Rane Brake Lining Ltd – Plant 3 Puducherry

Rane
Expanding Horizons

Welcomes you all

Rane Brake Lining Ltd – Plant 3 Puducherry

CII Energy Excellence

B. Shagul Hameed
Dy. Manager

M.Shenbaga vel
Ass. Manager

24th Aug 2021

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Ass. Manager

Company profile

RBL VISION

"To establish global presence and enhance domestic leadership by providing eco-friendly friction solutions"

RBL Milestones

- **2021** — Capacity enhancement; Installed 2MW solar power plant
- **2017** — Technology upgradation
- **2014** — Technical agreement with TMD; Two wheeler manufacturing road map creation
- **2013** — Deming Grand Prize

- **2008** — Trichy Plant (P4) operations commenced
- **2003** — Deming Award

- **1997** — Puducherry Plant (P3) operations commenced
- **1991** — Hyderabad plant (P2) operations commenced
- **1985** — Collaboration with Nisshinbo(NISB), Japan

NISSHINBO

- **1964** — RBL Commenced operations – Technical collaborations with Small & Parkes - UK ;Chennai plant commenced (P1)

Product segments & Customers

Product Segments

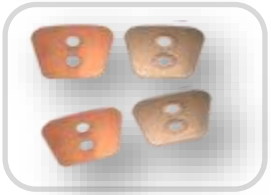
CVBL/CVDP

PCDP

Two wheeler Disc pad

Rail Block

Sintered friction



Clutch Facing

OEM Customers

brembo

CHASSIS BRAKES INTERNATIONAL

Continental

Automotive Axles Limited

Brakes India Limited

ENDURANCE Complete Solutions

Mando

Tier 1 Customers

MARUTI SUZUKI

HONDA

NISSAN

RENAULT

Mahindra

Ford

ASHOK LEYLAND

TATA

Hero

BAJAJ

KTM

AMW

ROYAL ENFIELD

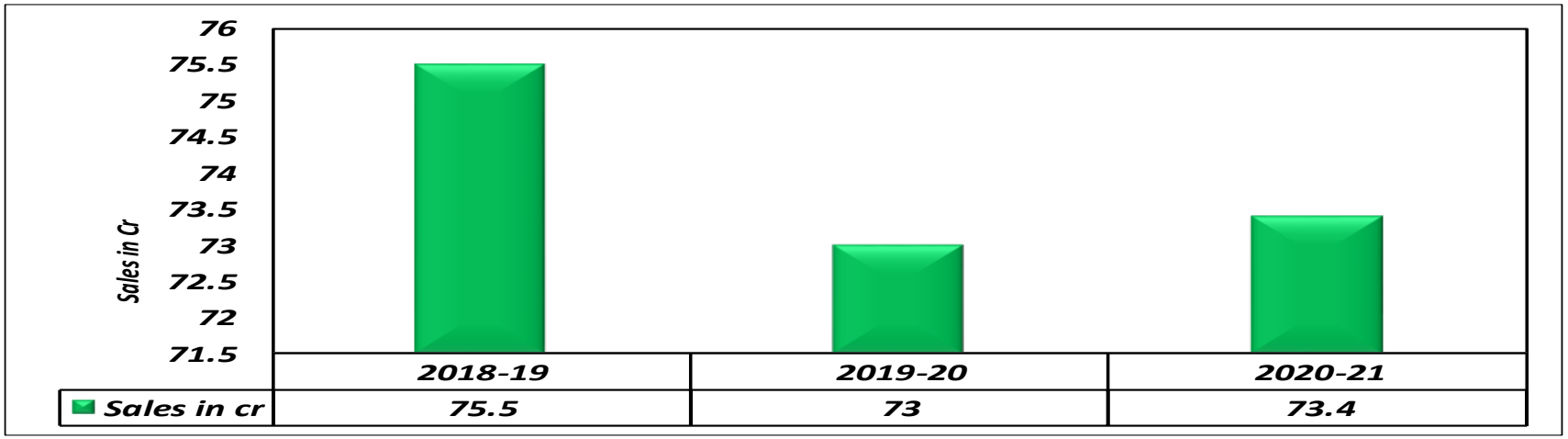
VOLVO

DAIMLER

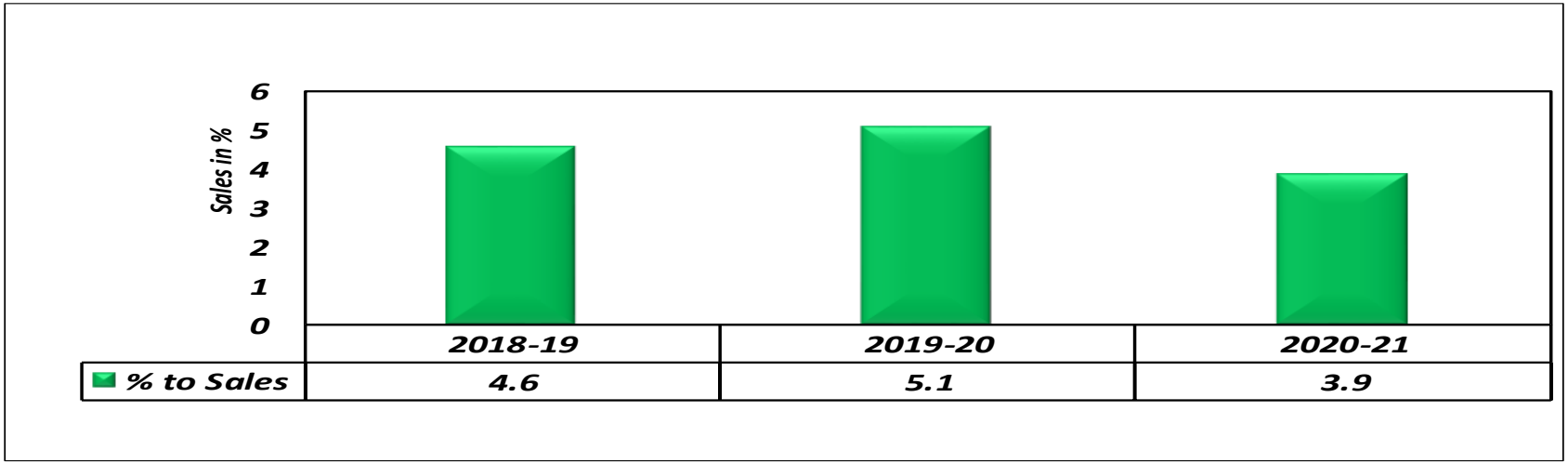
Contents

1. Impact of COVID 19

Plant Turnover



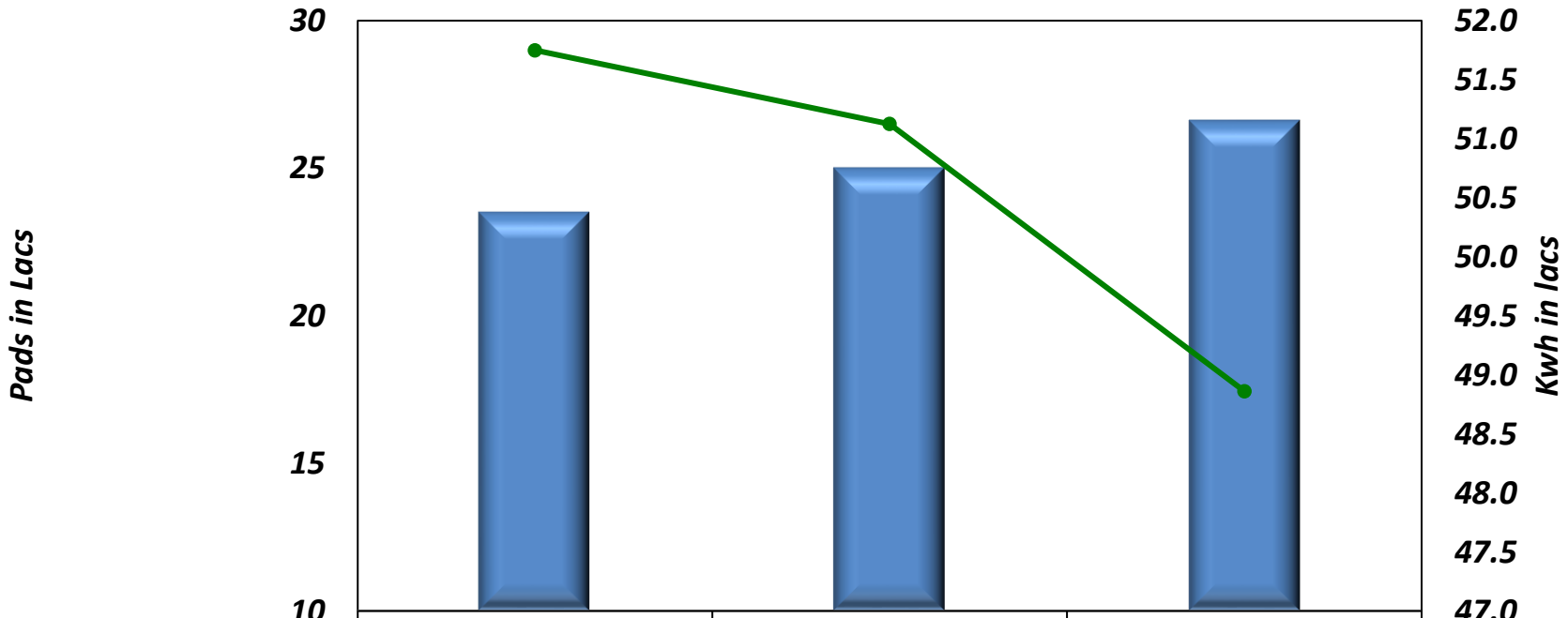
Power cost % to sales



Annual production performance (AOP) achieved

2. Specific Energy Consumption in last 3 years

Production vs energy consumption data for last 3 years



	2018-19	2019-20	2020-21
Production in lacs	23.5	25	26.6
kwh in lacs	51.7	51.1	48.9

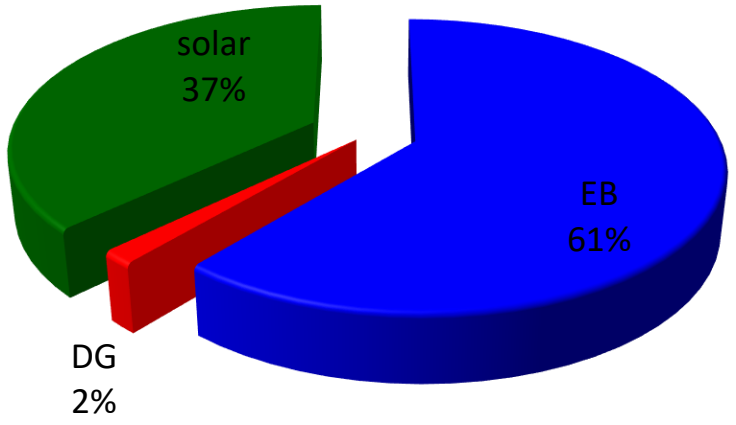
Production increased 12% : Energy consumption reduced 6%

2. Specific Energy Consumption in last 3 years

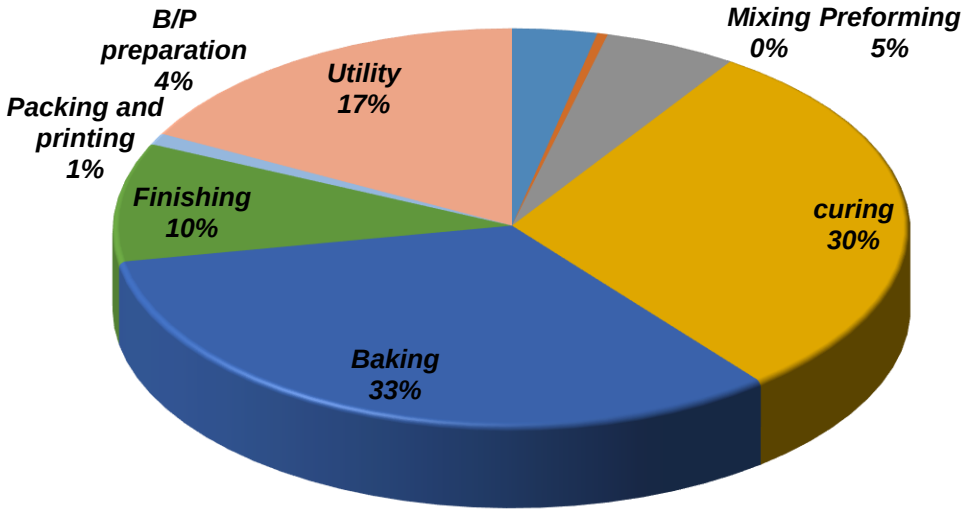
Source wise energy consumption data for last 3 years

Source	Consumption in kwh 2018-19	Consumption in kwh 2019-20	Consumption in kwh 20120-21
EB	50,45,200	46,47,140	29,92,300
DG	1,29,564	1,27,600	76,267
Solar		3,37,743	18,17,590
	51,74,764	51,12,483	48,86,157

Energy consumption - Source wise

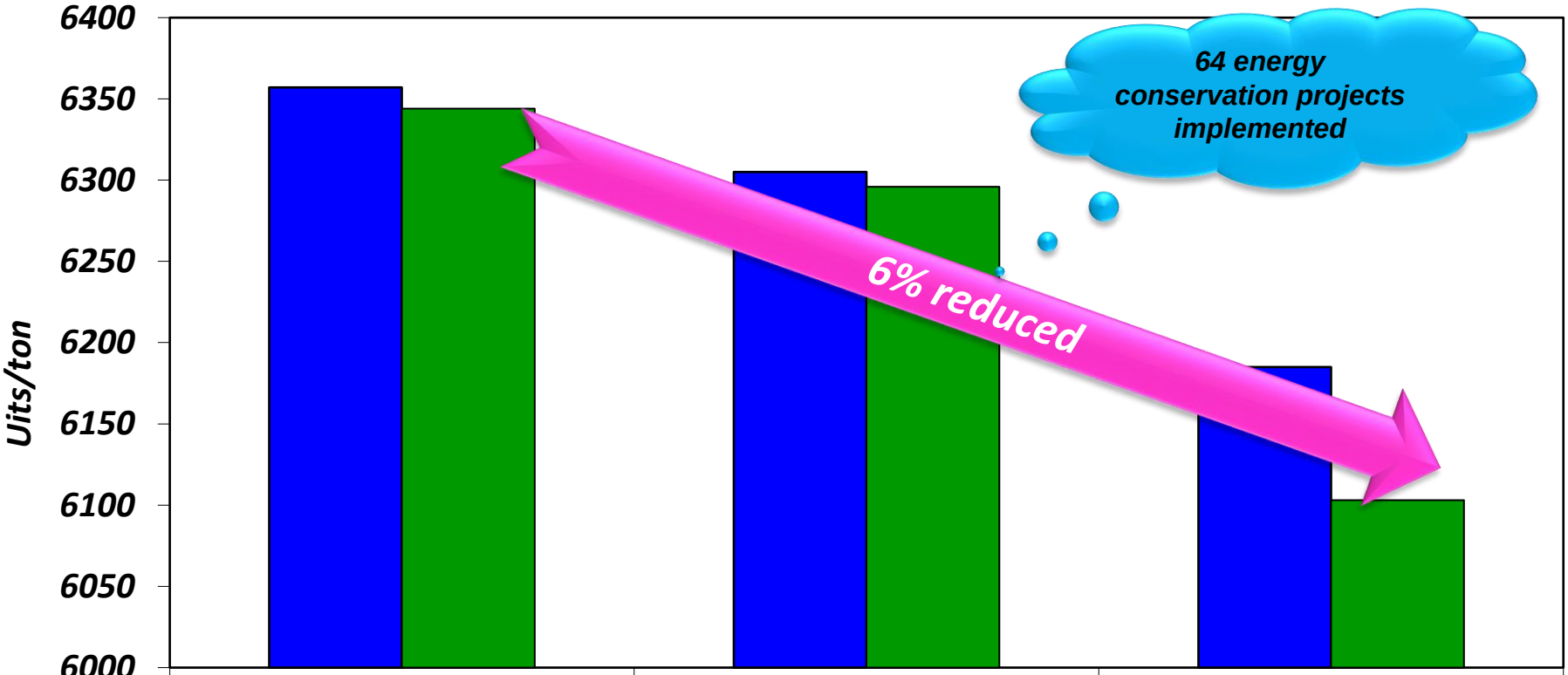


Plant Process wise power mapping



2. Specific Energy Consumption in last 3 years

Specific energy consumption

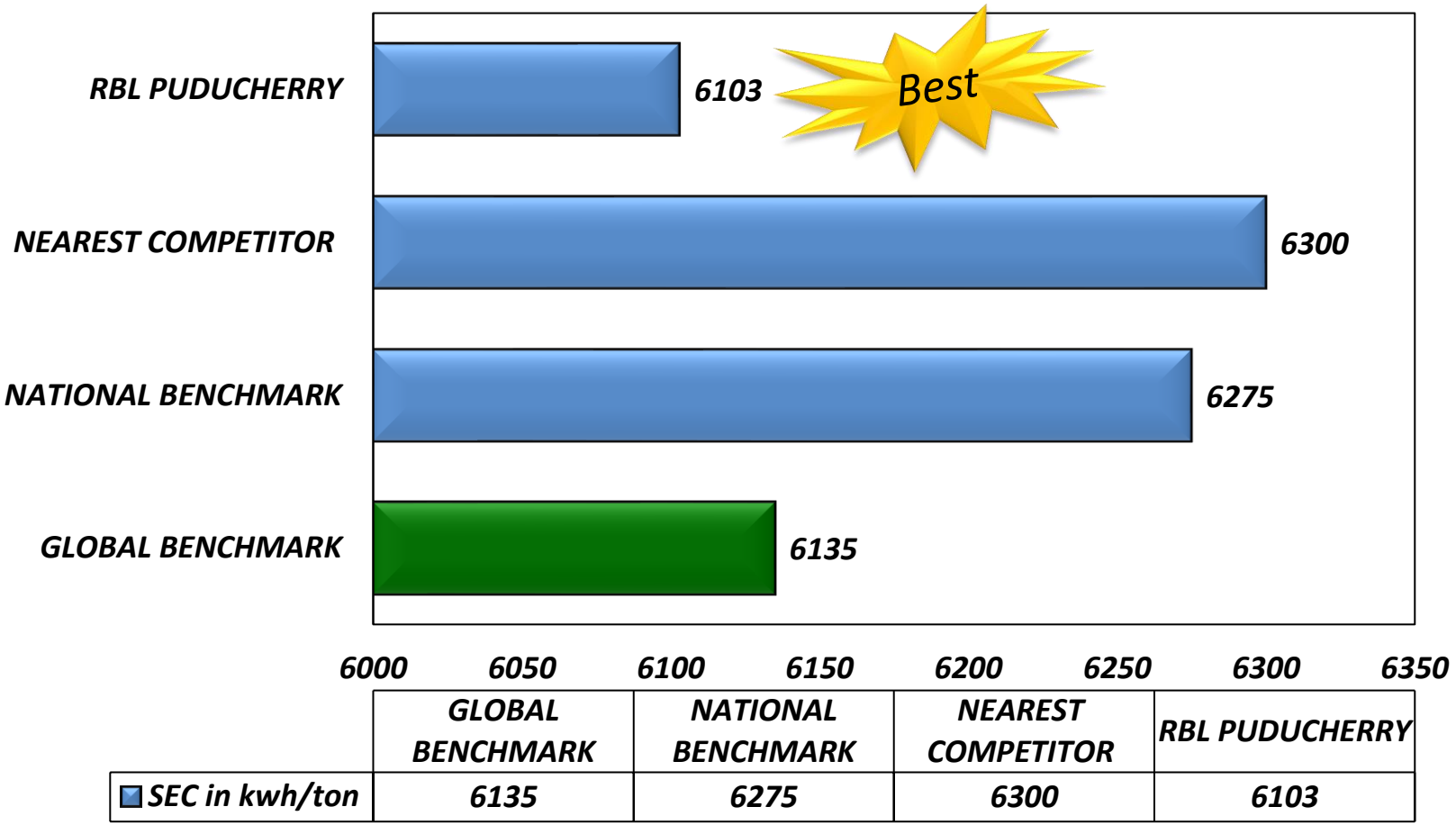


	2018-19	2019-20	2020-21
Target	6357	6305	6185
Actual	6344	6296	6103

Target for 2021-22 is 5409 KWh/Ton

3. Information on Competitors, National & Global benchmark

Specific Energy consumption in KWh/ton

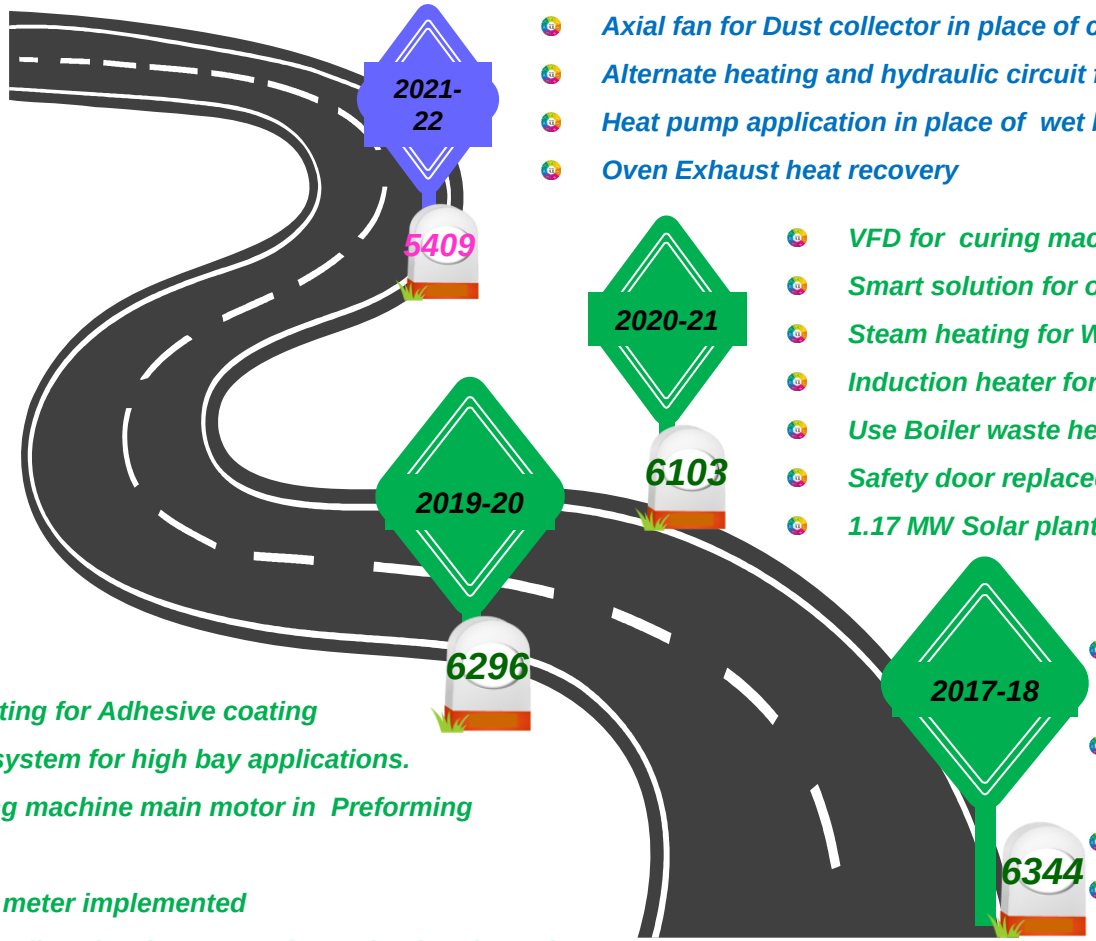


	GLOBAL BENCHMARK	NATIONAL BENCHMARK	NEAREST COMPETITOR	RBL PUDUCHERRY
SEC in kwh/ton	6135	6275	6300	6103

Target for 2021-22 is 5409 KWh/Ton

3.1 Road map to sustain benchmark

SEC in KWh / Tonnage



- *19 projects Identified*
- *0.83 MW Solar plant expansion*
- *Axial fan for Dust collector in place of centrifugal fans for Dust collector*
- *Alternate heating and hydraulic circuit for reducing 50% in cure press*
- *Heat pump application in place of wet blasting heaters*
- *Oven Exhaust heat recovery*

- *VFD for curing machine main motor in Curing machines*
- *Smart solution for office and conference hall lighting*
- *Steam heating for WB equipment in place of Resistive heaters*
- *Induction heater for pad drying in Powder coating*
- *Use Boiler waste heat for Auto cleaning water heating*
- *Safety door replaced with Safety sensor*
- *1.17 MW Solar plant*

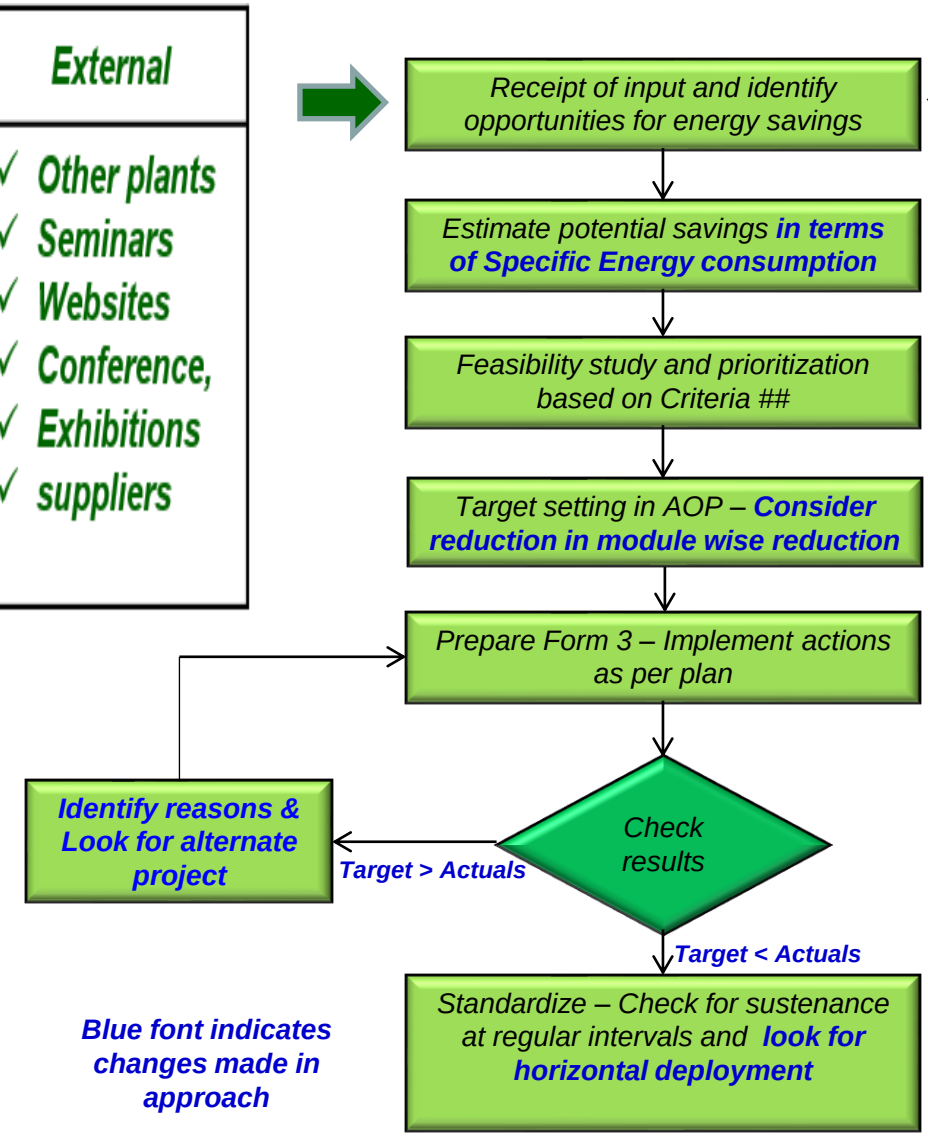
- *Induction heating for Adhesive coating*
- *LED lighting system for high bay applications.*
- *VFD for curing machine main motor in Preforming machine*
- *Smart energy meter implemented*
- *Wet blasting Boiler Diesel consumption reduction through Waste heat recovery*

- *Thyristor technology for baking oven heating*
- *VFD for curing machine main motor in Preforming machine*
- *Double daylight concept for TWDP*
- *LED lighting system for high bay applications.*

4. Energy Saving projects implemented in for last three years

Energy Conservation measures – Approach:

Internal	External
✓ Engineers ✓ Operators ✓ Last year pending	✓ Other plants ✓ Seminars ✓ Websites ✓ Conference, ✓ Exhibitions ✓ suppliers



Mapping of Energy saving Opportunities through RCC Guidelines

Criteria:

- High consumption process
- Module with 60% utilization
- Less payback
- Ease of implementation

Blue font indicates changes made in approach

4. Energy Saving projects implemented in for last three years

Summary of the year 2018-19

No of Energy saving projects	Investments (INR Million)	Electrical savings (Million kWh)	Thermal savings (Million Kcal/ MTOE)	Savings (INR Million)	Impact on SEC (Electrical, thermal)
23	1.6	0.18	0.1	1.2	511

Summary of the year 2019-20

No of Energy saving projects	Investments (INR Million)	Electrical savings (Million kWh)	Thermal savings (Million Kcal/ MTOE)	Savings (INR Million)	Impact on SEC (Electrical, thermal)
22	0.9	0.21	0.4	1.4	48

Summary of the year 2020-21

No of Energy saving projects	Investments (INR Million)	Electrical savings (Million kWh)	Thermal savings (Million Kcal/ MTOE)	Savings (INR Million)	Impact on SEC (Electrical, thermal)
19	1.1	0.29	0.2	1.8	193

2018-2021 : 5% of total units saved in last 3 years

4. Energy Saving projects implemented in last three years

The following 4 projects will be explained in detail

Hydraulic preform press speed optimization through VFD

Curing Machine Motor elimination

Baking oven Energy consumption reduction through Thyristor control

Air consumption reduction

5.1:- Energy saving : Hydraulic Preform press speed optimization through VFD

Problem :

High energy consumption in Preform press

Observations:

- ✓ Preforming operation is carried out to converting the powder mix into preform cake
- ✓ Preform machine is consists of 15 Hp motor
- ✓ Preform machine alone consumes 1345 units / month
- ✓ Machine process time is 26 Secs and loading & unloading time is 14 Secs

Analysis& Issues:

- ✓ Motor continuously running even during loading & unloading time.
- ✓ No provision to reduce speed and also to switch OFF during No load periods

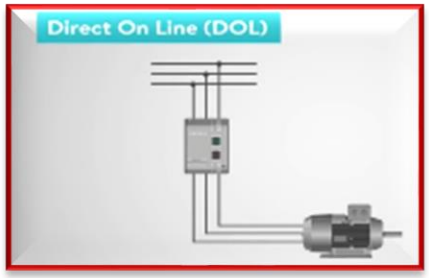
Action taken:

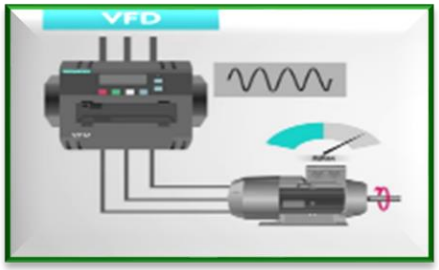
- ✓ VFD installed to reduce speed from 1440RPM to 1350 RPM during Main ram free flow time
- ✓ Motor switch off loading &unloading time through VFD

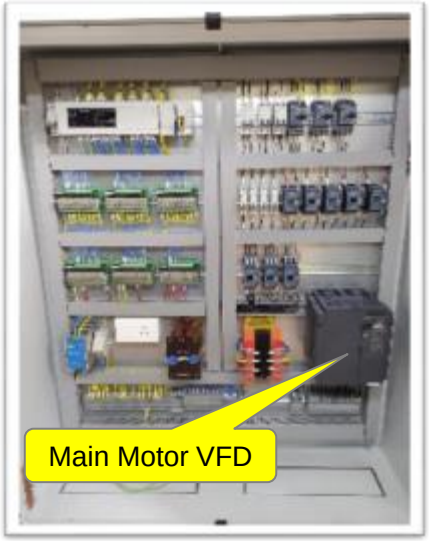
5.1:- Energy saving : Hydraulic preform press speed optimization through VFD

Action taken:

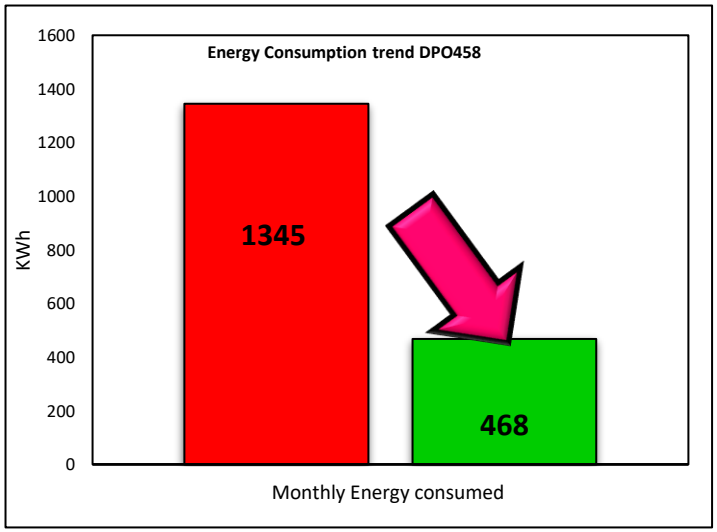
- ✓ *VFD installed to reduce speed from 1440RPM to 1350 RPM during Main ram free flow time*
- ✓ *Motor switch off loading &unloading time through VFD*







Result /Benefits :



- *Units saved 5616 kwh /machine /year*
- *29 Machine horizontally deployed total savings 1,62,864 kwh/year*
- *Machine cycle time reduced 26 sec to15 Sec.*
- *Co2 Emission reduced 130 Ton/year*

5.2:- Energy saving : Curing Machine Motor elimination

Machine:- Curing Machine

Problem:- High Power consumption in Curing Machine

Observed :-

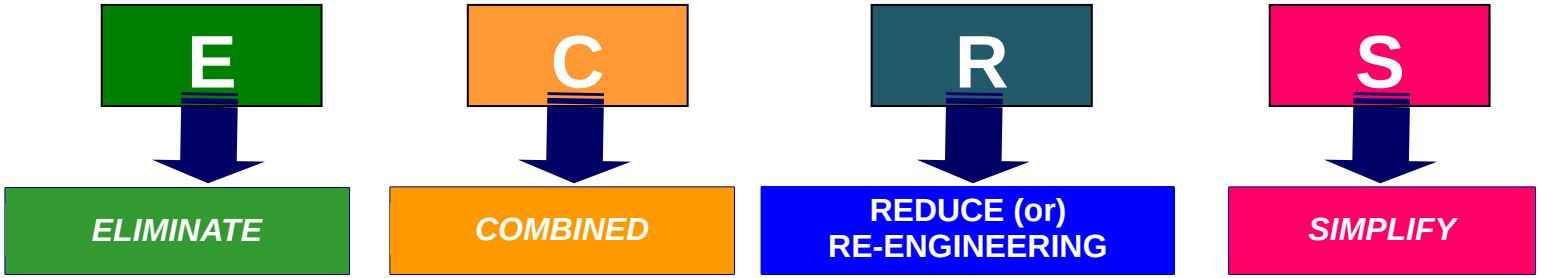
- ***Machine cycle time 400 sec***
- ***M1&M2 Motor power consumption for 90 sec- Essential***
- ***M2 Motor running remaining 310 sec energy loss***

Root Cause:-

M2 Motor & M3 Motor (Ejection ,Pilot& Booster) 'ON' throughout

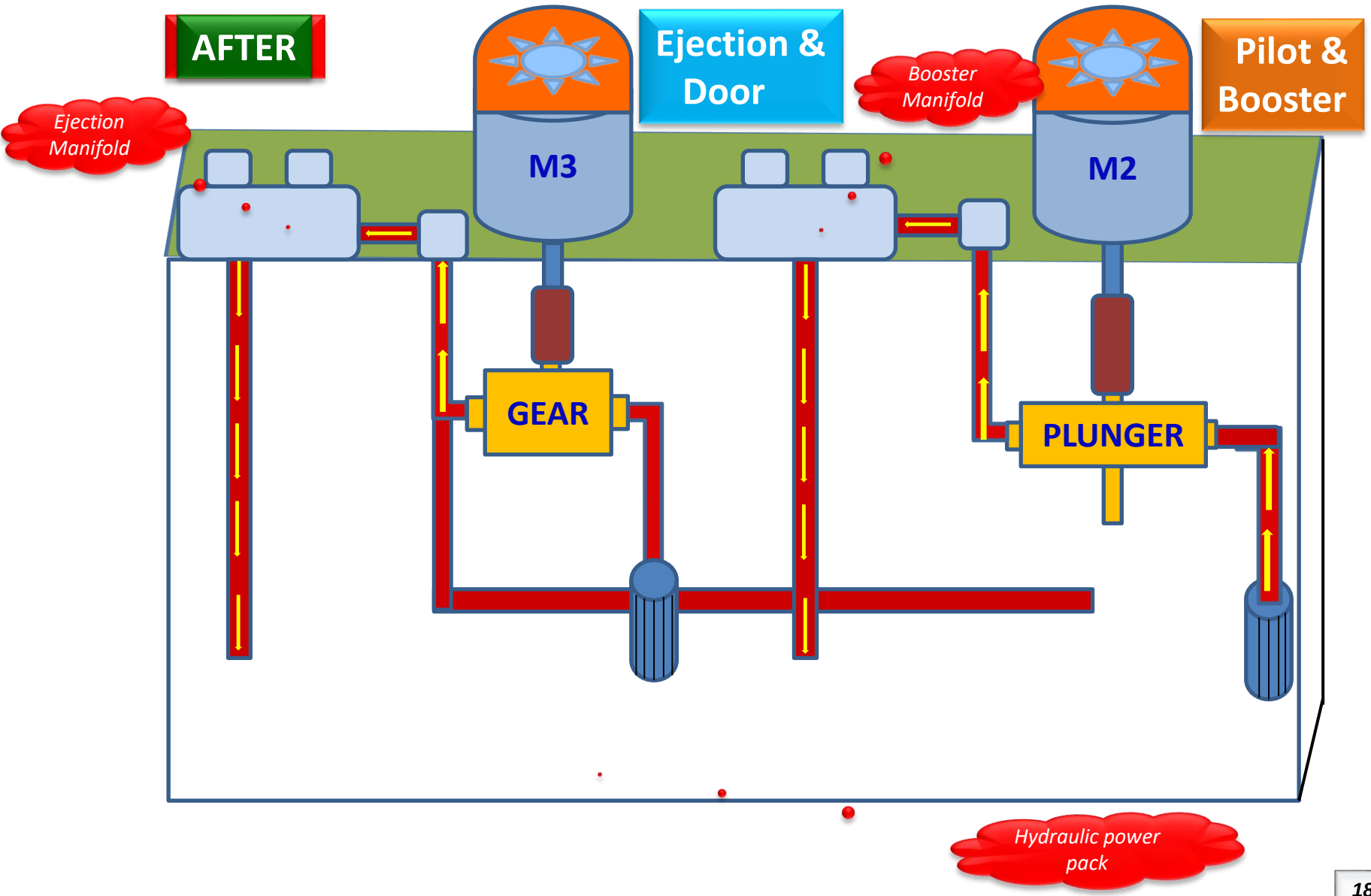
Action:-

- ***Check valve added , Pressure sensing taken & when Ejection pressure recharge required M2 motor 'ON'***
- ***Eliminate M3 Motor***
- ***Combined Pump 2&3 through Hydraulic & PLC Circuit modification***
- ***Motor switch off loading &unloading time through VFD***



Convert difficult activities into easy activities

5.2:- Energy saving : Curing Machine Motor elimination



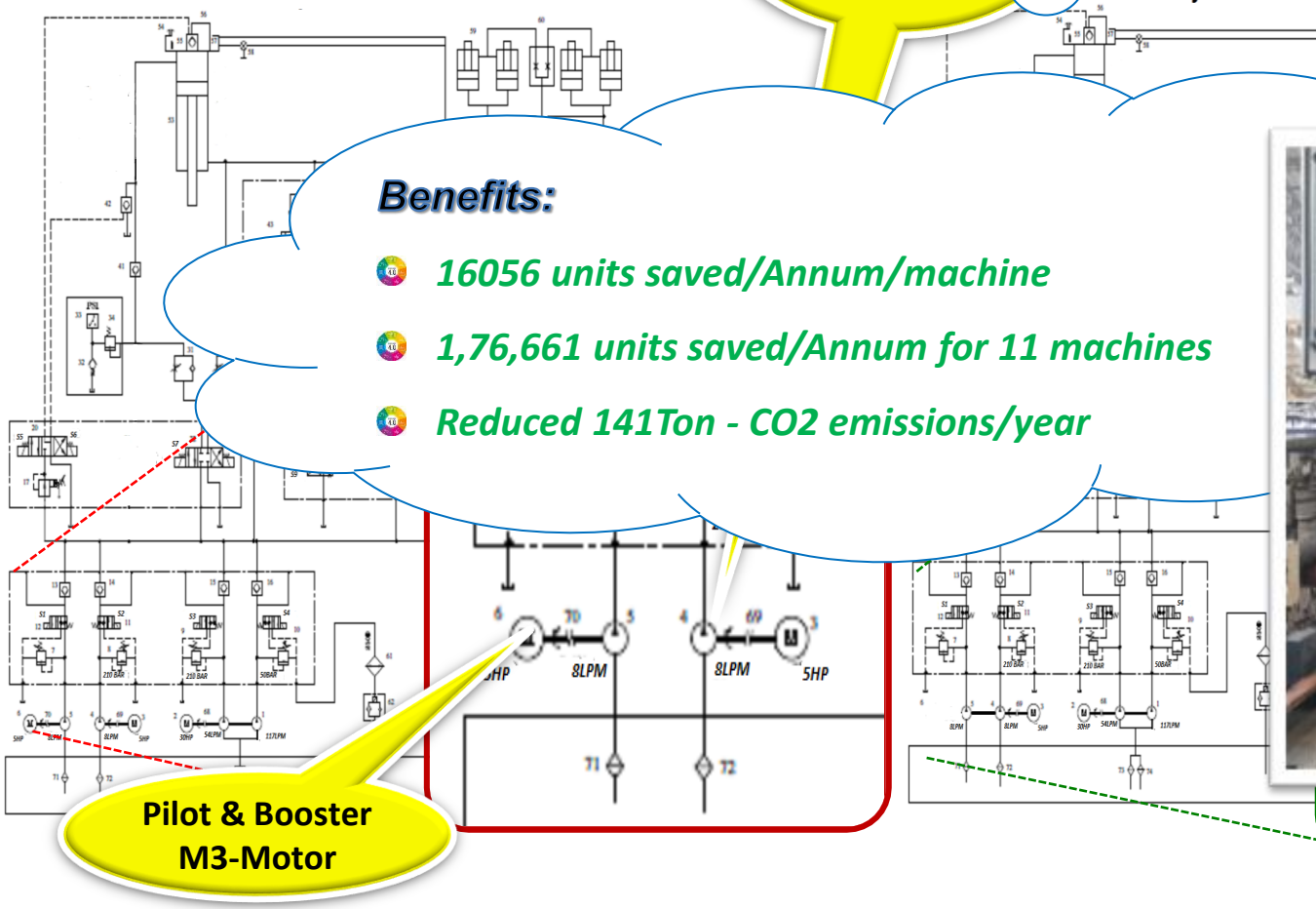
5.2:- Energy saving : Curing Machine Motor elimination

Before

Ejector & Door
M2-Motor

After

Ejector &Door +
Pilot & Booster
M2-Motor



Benefits:

- *16056 units saved/Annum/machine*
- *1,76,661 units saved/Annum for 11 machines*
- *Reduced 141Ton - CO2 emissions/year*

Pilot & Booster
M3-Motor

5.3:- Energy saving Baking oven Energy consumption reduction through implementation of Thyrister control

Issues and challenges :

Energy excess consumption in baking ovens

Analysis:

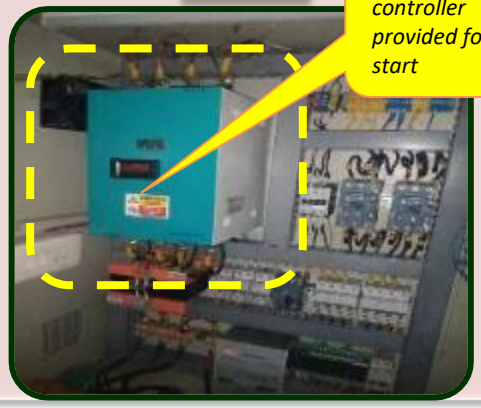
- *Heater on/off control by relay logic system*
- *When contactor ON heater continuously full load up to setting temperature reached*
- *Relay logic system don'ts regulate the heater load .*

Actions :

Thyristor controller is provided to soft start

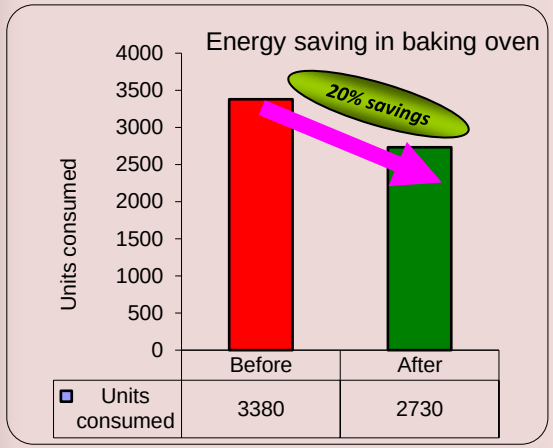
Before

After



Result :

- *Energy saved 650 units / Month / Machine and Heater life improved*
- *Energy saving achieved by 20%*



INR 4225 saved/month/machine

HD completed in 5 Ovens

INR 2.53 Lacs saved/ Annum

5.4:- Energy saving : Air consumption reduction

Machine ***:- Curing Press***

Problem ***:- High air consumption in Curing press***

Previous Level ***:- Average air consumption 250 cfm per day***

Observed ***:- Pneumatic cylinders are used for Safety ram lock and safety door***

Root Cause ***:- Each pneumatic cylinder connected with main line of 6 bar pressure***

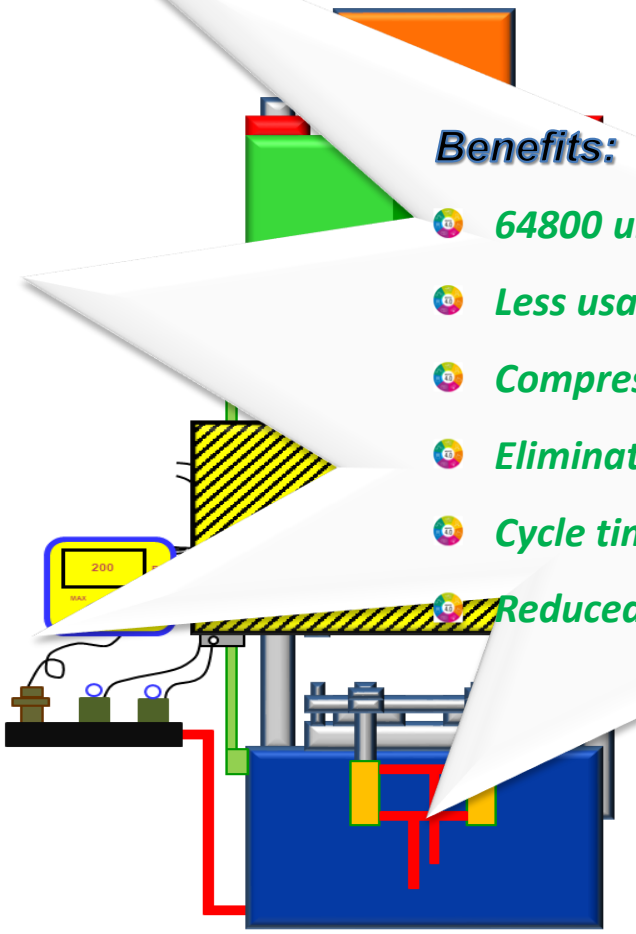
Action : Preform safety door replaced with safety curtain without compromising safety

Before

After

5.4 :- Energy saving : Air consumption reduction

Cur… press Safety door | **C… press Safety Curtain**



Benefits:

- 64800 units saved/Annum/machine
- Less usage of compressed air
- Compressor loading reduced
- Eliminate 250 cfm compressor
- Cycle time reduced 320sec to 305sec/load
- Reduced 5.8 Ton - CO_2 emissions/year

6. Innovative Projects implemented

11 innovation projects implemented in 2018-21

The following projects will be explained in detail

6.1: Re use of waste heat energy in Wet blasting

Machine:- Wet blasting machine

Problem:- High Diesel consumption in Wet blasting machine

Observed :-

- *High Diesel consumption in Wet blasting operation*
- *Fuel is one of the critical resource getting waste*
- *Steep increase in fuel price*
- *High Diesel consumption Directly impacts the company profit*

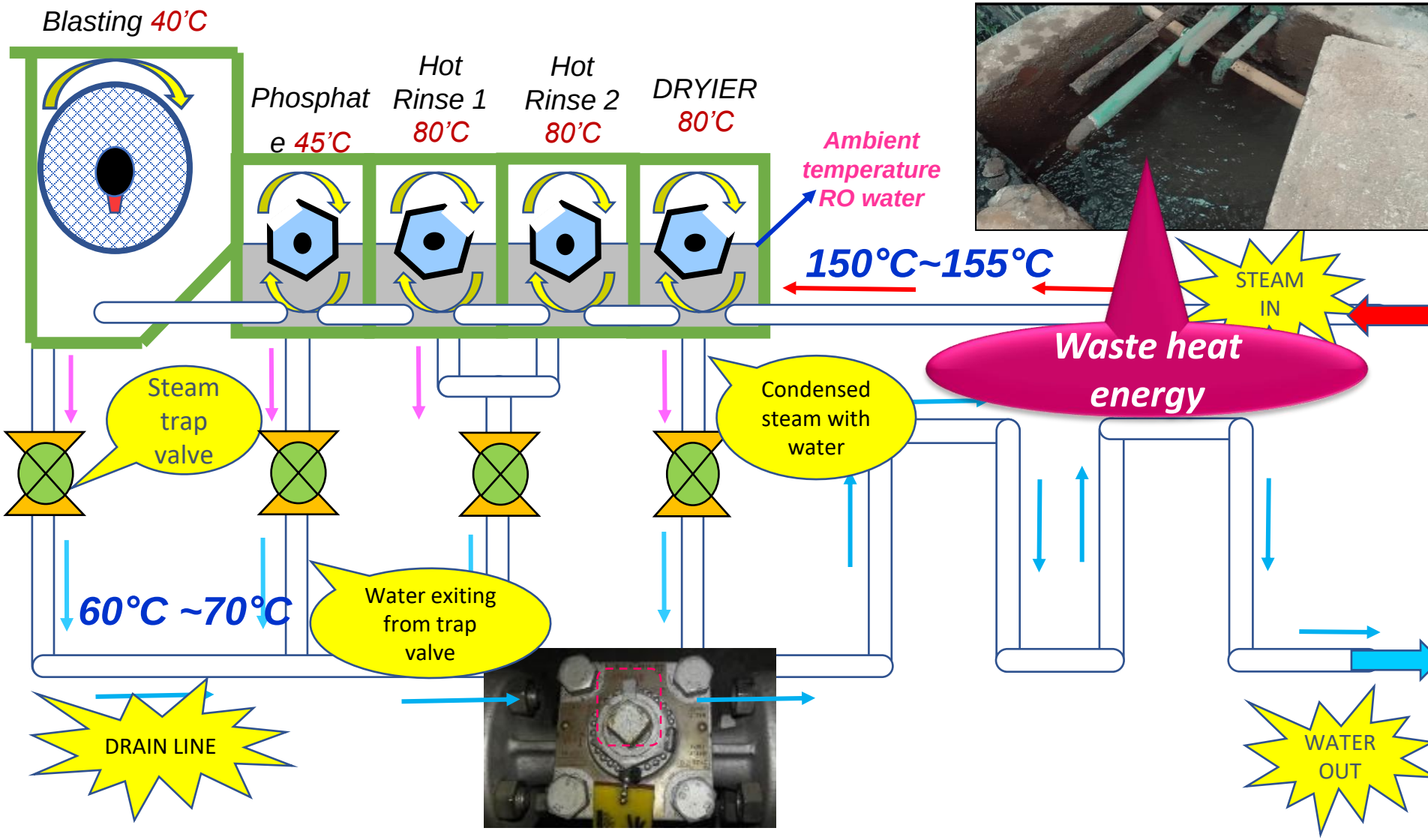
Root Cause:-

- *Boiler continuously firing due to RO Water top up for Back plate rinsing at ambient temperature*

Action:-

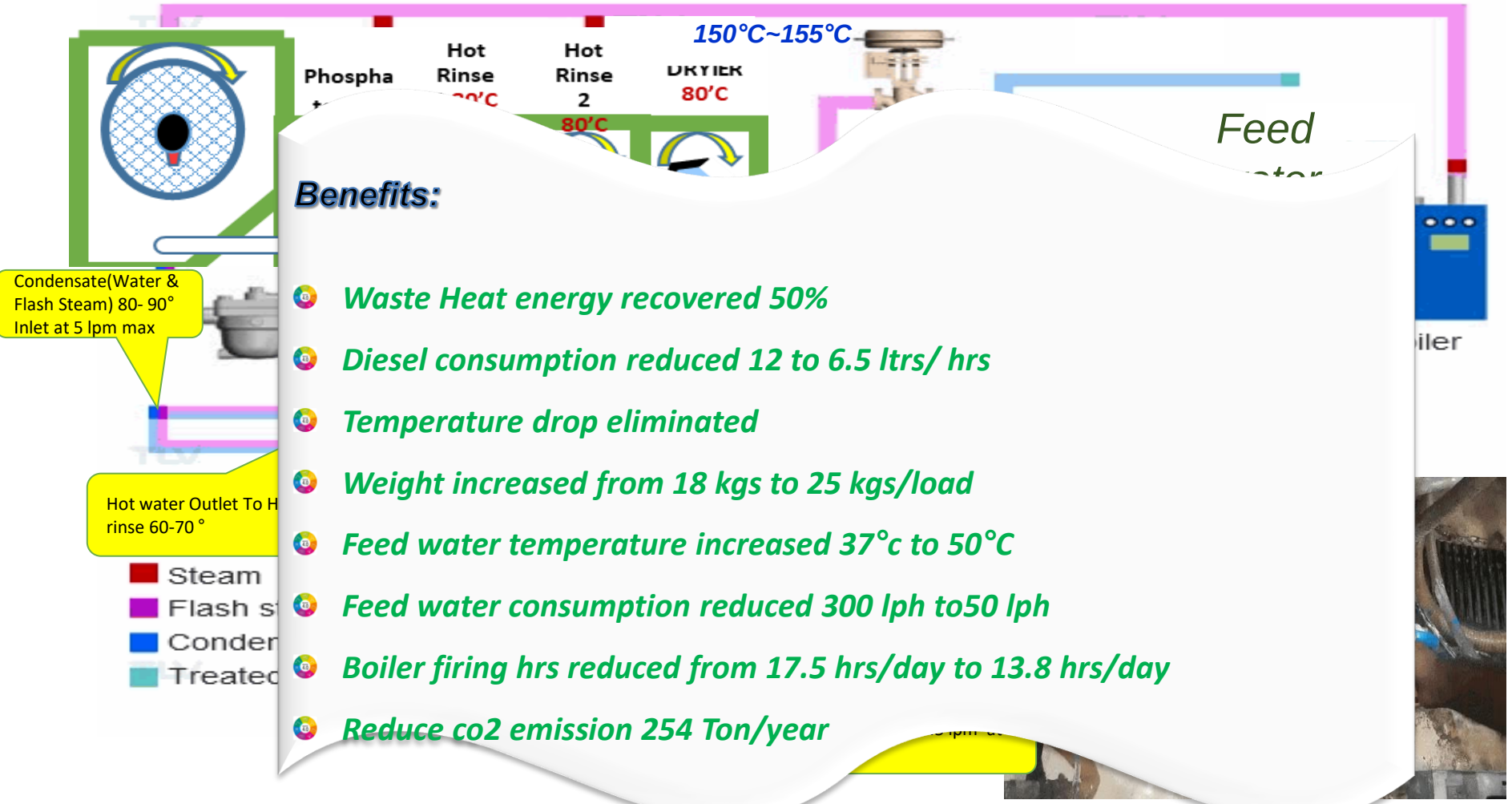
- *Condensate Steam (60 - 70°C) is used to preheat the Hot rinse RO water (60-70°C) through Heat exchanger*

6.1: Re use of waste heat energy in Wet blasting



Hence we decided to recover the waste heat energy

6.1: Re use of waste heat energy in Wet blasting



Benefits:

- *Waste Heat energy recovered 50%*
- *Diesel consumption reduced 12 to 6.5 ltrs/ hrs*
- *Temperature drop eliminated*
- *Weight increased from 18 kgs to 25 kgs/load*
- *Feed water temperature increased 37°c to 50°C*
- *Feed water consumption reduced 300 lph to50 lph*
- *Boiler firing hrs reduced from 17.5 hrs/day to 13.8 hrs/day*
- *Reduce co2 emission 254 Ton/year*

7. Utilisation of Renewable Energy sources

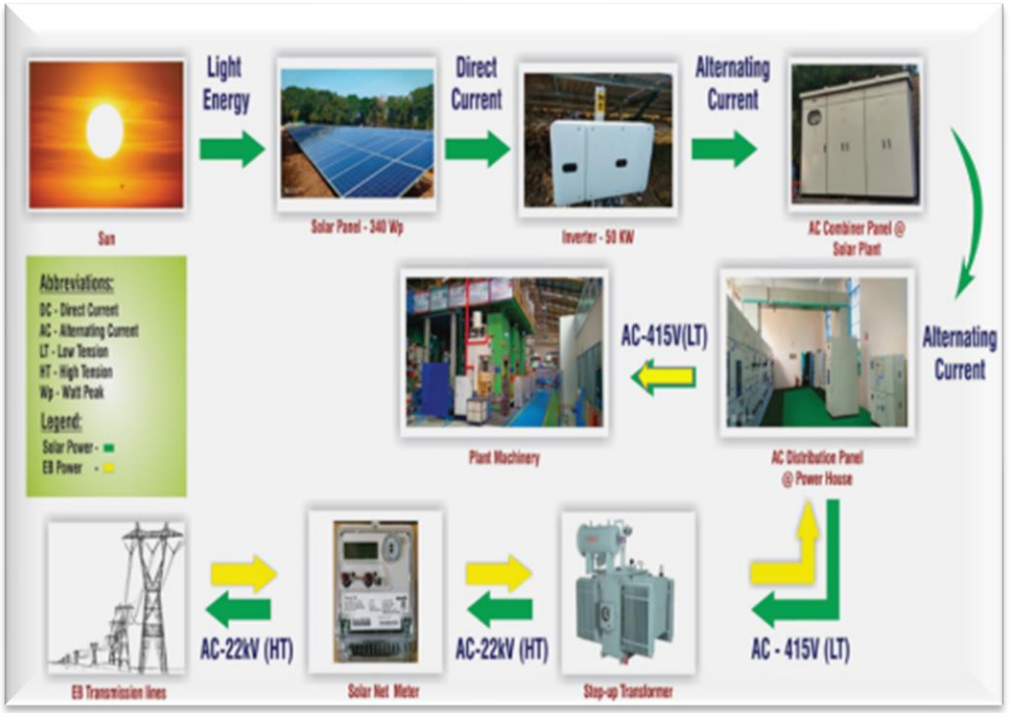
1.17 MW capacity solar plant is installed in FY 19-20

Geographical site Details:

- ❑ Overall plant area: 86090 Sq.m (21 acres)
- ❑ Solar panel installed area: 17838 Sq.m (4.4 acres)

Component Details:

- ❑ **Solar panel :**
  - ➢ Make : Adani Solar (India)
  - ➢ Model: TSM PD14
  - ➢ Capacity: 340 Wp
  - ➢ Qty: 4118 nos
- ❑ **Inverter:**
  - ➢ Make: Huawei (China)
  - ➢ Model: SUN 2000 – 50KTL – M0
  - ➢ Type : Outdoor-Rated String Inverter



Solar Plant Details:

- Plant Capacity: 1.17 MW AC / 1.4 MW DC
- Solar Panel Type: Polycrystalline – 72 Cell
- Module Mounting Structure: Fixed Tilt
- Approved for Group Net Metering

1.17 KW solar panel is installed at the Factory Premises Commissioned on 5'th Feb 2020.

7.Utilisation of Renewable Energy sources

1.17 MW Solar power plant Installation

Solar Power - Captive

Year	Type of Energy	Onsite/Offsite	Installed Capacity (MW)	Generation (Million KWh)	% of overall electrical energy
2019-20	Electrical	Onsite	1.17	0.3	7%
2020-21	Electrical	Onsite	-	1.82	37%

- Dependency on Electricity board reduced from 98 % to 70%
- 30% of energy used is generated through renewable energy
- Solar generation saving for the year 2020-21 18.2 Lacs units (INR 1Cr saving)
- Solar capacity enhancement 0.8Mw – awaiting JERc clearance
- Cut down CO_2 emission almost 1Mton and equivalent to planting 5000Tree/year

8. Waste utilization and management

Zero Waste disposal

- We generate Hazardous and Non hazardous waste from our process
- There is no facility for landfilling and Incineration in Puducherry sate
- Neighbour state restricts for land filling
- Alternate option evaluation done
- Planned for adopt co-processing method
  - Blend with coal in boiler feed in cement industries
  - Direct Incineration method adopted in cement industries

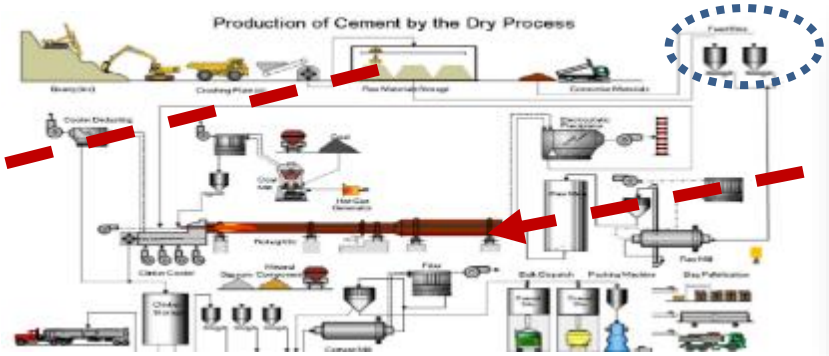
S.No	Type of waste Generated	Quantity of waste generated MT	Disposal method
1	Spent oil	1.6	Re cycle
2	Paint sludge	14.98	Co. Process
3	ETP sludge	10.3	Co. Process
4	Oil Soaked	3.39	Co. Process
5	Discard containers	48.2	Re use
6	Grinding Dust	192	Co. Process

3R concept adopted

Grinding dust disposal 192 tonnes per year

1. Reduce → Yield Improvement (Input weight optimization)
   - 26.4 tonnes of input material saved / previous year
2. Reuse → Used as a Raw material in another grade
   - 27 tonnes of material reused / current year
3. Recycle (Co-Processing) → Recycle those cannot be reused as raw materials
   - 110.6 tonnes of material disposed / previous year

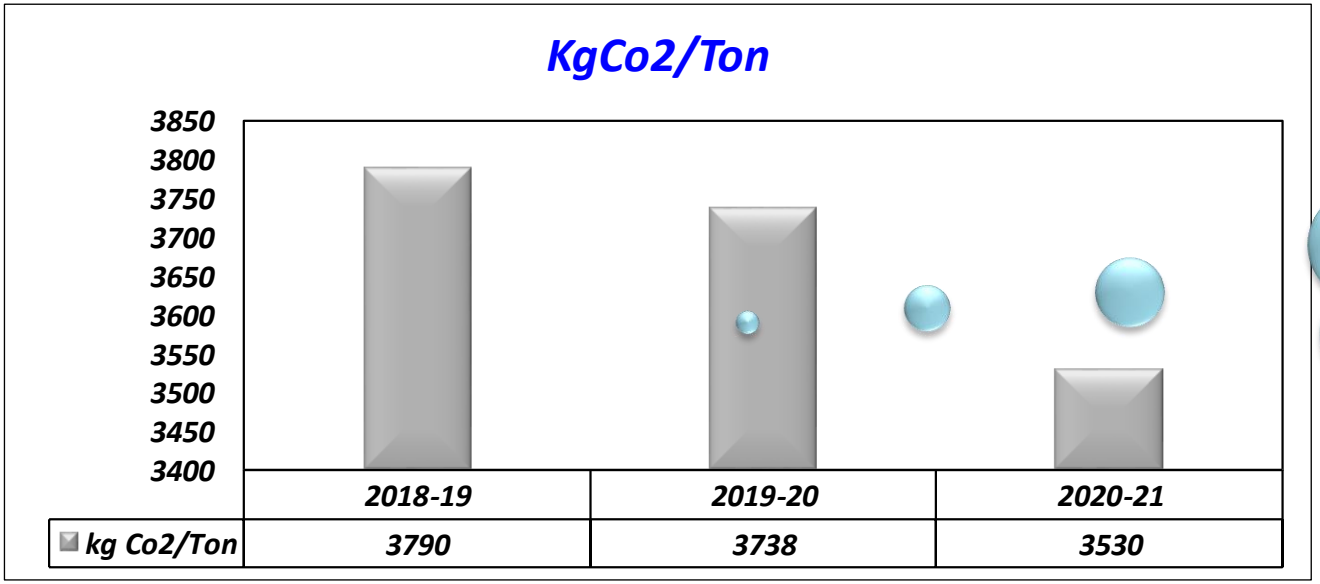
8. Waste utilization and management



- *As per CCCPL process 80 % of Coal and 20% other waste used as fuel at preheating tower*
- *Grinding dust been loaded in belt conveyor with coal as fuel to feeder bins thru crusher maintain temperature of 1400'c.*
- *Hazardous waste been directly loaded in rotatory kiln to maintain temperature of 1400'c.*
- *After preheating generated burned ash as raw material for Cement manufacturing.*
- *Total waste disposed quantity : 400 tons*

Zero land filling ensured
Zero Pollution
Zero Transportation

9. GHG Inventorisation



1.17 MW solar plant installed to reduce CO2 emission

Short term actions:

- ✓ *Implemented 18 projects to reduce GHG inventorisation*

Long term action plan:

- ✓ *Planned to install additional 0.83 MW solar plant to reduce CO2 emission*

9. GHG Inventorisation

Carbon foot print

Co2 Emission/Ton of product

Co2 absorption/ton of product

Co2 Emission

Co2 Absorption

Scope 1 Grid Power Emission

Scope 2 HSD Emission

Tree plantation

Benefits :

- Plant Green belt development 16 Acre and 1.17 MW solar plant implemented to reduce Co2 emission 1500 MT

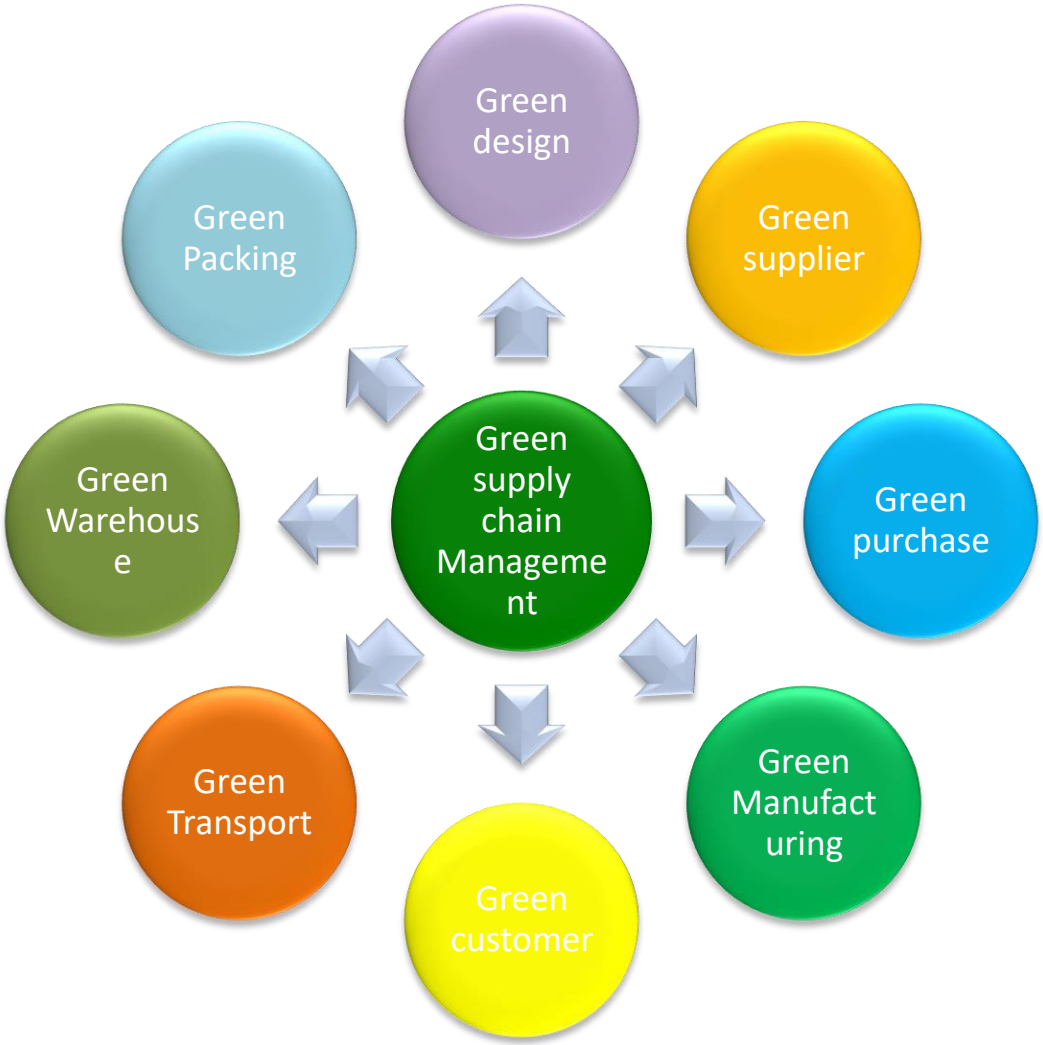
Grid 2698 kg co2/ton

HSD 285 kg co2/ton

LPG & Transport 65 kg co2/ton

Plant Green belt development 16 Acre and 1.17 MW solar plant (1500kgco2/ton)

10. Green Supply Chain



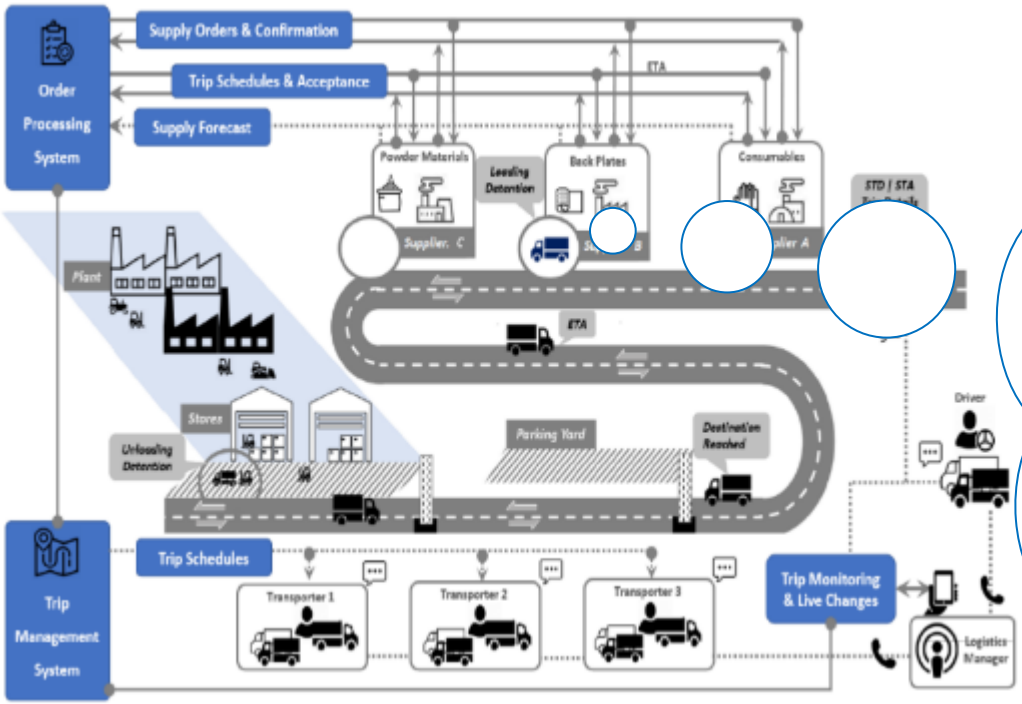
5 projects implemented in Green supply chain

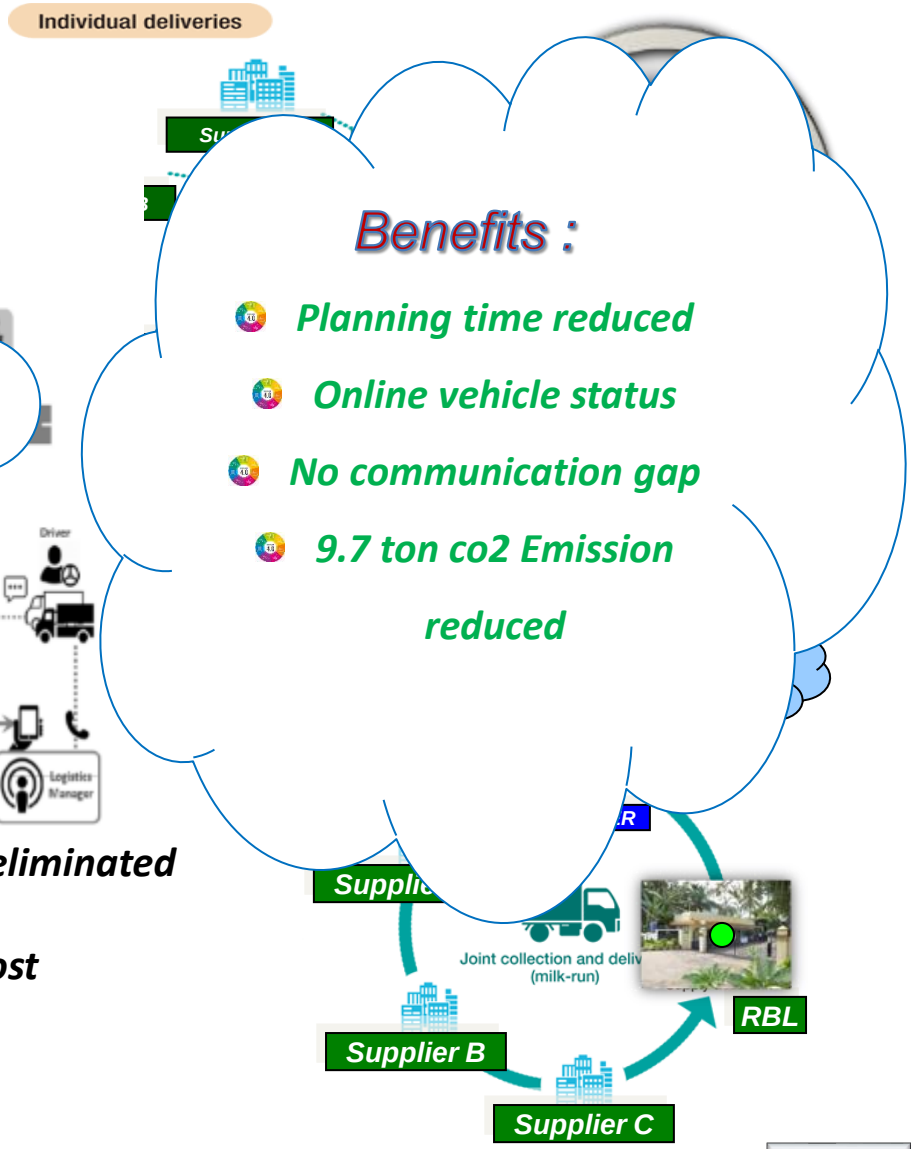
Digital supply chain management will be explained in detail

10. Green Supply Chain

Background

- *Separate vehicle for each supplier*
- *High traffic congestion in Chennai plant*





- *Materials collection charges & Multiple handling eliminated*
- *Transit damage eliminated*
- *Increases productivity and reduced operational cost*

10.2:Reusable trays implementation

Kaizen: Implementation of reusable & returnable trays

Before

Palletized condition

After

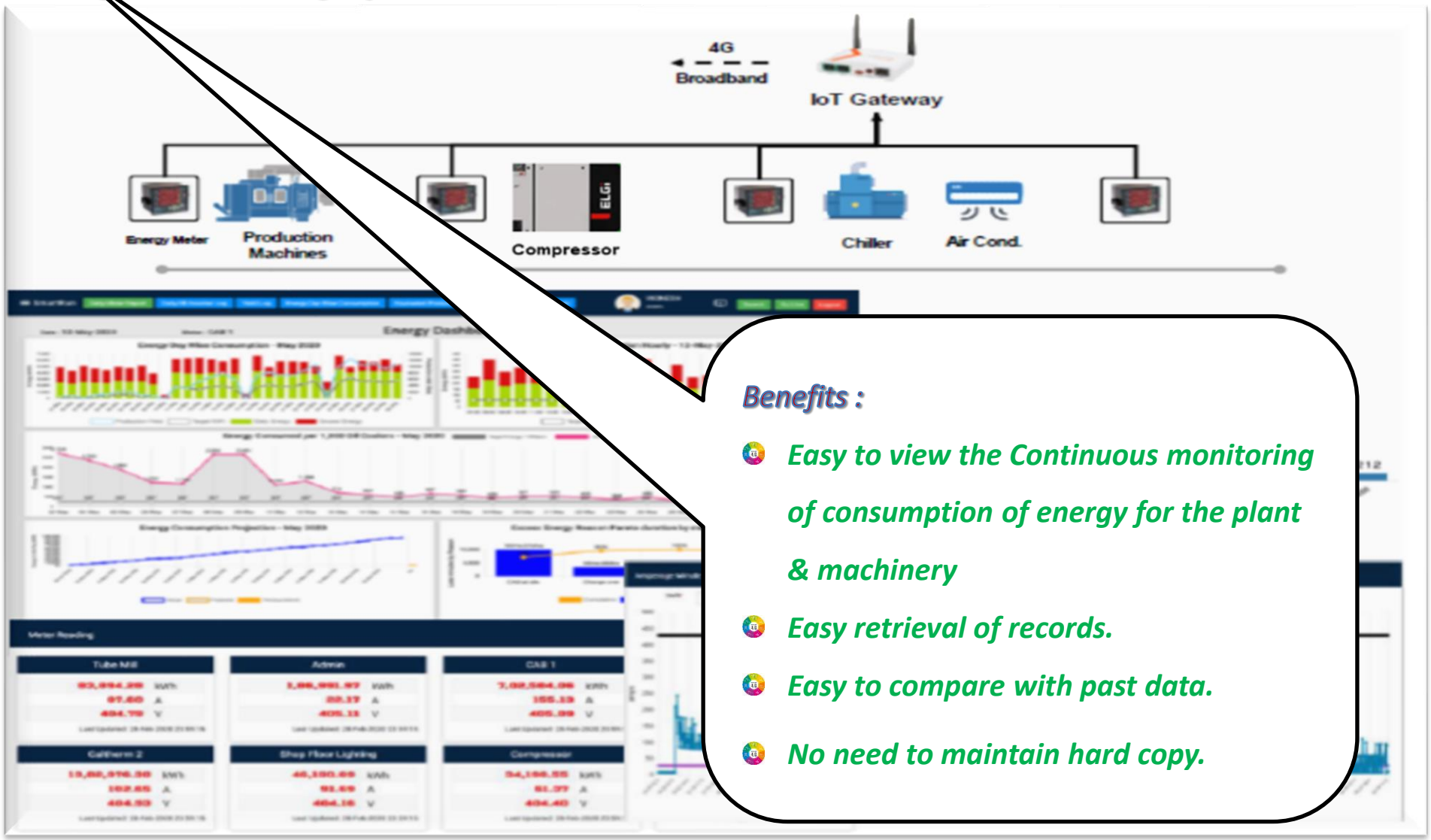
Individual Bin

106 Tonnes of cartons usage saved per year

Packaging cost savings : Rs 5.1 lacs per year.

11. Team work, Employee Involvement & Monitoring

Energy monitoring system use of ioT



Benefits :

- Easy to view the Continuous monitoring of consumption of energy for the plant & machinery
- Easy retrieval of records.
- Easy to compare with past data.
- No need to maintain hard copy.

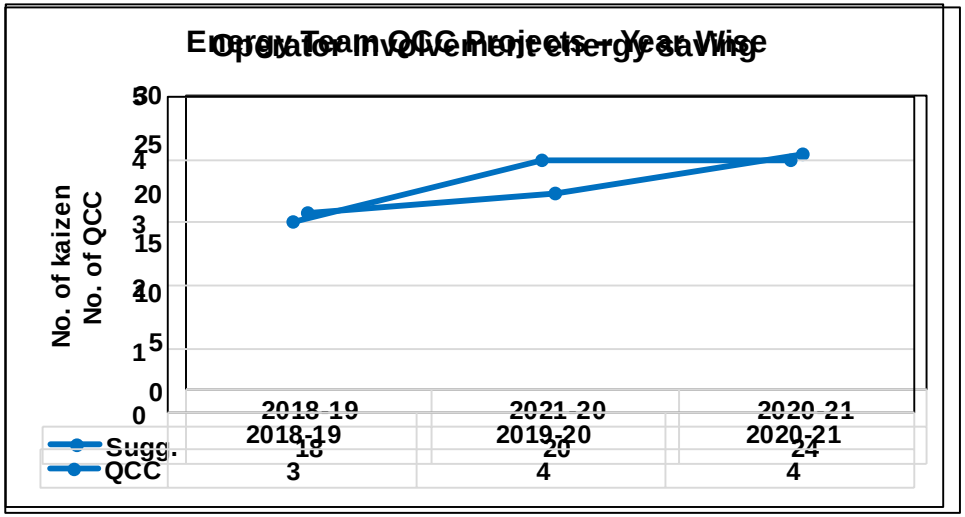
11. Team work, Employee Involvement & Monitoring

Review system:

Reviewee	Reviewer	Frequency
Technician	Supervisor	Shift wise
Supervisor	Energy manager	Daily
Energy manager	Manufacturing Head	Weekly
Manufacturing Head	Plant head	Monthly
Plant head	President	Monthly
President	Chairman	Quarterly

11. Team work, Employee Involvement & Monitoring

Energy awareness program conducted



Kaizen competition ABK-AOTS

Energy awareness video

Spot quiz - Weekly

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

S.no	Description	Certification	Planned on	Status
1	ISO 50001	Nil	2021-22	Study completed . Work under progress.
2	Green co	Nil	2022-23	----
3	IGBC rating	Nil	2022-23	-----

% Investment of energy saving projects

S.no	Year	Total turnover in Million	Amount invested in Million	Investment %
1	2020-21	734	0.71	0.10%
2	2019-20	730	0.80	0.11%
3	2019-18	755	0.73	0.10%

13. learning from CII Energy Award 2020 or any other award program

Quality :

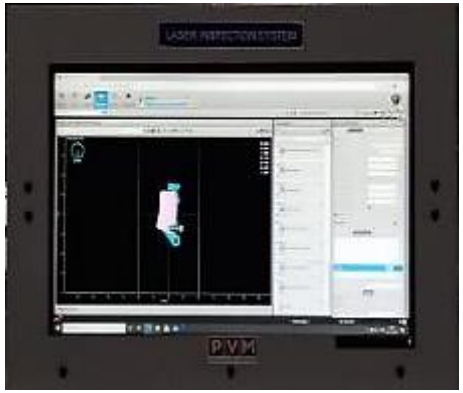
Online vision and dimension measurement system :

- *Capable to measure Dimension and product attributes and auto segregate online*
- *Programming for all part numbers and validation in progress*

Online vision and dimension inspection system

Vision Inspection

Dimension Inspection

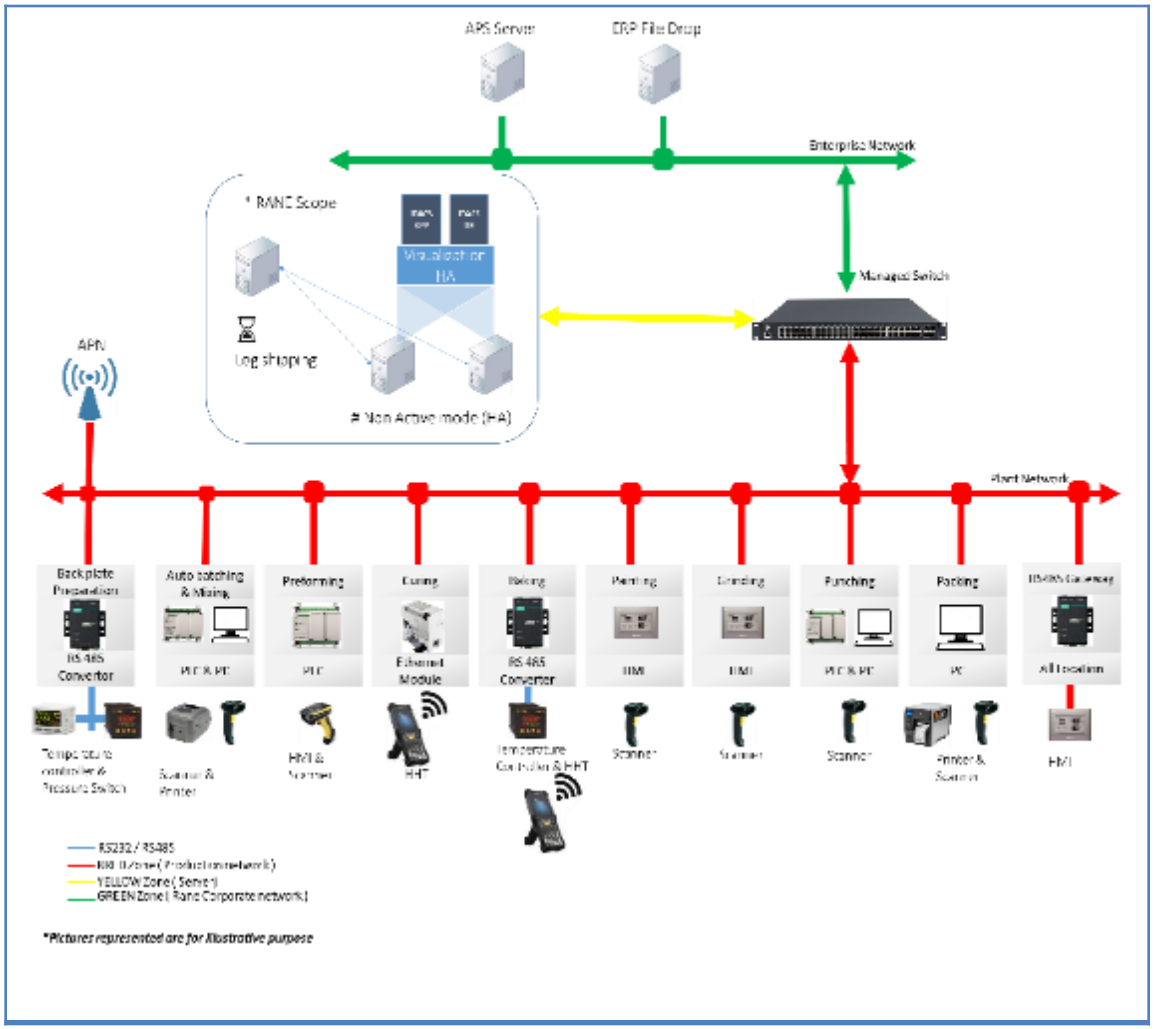


- *Vision sensor - Wenglor*
- *Dimension - Laser triangulation technology*
- *- Sensor - Gocator*

13. learning from CII Energy Award 2020 or any other award program

State of art IT enabled End to End traceability system

Traceability system

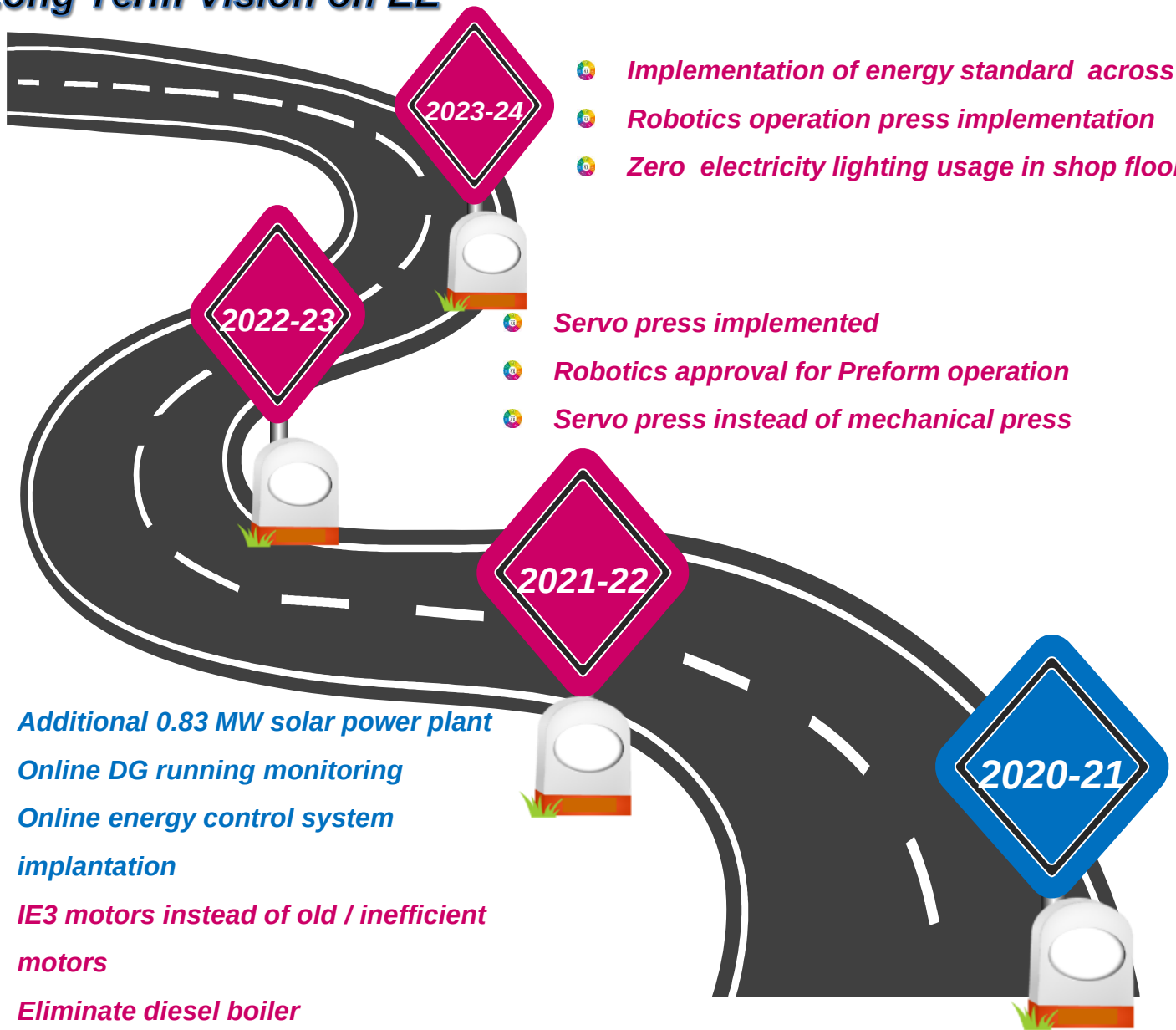


Benefits

- ***End to End traceability first time in Rane group***
- *High technology traceability equipment's used like HHT , Barcode and Scanners*
- *Process validation through machine , man and process parameters interface*
- *Real time process and product data capturing and analysis*
- *All process data saved in plant server which is connected to RDC server which is at Chennai*
- *Project started .Work under progress*

13. learning from CII Energy Award 2020 or any other award program

Long Term Vision on EE



- Implementation of energy standard across all plants
- Robotics operation press implementation
- Zero electricity lighting usage in shop floor

- Servo press implemented
- Robotics approval for Preform operation
- Servo press instead of mechanical press

- Additional 0.83 MW solar power plant
- Online DG running monitoring
- Online energy control system implantation
- IE3 motors instead of old / inefficient motors
- Eliminate diesel boiler

- Online DG running monitoring
- Energy management system implemented
- Peak hours production plan to reduce DG running hours

13. learning from CII Energy Award 2020 or any other award program

Awards

CII Solid waste management 1st Prize

RBL Puducherry - Won Best - Winners award in
CII- Southern Region Industrial Waste Management Competition
July-2021

Description	Team Photo
RBL-P3 won Best Winner award in CII- Southern Region Category - Solid Waste Management held on 09-July-2021	
Project details	
Zero Disposal of Waste to Environment	❖ Team Members R.SANKAR S.UDAYA KUMAR

QCC 1st prize : ACMA

ABKS-AOTS DOSOKI QCC– Platinum Award

Rane

Congratulations!

RBL Puducherry- Rane Winners QCC Team won Platinum award in 04th Innovative QC Competition organized by ABK-AOTS DOSOKAI TAMIL NADU CENTRE on 17th Nov 2019.

Team Members : Mummurthy K, Rajasekar D, Kirty K, Sakthivel A
Team Leader : Chandirasekaran S , Facilitator : Shenbagavel M

CII QCC Competition – First place

Rane Brake Lining Ltd – Plant 3 Puducherry

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Thank you…