24th National Award for 2023

Excellence in Energy Management

13-15 September 2023

# AUROBINDO PHARMA LIMITED

## Unit - 01

## HYDERABAD

| Sr. No | Name | Designation | Mobile Number | Email address |
|---|---|---|---|---|
| 1 | M Siva Satya Srinivas | Senior General Manager (H O D Engineering) | 8008558193 | SivaSatyaSrinivas.Mandru@aurobindo.com |
| 2 | B Sree Rama Sarma | Asst. General Manager (Electrical) | 9848604295 | Sreeramasarma.bommaraju@aurobindo.com |
| 3 | G Umamaheswar | Senior Manager (Power Plant) | 7330784870 | Umamaheswar.Gandla@aurobindo.com |

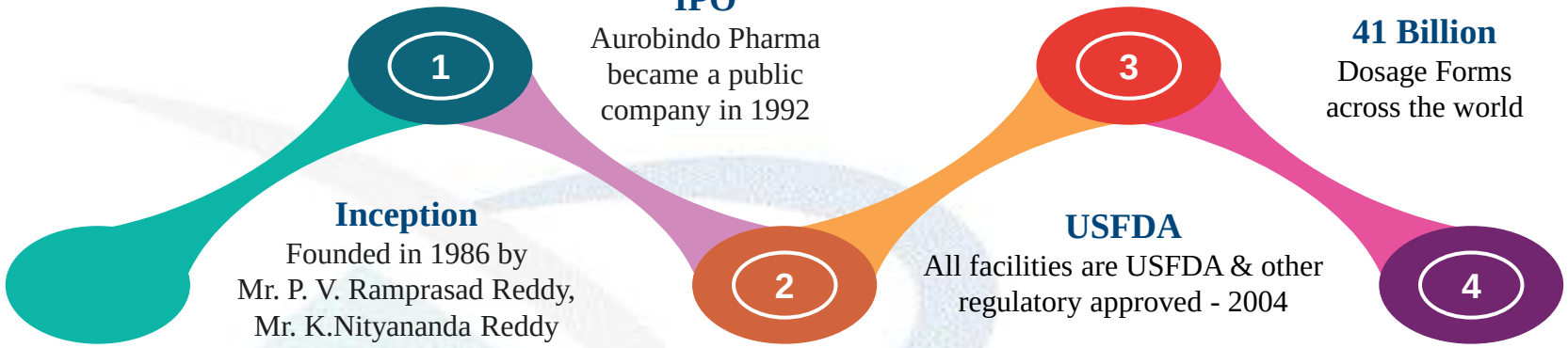
# Brief Introduction on Company/Unit

₹ 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

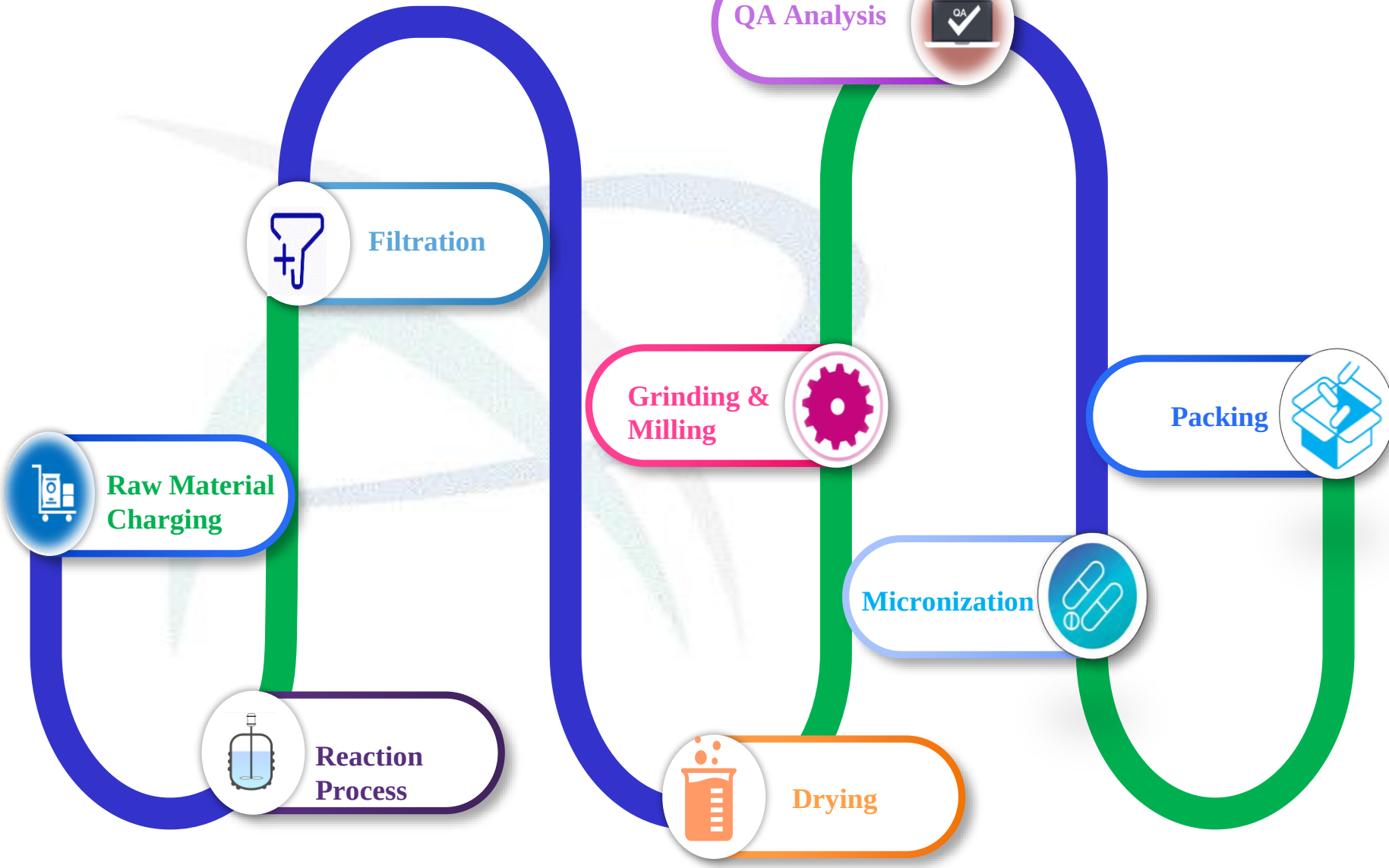
**R&D Capabilities**

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

# Details of the Products / Processes

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

**Manufacturing products :**



# Facility & Major Equipment of Unit-I

AUROBINDO

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 TPH Co-Gen & 27.5 TPH (1W+1S)
- 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 : 10500 KVA
- Connected Load : 39080 HP
- Transformers :15 No's (65550KVA )
- DG system : 16 No's ( 16080KVA)

# Energy Consumption Overview – Last 3 Years

| PRODUCTION ( MT ) | |
|---|---|
| Year | Value ( MT ) |
| FY 2020-21 | 3601 |
| FY 2021-22 | 2963 |
| FY 2022-23 | 3427 |

| OVERAL SPECIFIC ENERGY | |
|---|---|
| Year | Value ( M kcal/MT ) |
| FY 2020-21 | 59.1 |
| FY 2021-22 | 79.85 |
| FY 2022-23 | 78.01 |

Production

15.65 %

| THERMAL ENERGY | |
|---|---|
| Year | Value ( M kcal ) |
| FY 2020-21 | 148860 |
| FY 2021-22 | 175824 |
| FY 2022-23 | 206795 |

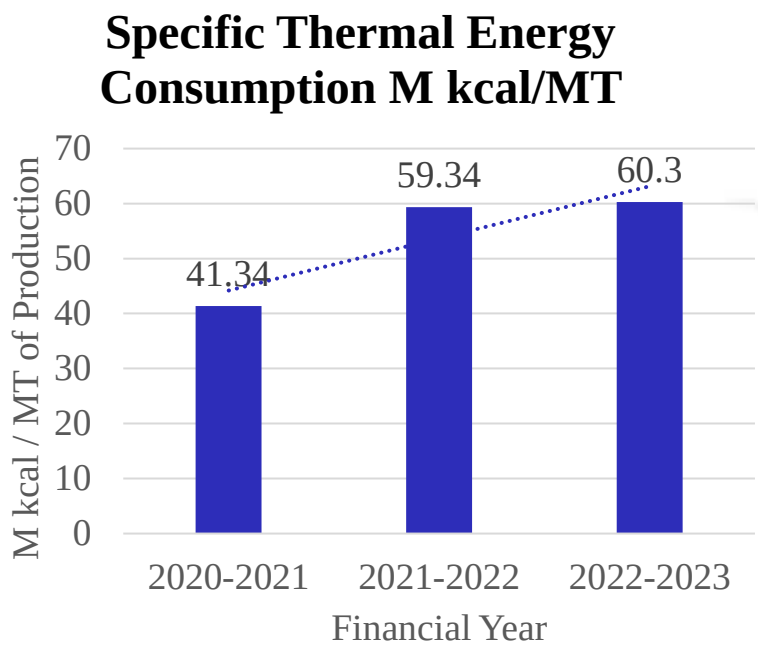
| ELECTRICAL ENERGY | |
|---|---|
| Year | Value (M kWh ) |
| FY 2020-21 | 74 |
| FY 2021-22 | 71 |
| FY 2022-23 | 70.48 |

Specific Energy

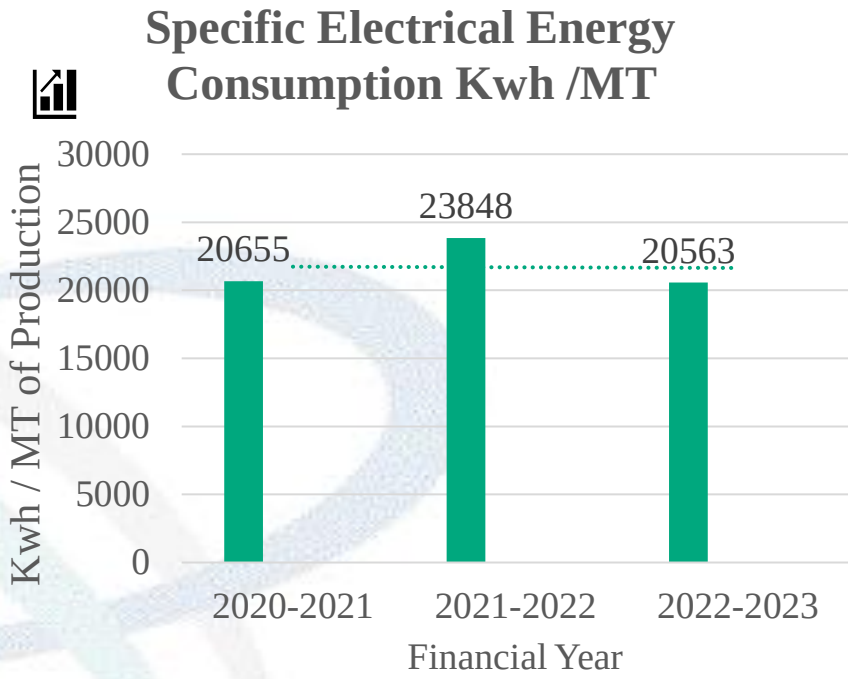
2.36%

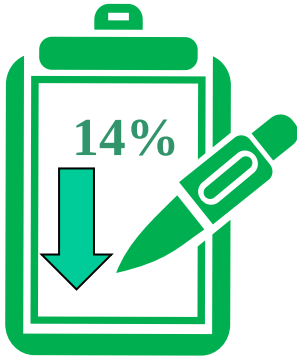
Implementation of various energy conservation activities contributed reduction of 2.36% in overall SEC of the Plant.

# Specific Energy Consumption Overview – Last 3 Years





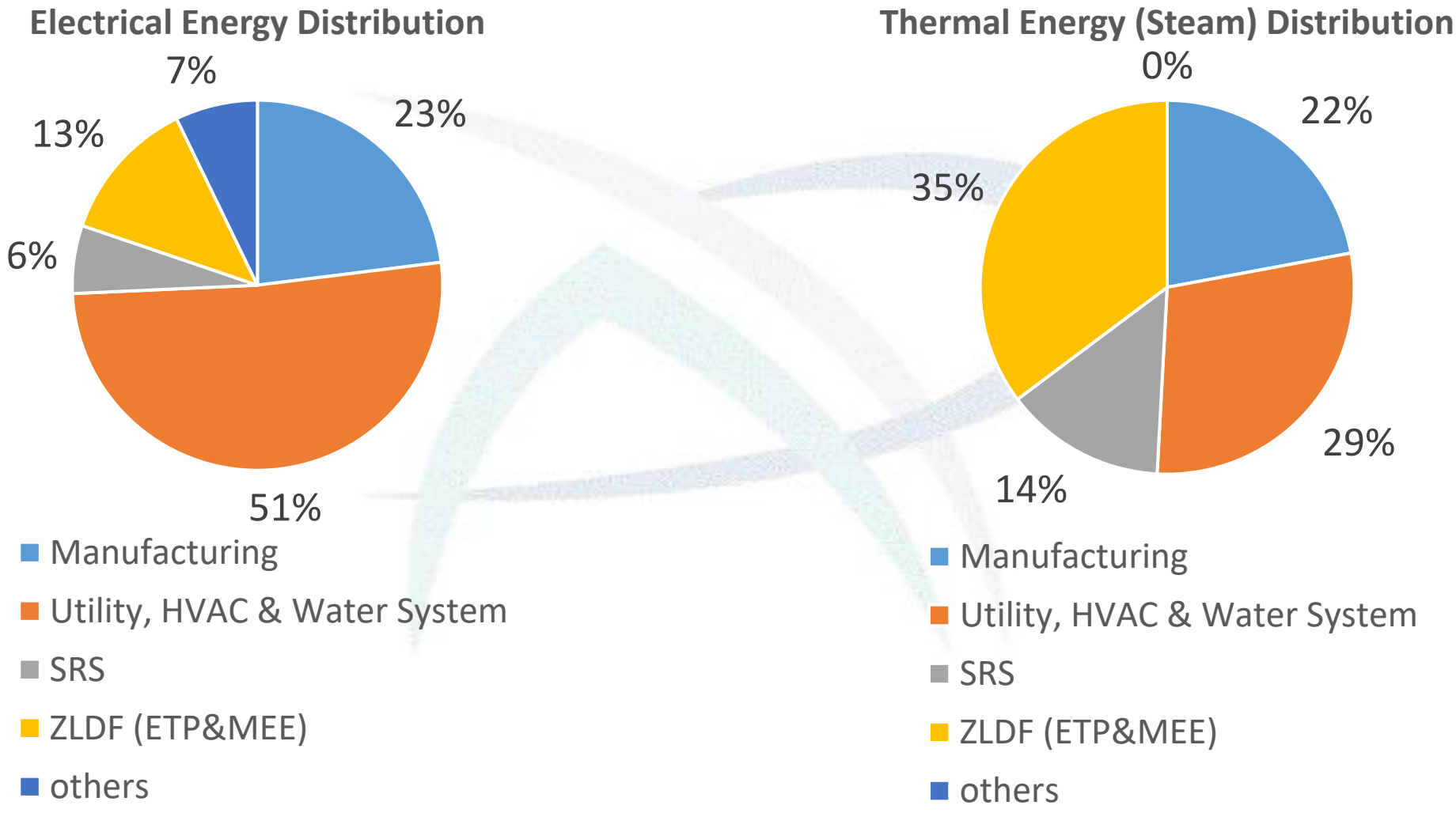



Implementation of Energy saving activities lead to decrease 14% Specific Electrical energy Consumption during FY 22-23.

1% increase in Sp. Thermal Energy in the FY 2022-23 was due to installation of VAMs replacing energy intensive reciprocating Chillers

# Energy Distribution – Electrical & Thermal



# Information on 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) | 5 | 0.86 | 0.91-1.1 | 0.87 |
| | -20 | 1.59 | 1.65-1.72 | 1.6 |
| | -35 | 1.95 | 2.52-2.71 | 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 2023-24

MEE Feed water temperature increase by Additional ATFD Condenser

Investment : ₹ 1 million
Savings : ₹ 10 million
Payback : 2 Months

**E Glass Epoxy FRP Blades for Cooling Towers**

Investment : ₹ 6.68 million
Savings : ₹ 6.4 million
Payback : 12.5 Months

**Flash Steam Recovery by Installing Flash Jet Pump**

Investment : ₹ 1.23 million
Savings : ₹ 2.7 million
Payback : 5.5 Months

**100% Rice Husk Conversion Cogen 35 TPH Boiler**

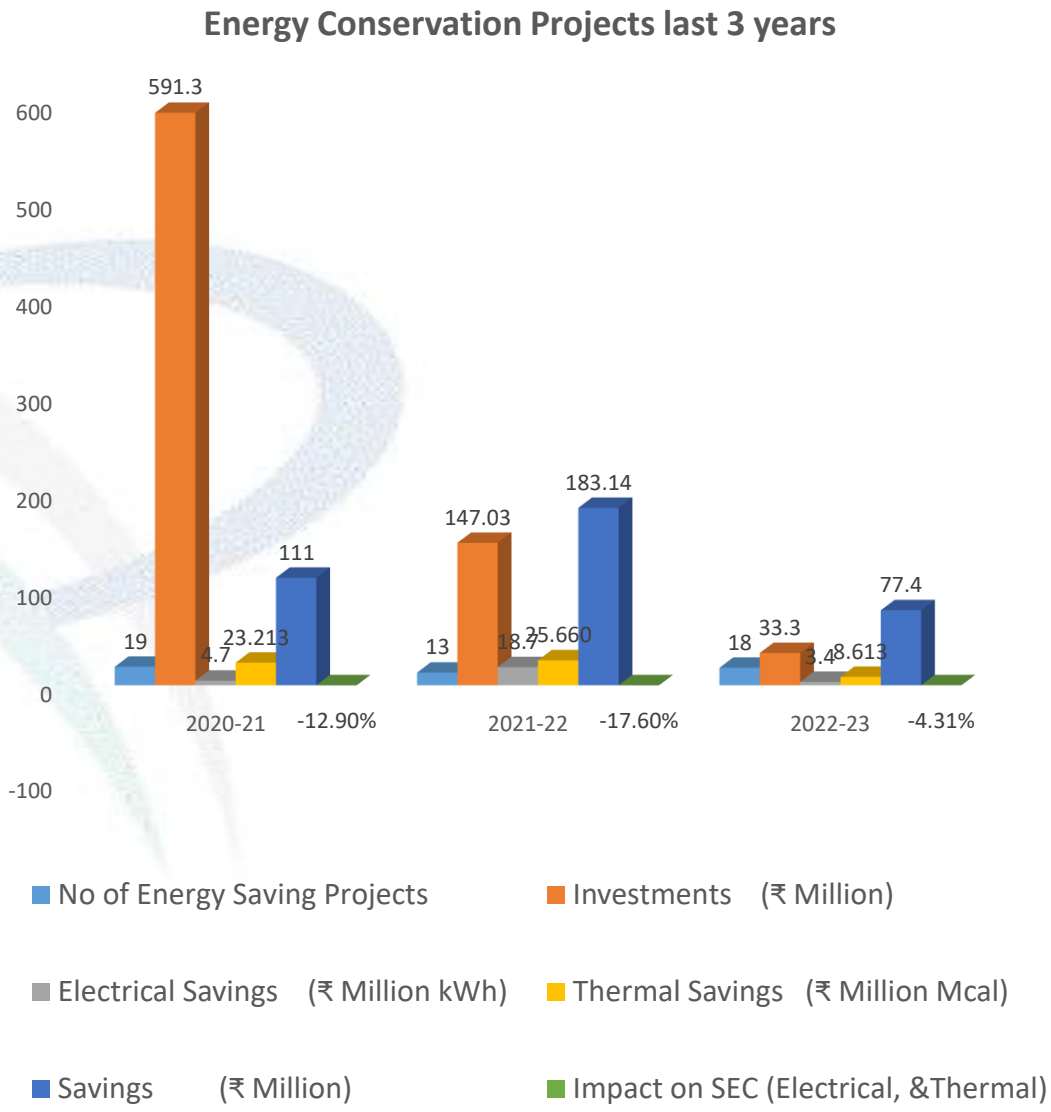
Investment : ₹ 60 million
Savings : ₹ 240 million
Payback : 4 Months

# Encon Projects Planned in FY 2023-24

| No | Title of Project | Annual Electrical Saving (Million kWh) | Annual Coal Saving (Tons) | Investment (Rs in Million) | Monetary Savings (Rs in Million) | ROI (in Months) |
|---|---|---|---|---|---|---|
| 1 | Flash Steam Recovery by Installing Flash Jet Pump | - | 2722.26 | 1.23 | 2.70 | 5.50 |
| 2 | MEE Feed water temperature increase by ATFD Condenser | - | 1090 | 1.00 | 10.00 | 1.20 |
| 3 | Savings with Using 100% Rise Husk in Coal Feeding Cogen Boiler | - | - | 60.00 | 240.00 | 4 |
| 4 | 2 MW Captive Solar PV Power Plant | 22.5 | | 95.8 | 17.3 | 68.2 |
| 5 | At present -20°c Contaminated Brine being send to MEE, Planning to store and recover MeOH by distilling in SRP and reuse for brine purpose. | - | 294.91 | - | 2.73 | - |
| 6 | -20°c Brine diverted to MB-3 from central utility 60TR CMU032 instead of CM3001 & CM3002 150TR. | 0.22 | - | - | 1.63 | - |
| 7 | Chilled water diverted to Main Ware house from central utility VMU007(330 TR) instead of Air cooled chiller CMU030 (107 TR). | 0.10 | - | - | 0.78 | - |
| 8 | Variable frequency drives for Boiler Feed Pump & for Utility pumps with pressure controllers. | 0.31 | - | 2.30 | 2.39 | 11.5 |
| | **Total** | **23.13** | **4107.17** | **160.33** | **289.33** | **18.08** |

# Energy Saving projects implemented in last 3 Years

| Year | Projects | Investments(₹ Million) | Electrical (Million kWh) | Thermal (Giga kcal) | Monetary Savings (₹ Million) | Impact on SEC (% ) |
|---|---|---|---|---|---|---|
| **2020-21** | 19 | 591 | 4.7 | 23.2 | 111 | -12.90% |
| **2021-22** | 13 | 147.1 | 18.7 | 25.6 | 183.4 | -17.60% |
| **2022-23** | **18** | **33.3** | **3.4** | **08.61** | **77.4** | **-4.31%** |




**FY 2022-23**


**$tCO_2$ EMISSION REDUCTIONS**

# Major Encon Projects Implemented – FY 22-23

## Nitrogen Plant Synchronization

- Synchronisation of all Nitrogen plants 300nm3/hr,150nm3/hr, 100nm3/hr and 60Nm3/hr)
- Leak detection provided to centrifuge during N2 Blanketing for controlling unnecessary venting to atmosphere at F&G Blocks.
- In this results 60Nm3/hr and 100Nm3/hr N2 plant completely stopped.
- **Investment : ₹ 4.7 millions**
- **Payback : 14.7**

## Coal Saving by DM Water Temperature Increasing with GVC(Gland vent Condenser) Heat Exchanger

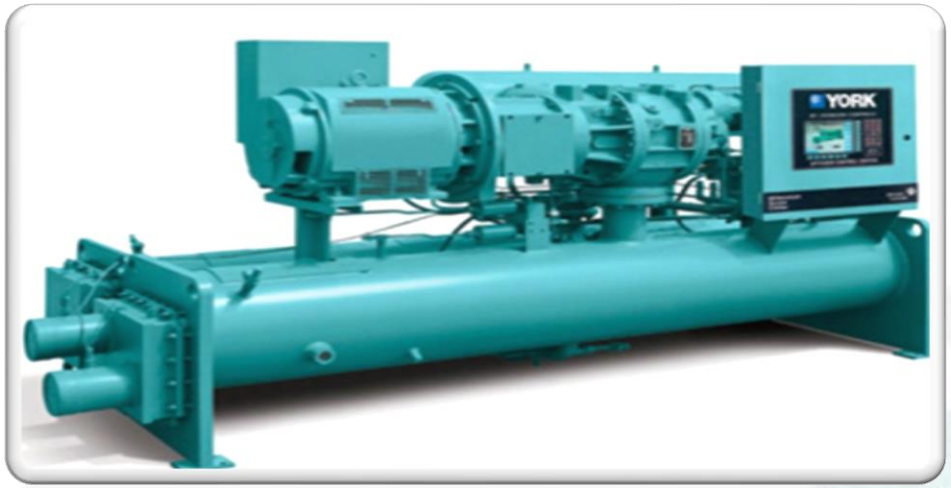
- Providing the Heat Exchanger at Turbine Gland Steam Vent in which DM water temperature increased made possible to achieve Coal Savings (1545 MT).

Investment : ₹ 1.0 million

Savings : ₹ 6.4 million

Payback : 2 Months

# Major Encon Projects Implemented – High Investment - FY 22-23




Screw Compressor Chiller for LYO in place of Reciprocating Compressor (200TR)

- Reciprocating Refrigeration system replaced by Scroll compressor type refrigeration system with software up gradation to Lyophilizer in K Block and process was repeated for second crop recovery

- Investment : ₹ 11.4 millions
- Payback : 14.4


**Additional Steam Line laying for MEE for Decreasing Turbine SSC.**

- Additional 6" Steam line laid for MEE ATFD for decreasing Turbine SSC and to prevent Steam vent due to un matching electrical and Steam load.
- By this project we have increased Turbine Power generation by 10%.

- Investment : ₹ 2 millions
  Payback : 4.1 Months

# Major Encon Projects Implemented – High Investment - FY 22-23


## VFD'S For CT Fans and CT Pumps & AHU'S .

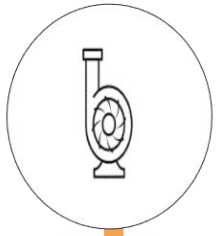
- Variable frequency Drive provided to 4 Numbers of CT Fans (24 KW) by Temperature control method.
- To 7 Numbers of CT Pumps (64 KW) by Pumps discharge pressure feed back.
- To 10 AHU'S for controlling Air flow for

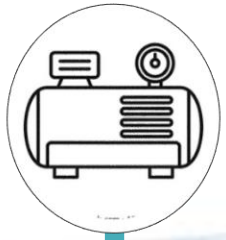
Investment : ₹ 0.6 millions
Payback : 4.5 Months

## Vertical Inline pumps

- Installed high efficiency vertical Inline pumps (30 HP) in place of Conventional low efficiency centrifugal pumps (40HP) For the same pump specifications – 2 nos
- Cost of each pump is 4 Lakhs , Savings per annum is 3.8 Lakhs ROI is 6 Months.

# Encon Projects – Medium / Low Investment - FY 22-23





## 01 Pumps

Performance Improvement

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

## 02 Chillers

Load Optimizations

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

## 03 Air Compressors

Operation controls

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

## 04 Steam

Performance Improvement

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

# Innovative Project

## 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

### GVC Heat Exchanger

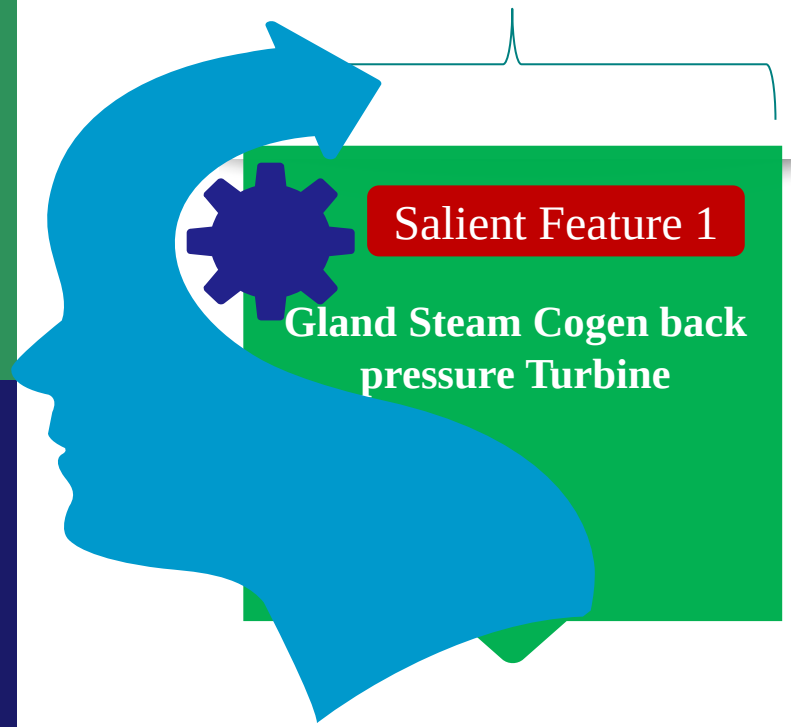
Extracted Gland steam need to condense in Gland Steam Condenser for Energy Saving Purpose.

### Present System

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

### CT Water replaced by DM Water

Then we can increase the DM Water temperature which we are sending to Boiler. Feed DM water Temperature increased 60°c from 35DegC.



**Salient Feature 1**

**Gland Steam Cogen back pressure Turbine**

**Salient Feature 2**

Gland Steam Condenser

**Salient Feature 3**

**Cooling Tower to GVC Heat Exchanger.**

**Salient Feature 4**

In place of Cooling tower water we are providing DM Water. So DM water temperature is increased equivalent to 1545 MT of Coal.

# In Process Project

## Flash Steam Recovery in MEE ATFD

Utilization of Utilization of Flash steam at ATFD.

200 Kg of Flash Steam can be prevented which is venting to atp.

Investment : 1.23 Millions
Savings : 2.7 Millions

Feasibility

Survey on available technologies

Proceed

Purchase order released to Vendor Thermax

Results

Benefits :

- Flash Steam can be recovered (200Kg/Hr)
- Condensate recovery can be increased
- Stripper Steam Consumption can be decreased.
- Power required by pump can eliminated.

# Renewable Energy (Future Scope)

## 100% Replacing coal (150MT) with Rice Husk in 35 TPH Boiler

Utilization of Renewable Energy Resource.

Investment : 60 Millions
Savings : 240 Millions

Feasibility

Survey on available technologies

Trial

From Last 2 Months Boiler trial taken with 20% (25 MT) Rice Husk.

Results

**Benefits :**

- Consuming Renewable Energy
- Reduction of CO2 Emissions and SO2 Emissions into atmosphere.
- No more 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 (million kWh) |
|---|---|---|---|---|
| Solar PV | Solar | On Site | 2 | **2250000** |

ROI YEARS
5.3

22.5
*Lakh Units/Year*

SAVINGS: ₹ 1.73 *Crore/Y*

INVESTMENT: ₹ 9.85 *Crore*

# Sustainability / GHG Inventorisation

AUROBINDO

## 01 Sustainability Report

### 2022-23

Published Integrated Annual Report for FY 2022-23

## 02 Goals & Targets -2025

### 2025

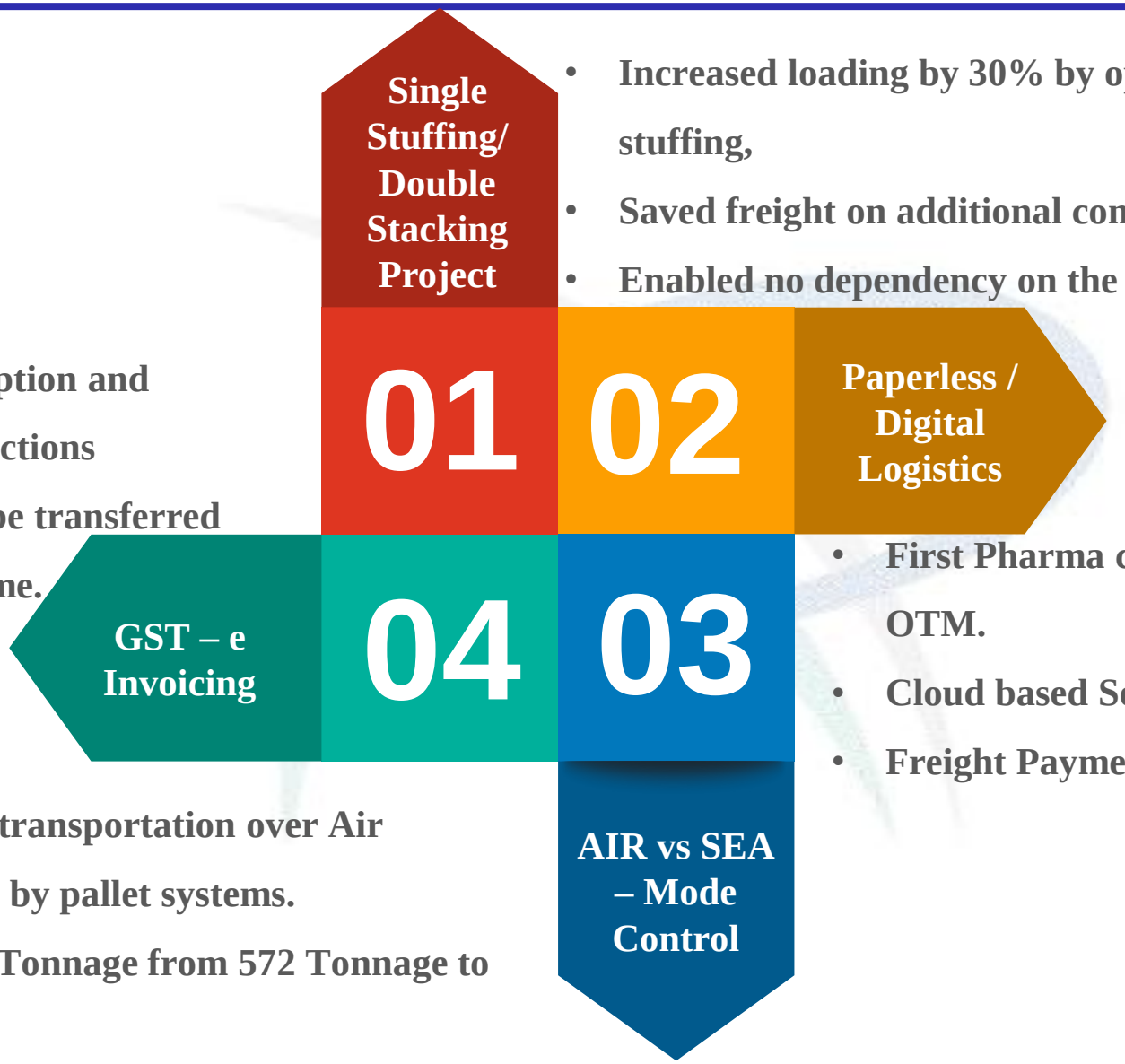
- 20% Renewable Energy Share (Power to Power)
- 12.5 % Reduction in Emissions
- 35% water conservation / restoration
- 60% coprocessing of hazardous waste
- 100% reuse & recycling nonhazardous waste
- 25% hours of learning per employee

## 03 GHG Emissions

### FY 2020- 23

| FY | Total Scope 1 emissions (tCO2e) | Total Scope 2 Emissions (tCO2) | Total GHG Emissions (tCO2e) |
|---|---|---|---|
| 2020-21 | 59,923 | 50,239 | 1,10,162 |
| 2021-22 | 61,090 | 62,520 | 1,23,610 |
| 2022-23 | 97,184 | 42,374 | 1,39,558 |

# 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 22-23, **5029 MT)**

Mixed spent carbon, Lq. Organic waste

Used filter pads Thermo coal

**CONTINUE**

**Co-fuel for cement units**

Value

Recycling (FY 22-23, 13.7 MT)

Value

Used oil
LED bulbs
Batteries

Value

Power cables, Wires, Contactors, Relays

**CONTINUE**

**Through authorized scrap agencies**

Value

Land filling/ Incineration (FY 22-23, 3577 MT)

Value

Evaporation Salt
ETP Sludge

Value

Bio-medical waste

**CONTINUE**

**Through authorized agency**

**END (Incineration)**

# 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 | AGM, Maintenance |
| 2 | AGM, TSD |
| 3 | Sr. Manager, Co-Gen. |
| 4 | Sr. Manager, Mechanical |
| 5 | AGM – Production. |
| 6 | Manager– Elec maintenance |
| 7 | Manager – Utilities |

**Responsibilities of core team**

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

# Learnings from CII - last 4 Years

AUROBINDO

### 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

### Renewable Energy
Installed 43 MW Group Captive Solar Plant near Pydibhimavaram, AP

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

# 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 |

# Teamwork, Employee Involvement & Monitoring, U-01

## 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

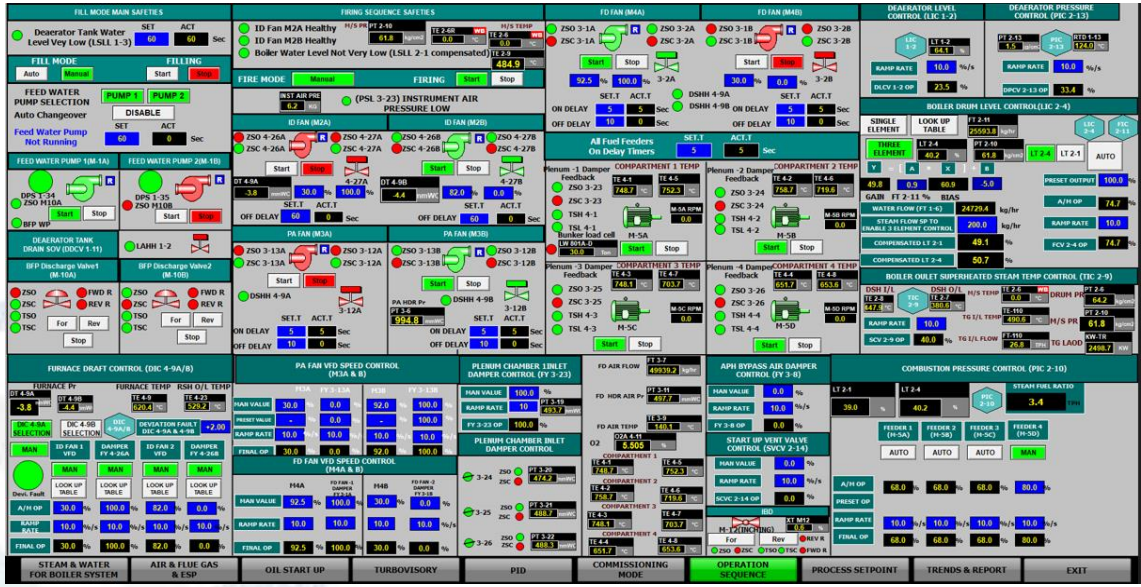
- Given training programmes on Root cause analysis (RCA), 5S, Good Engineering Practices
- Training on steam / utility systems


## Monitoring

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

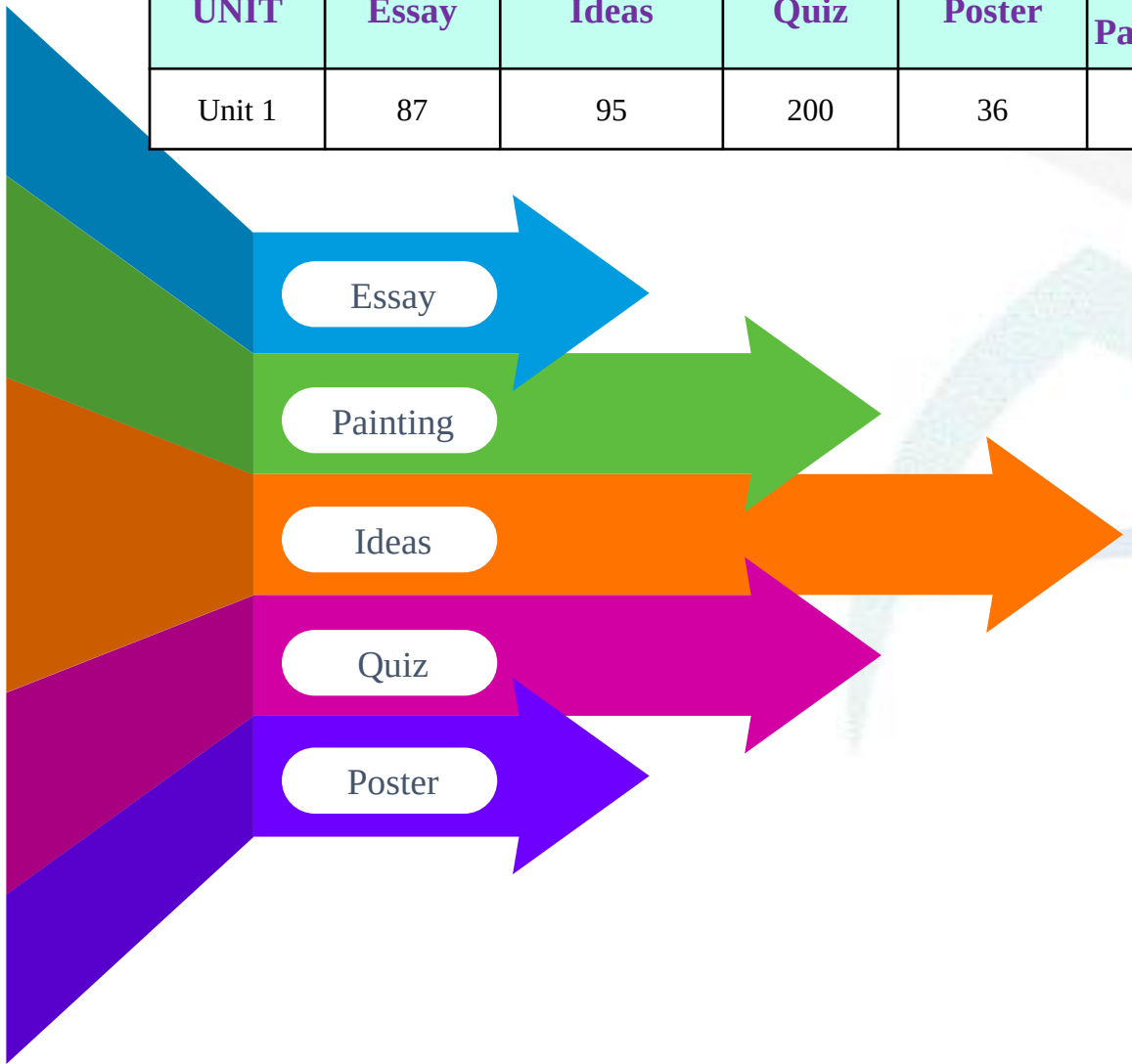
# Daily Monitoring & Reporting System

- 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.




# Energy Week / Energy Conservation Day Celebrations

| ENERGY CONSERVATION WEEK CELEBRATIONS | | | | | |
|---|---|---|---|---|---|
| **UNIT** | **Essay** | **Ideas** | **Quiz** | **Poster** | **Total Participants** |
| Unit 1 | 87 | 95 | 200 | 36 | 418 |



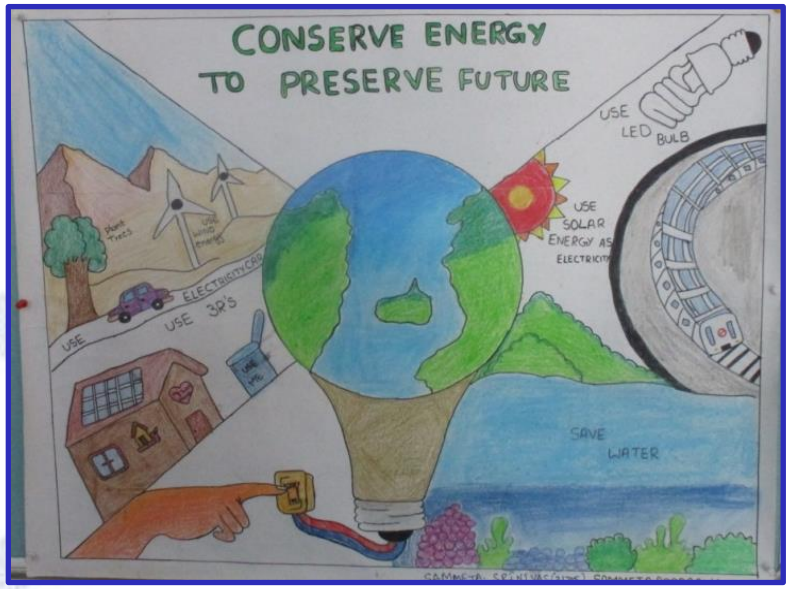

## Awareness

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 team

# Energy Week / Energy Conservation Day Celebrations



| No. | Idea Implemented |
|---|---|
| 01 | VAMs -5Nos installation (VAM006, 007, 008, 009 & 010). |
| 02 | OFR Technology for CMU522, CMU523, CMU524 and CMU525. |
| 03 | 140 TR (CMU503) Compressor RPM increased from 530 to 785. |
| 04 | Stand by Transformer (16MVA, 132KV) stopped. |
| 05 | Energy efficient pumps installed at I block (CT and primary Pump). |
| 06 | VFDs installed at various location |

# Awards & Recognitions

1


## Operational Excellence

Global Operational Excellence Company of the Year 2022
Global Healthcare Awards

2


## Human Resources & L &D

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

# Awards & Recognitions

1


2


3


4


5


6

# CSR Activities



ప్రాథమిక పాఠశాల భవనాన్ని ప్రారంభిస్తున్న ఎమ్మెల్యే మదన్ రెడ్డి

హుస్నాబాద్, ఫిబ్రవరి 01 (ప్రభమ్యూస్): రాష్ట్రంలోని అన్ని ప్రభుత్వ పాఠశాలలను తెలంగాణ ప్రభుత్వంఅభివృద్ధి చేస్తుందని ఎమ్మెల్యే మదన్ రెడ్డి అన్నారు. మండల పరిధిలోని బోర్పట్ల గ్రామంలో అరబిందో ఫౌండేషన్ ఆధ్వర్యంలో 90 లక్షల నిధులతో నిర్మాణం చేసిన ప్రాథమిక పాఠశాల భవనాన్ని బుధవారం ఎమ్మెల్యే మదన్ రెడ్డి ప్రారంభించారు. ఈ సందర్భంగా ఆయన మాట్లాడుతూ తెలంగాణ రాష్ట్రంలో

- 76.3CR Spended for Rural development.
- 1.8Lakh Families benefited.
- 0.69 Lakh villages benefited.
- Aurobindo Oncology Block of MNJ INR 80cr




# Thank You