AUROBINDO
Committed to healthier life!

24th NATIONAL AWARD 2023

EXCELLENCE IN ENERGY MANAGEMENT

TEAM MEMBERS

MEERA SHARIF SHAIK, SENIOR GENERAL MANAGER- Engineering

RAMA SESHU VARA PRASAD GEDALA, SENIOR MANAGER-Electrical

V S S SEETHA RAMARAJU PUSAPATI, MANAGER- Utility

AUROBINDO PHARMA LIMITED

UNIT XI , Pydibhimavaram, SRIKAKULAM

www.aurobindo.com

AUROBINDO PHARMA LIMITED

Inception: *Founded: 1986 by Mr. P. V. Ramprasad Reddy, Mr. K. Nityananda Reddy*
Aurobindo Pharma became a public company in 1992

- *USFDA cGMP Approved*
- *2nd Largest pharma by revenue (India)*
- *10th largest by generic sales (globally)*
- *Largest generics company in the US (by Rx dispensed)*

MISSION & VISION

Aurobindo's mission is to become the most valued Pharma partner to the World Pharma fraternity by continuously researching, developing and manufacturing a wide range of pharmaceutical products that comply with the highest regulatory standards

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

STATISTICS

Employees Worldwide	**33000+**
Market Presence	**155+ countries**
Mfg. Facilities	**25**
Dosage Forms	**41 Billion**
Revenue	**$ 3.1 Billion**

ROBUST R & D

One of the largest R&D facilities in India, Aurobindo Pharma has five research center's spread over 16,000 square meters. It also has 3 R&D centers in USA. The company employs over 1700+ scientists & analysts in-house expertise in product development.

OUR EVOLUTION

- *Successful innovation in process chemistry*
- *Cost competitive manufacturing*
- *Large diversified product portfolio*
- *Global leadership in anti-infective*
- *Largest generic portfolio in Antiretroviral drugs(ARVs)*

CORE STRENGTHS

- *Scale, Diversity and Leadership*
- *Operational Excellence*
- *Service Delivery*
- *Patient Focus*

AUROBINDO PHARMA LIMITED

UNIT-XI
PYDIBHIMAVARAM

REGULATORY AUDIT / CERTIFICATION

CDSCO-India
DCA-India
ANVISA-BRAZIL
COFEPRIS-MEXICO
EDQM & ANSM FRANCE
MHRA-UK
PMDA
TGA – Australia
WHO – Geneva
USFDA

OVERVIEW

- *Multi product facility spread over 161 acres*
- *Site distinguished into Phase-I, Phase-II, Phase-III & Intermediates section*
- *43 API Modules*
- *Purified water plants with closed loop circulation*
- *Wastewater treatment facility*

INDEPENDENT AREAS

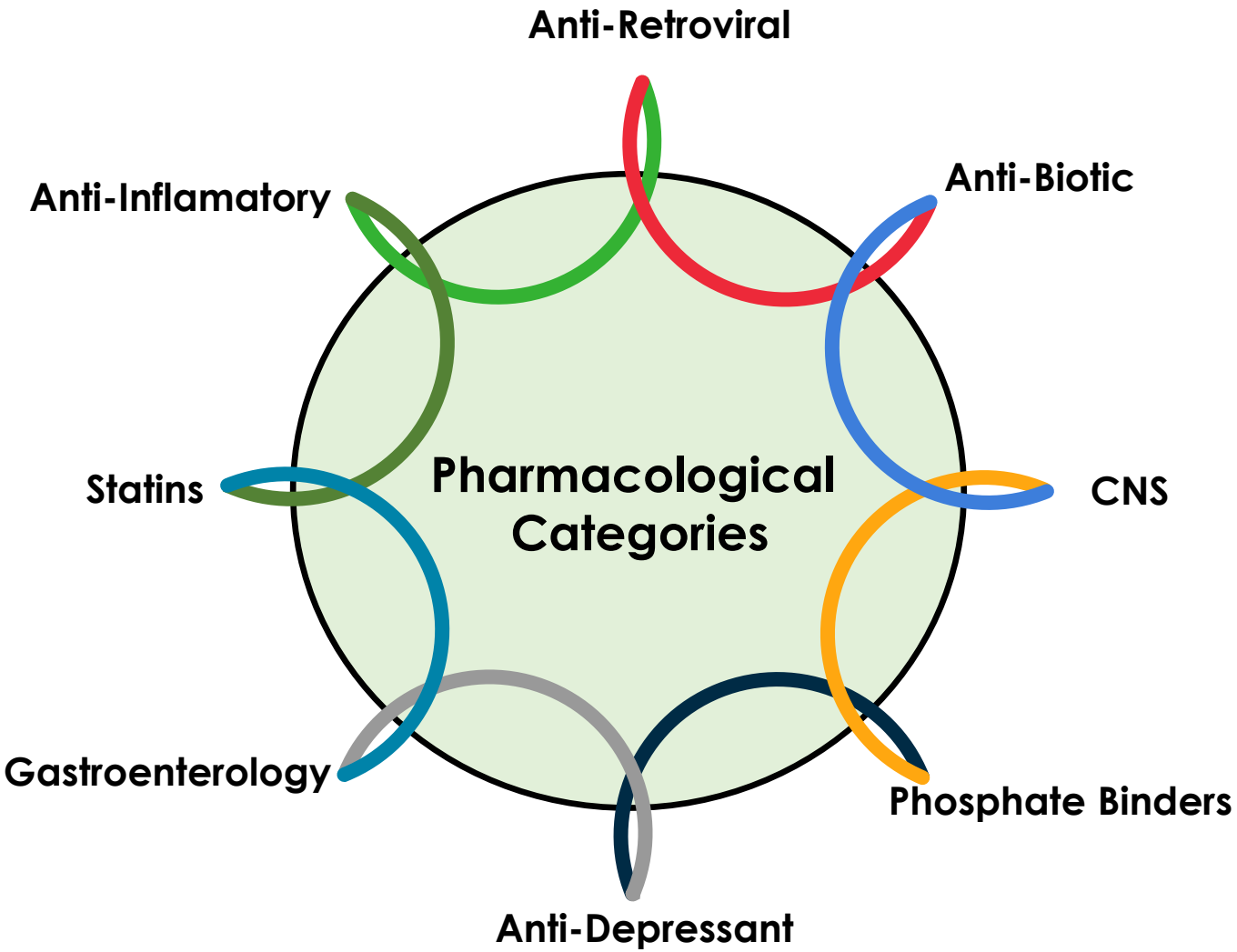
- *Warehouses*
- *Manufacturing Blocks*
- *Quality Assurance*
- *Quality Control*
- *Purified Water System*
- *Utilities*

STATISTICS

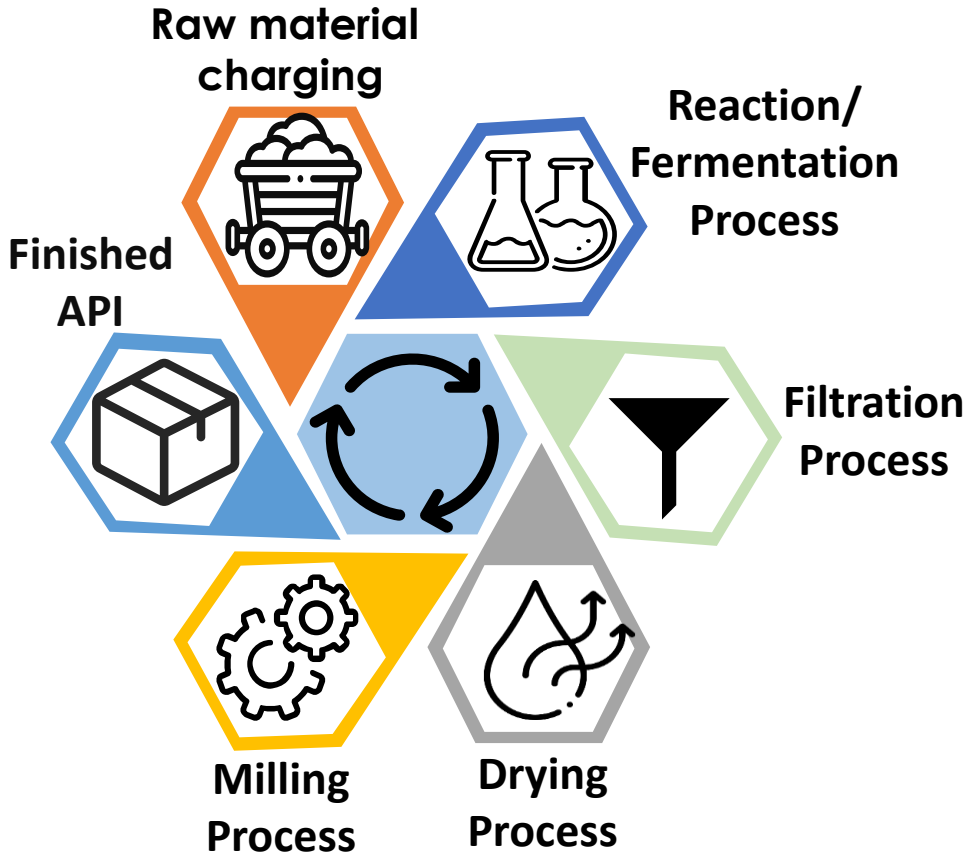
Total Employees	**2200+**
APL Facility	**25 Blocks**
No. of Products Mfg.	**104+**

UTILITY	INSTALLED CAPACITY
Nitrogen	*~1400 nm^3 / Hr*
Air Compressor	*~6486 CFM*
Power	▪ *Captive Power generation ~9 MW* ▪ *Also sourced from Andhra Pradesh Power Transmission Corporation with CMD- 21MW* ▪ *DG Backup Power 10.5 MW*
Steam	*80 TPH Installed capacity*

Manufacturing Process

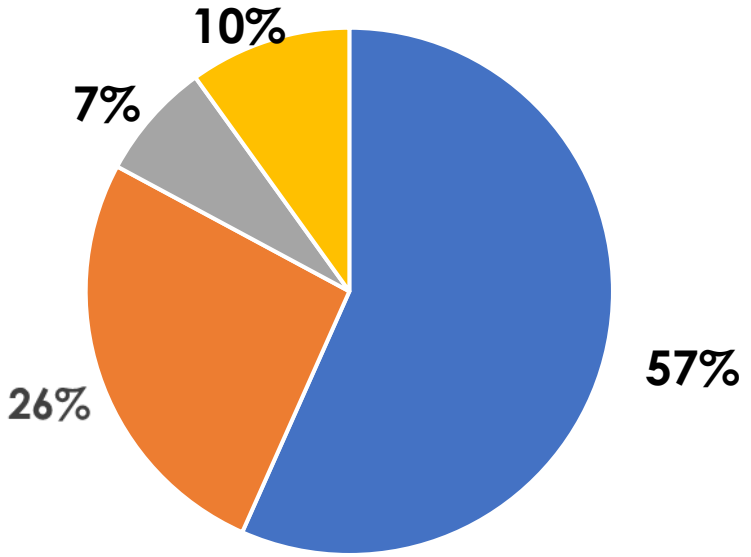


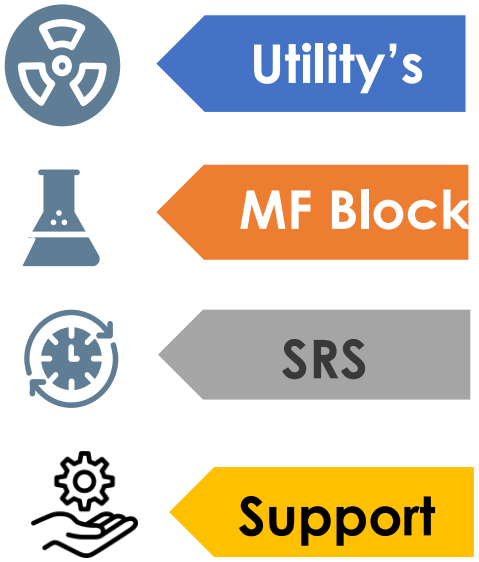
Process flow chart



Overall Energy Consumption Overview

S No	Parameters	Units	FY 2020-21	FY 2021-22	FY 2022-23
1	Annual Electrical Energy Consumption	Million kWh/year	132.52	121.92	91.39
2	Annual Electrical Energy Equivalent	Million kcal/year	113967.20	104851.20	78595.40
3	Annual Thermal Energy Consumption	Million kcal/Year	271850	245210	288356
4	Overall Energy Consumption	Million kcal/year	385817	350061	366951
5	Annual Production	MT/Year	4481	2291	2679
6	Specific Electrical Energy Consumption	MMkWh/Ton of production	0.029	0.053	0.034
7	Specific Thermal Energy Consumption	MMkCal/Ton of Production	60.66	107.03	108.00
Overall Specific Energy Consumption		**MMkCal/Ton of Production**	**86.10**	**152.79**	**137.30**





Electrical Distribution FY 2022-23

Production & Specific Energy Consumption data in last 3 years (FY 2020-23)

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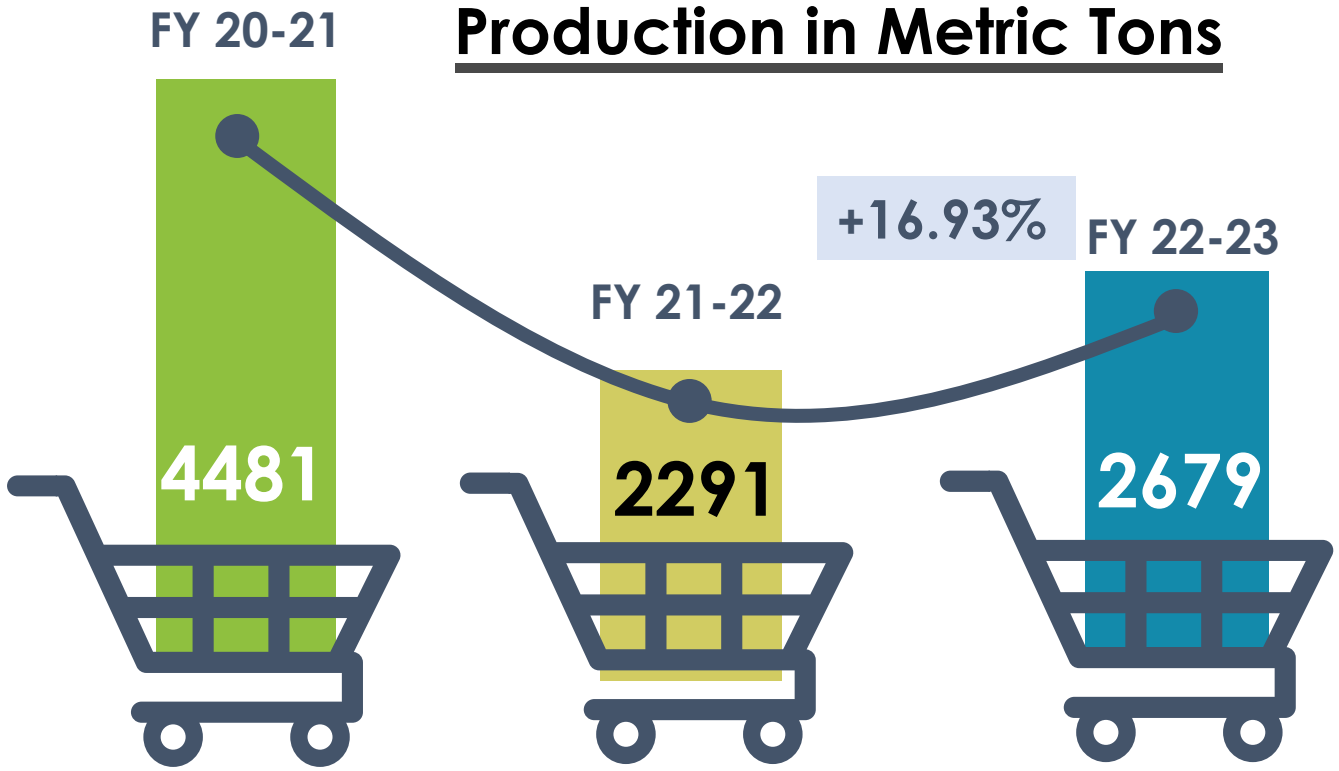
Production in Metric Tons



- The Specific Electrical Energy consumption for FY22-23 has brought down by 36% compared to FY 21-22.This is due to various energy initiatives and operational excellence at our unit.
- Coal consumption was optimized by different initiatives like elimination of direct steam purging, steam leaks arresting with in time & by change in reflux ratios/improvement of solvent recovery percentage at solvent recovery units.
- Though the production has increased by 16% ,coal consumption was optimized & Observed only 1% hike in Specific Thermal Energy consumption. Usage of Low GCV coal in place of High GCV coal has contributed to save the cost with an incremental increase in consumption.

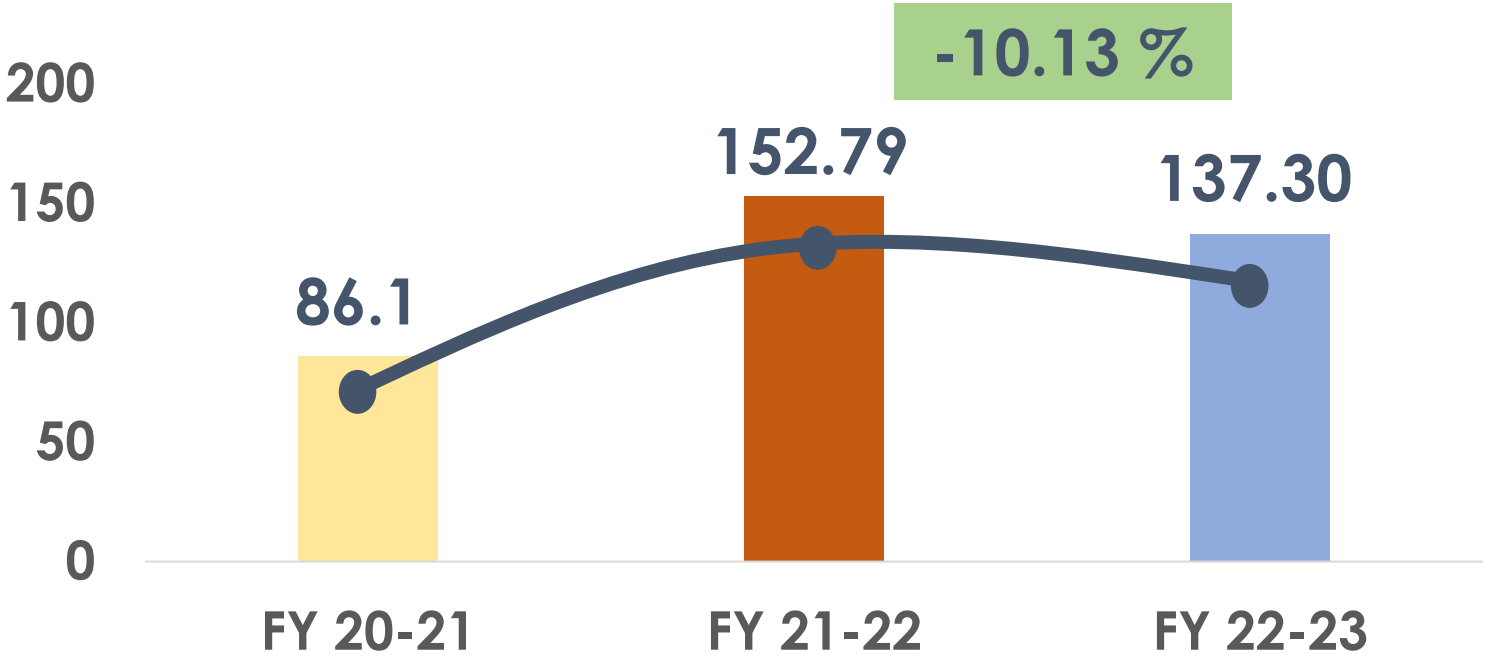
Specific Electrical Energy Consumption, Million KWH/Ton of production

FY 2020-2021	0.029
FY 2021-2022	0.053
FY 2022-2023	0.034

Specific Thermal Energy Consumption, Million kCal/ Ton of Production

FY 2020-2021	60.66
FY 2021-2022	107.03
FY 2022-2023	108

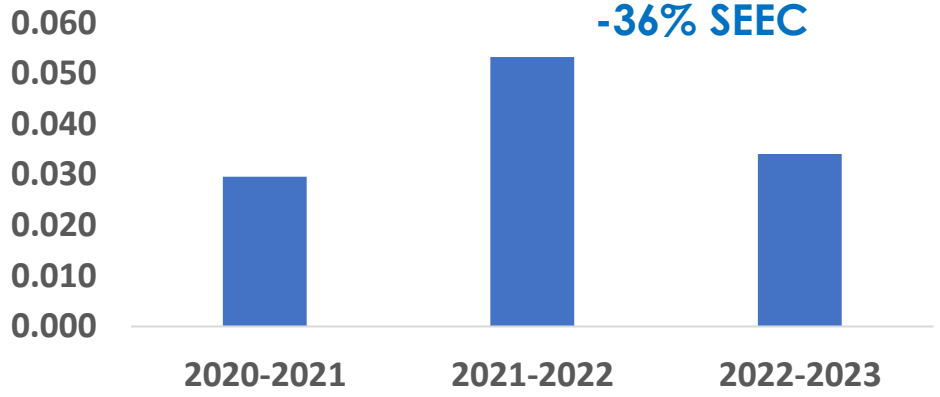
Overall Specific Energy Consumption trend in last 3 years (FY 2020-23)



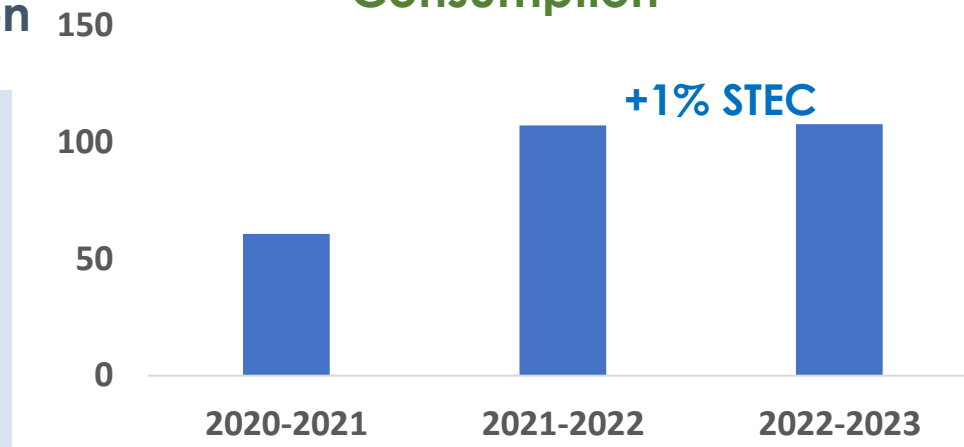
Overall Specific Energy Consumption, MMkCal/MT of Production

- The Overall Specific Energy Consumption of FY22-23 was brought down by 10% compared to FY21-22.
- This has been achieved by various energy efficient initiatives , adopting energy efficient equipment's & Operational excellence at our unit.
- Usage of Rice husk explored in place of coal to encourage non-conventional fuels usage at power plants.

Specific Electrical Energy Consumption



Specific Thermal Energy Consumption



Information on Internal Benchmarking

Internal Benchmarking	FY23 Baseline Units/day	FY23 Actuals Units/day	FY24 Base line Units/Day
Phase-I	1,09,900	1,06,046	95,441
Phase –II	75,500	71,345	64,210
Phase – III	96,000	94,491	85,041
Intermediate	1,05,000	1,10,262	99,235

FY23 & FY24 Energy Baseline

- FY23 energy consumption was Par in line with assigned baselines with increase in 16% production volumes. Possible with Energy efficient equipment and operational excellence, KAIZENS, DMAIC & KRAs.
- FY 23 targeted energy baseline was assigned based on actuals of FY 22 with reduction of 10% as target
- Based on actuals of FY 23, energy base line was considered for present financial year with 10% reduction target at budgeted production volumes of FY24

Way Forward Activities to achieve Baseline of FY 24

Proposed 23no of Energy projects with investment of Rs19.64Million with Projected saving of 11.13Million Kwh & monetary benefit of about Rs 160Million, some of the highlight's projects are mentioned below.

- ❑ Proposed to install VFDs to higher HP motors at Utility compressors secondary distribution pumps & Boiler Feed water pumps
- ❑ Proposed to arrange VFDs for Aerators at MBR Plant for optimization of energy.
- ❑ Proposed to replace existing Cooling tower Cast Aluminum blades with E-Glass FRP.
- ❑ Proposed to arrange microprocessor-based temperature controllers for DX Units.
- ❑ Proposed to Increase Air compressor FAD 273 CFM to 330 CFM by replacement of existing 50HP motors to 60HP Energy efficient motors.
- ❑ Proposal to arrange No air loss auto drain valves at Utility areas for optimizing compressor loading hour

Information on Energy Baselines - Utility

	Reciprocating Chillers			Screw Chillers	
Design Temp (°C)	+5	-20	-30	+5	Design Temp (°C)
Design SEC (kW/TR)	0.86	1.59	1.83	0.64	Design SEC (kW/TR)
Operating SEC (kW/TR)	0.92 - 1.1	1.71 - 1.81	2.0 – 2.5	0.68 – 0.82	Operating SEC (kW/TR)
Target NMT SEC (kW/TR)	0.86	1.59	1.83	0.64	Target NMT SEC (kW/TR)

Air Compressors	
Design SEC (kW/CFM)	0.18
Operating SEC (kW/CFM)	0.22 – 0.29
Target SEC (kW/CFM)	0.1

Steps to Achieve Target SEC:

- Identifying the chilled water / Chilled brine 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 En.con Projects planned in FY 2023-24

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1	Energy optimization by arrangement of VFD's & PTs for Utility secondary distribution pump's (+5 & -30 C)		INVESTMENT : 2.98 Million SAVINGS : 4.42 Million PAY BACK : 8.1 Months
2	Energy optimization by replacement of higher HP motors with desired HP w.r.t Pump capacities at Utility areas		INVESTMENT : 2.99 Million SAVINGS : 6.04 Million PAY BACK : 5.9 Months
3	Proposed to increase Air compressor FAD from 273 CFM to 330 CFM by replacing existing 50 HP motors with 60 HP energy efficient motors with accessories for 4 Nitrogen gas generation plants		INVESTMENT : 2.40 Million SAVINGS : 3.14 Million PAY BACK : 9.1 Months
4	Proposed to arrange VFDs for Aerators motor(40HP) at MBR Plant for optimization of energy (Total:21nos)		INVESTMENT : 1.29 Million SAVINGS : 1.70 Million PAY BACK : 9.1 Months
5	Proposed to replace existing Cooling tower Cast Aluminum blades with E-Glass FRP, due to this the efficiency of fans increases from 85-92% compared to the traditional efficiency range of 55-65%		INVESTMENT : 1.17 Million SAVINGS : 1.08 Million PAY BACK : 13 Months
6	Proposed to arrange microprocessor-based temperature controllers for DX coils at Phase-III QC,MSAT lab,WH-3 & WH-7 areas for energy optimization		INVESTMENT : 1.02 Million SAVINGS : 2.04 Million PAY BACK : 6 Months

Energy Saving projects implemented in last three years

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FY 21

Investments(₹ Million)	: 50.7
Electrical (Million kWh)	: 15.93
Thermal (Million kcal)	: 22.54
Monetary Savings (₹ Million)	: 92.32
Payback Period (In months)	: 7

21 No. projects executed in FY20-21

FY 22

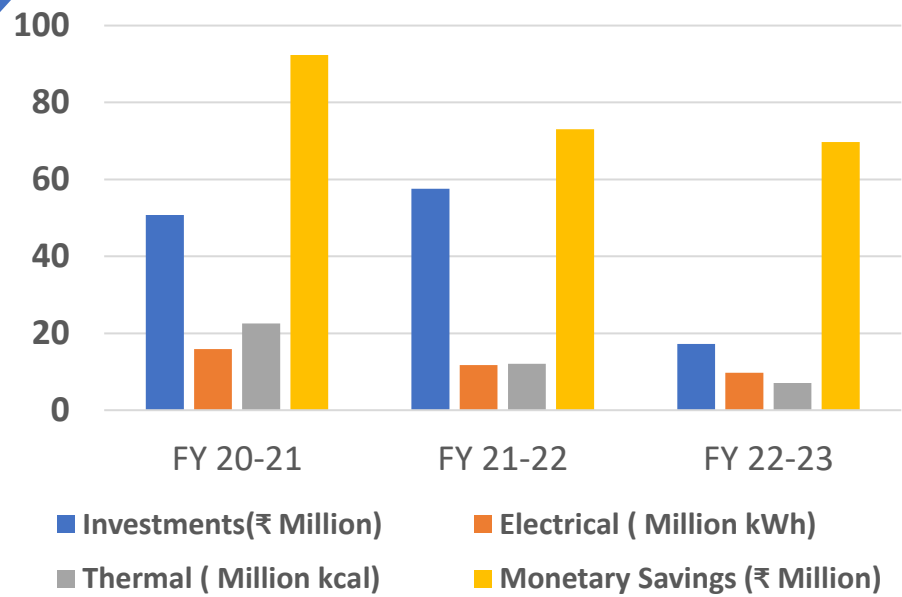
20 No. projects executed in FY21-22

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

FY 23

23 No. projects executed in 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



Energy Saving projects implemented in last three years

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Year 2020-21

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	Installation of Energy Efficient Screw Refrigeration Systems by Replacing the Old Reciprocating Systems - CMU015	4	0.7	-	3.96	12
2	Installation of Energy Efficient Screw Refrigeration Systems by Replacing the Old Reciprocating Systems - CMU016	4	0.77	-	4.4	11
3	Replacement of old and energy intensive Reciprocating Compressors with new Compressors for Conservation of Energy	1.6	0.23	-	1.29	15
4	Installation of energy efficient LED lamps by replacing old and energy intensive lighting appliances	1.75	0.71	-	4.3	5
5	Installation of Molecular Sieve Dehydrator system in Solvent Recovery Plant (SRP) and Eliminating Operation of Chilling Plants	34.1	0.4	-	2.4	170
6	Improved the performance of chilling plants, efficiency and running at close to design conditions - Operational Improvements	1.5	4.59	-	25.29	1
7	Installed new energy efficient pumps and replaced IE1 motors with IE3 energy efficient motors in utility systems	0.32	0.04	-	0.24	16
8	Replaced the existing cooling tower with energy efficient Wooden Cooling Tower	0.45	0.21	-	1.15	5

Energy Saving projects implemented in last three years

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Year 2021-22

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
6	Energy optimization by installation of Sequential Timer Logic for reduction in running hours of AHUs	0.5	0.32	-	1.94	3
7	Energy optimization of cooling tower RT pumps and CT fan running hours with auto ON/OFF with reference to chiller compressor(CMU084, CMU088) ON/OFF	0.1	0.27	-	1.65	1
8	Extraction of heat from rejected condensate water from blocks(Phase-2) to enhance the temperature of boiler feed water(DM water) by using heat exchangers	-	-	177.48	1.42	4.2

Energy Saving projects implemented in last three years

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Year 2022-23						
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	Energy optimization by replacement of existing 3nos of +5°C reciprocating compressor to energy efficient screw compressors	10.8	3.38	-	23.68	5
2	Energy optimization by synchronizing condenser & Utility cooling tower discharge header lines at I-Block & J-Block	5	0.28	-	1.96	31
3	Energy optimization by installing variable frequency drives to STG-I & III - Boiler Feed water Pumps	0.75	0.04	67	0.3	30
4	Energy optimization in lighting consumption by replacement of traditional 160W MLL lamps to 45W LED retrofit LED lamps	0.52	0.18	-	1.29	5
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

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: 10.80 Million **Savings:** 23.68Million

Energy optimization in lighting consumption by replacement of traditional 160W MLL lamps to 45W LED retrofit LED lamps at block inside& outside areas
Investment: 0.52Million **Savings:** 1.29Million

Energy optimization by synchronizing condenser & Utility cooling tower discharge header lines so as to achieve maximum capacity utilization of Cooling towers (CTI001 & CTU021), (CTJ001 & CTU023)
Investment: 5Million **Savings:** 1.96 Million

Energy optimization of Split A/C's and DX coils at QC & office areas by arrangement of microprocessor-based temperature controllers which will reduce running hours by taking feedback from inbuilt dual sensor
Investment: 0.169Million **Savings:** 0.69Million

Energy optimization by installing variable frequency drives to STG-I & III - Boiler Feed water Pumps
Investment: 0.75 Million **Savings:** 0.30 Million

Optimization of running hours of AHUs by arrangement of timer switch to office areas
Investment: 0.0010 Million **Savings:** 0.18Million

Innovative Projects implemented

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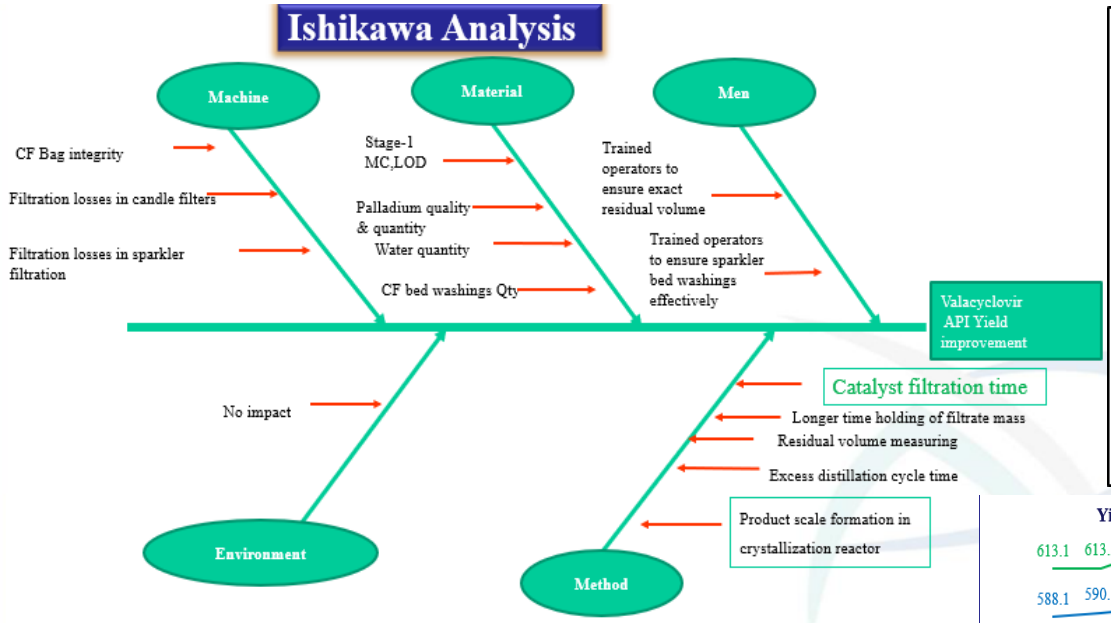
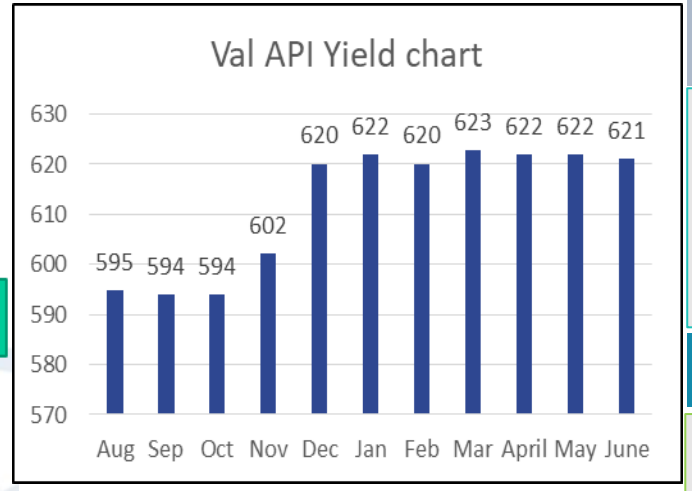
01

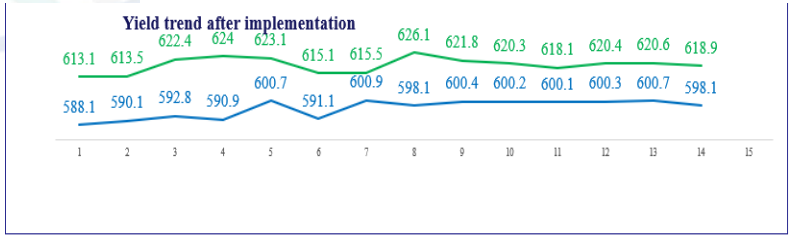
TITLE: Energy Optimization by enhancement of API Product Yield

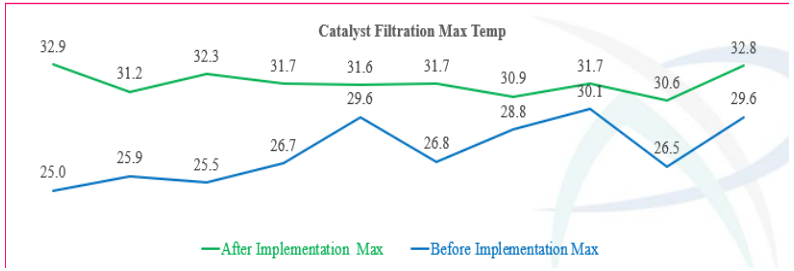
Description: Enhancement of productivity by reduction of catalyst filtration cycle time from 18 hours to 10hours with the use of elevated temperatures & also distillation cycle time reduced by 10hrs per batch.

- **Electrical Units saving per annum- 1.24 Lakh Units**









Before : Catalyst filtration was performed at 26-27°C.

After: Catalyst filtration is performing at 30-32°C, filtration cycle time reduced from 18hrs to

Yield Improvement

Before: Strip off solvent directly charged into the reactor caused scale formation.

After: Strip off solvent charging through spray balls under inert atmosphere enhanced recovery

Triggering Factor

- Low Yield and high cycle time.
- Multiple brainstorming sessions & by close monitoring the filtration operation, understood the role of temperature and thus carried out filtration at 31-32°C instead of 26°C.

Actions Taken

- Carried out catalyst filtration at 31-32°C.
- Solvent strip off thru spray balls
- Replaced GL Reactor to Hastalloy reactor to improve the heat transfer and optimize running hours

Benefits

- Achieving target yield of 620 kg with reduced cycle time &reduced equipment running hours.
- Total Batches per month- 45 nos
- Yield benefit in a month: 1125Kg
- **Electrical Units saving per batch 10,833**
- Cost saving/annum in Units Rs 9.7 lakhs
- Cost saving per Batch is Rs 1.58 Cr

Innovative Projects implemented

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02

TITLE: Energy Optimization by enhancement of Ethanol recovery by reducing reflux ratio at Solvent recovery plant

Description: By changing reflux ratio, achieved time cycle reduction from 25 hrs. to 19hrs. & optimized steam consumption at distillation columns for recovery of Ethanol from API Products at Solvent Recovery sections.

- **Thermal saving per Annum- 127 MMKcal Electrical units saving per annum - 2.9 Lakhs units.**

Before : Due to high reflux ratio, solvent recovery time was 25Hours with Reflux ratio:2:1

After : With the change in reflux ratio, solvent recovery time was reduced to 19Hours with Reflux ratio:1.5:1

Steam consumption and utilities operations optimized as the cycle time reduced by 6 hrs.

By change in rate of Reflux ratio, achieved enhanced recovery % of solvent with reduced recovery collection time

Triggering Factor

- Low Recovery of Ethanol and high cycle time.
- Process was reviewed and evaluated that no reflux need during distilled Ethanol collection as input contains ~2% Moisture.

Actions Taken

- Change in reflux ratio from 2:1 to 1.5:1, achieved time cycle reduction from 25 hrs. to 19hrs. & optimized steam consumption at distillation columns

Benefits

- Reduced distillation time by 6 hrs and occupancy increased.
- Ethanol recovery increased by 8%
- **Steam consumption reduced by 4.1 MT/hrs**
- **Coal saving per month 42 MT**
- Coal cost saving per annum Rs 42.74 Lakhs
- **Units KWH saving per annum 2.9 Lakhs units.**

Innovative Projects implemented

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03

TITLE: Energy optimization and cycle time reduction in API Product at J block

Description: Energy optimization by replacement of existing oil ring vacuum pump to advanced dry vacuum pump with booster, thus achieved reduction in man hours & enhanced productivity with increased occupancy of equipment's .

- **Thermal Saving Per Annum- 514 MMKcal Electrical Units Saving Per Annum- 78,706**

Before: Oil ring vacuum pump was used for drier which uses higher cycle time

To reduce drying cycle time & to improve over all recovery %, oil ring vacuum pump was replaced to advanced dry vacuum pump with booster

Achieved drying cycle time reduced from 74hrs to 24hrs which in turn reduces running hours of equipment & connected utility's & man hours

Energy optimization achieved due to reduced running hours/batch & equipment occupancy was increased to improve over all output

Triggering Factor

- High Drying Time per batch
- Brainstorming sessions & analysis for reduction of drying cycle time carried to reduce drying time and energy optimization.

Actions Taken

- Replaced existing oil ring vacuum pump with Advanced dry screw vacuum pump with additional booster capacity.
- Connected to 4 nos vacuum tray dryers

Benefits

- Increased occupancy of equipment due to reduced cycle time /batch by 50 hrs./batch
- **Units Savings for 47 no.of Batches 78,706 Units**
- Cost saving from units is Rs 6.27 lakhs
- **Steam consumption reduced by 14MT/batch**
- **Coal consumption reduced by 3.6 MT/batch**
- Coal cost saving of 14.5 lakhs

Utilisation of Renewable Energy sources

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Installed 30 MW Offsite Solar Power Plant : % Share in Energy Consumption : 30%

YEAR	Technology (electrical)	Type of Energy	Onsite/ Offsite	Installed Capacity (MW)	Generation (million kWh)	% of overall electrical energy
FY 20-21	Solar PV	Solar	Offsite	30	44.20	33.35
FY 21-22	Solar PV	Solar	Offsite	30	43.24	35.46
FY 22-23	Solar PV	Solar	Offsite	30	43.03	47.08

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 Nos units of Aurobindo considered

Generation

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

% Share to Unit-XI

CMD allotted from Solar : 5.04 MW/hour (75%)
Allotted Generation: 3.22 Cr Units / Year
% Share in Energy Consumption : 30%

.

Sustainability / GHG Inventorisation

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01 Sustainability Report

2022-23

Published sustainability 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

Emissions Intensity of last three years (FY2020-23):

FY	Scope 1 emissions	Scope 2 emissions	Total GHG Emissions (tCO2e)
2020-21	1,03,177	1,02,850	2,06,027
2021-22	1,07,417	79,063	1,86,480
2022-23	1,00,363	75,854	1,76,217

Sustainability / GHG Inventorisation

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Target for GHG Emissions Reduction :

"APL has set Sustainability goals for 2025 as "12.5% reduction in carbon footprint by 2025"

ENERGY DATA				
S. No	**Parameters**	**Unit of Measurements**	**FY 22-23**	**Emissions (Tons of CO2)**
1	Annual Electrical Energy Consumption	Million kWh	91	75,854
2	Annual Coal Consumption	MT	80099	1,00,124
3	Annual FO Consumption	KL	0	0
4	Annual Diesel Consumption	KL	108	239
5	Annual Petrol Consumption	KL	0	0

Action Plan :

To reduce carbon emissions,

- Installation of 30MW Solar power plant offsite.
- Coal consumption was reduced with different initiatives like elimination direct steam purging into hot water tanks, steam traps conditioning, steam leaks arresting with in time & by change in reflux ratios at solvent recovery units.
- Coal consumption reduction with replacement of coal usage to Husk at power plant areas for reduction of carbon emissions.
- Implemented & utilized Battery operated vehicles(forklifts) for material transportation.
- Introduced E-by cycles in plant area of around 200nos.
- Implemented & utilized Battery operated vehicles for man movement inside plant premises.
- 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.
- Proposal to utilize common transportation facility for all employees who are coming by own transportation.

Green Supply Chain Management

Information on Projects Implemented FY 22-23

1	LIMS software at QC areas for paper less documentation	▪ Decreased paper consumption as the system operates & shares data online which reduces effect on eco system. Inv: 150 Lakhs
2	Implemented & utilized Battery operated vehicles(forklifts) for material transportation	• Decreased Carbon Emissions due to reduced usage of rock oil
3	Introduced E-by cycles & by cycles in plant area of around 200nos	▪ Reduced pollution level inside plant which avoids usage of petrol and diesel for internal commute
4	Implemented & utilized Battery operated vehicles for man movement inside plant premises	• Decreased Carbon Emissions due to reduced usage of rock oil
5	Central Warehouse for goods collection & transportation	• Decreased Carbon Emissions due to reduced usage of rock oil
6	Introduced and removed multiple cars for senior management commute & arranged common vehicle to plant	• Decreased Carbon Emissions due to reduced usage of rock oil
7	Proposal to utilize common transportation facility for all employees who are coming by own transportation	• Decreased Carbon Emissions due to reduced usage of rock oil

Green Supply Chain Management

Information on Evaluation Done:

Initiated different projects for reducing Carbon emissions.

- FY 2021-22- 4nos projects implemented with investment of Rs 190 Million
- FY 2022-23- 7nos projects implemented with investment of Rs 24.23 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.

- Carbon emissions FY 22-23 was brought down by 5% compared to emissions of FY 21-22.

- 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

Projects Implemented FY 21-23 & Benefits Achieved

FY 2021-22

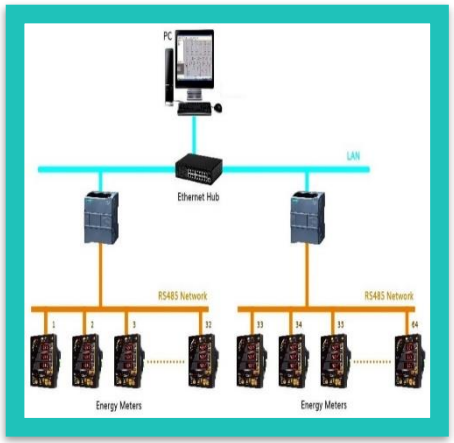
S.No	Projects Implemented	Investment Made (Rs In Million)	Remarks
1	Single Stuffing/ Double Stacking Project	190	Saved Freight on additional container with 50% extra space
2	Paperless / Digital Logistics		First Pharma company in India to adopt OTM
3	AIR vs SEA – Mode Control		Decreased air Tonnage from572 Tonn to 456 Tonn
4	GST – e Invoicing		Decreased Paper consumption and paper less/Digital transactions

FY 2022-23

S.No	Projects Implemented	Investment Made (Rs In Million)	Remarks
1	Implemented LIMS(Laboratory information management system) software at QC areas for paper less documentation & all activities are carried out through software	15	This initiative was implemented in QC areas of plant to reduce paper consumption so that ecosystem balance is achieved.
2	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 - 7nos	8.82	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
3	Introduced E-bicycles & By cycles in plant area of around 200nos	4.4	Bicycles were used to roam inside plant premises, implemented usage of e-bicycles for local employee commute which reduces carbon emissions & in turn reduces cost of petrol and diesel
4	Implemented & utilized Battery-operated vehicles for man movement inside plant premises for cost reduction of petrol & diesel usage -2 nos	1.19	For Senoir management local commute, implemented usage of BOPV to reduce carbon emissions & to reduce usage of petrol and diesel
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		Central warehouse facility was introduced for goods transportation from vendors to reduce carbon emissions and to increase occupancy of vehicle & vendor is benefited
6	Introduced and removed multiple cars for senior management commute & arranged common vehicle to plant so as to reduce cost of petrol and diesel for vehicles		This initiative was implemented to reduce carbon emissions due to usage of multiple vehicles. Which in turn increases occupancy and reduced usage of diesel and petrol
7	Proposal to utilize common transportation facility which was available for all employees who are coming to plant on own transportation		Common transportation is available from all areas to site, some of the employees are approaching to plant thru own transportation which increases carbon emissions.

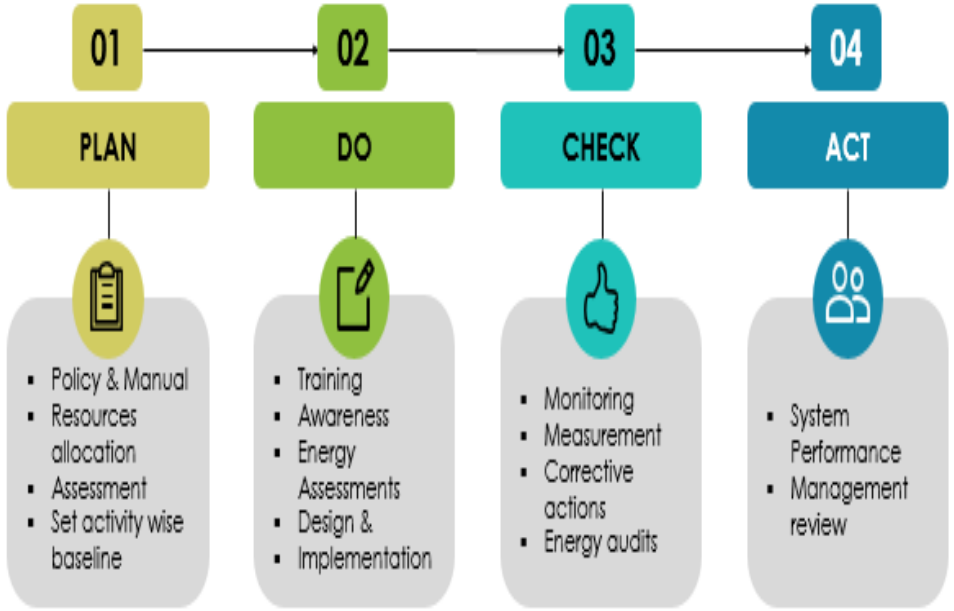
Energy Management System

Existing monitoring system



- Energy Monitoring Systems Implemented across all Power Control Centres – 400 No's - Daily Monitoring, Reporting and Reviewing
- Review meeting on day-to-day energy consumption and benchmarking 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.
- Carrying yearly calibrations to all energy meters to stay accurate

Energy Management System-Procedure



ISO 50001:2018 Opening Meeting & Internal Auditor Training Program By CII

New initiatives at our Unit:

- **ISO 50001:2018 certification implementation by Nov'23**
- Initiated internal audits as per ISO 50001: 2018 guidelines
- Nominated internal audit core team members and imparted training
- Energy baseline assigned for significant energy consumption areas
- Monthly review on En.Con activities and their progress is reviewed by senor management
- Lean Daily Meetings (LDM's) and KRA's are designed to focus on energy baselines to achieve energy base lines

Learning from past CII award programs

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SCREW CHILLERS

Phased manner replacement of Chillers with Energy Efficient Chillers

EMS

continuous monitoring, reporting and reviewing of power consumption all over the plant

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 by running softballs through tubes on preset time cycles.

NET ZERO commitment

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Net Zero Target year /commitment :

- APL has set Sustainability goals for 2025 as "12.5% reduction in carbon footprint by 2025"

Roadmap for achieving the target:

- Driven from corporate level, we have taken initiatives from green supply chain management to achieve target by 2025 .
- New solar plants set up on whole under process to reduce carbon emissions & to reduce Greenhouse gas emissions we have initiated different projects .
- Supply chain & logistics improvement is under discussion for centralized logistics to reduce carbon emissions

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 & Celebrations

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CII Best Energy Efficient Unit Award


CII
Confederation of Indian Industry

22nd National Award for Excellence in Energy Management 2021

This is to certify that

Aurobindo Pharma Limited, Unit XI, Vizag

has been recognized as

'Energy Efficient Unit'

This acknowledgement is based on the evaluation by panel of judges at the "National Award for Excellence in Energy Management" held during 24 - 27 August 2021.

K S Venkatagiri

Ravichendran Purushothaman

Best L&D Excellence Award

ISO 14001:2015 Certification

Best Energy Conservation Project

Best KRA Award

Best LDM Award

Teamwork, Employee Involvement & 5S Implementation

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Talent Development Program

Kaizen Award Winning Program

Energy Conservation Week Celebration

5S Implementation At Our Unit

Summary of KAIZENS Implemented 2022-23

S No	Initiative department	Initiatives	Completed	To be completed	Investment (in Lakhs)	Savings /Annum Rs.(in Lakhs)	ROI in months
1	Manufacturing	65	65	0	31.6	196	6
2	Engg. & Utility	120	120	0	34	246	7.2
Total		**185**	**185**	**0**	**65.6**	**442**	**13.2**

- The mentioned Kaizens include process improvements, process and Engg. Safety and Engg. & Utility cost saving as well as energy saving.

Teamwork, Employee Involvement & Monitoring

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- Discussion on DMAIC projects for capacity improvement, Process consistency, Impurity reduction.
- DMAIC ignited our innovations and to achieve improvements in process

- Discussion on energy saving activities.
- Finding path to reach internal benchmarks.
- Daily report on energy consumption and identifying the losses and initiating actions

Daily LDM-Energy Review

Virtual Training on six sigma

Monthly LDM Review

Energy Week Celebrations

- Energy Conservation week celebrations involving every department to motivate Energy saving importance and enhancing the involvement in energy saving activities

- Discussion on Kaizen improvements
- Discussion on new initiatives
- Monthly LDM winner is awarded with trophy
- LDM enhanced the huge impact on Energy saving activities.

Initiatives & Implementations

Daily Safety Dashboard

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SAFETY DASH BOARD

Date	13/06/2022	
Date of Lost time injury (LTA)	13/07/2021	
Accident free days since LTA	335	Days
Date of Hospitalization	28/01/2022	
Hospitalization free days	136	Days
Date of First Aid injury	10/06/2022	
First Aid injury free days	3	Days
Mock drill planned on 12 th Jun'22	Fire occurred while Material charging into reactor	
New Initiatives for the month	22	

Monthly LDM Review Meetings

Bonus Points:

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1. Timely conducting LDM meeting and sharing score
2. Quality of discussion during LDM with time limit
3. Action item tracking along with Backup
4. Shop floor people involvement including Cross functional Team
5. Presentation and board arrangements

LDM responsible persons & Score details for the month of May-2022

S.No	Block name	Block in charge name	Earned green marks	Not meet the points out of 5 points
1	J	P.Venkata Sanyasi Setti	6	Timely sharing Score on 24/05/2022 Action item tracking along with Backup
2	SRS-1,2 & Block-13	K.Malakondaiah	6	Timely sharing Score on 30/05/2022 Action item tracking along with Backup
3	SRS-R	K.Malakondaiah	6	Timely sharing Score on 30/05/2022 Action item tracking along with Backup
4	SRS-T	Ch.Viswantha Reddy	6	Timely sharing Score on 19/05/2022 Action item tracking along with Backup
5	EHS	Srikanth Reddy	8	Timely sharing Score on 24/05/2022,25/05/2022 & 27/05/2022
6	1	CHLV.Prasad	8	Action item tracking along with Backup
7	9	N. Vijay Kumaar	8	Timely sharing Score on 18/05/2022
8	E	G.Rama Rao	8	Timely sharing Score on 18/05/2022
9	F	P.Lenin babu	8	Timely sharing Score on 18/05/2022
10	K	V.K.Dixit	8	Timely sharing Score on 27/05/2022
11	NM-II	N. Venkatesh	8	Timely sharing Score on 30/05/2022
12	NM-III	P. Ayodhya Ramaiah	8	Action item tracking along with Backup
13	NM-IV	B. V. Giri	8	Action item tracking along with Backup
14	P	A.Hanumantha Rao	8	Timely sharing Score on 30/05/2022
15	QC	S. Uday Kumar	8	Presentation and board arrangements

SIX SIGMA Training Program

Daily LDM Meetings

Monthly Review Meetings (MRM)

Blocks : A to F Area in-charge : Sameer Shaikh

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Volumes :

Block	Module	Product Name	Capacity (Kg)	Plan (Kg)	Actual (Kg)	Plan Vs Actual (%)	Remarks
A	I	Sildenafil citrate API	1,276.0	754	766.40	101.6	----
	II	Alendronate Sodium API	3750.0	900	903.2	100.4	----
	Int.	Pioglitazone stage-II	1078.0	375	309.90	82.6	One batch short fall due to non-availability of approved Acetic acid raw material.
B&C	Int.	Alendronate sodium	1,620	1,620	1,642.5	101.4	----
		Atemoxetine	1,575	700	719.3	102.8	----
C	Int.	Darunavir Stage II	875	375	382	101.9	----
D	DM-I	Galanthamine Hbr Stage I	525	75	75	100.0	
		Galanthamine Hbr Stage II	525	150	150	100.0	----
		Galanthamine Hbr Stage III	273	117	117	100.0	
		Galanthamine Hbr Stage IV	280	120	121	100.8	
		Galanthamine Hbr Stage API	301	129	130	100.8	
	DM-II	Esomeprazole Mg.tryhydrate Stage II	60	60	58	96.7	Scrapping of material before filtration stopped
	DM-II	Esomeprazole Mg.tryhydrate	50	50	52	104.0	
	DM-II	Rizatriptan Benzoate Stage I	450	150	146	97.3	Stage-I is liquid stage, throughput quantity is consumed in API stage. Obtained API yield is within target.
	DM-II	Rizatriptan Benzoate API	152	38	39	102.6	
	DM-III	Lamivudine Form I	340	340	345	101.5	
	DM-III	Valganciclovir Stage I	1,098	366	367	100.3	

A B C D E F

Names of other Initiatives

- GEMBA Walk
- Daily Business Leaders Meet (1 PM)
- Shop Floor Visits
- Investigating on Every Safety Incident
- Energy Conservation/Energy Saving Initiatives
- Kaizen Awards
- Striving for Zero Accidents/Zero First Aid

CSR Activities

- 14 Villages Adopted
- 48 Water Drinking Plants
- 350 + Healthcare Programme
- 21 Educational Institutions
- Distribution of Cycles & Wheelchairs

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THANK YOU

Sr. No	Name	Designation	Mobile Number	Email address
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