24th National Award for Excellence in Energy Management

2023

September 2023

AUROBINDO PHARMA LIMITED
UNIT IX, HYDERABAD

S. No.	Name	Designation	Department
01	Mr V Sreerama Murthy	Sr. General Manager	Operations
02	Mr. Kamalakar B	Asst. General Manager	Engineering
03	Mr. Ramesh Badeti	Sr.Manager	Engineering

1. Brief Introduction on Company

AUROBINDO

$2.5B Global Revenue

Employees	33k+
Market presence	150+
Mfg. Facilities	25

Inception
Founded in 1986 by Mr. P. V. Ram Prasad Reddy, Mr. K. Nityananda Reddy

IPO
Aurobindo Pharma became a public company in 1992

USFDA
All facilities are USFDA & other regulatory approved

41+ Billion
Dosage Forms across the World

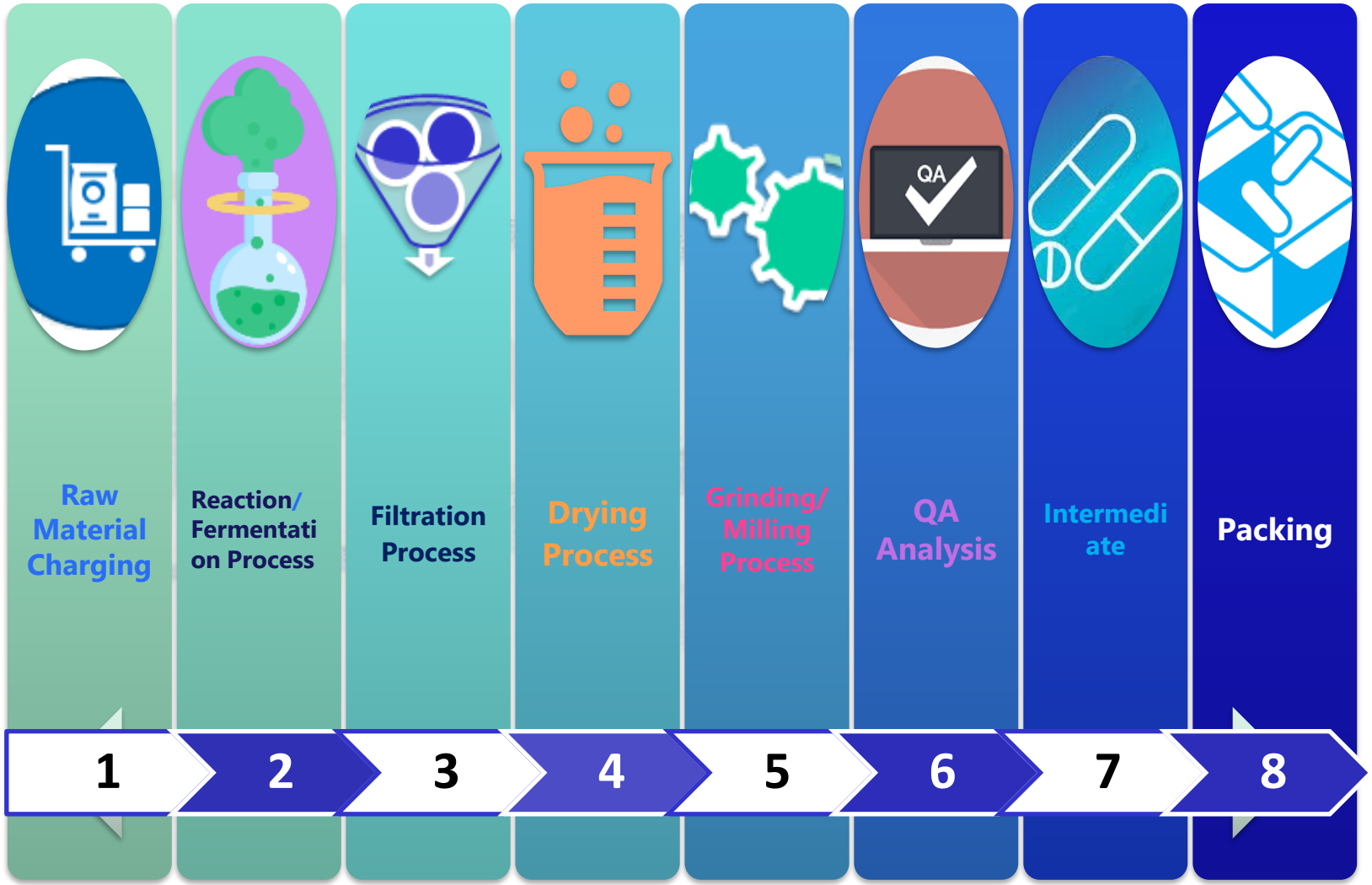
Largest generics company in the US (by Rx dispensed)

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

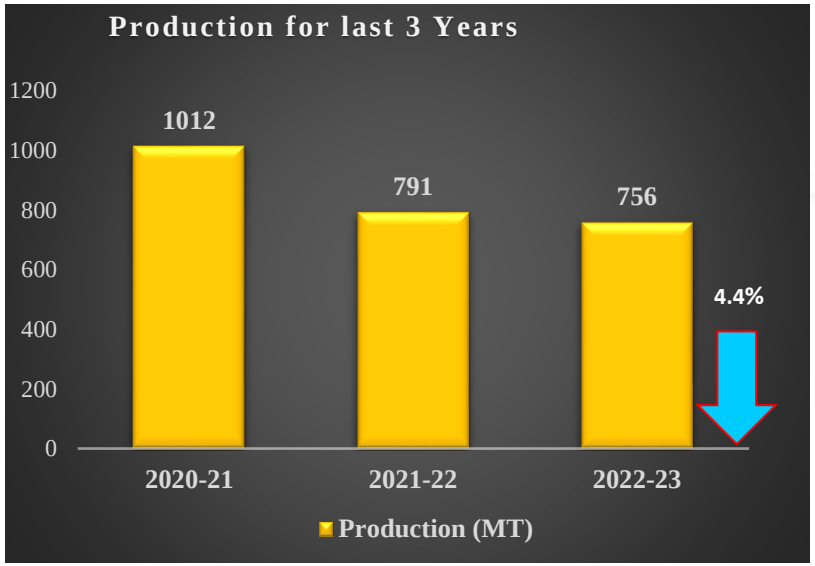
2. Manufacturing Process

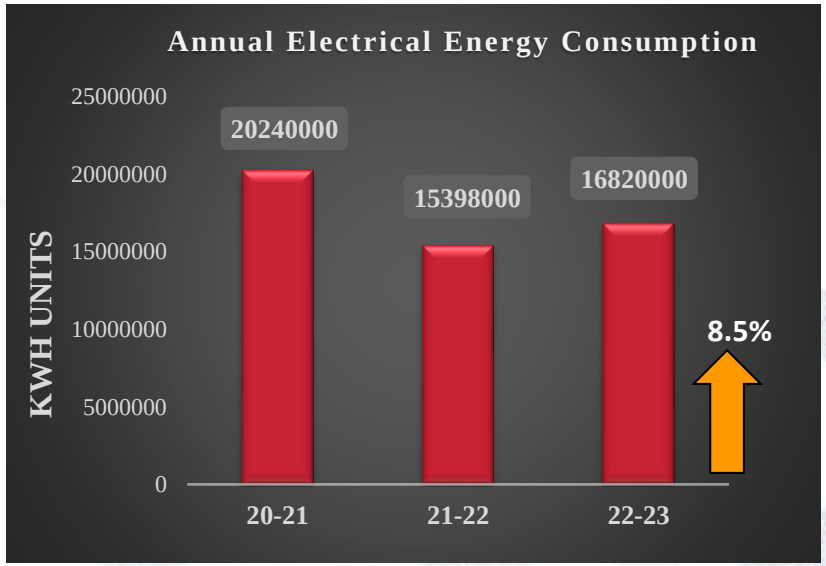
- Lopinavir
- ECBA
- Sertraline Mandelate
- Bohi Hydrochloride
- Dolutegravir
- Modafinil
- Citaloprom

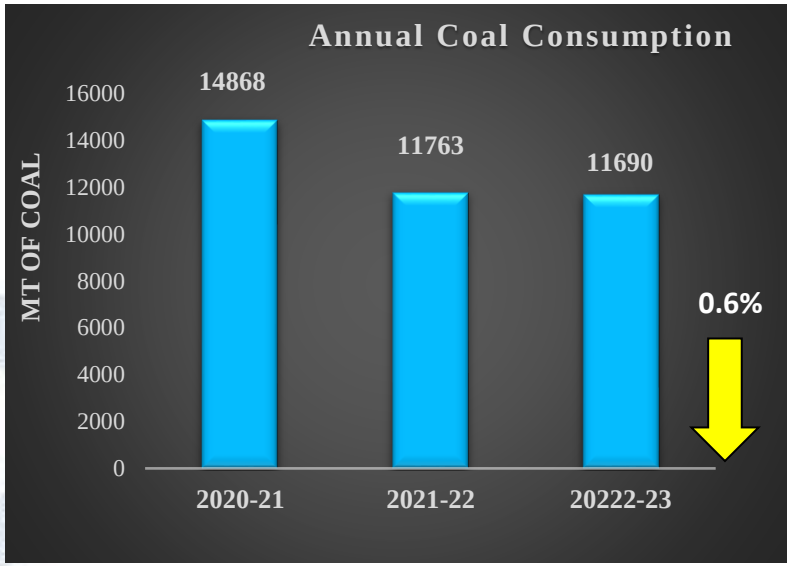
Major Products



3. Specific Energy Consumption in Last 3 years



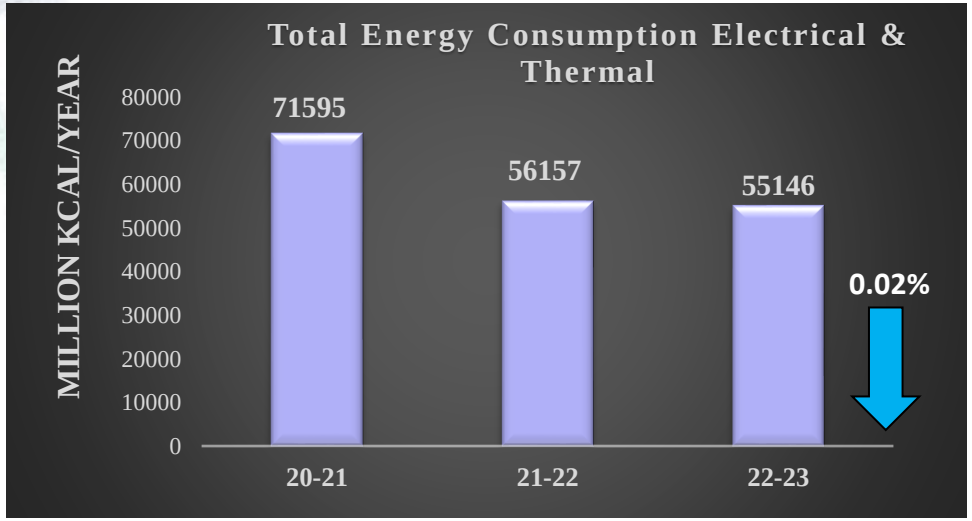




Increase consumption in during the FY 2022-23 was observed due to some of the products were changed which are process cycle times are more than previous year products and non-linear nature of consumptions.

Revenue was increased 48 percent even though production decreased 4.4%.

Implementation of energy conservation projects resulted in maintaining the SEC as FY 2021-22, even though long process cycle time products were manufactured during FY 2022-23



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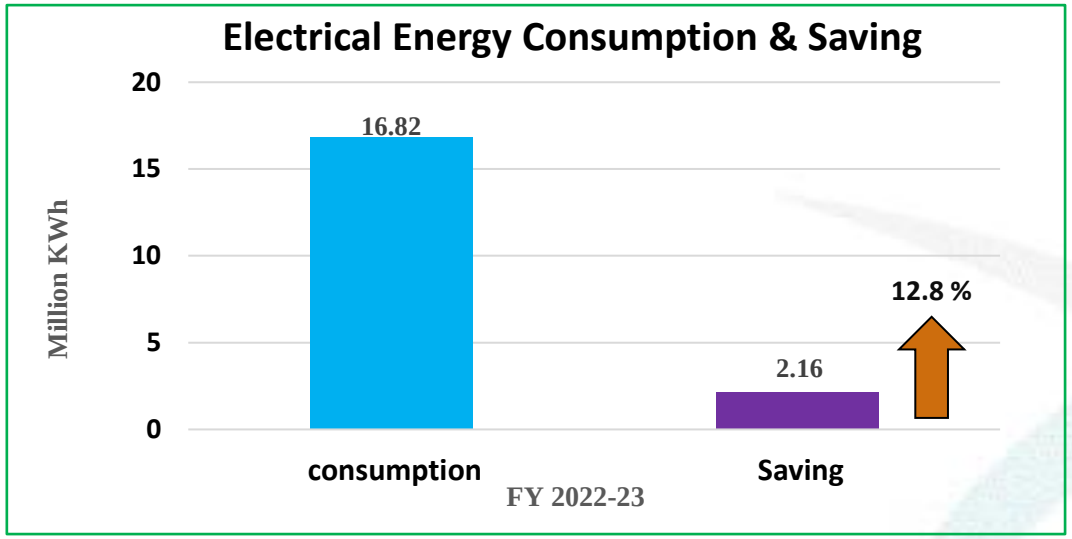

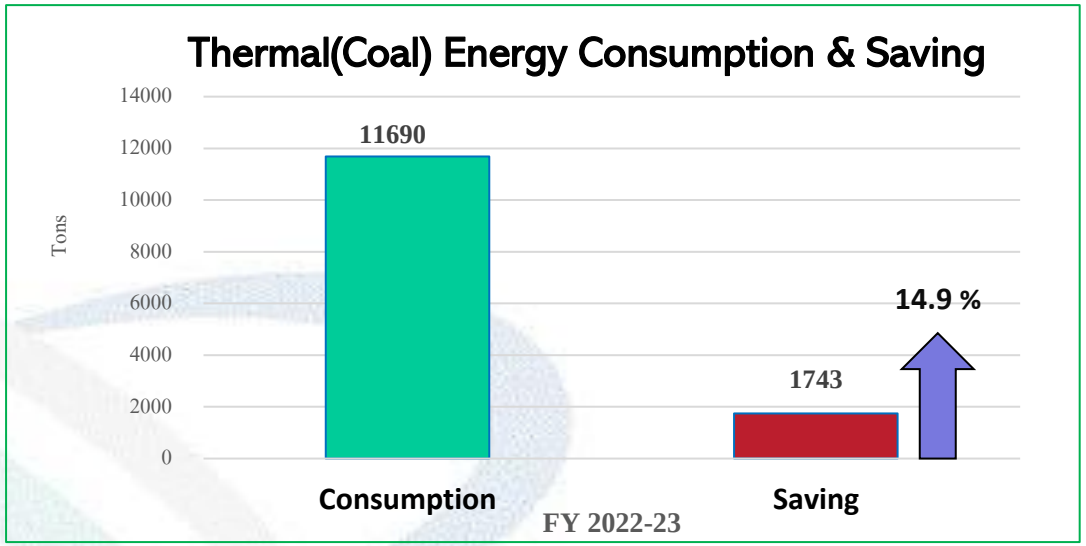

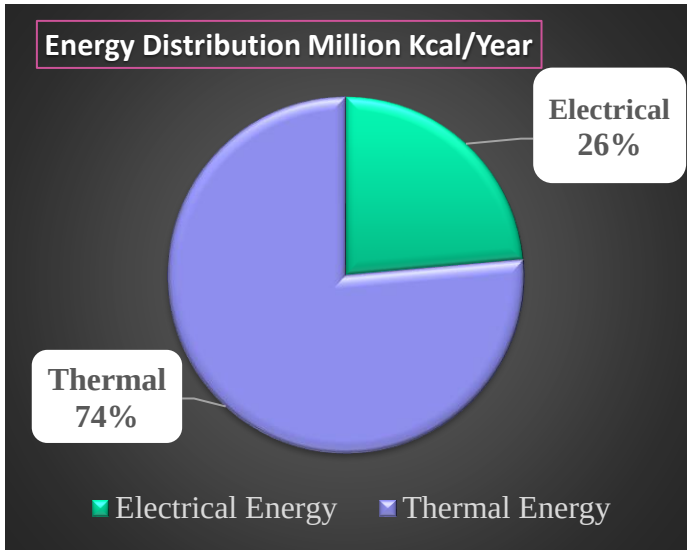

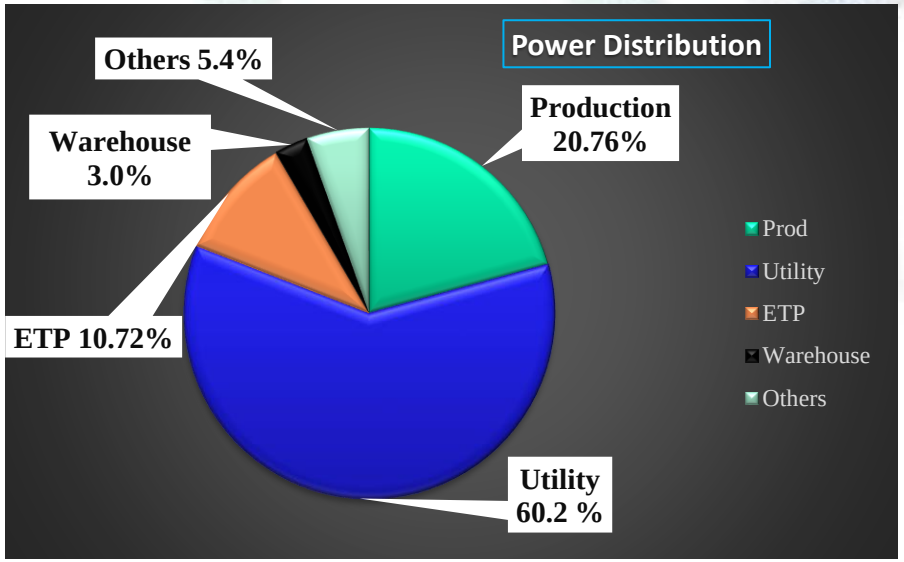

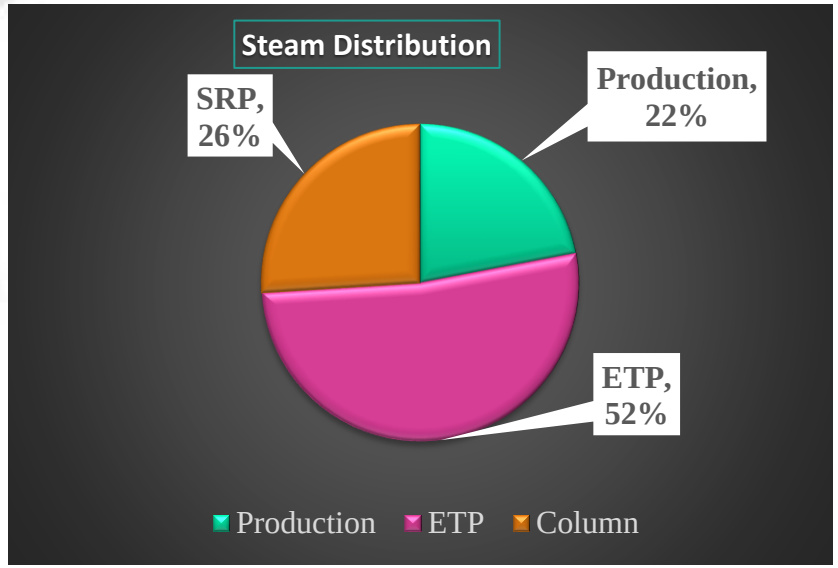

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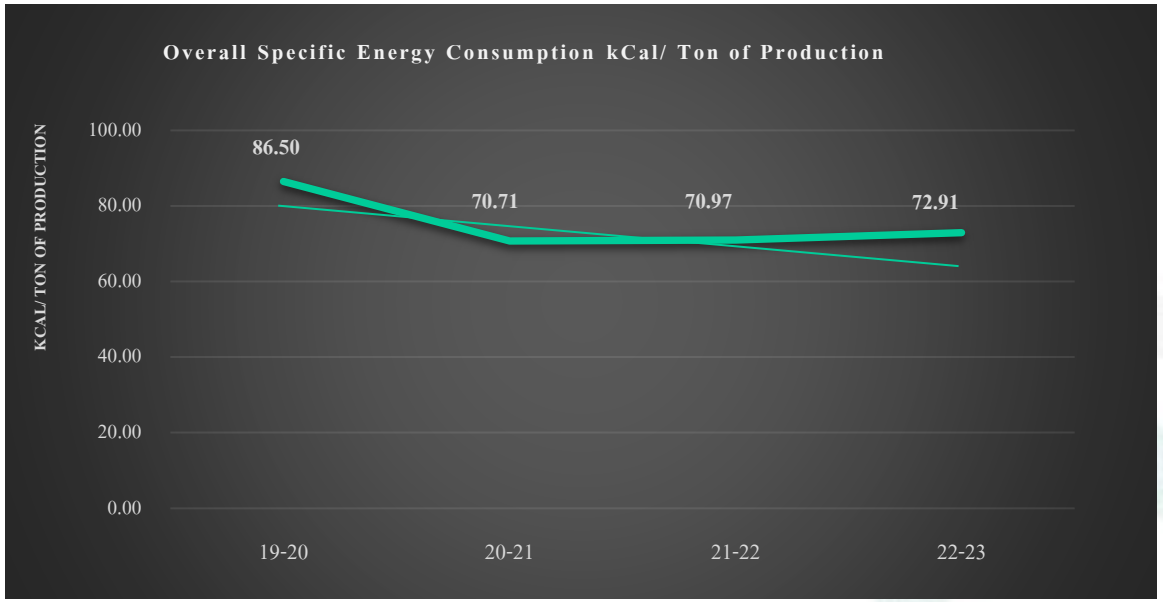
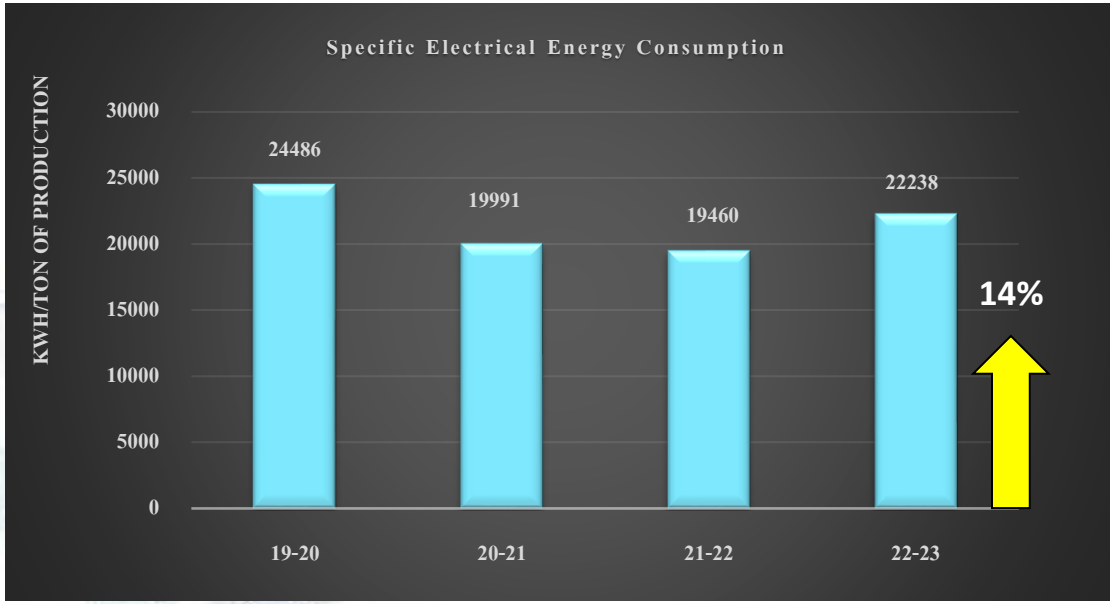
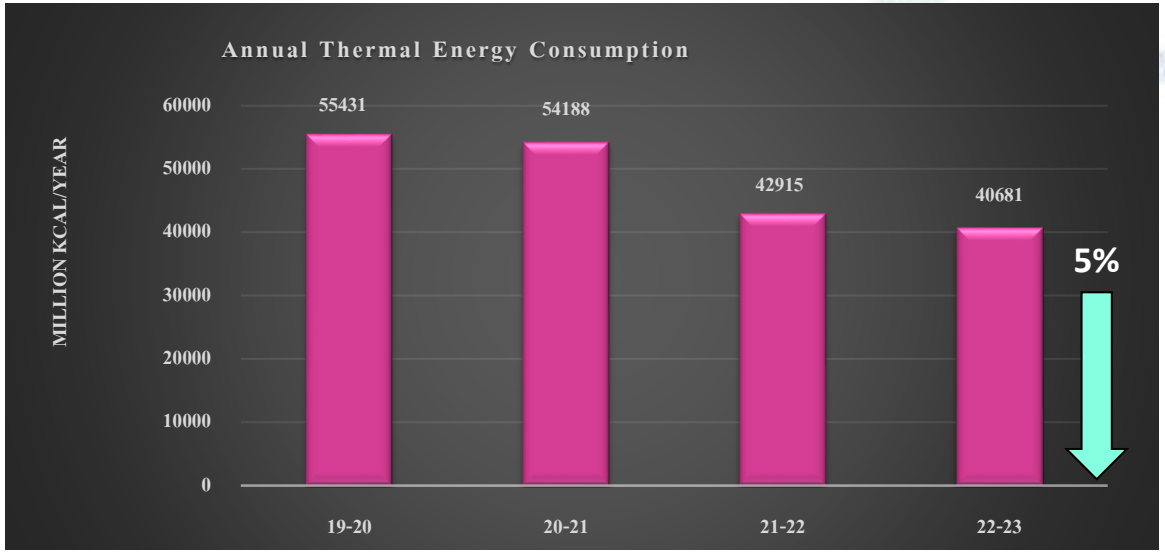






A increase in SEC during the FY 2022-23 was observed due to some of the products were changed which are long process than previous products and non-linear nature of consumptions.

Implementation of energy conservation projects resulted in maintaining the SEC as FY2021-22, even though long process products were manufactured during FY 2022-23

4. Information on Internal Benchmark - Utility

Description	Design Temp (°C)	Design SEC (kW/TR)	Operating SEC (kW/TR)	Target SEC (kW/TR)
Reciprocating Chillers (Water Cooled)	+5	0.86	0.89 - 0.91	0.86
	-15	1.39	1.41 - 1.43	1.39
	-20	1.58	1.60 - 1.62	1.58

Description	Design SEC (kW/CFM)	Operating SEC (kW/CFM)	Target SEC (kW/CFM)
Air Compressors	0.16	0.20 - 0.23	0.18

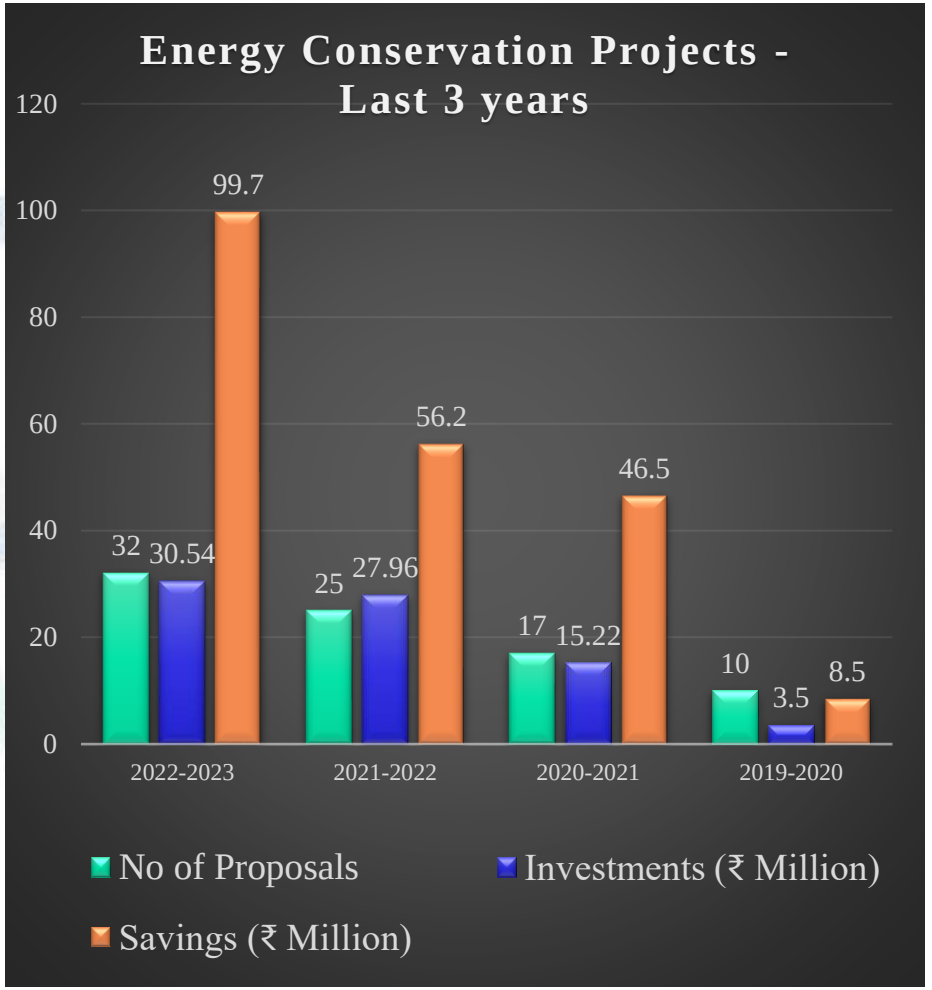
Description	Design SFR (KG/KG)	Operating SFR (KG/KG)	Target SFR (KG/KG)
Boiler	4.25	4.20	4.25

4.Major Encon Projects in FY 2023-24

S.NO	Title of Project	Total Annual Savings (Rs million)	Investment Made (Rs million)	Payback (Months)	**Remarks**
1	Old pumps and motors -08No's will be replaced with Higher Energy efficiency pumps and Motors	2.14	2.00	11.2	Capex Approval U/P
2	Implementation of VFD's for utility pumps	0.79	0.93	14.2	Capex Approval U/P
3	Power Saving with E-Glass Epoxy FRP Fans	2.16	2.77	15.4	Capex Approval U/P
4	NPU003 IR vertical air compressor is replaced with screw compressor	0.40	1.50	45	Capex Approval U/P
5	Replacement of Liquid Nitrogen by N2 gas system	6.07	8.90	17.6	Capex Approval U/P
6	OFR Technology for CMU702 & CMU804 Refrigeration compressors, Make: Hi-Freeze	1.63	4.65	34.2	Capex Approval U/P
7	VFDs to be arranged for centrifuges to control RPM and run on need basis	0.79	2.15	32.7	Capex Approval U/P
8	Replacement of Old standard efficiency motors with New Premium Energy Efficient Motors	0.44	0.80	21.9	Capex Approval U/P
	Total	**14.14**	**23.71**	**19.7**	

5. Energy Saving Projects Implemented in last 3 years

Summary of Energy Saving Projects Implemented in the Last 3 Years						
Year	**No of Energy Saving projects**	**Investments (₹ Million)**	**Electrical savings (Million KWh)**	**Thermal Savings (Tons)**	**Savings (₹ Million)**	**Payback period (In Months)**
2022-23	32	30.54	2.2	1743	99.7	3
2021-22	25	27.96	2.5	1768	56.6	2
2020-21	17	15.22	4.9	3123	46.5	4
2019-20	10	3.5	0.9	472	8.5	5



5. Energy Saving Projects Implemented in last 3 years

Projects Implemented in FY 22-23				
S. No.	**Name of Energy saving projects**	**Investments (₹ Million)**	**Annual Savings (₹ Million)**	**Payback (Months)**
1	Old pumps and motors are replaced with New Energy Efficient Motors and Pumps	0.42	1.63	3
2	Implementation of VFD's for Variable load Pumps to operate at optimum efficiency	1.50	1.59	11
3	Replacement of Old standard efficiency motors with New Premium Energy Efficient Motors	0.53	0.10	67
4	Increasing the condenser units cleaning for Air conditioners (Ductable, Cassette, Packaged and split)	0.02	0.10	3
5	Implementation of Timer Controls for Vacuum Pumps in process to avoid unnecessary operations	0.04	2.05	1
6	Installation of Sky Lights in the Coal shed to use natural lighting during daytime and avoiding usage of conventional lighting	0.20	0.06	43
7	Replacement of Cooling Tower Fills to improve the L/G ratio, effectiveness and approach	0.19	0.47	5
8	Operational improvement in Chilling Plants through Energy Cell Team assessment	0.10	3.22	1
9	Energy Savings by arresting the leakages in the Flue gas Duct (Reduced load on ID Fan)	0.05	0.16	4
10	Replacement of Higher capacity motor with Lower capacity motor for F block AHU,ETB106 and MEE	0.20	0.21	11
11	Timers arranged for Air Handling Units	0.05	1.91	1
12	Increasing of condensate temperature by Increase in heat surface area of Water Pre-heater in flue gas duct to increase heat transfer	0.50	1.46	4
13	Composite FRP Fan arranged for J block CTU022 cooling tower	0.13	0.10	17
14	Operational Improvement of Air Compressors and Nitrogen Plants and arresting the leakages	0.10	0.59	2
15	Implementation of Automation system in Washrooms	0.11	0.06	21
16	Blow down water saving by using Eco Chemicals for 07No's of cooling towers	0.17	0.11	19
17	Steam Operated Pump Trap arranged in place of bucketed steam traps	0.20	0.28	9

5. Energy Saving Projects Implemented in last 3 years

Projects Implemented in FY 22-23				
S. No.	**Name of Energy saving projects**	**Investments (₹ Million)**	**Annual Savings (₹ Million)**	**Payback (Months)**
18	Coal saving achieved by installing of O2 Analyzers and reducing O2 % from 11.9% to 8% at 12TPH & 8TPH Boilers	1.00	2.72	5
19	RVPD stopped 47 HP due to HTDS sludge mixed with LTDS sludge	0.30	3.83	1
20	RO-01 reject given as RO-02 feed and recovery improved by 20% , steam and power saved to reduce HTDS to MEE feeding	2.5	3.51	9
21	Operational improvement activities VAM601 efficiency improved by LTH replaced with new, LIBR 100Kgs added and servicing done	0.57	4.14	2
22	Reduction of Time cycles in CSA Recovery saving achieved Recovered Camphor sulphonic acid	0.00 3.81	1.62 0.60	0 76
23	THP recovery improved from 54% to 65% at G block and Solvent Recovery system Qty:21.579MT	2.00	9.00	3
24	DIPE recovery improved 63% by develop the recovery process. Qty:39.89MT	1.00	8.70	2
25	Recovery of A CN from 82 % to 86% by Distillation column replace with structural packing in place of random Qty:20.232MT	0.10	0.66	2
26	Monoglym recovery improved from 67% to 81% and Qty16.186MT:by implementing Low vacuum distillation , Continuous feeding in distillation & Brine utility arranged for Condenser.	1.00	6.70	2
27	Ethyl Acetate Recovery introduced and developed the recovery process. Qty:54.363MT	1.20	4.34	3
28	Methylene Chloride (MDC)Recovery introduced and developed the recovery process. Qty:51.489MT	0.40	2.38	2
29	Replacement of low efficiency aerators capacity : 50HP Motor with high efficiency aerators capacity : 30HP Motor	6.53	0.8	94
30	Productivity increased 1.878MT by Yield improvement	2.22	32.77	1
31	Replacement of Old motors with New Premium Energy Efficient Motors	0.40	0.08	60
32	Reduction of Specific Steam Consumption from 1.69Kg/Ltr to 1.51Kg/Ltr by improve the column efficiency	3.00	3.70	10
	Total	**30.54**	**99.7**	**3**

#1 EFFICIENCY IMPROVEMENTS

AUROBINDO

Start
01/04/22

Energy Efficiency Vertical Inline and Horizontal Single stage with motors

Solution Implemented

- Energy Efficiency pumps installed in place of lower efficiency pumps.
- Performance evaluation done and identified the opportunity .

Advantages

- Low maintenance and space.
- Power saving

2.04
Lakh Units/Year

SAVINGS: ₹ **16.3** *Lakh/Year*

INVESTMENT: ₹ **4.15** *Lakh*

MOTNHS
3

AUROBINDO

Start
01/04/22

Installation of VFD with pressure Transmitter for pumps

Solution Implemented

- Installed VFD with pressure transmitter for auto control of utility pumps

Advantages

- To control the wastage of power
- Smooth starting of pump and motor
- Reduce the mechanical wear and tear

1.99
Lakhs of Units/Year

SAVINGS: ₹ **15.9** *Lakh/Year*

INVESTMENT: ₹ **15** *Lakh*

MOTNHS
11

#3 OPERATIONAL IMPROVEMENTS

AUROBINDO

Start
01/04/22

Reduced Steam Demand in SRS through increased efficiency of columns

Solution Implemented

- Fixing column vs Solvent based on design for effective boil up
- Redistillation reduced by making of dedicated lines and storage tanks.
- Batch wise feeding & distillation changed to continuous feeding & distillation for few products.

Advantages

- Reduced Re-distillation time cycle & distillation qty. increased.
- Utilization of Steam & Power saving.

328
Tons of Coal

SAVINGS: ₹ **37.0** *Lakh/Year*

INVESTMENT: ₹ **30.0** *Lakh*

MOTNHS
10.0

#4 EFFICIENCY IMPROVEMENTS

AUROBINDO

Start
21/01/23

Composite FRP Fan installed

Implemented Glass Coated Fan

Existing FRP Coated Fan

Solution Implemented

- Replacing Composite FRP Fans to Cooling tower instead of FRP fan.

Advantages

- Reduced Power Consumption
- High air lift ratio.

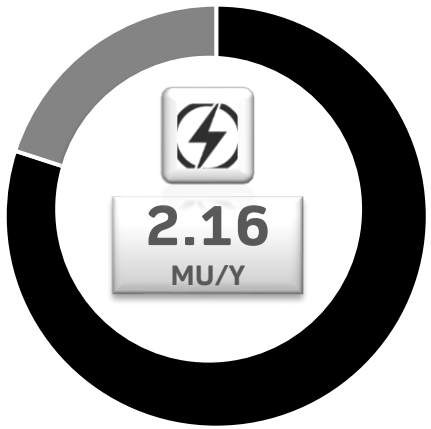
12120
Kwh/year

SAVINGS: ₹ **1.0** *Lakh/Year*

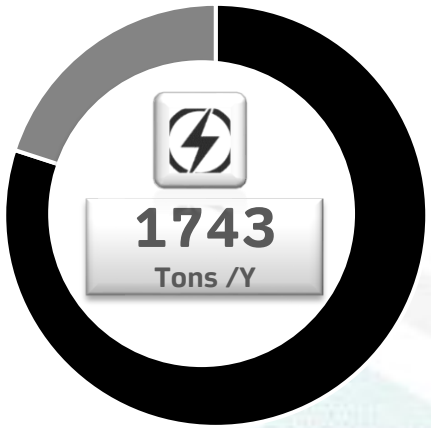
INVESTMENT: ₹ **1.3** *Lakh*

ROI MOTNHS
16.0

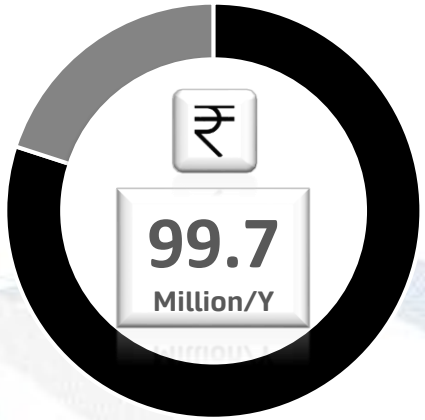
Results Achieved FY2022-23



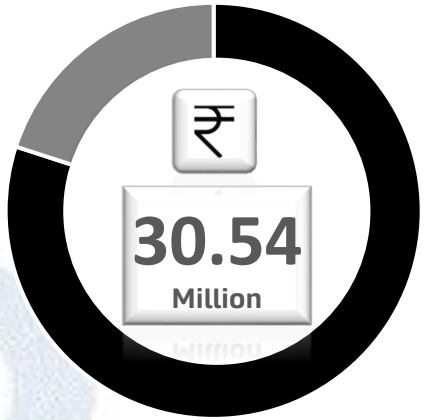
TOTAL ELECTRICAL SAVINGS



TOTAL COAL SAVINGS

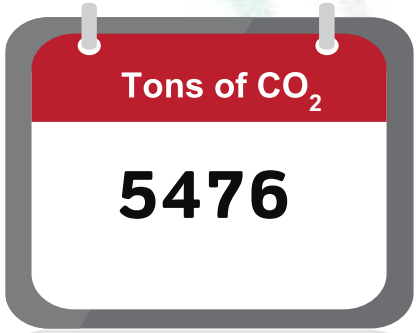


TOTAL MONETARY SAVINGS



TOTAL INVESTMENT

PAYBACK PERIOD



CO_2 REDUCTIONS

6. Innovative Projects implemented

AUROBINDO

Start
June 2022

I. Radar Level transmitter for reactor level controlling

Trigger for implementation :

- During ending stage of BN -III batch in the reactor SRJ006, as per batch process agitator should be stopped at 900Kgs of left over material.
- In SRG117 reactor during addition of Bohi Hydrochloride product should be stopped by Auto cut off with hooter after Mass transferring 80Ltrs into SRG102 reactor.
- To avoid differences batch to batch.

Benefits

- Product Yield/Quantity is improved

Replicability :

- Yes, huge replication opportunities
- Based on product requirement

Results :

- Monetary Savings = 76.8 Lakh / Y
- Investment = 6.5 Lakh
- Payback = 1 Month

6. Innovative Projects implemented

Start
Sep 2022

II. Auto Powder Transferring Systems for reactor batch charging

Trigger for implementation :

- Two PTS of capacity 500 Kg/hr. are Installation completed for Schiff base charging in sertraline mandelate stage-II and another one is Tetra lone charging in Schiff stage-I product
- Charging of Schiff base material by PTS time saving reduced from 6Hrs(While manual charging) to 0.45Hr,manpower reduced -06persons to 02Persons.
- To reduce utility consumption during batch charging

Benefits

- Increased no of batches by reducing batch cycle time
- Safe charging and avoid human intervention

Replicability :

- Yes, huge replication opportunities
- All process areas
- Taken up for other areas implementation

Results :

- Monetary Savings = 25 Lakh / Y
- Investment = 17.5 Lakh
- Payback = 8 Months

6. Innovative Projects implemented

Start

June'2022

III. Tank Weighing systems installed for Receivers

Trigger for implementation :

- As per batch process total mass volume to be transferred in two receivers REB352 & REE058 as equal sharing but observed weight differences in receivers by manual weighing.
- To avoid differences batch to batch in weighment.
- Time taking four hours for each batch to weighing manually

Benefits

- Product Yield and Quantity is improved
- To increase no of batches by reducing batch cycle time
- Avoid human intervention in weighing

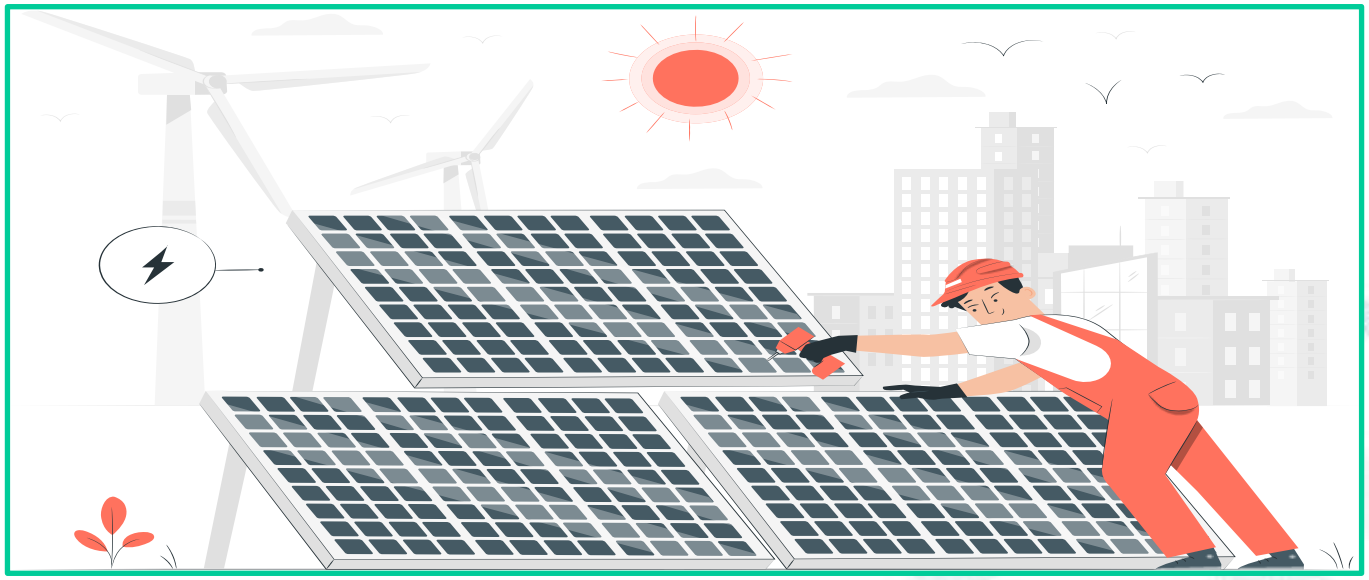
Replicability :

- Yes, huge replication opportunities
- All process areas
- Taken up for other areas implementation

Results :

- Monetary Savings = 8.51 Lakh / Y
- Investment = 7.5 Lakh
- Payback = 10 Months

7. Utilisation of Renewable Energy sources



SINSTALLED CAPACITY
42MW Solar Power Plant Under
Mode : Group Captive Mode
Project Timeline: 2022-23
Project mode : Off Site Generation

LOCATION & DEVELOPER
Ramannapet, Yadadri Bhuvanagiri District, Telangana
M/s NVNR Ramannapet- I & II Power Plant P. Limited
Investment : ₹ 5.382 Cr.

TYPE OF AGREEMENT
Open Access & 25 Years
Starting : July 022
Total 7 Nos units of Aurobindo considered

% SHARE TO UNIT-IX
% Share in Energy Consumption : 17.65%
Allotted Generation: 0.26 Cr Units / Year

30% Rice Husk using for operation of 8TPH & 12TPH Boiler and proposed for 100% husk with necessary modification.

1. **Renewable Energy** The most important feature of renewable energy is that it can be harnessed without the release of harmful pollutants.
2. **SO2 Emission**: Sulphur dioxide is a corrosive acid gas, which combines with water vapour in the atmosphere to produce acid rain
3. **Carbon Footprints**

Due to less Carbon percentage in Rice Husk Annually
4384(MT)CO2 Emissions (MT) into atmosphere will decrease

8. GHG Inventorisation

1 Sustainability Report

2022-23

Published maiden sustainability report for FY 2022-23

2 Goals & Targets -2025

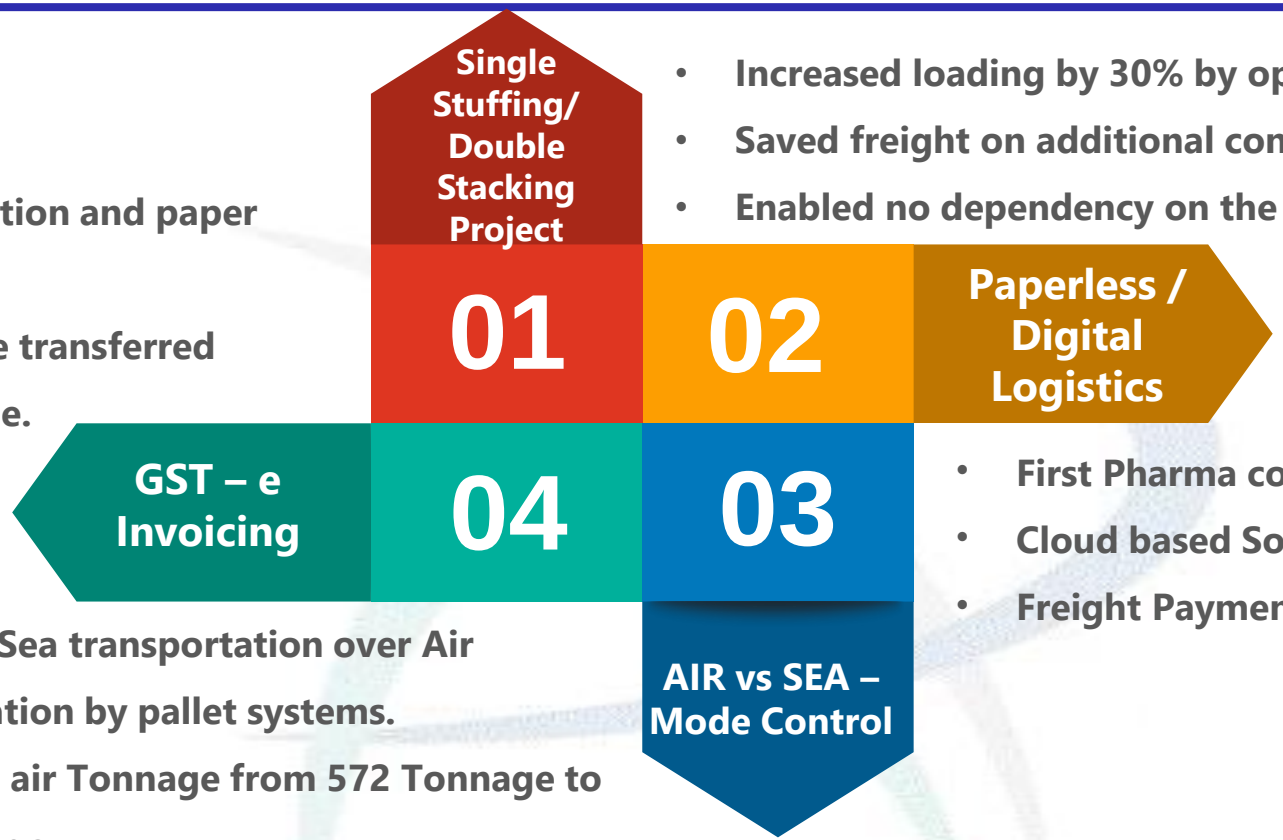
- 20% Renewable Energy Share (Power to Power)
- 12.5 % Reduction in Emissions
- 35% water conservation / restoration
- 60% co-processing of hazardous waste
- 100% reuse & recycling nonhazardous waste
- 25% hours of learning per employee

3 FY 2019-22

GHG Emissions

Year	Total Scope 1 emissions (tCO2e)	Total Scope 2 Emissions (tCO2)	Total GHG Emissions (tCO2e)
2019-20	19175	17214	36389
2020-21	18742	16799	35541
2021-22	14839	12780	27619
2022-23	14704	13961	28665

9.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

Project Details:

S. No	Projects Implemented	Investment Made (Rs In Million)	Benefits Achieved	Description
1	Online Stack monitoring	5.08	Continuous monitoring of stack discharge parameters	Online stack monitoring system has arranged to boiler stacks for continuous monitoring of discharge parameters
2	EURO TECH Aerators	6.53	Final discharge organic content reduction	04 no's of new aerators arranged for aeration tank for improving the bio aeration process which results in decreasing the final discharge organic content reduction
3	Green belt	0.09	Green belt increased	New garden area developed

10. Energy Management System and Other requirements

- Daily review meeting by HOD
- Daily/Monthly review meeting by Plant Head and Monthly/Yearly review conducted by Higher Management
- Yearly energy assessment audit by CED(Energy Cell) Team/training's by Inhouse and External
- Daily energy meters reading taking manually and EMS system under implementation
- Idea generation and Implementation of kaizen's
- Optimized working of various electrical equipment's, like Utility Motors, pumps, lighting, lift uses, AC's
- Fitment of additional VFD installation
- Daily monitoring of utility equipment efficiencies and leakages of air nitrogen steam
- Have trained and encouraging frontline team members for energy conservation in day to day operation and having regular consistency of monitoring consumption pattern and taking proactive measures by cutting down the unnecessary power elements based on the usage & occupancy level wherever possible
- To Ensure all employees involvement there are several internal & external awareness training programs has been conducted as per the scheduled framework.

Energy Management System Under Implementation

Teamwork, Employee Involvement & Daily Monitoring

AUROBINDO

Teamwork

- Implemented kaizen
- Awards and appreciation for best programs.
- Higher Management Reviews.

Employee Involvement

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

Training Programs

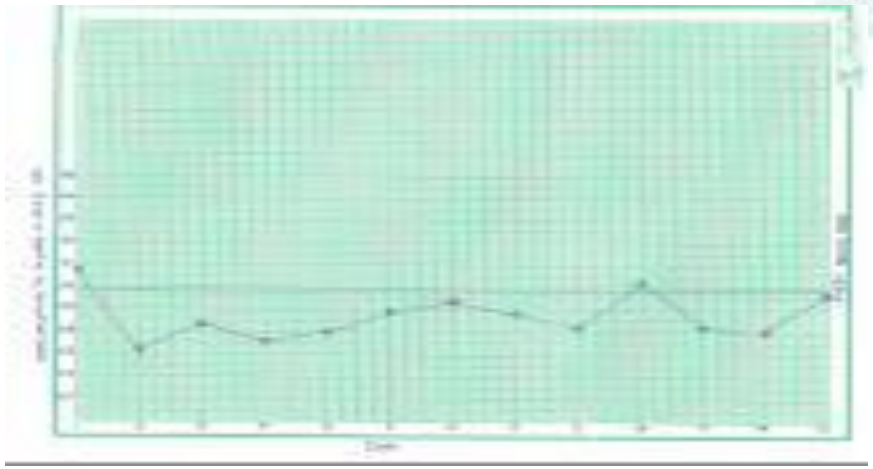
- Given training programs on Root cause analysis.
- Training on energy conservation power/steam / utility systems.

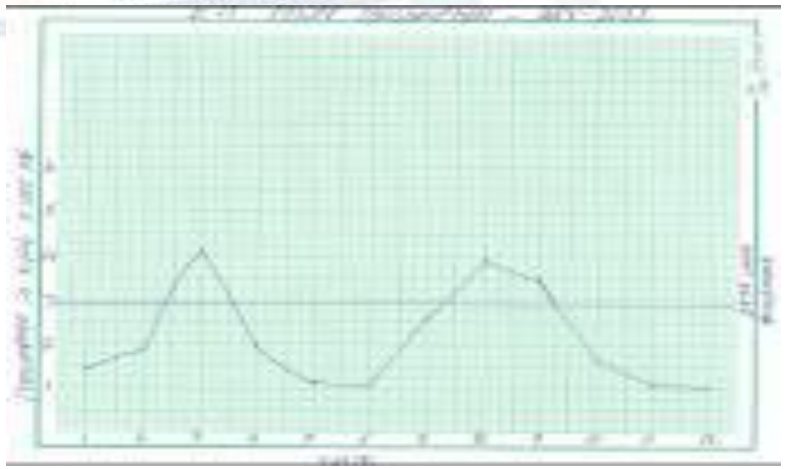
DAILY

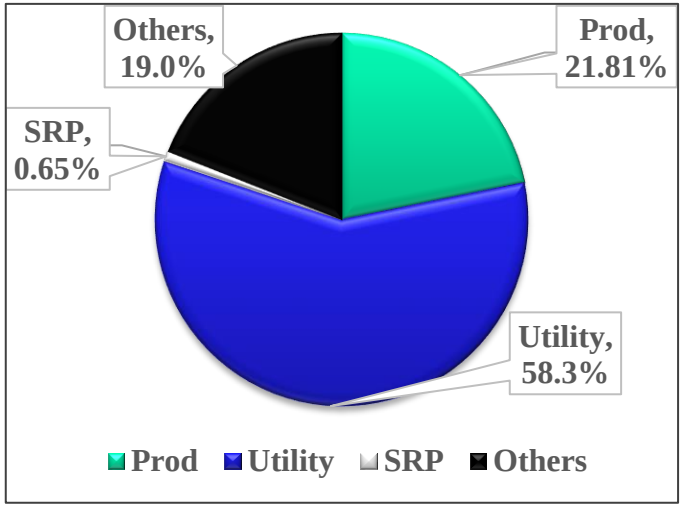
- Performance Reports
- KPIs
- Overall Consumption
- LDM Meeting
- KAIZENS Implementation

MONTHLY

- Avg. Monthly Report
- Recommendation for any service / Maintenance
- Inter - Unit Comparisons







Implemented across all blocks and utility Daily Monitoring, Reporting and Reviewing

Energy Conservation Day Celebrations & Energy Audit Instruments

Awareness

Banner Hosting

IDEA Generation

Quiz Competition

Essay Writing

Poster Making

List of Participants

- **Painting-37 No's.**
- **Essay Writing-36 No's.**
- **Energy Idea-213 No's**
- **Quiz-73 No's.**

S No	Instruments	Make
1	Power Quality Analysers (2 Nos)	Krykard
2	Flue Gas Analyser	Kane(NEVCO)
3	Thermal Imager	Testo
4	Ultrasonic Flow Meter	Eesiflo
5	Ultra Sonic Thickness Gauge	Eqinox
6	Pitot tube	Nevco
7	Digital Manometer / Pressure meter	Comark
8	Hotwire Anemometer	Testo
9	TDS / pH Meter	Aquisol
10	Stroboscope / Tachometer	Extech
11	Humidity, DBT & WBT Meter	Testo
12	Digital Pressure Guage	Testo
13	Lux Meter	Extech
14	Stop watch	Extech
15	Psling Psychrometer	Dimple

Learnings from CII - last 3 Years

Implementation of OFR Systems – Refrigeration Systems

- Improved reliability & safety in Refrigeration Systems.
- Savings to the tune of 32-48% observed in the existing plants.

Procurement of No Air Loss Drain Valves in Compressed Air Systems

- Avoided loss of compressed air to atmosphere.
- Attractive payback period of 3 months.

Procurement of Vertical Inline Pumps replacements & New projects

- Energy Efficient and reduced power consumption.
- Low foot print , Less maintenance and down time.

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

- Energy Efficient and reduced power consumption.
- Low footprint , Less maintenance and down time.

11. 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

Awards & Recognitions

Excellent Energy Efficient Unit in 2021 & 2022

1

Operational Excellence

Global Operational Excellence Company of the Year 2022
Global Healthcare Awards

2

Human Resources

Significant Achievement in HR Excellence, 13th CII National HR Excellence Award, 2022

3

Business Development

- **Excellence in Business Partnering, Economic Times Human Capital Awards, 2022**

CSR Activities

- 76.3 Crores spend
- 7.38Lakh Beneficiaries

Education and skill development
- Eradication of hunger and poverty
- Sustainable agriculture and environment protection
- Disaster and healthcare relief programmes
- Other rural development activities

Thank You

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