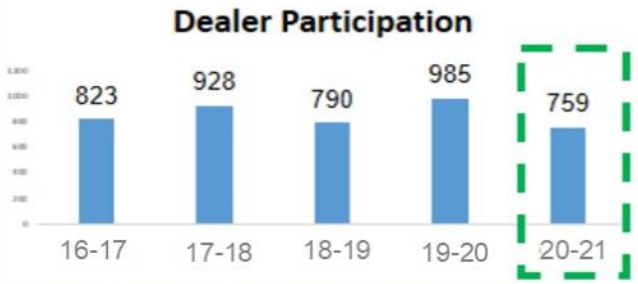
Leaflet Design

Sticker Design

SIAM PUC Banner

Badge Design

SIAM Banner send to 1021 Dealers



Dealer Participation

Leaflets & Sticker and banner display

Plant Distribution

Free PUC

Green consumer day is celebrated at dealer end to promote awareness

Green consumer day celebration – September'2020

***Campaign Focus:** Awareness to Reduce, Reuse & Recycle waste material to reduce carbon footprint*

HMSI

Creatives

Awareness Methodoly

Promotion Area

DEALER

Display of Banner

Digital Promotion

Social Distancing & Mask

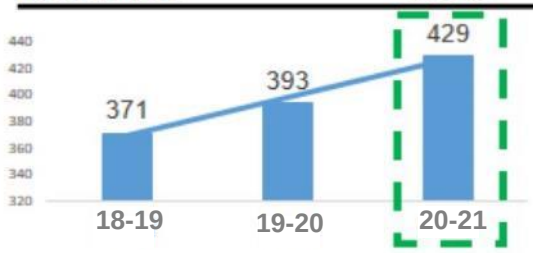
Plantation

Awareness to Staff

Sapling distribution

Event Outcome

Activity	Contribution
No of Leaflet distributed	74552
Awareness Sticker pasted on Vehicles	5321
Awareness Sticker pasted on Invoices	4371
Dlr Participated	429 Dlrs



Participation increased from last year

Several initiatives are taken by dealers to reduce energy and environment impact

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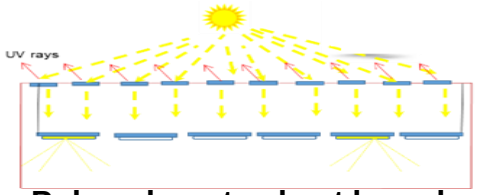
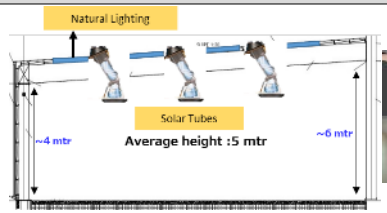
New Projects : Solar tubes & Aluminum Piping installation

Installation of solar tubes

Before	After	Benefits
  **Polycarbonate sheet based lighting**	   **Solar Tubes**	**INVESTMENT 0.3 Mill** **1500 kWh/annum** **1.12 tons** ❖ Solar Tubes are installed in the building and office to use natural lighting ❖ LUX levels achieved in office areas.

Aluminum piping for compressed air

Before	After	Benefits
 **Galvanized Iron pipes for Compressed air**	 **Aluminum pipes for Compressed air**	**INVESTMENT 1.5 Mill** **81845 kWh/annum** **61138 kWh/annum** ❖ Losses are considerably reduced through usage of aluminum piping. ❖ The PU tube which is used from the header line can be eliminated by reducing the size. ❖ Frictional Losses can be reduced by using Aluminum Piping. ❖ Cost saving per year is 0.16 mill

Continuous energy efficiency are initiatives taken to reduce Utility cost

Electronic Controller for AC operation

Background & Situation Analysis

- There are 250 No's of AC units are available in line1,2,3 & line4.
- Conventional AC's do not have Room Temp. Sensor or a Coil Temp. Sensor.
- AC's are getting operated only on the Return Temperature basis.
- There is no any Automatic control available in the AC Units installed.

Proposal

Existing **Proposed**

Simple On-OFF controller based on set temperature

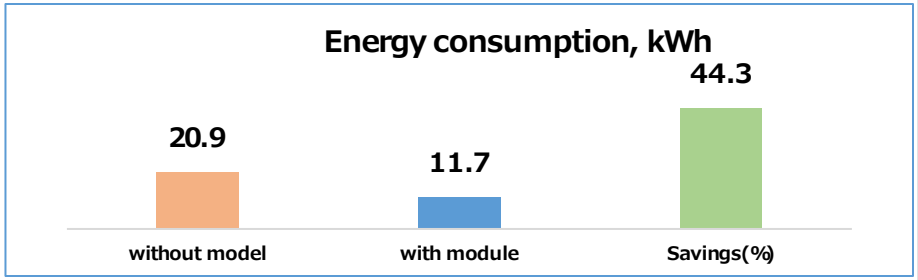
AC Unit

Airtron Unit

- Adopting electronic controller Power Saving Programmable Technology Device.
- The electronic Intelligence device automatically adjust itself to change in ambient condition.

Content of Execution

- Normally All AC's are Controlled by a Mechanical Relay & Timer and No Intelligence.
- Airtron Saves around 44% of electricity on all types of Air-Conditioners.



Investment, ROI Calculation

Investment	2.1 Mill
Saving	2.9 Mill
ROI	16 months

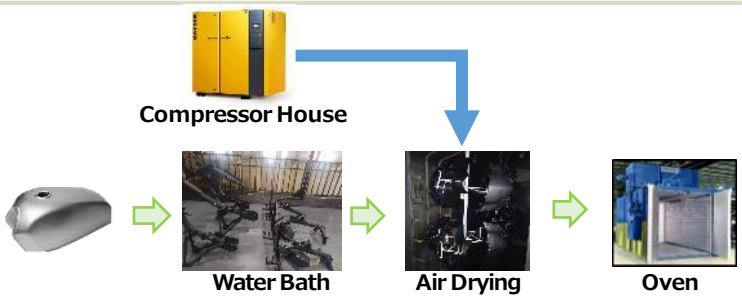
64218 kWh/annum

47.97 tons

Smart AC controller has been installed to ensure energy reduction during AC operation

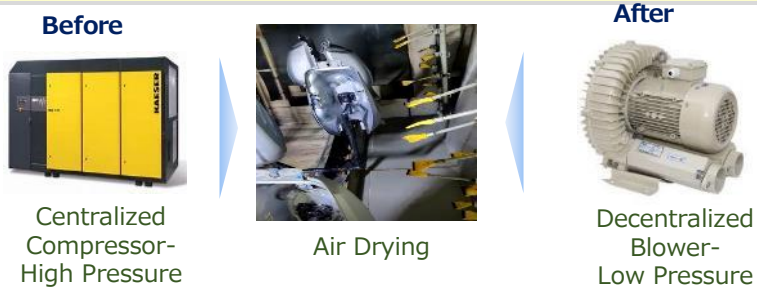
Decentralized Blower To Replace Compressed Air

Background & Situation Analysis



- Currently compressed air is utilized for air drying of parts for cleaning in paint shop
- The dried parts are then fed into the oven
- Compressed air is expensive and leads to wastage of energy

Proposal



- As the compressed air requirement is volume dependent and not pressure dependent alternate options can be worked out
- High pressure compressed air at 5 bar can be eliminated through use of decentralized blower at 2 bar
- Use of blower will help reduce power consumption in comparison to compressed air

Saving Analysis

- 30 % electricity savings by optimizing the air pressure.
- Blowers will ensure parts cleaning by less pressure through high volume.

Parameter	Before	After
Compressed air requirement, cfm	1200	900
Electricity requirement, kWh/day	2880	2160
Cost of operation, Rs/day	19353	14515
Quality of the part	OK	OK

Benefits

25920 kWh/annum

19.36 Tons/year

2.6 Mill

13.1 lakhs/annum

24 Months

Installation of decentralized blowers for high volume air requirement and compressed air for high pressure air requirement will ensure compressed air savings

VFD Installation in Production equipments

Background

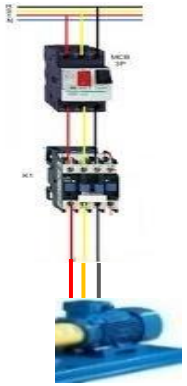
Modifications in machines are being carries out at production body through utilization of In-house maintenance associates for activities such as M,S,Q,C,D Improvements

Production Body

Situation Analysis:

ABS PT VFD Installation for KWH Energy Savings/Day.

Before



14 Pumps
50Hz
53 Amps

After

14 Pumps
Avg: 38Hz
Avg: 32Amps

Benefits:

Energy Saved : 67500 kwh

CO2 reduction: 50422 kg/year

Cost Saving : Rs 4.54 lakhs / year

Production Body

Situation Analysis:

AE4M11 Mission Case Bearing Press M/C VFD Implementation For Cost & Energy Saving

Before

- **Operating Full load 50 Hz.**
- **Motor energy consumption was more (Per year 15933 UNITS)**
- **Cost Per year 135436 Rs (8.5 Rs per unit)**
- **Motor life decrease**

After

- **Operating Freq 35 Hz.**
- **Motor energy consumption was less (Per year 9694 kWh)**
- **Cost Per year 82405 Rs**
- **Motor life Increased**

Benefits:

Energy Saved: 6239 kwh

CO2 reduction: 4660 kg/year

Cost Saving : Rs 53,000 / year

Maintenance improvements are focused on increasing equipment availability and energy efficiency .

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

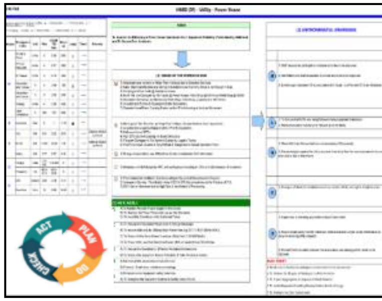
Review Mechanism

1 Situation Analysis 20-21

Legal Requirements

Production Capacity

Benchmarking



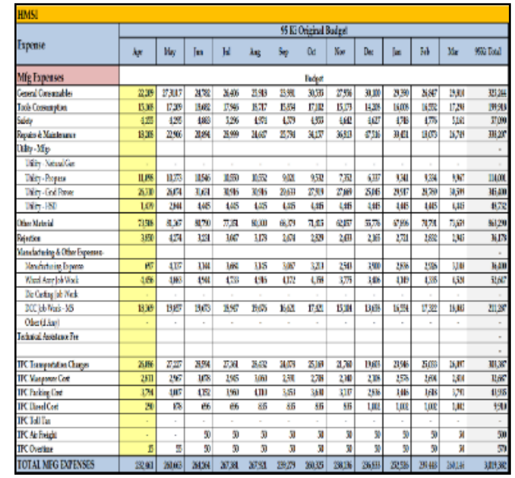
Corporate ad site level targets

Best Available Technologies

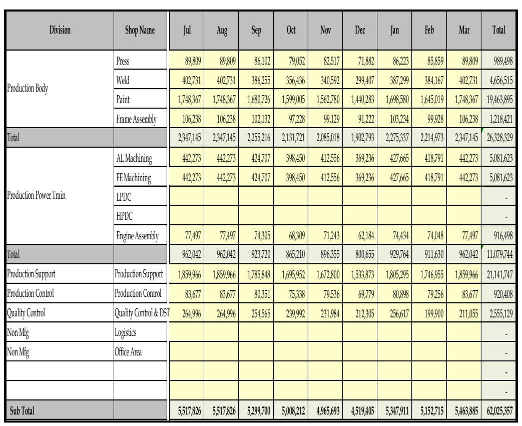
Continual Improvement

2 Target Setting by Self & PPC

3 Budget Preparation 21-22



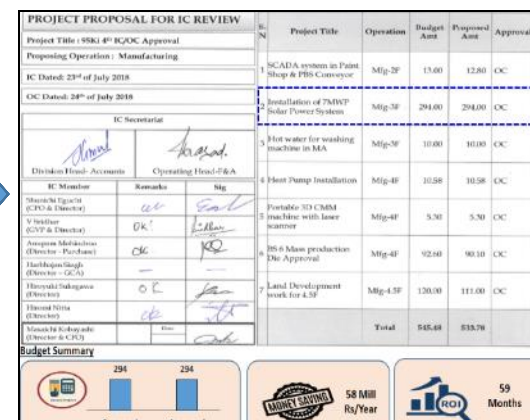
4 Budget Submission to PPC



Division	Shop Name	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Total
Production Body	Press	89,809	89,809	86,102	79,052	82,517	71,882	86,223	85,859	89,809	989,498
	Weld	402,731	402,731	386,255	356,436	340,592	299,407	387,299	384,167	402,731	4,656,515
	Paint	1,748,367	1,748,367	1,680,726	1,599,005	1,562,780	1,440,283	1,698,580	1,645,019	1,748,367	19,463,895
	Frame Assembly	106,238	106,238	102,132	97,228	99,129	91,222	103,234	99,928	106,238	1,218,421
Total		2,347,145	2,347,145	2,255,216	2,131,721	2,085,018	1,902,793	2,275,337	2,214,973	2,347,145	26,328,329
Production Power Train	AL Machining	442,273	442,273	424,707	398,450	412,556	369,236	427,665	418,791	442,273	5,081,623
	FE Machining	442,273	442,273	424,707	398,450	412,556	369,236	427,665	418,791	442,273	5,081,623
	LPDC										-
	HPDC										-
	Engine Assembly	77,497	77,497	74,305	68,309	71,243	62,184	74,434	74,048	77,497	916,498
Total		962,042	962,042	923,720	865,210	896,355	800,655	929,764	911,630	962,042	11,079,744
Production Support	Production Support	1,859,966	1,859,966	1,785,848	1,695,952	1,672,800	1,533,873	1,805,295	1,746,955	1,859,966	21,141,747
Production Control	Production Control	83,677	83,677	80,351	75,338	79,536	69,779	80,898	79,256	83,677	920,408
Quality Control	Quality Control & DST	264,996	264,996	254,565	239,992	231,984	212,305	256,617	199,900	211,055	2,555,129
Non Mfg	Logistics										-
Non Mfg	Office Area										-
											-
											-
Sub Total		5,517,826	5,517,826	5,299,700	5,008,212	4,965,693	4,519,405	5,347,911	5,152,715	5,463,885	62,025,357

5 Meeting with Opt.Head

6 Budget Approval



PROJECT PROPOSAL FOR IC REVIEW

Project Title : 95Ki 4th IC/OC Approval

Proposing Operation : Manufacturing

IC Dated: 23rd of July 2018

OC Dated: 24th of July 2018

IC Secretariat

Division Head- Accounts | Operating Head-F&A

S. N	Project Title	Operation	Budget Amt	Proposed Amt	Approval
1	SCADA system in Paint Shop & PBS Conveyor	Mfg-2F	13.00	12.80	OC
2	Installation of 7MWP Solar Power System	Mfg-3F	294.00	294.00	OC
3	Hot water for washing machine in MA	Mfg-3F	10.00	10.00	OC
4	Heat Pump Installation	Mfg-4F	10.58	10.58	OC
5	Portable 3D CMM machine with laser scanner	Mfg-4F	5.30	5.30	OC
6	BS 6 Mass production Die Approval	Mfg-4F	92.60	90.10	OC
7	Land Development work for 4.5F	Mfg-4.5F	120.00	111.00	OC
		Total	545.48	533.78	

Budget Summary

294 294 Proposed Approved

MONEY SAVING 58 Mill Rs/Year

ROI 59 Months

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

HO

1F

Energy Representative

2F

Energy Representative

3F

Energy Representative

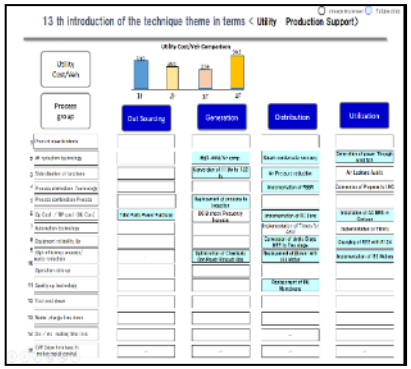
4F

Energy Representative

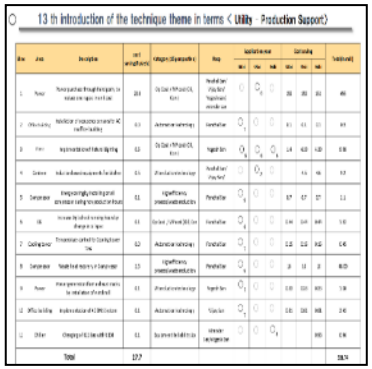
Synergy Meeting

Cost Down Initiatives

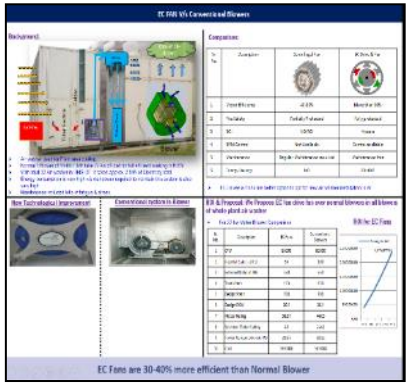
Themes Discussion



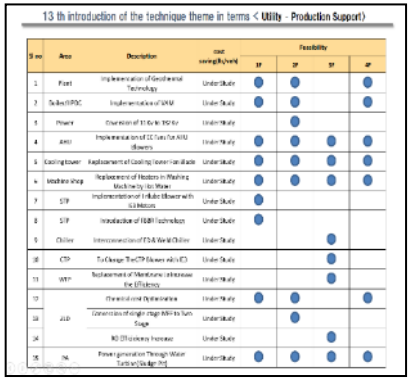
Feasibility Study



Applicable Themes



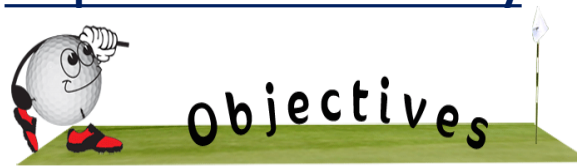
Summary of Themes

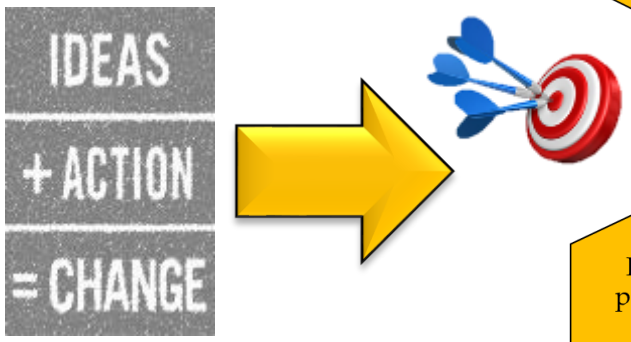


Final Submission

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

Purpose of Kaizen Activity





- Questioning the Status Quo
- Increase joy of Creation
- Creating a workplace where free minded ideas grows
- Joy of improving workplace
- Feeling of participation
- Development of ones own abilities

Evaluation Method:

Awards

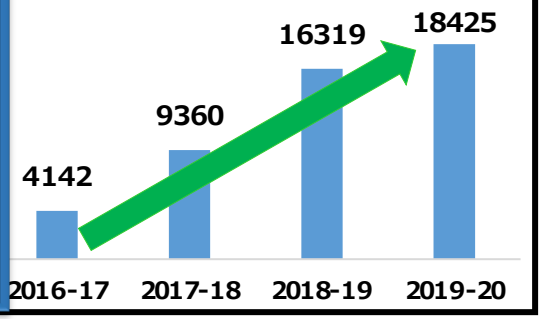
Recognition

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 Week Celebration– 22nd – 27th Feb

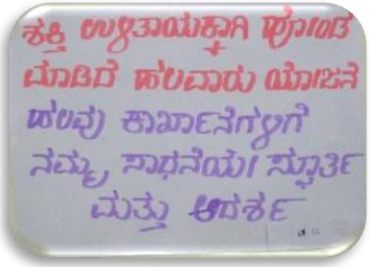
PURPOSE OF ENERGY WEEK CELEBRATION

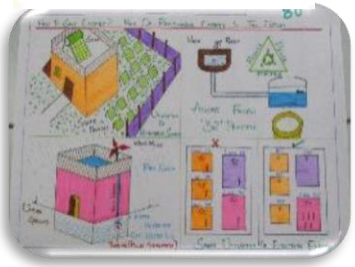
1. To create awareness among associates and suppliers about energy conservation.
2. To create awareness about switching to renewable energy from nonrenewable energy.

GLIMPSES OF ENERGY WEEK CELEBRATION

ENERGY WEEK ACTIVITY SCHEDULE - FEBRUARY - 2021

Sl. No	Activity	22-Feb	23-Feb	24-Feb	25-Feb	26-Feb	27-Feb
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 Model	▼					▼
7	Energy conservation commitment by signing on banner				▼		
8	Quiz competition				▼		
9	Information sharing in canteen on Energy conservation						▼





Total 1350 Participants in Energy Week celebration

3F has been awarded by CII for its sustainable environment practices
CII hosts the annual award ceremony to recognize the best Environment practises that companies follow
The award ceremony was held in the 8th Greenco summit held in New Delhi

Greenco Star Performer Award
Most Innovative Environment Best Practices award & Most Useful Presentation

- First factory in Honda India Group to achieve "Greenco" rating
- First Manufacturing facility in Karnataka to achieve Platinum rating
- National best in Waste management and Innovation

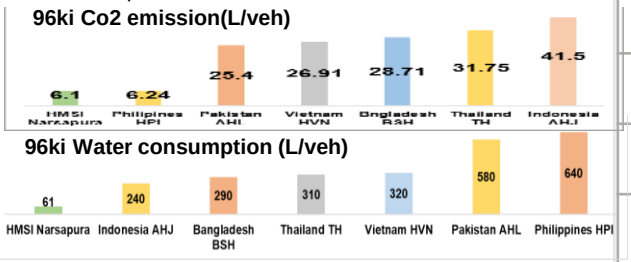
2018-2019

Most Innovative Environment Best practises Award

Greenco Star Performer award

Most Useful presentation elected by Audience)

- Greenco Star performer award is given to Greenco rated companies



2019-2020

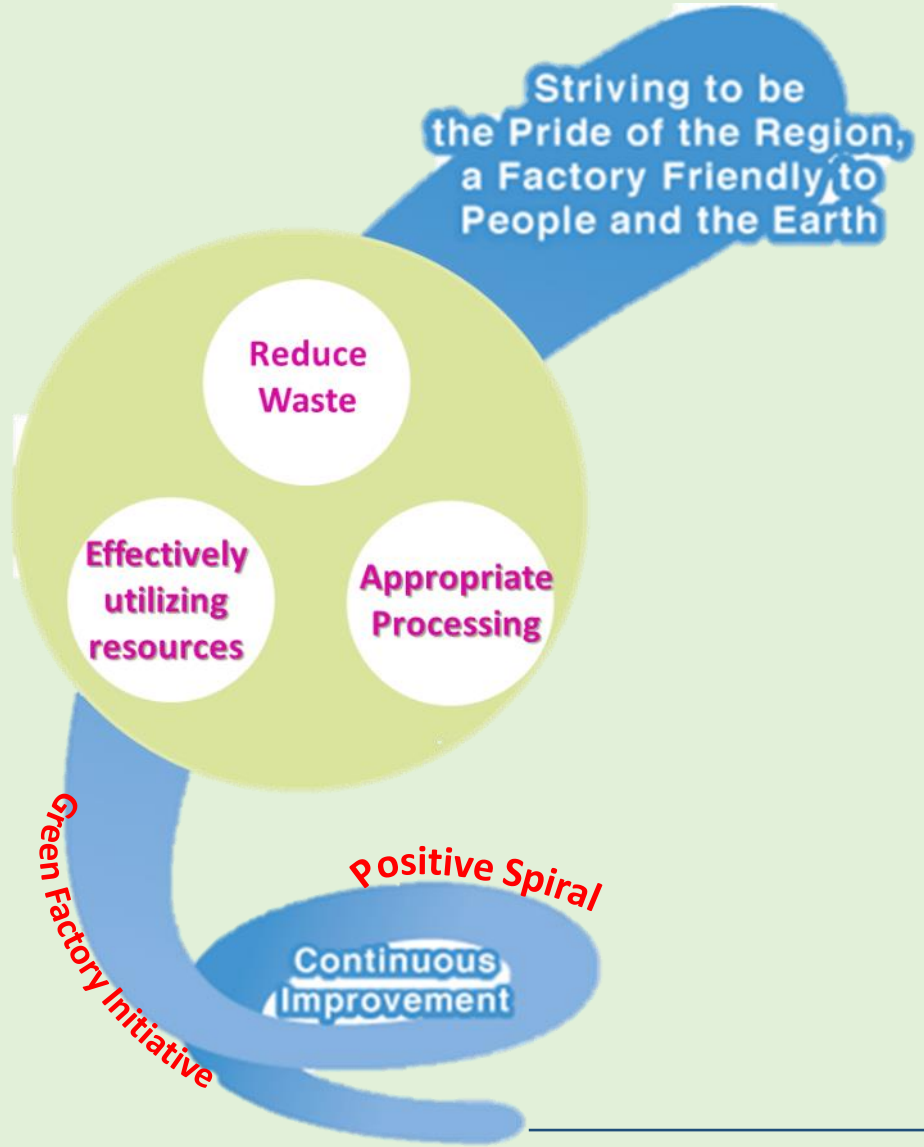
Project details	98KI		99Ki	
	Q 1-2	Q3-4	Q 1-2	Q3-4
Zero land fill facility		▽		
Additional 2MW roof top PV		▽		
Additional Solar dishes installation			▽	▽
ASU hot water conversion project			▽	▽

2021-2023

3F will continue its journey toward implementing more Environmentally sustainable projects which is having very good financial viability also

Table of Contents

Way forward-Net Zero Energy and Carbon Negative



Energy Efficiency

• Paint Shop Hot Water conversion	-Sep'22
• EC Fans in ASU	-Oct'21

Renewable Energy

• 2.5 MW Solar RT expansion	-Apr'22
• 2.7 MW Offsite Captive Wind	-Oct'22

Advanced Treatment technologies

• Short PT for ABS	-Feb'22
• Zirconium PT	-Jan'22

Reducing toxic chemicals

• Auto Booth control	-Sept'22

Supply chain emission reduction

• Milk run for south parts supply	-Nov'20

Zero-Waste

Reducing Waste

• Plastic packaging elimination	-Nov'22
• Aluminium Chips reduction	-Aug'20

Management Systems & Ratings

• Energy Audit	-Jan'22
• Greenco Platinum Plus	-Nov'21

Activities to contribute to society

Joint-Community Activities

• External solar/wind park	-Sep'23
• Drainage strengthening in neighbouring villages	-Mar'22
• External Greenbelt expansion	-Mar'23

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

THANK YOU

It is in our hand to protect our beautiful earth