



AUROBINDO
Committed to healthier life!

24rd National Award for Excellence in Energy Management 2023

13 - 15 September 2023

**AUROBINDO PHARMA LIMITED, UNIT XIV,
VISA KHAPATNAM, ANDHRA PRADESH**



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Aurobindo Group Introduction

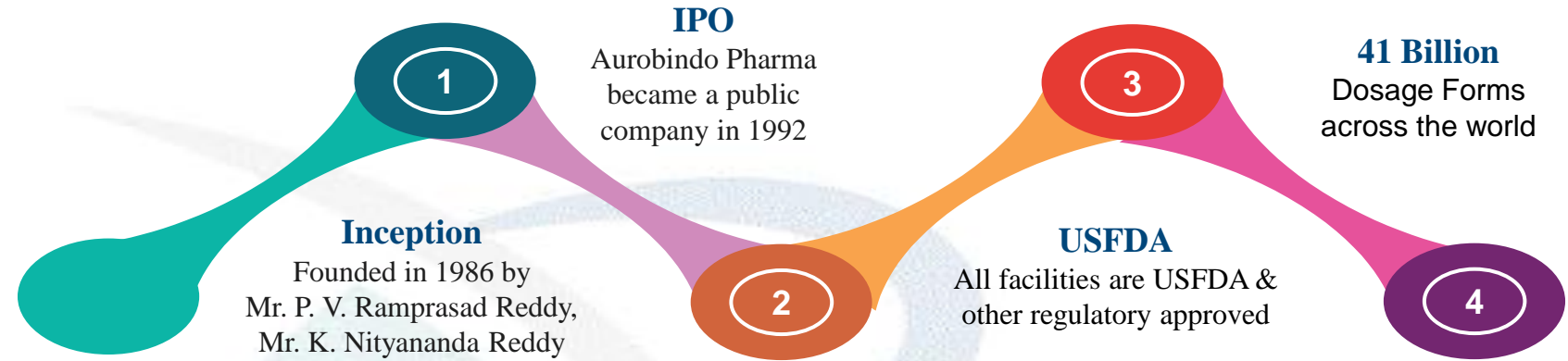



₹ 24,855 CR
Revenue

Employees **33k+**

Market presence **150+**

Mfg. Facilities **25**




01 Largest generics company in the US (by Rx dispensed)

02 **43,000 MWh** Solar Power Generation

03 **17%** Reduction in carbon emissions from baseline year FY20 (Achieved more than 100% of 2025 target)

 **₹ 76.3 Cr** In CSR Spends
7.38 Lakh Beneficiaries

 **R&D Capabilities**
5 in India and 4 in the US
1,500+ Scientists and analysts globally



Brief Introduction on APL Unit-XIV

Facility

Facility Details

Total Factory area	86036 m ² (21 Acrs)	
Build up Area	33466 m ²	38 %
Roads	16607 m ²	20%
Green Belt area	27854 m ²	33%
Future Expansion	8108 m ²	9%

Utility Equipment

- ❖ FBC boiler : 12 TPH
- ❖ Air Compressors : 2314CFM
- ❖ Chillers(+5°C) : 2170 TR
- ❖ Chillers (-20°C) : 360 TR
- ❖ Chillers (-30°C) : 300 TR
- ❖ Nitrogen plant : 500 Nm³/hr
- ❖ Cooling towers : 9800 TR

Process Equipment

- ❖ Reactors : 141 No's
- ❖ Centrifuges : 34 No's
- ❖ ANFD : 26 No's
- ❖ Tray driers : 27 no's

**Installed
Reactor
Capacity
1293 KL**

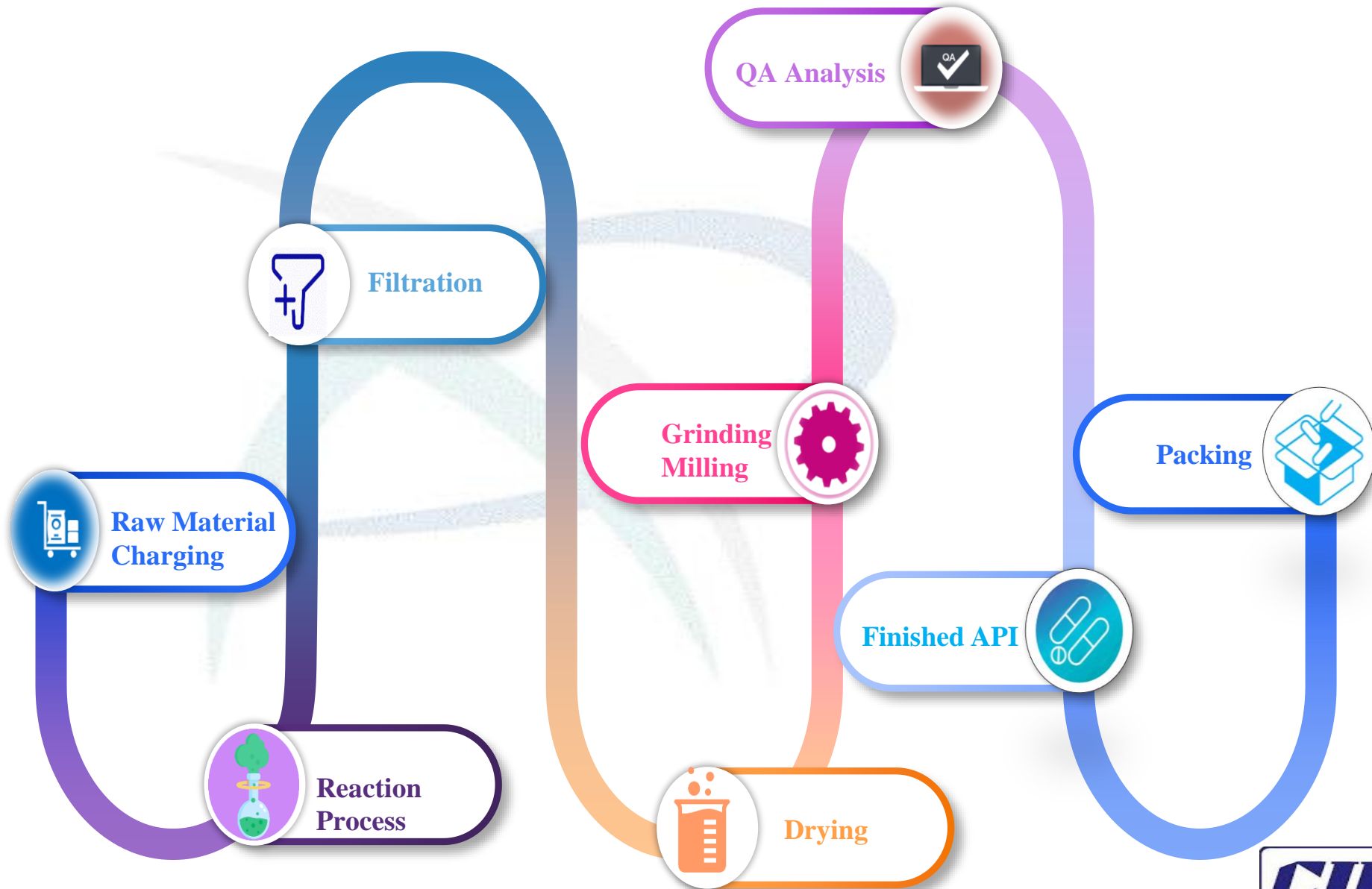
Electrical

- ❖ HT Connected : 33 KV
- ❖ Transformer : 3 No's X 2500KVA
- ❖ DG system :2 No's X 1500KVA

Products / Processes Details

- Clopidogrel Bisulphate Form-II API
- Polyallylamine Hydrochloride
- Ertapenem
- Dolutegravir
- Lamotrigine
- Topiramate

Major products :



Energy Consumption Overview – Last 3 Years



PRODUCTION

YEAR	VALUE (MT)
FY 2020-21	380.3
FY 2021-22	179.03
FY 2022-23	448.63

SPECIFIC ENERGY

YEAR	VALUE (MTOE)
FY 2020-21	8.59
FY 2021-22	11.66
FY 2022-23	8.04



Production

150 %



YEAR

VALUE (m kcal)

FY 2020-21	17561
FY 2021-22	11789
FY 2022-23	13898

YEAR

VALUE (m kWh)

FY 2020-21	17.61
FY 2021-22	10.58
FY 2022-23	17.94

THERMAL ENERGY

ELECTRICAL ENERGY

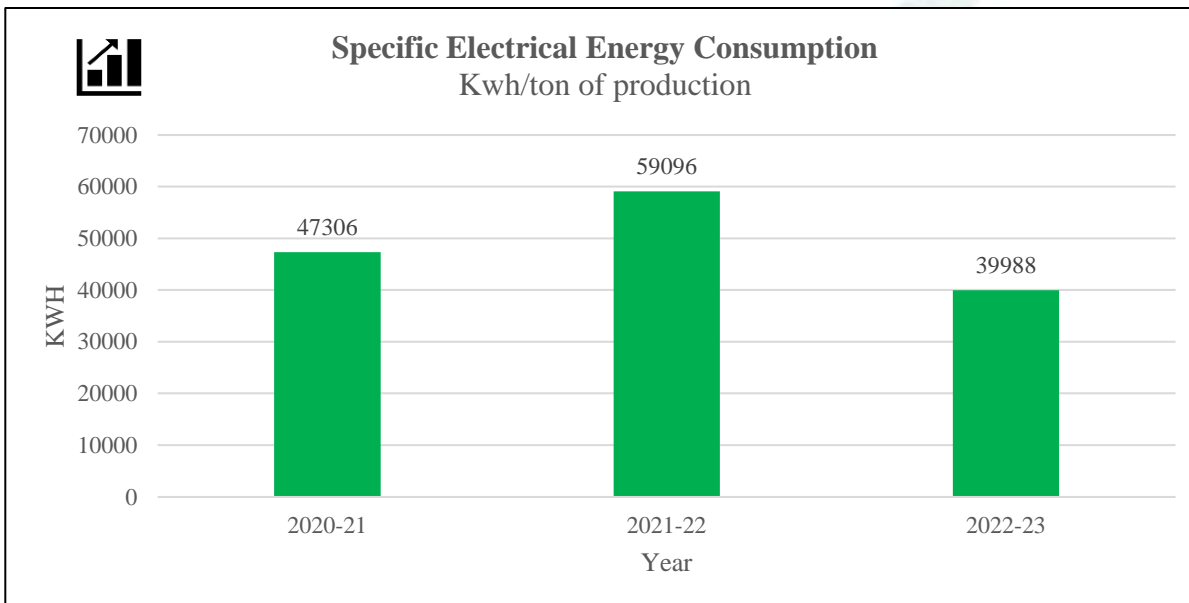
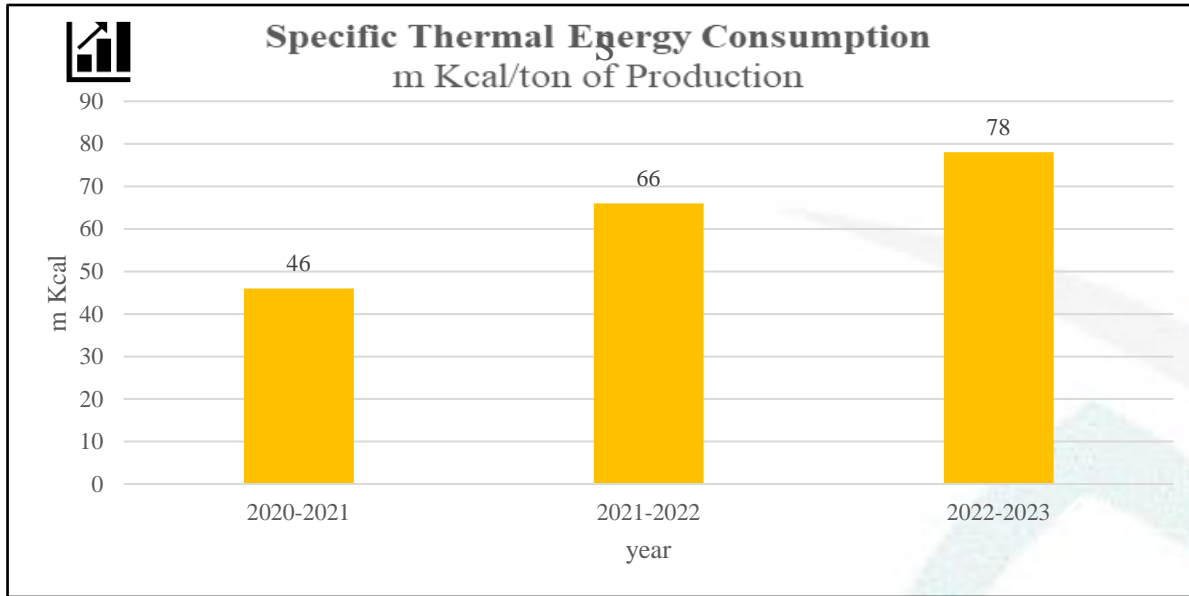


Specific Energy

31 %



Specific Energy Consumption Overview – Last 3 Years



- APL Unit-XIV boiler capacity 12TPH operational load is 32 % .
- Neighbour APL Unit-XV boiler capacity 6 TPH operational load is 30%.
- Synchronize the steam line to Unit-XV and kept one 6TPH boiler in standby mode.
- Total specific thermal energy consumption 148mKcal in that 78mKcal is unit XIV Consumption.



- Production for the year 2022-23 448.63 tons.
- Production for the year 2021-22 179.03 tons.

Internal benchmark - Utility

Refrigeration Plants :

Description	Design Temp (oC)	Design SEC (kW/TR)	Operating SEC (kW/TR)	Target SEC (kW/TR)
Reciprocating Chillers (Water Cooled)	-30	2.5	2.80 - 2.90	2.7
Screw Chillers (Water Cooled)	+5	0.65	0.75 - 0.85	0.7
	-20	1.97	2.1 - 2.3	2.0

Air Compressor :

Description	Design SEC (kW/CFM)	Operating SEC (kW/CFM)	Target SEC (kW/CFM)
Screw Compressor	0.16	0.18 - 0.20	0.18

Description	Design SFR (KG/KG)	Operating SFR (KG/KG)	Target SFR (KG/KG)
Boiler	5.5	4.2 - 4.6	5.0

Major Encon Projects Planned in FY 2023-24

VFD's for utility pumps (Phase-II)
Investment: ₹ 0.43 Million
Saving : 0.31 Million kwh



Auto tube cleaning
Investment: ₹ 1.29 Million
Saving : 0.12 Million kwh



EnCon projects: 8 No's
Investment:
₹ 3.83 Million

Steam operated traps (SOPT)
Investment: ₹ 0.8 Million
Saving : 1.34 Million Kcal



Process time cycle reduction

Automation

Enrepower System

Equipment Efficiency Enhancement

Energy Resources

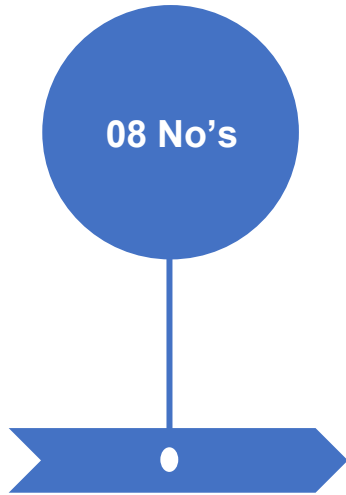
Processing and re usage of MDC recovery solvent of Ertapenem side chain stage -II process.
Investment: ₹ 0.3 Million

Fridge tech coil for chilled water system to improve the SEC of chiller
Investment: ₹ 1.4 Million

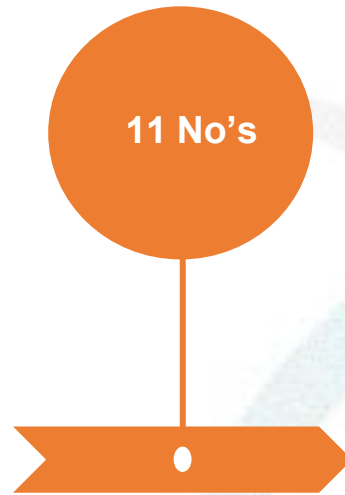
Processing and re usage of Isopropyl Acetate recovery solvent of Ertapenem side chain stage -I process.
Investment: ₹ 0.35 Million

Energy Saving projects implemented in last 3 Years

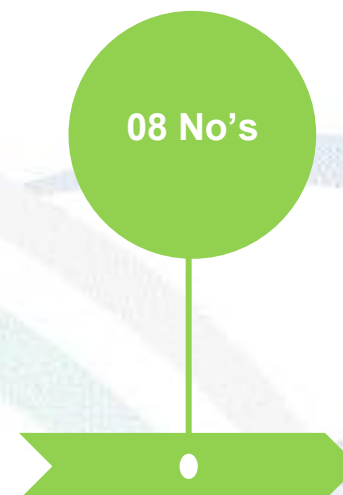
2020-2021



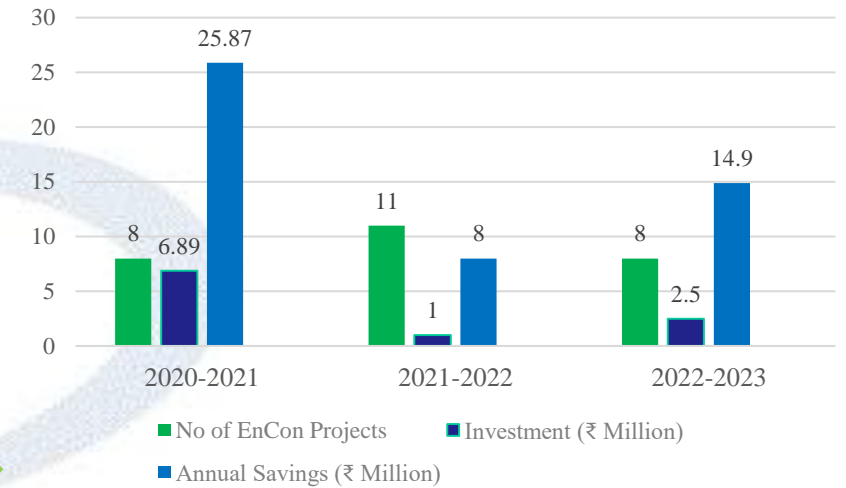
2021-2022



2022-2023



Energy Conservation Last 3 Years



Investments(₹ Million) : 6.89
 Electrical (Million kWh) : 4.02
 Thermal (Million kcal) : 680.16
 Monetary Savings (₹ Million): 25.87

Investments(₹ Million) : 1.0
 Electrical (Million kWh) : 0.706
 Thermal (Million kcal) : 0.672
 Monetary Savings (₹ Million): 8.0

Investments(₹ Million) : 2.5
 Electrical (Million kWh) : 0.65
 Thermal (Million kcal) : 5.4
 Monetary Savings (₹ Million): 14.9

Energy Saving projects implemented in 2022-23

S.No	Name of the energy Saving project	Investments(INR Millions)	Electrical Savings (Million Kwh)	Thermal Savings (Million Kcal)	Total Savings(INR Million)	Payback Period (in months)
1	Utilization of existing -20 °C screw chiller in place of reciprocating chiller (-20°C) for process to conserve the energy	0.7	0.43	--	3.51	2.4
2	Installation of Steam condensate pumps of Pressure Powered Pump Package unit type (PPPPU) for immediate transfer of steam condensate	0.45	--	582	5.41	1.0
3	Usage of Eco Chemical in place of conventional chemicals to reduce the cooling tower blowdown & make up water	0.36	--	--	4.06	1.1
4	Installation of auto tube cleaning system to optimize the performance of Water cooled chillers	0.43	0.08	--	0.71	7.3

Energy Saving projects implemented in 2022-2023

S.No	Name of the energy Saving project	Investments(INR Millions)	Electrical Savings (Million Kwh)	Thermal Savings (Million Kcal)	Total Savings(INR Million)	Payback Period (in months)
5	To Optimize the performance of air Compressor by detection and rectification of air leakage rate in distribution system.	0.1	0.05	--	0.46	2.6
6	Replacement of Cooling tower Aluminium blades with E-Glass epoxy (FRP) blades	0.32	0.04	--	0.36	10.8
7	Optimize the Energy conservation in split AC's by installation of Airtron controller.	0.032	0.02	--	0.19	2.0
8	Recovery of AHU Condensate water and re usage as Cooling Tower makeup water.	0.12	--	--	0.16	8.9

Energy Saving projects implemented in 2021-22



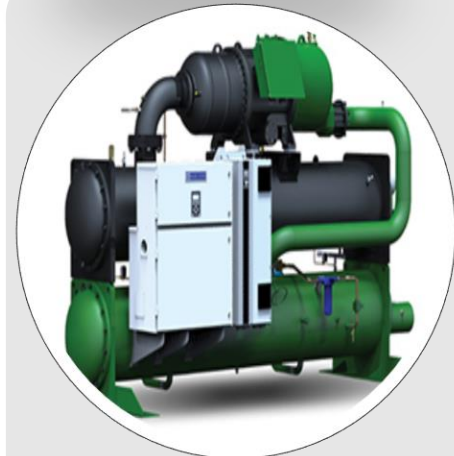
Adiabatic Cooling System for Air Cooled Chillers

Investment : ₹ 3.14 million
Savings : ₹ 1.4 million
Payback : 28 Months



E Glass Epoxy FRP Blades for Cooling Towers

Investment : ₹ 3.7 million
Savings : ₹ 2.7 million
Payback : 17 Months



405TR WC Screw Chiller by Replacing Reciprocating Chiller

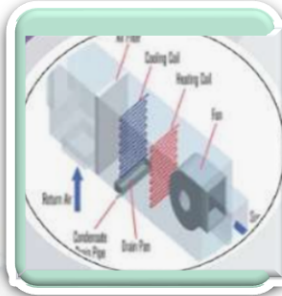
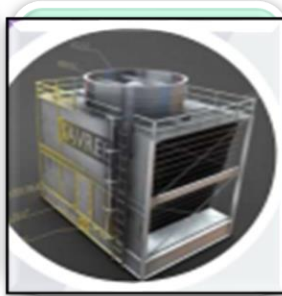
Investment : ₹ 8.25 million
Savings : ₹ 8.74 million
Payback : 11 Months



Vertical Inline Energy Efficiency Pumps by Replacing Energy Intensive Pumps

Investment : ₹ 1.55 million
Savings : ₹ 4.22 million
Payback : 4 Months

Energy Saving projects implemented in 2020-21



Installed Energy Efficient (IE3) Motors along with vertical inline Energy efficient pumps in place of conventional motors and inefficient pumps

Energy saving (Million KWH/Year):
1.23

Auto Temperature controllers Installed for cooling towers fan to reduce the power consumption

Energy saving (Million KWH/Year):
0.97

Installation of Pressure Reducing valves and Synchronisation of the Compressed air lines

Energy saving (Million KWH/Year):
0.71

Implementation of Interlocking system for RT and primary pumps of chilled water and chilled brine plants

Energy saving (Million KWH/Year):
0.36

Installed the VFD control system for AHU's to optimise the power consumption

Energy saving (Million KWH/Year):
0.33

Synchronization of Chilled brine and chilled water secondary pumps

Energy Saving (Million KWH/Year):
0.32

Installation of Centralized cooling system to dry vacuum pumps instead of individual cooling radiators

Energy saving (Million KWH/Year):
0.09

Installation of Steam condensate pumps (PPPPU) for immediate transfer of Steam condensate

Energy saving (Million KCal/Year):
680

Annual Electrical Energy Savings
Million KWH /Year

4.02

Annual Thermal Energy saving
Million Kcal /Year

680.6

Innovative projects implemented in 2022-23



Steam line synchronization from APL unit XIV to neighbour unit APL Unit-XV

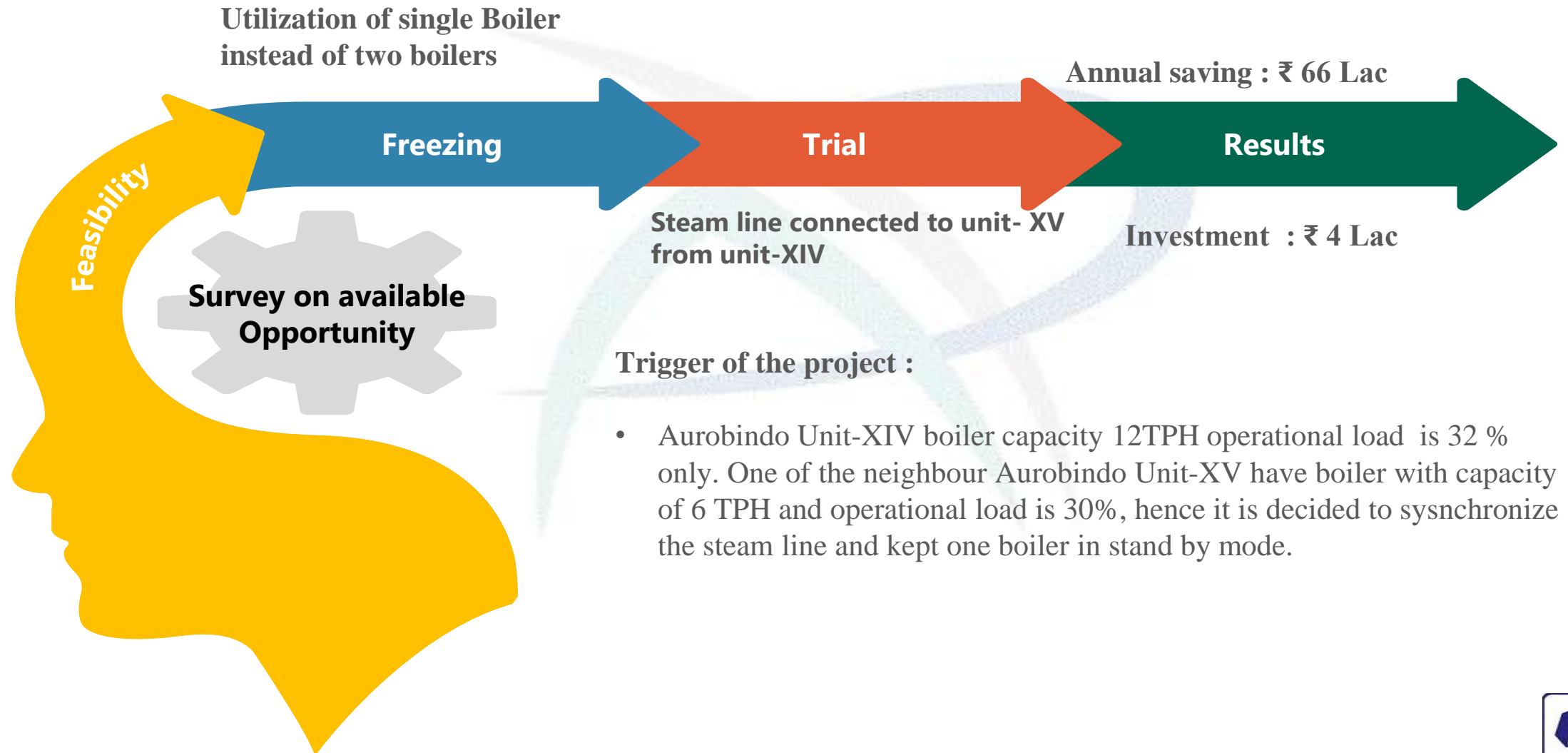
- Synchronization of steam line for supply of steam from Aurobindo Unit-XIV boiler to neighbour unit Aurobindo Unit-XV and kept one boiler in stand by mode.
- **Savings : 6.6 Million.**
- **Investment : ₹ 0.4 million**
- **Payback : 0.7 months**



Acetone Recovery in Clopidogrel Bisulphate Stage -1

- Vacuum pump vent connected to heat exchanger to enhancement of acetone recovery in Clopidogrel Bisulphate Stage-I
- In existing process, Acetone recovery in Clopidogrel bisulphate stage-I is 74% now it was recovered as @ 85%
- **Savings : 7.7 million**
- **Investment : ₹ 0.8 million**
- **Payback : 1.2 months**

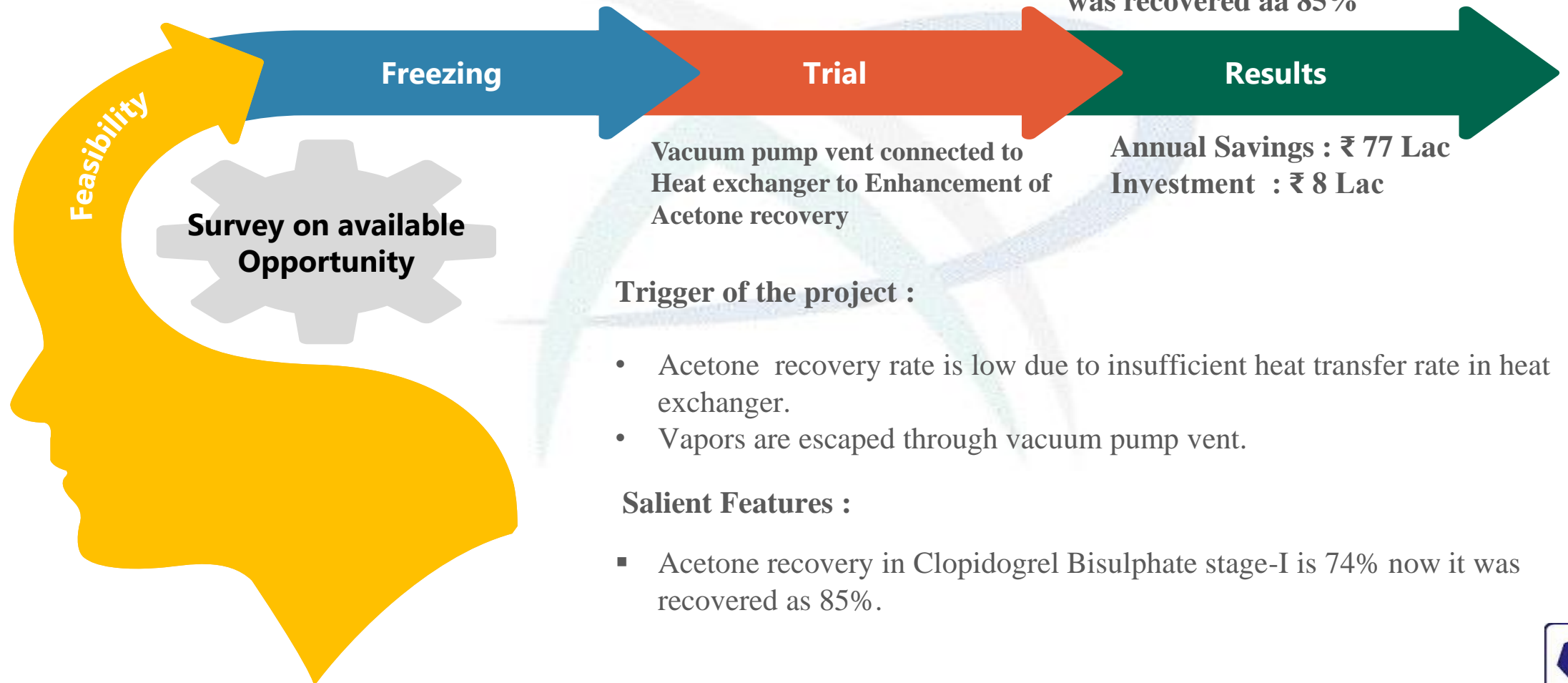
Steam line synchronization from Aurobindo unit XIV to neighbour unit Aurobindo Unit-XV



Enhancement of Acetone recovery in Clopidogrel Bisulphate Stage-I

Acetone distillation rate
Improvement & Distillation
Time reduction

Acetone recovery in Clopidogrel
Bisulphate Stage-I is 74% now it
was recovered as 85%



Inventorisation

01
Sustainability
Report



2020-21

Published Integrated
Annual Report for FY
2022-23

2025

- 12.5 % Reduction in Emissions
- 35% water conservation / restoration
- 60% co-processing of hazardous waste
- 100% reuse & recycling nonhazardous waste
- 25% hours of learning per employee

02 
Goals & Targets -2025

2020- 23

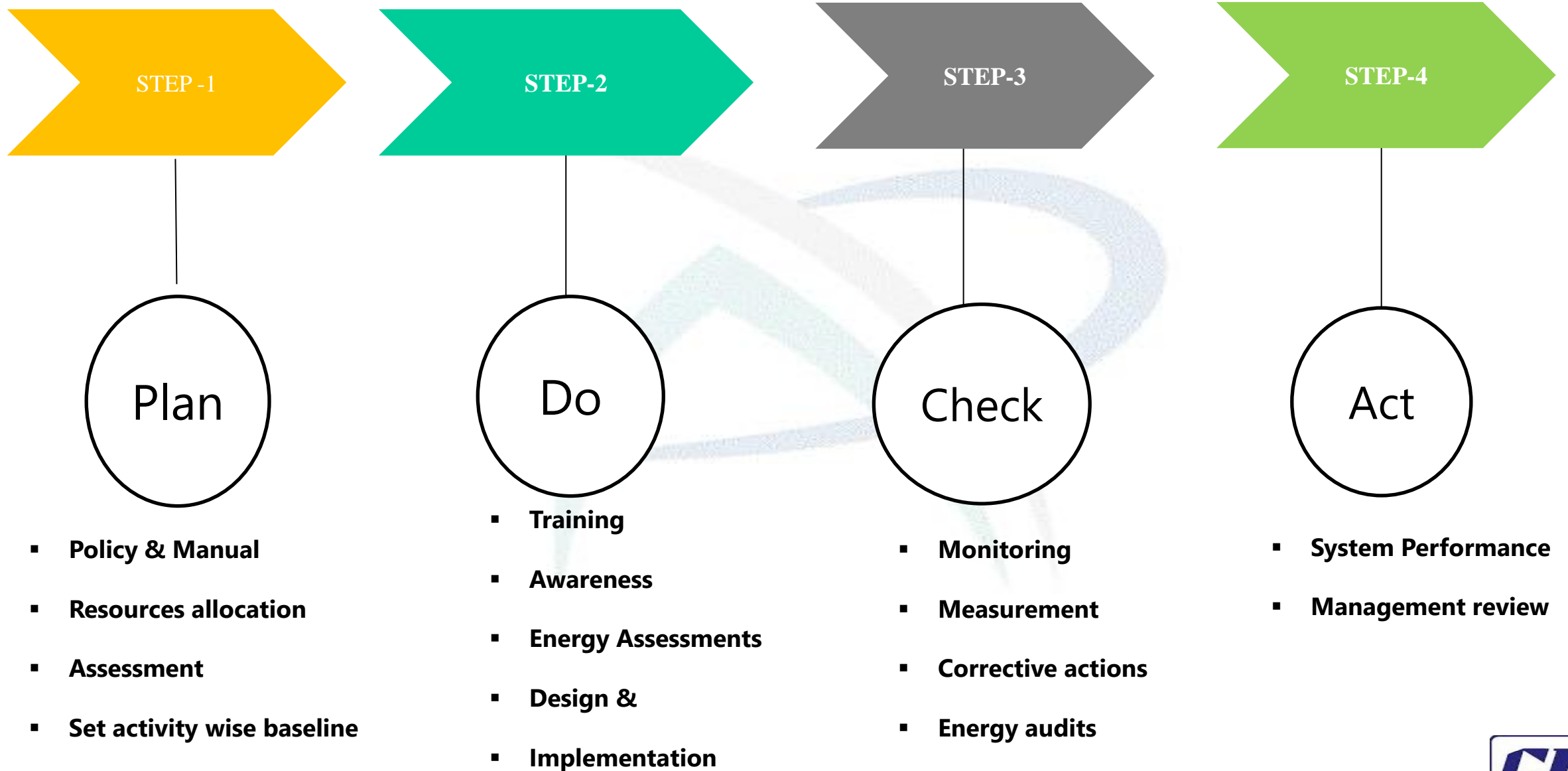
FY	Total Scope 1 Emission (tCO ₂ e)	Total Scope 2 Emission (tCO ₂)	Total GHG Emission (tCO ₂ e)
2020-21	6749	14,021	20,770
2021-22	5208	9195	14,403
2022-23	10,636	14,926	25,562

03
GHG
Emissions

- Project implemented : **Paperless / Agile product life cycle management**
- Investment Made (Rs In Million): **6.5 million**
- Benefits Achieved : This is a cloud based system to adopt electronic documentation for easily tracking of QMS.
- Monitor and tracking of QMS activities i.e. Change request form, OOS ,OOT, Deviation, CAPA , SOP , BPCR , Market compliance and Audit management.

- Project implemented : **Paperless / Calibration Management System product life cycle management**
- Investment Made (Rs In Million): **0.2 million**
- Benefits Achieved : This is a Java based system to adopt electronic documentation for easily tracking of Calibrations.
- Calibration certificates stored in electronic form instead of maintaining hard copy of certificates.

Energy Management System - Procedures



Daily Monitoring & Reporting System

EL Measures software for energy monitoring.



- ✓ Power monitoring Plant /block wise with EL Measure Software.
- ✓ Stem demand monitoring Plant /block wise.
- ✓ Reports/Trends (hourly / Daily/Monthly/Annual)
- ✓ Hourly based Real time parameters recording
- ✓ Daily report sharing & analysis (Plant/block wise)
- ✓ Monthly Energy Analysis for Area/block wise

Energy measuring devices



Lux meter



Tacho Meter



pH & TDS Meter



Clamp Meter



Ultra Sonic Flow Meter



Anemometer

New Systems Implemented

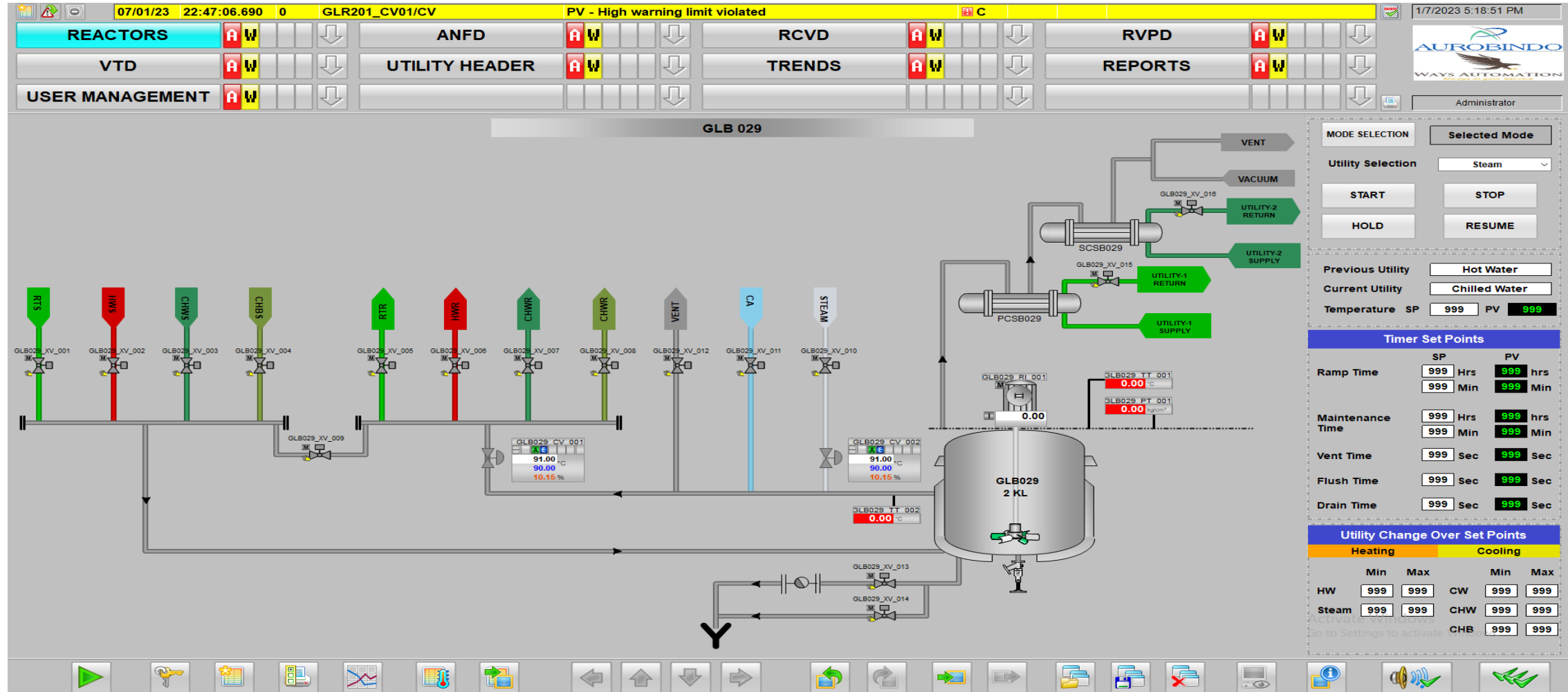
Distributed Control System:- Used for process control and avoid to utility mix-up.

07/01/23 22:47:06.690 0 GLR201_CV01/CV PV - High warning limit violated C 1/7/2023 5:18:51 PM

REACTORS ANFD RCVD RVPD
 VTD UTILITY HEADER TRENDS REPORTS
 USER MANAGEMENT

Administrator

GLB 029



MODE SELECTION Selected Mode

Utility Selection Steam

START STOP
 HOLD RESUME

Previous Utility Hot Water
 Current Utility Chilled Water
 Temperature SP 999 PV 999

Timer Set Points

	SP	PV
Ramp Time	999 Hrs 999 Min	999 hrs 999 Min
Maintenance Time	999 Hrs 999 Min	999 hrs 999 Min
Vent Time	999 Sec	999 Sec
Flush Time	999 Sec	999 Sec
Drain Time	999 Sec	999 Sec

Utility Change Over Set Points

	Heating		Cooling	
	Min	Max	Min	Max
HW	999	999	CW	999
Steam	999	999	CHW	999
			CHB	999

Go to Settings to activate

Teamwork, Employee Involvement & Monitoring



Category	Frequency
Talent of the Month	Every Month
Rewards & Recognition	3 Months
Uttam Vyavahar Puraskar	6 Months

Teamwork

- Implemented Kaizen & 5S programmes by forming teams
- Awards & appreciations for best programmes



Employee Involvement

- Organized Energy Conservation Week Celebrations and involved all employees
- Energy review and monitoring

Training Programmes

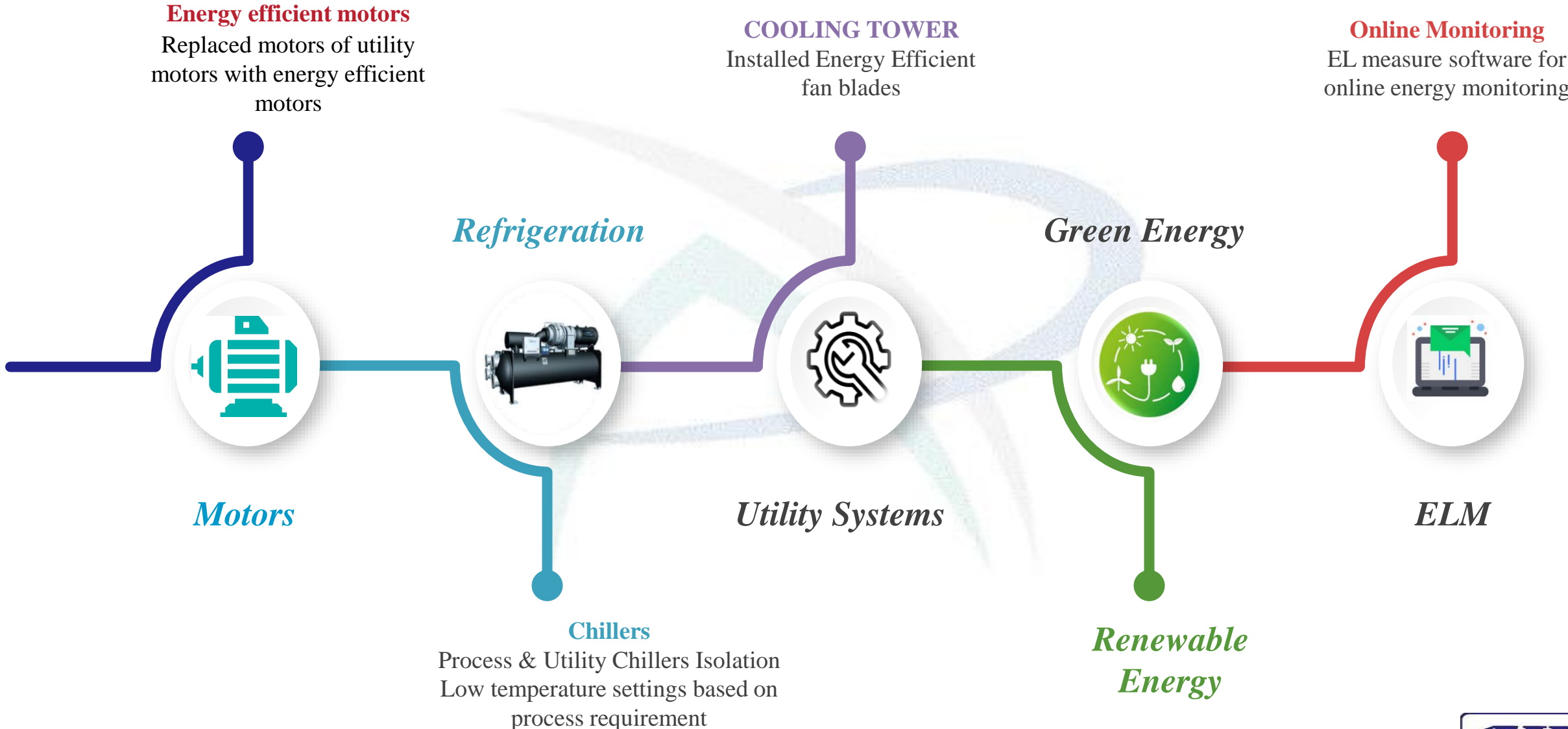
- Given training programmes on Root cause analysis (RCA), and Reliability Maintenance (RM)
- Training on steam / utility systems



Monitoring

- Daily / weekly monitoring of Energy Consumption areas / major equipment.
- Review of energy consumption and performance by cross functional team members.

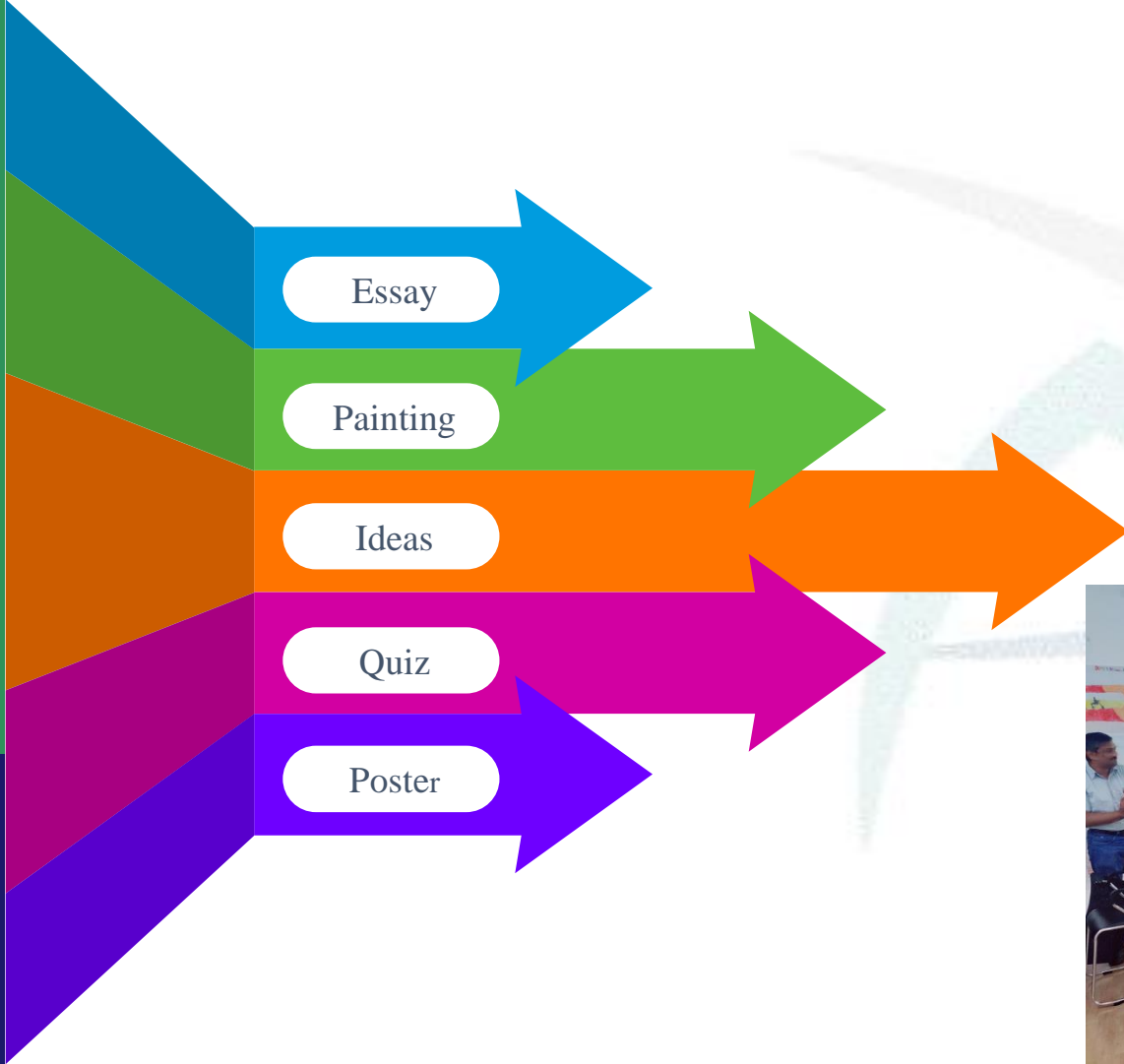
Learnings from CII



NET ZERO commitment

Pillar	Goals-2025	Progress made so far	Status
Responsible manufacturing 	20% Renewable energy share (Power-to-Power)	Achieved 12% renewable energy share (Power-to-Power)	In progress
	12.5% Reduction in carbon footprint (as per SBTi – WB2C)	Achieved >100% -17% reduction in carbon footprint from baseline year FY20	Achieved
	Towards water neutrality 35% Water conservation / restoration	Achieved >100% -38% water conservation/ restoration	Achieved
	60% Co-processing of hazardous waste	Achieved > 100% - 62% Co-Processing of hazardous waste	Achieved
	100% Reuse / recycle of non-hazardous waste	Achieved 100%	Achieved

Energy Week / Energy Conservation Day Celebrations –



Awareness

Participated got from all departments like Production, Engineering & EHS, SRS and TSD etc



Winner

Corporate Energy cell and L&D team Awarded for

- Best opportunity assessment
- Best Energy Conservation Idea



Awards & Recognitions

1



Operational Excellence



Global Operational Excellence Company of the Year 2022
Global Healthcare Awards

2



Human Resources



HR Innovation & Techfest 2021
Most Collaborative Hiring Team
Innovation in Employee Engagement

3



Environment, Health & Safety



Winner of the Golden Peacock Occupational Health & Safety award 2021 (GPOHSA)

Awards & Recognitions

APL- Unit XIV



CSR Activities



- 14 Villages Adopted
- 48 Water Drinking Plants
- 350 + Healthcare Programme
- 21 Educational Institutions

Thank You