24th National Award for 2023
Excellence in Energy Management
13 - 15 September 2023 II HICC, Hyderbad

Galaxy Surfactants Limited, Taloja

V/23 Industrial Area, Taloja, Navi Mumbai, Maharashtra, 410208

Presented By -

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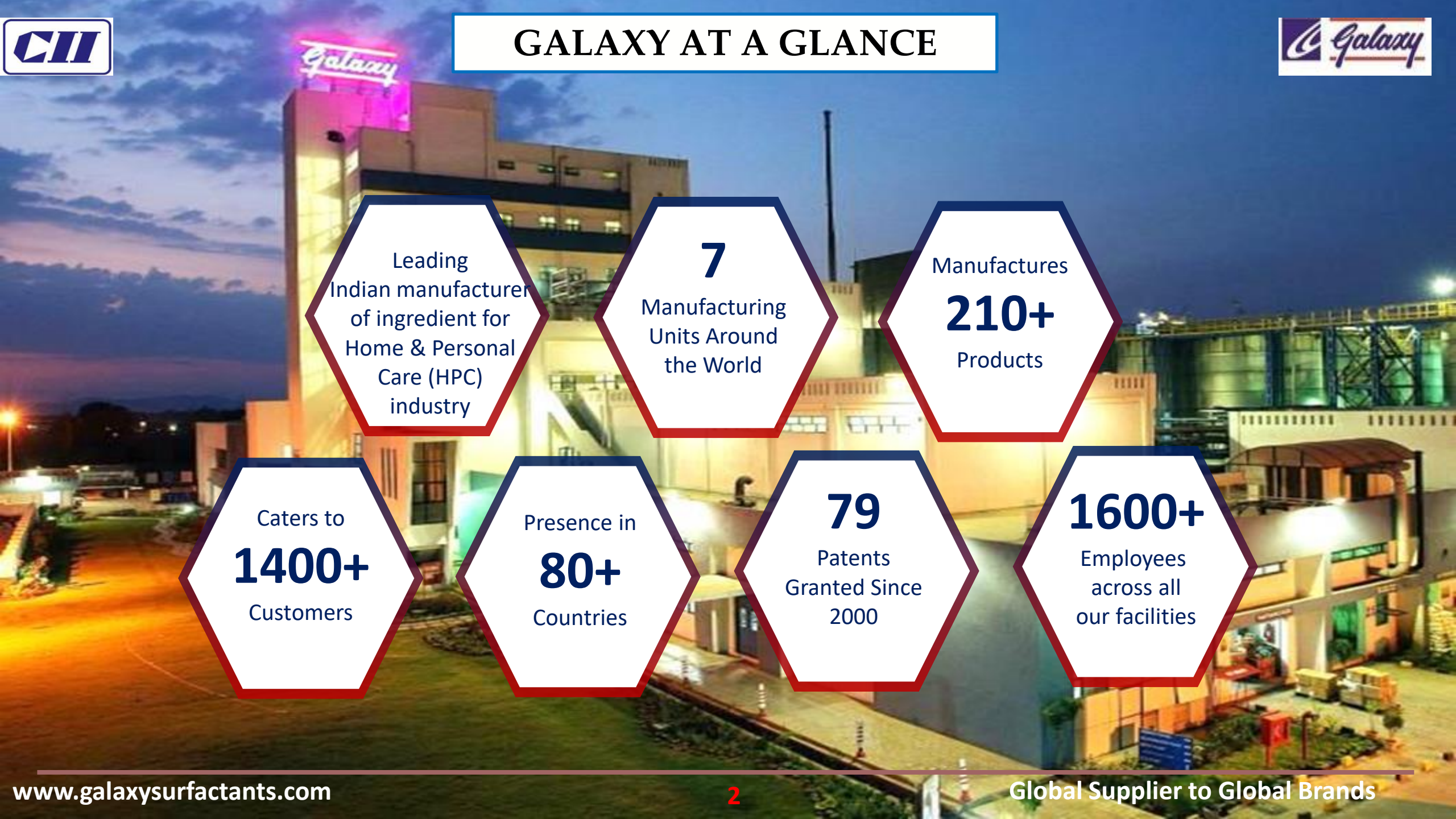
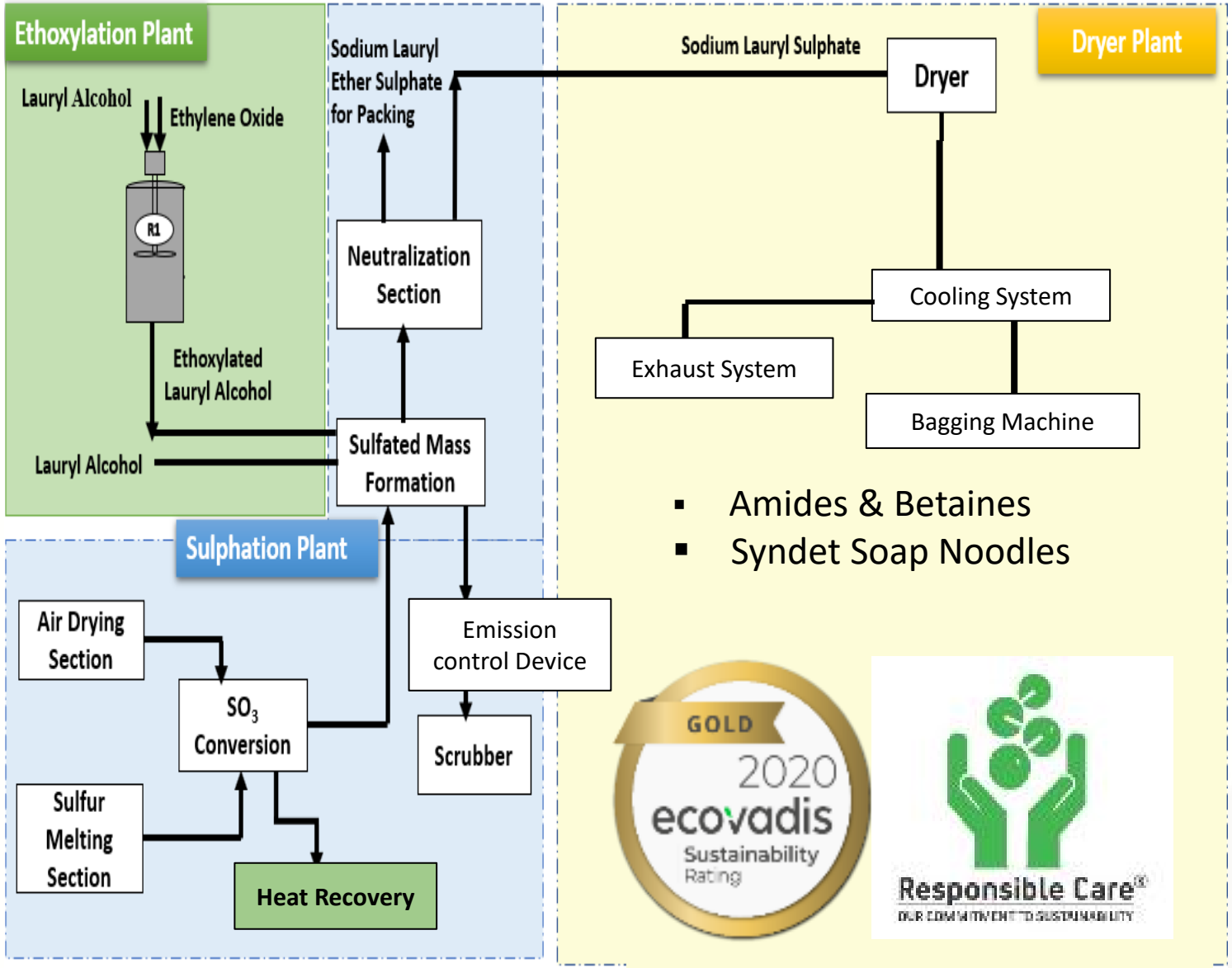
GALAXY AT A GLANCE



Manufacturing Process



Transformers: 2 x 2.5 MVA
1 X 1.6 MVA

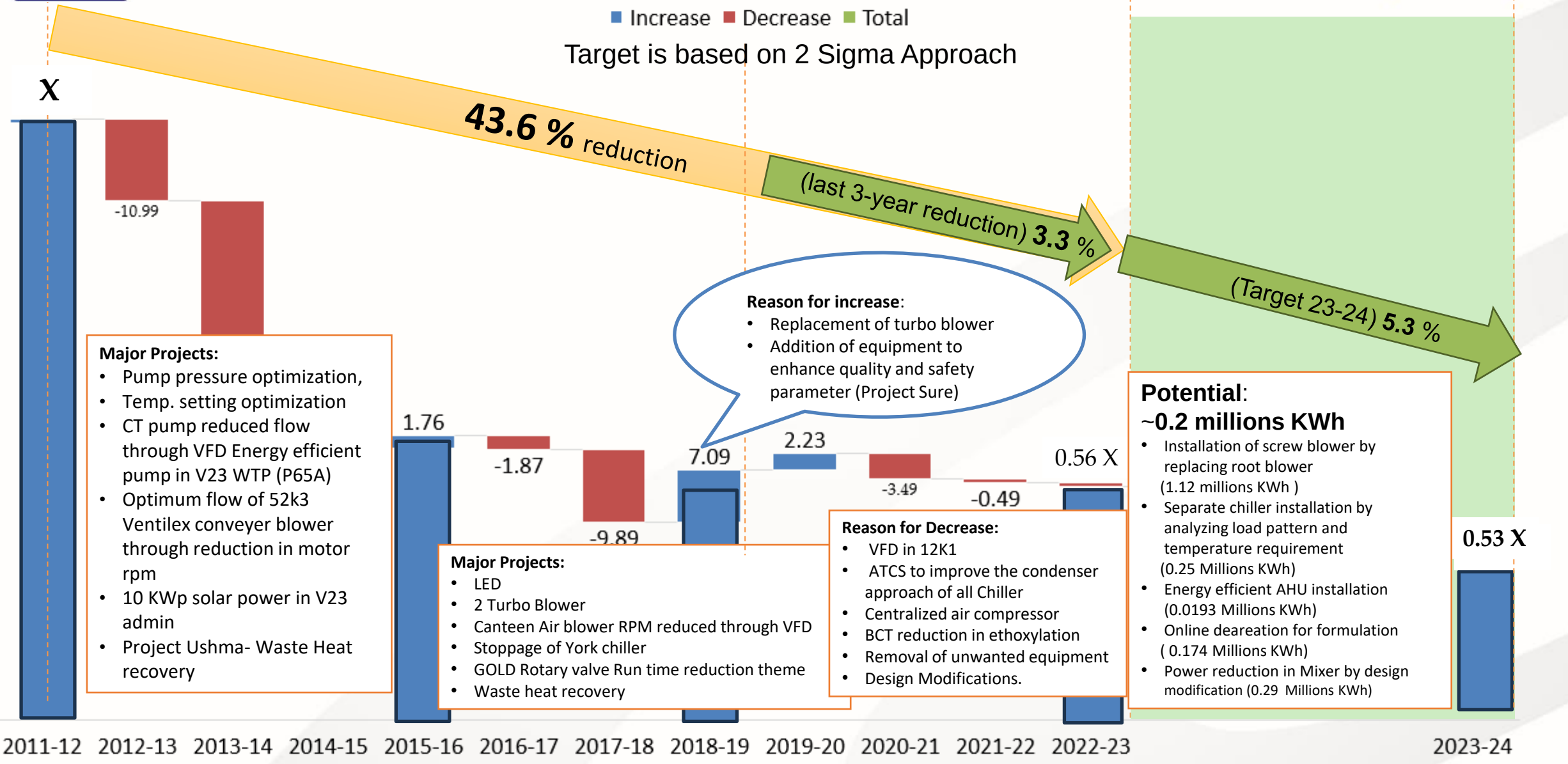
Coal Boiler : 5 TPH
(Natural Gas Boiler Installation FY 23-24)
Boiler Efficiency – 83 %

Utility Chillers : 1 x 250 TR , 1 x 210 TR

Air Compressor : 2 x 293 CFM with VFD

Thermic Fluid Heater : 1 million Kcal
Max Sanctioned Demand : 3.5 MVA
Load factor : 65-70 %
Power factor : >0.995
(APFC + Harmonic Filters)

Overall Specific Energy Consumption (MWh/MT)



Major Projects:
- Pump pressure optimization,
- Temp. setting optimization
- CT pump reduced flow through VFD Energy efficient pump in V23 WTP (P65A)
- Optimum flow of 52k3 Ventilex conveyer blower through reduction in motor rpm
- 10 KWp solar power in V23 admin
- Project Ushma- Waste Heat recovery

Reason for increase:
- Replacement of turbo blower
- Addition of equipment to enhance quality and safety parameter (Project Sure)

Major Projects:
- LED
- 2 Turbo Blower
- Canteen Air blower RPM reduced through VFD
- Stoppage of York chiller
- GOLD Rotary valve Run time reduction theme
- Waste heat recovery

Reason for Decrease:
- VFD in 12K1
- ATCS to improve the condenser approach of all Chiller
- Centralized air compressor
- BCT reduction in ethoxylation
- Removal of unwanted equipment
- Design Modifications.

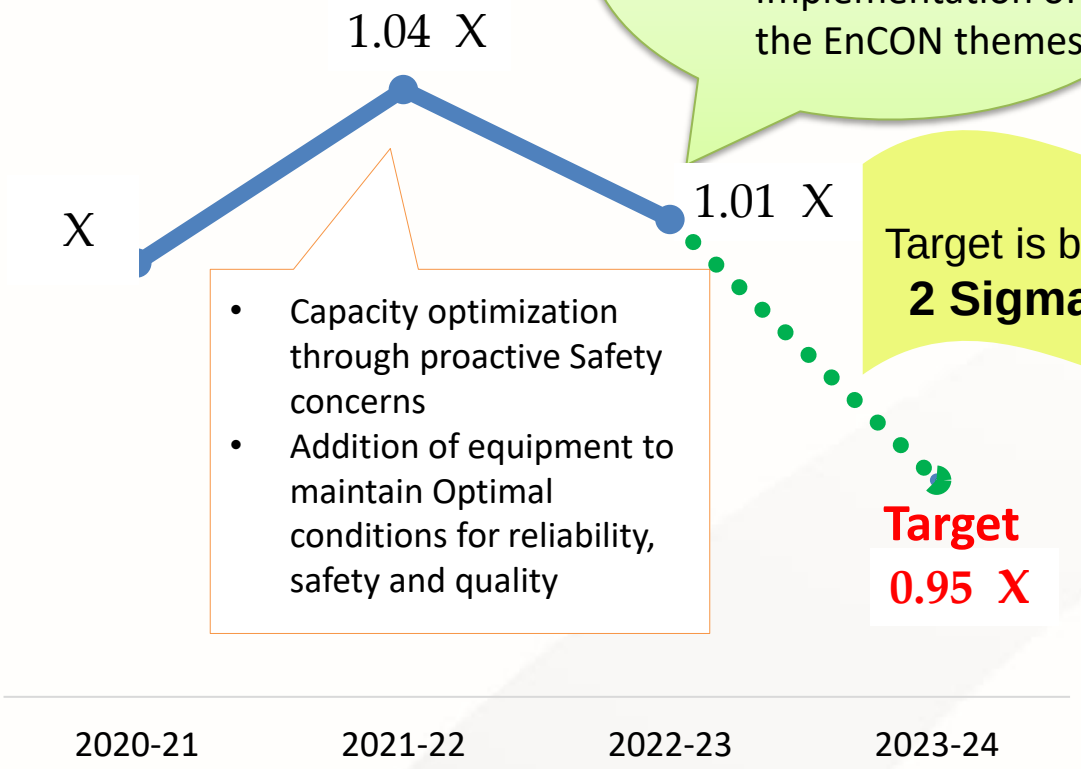
Potential:
~0.2 millions KWh
- Installation of screw blower by replacing root blower (1.12 millions KWh)
- Separate chiller installation by analyzing load pattern and temperature requirement (0.25 Millions KWh)
- Energy efficient AHU installation (0.0193 Millions KWh)
- Online deareation for formulation (0.174 Millions KWh)
- Power reduction in Mixer by design modification (0.29 Millions KWh)

Specific Energy Consumption Trends

Electrical Energy (KWh /MT)

Target reduction FY 23-24– **5.8 %**

- Increased output with the same energy input.
- Implementation of the EnCON themes



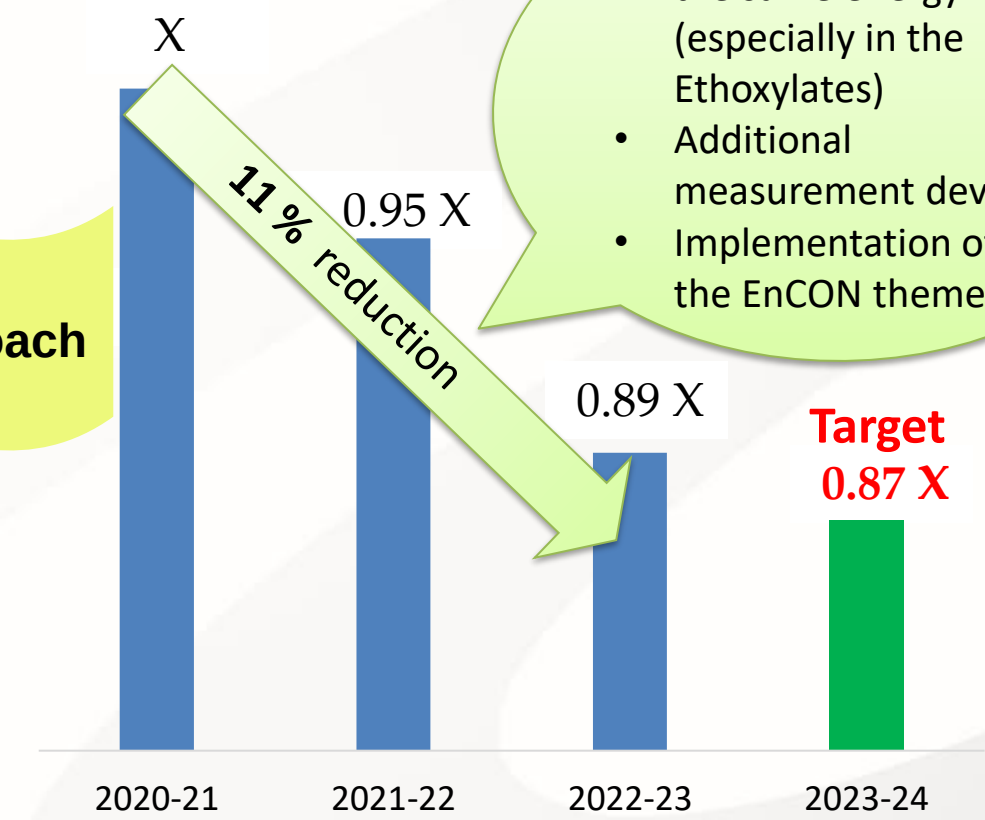
- Capacity optimization through proactive Safety concerns
- Addition of equipment to maintain Optimal conditions for reliability, safety and quality

Target is based on **2 Sigma Approach**

Thermal Energy (Kg/MT)

Target reduction FY 23-24 – **2.3 %**

- Increase output with the same energy input (especially in the Ethoxylates)
- Additional measurement devices
- Implementation of the EnCON themes



Internal Bench-marking

Internal benchmarking is among all the sulfation Plant

Location	Year of Commissioning	Specific Energy Consumption
Taloja (L1)	1997	X
Taloja (L2)	2004	0.85 X
Taloja (L3)	2010	0.94 X
Egypt	2011	*0.78 X
Jhagadia (Gujarat)	2018	0.75 X

System Standardization

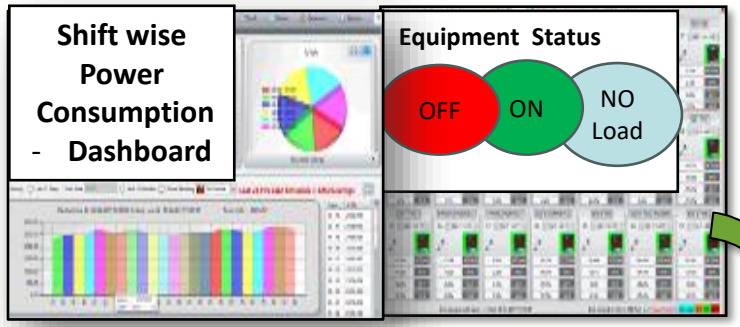
Energy Monitoring System

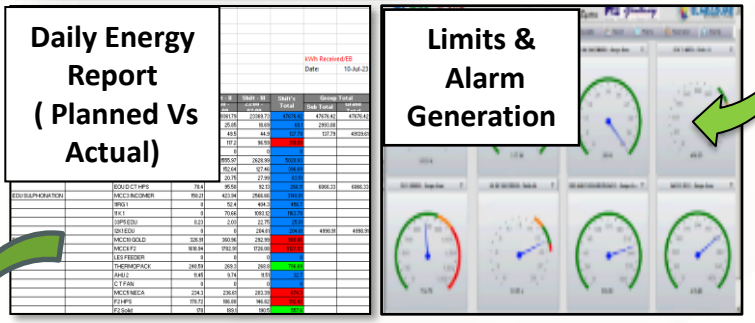
Data

Information

Decision

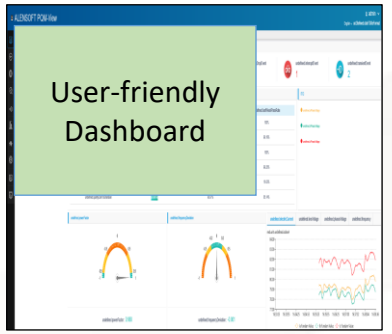
Energy Management Software

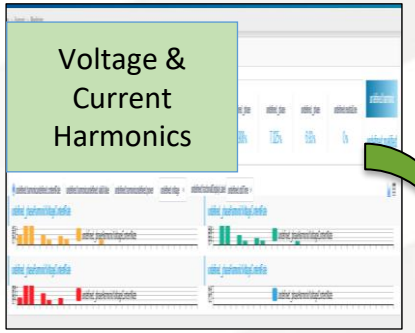


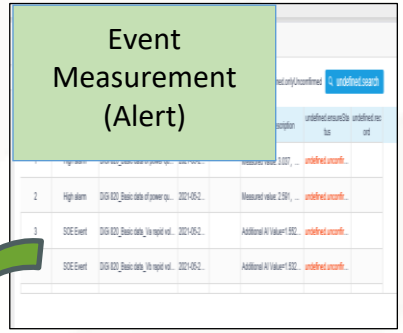


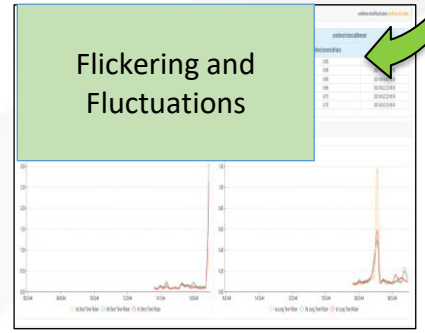
- Revised Budgeted value
- To Identify En-CON Themes
- Automation
- Provided Interlocks
- Amended SOP's
- Specialized Audits

Power Quality Software





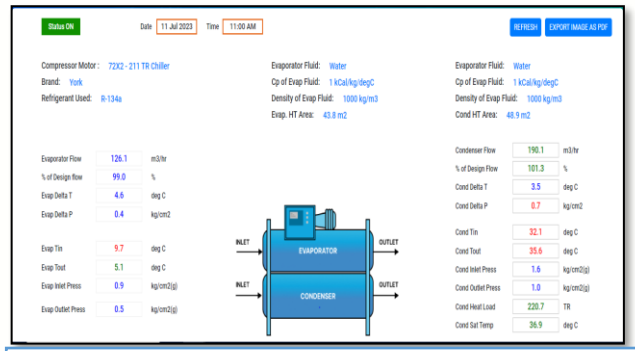




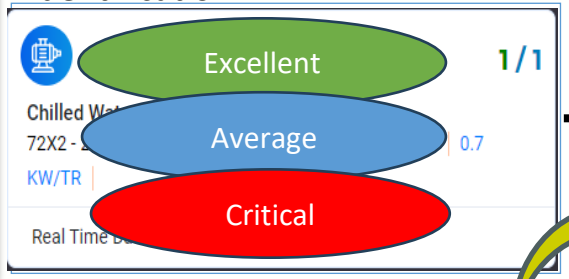
PARAMETERS	STANDARD	ACTUAL VALUE
VOLATGE HARMONICS	5 % THD	2 %
CURRENT HARMONICS	8 % THD	4 %
POWER FACTOR	1	0.999

- System Harmonic level validated
- Breakdown Root cause analysis

Equipment Performance Monitoring



User friendly deviation identification



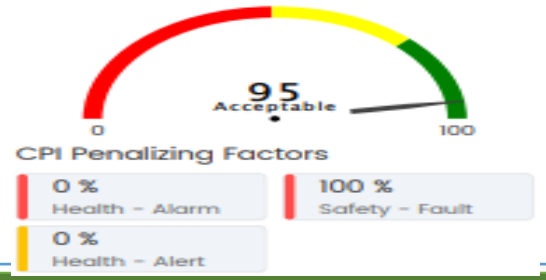
DATA

INFO

ACTION

- Maintenance log and alert
- Hourly & Daily report with recommended actions for Below Average/Critical recommended parameters

Property	Excellent	Below Average/Critical	Recommended actions for Below Average,
Evaporator Flow m3/hr	>127	<114	*Chilled water flow rate less than 114 m3/hr. Check the chilled water pump. Make sure the valves are fully open. Check pump amperes. Check pump outlet pressure. Check the chiller performance graphs.*



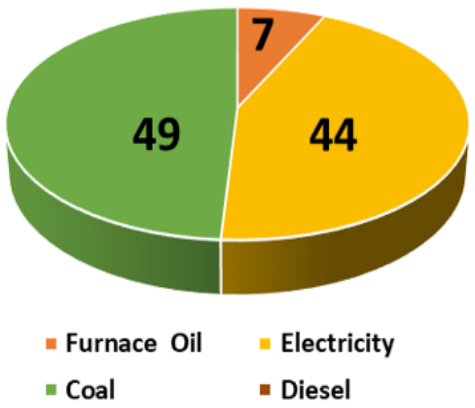
Chiller Performance index

Cloud based Monitoring System- Chiller

Sigma Air Manager - Compressor

Energy Mapping Overview

Total Energy



Steam-
50 %

- Condensate heat recovery
- Boiler efficiency monitoring and control
- Waste heat recovery boiler

Motor & Pumps-
40.4 %

- IE3 Motors while procuring new motors
- HPS System based on pressure
- Temperature interlocks with CT fan (PID)
- VFD installation to the variable load
- Dedicated audit for Pumps by Grundfos

HVAC-
5.7 %

- KW/TR= 0.55 to 0.65
- Automatic Tube Cleaning System for all chillers
- Separate chiller for low and high temperature equipment
- Continuous monitoring of critical parameters

Lighting-
1.7 %

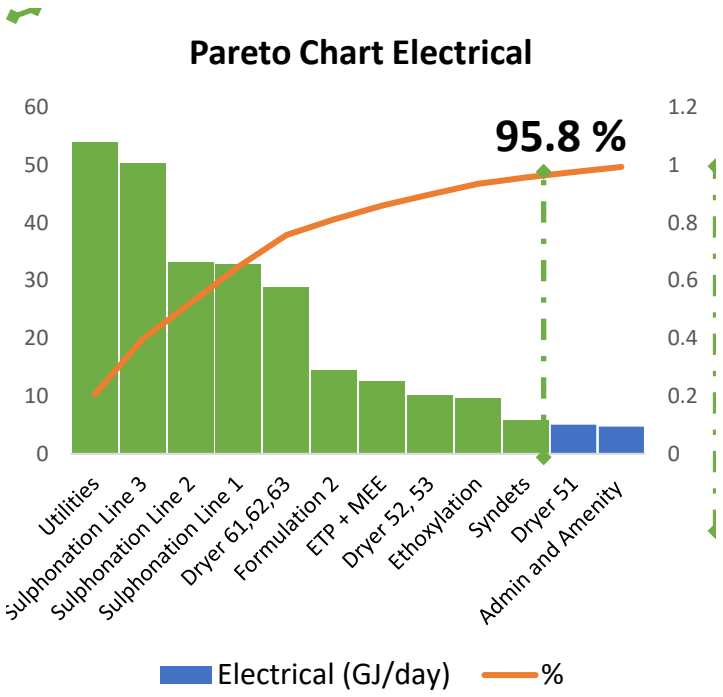
- 100 % LED Installation
- Lighting Energy Saver for lighting system

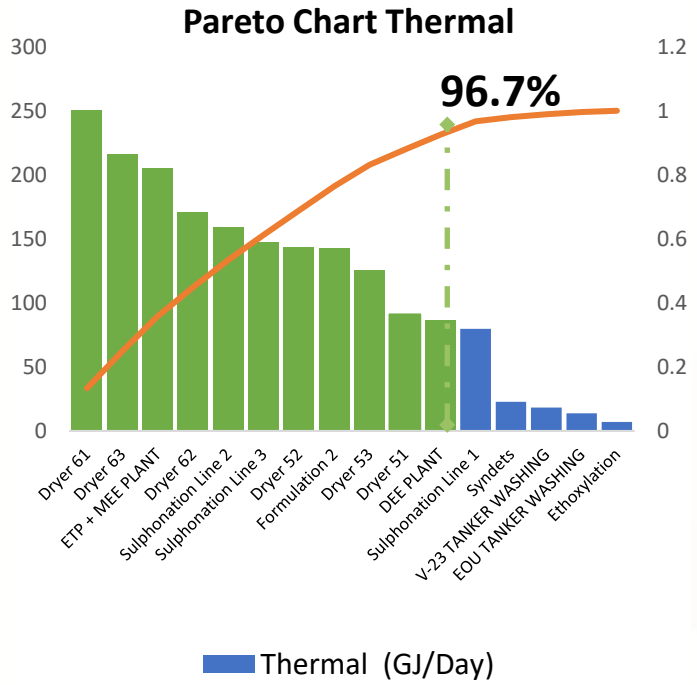
Compressed Air-
1.3 %

- KW/CFM – 0.16
- Centrifugal Compressor Centralize System with VFD
- Air leak detection software
- IOT Software for CBMS

Process Heating-
0.9 %

Extent of Energy Monitoring



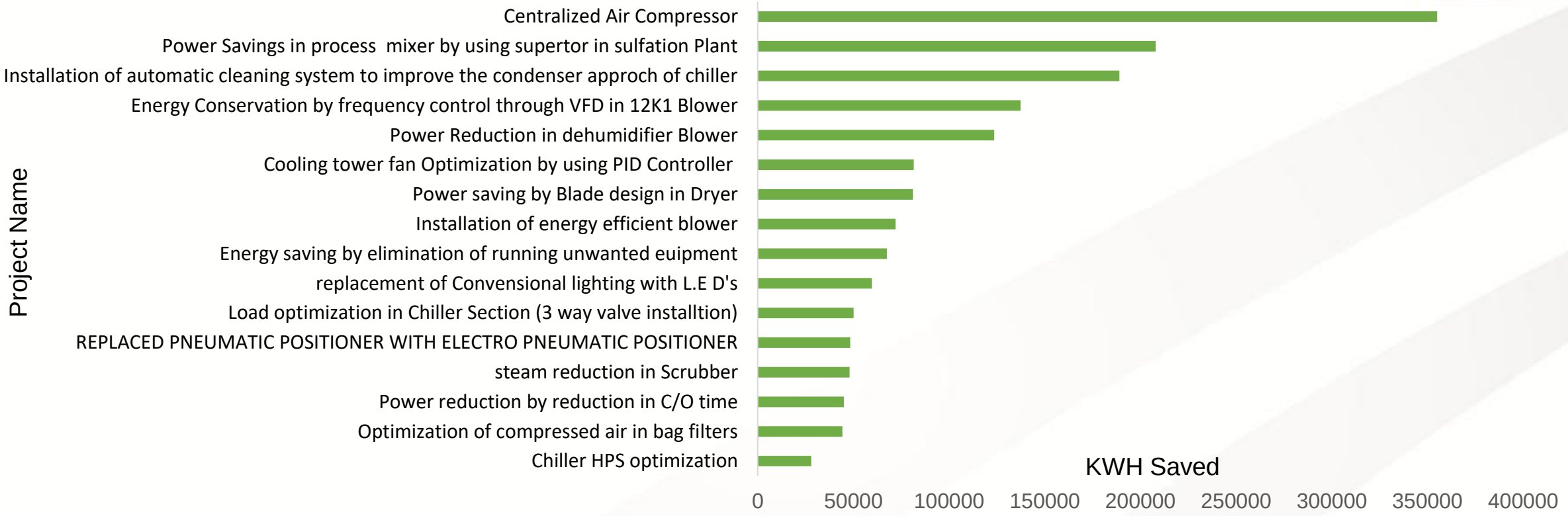


Monitoring Instruments	Nos
Multi Function meters (Equipment level Monitoring) 	144
Steam flow Meter (Section Level Monitoring) 	12
Compressed Air flow meter (Generation & plant level) 	5
Nitrogen (Storage & plant level)	3

Significant Energy Users should comply the EnMS Standard requirements…!!

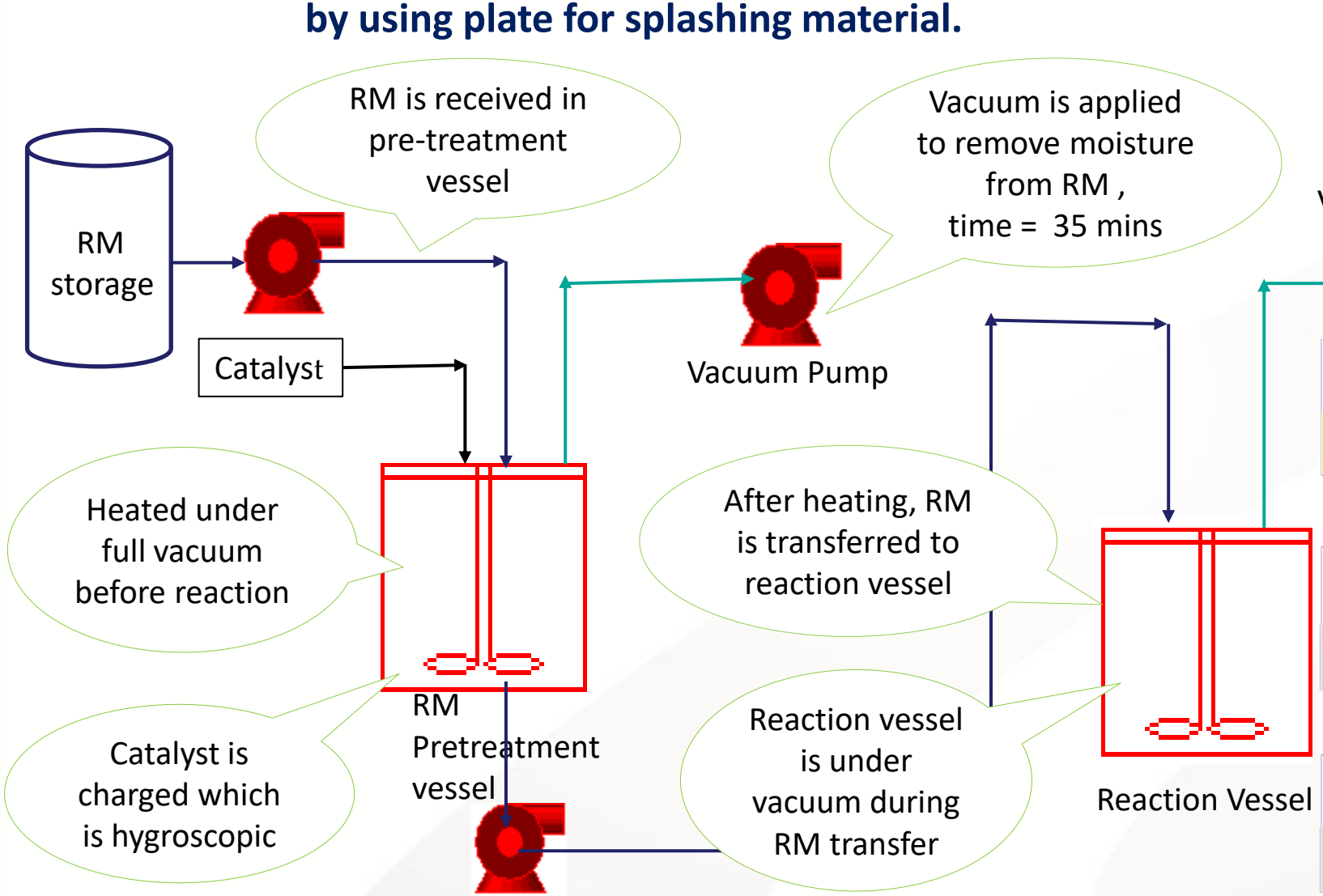
Target Setting – Plants Level
(**2 sigma Approach**)

EnCON Project Implemented



Year	No. of Energy saving projects	Investments (INR Million)	Electrical savings (Million kWh)	Thermal savings (Million Kcal)	Savings (INR Million)
FY 2020-21	4	0.2	0.093	85	2.8
FY 2021-22	18	11	0.88	2188	20
FY 2022-23	5	3	0.088	1941	7

Project Name - Implementation of Innovative logic for Batch cycle time reduction in the batch mixing vessel by using plate for splashing material.



Thought Process

Why-1: **Why higher vacuum application time is required for removing moisture from RM?**

Because there is no surface area generation to remove moisture

Why-2: **Why there is not enough surface area generated?**

Because there is no splashing of Raw material in reactor

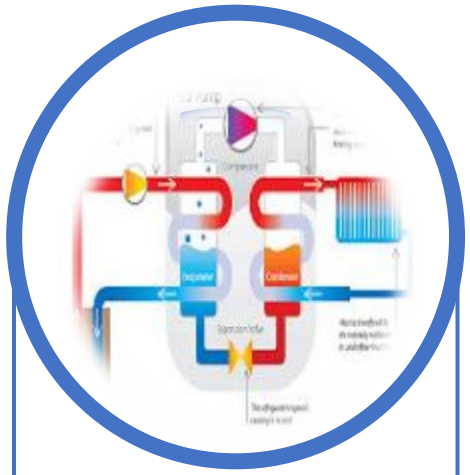
Why-3: **Why there is no splashing of material in reactor?**

Because circulation line in reactor is a dip line.

Benefits-

- ✓ Batch time reduction - **10** min/batch
- ✓ No of batch increased - **330** batches/ Annum
- ✓ Decreased specific energy consumption by **7 %**
- ✓ Annual KWH Savings - **23,100** KWH
- ✓ Production increased by **3000** MT/annum
- ✓ Total savings Rs **1.6** Cr/annum

En CON Project Planned… FY 2023-24



Heat Pump

1

To save 150 - 200 kW of heat load of boiler by using heat pump

Order has been placed

Screw Blower installation

2

Replacement of lobe blower with screw blower to achieve 35 % reduction

Order has been placed

Energy Efficient AHU

3

PM Motor and efficient Fan for Warehouse AHU

Detailed Engineering Completed

Steam trap monitoring

4

Online monitoring of steam traps

Detailed Engineering Completed

~0.2 millions KWh

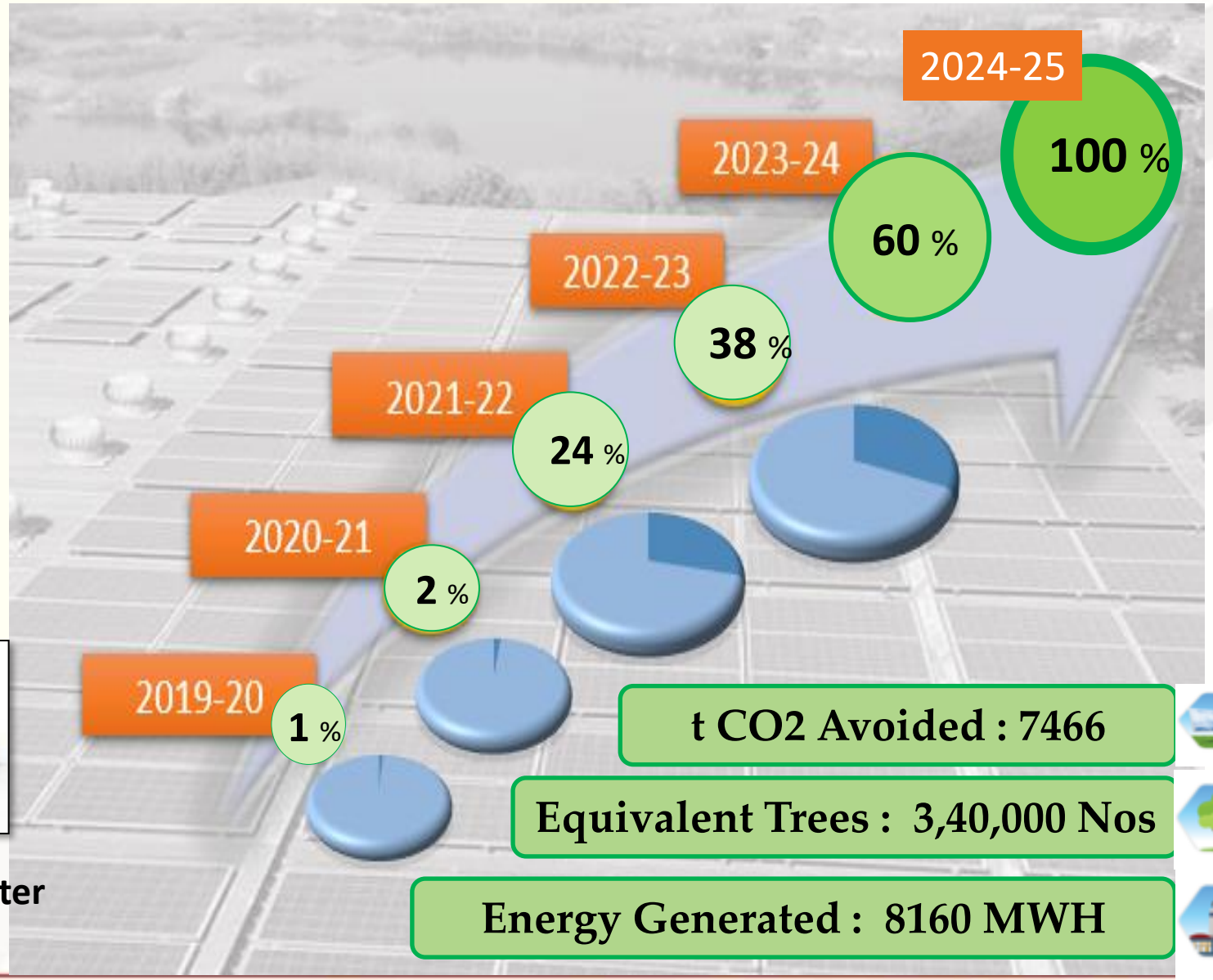
Renewable Energy (RE 100)

Renewable Energy (Taloja Plant)

- Open Access – **5.64** MWp
- Inhouse Solar -**314** KWp

TOTAL : ~ 6 MWp

(38 % of Total Ele. Energy)



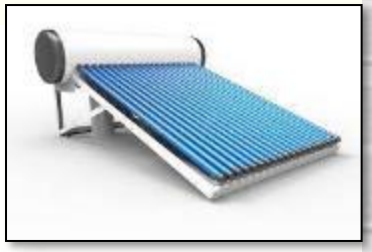
t CO2 Avoided : 7466

Equivalent Trees : 3,40,000 Nos

Energy Generated : 8160 MWH

Renewable Energy Resources –

Rooftop Solar



Solar Water Heater

Sustainability

Scope 1

- Refrigerant Refilling, Coal, Diesel/ Petrol, Fire Extinguisher, FO, HSD, LDO, LPG, Natural Gas, Scrubber Emission

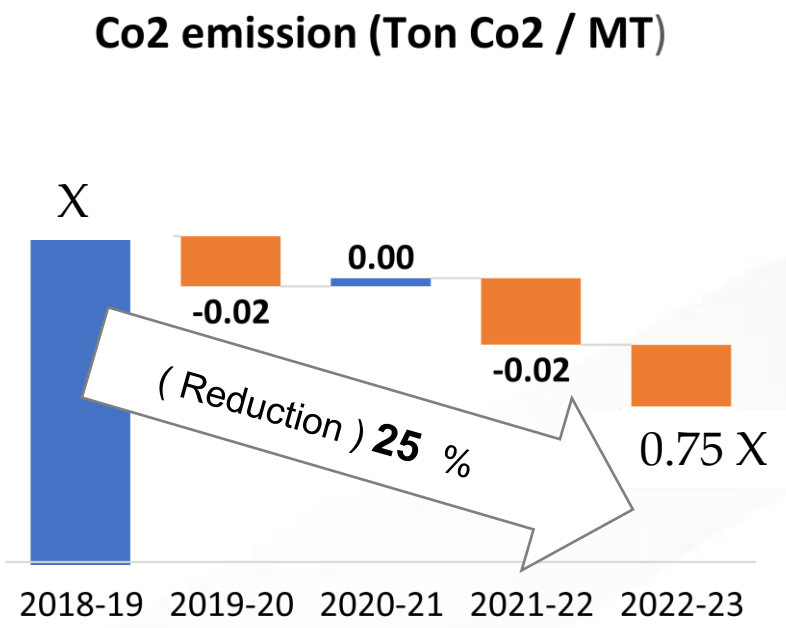
Scope 2

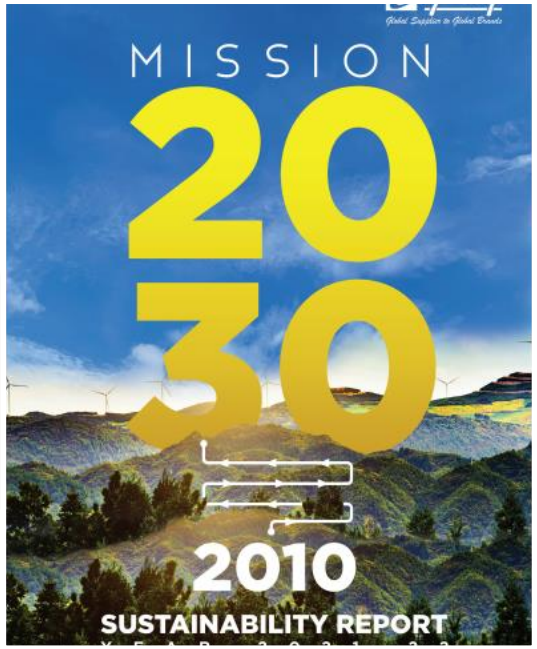
- Purchased Electricity

Scope 3

- Capital Goods & Services
- Upstream transportation & distribution
- Business Travel, Employee Commuting,
- Downstream transportation
- Emission due to waste transportation

Online monitoring Software of GHG





Sustainability Report 2021-2

CDP
DISCLOSURE INSIGHT ACTION

- ✓ Climate Change- **B-**
- ✓ Water Security- **B**
- ✓ Forest- **C**

ISO 14064

SUSTAINABILITY GOALS 2023–24

sustainability is the way of life

01

Climate Change

- Science Based Target Reducing Scope 1+2 Emissions to 46584 tCO2e
- Tree plantation Plantation of 10,000 Trees
- Renewable Energy Utilization 25% of Renewable energy in operations

02

Circular Economy

- Waste Mapping Achieving 50% product wise waste mapping.
- Waste Circularity Achieving 15% waste circularity.
- Zero Waste to incineration Ensuring 35% Disposed waste doesn't go to incineration.

03

Water Stewardshipg

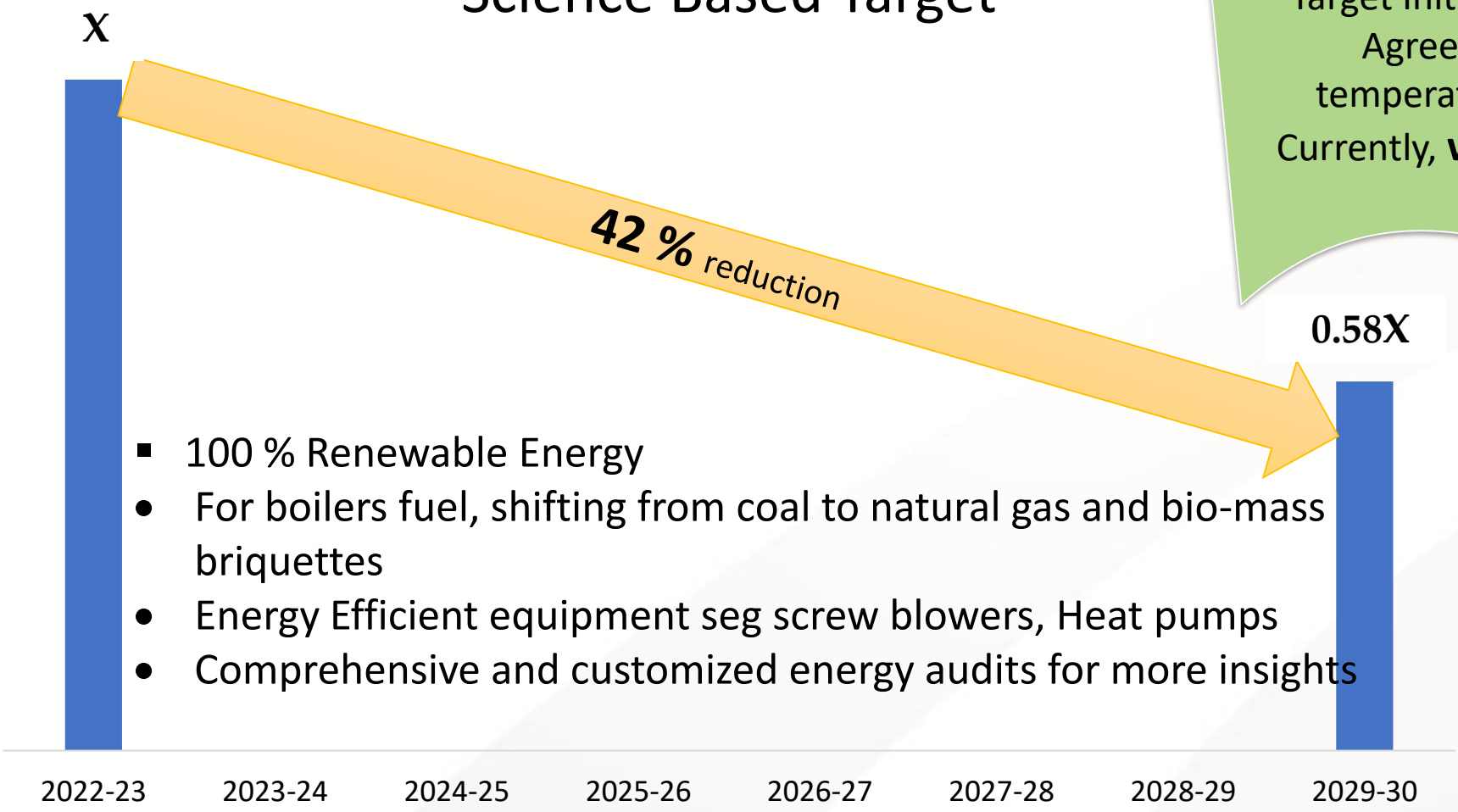
- Water Management System Implementation of Water Management System at all sites by 2030
- Water withdrawal Reduction in Water withdrawal intensity by 7%

- Natural Gas Boiler moving forward towards elimination of coal and furnace oil by 2023-24
- Energy Management horizontal deployment of ISO 50001 :2018

Net Zero Pathway

* We are committed to the Science Based Target Initiative in alignment with the Paris Agreement goal to limit the global temperature rise to 1.5 degrees Celsius. Currently, **we are in the target validation process.**

Science Based Target



- 100 % Renewable Energy
- For boilers fuel, shifting from coal to natural gas and bio-mass briquettes
- Energy Efficient equipment seg screw blowers, Heat pumps
- Comprehensive and customized energy audits for more insights

Green Supply Chain Management

1

RM1

The number of **25 kg** paper bags for RM saved are **13,058**

2

RM2

By switching from RM 39% to RM 62%, we have avoided **49 IBCs** and **2718 kg of waste**

- Bags Reused - **5** Times
- Instead of **bags** for solid RM,
  Tankers are used for transportation of liquid RM.

➢ **Projects Planned** –

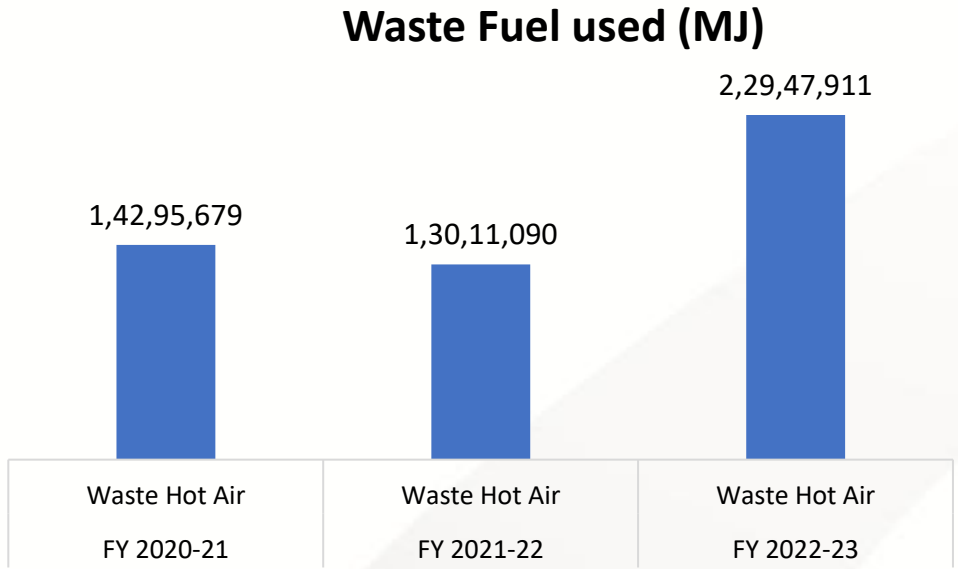
1. Shifting RM 2000PPM entirely to liquid at Taloja.
2. Transferring RM from HDPE Drums to tankers.

➢ Maxima IBC : 20IBCs in 20feet container, resulting in 9% reduction in plastic content of IBC inner Bottle

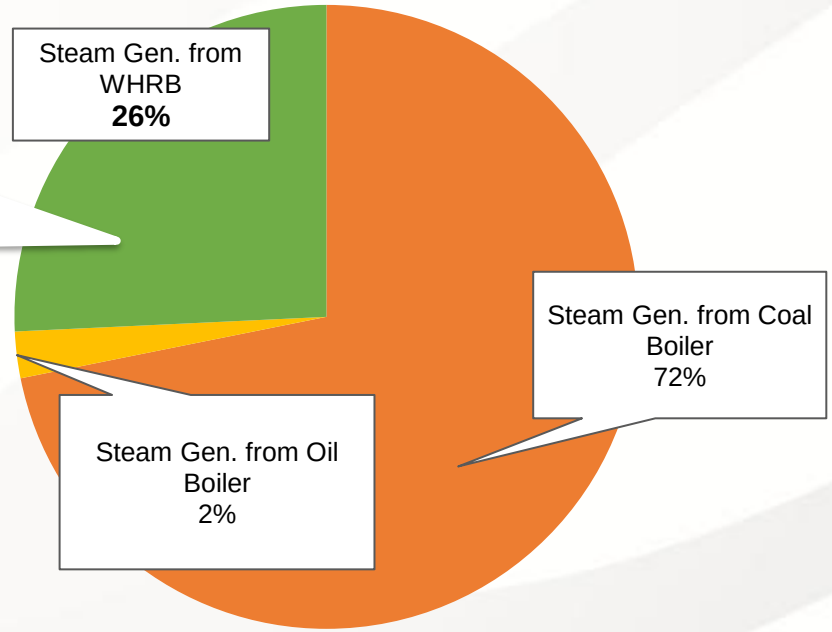
Waste Heat Utilization

Zero Liquid Discharge Unit since May 2017

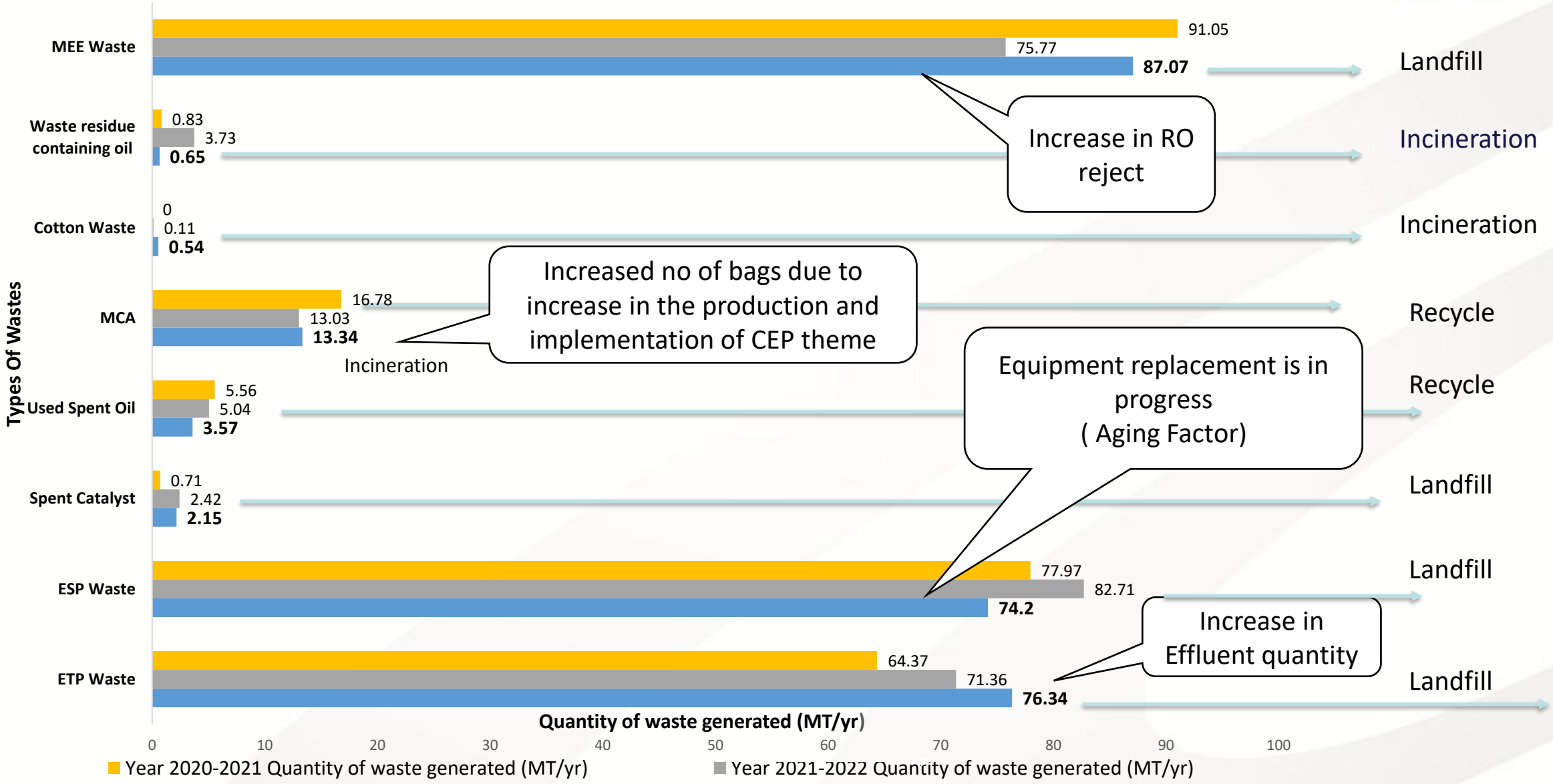
- Condensate recovery (>50 %) as condensate sent to boiler.
- MEE has been installed and commissioned in Feb 2020.
- 1.9 tons of waste at sulfation plant was reduced by changing design
- WHRB Capacity = 2* 1 TPH.



Waste heat recovery is **26 %**

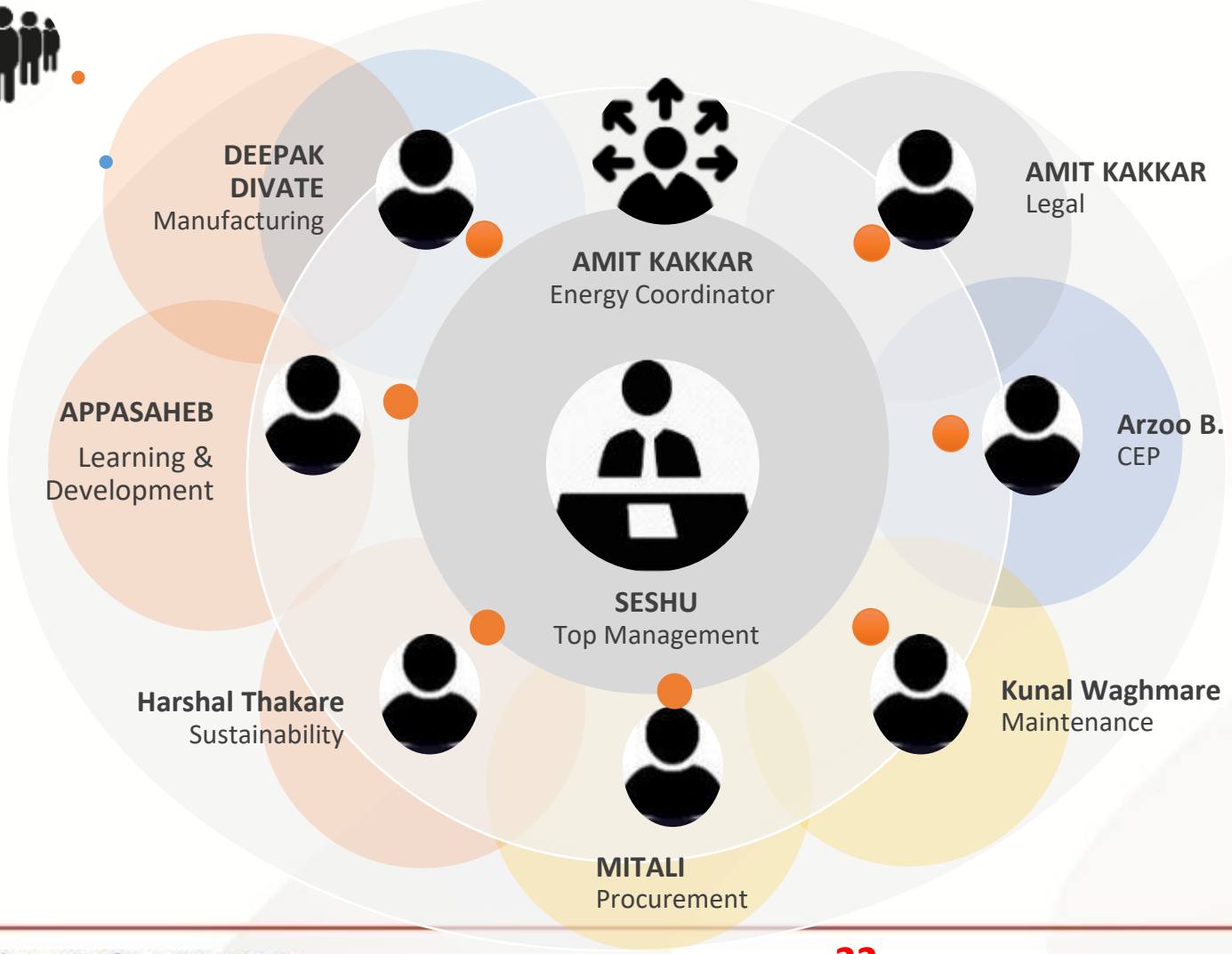


Type of Hazardous Wastes Generated & Their Methods Of Disposal



Teamwork, Employee Involvement & Monitoring

Energy Management Cell

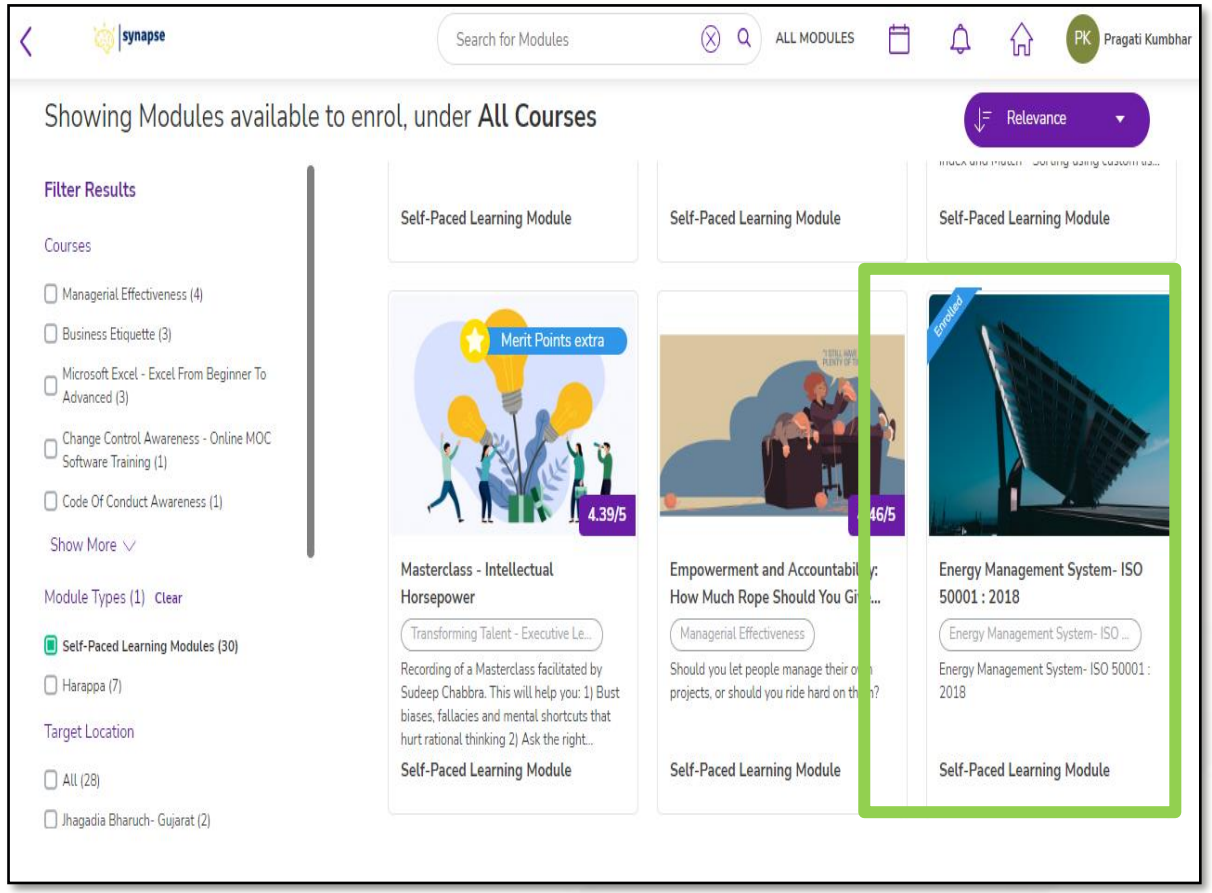


1. MIS – Status of Energy Saving Project
2. Energy performance review- included in MIS and DPR's
3. Plant Monthly meeting
4. Sustainability Cell Meeting
5. Annual Performance Report, Sustainability Report & BRR
6. Corporate -Management Review & Quarterly meeting

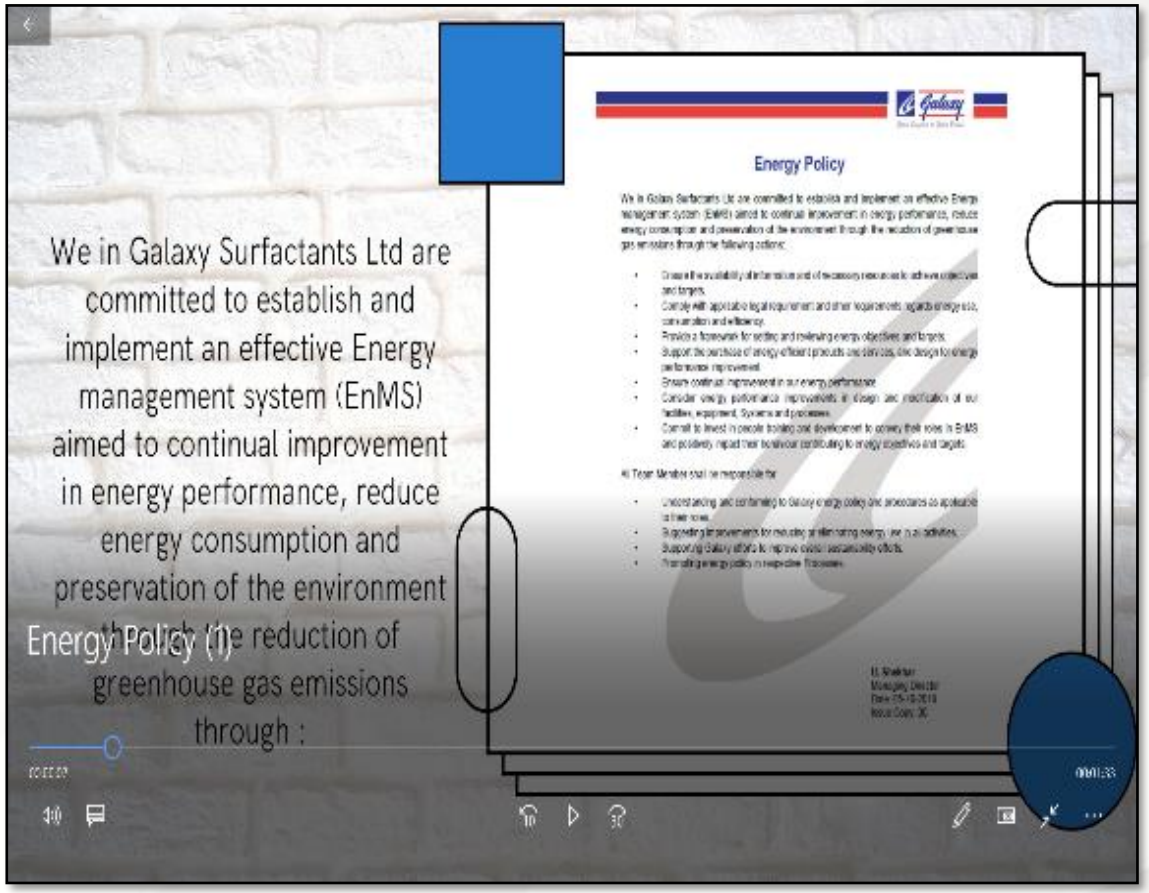
Strategy Adopted for Awareness creation and Employee Involvement

- Team of 22 Internal auditors available
- 2 BEE Certified Manager
- E-Module on energy conservation and requirements of Energy Management System ISO 50001 : 2018
- Celebration of Energy week
- WESAP – Training
- 16 Major loss- Training
- Energy Policy & Requirements Energy Management System ISO 50001:2018 Video
- Reward and Recognition

Strategy Adopted for Awareness creation and Employee Involvement



E-Learning on EnMS (LMS)



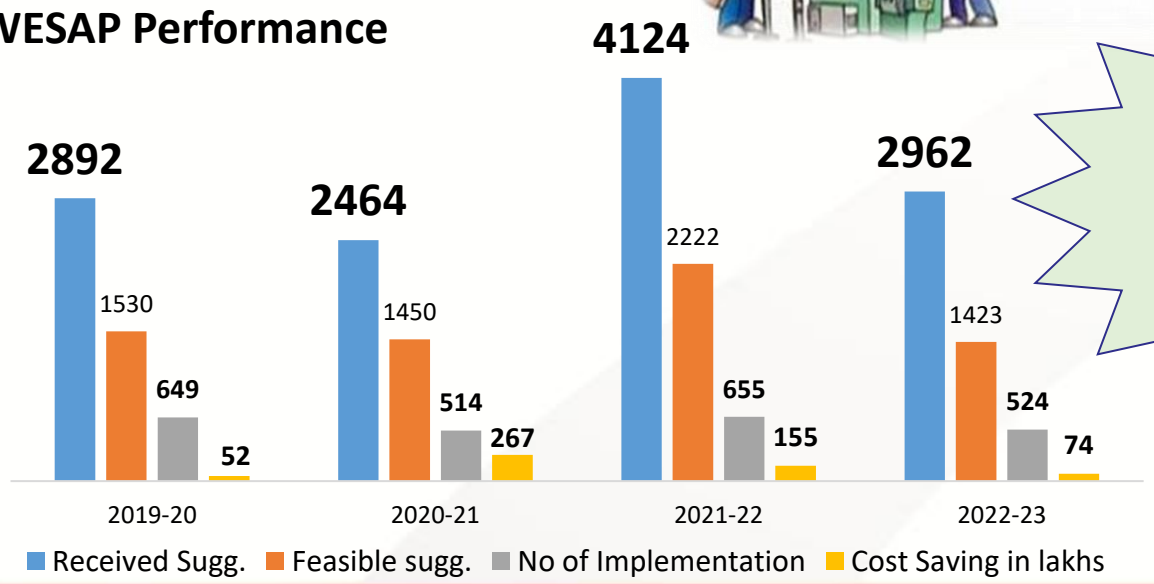
Video on Energy Policy

WESAP (Waste Elimination Suggestion Award Programme)

TPM Based Organization

Captures **16** types of losses

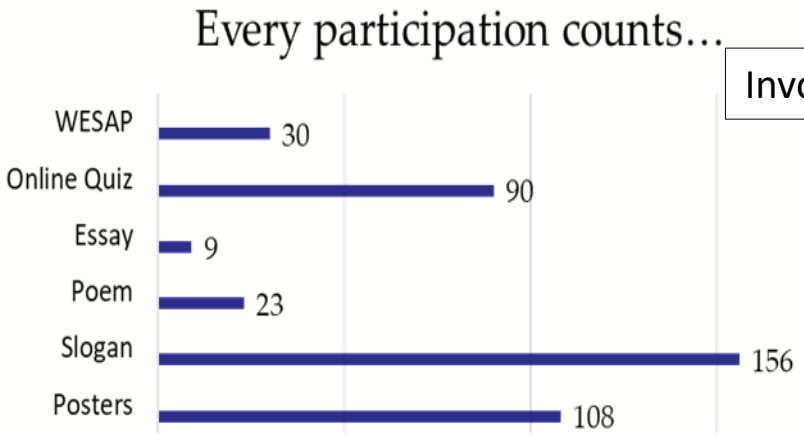
WESAP Performance



Successfully Completed **9** Years

- Equipment Failure (Breakdown) Loss
- Set up & Adjustment Loss
- Cutting Tool/ Blade Change Loss
- Start-up Loss
- **Energy Loss**
- Minor Stoppage & Idling Loss
- Speed Loss
- Defects and Rework Loss
- Shutdownloss(Planned Maintenance Loss)
- Operation Loss
- Operating Stir Loss
- Line Organization Loss
- Distribution/ Logistic Loss
- Measurement & Adjustment Loss
- Consumable Loss
- Yield Loss

Energy Week Celebration



Involvement of Factory Manager

Appreciation from Vice President

Involvement of all Contractors, Staff & Operators

Implementation of ISO 50001/ Green Co/ IGBC rating

Energy Management System

Galaxy has adopted structured way of energy monitoring and control through EnMS 50001:2018. The certification was awarded to Taloja plant, India after successful audit conducted by BSI, a certification body.

CII Green Co

Galaxy has adopted the GreenCo rating system at its Taloja plant, India to assess its operations' environmental performance adopting a procedure-based approach.
The plant thus became only the 2nd Surfactant unit in the country to achieve this feat.

Award & Achievements

Learnings from CII

VFD For chiller

Steam Trap Monitoring

Heat Pump

EC Motors & Fan for HVAC

Dry Vacuum Pumps

Integrate GHG Accounting with ERP system

Ultrasonic Water Sensors

Save Today for Tomorrow Survival

Thank You !!

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