25th National Award for Excellence in Energy Management

10-12 September 2024

Apitoria Pharma Private Limited

UNIT -1

S. No	Name	Designation	Mobile Number	Email address
1	B. Sree Rama Sarma	Deputy General manager - Engineering	9848604295	Sreeramasarma.bommaraju@apitoria.com
2	G. Umamaheswar	Asst. General Manager (Power plant)	7330784870	Umamaheswar.Gandla@apitoria.com
3	Abdul Rezwan	Senior Manager (TSD)	9394449090	abdul.rezwan@apitoria.com

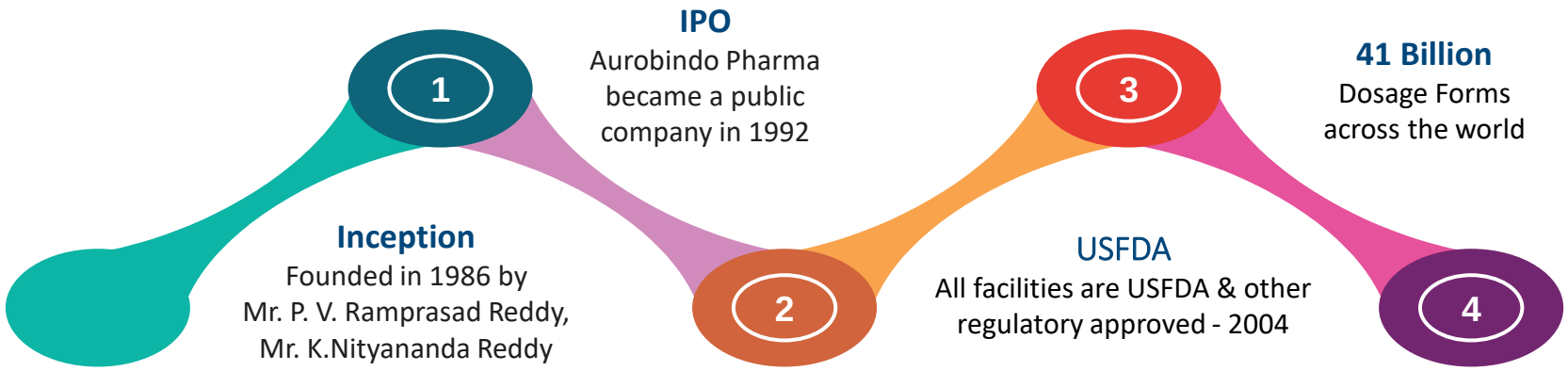
Brief Introduction on Company/Unit

₹ 29851 CR
Revenue

Employees 37k+

Market presence 150+

Mfg. Facilities 29



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

02 **43,071 MWh**
Solar Power Generation

03 **16%**
Reduction in carbon emissions from baseline year FY20 (Achieved more than 100% of 2025 target)

₹ 373 Million In CSR Spends

8.59 Lakh Beneficiaries

R&D Capabilities

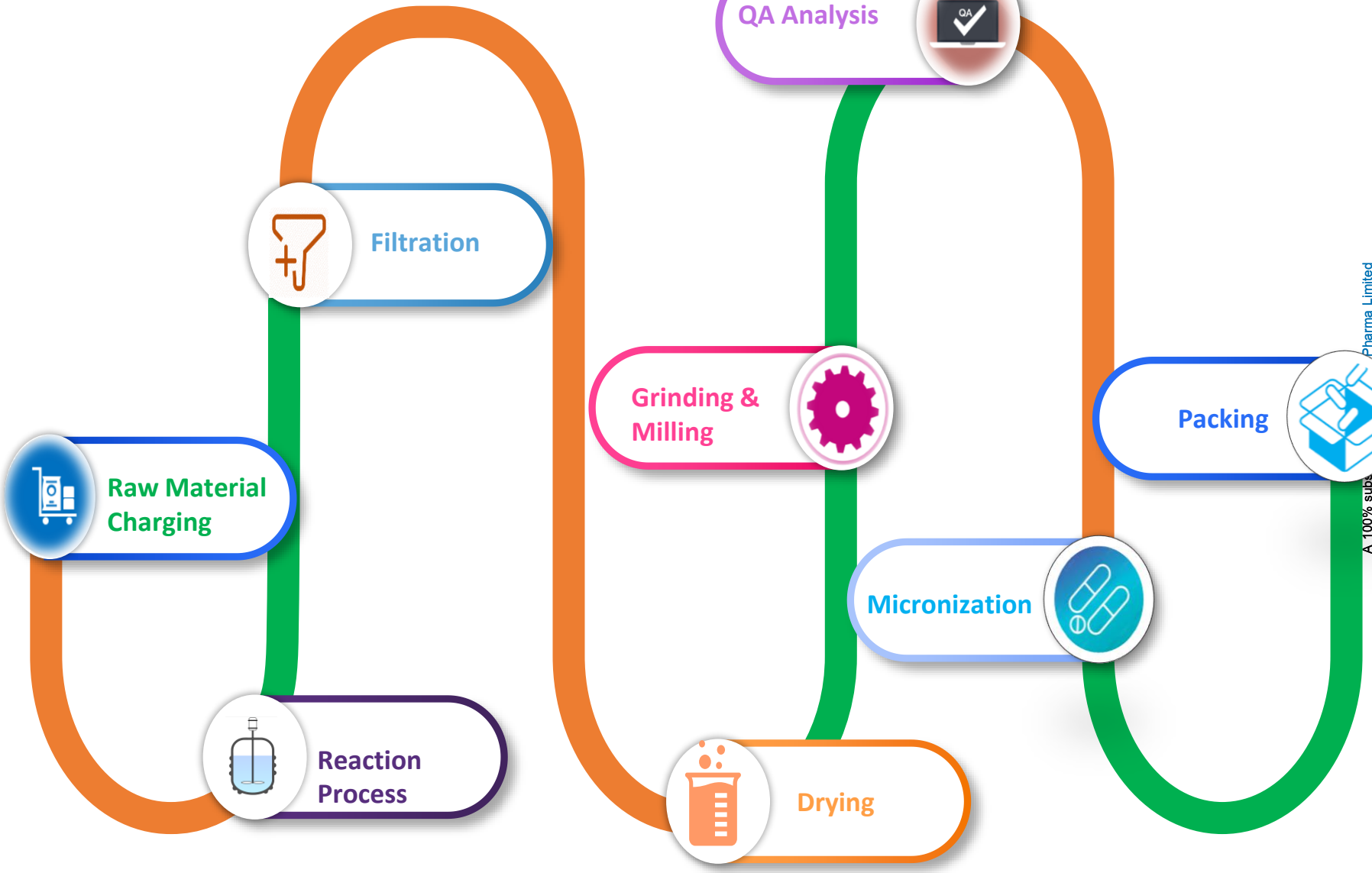
5 in India and 4 in the US
1,500+ Scientists and analysts globally

A 100% subsidiary of Aurobindo Pharma Limited

Details of the Products / Processes

- Metformin Hydrochloride
- Gabapentin
- Mirtazapine
- Cefuroxime &
- 25 other API Products.

Manufacturing products :



Facility & Major Equipment of Unit-I

Unit-I

Facility

Total Factory area	465105 m² (115 Acres.)	
Build up Area (m²)	252645	54%
Roads (m²)	65114	14%
Green Belt area (m²)	139531	30%
Open area (m²)	7815	2%

Process Equipment

- **Reactors : 315 No's**
- Centrifuges : 127 No's
- ANFD : 05 No's
- Lyophilizer : 02 No's

Utility Equipment

- FBC boiler : 35 & 27.5 TPH
- Air Compressors : 4592 CFM
- Chillers(+5°C) : 3927 TR
- Chillers (-20°C) : 1090 TR
- Chillers (-35°C) : 220 TR
- Chillers (-65°C) : 100 TR
- Cooling towers : 18475 TR

Electrical

- CMD : 9000 KVA
- Connected Load : 39080 HP
- Transformers :15 No's (65550KVA)
- DG system : 16 No's (16080KVA)
- Power plant :1No (4.0 MW)
- Solar plant :1No (1MW)

FDA

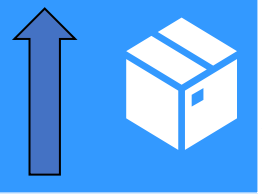
Energy Consumption Overview – Last 3 Years

PRODUCTION (MT)	
Year	Value (MT)
FY 2021-22	**2963**
FY 2022-23	**3427**
FY 2023-24	3485

OVERAL SPECIFIC ENERGY	
Year	Value (M kcal/MT)
FY 2021-22	79.85
FY 2022-23	**78.01**
FY 2023-24	70.03

Production

1.6 %



THERMAL ENERGY	
Year	Value (M kcal)
FY 2021-22	175824
FY 2022-23	206795
FY 2023-24	178070

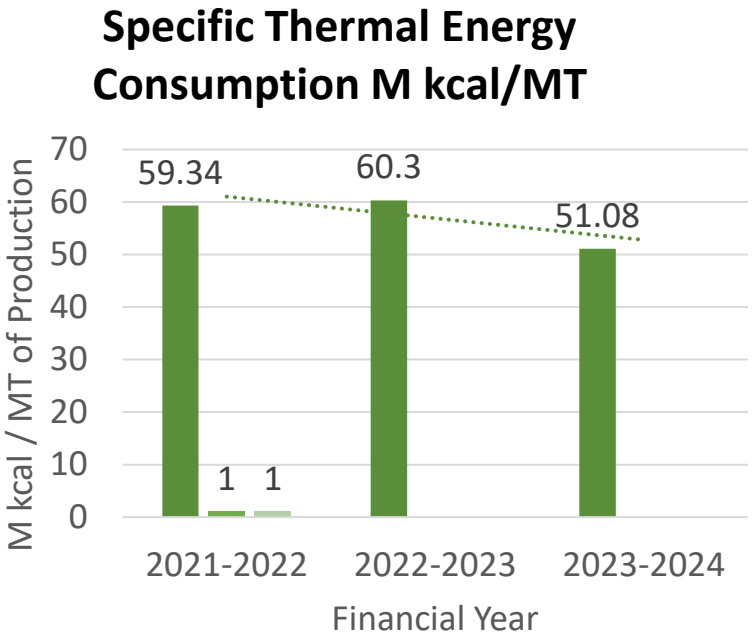
ELECTRICAL ENERGY	
Year	Value (M kWh)
FY 2021-22	71
FY 2022-23	70.48
FY 2023-24	77

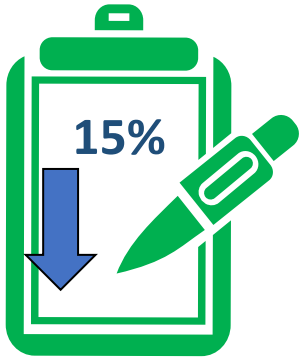
Specific Energy

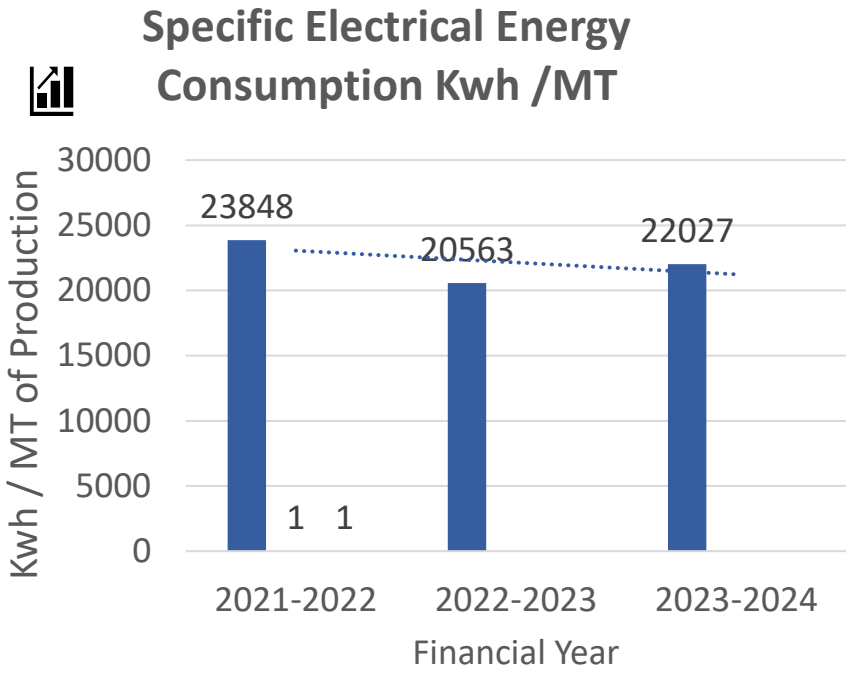
10.24%

Implementation of various energy conservation activities contributed reduction of 10.24% in overall SEC of the Plant.

Specific Energy Consumption Overview – Last 3 Years





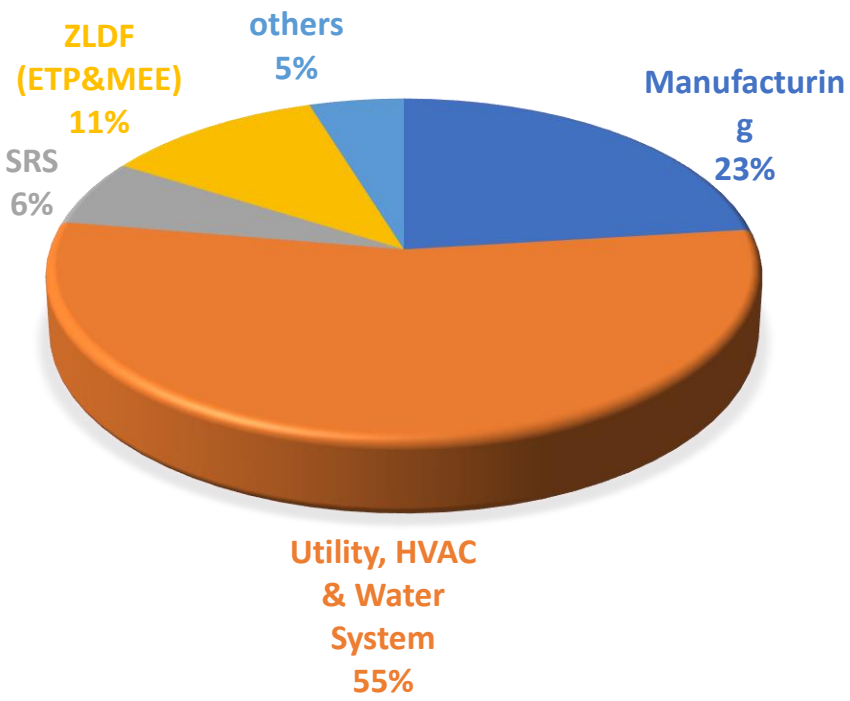


Implementation of Energy saving activities lead to decrease 15% Specific Thermal energy Consumption during FY 23-24.

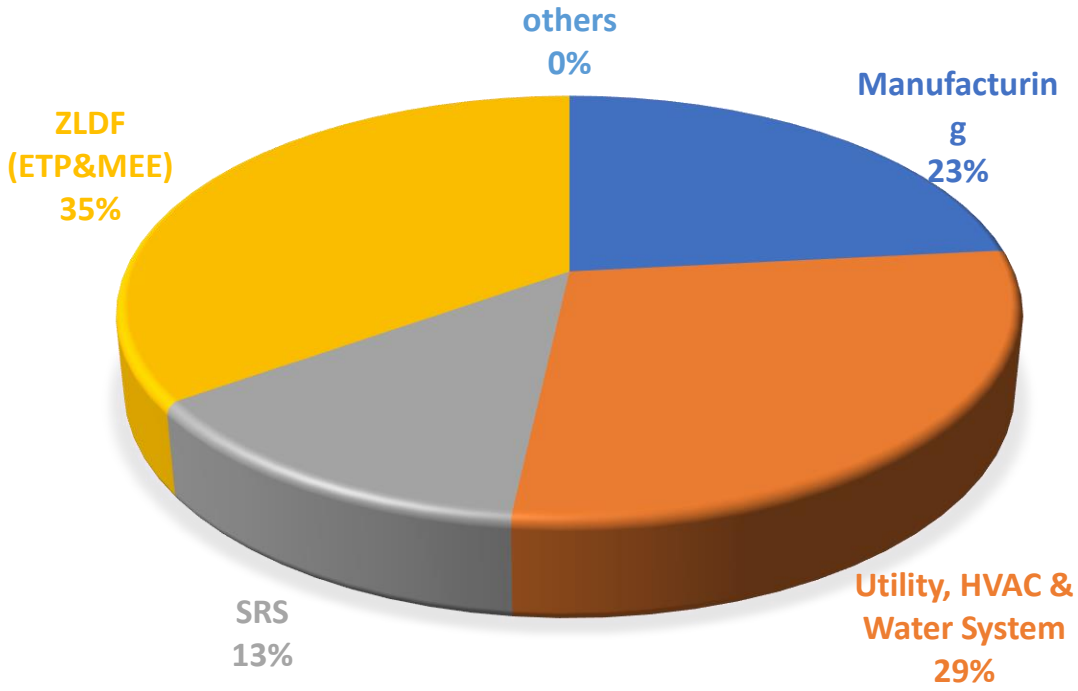
7% increase in Sp. electrical Energy in the FY 2023-24 was due to Liquid nitrogen replaced with mechanical chillers (-65^{0}C,100TR) and compressed air nitrogen plants(300NM^3 and 250NM^3 - 2Nos)

Energy Distribution – Electrical & Thermal

ELECTRICAL ENERGY DISTRIBUTION



THERMAL ENERGY (STEAM) DISTRIBUTION



Information on Internal benchmark - Utility

Refrigeration Plants :

Description	Design Temp (°C)	Design SEC (kW/TR)	Operating SEC (kW/TR)	Target SEC (kW/TR)
Reciprocating Chillers (Water Cooled)	5	0.86	0.90-0.96	0.87
	-20	1.59	1.65-1.72	1.6
	-35	1.95	2.25-2.64	2
	-65	4.4	4.4 - 4.7	4.4
Screw Chillers (Water Cooled)	5	0.63	0.68 – 0.82	0.65
Screw Chillers (Air Cooled)	5	1.2	1.4-1.5	1.3

Description	Design SEC (kW/CFM)	Operating SEC (kW/CFM)	Target SEC (kW/CFM)
Air Compressors	0.16	0.22-0.29	0.17

Description	Design Efficiency %	Operating Efficiency %	Target Efficiency %
Boiler	78	76.0-76.5	77.5

Major Encon Projects Planned in FY 2024-25

Vertical Inline Pumps Installation

Investment : ₹ 5.05 million
Savings : ₹ 2.43 million
Payback : 25 Months

E Glass Epoxy FRP Blades for Cooling Towers

Investment : ₹ 6.68 million
Savings : ₹ 3.55 million
Payback : 22.6 Months

SEPIS Technology arrangement for induction motor loads

Investment : ₹ 2.28 million
Savings : ₹ 0.96 million
Payback : 28 Months

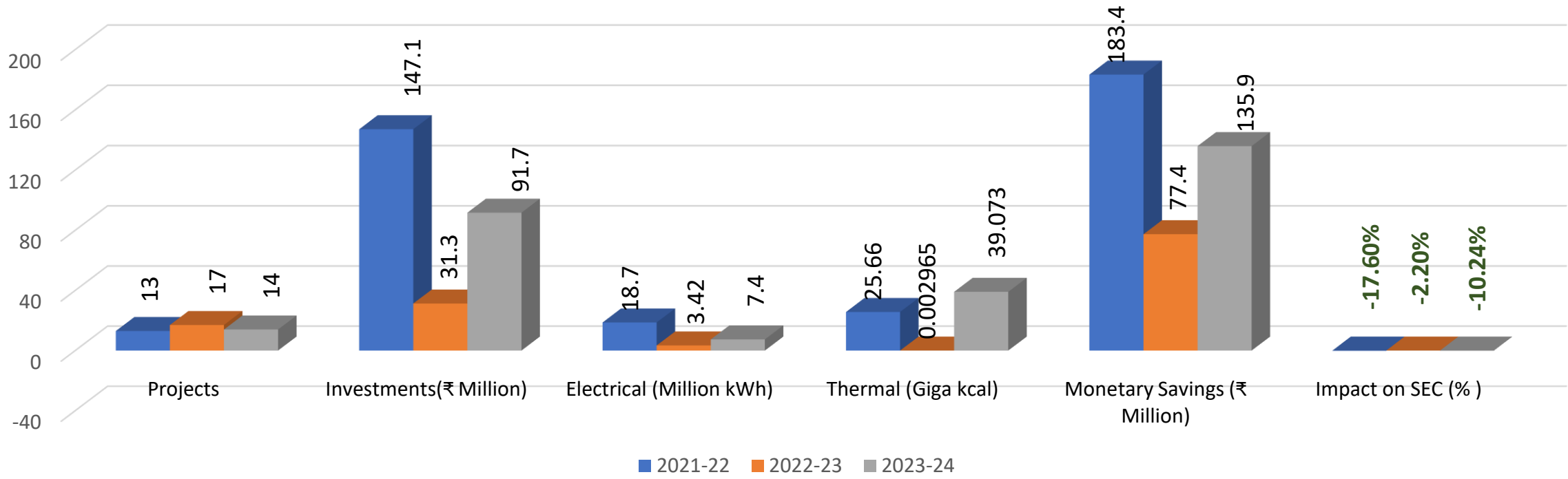
Variable frequency drives with pressure controllers for Utility pumps

Investment: ₹7.2million
Savings : ₹ 4.4 million
Payback : 19.3 Months

Encon Projects Planned in FY 2024-25

No	Title of Project	Annual Electrical Saving (Million kWh)	Annual Coal Saving (Tons)	Investment (Rs in Million)	Monetary Savings (Rs in Million)	ROI
1	Adiabatic Cooling(Pre-Cooler) for Air cooling chillers	0.2924		2.25	1.73	8.8
2	Axial Blowers Installation for AHU'S	0.1935		6.0	1.49	48
3	Vertical Inline Pumps Installation in Non Ceph Utility.	0.3149		5.05	2.43	25
4	Variable frequency drives with pressure controllers for Utility pumps	0.5766		7.2	4.44	19.3
5	Replacing cooling tower fans with Glass line FRP MOC in place of aluminum.	0.4607		6.68	3.55	22.6
6	SEPIS Technology to be provided to Y block RT pumps and Compressor motors	0.1247		2.28	0.96	28.5
7	VFDs installation for AHUs at Non ceph area	**0.1535**		0.6125	1.18	6.2
8						
	Total	2.1163		30.0725	15.78	158.4

Energy Saving projects implemented in last 3 Years



Year	Projects	Investments(₹ Million)	Electrical (Million kWh)	Thermal (Million kcal)	Monetary Savings (₹ Million)	Impact on SEC (%)
2021-22	13	147.1	18.7	25660	183.4	-17.60%
2022-23	17	31.3	3.42	2.965	77.4	-2.20%
2023-24	14	91.7	7.4	39073	135.9	-10.24%

Major Encon Projects Implemented –FY 23-24

S.No.	Name of Energy saving projects	Investments (INR Million)	Electrical savings (Million kWh)	Thermal savings (Million Kcal)	Total Savings (INR Million)	Payback period (months)
1	Flash Jet Pump Installation at MEE for Recovery of flash steam and diverting it to Stripper.	1.9	0.0	1039.3	4.3	5.2
2	Coal Saving by DM Water Temperature Increasing with GVC Heat Exchanger	2.0	0.0	819.1	3.2	7.2
3	Synchronization of all Nitrogen plants at Non ceph	1.6	0.3	0.0	2.4	7.8
4	Facility creation for DMAC recovery in Cefuroxime Axetil Crystalline.	27.3	0.1	253.8	31.2	10.5
5	GABA Existing process is converted to New CIP Process	53.4	5.4	11893.9	78.5	8.2
6	Boiler steam vent losses reduction	0.5	0.0	22079.1	2.9	2.1
7	Energy conservation ideas implemented which received from plant during energy conservation week	3.4	0.5	23.2	4.0	
8	Practices implemented to unnecessary running equipment's stopped, Chillers and Chiller circulation stopped after achieved temperature in CRT room(HVAC) – centralized chilled water lines	0.0	1.1	0.0	8.8	0.0
	Summary	89.9	7.4	36108.4	135.3	8.0

Major Encon Projects Implemented –FY 22-23

S.No.	Name of Energy saving projects	Investments (INR Million)	Electrical savings (Million kWh)	Thermal savings (Million Kcal)	Total Savings (INR Million)	Payback period (months)
1	Co gen steam turbine SSC(Specific steam consumption) decreased by arranging additional steam line to MEE ATFD.	2.0	0.0	2965	9.75	0.1
2	Improving the operational efficiency of refrigeration plants by Descaling, refrigerant charging & pipeline modifications (7 Nos)	0.1	0.912	0.0	7.03	0.2
3	Condensate water increased from 60 to 65% by providing accurate conductivity sensors	0.2	0.0	0.49	0.38	0.1
4	Reciprocating Refrigeration system replaced by Scroll compressor type refrigeration system with software upgradation to Lyophilizer in K Block	4.43	0.19	0	1.45	36
5	'increasing Capacity of 140TR(+5) chilling plant utilization by increasing compressor rpm from 550 to 785 .In this results, 200TR chilling plant running hours Decreased as both are in single loop.	0.25	0.34	0	0.37	1.0
6	Improving the CMU011 brine plant condenser heat exchanging capacity by modification of existed cooling tower lines for this Discharge pressure decreased	0.15	0.15	0	0.28	8.4

Major Encon Projects Implemented – FY 23-24

Interconnecting of Nitrogen lines (synchronization).

- Synchronization of all Nitrogen plants (250NM3/hr-2nos,125NM3/hr, 60NM3/hr and 50NM3/hr) and Leak detection provided to centrifuge during N2 Blanketing for controlling unnecessary venting to atmosphere at L&M block Blocks. In this results 60NM3/hr and 50NM3/hr N2 plant completely stopped.

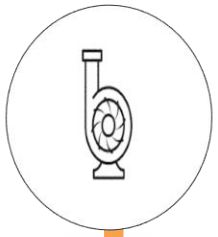
- Electrical saving : 0.3132 millions Kwh
- Investment : ₹ 1.6 millions
- Payback : 7.8 Months

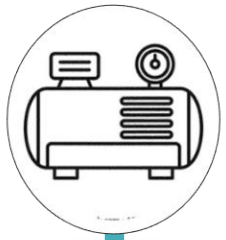
Boiler steam vent losses reduction

- we segregated noncritical electrical loads for frequent change over facility with minimum Load (50 KW, 6nos) and we are operating these Noncritical loads very frequently. so as to match Electrical Loads and Plant steam Consumption there by we achieved savings by preventing steam venting to atmosphere. Earlier we don't have change overs with minimum KW.

- Thermal savings : 22079million Kcal.
- Investment : ₹ 0.5 millions
- Payback : 2.1 Months

Encon Projects – Medium / Low Investment - FY 23-24





01 Pumps

- Impeller Trimming
- VFD with PID
- Auto Level Cutoff
- Swapping of pumps

02 Chillers

- Shifting of load from low efficient chillers to highly efficient Chillers.
- Regular assessments and monitoring & replacements

03 Air Compressors

- No Air Loss Drain Valves
- Reducing the Pressure Settings
- Arresting Air Leakages
- Centralized air implemented

04 Steam

- Steam Line Trap Survey for finding defective traps.
- Arresting the steam line leakages on time.

Innovative Project -1 : Gabapentin CIP Process

Existing process:

40 Kl water is used for adsorption & regeneration of dissolved inorganic salts from product in adsorption column per batch .

Highly energy driven : 10 Kl per batch and 30-40 Kl per day water distillation in process.

30 KL LTDS generated per batch & 90 -120 KL to be treated in ETP for re usage.

CIP process & Innovation :

Elimination of adsorption process.

Usage of Crystallization technique to remove dissolved inorganic salts.

Elimination of water distillation & water usage for regeneration.

Usage of ANFD for elimination of product exposure by capex investment of 50.34 Million INR.

5 reactors , 1 distillation column, 4 evaporators(FCE), 3 vacuum tray dryers, 2 centrifuges are free for other products

Impact Created.

Effluent reduction of 120 KL per day (40 MT/month manufacturing).

Energy Reduction:

Elimination of water distillation 10 Kl per batch leading to energy savings of 54,00,000 Kcal/ Batch & Effluent reduction :40 Kl per batch

Summary: 11893 million Kcal per Anum. With annual thermal savings of 36.88 Million INR.

Savings in reduction of running Hrs of reactors & MEE plant.

leading to Power savings.

Summary: Annual power savings of 5.4 million KWH and a annual cost savings of 41.61 million INR.

Innovative Project -2

DM Water temperature increase by GVC Heat Exchanger in Cogen.

Back Pressure Turbine

Gland Steam need to extract from Back pressure turbine in Cogen Plant

Present System

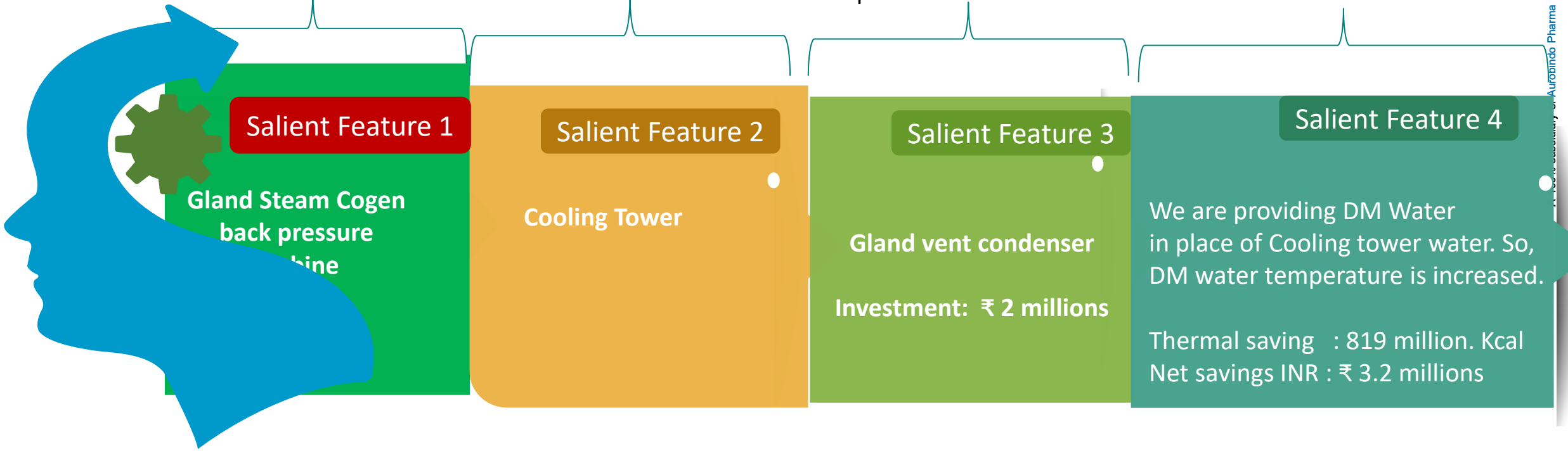
To condense the extracted steam from Turbine Cooling tower Water Is provided.

GVC Heat Exchanger

Extracted Gland steam need to condense in Gland Steam Condenser for Energy Saving Purpose.

CT Water replaced by DM Water

Then we can increase the DM Water temperature which we are sending to Boiler.(For 10 Kl of Water Delta T increased =60˚c.



Innovative Project -3

Flash Steam Recovery in MEE ATFD

Utilization of Utilization of Flash steam at ATFD.

Savings : ₹ 4.3 Millions
Thermal saving : 1039 Million K.cal

Feasibility

Survey on available technologies

Proceed

Investment : ₹ 1.9 Millions

Results

Benefits :

- Flash Steam can be recovered
- Condensate temperature can be increased
- Stripper Steam Consumption can be decreased.
- Power required by pump can be eliminated.

Renewable energy: 1 MW Captive Solar PV Power Plant (In process)

Installation of 1 MW Solar Power Plant – Completed on July'24

Technology (electrical)	Type of Energy	Onsite/Offsite	Installed Capacity (MW)	Generation (kWh)	% of overall electrical energy
Solar PV	Solar	On Site	1	**1620000**	2.1

16.2
Lakh Units/Year

SAVINGS: ₹ 1.1 *Crore/Y*

INVESTMENT: ₹ 5.1 *Crore*

ROI YEARS
4.5

Renewable Energy

20% Replacing coal with Rice Husk in 35 TPH Boiler

Investment INR : 2.0 Millions
Savings INR : 9.75 Millions,
Renewable thermal saving : 2965 million K.cal

Utilization of Renewable Energy Resource.

Feasibility

Survey on available technologies

Trial and implemented

Initially Boiler trail taken with 10% Rice Husk and continue with 20%.

Results

Benefits :

- Consuming Renewable Energy
- Reduction of CO2 Emissions and SO2 Emissions into atmosphere.
- Reduced Dependency on Fossil Fuel.

Potential : Eco Friendly Fuel

2 MW Captive Solar PV Power Plant (Future Scope)

Installation of 2 MW Solar Power Plant

Technology (electrical)	Type of Energy	Onsite/Offsite	Installed Capacity (MW)	Generation (kWh)	% of overall electrical energy
Solar PV	Solar	On Site	2	**3240000**	**4.2**

32.4
Lakh Units/Year

SAVINGS: ₹ 2.2 *Crore/Y*

INVESTMENT: ₹ 10.2 *Crore*

ROI YEARS
4.5

Sustainability / GHG Inventorisation

01 Sustainability Report

2023-24

Published Integrated Annual Report for FY 2023-24

02 Goals & Targets -2025

2025

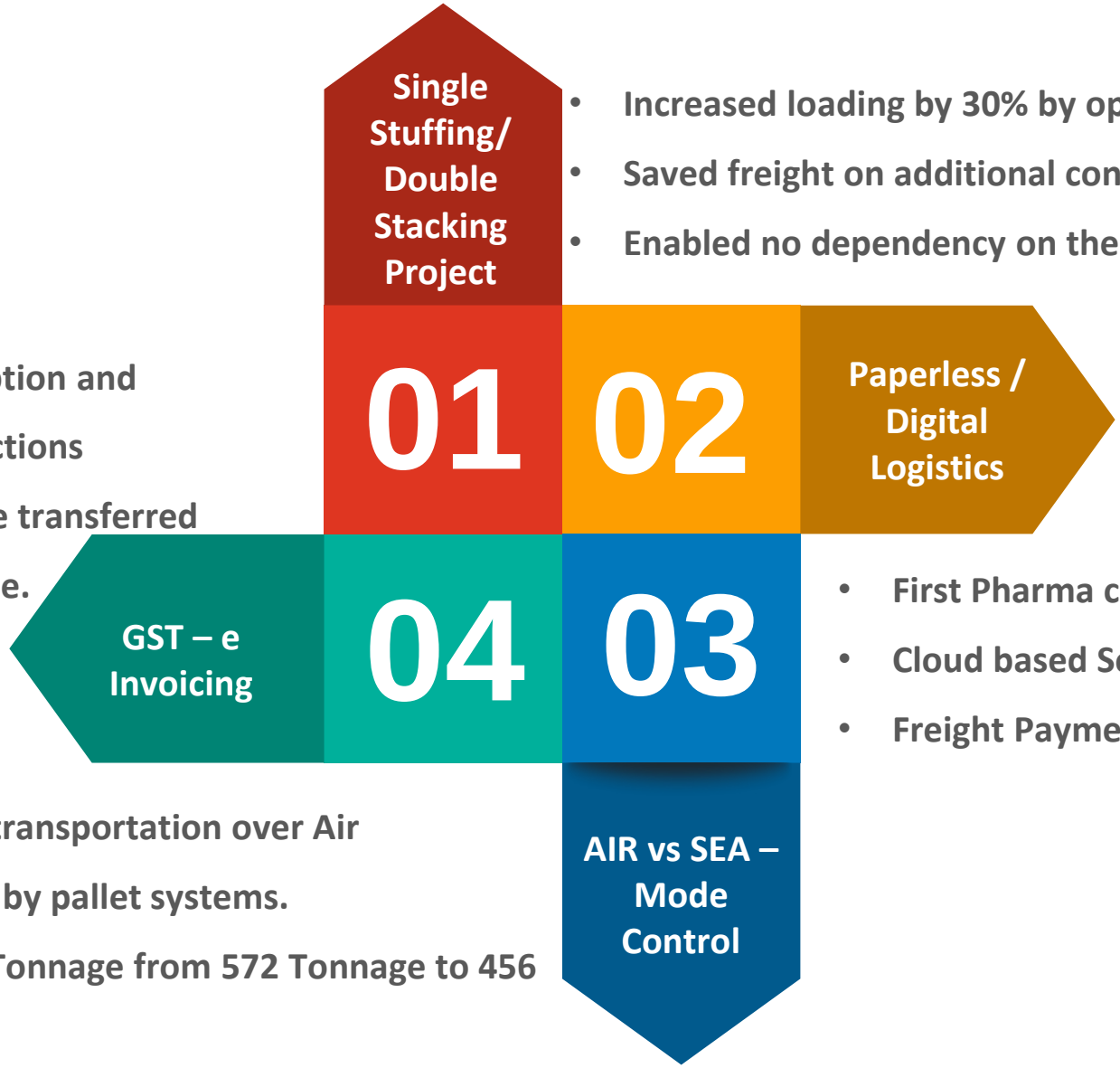
- 20% Renewable Energy Share (Power to Power)
- 12.5 % Reduction in Emissions
- 35% water conservation / restoration
- 60% coprocessing of hazardous waste
- 100% reuse & recycling nonhazardous waste
- 25% hours of learning per employee

03 GHG Emissions

FY 2020- 24

FY	Total Scope 1 emissions (tCO2e)	Total Scope 2 Emissions (tCO2)	Total GHG Emissions (tCO2e)
2021-22	61,090	62,520	1,23,610
2022-23	97,184	42,374	1,39,558
2023-24	80,608	42,681	1,23,289

Green Supply Chain Management



- Increased loading by 30% by optimizing with shipper stuffing,
- Saved freight on additional container with 50% extra space
- Enabled no dependency on the wooden pallets.

- Decreased Paper consumption and paper less / Digital transactions
- Invoice information will be transferred from the portal in real-time.

- First Pharma company in India to adopt OTM.
- Cloud based Solution
- Freight Payments linked from OTM to ERP.

- Increased Sea transportation over Air transportation by pallet systems.
- Decreased air Tonnage from 572 Tonnage to 456 Tonnage

Waste utilization and management

Waste Management

Value

Waste having heat value(FY 23-24, **4528 MT)**

Mixed spent carbon, Lq. Organic waste

Used filter pads Thermo coal

CONTINUE

Co-fuel for cement units

Value

Recycling

(FY 23-24, 12.8 MT)

Value

Used oil
LED bulbs
Batteries

Value

Power cables, Wires, Contactors, Relays

CONTINUE

Through authorized scrap agencies

Value

Land filling/ Incineration

(FY 23-24, 4471 MT)

Value

Evaporation Salt
ETP Sludge

Value

Bio-medical waste

CONTINUE

Through authorized agency

END (Incineration)

Energy Management System

• Policy & Manual • Approval & Budget Sanctions & Allocation of all required resources	Senior Management
• New and Innovative Energy Conservation Ideas • Energy Assessments , Review and Submissions to Senior Management	Sr GM (Corporate Engineering)
• Monitoring & Corrective actions. • Coordinating with all stake Holders for Implementation.	Energy Cell (Corporate)
• Organizing shop floor meetings to Implementation of ideas. • Evaluate ideas for implications and possible returns & ROI , Nominating the idea for appreciation	Engineering Head (Unit wise)
• Attending meeting called by Core team fortnightly • Decision making on the energy saving ideas generated to take up/dropped. • Ground level implementation of energy conservation proposals	Energy Team - PoC (Unit Wise)

Plant Side Energy Management System

Plant Energy Committees formed

Site Apex Committee

1	Operations Head
2	Manufacturing Head-NC
3	Manufacturing Head-Ceph
4	Engineering Head

Energy Conservation Core team

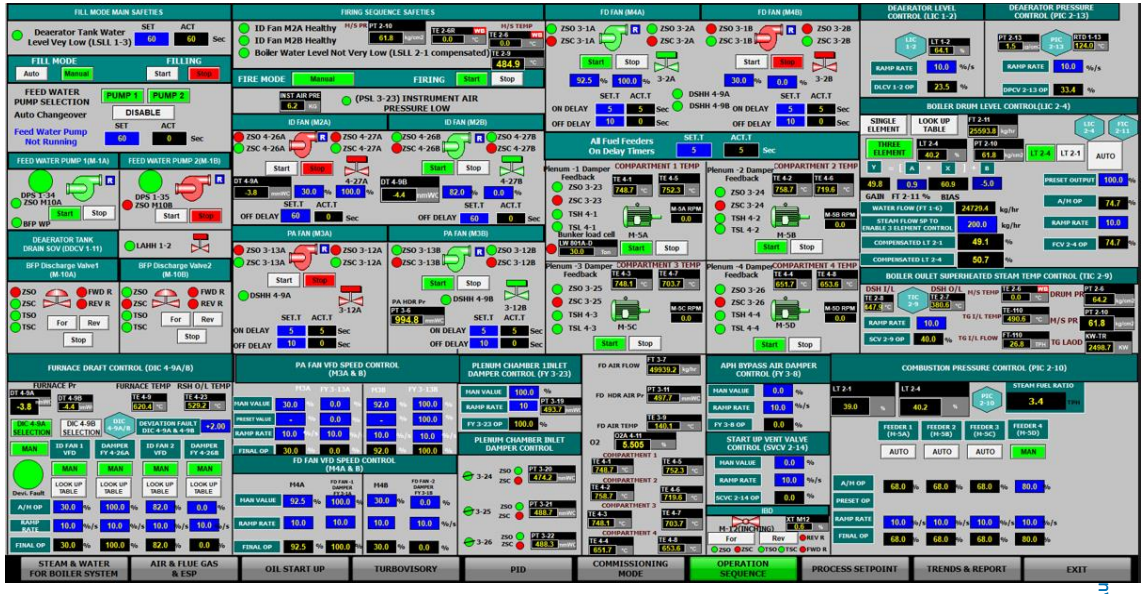
1	DGM, Engineering and utility
2	AGM, TSD
3	AGM, power plant.
4	Sr. Manager, Engineering
5	AGM – Production.
6	Manager– Electrical maintenance
7	Sr. Manager – Utilities

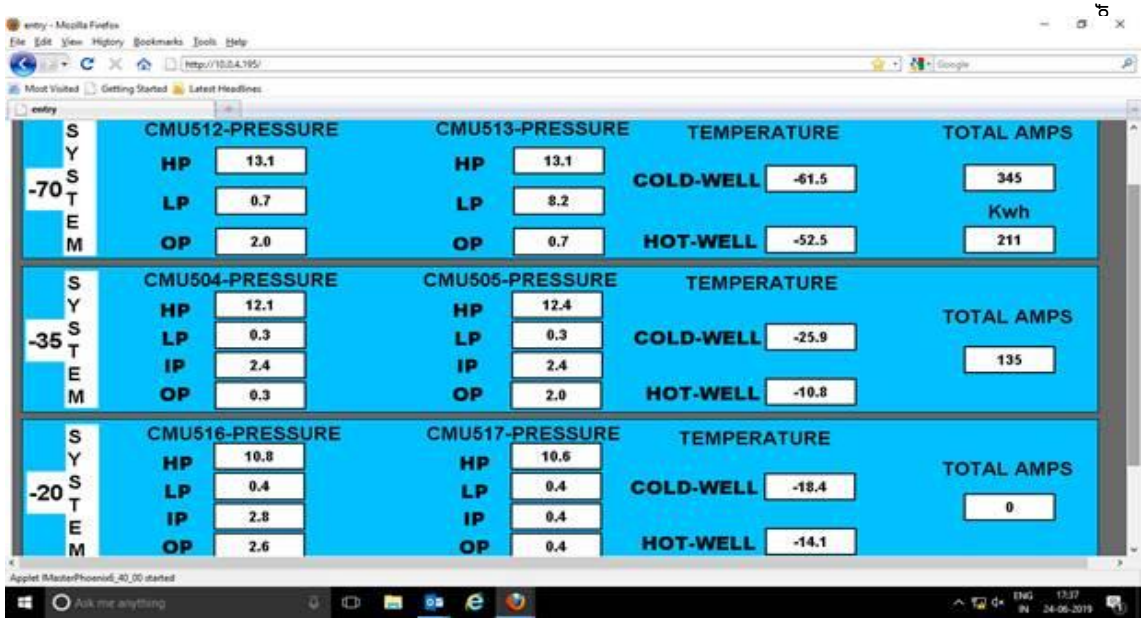
Responsibilities

- Organizing shop floor meetings to generate ideas
- Implementation of idea through respective departments
- Evaluating the returns after implementation
- Monitoring the return for 3 months
- Nominating the idea for appreciation

Daily Monitoring & Reporting System

- Co-gen being operated a max capacity utilization based on steam demand.
- Introduced LDM in which benchmarks for each block power consumption established and being tracked on daily basis .
- Specific energy consumption of all Utility equipment being routinely monitored and reviewed on monthly basis.
- Water conservation and monitoring. All streams of water are studied and recycled. Purified Water RO reject are used for Cooling Tower make up.





Learnings from CII - last 4 Years

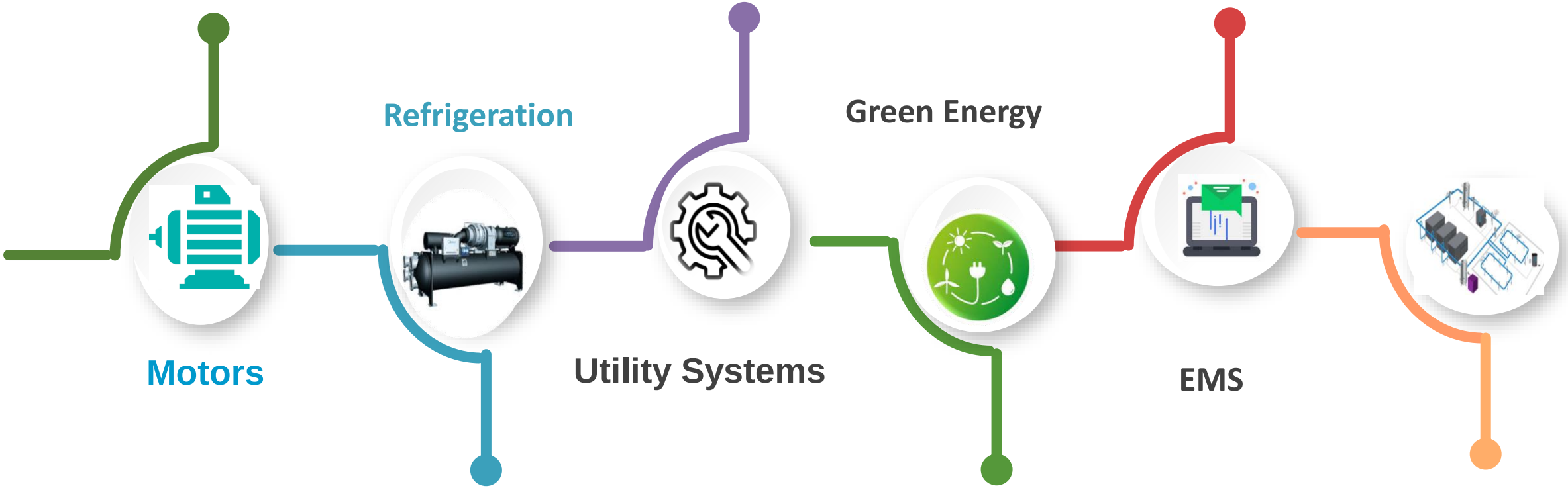
Energy efficient motors
Replaced motors of Boiler blowers, utility motors with energy efficient motors

Air Compressors
Installed No Air Loss Drain (NAD) valves form M/s Godrej

Online Monitoring

Refrigeration

Green Energy



Motors

Utility Systems

EMS

Chillers
Phased manner replacement of Chillers with Energy Efficient Chillers, chilled water plants centralized

Renewable Energy
Installed 43 MW Group Captive Solar Plant near Pydibhimavaram, AP. Rice husk usage as a fuel in Boiler and 1MW installation at In -site

Energy Savings in Compressed air & Nitrogen
Implemented the central controller for better pressure regulation.

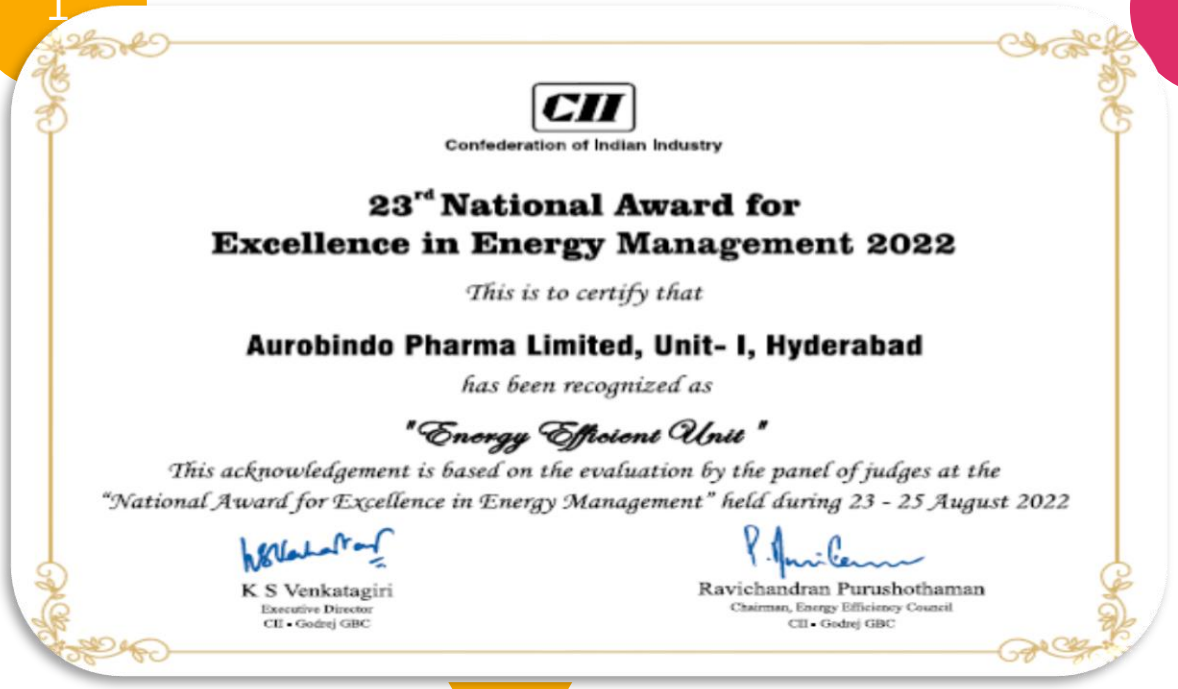
Net Zero Commitment -2024

Pillar	Goals -2025	Progress made so far (Base on FY2020)	Status
Renewable Energy (power to Power)	20%	14%	InProgress
Reduction in carbon footprints (as per SBTi – WB2C)	12.5%	17%	Achieved
Towards water neutrality	35%	38%	Achieved
Co-processing of Hazardous waste	60%	62%	Achieved
Re use or Recycle of Non-Hazardous waste	100%	100%	Achieved

Awards & Recognitions - CII

Energy Efficient Unit – Consistent in the same category in the last 04 Years

1



Confederation of Indian Industry

23rd National Award for Excellence in Energy Management 2022

This is to certify that

Aurobindo Pharma Limited, Unit- I, Hyderabad

has been recognized as

"Energy Efficient Unit"

This acknowledgement is based on the evaluation by the panel of judges at the "National Award for Excellence in Energy Management" held during 23 - 25 August 2022

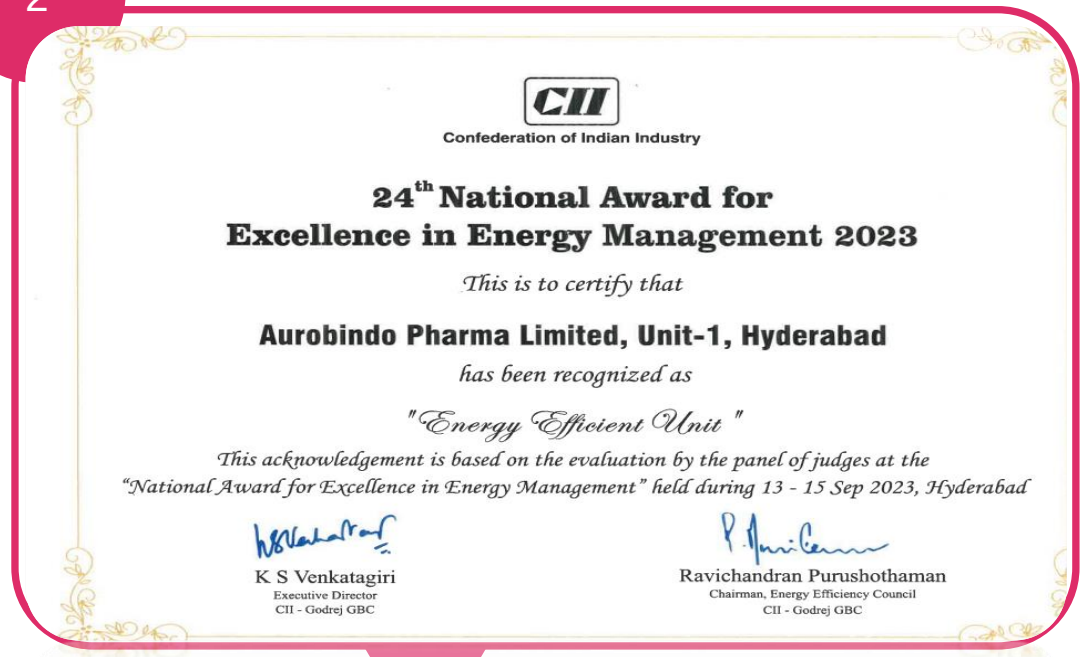
K S Venkatagiri
Executive Director
CII - Godrej GBC

Ravichandran Purushothaman
Chairman, Energy Efficiency Council
CII - Godrej GBC

CII Energy award

Certification of 23rd
National award for Energy efficient unit 2022.

2



Confederation of Indian Industry

24th National Award for Excellence in Energy Management 2023

This is to certify that

Aurobindo Pharma Limited, Unit-1, Hyderabad

has been recognized as

"Energy Efficient Unit"

This acknowledgement is based on the evaluation by the panel of judges at the "National Award for Excellence in Energy Management" held during 13 - 15 Sep 2023, Hyderabad

K S Venkatagiri
Executive Director
CII - Godrej GBC

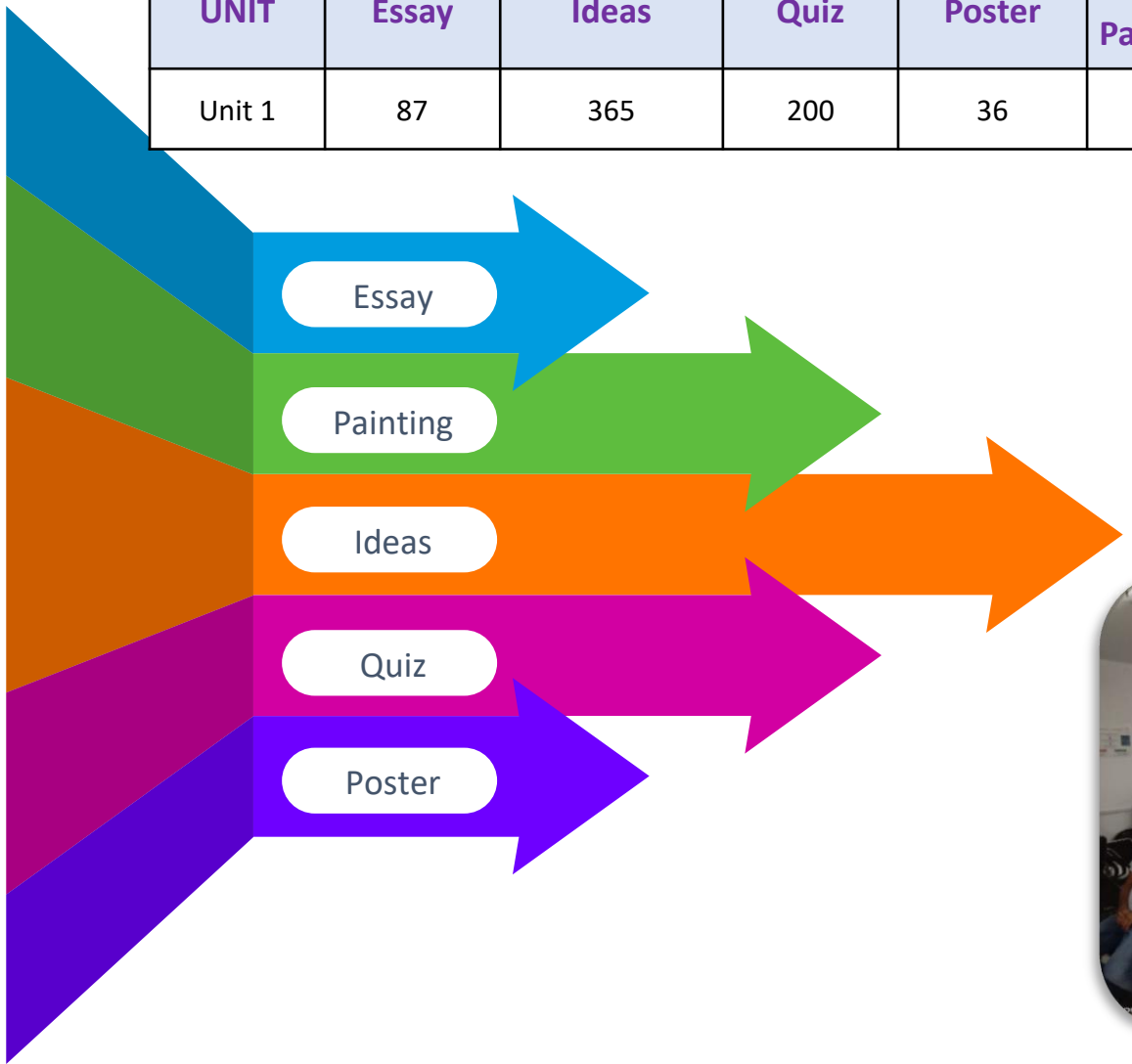
Ravichandran Purushothaman
Chairman, Energy Efficiency Council
CII - Godrej GBC

CII Energy Award

Certification of 24th
National award for Energy efficient unit 2023.

Energy Week / Energy Conservation Day Celebrations

ENERGY CONSERVATION WEEK CELEBRATIONS					
UNIT	Essay	Ideas	Quiz	Poster	Total Participants
Unit 1	87	365	200	36	688



Awareness

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

Winner

Awarded Most No of Energy Conservation Ideas Implemented Unit from Corporate Energy cell and L&D tea

Teamwork, Employee Involvement & Monitoring

Teamwork

- Block level teams responsible for Energy monitored on KPI.
- Awards & appreciations for best programs.
- Implementing 5S programmes by the same teams

Employee Involvement

- Organized Energy Conservation Week Celebrations.
- Involved all department employees in the event.
- Energy KPI review

Training Programmes

- Given training programmes on Root cause analysis (RCA), 5S, Good Engineering Practices
- Training on steam / utility systems

Monitoring

- Daily / weekly monitoring of Energy Consumption areas / major equipment.
- Review of KPIs, Performances in the presence of plant heads.

Awards & Recognitions

1

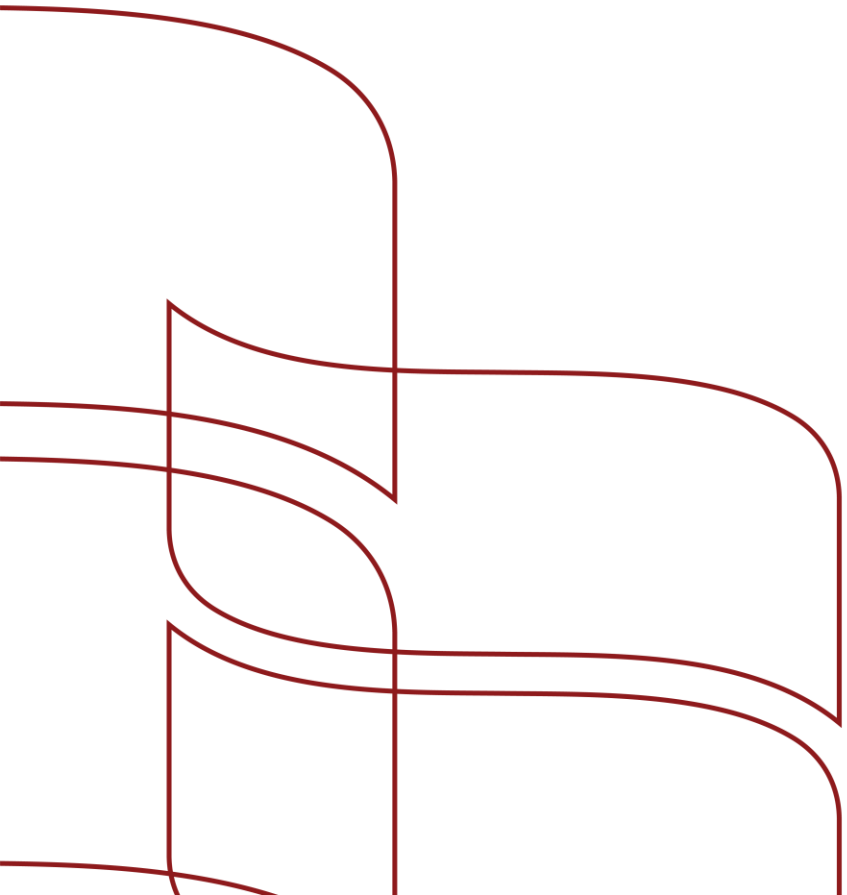
Operational Excellence

Certification of Lean Six Sigma Green Belt in MERAKI Batch-2 in the year 2024 in the Aurobindo group of companies.

2

Human Resources & L &D

L&D Excellence ” and “Best L&D Team ” in 12th Edition Learning and development Summit & Awards 2023.



Thank You.....

A 100% subsidiary of Aurobindo Pharma Limited

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