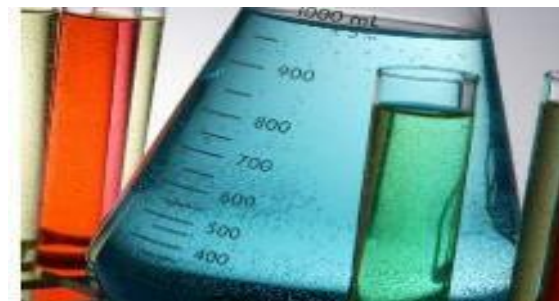




AUROBINDO PHARMA LIMITED
UNIT-11U ,
PYDIBHIMAVARAM



24rd National Award for

Excellence in Energy Management

August 13 - 15 September 2023

2023



AUROBINDO PHARMA LIMITED

UNIT-11U ,

TEAM MEMBERS

Sr. No	Name	Designation	Mobile Number	Email address
1	Mr. B. Srinivasa Rao	Asst. General Manager-EU	9666041942	SrinivasaRao.Balivada@aurobindo.com
2	Mr. M. Bimalakar Prasad	Dy.Manager-EU	7288820120	BimalakarPrasad.Malladi@aurobindo.com
3	Mr. G.Ramana Rao	Dy. Manager-EU	9000595190	RamanaRao.Gollangi@aurobindo.com

Brief Introduction on Company/Unit



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

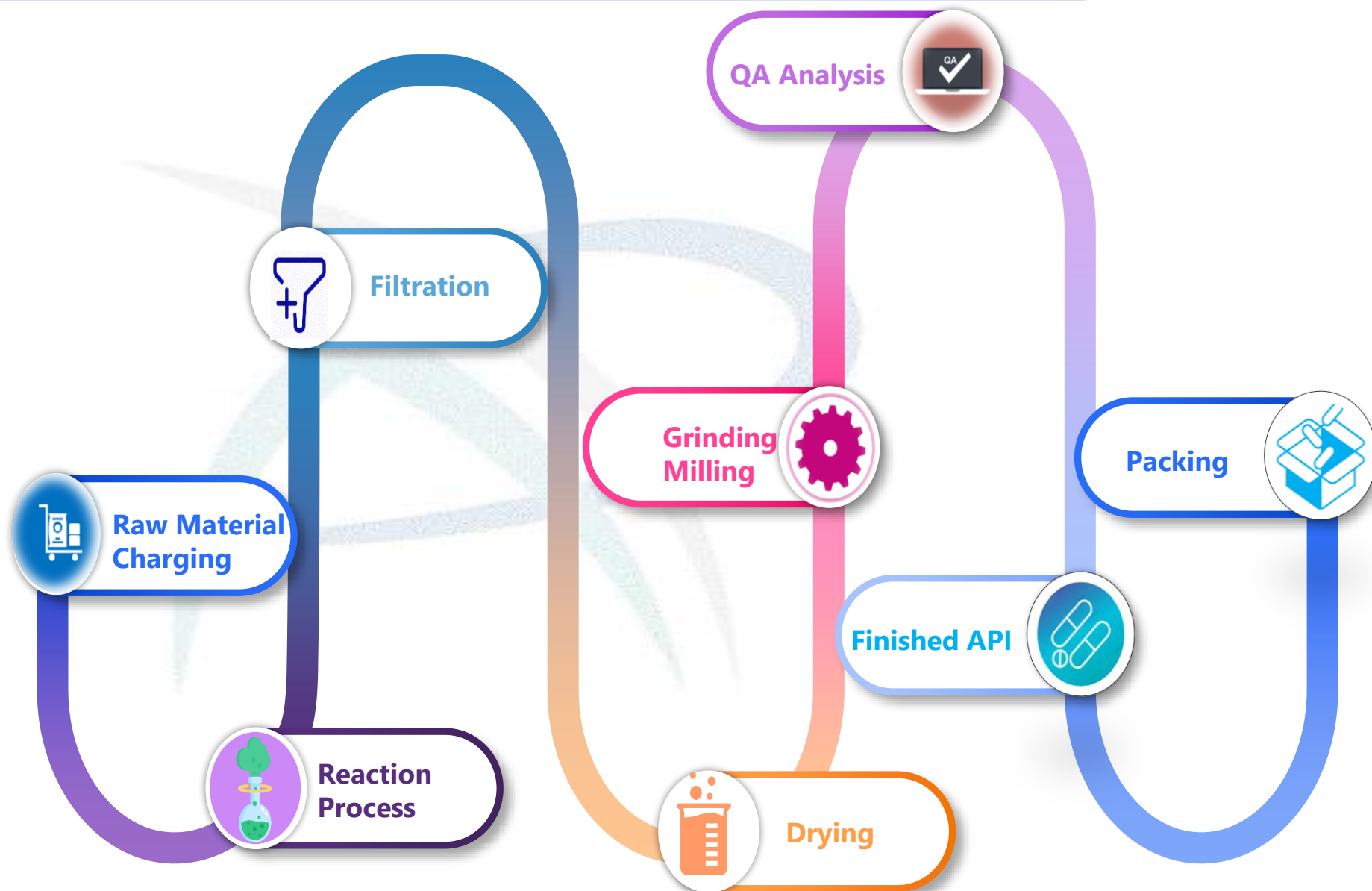


R&D Capabilities
5 in India and 4 in the US
1,500+ Scientists and analysts globally

Details of the Products / Processes

- Amoxicillin Trihydrate
- Ampicillin Trihydrate
- Cloxacillin Derivatives
- Sultamycillin Tosylate
- Cephalexin
- Cefadroxil
- Cefixime
- Proxetil

Major products :



3. Energy Consumption Overview – Last 3 Years



PRODUCTION

YEAR	VALUE (MT)
FY 2020-21	3866
FY 2021-22	3860
FY 2022-23	5020

SPECIFIC ENERGY

YEAR	VALUE (m kcal/KG)
FY 2020-21	12868
FY 2021-22	12391
FY 2022-23	11303



Production

30.05%



YEAR

VALUE (m kcal)

FY 2020-21

22987

FY 2021-22

21916

FY 2022-23

25543

THERMAL ENERGY



YEAR

VALUE (m kWh)

FY 2020-21

31.10

FY 2021-22

30.11

FY 2022-23

36.26

ELECTRICAL ENERGY



Specific Energy

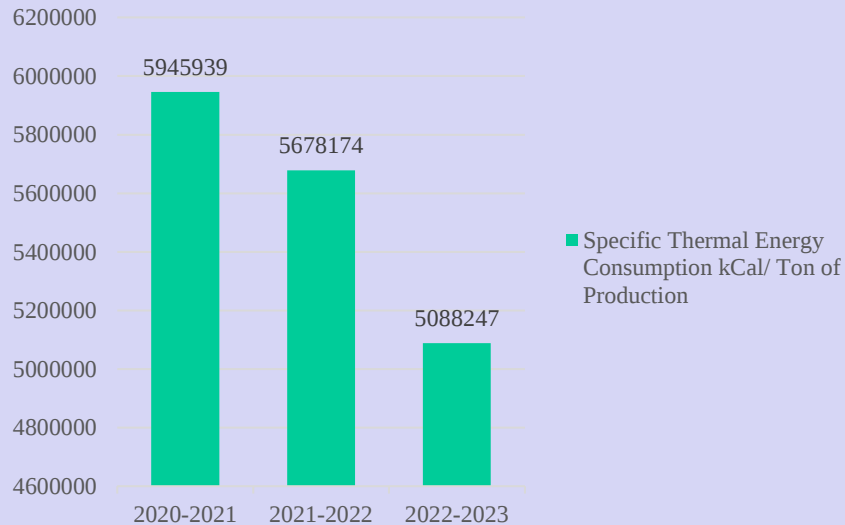
10%



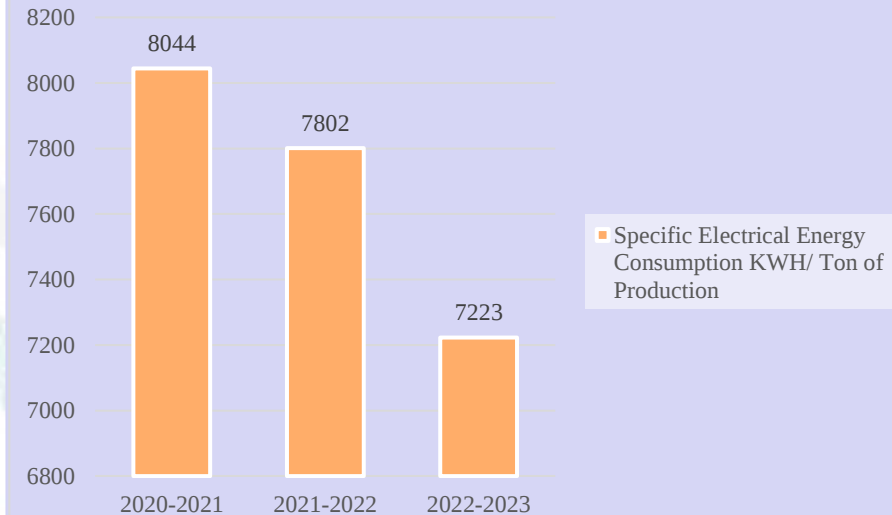
3. Specific Energy Consumption Overview – Last 3 Years



Specific Thermal Energy Consumption
kCal/ Ton of Production



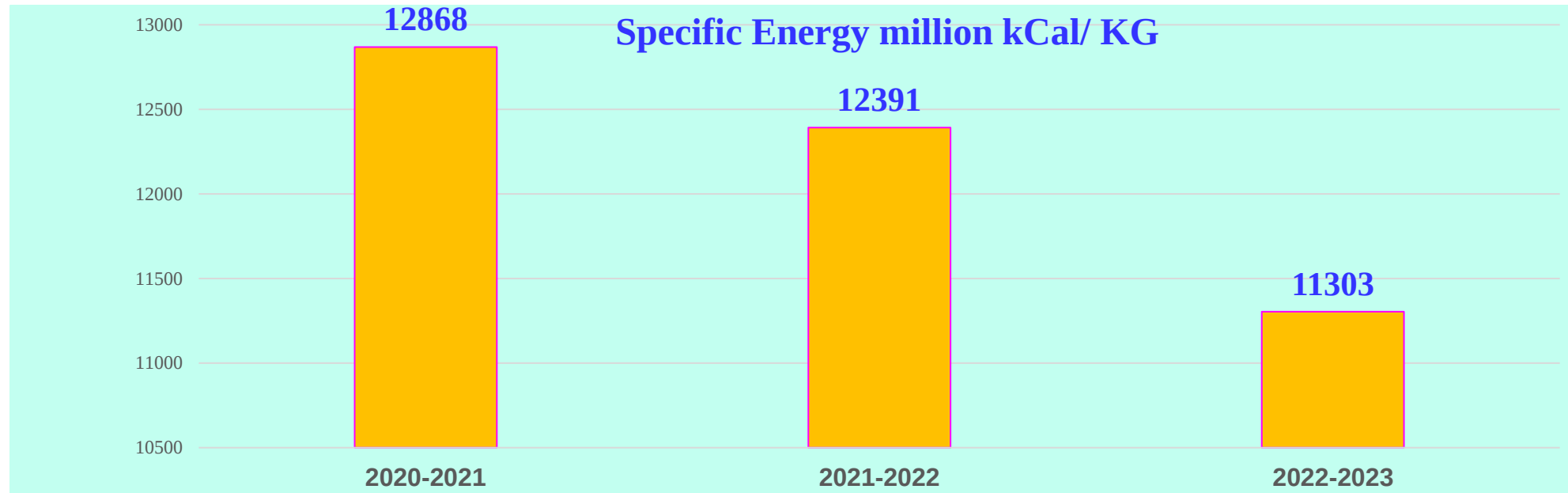
Specific Electrical Energy Consumption
KWH/ Ton of Production



Implementation of various energy conservation activities contributed reduction of 10 % in overall SEC of the Plant :-

- > Condensate water used in Hot water system as make-up water, which reduce the steam & purified water consumption. **Yearly Saved 720 KL PF water & 37.8 million kCal of steam.**
- > **“Steam Operated Pump trap”** introduce for distillation column condensate to reduce the steam loss. Yearly saved : **61.05 m Kcal/4 Columns**
- > Introduce the new model FBD with higher capacity to minimize steam consumption and low power rating. Steam saving: **14651 Kcal/Yr, Power Saving : 20 KWH**
- > Higher Efficiency Screw type Chilling plant introduced in place of reciprocation chiller Cap-300 TR, **Yearly Saved : 751680 KW**
- > 23 No's chilling plant secondary pumps & process RT pumps frequency controlled WRT line Pressure by installing pressure TX & VFD. **Yearly Saved: 827103 KW**
- > AVPF introduced for GVNE product filtration (55% Power reduced (90 to 40 KW) and Cycle time reduced from 36 Hr. to 4 Hrs), **Yearly Saved: 543312 KW**

3. Specific Energy Consumption Overview – Last 3 Years



➤ Specific Energy Consumption reduced by 10% comparatively last year.

4. Information on Internal benchmark - Utility

❖ Internal Bench mark : Chilling plant & Air Compressor

Description	Design Temp (oC)	Design SEC (kW/TR)	Operating SEC (kW/TR)	Target SEC (kW/TR)
Reciprocating Chillers (Water Cooled)	+5	0.83	0.85 - 0.88	0.84
	-20	1.58	1.59 -1.61	1.59
	-30	1.84	1.86 -1.90	1.85
	-35	1.95	1.97- 2.00	1.96
Screw Chillers	+5	0.63	0.64 – 0.66	0.65

Description	Design SEC (kW/CFM)	Operating SEC (kW/CFM)	Target SEC (kW/CFM)
Air Compressors	0.19	0.21-0.22	0.20

> Chillers (+5°C , -20°C , -30°C & -35°C), Air compressors and Nitrogen Plants Performance evaluation done by CED Team , Based on evaluation data set as a target. Every month plant team did chiller assessment, Air compressor and Nitrogen plant performance to reach the target.

Energy Audit Instruments

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



5. Major Encon Projects Planned in FY 2023-24



300 TR Screw Chiller by Replacing Reciprocating Chiller

Investment : ₹ 8.0 million
Savings : ₹ 14.30 million
Payback : 05 Months



E Glass Epoxy FRP Blades for Cooling Towers

Investment : ₹ 1.08 million
Savings : ₹ 2.1 million
Payback : 6 Months



Replacement of Old High SEC Air Compressors with new efficient Air Compressors

Investment : ₹ 3.21 million
Savings : ₹ 3.81 million
Payback : 10 Months



Vertical Inline Energy Efficiency Pumps by Replacing Energy Intensive Pumps

Investment : ₹ 8.45 million
Savings : ₹ 10.18 million
Payback : 10 Months

5. Major Encon Projects Planned in FY 2023-24



Replacement of Standard efficiency motors with Energy Efficiency Motors

Investment : ₹ 1.79 million
Savings : ₹ 0.1 million
Payback : 17 Months



Installation of VFD's to Secondary Pumps and Variable load Pumps

Investment : ₹ 2.70 million
Savings : ₹ 0.9 million
Payback : 3 Months

➤ Major Encon Projects

- ❖ Replacement of +5 Chilling plant of same capacity 300 TR from Reciprocating chiller to Screw type Chiller (Benefit SEC: 0.83 to 0.63 KW/TR. Investment of **8 million**)
- ❖ Replacement of existing primary pump & secondary pump sets of Chilling plant with energy efficient pump sets – **8.45 million**
- ❖ Energy Saving by providing Efficient Air Compressors – **3.21 million**
- ❖ RT Pumps Replacement with existing centrifugal pumps of cooling tower with energy efficient pump sets – **6.83 million**
- ❖ Energy Efficient motors for higher running hours pumps (From 15 HP to 30 HP only) – **1.79 million**
- ❖ Cooling tower CT fan blade replaced with E Glass Epoxy FRP blades, in place of aluminum blades – **1.08 million**
- ❖ RPM Control for Raw water pumps, -20°C Plants Through pressure Feedback – **0.4 million**
- ❖ 250 Watts SV Lamps Replacement with 100 Watts Led Lights – **0.3 million**
- ❖ Providing DRY Run protectors for solvent transfer pumps in SRS – **0.16 million**
- ❖ Recovery condensate and flash improves steam system efficiency 18 to 20% - **2.1 million**

5. Energy Saving Projects Implemented in the last year

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 (Million kcal)	Savings (₹ Million)
2020-21	17	2.384	4.24	0	25.47
2021-22	17	23.84	3.40	0	22.13
2022-23	20	14.55	12.75	14761	30.70

➤ Major Implemented

- ❖ Cloxa product vacuum filtration & Drying introduced, which results, (46% power reduced and 2 Hrs Cycle time reduced)
- ❖ N2 blanketing system installed for 24 no's centrifuges to minimize the nitrogen consumption during centrifugation.
- ❖ AVPF introduced in place of 06 number of centrifuges, Saved KW : 543312/Year

➤ Major Implemented

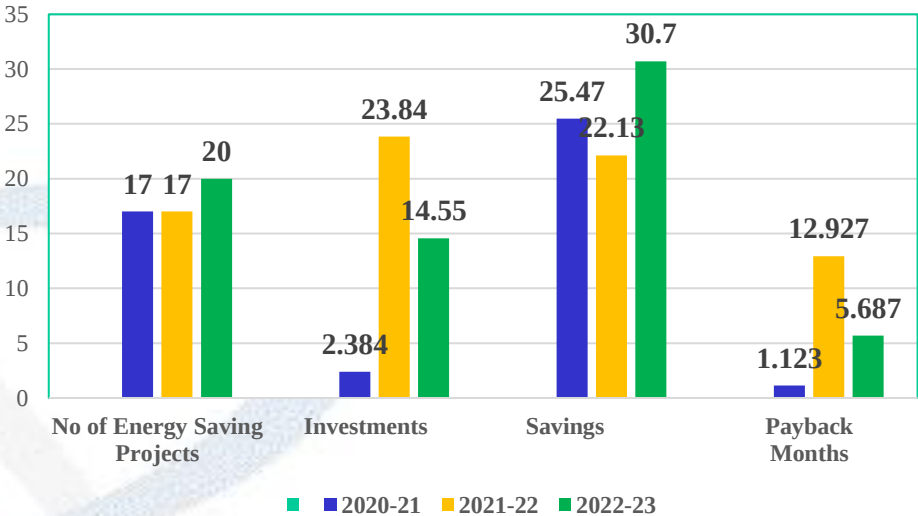
- ❖ Optimization of -20° C Chilling Plant operations during less Production By providing Inter Connection of plant No – I & II. Capacity : 200 TR
- ❖ Screw type +5°C Chiller (Plant-V, Screw type Cap-300 TR), its related RT pumps/ Primary pump completely stopped by modification pipe line and arranged higher flow rate pump (Saved : 244 KW)
- ❖ +5°C Chiller and its related RT pumps and Primary pump completely stopped by modification pipe line and energy pumps
- ❖ Controlling the Cooling tower fan motors running hours by providing VFD and temp. controller
- ❖ Cleaning of chilling plant condenser tubes with high pressure jet pump
- ❖ Cooling tower CT fan blade replaced with FRP blades, reduced power consumption
- ❖ Reduction in power consumption by providing VFDs to Utility secondary Pumps
- ❖ Interlocking of Compressors RT & primary pumps.

5. Energy Saving Projects Implemented in the last 3 years

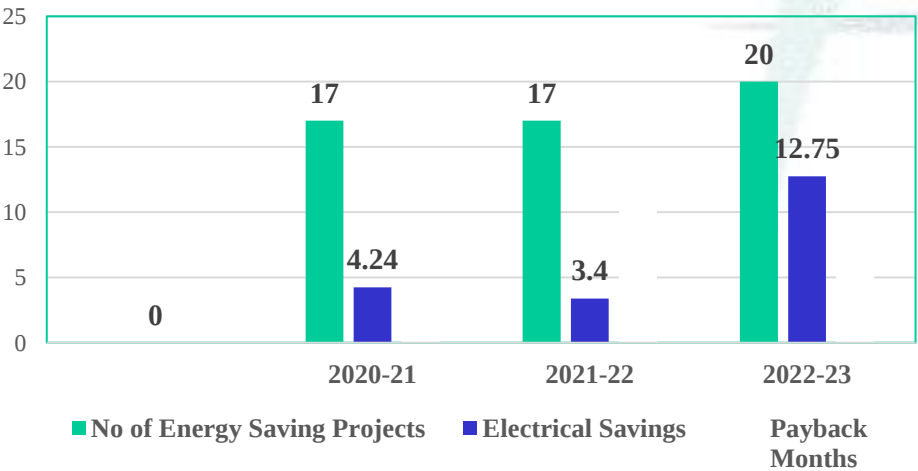
Summary of Energy Saving Projects Implemented in the last 3 years

Year	No of Energy Saving Projects	Investments (₹ Million)	Electrical Savings (Million kWh)	Thermal Savings (Million kcal)	Savings (₹ Million)	Payback Months
2020-21	17	2.384	4.24	0	25.47	1.123
2021-22	17	23.84	3.40	0	22.13	12.927
2022-23	20	14.55	12.75	14761	30.70	5.687

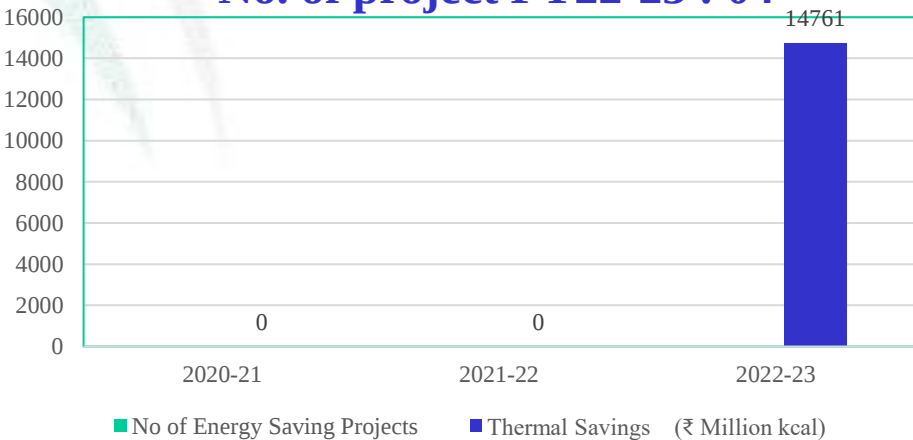
Summary Implemented Projects



Electrical saving million KW



Thermal Saving million kcal
No. of project FY22-23 : 04



5. Major Encon Projects – Medium / Low Investment - FY 22-23

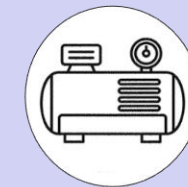
CHILLERS

- Shifting of load from low efficient chillers to highly efficient Chillers.
- Regular assessments and monitoring & replacements
- Condenser & Evaporator Approach improved by providing design flow & de-scaling.



AIR & N2 COMPRESSORS

- No Air Loss Drain Valves introduced for air compressor receivers.
- Auto cut-off provided for loading & unloading of plant with respect to receiver pressure.
- Regular monitoring & arresting the air & N2 Leakages
- Every three months evolution done by FAD.
- Reciprocating replaced with screw for better SEC



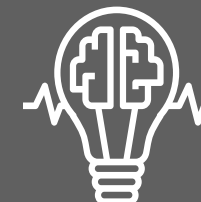
PUMP

- Dry run protection introduced to avoid dry running of critical process pumps.
- VFD with PID controller provided for chilling plant Secondary pumps
- Auto Level Cutoff for PIT pumps and solvent receivers.
- Double Mech. Seal with cooling provided for high temperature & back pressure applications.



LIGHTING

- LED lamps implemented in powder process areas & street lights.
- Sensor based control provided for office & panel rooms.
- Voltage stabilizer introduced.
- Solar panels introduced for street lights.



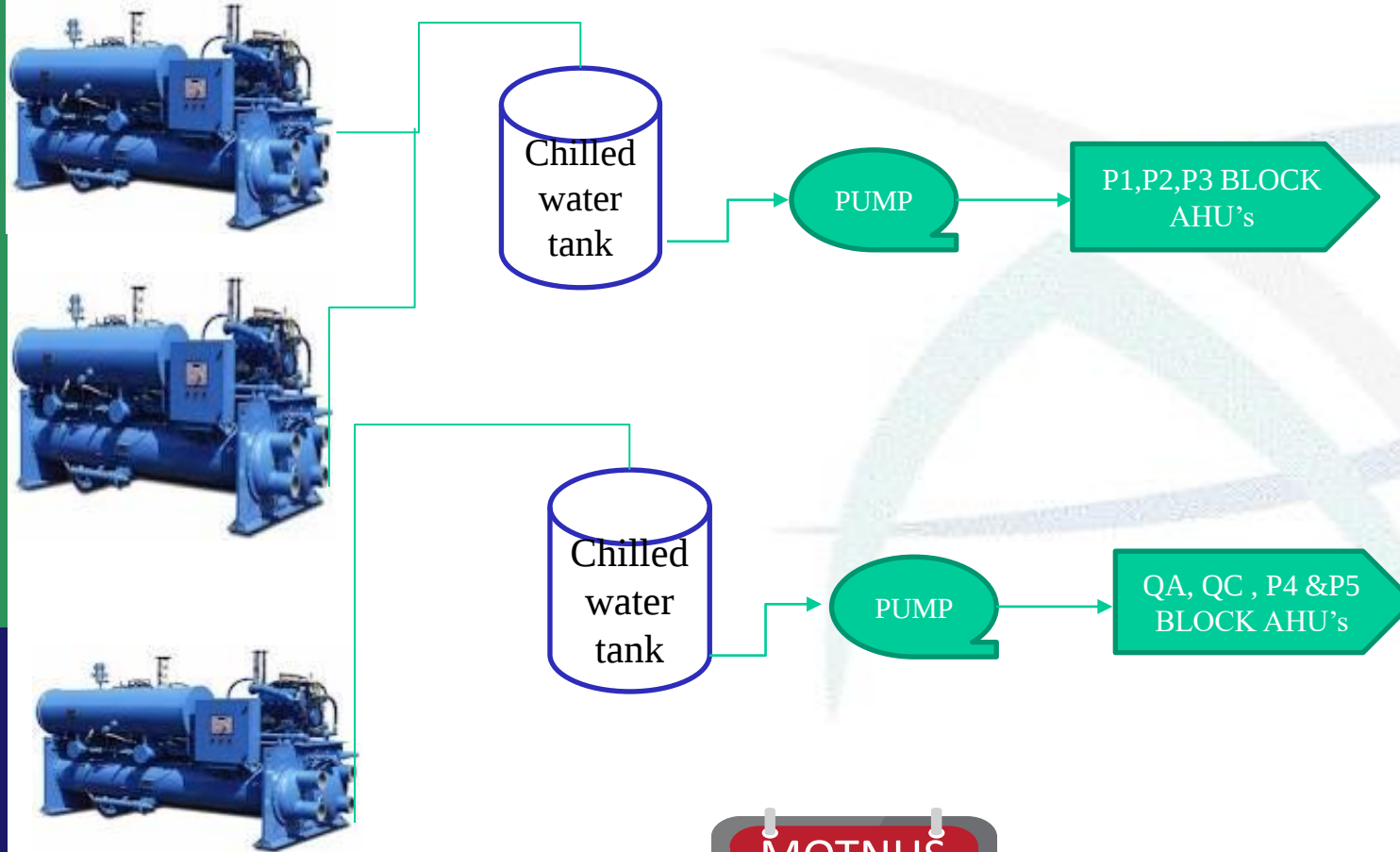
Start
10/09/22

6. Innovation Project Implementation

Finish
30/09/22



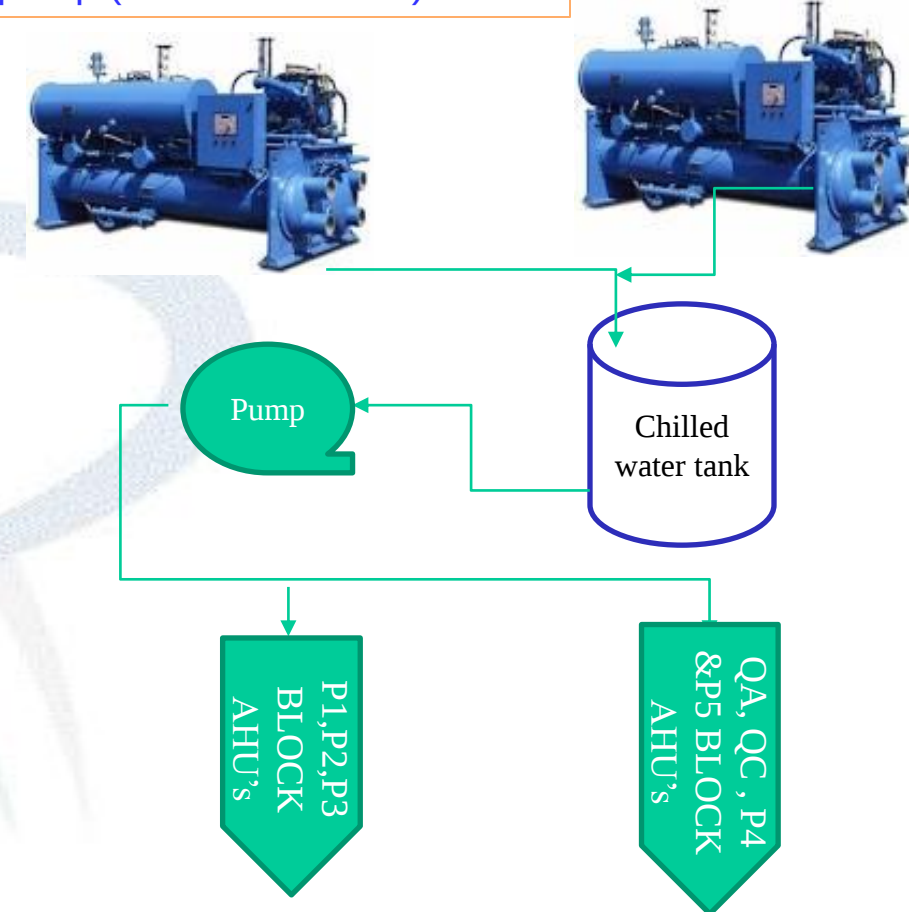
■Screw type +5°C Chiller (Plant-V, Screw type Cap- 300 TR), its related RT pumps/ Primary pump completely stopped by modification pipe line and arranged higher flow rate pump (Saved : 244 KW)



SAVING: Rs.114.95 Lakhs/Y
INVESTMENT: 3.0 Lakhs

MOTNHS
0.3

BEFORE
IMPLEMENTATION



AFTER
IMPLEMENTATION

Start

15/09/22

6. Innovation Project Implementation

Finish

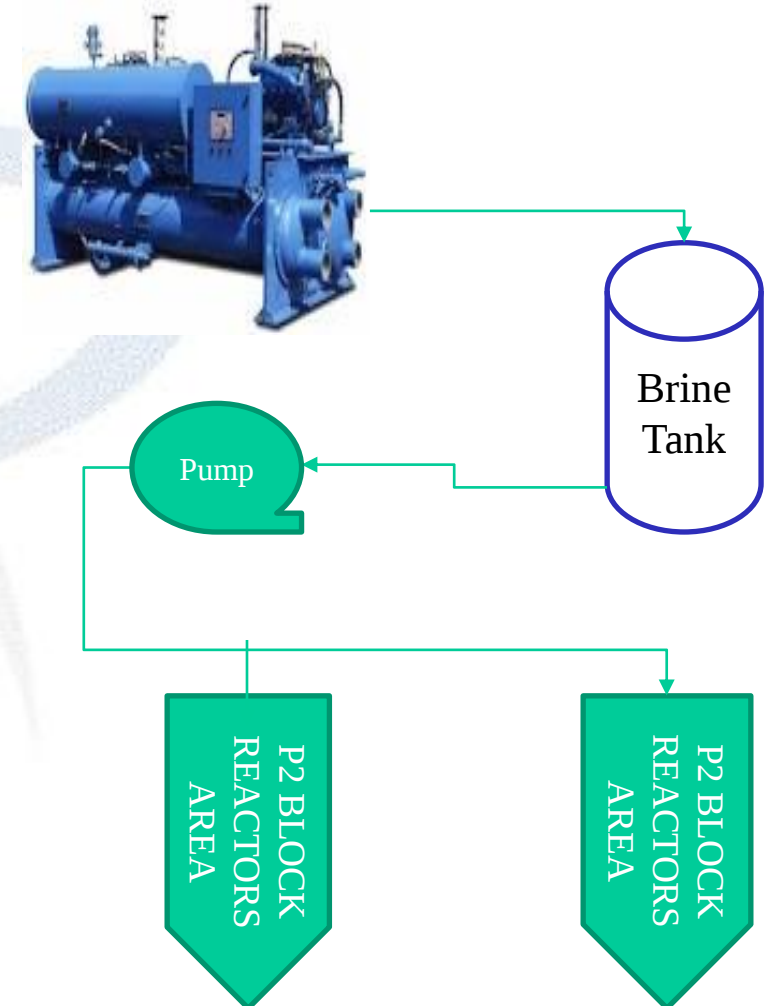
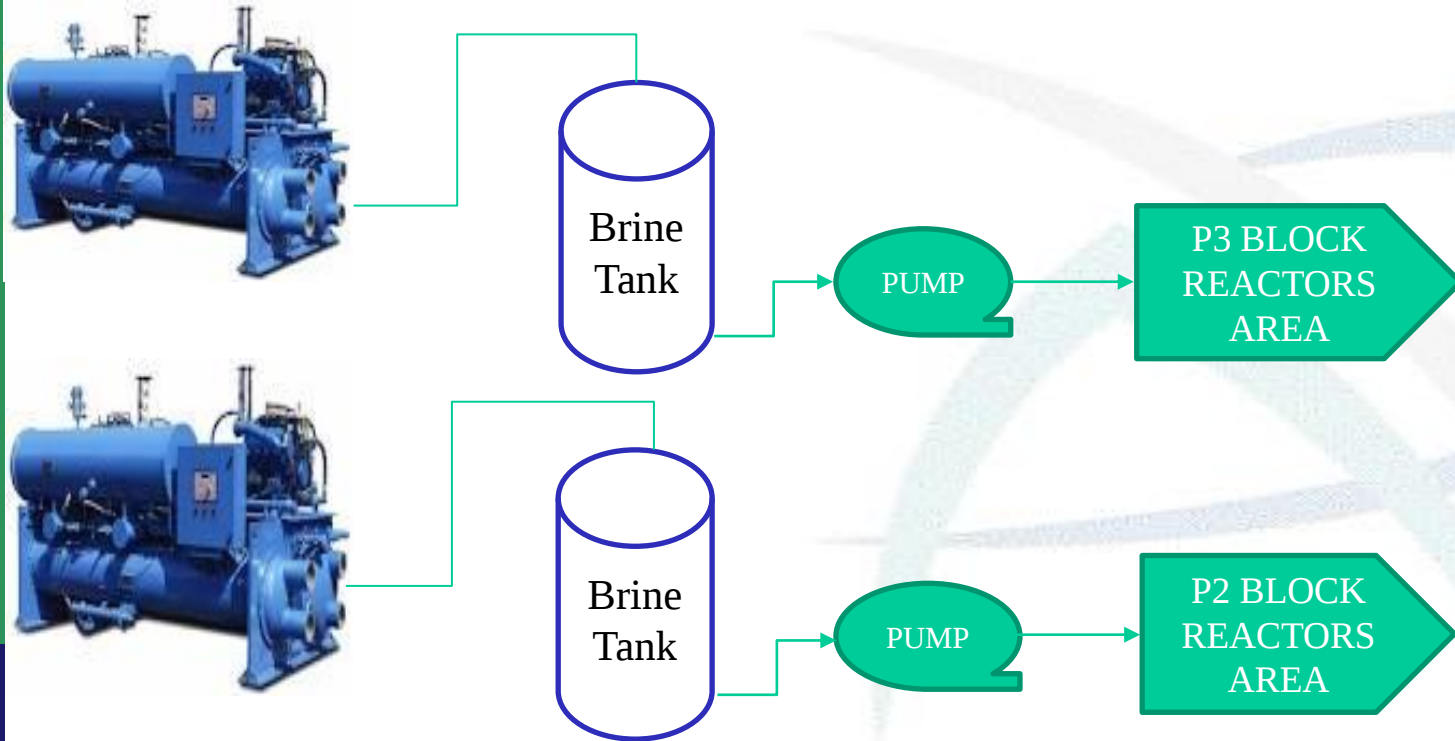
30/09/22



BEFORE
IMPLEMENTATION

Optimization of -20° C Chilling Plant operations during less Production By providing Inter Connection of plant No – I & II.
Capacity : 200 TR

AFTER
IMPLEMENTATION



SAVINGS: ₹13.40 Lakh/Y

INVESTMENT: ₹ 1.5 Lakh

MOTNHS

1.3

6. Innovation Project Implementation

Start
05/05/22

AVPF Introduced In place of Centrifuges

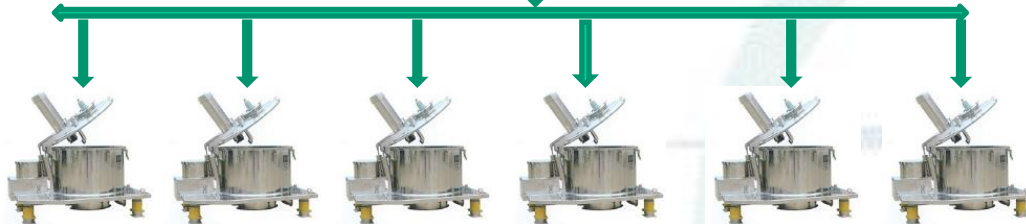
Finish
25/06/22

BEFORE
IMPLEMENTATION

REACTOR – 15KL



CENTRIFUGE – 48"



Each Centrifuge motors – 15 KW

Qty of Centrifuge – 06no's.

Total Motor HP – 90 KW

ML's PUMP Motor – 3 KW

Qty of ML's Pumps – 03

Total Motor - 09 KW, Equipment Running HR's / Batch – 18Hrs

AFTER
IMPLEMENTATION

REACTOR – 15KL



AVPF – 10 PLATE

AVPF motors – 55 KW

Qty – 01 No.

Total Motor – 55 KW

Equipment Running HRs / Batch – 3Hrs

Power reduction - 46%

Saved KW : 543312/Year



SAVINGS: ₹40.02 Lakh/Y

INVESTMENT: ₹ 160 Lakh

MOTNHS
4.0

6. Innovation Project Implementation

Start

05/05/22

❖ Thermal Saving

Finish

25/07/22

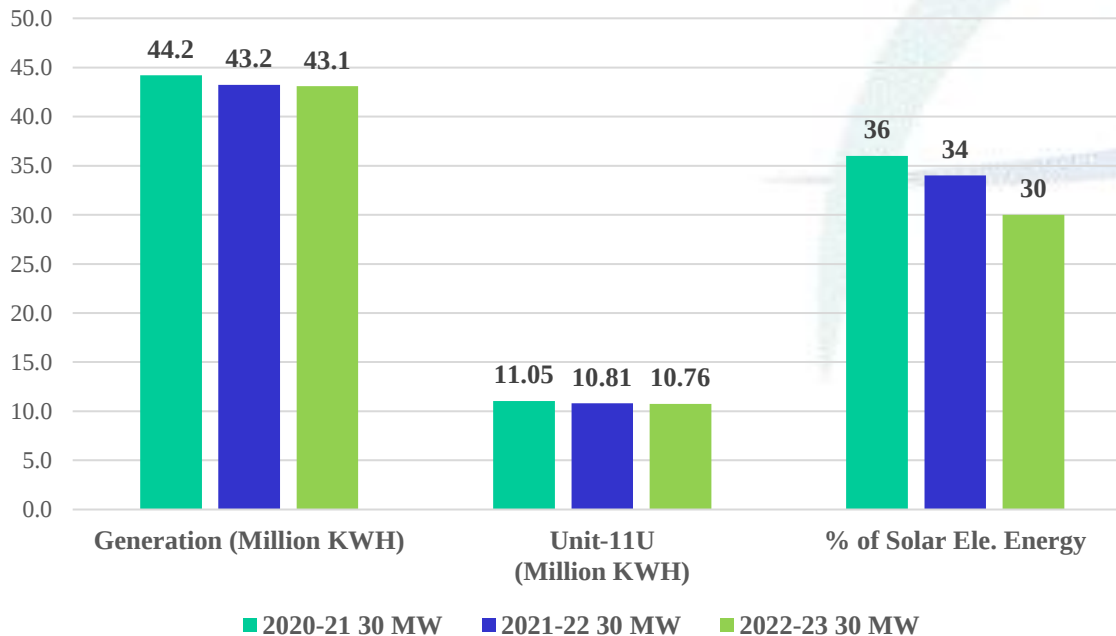
- Introduce the advanced FBD cap-300 kg/hr. in place of Cap-120 kg/Hr. 3 no's with low power and steam consumption. **(Thermal Saving : 14651 m kcal/Year)**
- Cloxa product vacuum filtration & Drying introduced, which results, (46% power reduced and thermal energy decreased) **(Thermal Saving : 10.32 m kcal/Year)**
- ❖ Condensate water used to Hot water system as make-up water, to reduce the steam & purified water **(Thermal Saving : 37.8 m kcal/Year)**
- ❖ Steam Operated Pumping trap introduce for distillation column condensate to reduce the steam loss **(Thermal Saving : 61.05 m kcal/Year)**

7. Utilisation Renewable Energy Sources : last 3 years

Solar 30 MW Renewable Energy

Year	Technology (Ele)	Type of Energy	On site/Off Site	Installed Cap.	Generation (Million KWH)	Unit-11U (Million KWH)	% of Ele. Energy
2020-21	Renewable	Solar system	Offsite	30 MW	44.2	11.05	36.0
2021-22	Renewable	Solar System	Offsite	30 MW	43.24	10.81	34.0
2022-23	Renewable	Solar System	Offsite	30 MW	43.03	10.76	30.0

30 MW Solar-11U



8.Sustainability / GHG Inventorisation

01 Sustainability Report



◆ **2020-21**
Published maiden
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

◆ **FY 2020- 23**

FY	Production (MT)	Total kgCO ₂ / Ton of Product	Scope 1	Scope 2
2020-21	3866	53041	29189	23852
2021-22	3860	56318	31326	24993
2022-23	5020	62,025	31929	30096

03 GHG Emissions

Net Zero Commitment

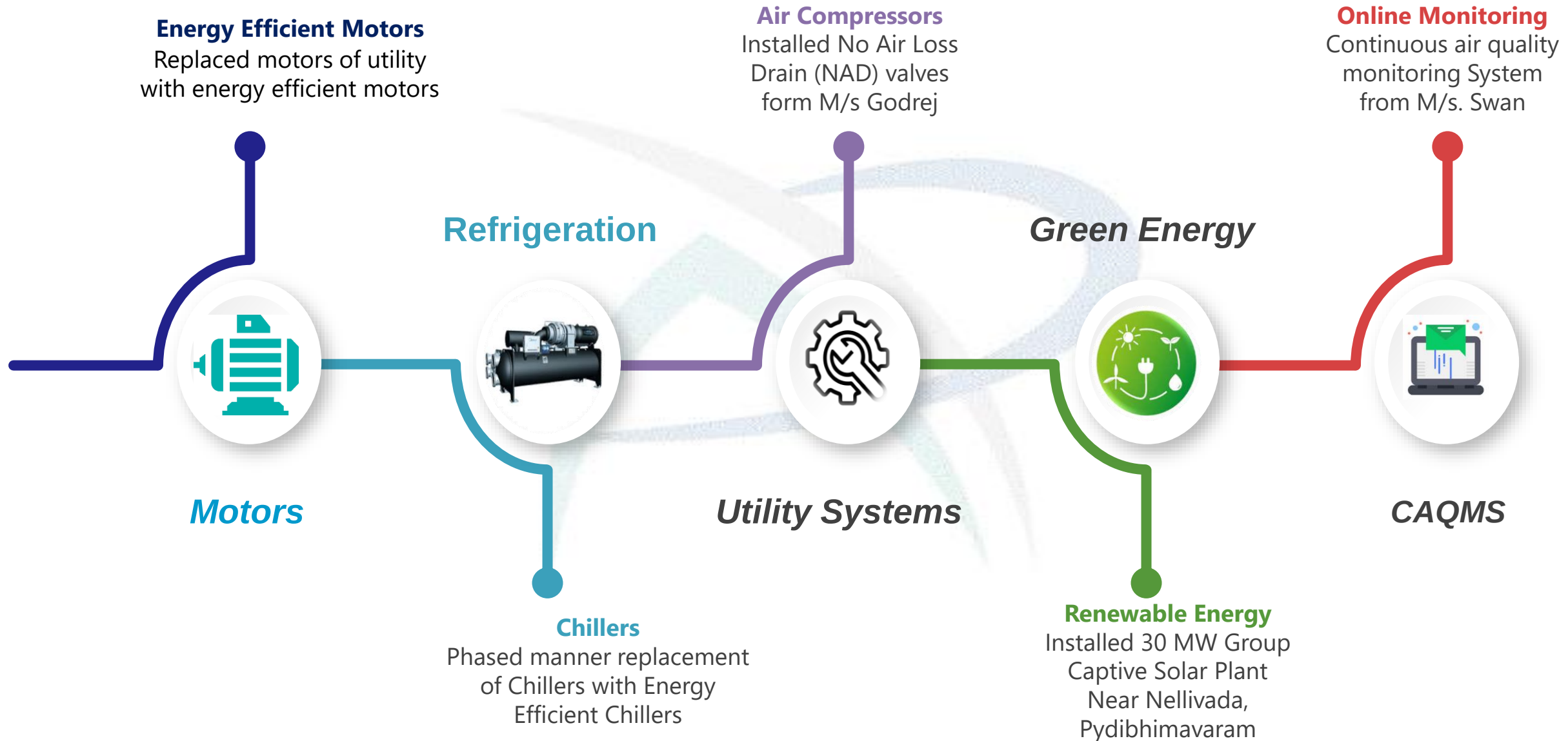
Pillar	Goals-2025	Progress made so far	Status
Responsible manufacturing      	20% Renewable energy share (Power-to-Power)	Achieved 12% renewable energy share (Power-to-Power)	In progress
	12.5% Reduction in carbon footprint (as per SBTi – WB2C)	Achieved >100% -17% reduction in carbon footprint from baseline 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

9. Green Supply Chain Management



AUROBINDO

Learnings from CII - last 3 Years



Energy Week / Energy Conservation Day Celebrations

Programs conducted during “Energy conservation week”



Awareness Rally inside the Plant

Essay writing

Total No. of
Participants 83 no's

Real Time

Total No. of
Assessments 03 no's

Best Ideas

Total No. of
Participants 78 no's

Technical Quiz

Total No. of
Participants 120
no's

Poster Making

Total No. of
Participants 133
no's

Total Employees : 563

➤ Total participants : 417

➤ Overall participants : 74%



Energy Week / Energy Conservation Day Celebrations



Teamwork, Employee Involvement & Monitoring



Teamwork

- Implemented Kaizen & 5S programmes by forming teams
- Awards & appreciations for best programmes



Employee Involvement

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



Training Programmes

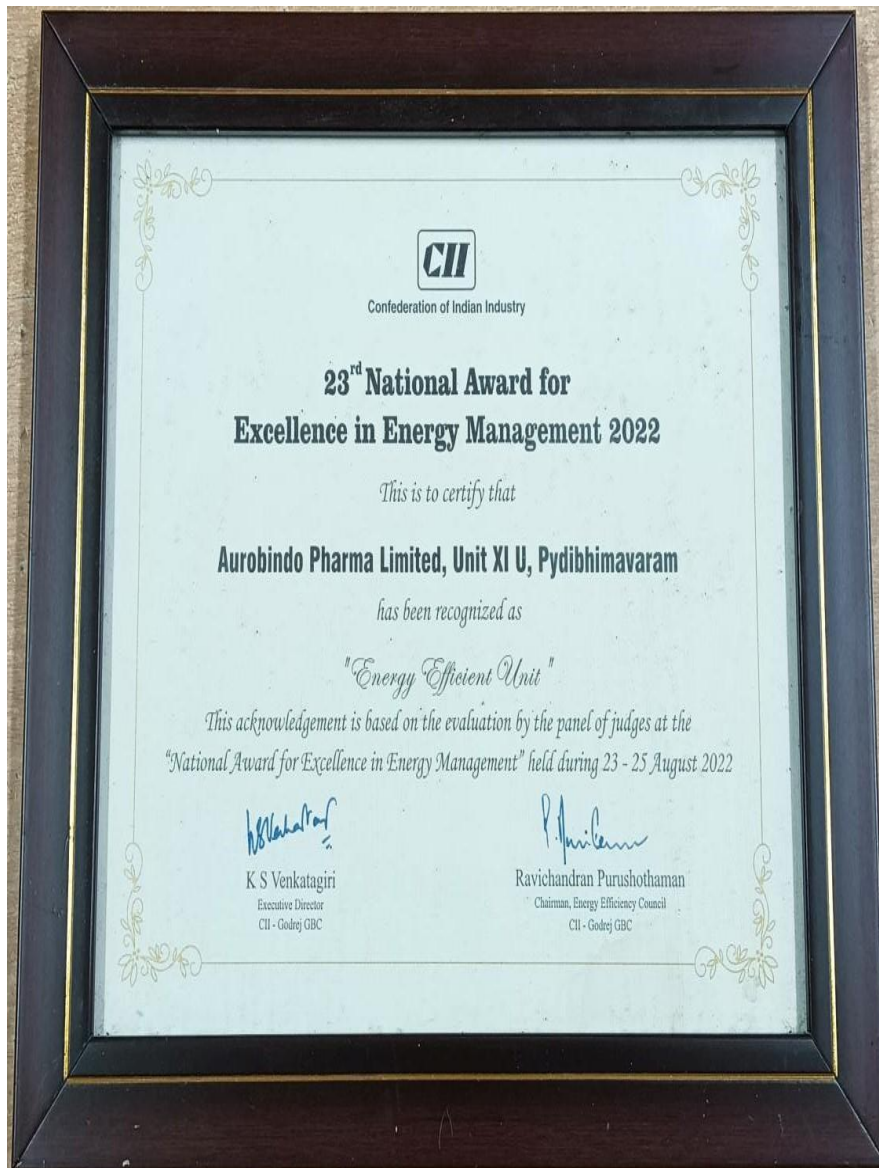
- Given training programmes on Root cause analysis (RCA), and Reliability Maintenance (RM)
- Training on steam / utility systems



Monitoring

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

Awards & Recognitions



CSR Activities



- Construction of Multi-Purpose Community Hall in rural areas @ 3.60 Cr.
- Distribution of bicycle to Govt . School girls, Qty : 2550 @ 1.50 Cr.
- Providing Solar energy System to 40 no's Sachivalayam @ 0.60 Cr.
- Red Cross Society - Blood bank Building construction @ 0.55 Cr
- **Total contributed amount Rs. 10 Cr.**

Construction of Multi-Purpose Community Hall, NGR Puram village, Ranasthalam mandal, Srikakulam district



Thank You



Aurobindo Pharma Limited, Unit – 11U
Pydibhimavaram, Vishakapatnam
Andhra Pradesh, India

Phone: +91 (08942) 254212/4337/4366

Ph.9666041942

Email: Srinivasarao.balivada@aurobindo.com