25th NATIONAL AWARD

EXCELLENCE IN ENERGY MANAGEMENT

2024

TEAM MEMBERS

MEERA SHARIF SHAIK, ASSOCIATE VICE PRESIDENT

RAMA SESHU VARA PRASAD GEDALA, ASSISTANT GENERAL MANAGER

VENKATA SATYA SIVA SEETHA RAMARAJU PUSAPATI, MANAGER

KISHORE KUMAR MUPPAM,DEPUTY MANAGER

APITORIA PHARMA PRIVATE LIMITED

(A 100% Subsidiary Of AUROBINDO PHARMA LIMITED)

UNIT IV , SRIKAKULAM

APITORIA PHARMA PRIVATE LIMITED

A 100% Subsidiary Of AUROBINDO PHARMA LIMITED

Founded in 1986 by Mr. P. V. Ramprasad Reddy & Mr. K. Nityananda Reddy
Aurobindo Pharma became a public company in 1992

- *cGMP / EMS/EnMS compliant facility*
- *2nd Largest pharma by revenue (India)*
- *9th Largest by generic sales (globally)*
- *Largest generics company in the US (by Rx dispensed)*

Vision

" To become a leading and an admired global pharma company, ranked in the top 25 by 2030"

Regulatory Audit / Certification

CDSCO
USFDA
DRUG CONTROL ADMINISTRATION
ANVISA-BRAZIL
COFEPRIS-MEXICO
EDQM & ANSM FRANCE
FDA-Korea
MHRA-UK
PMDA
TGA – Australia
WHO – Geneva
EnMS & EMS - NQA

Environment Social Governance

We are committed to realising the global goals of limiting climate change, global warming and other environmental concerns.

We take pride in the success, growth and empowerment of its employees as they represent our brand to the external world and help us realise our aspirations.

We have always emphasised the importance of stakeholders and strong governance to ensure long-term growth while minimising disruptions caused by ethical or transparency issues.

Overview

- *Multi product facility spread over 161 acres.*
- *Site distinguished into Phase-I, Phase-II, Phase-III & Intermediates sections with 46 API Modules*
- *Site established with various facilities like Utilities, Warehouse, QC, QA, MSAT lab, RO water plants, ETP/MEE for manufacturing of API.*
- *Power Plant with Back-up power of 8.7MW , DG sets with 16MVA installed capacity, Solar off site 30 MW plant.*

Statistics

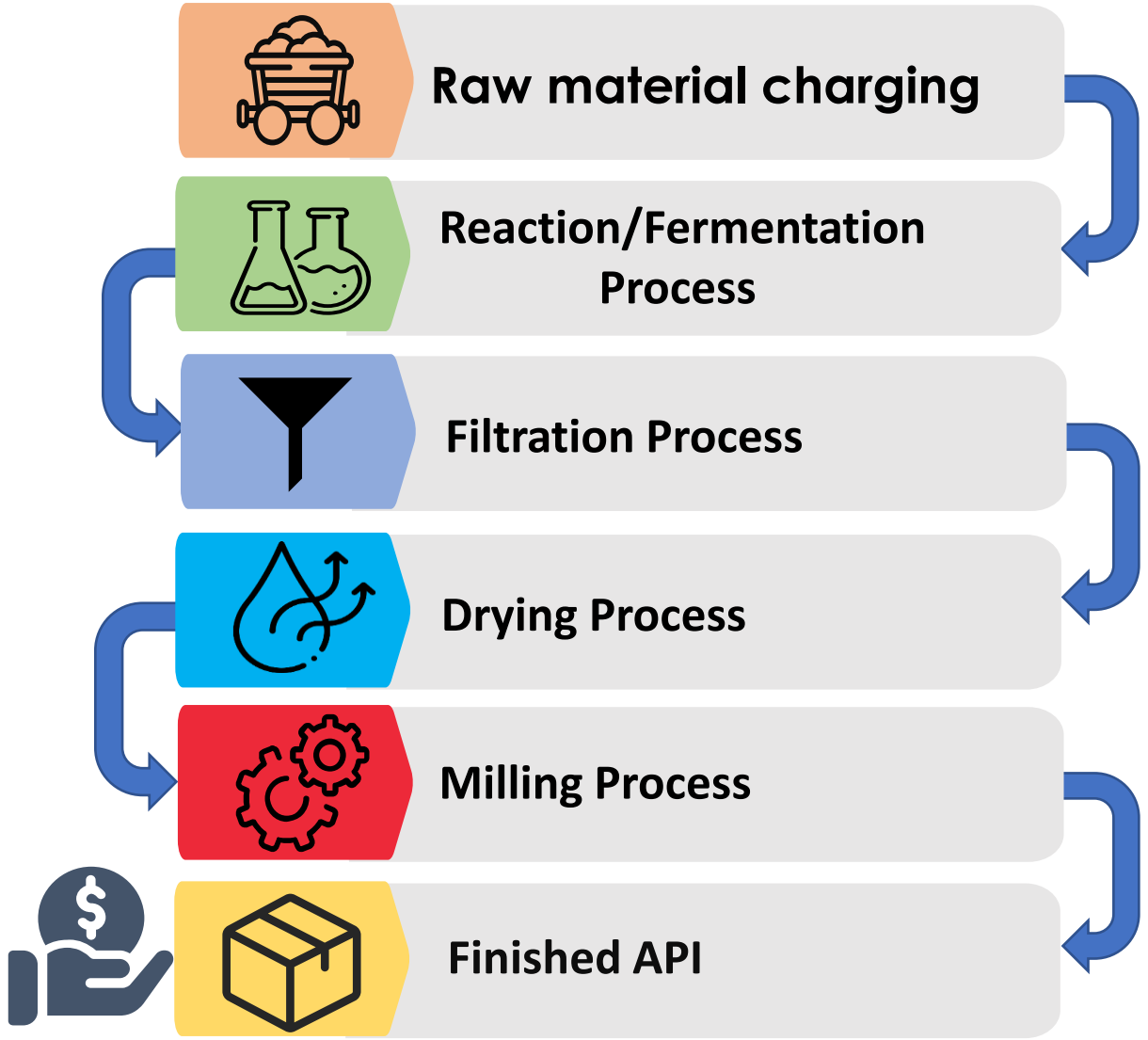
Total Employees	**2069**
APL Facility	**25 Blocks**
No. of Products Mfg.	**92+**

Manufacturing Process

MAJOR PRODUCTS

- Lamivudine
- Levetiracetam
- Sertraline HCL Form-1 (Micro)
- Tenofovir (Compact)
- Valacyclovir HCl
- Valganciclovir HCl
- Abacavir Sulphate
- Dolutegravir sodium

Process flow chart



Overall Energy Consumption Overview

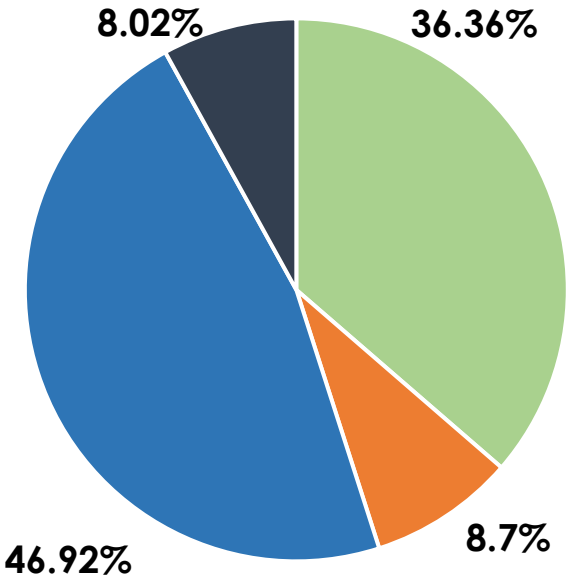
S No	Parameters	Units	FY 21-22	FY 22-23	FY 23-24
1	Annual Electrical Energy Consumption	Million kWh/year	98.81	91.39	98.06
2	Annual Electrical Energy Equivalent	Million kcal/year	84977	78595	84331
3	Annual Thermal Energy Consumption	Million kcal/Year	245210	288356	323071
4	Overall Energy Consumption	Million kcal/year	330187	366951	407402
5	Annual Production	MT/Year	2291	2679	3578
6	Specific Electrical Energy Consumption	kWh/Ton of production	0.043	0.034	0.027
7	Specific Thermal Energy Consumption	kCal/ Ton of Production	107.03	107.64	90.31
8	Overall Specific Energy Consumption	kCal/ Ton of Production	144.21	137.04	113.93

Utility's 46.92%

Production Block's 36.36%

Solvent Recovery 8.7%

Support 8.02%

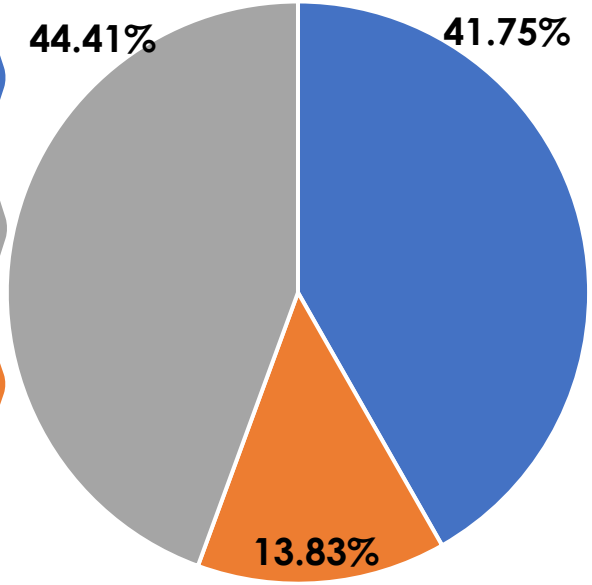


Electrical Distribution FY 2023-24

Production Block's 41.75%

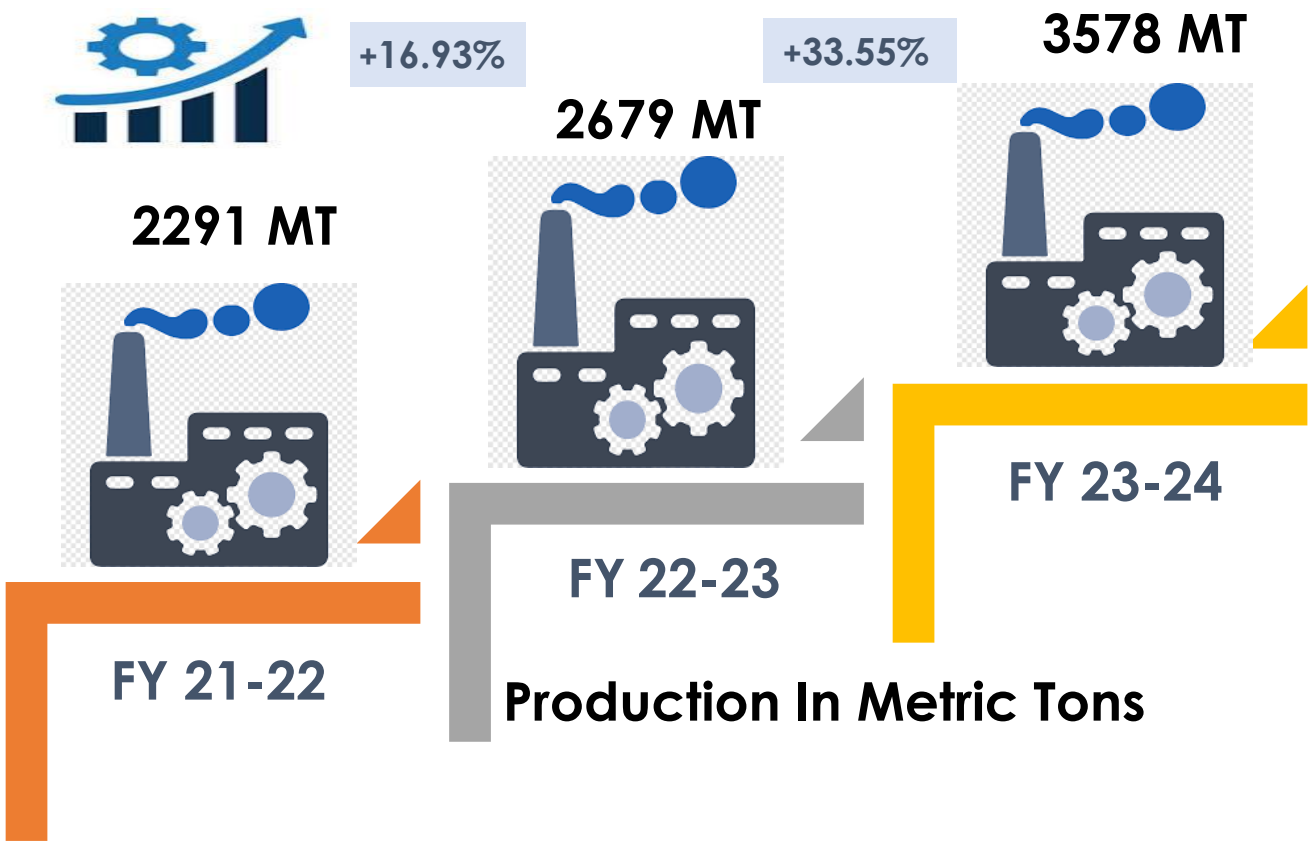
Solvent Recovery 44.41%

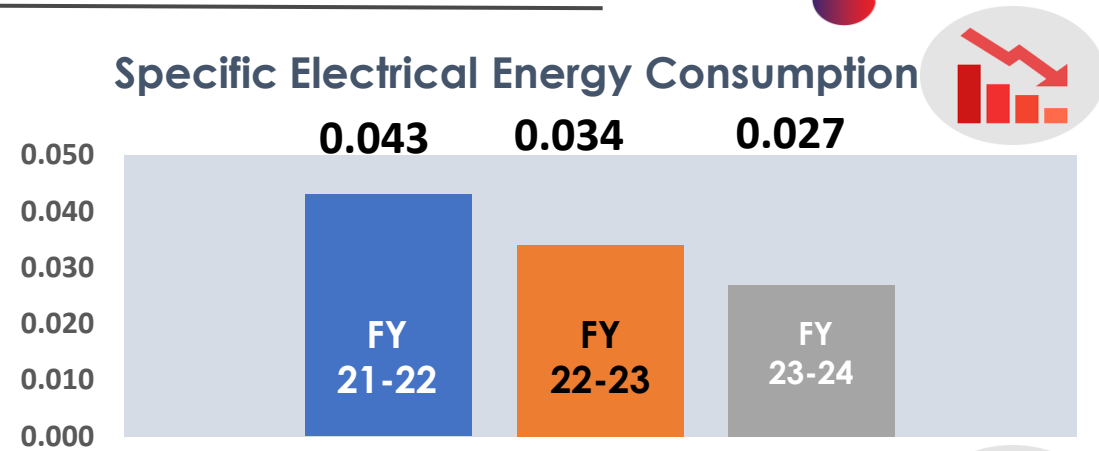
ETP & MEE 13.83%

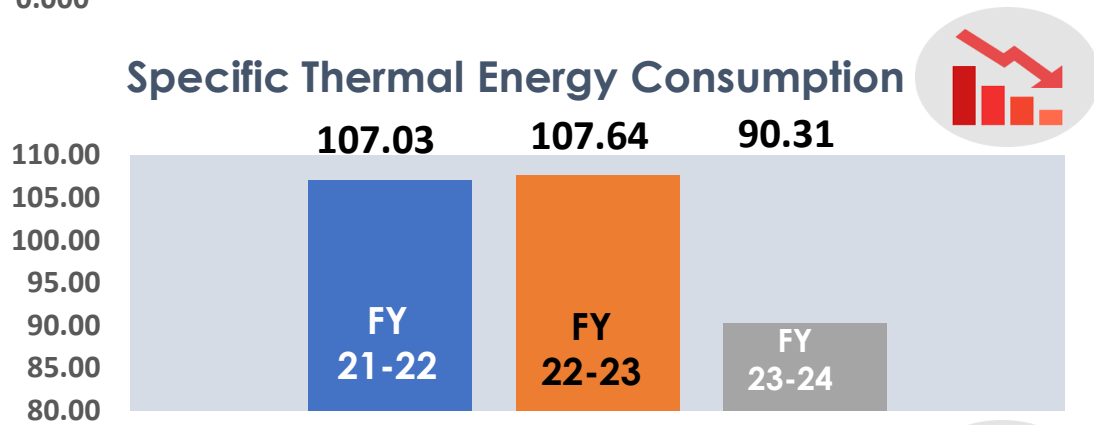


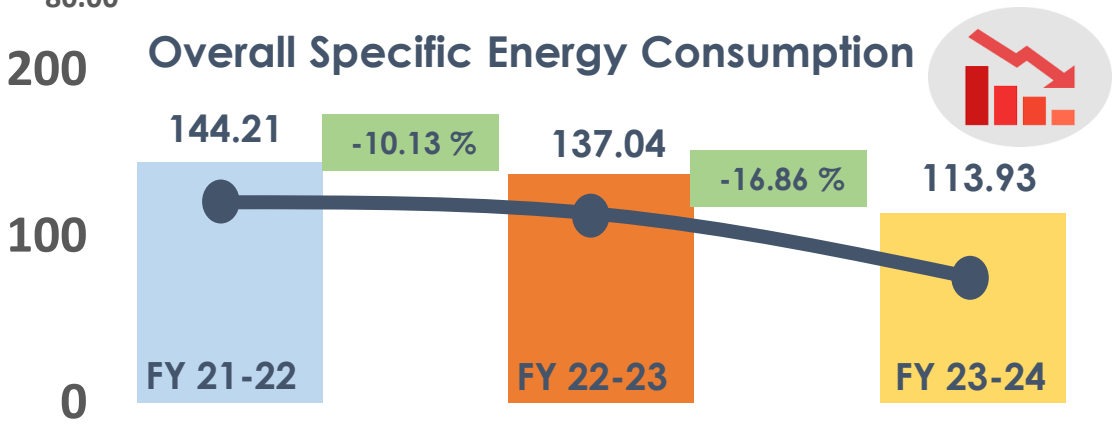
Steam Distribution FY 2023-24

Production & Specific Energy Consumption data in last 3 years (FY 2021-24)









- The Specific Electrical Energy consumption for FY23-24 has brought down by 20% compared to FY 22-23.This is due to various energy initiatives and operational excellence at our unit.
- Coal consumption was optimized & Observed 16% drop in Specific Thermal Energy consumption.
- The Overall Specific Energy Consumption of FY23-24 was brought down by 16% compared to FY22-23

Information on Internal Benchmarking

Energy Base line -internal

	Baseline Units/day FY 2023-24	Actual Units/day FY 2023-24	Baseline Units/day FY 2024-25
Mfg. Facility-I	95,441	99,121	94,164
Mfg. Facility-II	64,210	71,231	67,669
Mfg. Facility-III	85,041	87,566	83,187
Mfg. Facility - INT	99,235	1,06,148	1,00,840
Total	**3,43,927**	**3,64,066**	**3,45,860**

FY23 & FY24 Baseline Justification

- FY 2023-24 targeted energy baseline was assigned based on actuals of FY 2022-23 with reduction of 5% as target.
- FY24 actuals energy consumption increased by 5% w.r.t baseline was due to increase in 33% production volumes.
- For FY 24-25 baselines was assigned w.r.t actual consumption of FY 23-24 with reduction of 5% as target.

Objectives To Achieve The Targeted Baseline Of FY24-25

Planned 27no of Energy projects with investment of Rs 46.14 Million & Projected saving of 12.34 Million Kwh .Some of the highlight's projects are mentioned below,

- ❖ Proposal to install Roof top Solar panels for reducing lighting load at Phase II & III areas
- ❖ Proposal to install online pipe cleaning machine for chiller condensers descaling activity (Anti-scale impulse tech / Autonomous ball tech) to reduce power consumption up to 5-10% of chiller ,
- ❖ Proposed to install energy efficient vertical pumps in place of existing horizontal centrifugal pumps for energy optimization at site,
- ❖ proposed to replace existing Cooling Tower fan blades to Aerodynamic energy efficient Maya fans to optimize power consumption by 45% compared to earlier.

Information on Significant Energy Consumption vs Baselines - Utility

	Reciprocating Chillers			Screw Chillers		Air Compressors	
Design Temp (°C)	+5	-20	-30	+5	Design Temp (°C)	Design SEC (kW/CFM)	0.18
Design SEC (kW/TR)	0.86	1.59	1.83	0.64	Design SEC (kW/TR)	Operating SEC (kW/CFM)	0.26
Operating SEC (kW/TR)	0.96	1.78	2.35	0.76	Operating SEC (kW/TR)	Target SEC (kW/CFM)	0.2
Target NMT SEC (kW/TR)	0.90	1.70	2.0	0.70	Target NMT SEC (kW/TR)		

Steps to Achieve Target SEC:

- Identifying the chilled water(+5C) / Chilled brine (-30C) compressors which are operating at partial loads < 60% of designed capacity
- Synchronize two Chilled water / Chilled brine compressors and diverting the load to only one chiller and operate that chiller at full load
- Continuous monitoring of chiller load w.r.t to TR and increase the frequency of descaling
- Providing softener water to reduce the scaling which in turn deliver better heat transfer rate
- Installation of Automated tube cleaning system to continuously remove the scale in chiller & condenser to consistently meet the targeted SECs

List Of Major Energy Conservation Projects Planned In FY 2024-25 (U/Progress)

1

Energy optimization by installation Roof top Solar panels for reducing lighting load at Phase II & III areas.

INVESTMENT : 7.83 Million
COST SAVING :1.87 Million
kWH savings : 0.25 Million

2

Energy optimization by installation of online pipe cleaning machine for chiller condenser descaling activity

INVESTMENT : 6.18 Million
COST SAVING : 13.04 Million
kWH savings : 1.72 Million

3

Energy optimization by replacement of existing horizontal centrifugal pumps to Vertical energy efficient pumps/ Motors of IE3/IE4

INVESTMENT : 4.21 Million
COST SAVING : 20.27 Million
kWH savings : 2.67Million

4

Energy optimization by replacement of existing Cooling Tower fan blades to Aerodynamic En. Efficient fan blades

INVESTMENT : 4.13 Million
COST SAVING : 5.96 Million
kWH savings : 0.78Million

5

Energy optimization by replacement of existing 50HP motor to 60HP Energy Eff. Motors connected to Nitrogen plants

INVESTMENT : 1.21 Million
COST SAVING : 4.19 Million
kWH savings : 0.55 Million

6

Energy optimization by arrangement of VFDs to Steam Turbine Generator -I & II Boiler feed water pumps

INVESTMENT : 2.3 Million
COST SAVING : 5.3 Million
kWH savings : 0.7 Million

Energy Saving Projects Implemented In Last Three Years

FY21-22

Investments(₹ Million)	: 57.6
Electrical (Million kWh)	: 11.75
Thermal (Million kcal)	: 12.1
Monetary Savings (₹ Million)	: 73.0
Payback Period (In months)	: 8.2

Total No.of projects Executed

20

FY22-23

Investments(₹ Million)	: 17.24
Electrical (Million kWh)	: 9.7
Thermal (Million kcal)	: 7.07
Monetary Savings (₹ Million)	: 69.68
Payback Period (In months)	: 2.9

Total No.of projects Executed

23

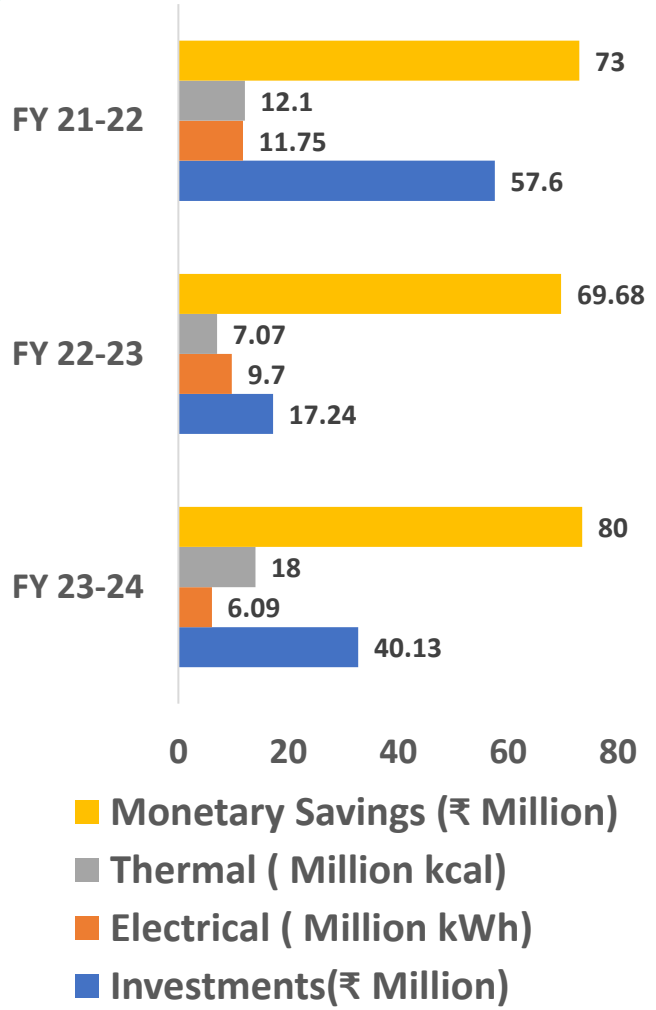
FY23-24

Investments(₹ Million)	: 40.13
Electrical (Million kWh)	: 6.09
Thermal (Million kcal)	: 18
Monetary Savings (₹ Million)	: 80
Payback Period (In months)	: 5.01

Total No.of projects Executed

34

Trend of Energy projects for FY21-22, FY22-23 & FY 23-24



Energy Saving projects implemented in last three years

Year 2023-24

Sr. No	Name of Energy saving projects	Investments (INR Million)	Electrical savings (Million kWh)	Thermal savings (Million Kcal)	Total Savings (INR Million)	Payback period (in months)
1	Analysis done for operation of chillers which are operating at low SEC & Replaced existing +5 C reciprocating compressor to Energy efficient screw compressors of rating 300TR at site & achieved energy optimization	16.34	19.28	0	19.28	10.17
2	Energy optimization at Utility area, which was achieved through installation of VFDs to Utility secondary distribution pumps. Earlier sec. distribution pumps are in operation irrespective of flow rate in header line. Proposed to control RPM of pumps through feed back control from pressure transmitter in line	4.72	1.67	0	1.67	33.96
3	Identified Aerators which are operating at MBR plant are in continuous operation & possessing huge potential savings, Proposed & arranged VFDs for optimization of energy (Total qty :21nos), Achieved 30% Energy savings after implementation.	1.72	1.92	0	1.92	10.73
4	Checked feasibility for energy conservation at Power plant area, Installed VFD for Power plant -III Boiler FD Fan & achieved 20% energy savings	1.4	1.31	0	1.31	12.83
5	To optimize steam consumption at SRS T Distillation columns Using Sub-cooler	0.9	0	1.16	2.14	5.04
6	In order to enhance the Boiler combustion efficiency & to achieve Energy savings, Installed Oxygen analyzer to Boiler and interconnection done for FD fan to oxygen analyzer	1.5	0.47	2.42	4.84	5.04
7	Identified Chiller associated pumps are in operation unnecessarily even though chiller was stopped. Provided necessary Interlocks for RT Pump & CT fan for control the power consumption of CMU-089 chiller at Utility-IV	0.83	1.13	0	1.13	8.81
8	Energy optimization through replacement of existing evaporator of +5°c Compressor CMU001 to new one. which in turn reduces the running hours & Increases the efficiency of chiller (By replacing the evaporator due to existing evaporator 29no's of tubes are obsoleted out of 104 tubes) at Phase I Utility.	0.27	0.10	0	0.79	4.17
9	Individual Air compressor is operating for Nitrogen plant (Reciprocating-278CFM) , process air(75CFM) and Instrumentation air(75 + 112CFM).Interconnected single Air compressor 384CFM (Screw compressor-ACU081) and stopped the all the individual air compressors operating for Nitrogen plant, process air and Instrumentation air & achieved energy savings.	0.23	0.09	0	0.65	4.17

Total No. of Projects for FY23-24 : 34No's , **Total Investment in Million**: Rs. 40.13Millions, **Total Electrical savings**: 6.09Million kWh

Energy Saving projects implemented in last three years

Year 2022-23, Total No.of Projects Executed : 23no's, Total Investment: Rs.17.24 Millions						
Sr. No	Name of Energy saving projects	Investments (INR Million)	Electrical savings (Million kWh)	Thermal savings (Million Kcal)	Total Savings (INR Million)	Payback period (in months)
1	Optimized the overall utilities consumption by 15% compared to FY-2020-21 with continuous monitoring and excellence in handling	2	3.21	-	19.23	1
2	Energy optimization by replacement of 160W ML lamps with 27W LED lights at entire plant	2.17	3.09	-	18.52	1
3	Replacement of reciprocating ammonia based +5 chillers with (3 no's) 250 TR screw compressor chillers at D & E utilities utilized for process and HVAC	40	2.75	-	16.5	29
4	Optimized the utilization of partially loaded CMU86 chiller by diverting the load to CMU87 chiller with arrangement of new pump	0.15	0.43	-	2.55	1
5	Energy optimization of Split A/C's and DX coils at QC & office areas by arrangement of microprocessor-based temperature controllers	0.16	0.09	-	0.69	3
6	Optimization of running hours of AHUs by arrangement of timer switch to office areas	0.001	0.02	-	0.18	0
7	To optimum the energy consumption, CMU084(400TR) +5 chilling plant was stopped & its load was diverted to newly installed HVAC chillers CMU099,CMU100 & CMU101	0	0.18	-	1.26	0

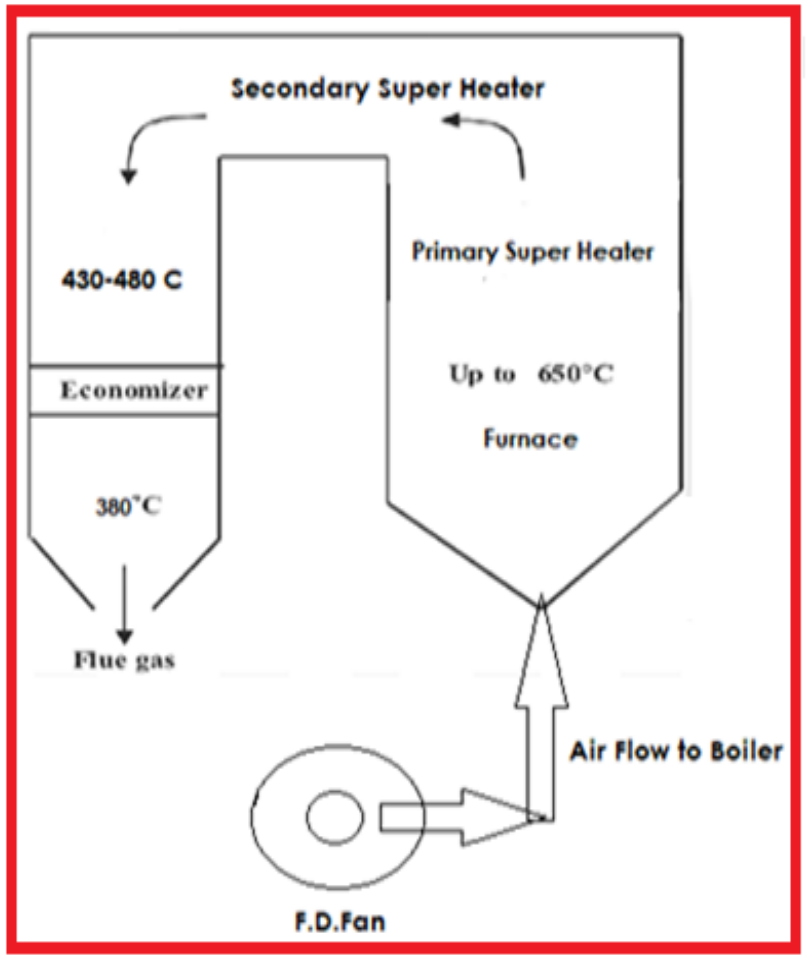
Year 2021-22, Total No.of Projects Executed: 20no's,Total Investment: Rs.57.6 Millions						
Sr. No	Name of Energy saving projects	Investments (INR Million)	Electrical savings (Million kWh)	Thermal savings (Million Kcal)	Total Savings (INR Million)	Payback period (in months)
1	Optimized the overall utilities consumption by 15% compared to FY-2020-21 with continuous monitoring and excellence in handling	2	3.21	-	19.23	1
2	Energy optimization by replacement of 160W ML lamps with 27W LED lights at entire plant	2.17	3.09	-	18.52	1
3	Replacement of reciprocating ammonia based +5 chillers with (3 no's) 250 TR screw compressor chillers at D & E utilities utilized for process and HVAC	40	2.75	-	16.5	29
4	Optimized the utilization of partially loaded CMU86 chiller by diverting the load to CMU87 chiller with arrangement of new pump	0.15	0.43	-	2.55	1
5	Optimized the utilization of CMU61 chiller by diverting the load to Main utility chillers with unification of chiller inlet/outlet's	0.5	0.32	-	1.94	3

Energy Saving projects implemented in last three years

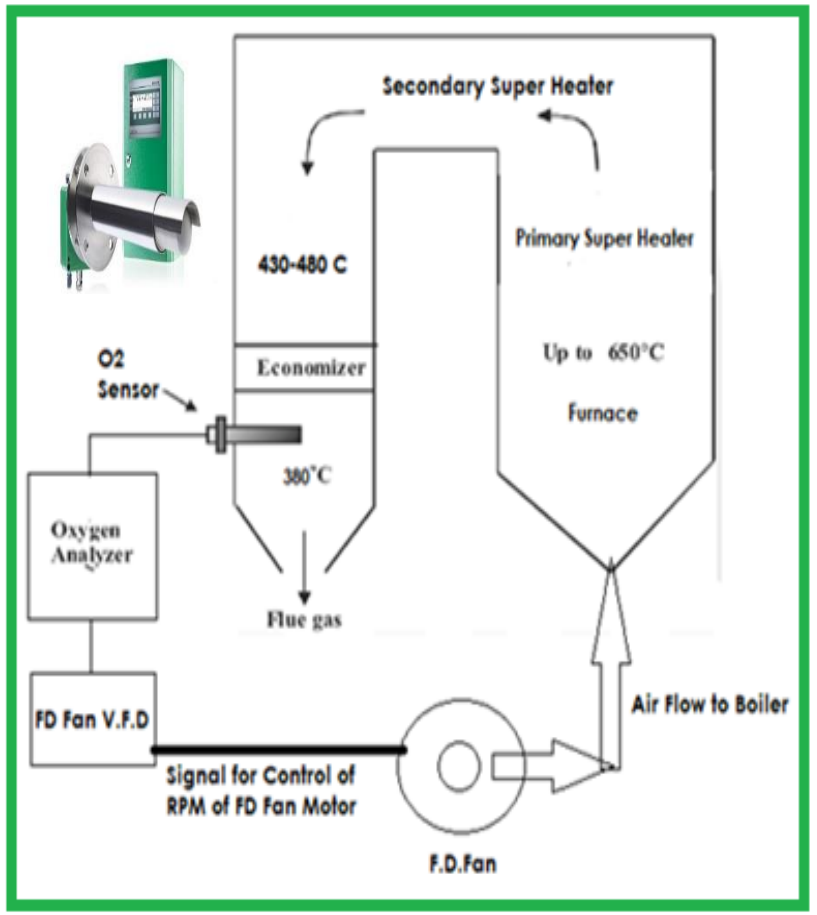
TITLE: To enhance boiler efficiency by installing Oxygen analyzer, VDF to FD fan and automation in DCS..

Description: Installed Oxygen analyzer to monitor and control the oxygen content in air supplied for Boiler for efficient combustion. Observed increase in Boiler efficiency. Oxygen analyzer takes feed back from boiler for continuous monitoring and control and based on feed back FD fan VFD will operate

Before: Draft was managed by open/closing of damper irrespective of O2 content inside furnace which shows impact on Boiler combustion efficiency &Inconsistency in maintaining O2 levels



After: After installation of Oxygen analyzer in Boiler after Economizer, Oxygen content in Furnace was maintained as per norms & increased boiler combustion efficiency



Triggering Factor

- High Coal consumption & low efficiency of boiler due to issue with not monitoring of Oxygen content inside boiler,
- For control of Air & fuel ratio for optimization of coal consumption, analyzed and implemented oxygen analyzer for Boiler.

Actions Taken

- Arranged Oxygen Analyzer for Boiler after Economizer for maintaining FD fan air flow and thus achieved high rate of Fuel combustion.
- We have to maintain minimum of below 2% & Maximum of 4% Oxygen content in boiler for efficient combustion. This was achieved by installation of Oxygen analyzer to boiler & provided interlock with FD Fan Variable Frequency Drive for Energy savings

Benefits

- High Fuel combustion rate compared to earlier which increases over all efficiency of boiler
- Oxygen analyzer will display the O2 content in Boiler & Controls the air flow & combustion
- Air flow maintenance of Boiler is much easier as the VFD maintains air flow based on oxygen content inside boiler by taking feedback from O2 Analyzer
- Total Coal savings/Annum : 672MT
- Total Cost savings/Annum: Rs 43.68 Lac.

Energy Saving projects implemented in last three years

PROJECT : Installed Variable frequency drives with pressure transmitter to control RPM of secondary pumps with respect to water flow to optimize energy at Utility areas.

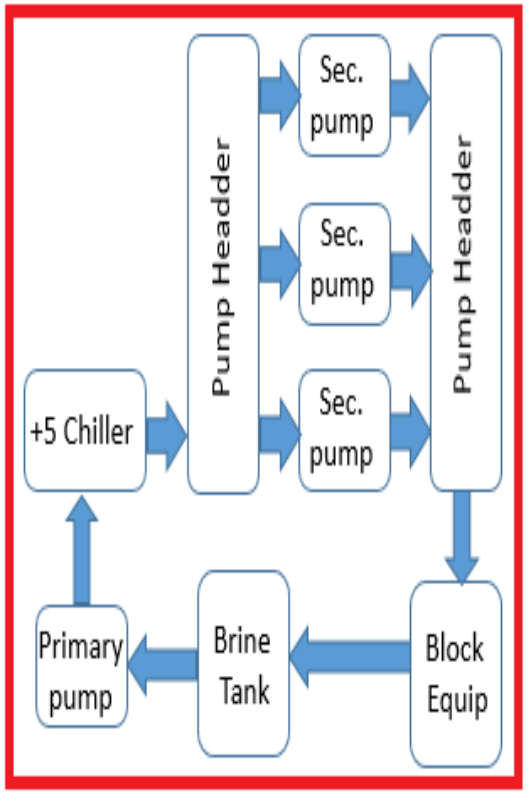
OBJECTIVE : To optimize the energy consumption of utility secondary distribution &RT pumps(+5 C & -30C) by providing VFD's which are in operation 24X 7.

PROBLEM: Existing Utility secondary distribution pumps (+5C & -30C) & RT pumps are in operation 24X 7, as there is no provision to switch off as per requirement

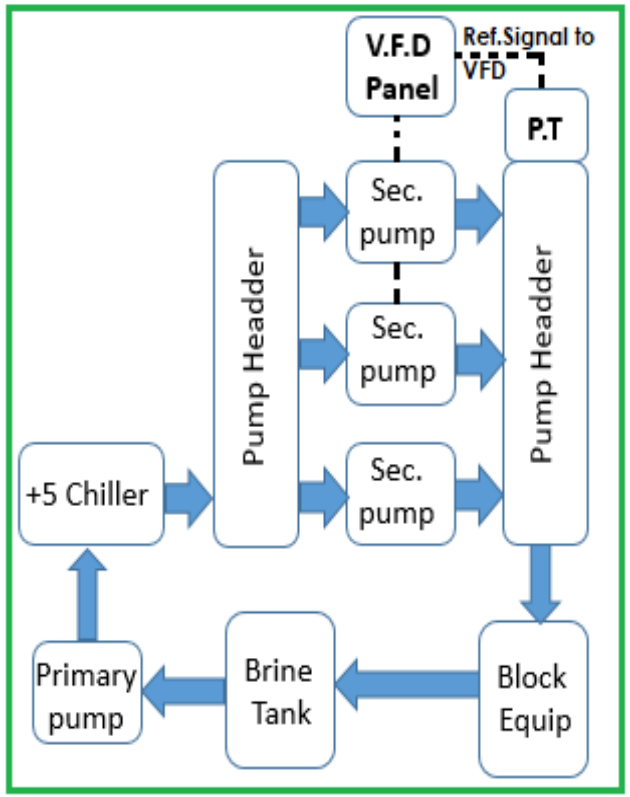
ACTION PLAN :

- Analysed power consumption of Utility secondary & RT pumps -17no's &feasibility to reduce power cons. as the connected load being high.(Total connected load, HP: 495 & KW: 371)
- We have designed circuit to operate one VFD for 2pump feeders (Main & Stand by) as per requirement which will operate through feedback from pressure transmitter connected in pipeline

Before:



After:



BENEFITS:

- Reliability of pumps increases & increased over all equipment effectiveness,
- VFD reduces inrush currents of motors which helps in increased motor life.
- Auto & manual operation of pumps can be selected as per requirement for controlling of pumps

SUMMARY:

Energy Cons. Before installation	7231
Energy Cons. After installation	5401
Realized Energy savings incurred (kWh)/month	1830
Realized Energy savings /Annum (kWh)	274200
Realized Energy cost savings /Annum (Rs.in Lac)	20.83

Energy Saving projects implemented in last three years

PROJECT : To optimize energy by cooling tower synchronization which was catering chilled water to Reactor jacket and Condensers/Heat exchangers at D & E block areas.

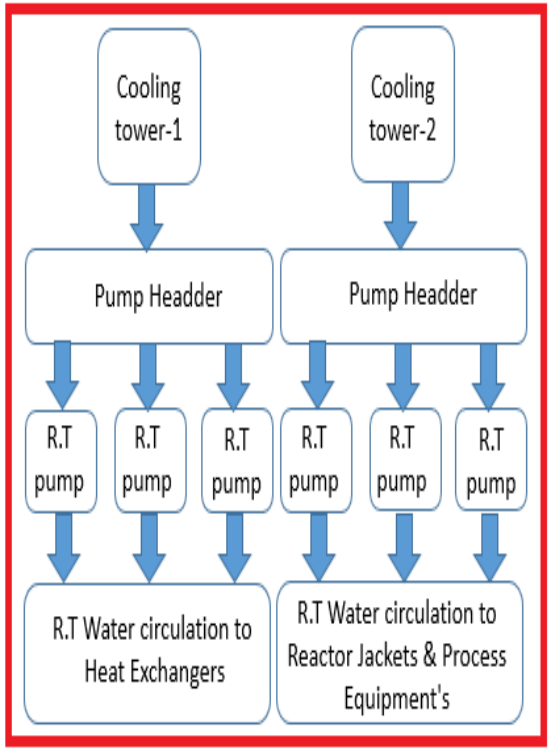
OBJECTIVE : To optimize the electrical energy by reduction of running hours of R.T water pumps, CT fans by cooling tower synchronization.

PROBLEM: Identified 2nos of Cooling tower related R.T water pumps are running unnecessarily with partial loads which are connected to process and Utility operations

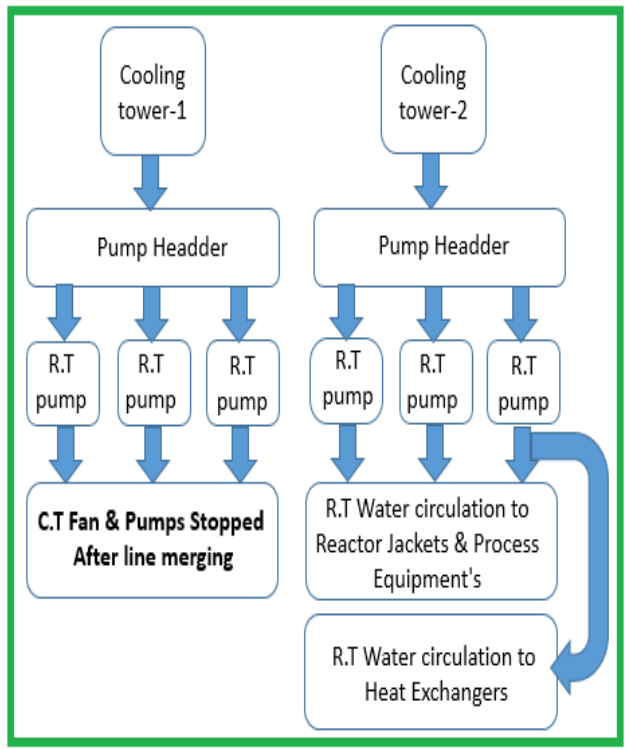
ACTION PLAN :

- Analyzed & stopped pumps by cooling tower synchronization ,carried out pipeline modification to stops pumps to reduce partial loading
- Cooling tower synchronization carried out at D & E blocks for energy savings

Before:



After:



BENEFITS:

- Huge saving by stoppage of pumps by cooling tower line synchronization
- Pumps are operating with partial loads prior to modification & at present they are running at 85% load

SUMMARY:

Energy Cons. Before installation	5290
Energy Cons. After installation	2425
Realized Energy savings incurred (kWh)/month	2865
Realized Energy savings /Annum (kWh)	859500
Realized Energy cost savings /Annum (Rs.in Lac)	65.32

Energy Saving projects implemented in last three years-Visual

Energy optimization by replacement of existing 3nos of +5°C reciprocating compressor to energy efficient screw compressors, utilized for process and HVAC

Investment: 16 Million
Savings: 19.28 Million

1

Energy optimization at Utility area through installation of VFDs to Utility secondary distribution pumps. RPM of pumps was controlled through feed back from pressure transmitter

Investment: 4.7 Million
Savings: 1.67 Million

2

Energy optimization of cooling towers by replacement of existing Traditional type cooling tower fan blades to Aerodynamic Energy efficient Fan blades

Investment: 1 Million
Savings: 0.09 Million

3

Energy Optimization of ETP Aerators by arrangement of Variable Frequency Drives(VFDs) for reduction of RPM

Investment: 10 Million
Savings: 23.68Million

4

Energy optimization in Lighting consumption by replacement of Traditional 160W MLL lamp to 45W LED retrofit at Block areas & Utility areas

Investment: 0.96 Million
Savings: 2.67 Million

5

Energy optimization at Power plant area by arrangement of Variable Frequency Drives (VFDs) to Boiler FD Fans

Investment: 1.4 Million
Savings: 1.31 Million

6

Innovative Projects implemented

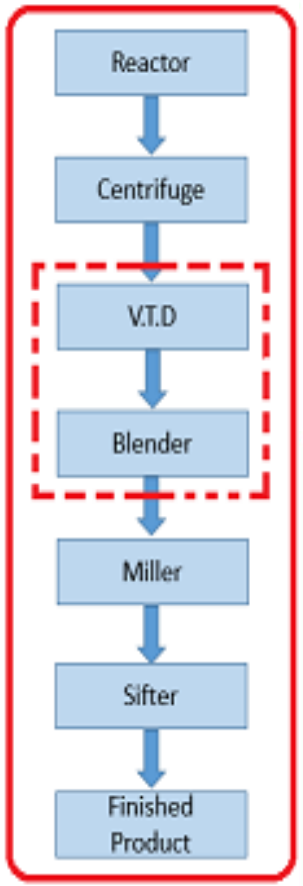
1

TITLE: To install Rotary Vacuum Paddle Drier in place of Vacuum Tray Drier & Blender to optimize energy consumption & productivity improvement at MF blocks

Description: By installing RVPD will simplify the process flow and increase the productivity with optimum energy consumption.

Before: In Block –J equipped with VTD & Blender for processing of Valsatran product. Equipment running hours are high so the batch cycle and high-power consumption.

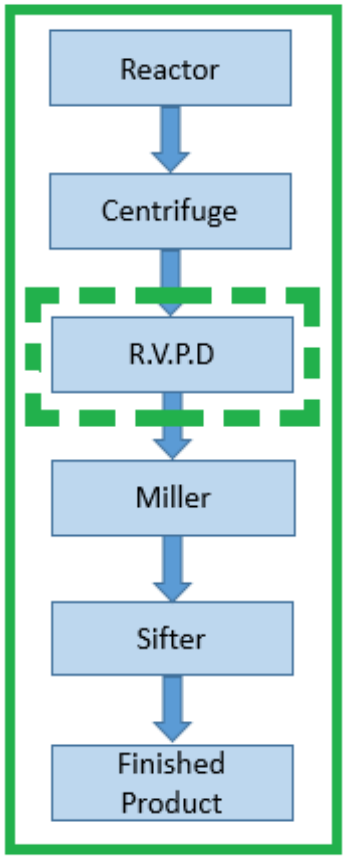
Process flow: Before



After: Existing V.T.D was replaced to R.V.P.D with change control process and observed reduced batch cycle time/batch with same quality of product. Energy savings was achieved through reduced batch operational hours.

RVPD

Process flow: After



Triggering Factor

- High process operational batch time: 72hrs,
- Hige Energy consumption due to high operational hours of batch process,
- Process operation flow is high.

Actions Taken

- Analysis done and replaced existing V.T.Ds to R.V.P.Ds for reduction of batch cycle time
- Reduced operational Hrs./batch which is having high potential to save energy
- Increased occupancy of equipment's due to more batches charged with in saved time cycle

Benefits

- Reduced operational Hrs of equipment from 72Hrs to 18Hrs.
- Total savings of running hrs time/batch: 54Hrs.
- Total kWh savings /batch: 805
- Total kWh savings for 50 Batches : 40,230 kWh,
- Total kWh cost savings: Rs 3.05Lac
- Productivity saving
- Investment : 50 lakhs

Innovative Projects implemented

2

TITLE: To optimize the batch cycle time & energy consumption of Ethanol Recovery by MLR Sieve Dryer process.

Description: Installation of MLR Sieve dryer instead of PSA- Pressure swing adsorption in the dehydration process to reduce the batch cycle time and to enhance of Ethanol recovery. By use of distillation column & pipeline modification achieved projected recovery % to 70% from 38.60%.

Problem

Earlier recovery of Ethanol in the process of Quetiapine Fumurate API was through PSA process where batch cycle lead time is high

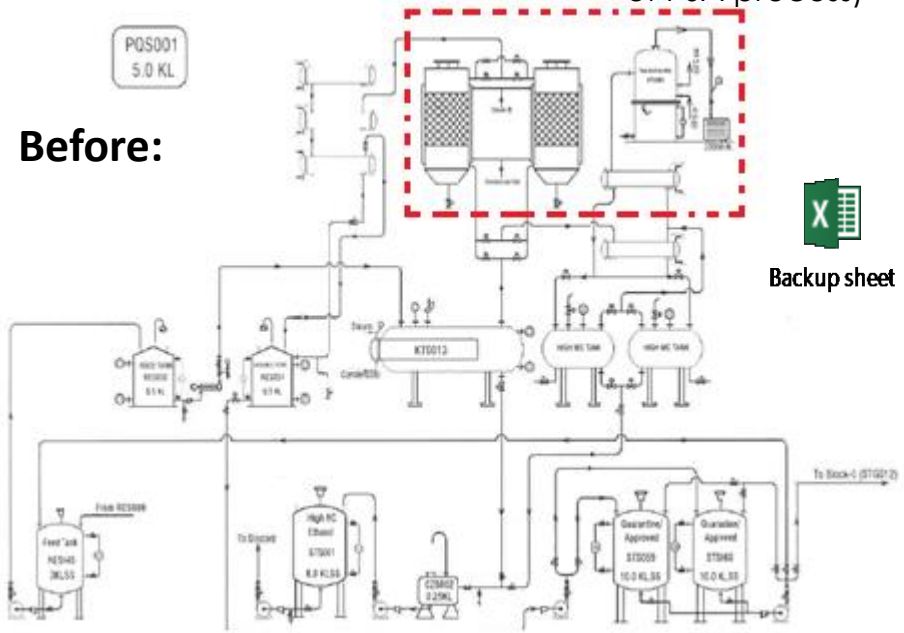
Impact

High Energy consumption & Low productivity due to low Recovery % (Earlier process is of PSA process)

Brain Storming

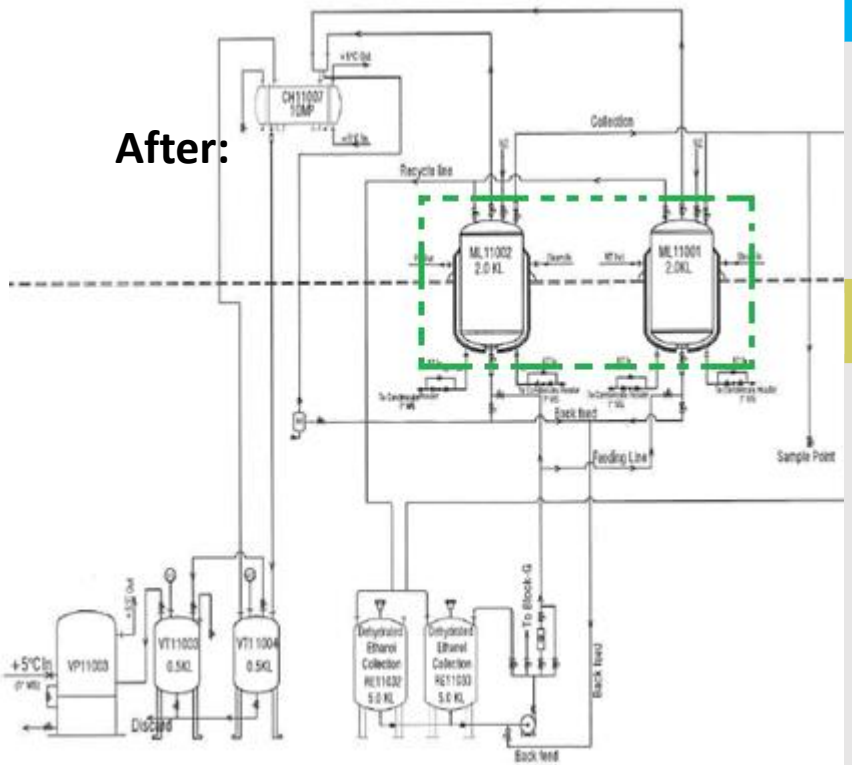
After Brainstorming sessions & through analysis, Process was modified from PSA to MLR process by some piping modification& by use of Dist. Column, achieved reduced batch process time & Energy savings.

Before:



Backup sheet

After:



Details	PSA Process Loads	MLR Process Loads
Number of Pumps	7	2
Total rated load in KW	16.7	5.9
Units Consumptions per Day	287	49

Triggering Factor

- For reducing batch cycle time, improve in Recovery %, energy optimization
- By change in Process & facility, Recovery % was projected

Actions Taken

- Created new facility at SRS-I by Distillation column DI11005 & by pipeline modification.
- By change in Recovery process to PSA from MLR, recovery % was enhanced.
- Recovery followed by dehydration was carried out for further enhancement of recovery

Benefits

- Recovery % of Ethanol was increased to 70.63%
- Energy Cons. Before (PSA process): 86040kWH,
- Energy Cons. After (MLR Process): 14340kWH, Energy savings : 71,700 kWh & Energy cost savings: Rs 5.44Lac
- Coal Saving: 74 MT & Coal Cost savings: Rs 4.91Lac
- Total cost savings: Rs 53.58Lac/ Annum(65no batches)
- Investment: Rs 20 Lakhs
- Total solvent saved : 59,607Kg,
- Pay back in Months:15.

Innovative Projects implemented

3

TITLE: To optimize steam consumption at SRS T Distillation columns Using Sub-cooler

Description: Proposed to install Sub-cooler in reflux line to increase the temperature diff between vapour & liquid and to create better energy transfer. This will decrease the reflux ratio resulting reduction in batch cycle time & low steam consumption

Problem

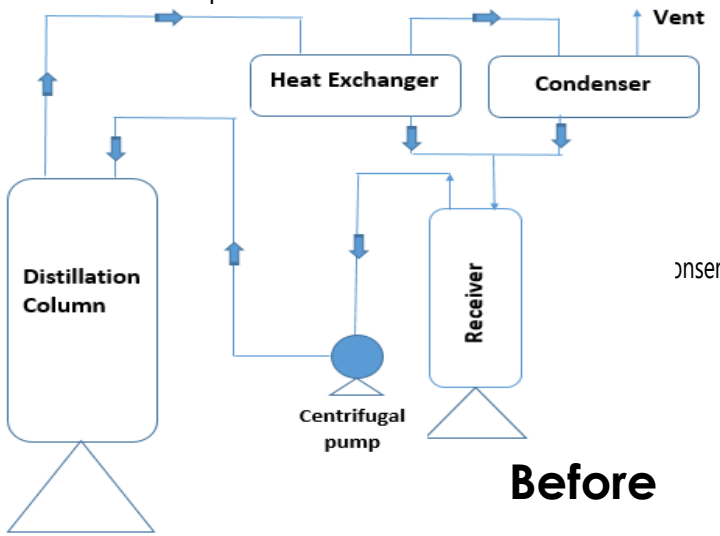
Recovery time of Methanol + water & Ethanol + water distillation was taking high cycle time & huge steam consumption

Impact

Low rate of recovery due to high Reflux rate which shows impact on power consumption.

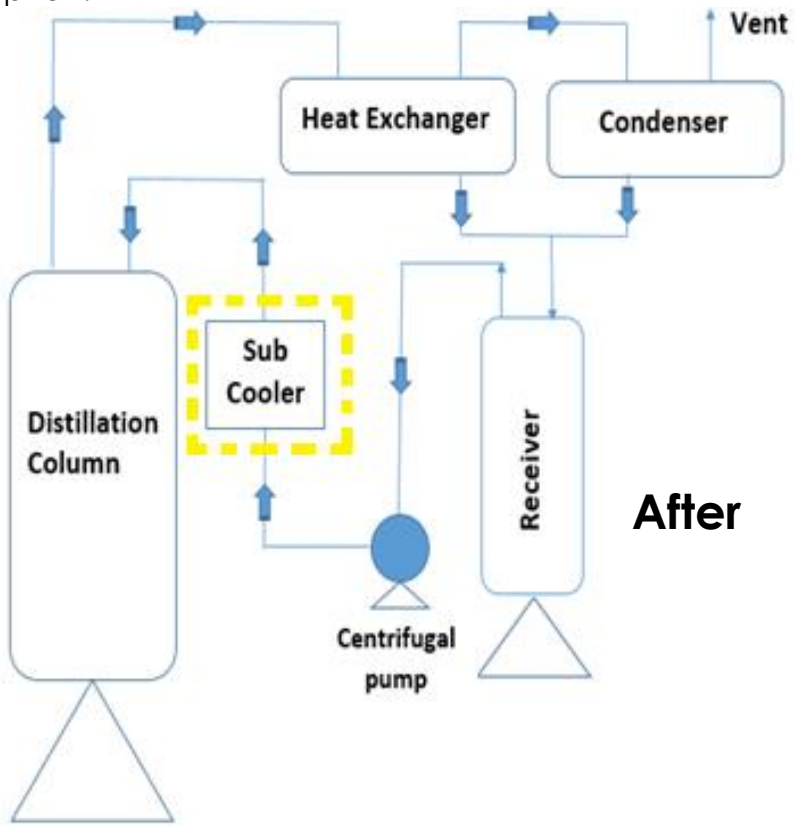
Brain Storming

Data collection of heat load, volumes and time cycles.



Before

Enegy
onservation at SRS



After

Details	Before	After
Batch Cycle Time in Hrs	40	30
Steam required per annum in KGs	15646721	11968618
Saving in Steam in KGs	3678104	
Realised Coal saving per annumin MT	323	
Cost savings in lakhs	21	

Triggering Factor

- High Steam consumption for operation of Distillation columns
- Actual process of recovery rate was taking high cycle time

Actions Taken

- Installed sub cooler in reflux line with required line modifications.
- Temperatures were monitored and Reflux ratio of solvent was reduced to 1.5:1 from 3:1

Benefits

- Batch time cycle decreased from 40 hrs to 30 hrs.
- Steam Consumption reduced .
- Total coal savings : 323 MT/annum
- Total Coal Annual cost saving of Rs 21 Lakhs
- Investment : Rs 9

Innovative Projects implemented

4

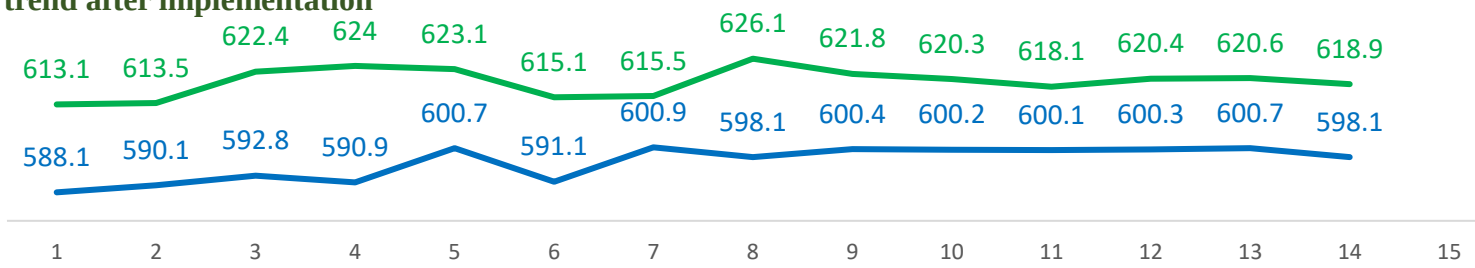
TITLE: Enhancement of Valacyclovir HCl Product API Yield & Energy savings through change in facility

Description: Energy saving at Block N by change of G.L.R(Glass lined Reactor) to Hast alloy Reactor for increase in heat transfer rate & by piping modification of existing hot water pump catering to ANFD.

Before: G.L Reactor was equipped for Mass transfer &For reaction

After: G.L Reactor was replaced to Hast alloy Reactor for increase in Heat transfer rate-2 nos

Yield trend after implementation



Green line: After Yield in Kg's

Blue line: Before Yield in Kg's

No.of Batches

Triggering Factor

- Observed huge batch cycle time in earlier process due to low heat transfer rate to mass.
- Existing hot water line to RVPD was small ,due to this heat transfer to mass is low, thus increased batch cycle time.

Actions Taken

- Analyzed and observed that due to low heat transfer rate, batch cycle time was high
- Replaced existing GL reactor to hast alloy type for high heat transfer rate & with the change of circulation pump of hot water to RVPD, reduced batch cycle time by 30hrs.
- Spray balls provided for effective removal of scaling material for crystallizer reactors.

Benefits

- Equipment occupancy was increased & production output was increased due to lower batch cycle.
- Charge more batches within the saved time cycle.
- Energy Cons. Before/Annum : 3,00,300 kWH
  Energy Cons. After/Annum : 2,19,450 kWH
  Total kWh savings : 81125 kWH
  Total kWh Cost savings : Rs 6.16 Lac
- API Yield improvement from 598 kg to 622kg
  (Total: 42nos of batches & Batch output increased /month:1260Kg's, resulted capacity improved from 27 MT to 34 MT.

Installed 30 MW Offsite Solar Power Plant

Offsite					
Year	Source (Solar, Wind, etc.,)	Total offsite Installed capacity (MW)	Capacity addition (MW)	Total Generation (Million kWh)	Share % w.r.t to overall energy consumption
FY 21-22	Solar PV	30	0	43.24	35.46
FY 22-23	Solar PV	30	0	43.03	47.08
FY 23-24	Solar PV	30	0	43.07	43.92

Installed Capacity

30MW Solar Power Plant Under
Mode : Group Captive Mode
Project mode : Off Site Generation

Location & Developer

Varisam village, Pydibhimavaram,
Ranasthalam, Srikakulam.
M/s Aurobindo Ltd
Investment : ₹ 120 Cr.

Type of Agreement

Open Access : 5 Years
Starting : May 2017
Total 2 No's units of Aurobindo considered

Generation

Total generation : 4.3 Cr Units /Year
Allocation Capacity : 6.75 MW/hour

Sustainability / GHG Inventorisation

1 **Sustainability Report**

2 **Goals & Targets -2025**

3 **GHG Emissions**

2023-24

Published sustainability report for FY 2023-24

2025

- 20% Renewable Energy Share (Power to Power)
- 10 % Reduction in Emissions
- 35% water conservation / restoration
- 60% co-processing of hazardous waste
- 100% reuse & recycling nonhazardous waste
- 25% hours of learning per employee

Emissions Intensity of last three years (FY2021-24):

FY	Scope 1 emissions	Scope 2 emissions	Total GHG Emissions (tCO2e)
2021-22	1,07,417	79,063	1,86,480
2022-23	1,20,802	72,385	1,93,187
2023-24	1,35,300	1,38,231	2,73,531

Target for GHG Emissions Reduction :

"APPL has set Sustainability goals for 2025 as "10% reduction in carbon footprint by 2025"

Action Plan :

To reduce carbon emissions,

- Installed 30MW Solar power plant offsite.
- Coal consumption was reduced with improving boiler efficiency.
- Up gradation of Boiler ESP from 115 mg/nm3 to 50 mg/nm3 to reduce the chimney emissions. Investment: 219 Lakhs
- Implemented & utilized Battery operated vehicles(forklifts) for material transportation.
- Central Warehouse for goods collection & transportation for each unit instead of multiple vehicles.
- Introduced and removed multiple cars for senior management commute & arranged common vehicle to plant.
- Implemented common transportation facility for all employees who are coming by own transportation.
- New ETP project proposals- Effluent segregation in production blocks & 1000 KLD Tertiary Clarifier System for ETP work under progress with budget of Rs 2.25Cr.

Environment

5%
Reduction in energy intensity (GJ/Turnover) (baseline year FY20)

~23%
Reuse of waste water out of total waste water generated (232,373 KL)

~16%
Reduction in carbon emissions (237,455 tCO_2e reduction compared to FY20)

~14% (power to power)
Renewable energy used in operations (124,446 MWh)

Social

~24
Training hours per employee

12.54%
Women in workforce

8.59 Lakh
Lives impacted through CSR interventions

Governance

50%
Board comprises Independent Directors, of which two are women

8
Non-executive Directors, including Independent Directors

2
Executive Directors

14 years
Average tenure of the Directors on our Board

Green Supply Chain Management

Information on Projects Implemented :

01

Implemented common bus for senior management team instead of multiple cars for pick and drop to reduce carbon emissions

02

LIMS software implemented at QC labs for online activities avoiding manual & paper less documentation

03

Proposal for rooftop solar for lighting for 2 areas assessment completed and in progress

04

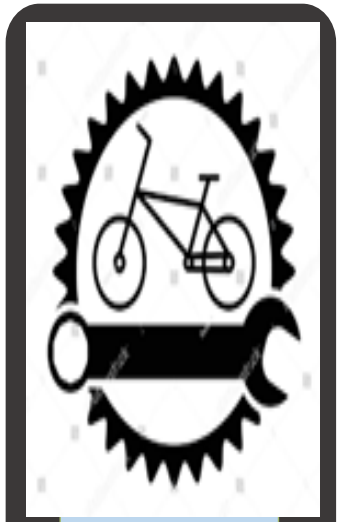
Central Warehouse for goods collection & transportation is in place avoiding multiple vehicle movement.

05

Procured 15 nos Battery operated vehicles (forklifts, stackers) for material transportation in the site premises

06

Procured Electric-Vehicles/ Hybrid vehicles for Employee commute within the site instead of diesel cards to reduce carbon emissions



07

Facilitated with Battery operated & manual Bicycles for internal employee conveyance

Green Supply Chain Management

Projects Implemented FY 22-24 & Benefits Achieved

S.No	Projects Implemented	Investment Made (Rs In Million)	Remarks
1	Reduction of paper consumption of FY24 by 10% compared to FY23	2.87	Paper consumption reduced drastically by introducing several brainstorming activities at site. Instructions given to all team for reducing prints by giving access to printers for only authorized persons.
2	Implemented LIMS(Laboratory information management system) software at QC areas for paper less documentation & all activities are carried out through software	5.62	This initiative was implemented in QC areas of plant so as to reduce paper consumption so that ecosystem balance is achieved. Earlier QC related documents were printed and stored, now with implementation of LIMS Paper less documentation is achieved and retrieving of data is much easier than before
3	Proposal for rooftop solar for lighting from 06:00hrs to 18:00hrs to reduce load on EB source.	22	Rooftop solar PV is firstly planned at Phase II PCC room for diverting load on EB from 06:00hrs to 18:00Hrs.
4	Proposal to utilize common transportation facility which was available for all employees who are coming to plant by own transportation	1	Common transportation is available from all areas to site, some of the employees are approaching to plant thru own transportation which increases carbon emissions. Planning to cover all employees through common transportation for ease of transport& reduced carbon emissions
5	Centralized warehouse system is planned such that bulk transportation is being ensured to plant instead of multiple vehicles sending partial material loads to site from vendors	1.5	Central warehouse facility was introduced for goods transportation from vendors to reduce carbon emissions and to increase occupancy of vehicle & vendor is benefited
6	Implemented & utilized Battery-operated vehicles(forklifts) for material transportation inside of plant to avoid usage of petrol operated TATA ACE, there by achieved reduction in cost of petrol and diesel - 5nos	6.3	For raw material supply chain management to blocks which are located at remote areas transportation is now easier by the usage of battery-operated vehicles inside plant
7	Implemented & utilized Battery operated vehicles for man movement inside plant premises for cost reduction of petrol & diesel usage -2 nos	1.19	For Senior management local commute, implemented usage of BOPV to reduce carbon emissions & to reduce usage of petrol and diesel

Information on Evaluation Done:

Initiated different projects for reducing Carbon emissions.

- FY 2022-23- 7nos projects implemented with investment of Rs 24.23 Million
- FY 2023-24- 7nos projects implemented with investment of Rs 40.48 Million

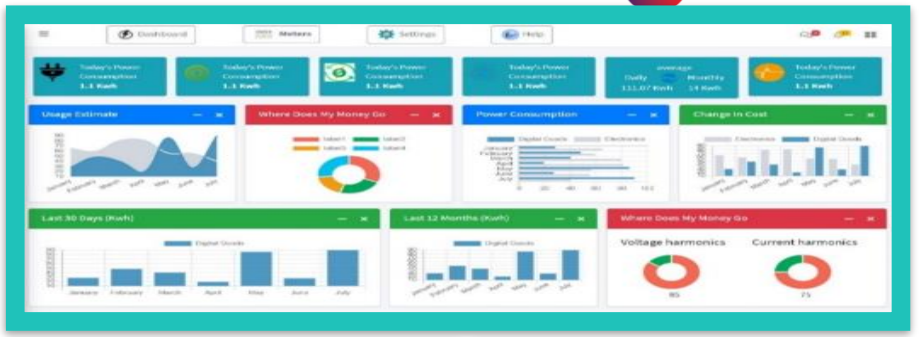
- Based on the projects executed, we have observed reduction of carbon emissions due to reduced usage of coal ,diesel & by installation of offsite solar power generation , adopting energy efficient equipment's & by different initiatives around plant premises.

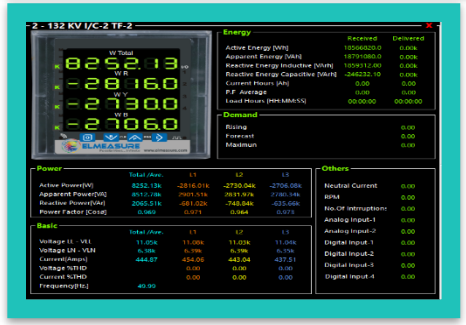
- Introduced usage of rice husk in place of coal which offering significant environmental advantages. Husk combustion produces minimal greenhouse gas emissions and contributes to reducing carbon footprints

Energy Management System

Existing Energy Monitoring System:

- ✓ Existing E.M.S was of ELMEASURE make connected to all areas across site for data retrieval.
- ✓ Generates & Circulates online report daily for Monitoring of Energy consumption.
- ✓ Real time data analyze and review.





Challenges During Implementation &how we Overcome:

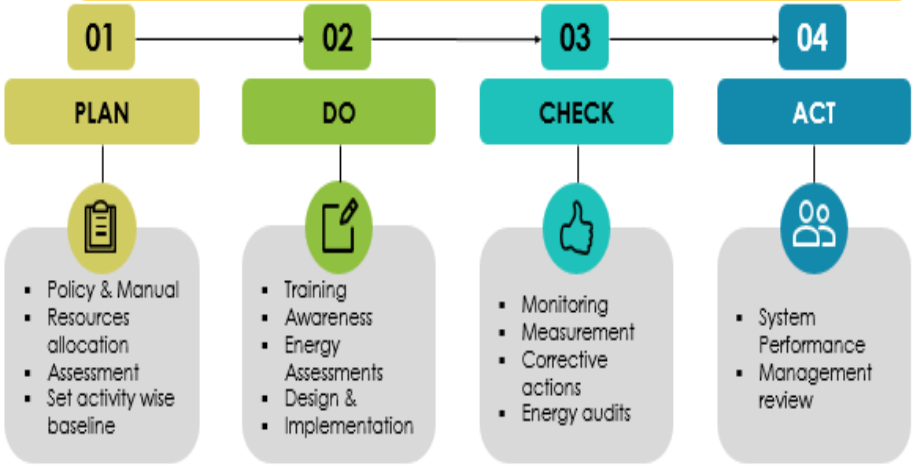
- Data collection of energy consumption from entire site
- Problem of effective data management & its monitoring

- Lack of awareness on energy management at work.
- Lack of identification of energy performance indicators & Non availability of resources

- Management decision to establish EMS at Site. Required Training & resources
- Review meetings on daily/monthly energy consumption its baseline targets.
- Implemented EMS connecting all 400 energy meters online, reports generation.

- Consumption and energy baseline targets.
- Enabled us to focus on our daily losses and peak load areas and made us to focus on areas concerned for optimization of energy.

Energy Management System- Procedure



Energy Management System –Cont.

ISO 50001:2018 certification

- ✓ Our Apitoria Pharma Private Limited, Unit –IV is ISO50001:2018 certified by NQA Certification Pvt.Ltd,
- ✓ Internal auditor training programme was conducted for implementation of ISO 50001:2018,
- ✓ Stage-I and Stage-II audits are successfully completed and declared certification.
- ✓ Under the guidance of CII, our Unit achieved ISO 500001-2018 certification.
- ✓ In house training for all employees on awareness of EMS for identification of Significant Energy Usages
- ✓ Several initiatives implemented at site for enhancing EMS effectiveness

ISO 50001:2018: Internal Auditor Training Program By CII

ISO 50001:2018: Certification Audit Closing Meeting

Learnings from past CII award programs

SCREW CHILLERS (+5 &-30C)

Phased manner replacement of Chillers with Energy Efficient Chillers

E-GLASS FRP BLADES

The efficiency of fans increases to 85-92% compared to the traditional fans

Auto Tube cleaning system

Equipped for 250TR Screw chillers for online descaling of condensers

Axial blowers & EC blowers for AHUs

Existing Centrifugal blowers connected to AHUs are to be replaced to Axial blowers

VFDs for Utiity sec.Dist Pumps

Utility Sec. distr. pumps connected to Process (+5 &-30 C) area equipped with VFD with Pressure transmitter feed back for Energy optimization

Microproc. Based Temp. Controller

Proposed to arrange microprocessor-based temperature controllers for DX coils

NET ZERO commitment

Steps that are needed to achieve net zero:

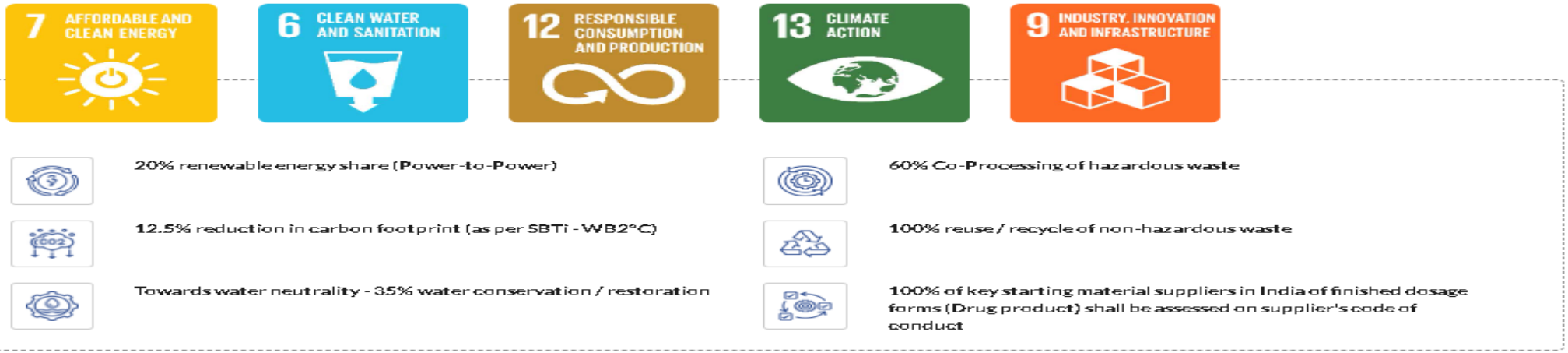
- **Assess your risk & impact:** Assess climate risks, opportunities and climate impact.
- **Set a target:** Set a net zero target, aligned with science.
- **Plan for the transition:** Plan for the transition via a strategic roadmap, addressing risk and reduction.

Net Zero Target year /commitment :

- Aurobindo is yet to declare Net zero emission Target; However, Aurobindo has set Goals - 2025 to Reduce Carbon Footprint by 10% from baseline FY20 (as per SBTi- WB2C).

Roadmap for achieving the target:

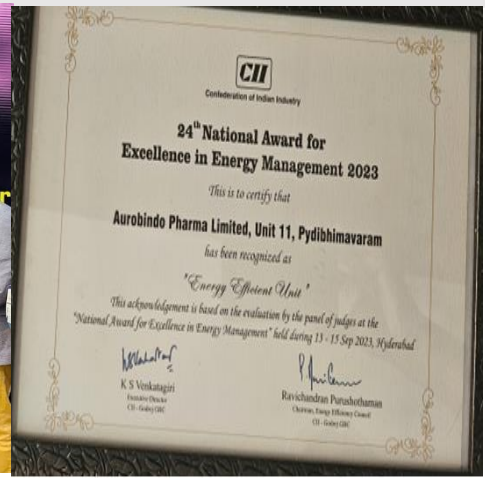
- Transition to Renewable energy(our goal is to achieve 20% share of solar power) by 2025.
- Energy efficiency improvement
- Transition to Green fuels
- Green belt development and Carbon sequestration
- Domestic effluents like canteen/toilet treatment and recycle for usage of gardening purpose. 200kl/day by improving existing domestic RO plant
- Initiatives for water saving : Type 2 cleaning implementation of simplification & speedification initiatives will give water reduction in process cleaning by 20% thereby optimization of raw water usage.



Awards & Celebrations

01 Energy Conservation Week Celebrations -2023

02 CII 2023- Energy Efficient Unit Award



03 8th CII National 5S Excellence- Won Diamond Category,2023

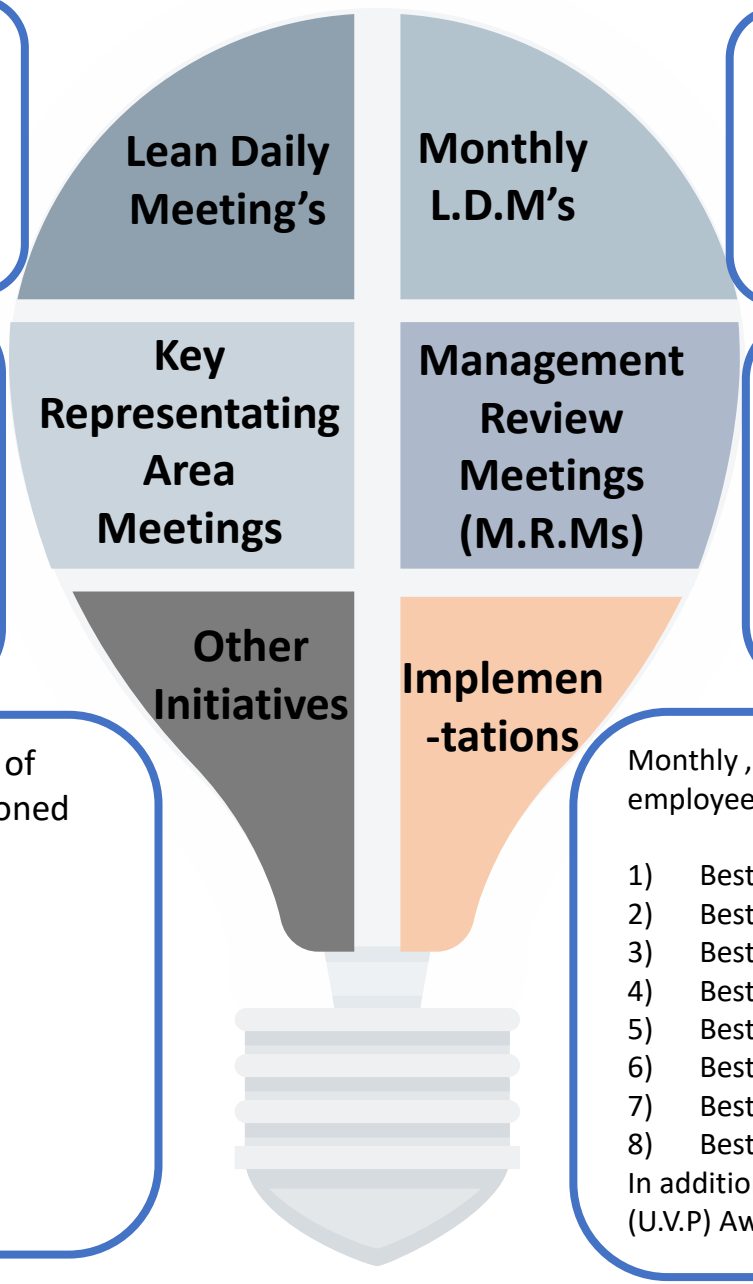
04 CII Industrial Safety Excellence Awards 2023

05 Best Site in Energy/5S in Inter unit Competition - Award From Group CEO

06 R&R Awards- Site Level Best Energy Project

Initiatives & Implementations for Energy Monitoring and Control

- ✓ Daily 35nos of Lean Daily Meetings at predetermined time will happen across site at shop floor level(Block wise) & Department wise,
- ✓ This LDM is designed to track Energy consumption &reason for increase of consumption with respect to baseline by indicating green/red color & Team has to update the board for proper decrease or increase in energy consumption with respect to baseline



- Monthly Lean Daily Meetings(L.D.Ms) are conducted as per schedule & Score card of the month was generated,
- No.of KAIZENS implemented for the month was reviewed and best KAIZEN was awarded in R & R program
- Best En.Con project implemented was awarded in R & R program

- ✓ Monthly KRA Meetings are happening for review Area wise and actions will be initiated for control,
- ✓ Monthly Power consumption with respect to Baseline will be monitored and discussions will be held
- ✓ Coal consumption with respect to Baseline will be monitored and discussions will be held, Reason for increase /decrease to be mentioned
- ✓ Monthly review of on-going En.Con. Projects status during meet
- ✓ Way forward actions to be discussed

- ➢ Monthly Review Meetings for site level will happen & Highlights and low lights are discussed & Site Score card was generated,
- ➢ Over head gaps are discussed,
- ➢ Major En.Con projects Status was reviewed,
- ➢ Power & Coal consumption was reviewed and action plans were initiated

Few more implementations for site for improvement of productivity was inline, some of initiatives are mentioned below,

Names of Other Initiatives:

1) R&R Program(Rewards & Recognitions Programe)
2)GEMBA Walk
3)Shop floor visit & Observations sharing
4)Best KAIZEN
5) Energy conservation project awards

Monthly , Rewards & Recognition program was held to reward those employees who have shown excellence in below categories

1) Best Safety Block of the Month
2) Best LDM Block of the Month
3) Best Investigation for the Month
4) Best KAIZEN for the Month
5) Best Project of the Month
6) Best facility Maintenance for the Month
7) Best Block of the Month
8) Best KRA

In addition to this, Talent of Month (T.O.M) and Uttam Vyavhar Puraskar (U.V.P) Awards functions area being celebrated across site.

CSR Activities

1 Donated Sports Equipment to Z.P.H School

2 Street Lights installation work carried out-100No's

3 Financial supports for Sports Meet- High schools

4 Donated Tri Motor bikes to PwDs

5 Donated Transport vehicle to Eye Hospitals

6 Financial support for construction of schools

THANK YOU

Sr. No	Name	Designation	Mobile Number	Email address
01	MEERA SHARIF SHAIK	ASSOCIATE VICE PRESIDENT	8179541467	sm.sharif@apitoria.com
02	RAMA SESHU VARA PRASAD GEDALA	ASSISTANT GENERAL MANAGER	7730004755	grsv.prasad@apitoria.com
03	VENKATA S SIVA SEETHA RAMARAJU PUSAPATI	MANAGER	7997882165	VenkataSatyaSivaSeethaRamaRaju.Pusapati@apitoria.com
04	KISHORE KUMAR MUPPAM	DEPUTY MANAGER	9032127960	KishorKumar.Muppam@apitoria.com