

# 22<sup>nd</sup> National Award for Excellence in Energy Management 2021

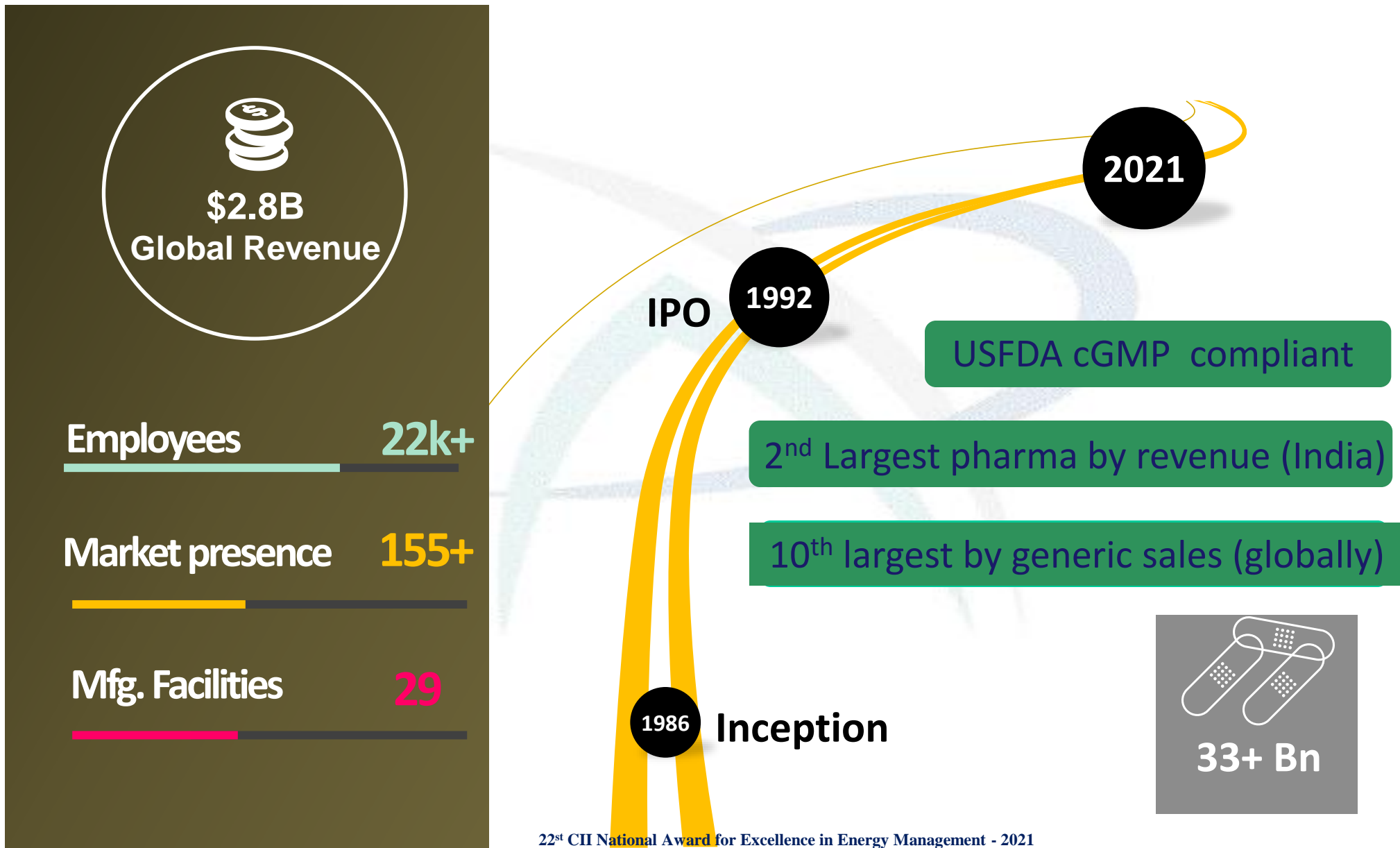
24 - 26 August 2021

## AUROBINDO PHARMA LIMITED

### UNIT XI , SRIKAKULAM

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# 1. Brief introduction on Company/Unit

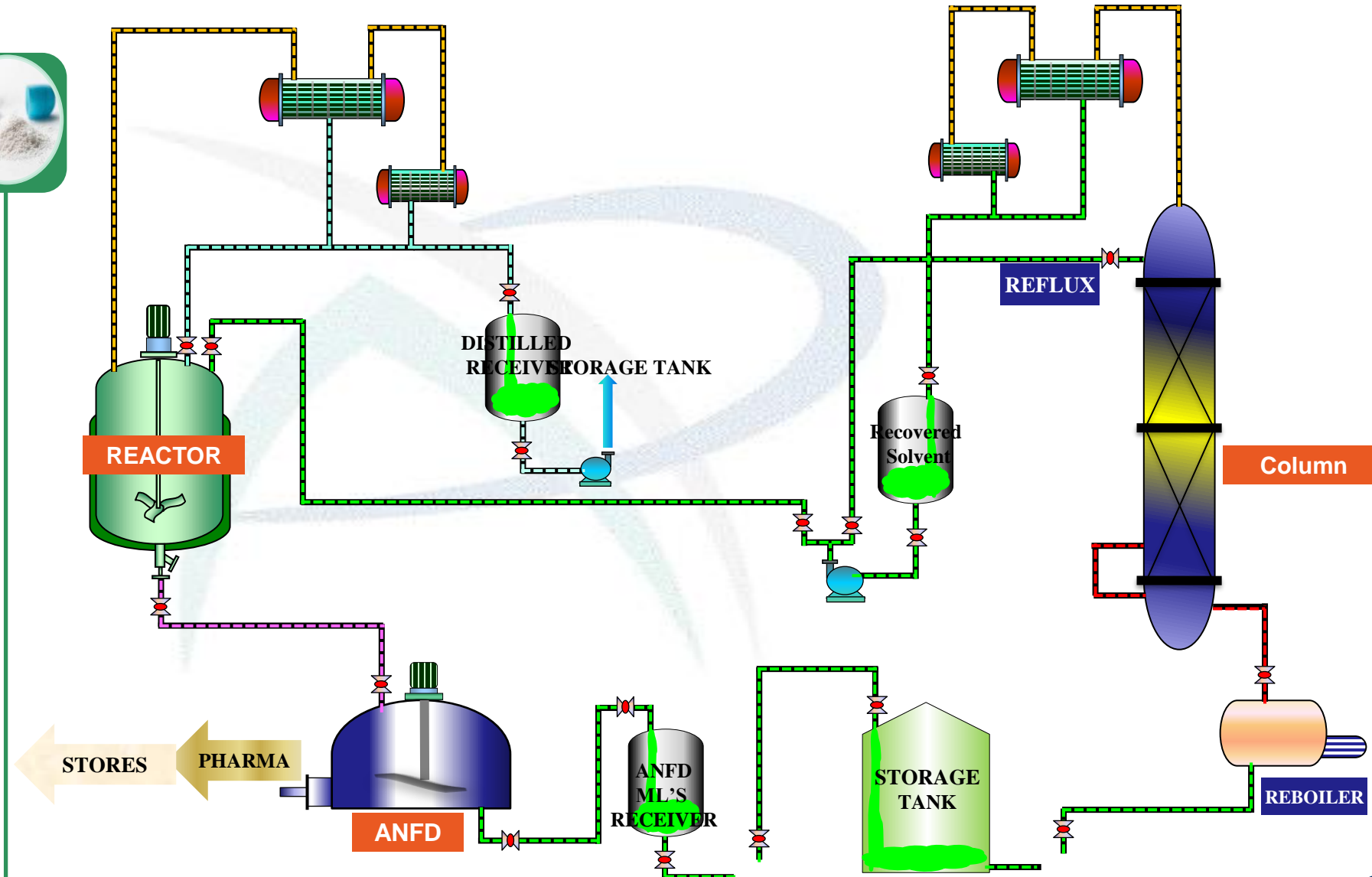


## 2. Details of the Products / Processes

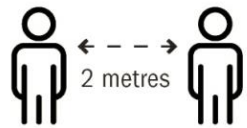
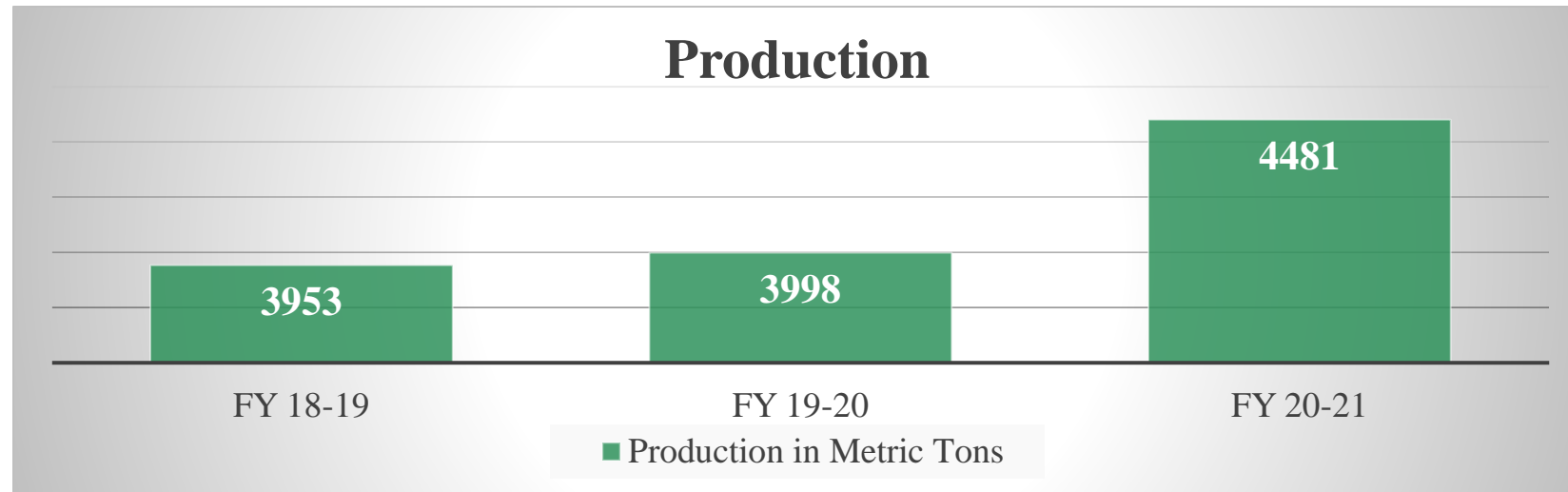
### Major products



- Abacavir Sulfate
- Dolutegravir sodium
- Lamivudine
- Levetiracetam
- Setraline HCL Form-1 (Micro)
- Tenofovir (Compact)
- Valacyclovir HCl
- Valganciclovir HCl



### 3. Impact of COVID 19



**Social distancing**



**Masking**



**Regular hand wash**



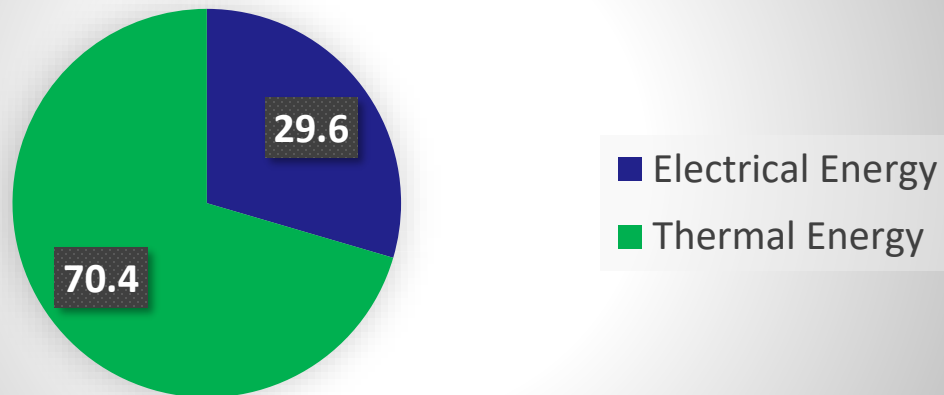
**Sanitization**

**With high standards of COVID-19 precautionary measures we had enhanced our production over the FY 20-21 with the best efforts and cooperation with Management and all departments laid a successful and continuous fight against COVID-19**

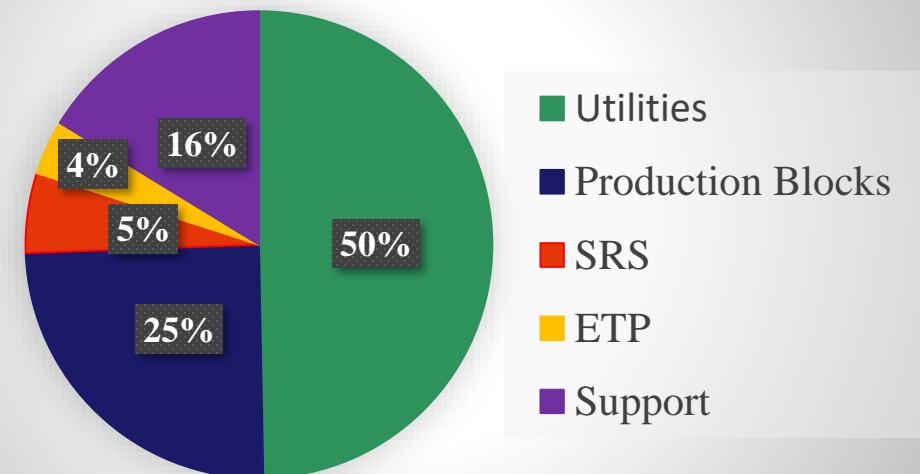
# 4. Energy Consumption Overview

S No	Parameters	Units	FY 18-19	FY 19-20	FY 20-21
1	Annual Electrical Energy Consumption	million kWh/year	119.96	130.67	132.52
2	Annual Electrical Energy Equivalent	Million kcal/year	103165.6	112376.2	113967.2
3	Annual Thermal Energy Consumption	Million kcal/Year	348391.29	294398.71	271850.26
4	Overall Energy Consumption	Million kcal/year	451556.89	406774.91	385817.46
5	Annual Production	MT/Year	3953	3998	4481
6	Specific Electrical Energy Consumption	Mil kWh/MT of production	0.0303	0.0326	0.0295
7	Specific Thermal Energy Consumption	Mil kcal/ MT of Production	88.133	73.636	60.667
8	Overall Specific Energy Consumption	Mil kcal/ MT of Production	114.231	101.744	86.10

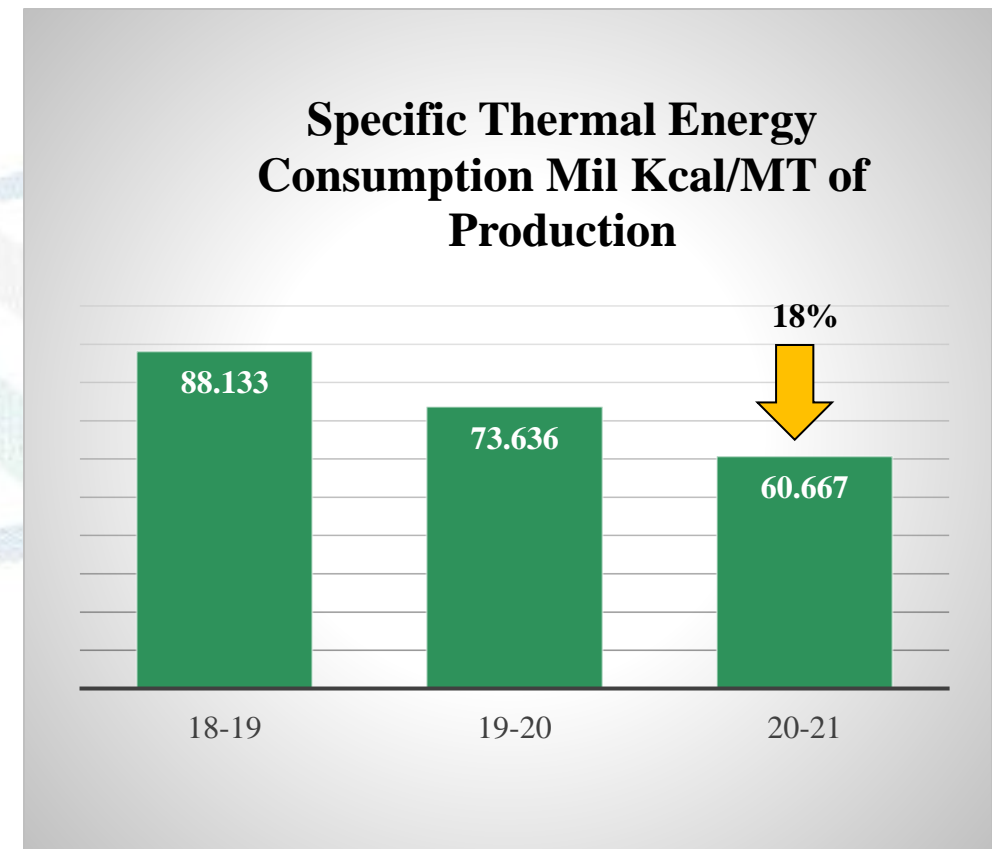
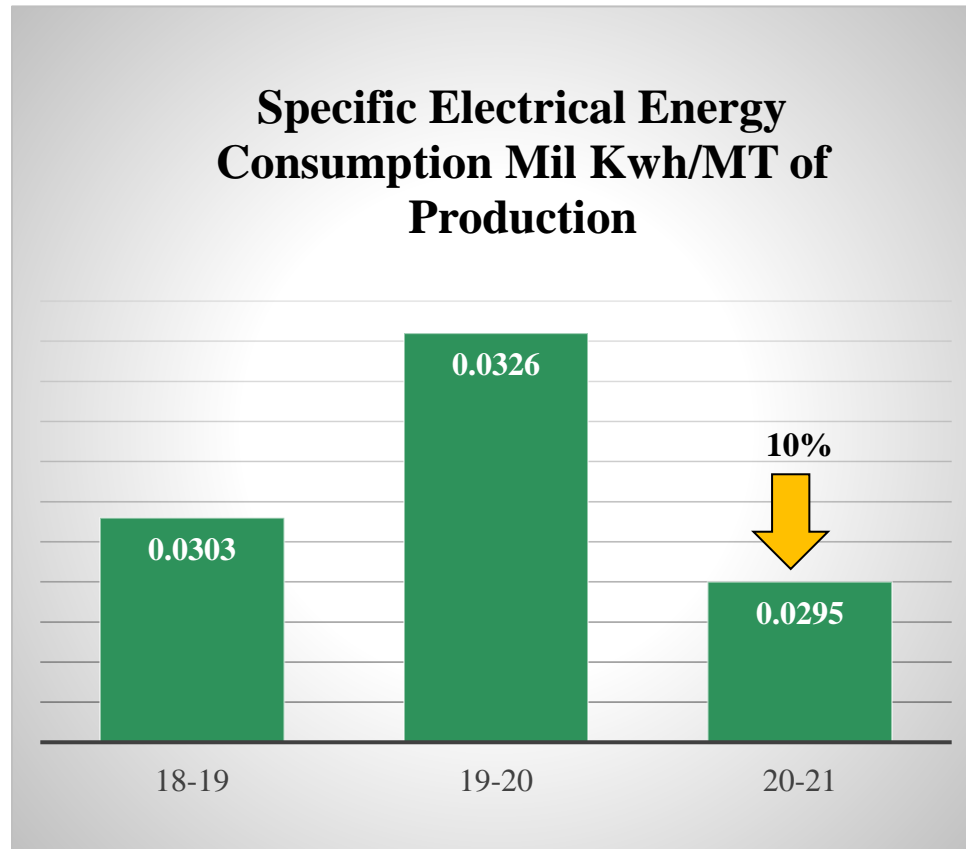
Energy Distribution FY 20-21



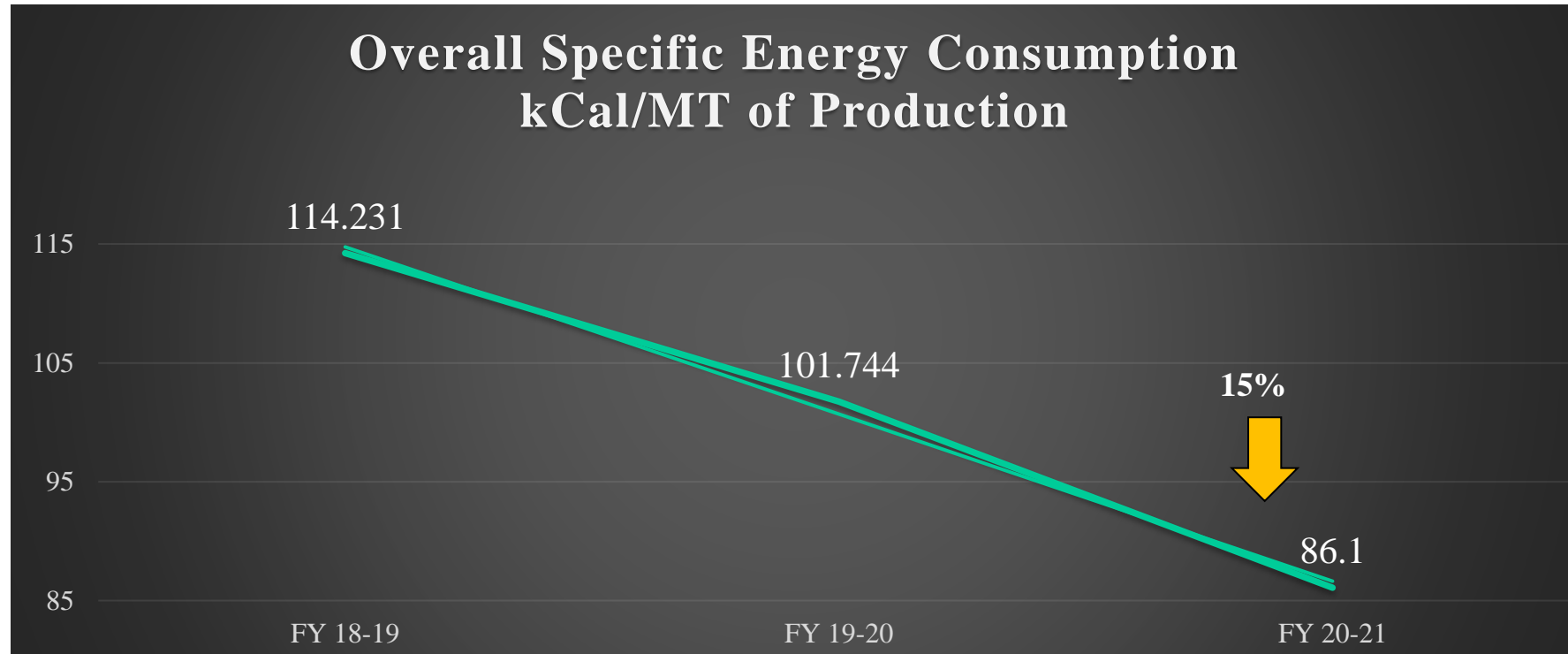
Electrical Energy Distribution FY 20-21



## 4. Specific Energy Consumption in last 3 years (FY 2018-21)



## 4. Overall Specific Energy Consumption in last 3 years (FY 2018-21)



Decrease of SEC in the FY 2020-2021 due to the implementation of various energy conservation activities and also due to the decrease in coal consumption.

## 5. Information on Internal benchmark - Electrical

### Energy Consumption Benchmarking Phase wise:

FY 2020-2021					FY 2021-2022				
Area	Phase-I	Phase –II	Phase – III	Intermediate	Area	Phase-I	Phase –II	Phase – III	Intermediate
Actuals Units/Day	93,535	1,06,181	1,12,756	1,40,418	Benchmark Units/Day	89,606	1,01,720	1,08,020	1,34,519
Benchmark Units/Day	91,527	99,911	1,07,788	1,32,551					

FY 2020-21 energy consumption is high w.r.t internal benchmarking due to enhanced production( i.e. 3998 to 4481 MT) and additional electrical loads of 1800 KW still the SEC is achieved low comparatively with FY 2019-20

### Way Forward Activities to meet benchmark targets:

- Replacement of inefficient chillers with higher efficiency Chillers.
- Identified inefficient cooling towers and proposing for replacement.
- Replacement of old motors with IE3 type motors.
- Objective to increase the STG units in FY 2021-22.
- Utility Chillers online monitoring system proposed to enhance the system and reduce losses.
- Working on air compressors energy optimization.
- Installation of VFDs to higher HP motors at Power plant.

FY 2021-2022				
Description	Design Temp (oC)	Design SEC (kW/TR)	Operating SEC (kW/TR)	Target SEC (kW/TR)
Reciprocating Chillers (Total-30 Nos)	+5	0.63	0.77-1.0	0.90
	-20	1.58	2.12-2.57	1.8
	-30	1.83	1.99-2.1	1.9

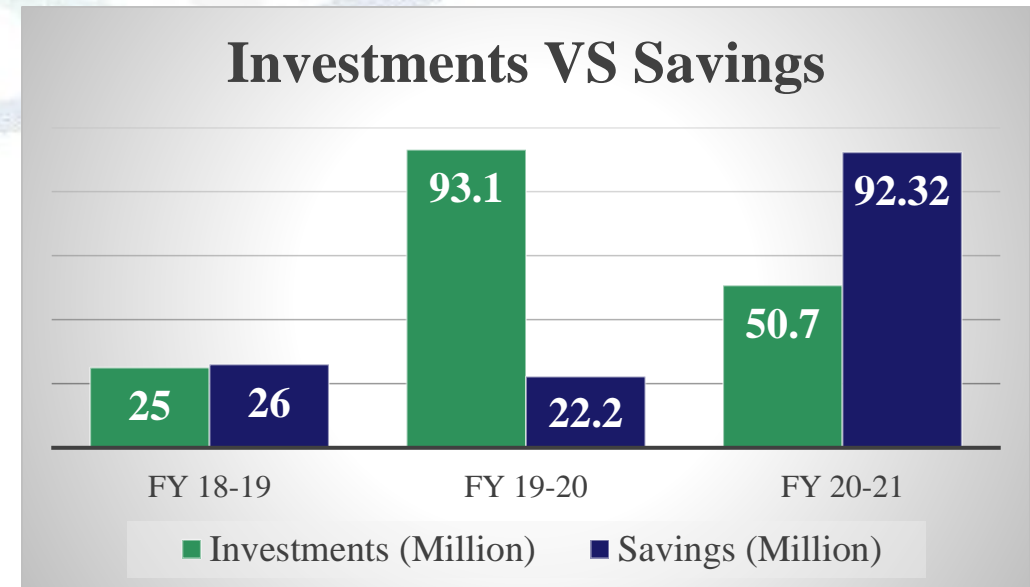
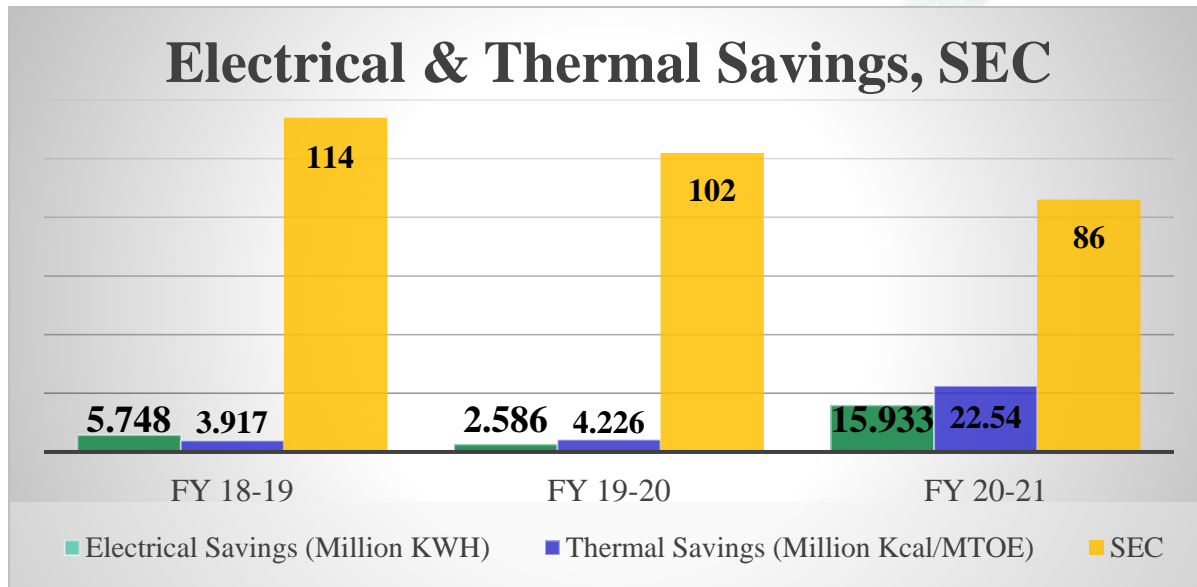


## 5. Major Encon Projects in FY 2021-2022

S No	Project Details	Proposed Investment (₹ Million)	Expected Monetary Savings/ Annum (₹ Million)	Payback (Months)	Remarks
1	Replacement of Reciprocating Chillers with energy efficient Screw Chillers in +5 Group	49.0	26.3	22.4	under installation
2	Replacement of Reciprocating Chillers with energy efficient Screw Chillers in +5 Group	17.8	21.9	9.8	Submitted to HO for Approval
3	Replacement of inefficient pumps with Energy efficient pumps	15.9	21.7	8.8	
4	Replacement of higher size motors with Premium Efficiency Optimum Size Motors	7.4	5.2	17.0	
5	Installing VFD to Boiler Feed Pump to run at optimum load – Boiler 2 & Boiler 3	0.51	1.4	8.7	
6	Installation of VFD to FD fan of Power Plant I & II (150 HP & 180 HP)	0.5	1.18	5.1	
7	Installation / replacement of 100 TR, -30 oC Screw compressor system in place of Reciprocating System optimizing the operating costs	8.05	3.76	25.7	
8	Conversion of conventional lights 160 Watt to 40 w LED targeted 500 no's for the FY 2021-22	2.5	4.15	7.2	Under execution
9	To increase Power Generation of Steam Turbine Generation (STG) Units by 5% by reducing downtime of boilers	0.1	14.61	0.1	
10	Induced Draft Double Cross Flow Wooden Cooling Tower Without Basin Capacity: 1000 TR (for CMU 074,75 & CMU 080,081)	4.5	5.73	9.5	
<b>Total</b>		<b>106.75</b>	<b>105.93</b>	<b>18.2</b>	

# 6. Energy Saving projects implemented in last three years

Summary of Energy Saving Projects Implemented in the last 3 years						
Year	No of Energy savings Projects	Investments (₹ Million)	Electrical savings( Million KWH)	Thermal savings( Million Kcal)	Savings (₹ Million)	Impact on SEC (Electrical, Thermal)
2020-2021	21	50.7	15.933	22.546	92.32	8.6 %
2019-2020	12	93.1	2.586	4.2	22.2	1.56 %
2018-2019	17	25	5.748	3.917	26	1.88 %



## 6. Energy Saving projects implemented in last three years

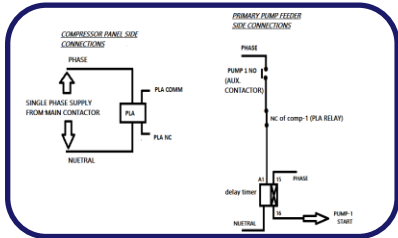
### Energy Measures executed to achieve the SEC for the FY 20-21

- Optimization of Energy Consumption by Increasing the set point of Evaporator in Refrigeration Plants.
- Installation of Energy Efficient Screw Refrigeration Systems by Replacing the Old Reciprocating Systems.
- Installation of Auto ON/OFF timer for AHU units for optimizing the running of Equipment.
- Installation of Sequential Timer Logic for reduction in running hours of ETP Aerators (47.5HP motor).
- Installation of Molecular Sieve Dehydrator system in Solvent Recovery Plant (SRP) and Eliminating Operation of Chilling Plants.
- Improved the performance of chilling plants, efficiency and running at close to design conditions - Operational Improvements.
- Installation of energy efficient LED lamps by replacing old and energy intensive lighting appliances.



Installed Energy Efficient Screw refrigeration 400 TR chiller by replacing the old reciprocating chiller.

# 6. Energy Saving projects implemented in last three years



Interlocking arranged between Primary pump and Compressor Unit to avoid idle running of equipment.

Optimize Utilization of Process Cooling Tower for -20°C & -30°C Chilling plants by avoiding running of existing Cooling Tower



Energy saving of 400TR cooling tower C.T fan by arranging temp. based controller

Reduction in running hours of ETP Aerators (47.5HP motor) by using sequential timer logic



## 6. Energy Saving projects implemented in last three years



Reduction of Lighting consumption by retrofitting the conventional lamps with LED's

Energy reduction by replacing horizontal pump with vertical pumps with IE3 motors



Reduction of Lighting consumption by using transparent roof sheets- Day light sheeting

## 6. Energy Saving projects implemented in last three years

### Molecular Sieve Dehydrator system

- Installation of Molecular Sieve Dehydrator system in Solvent Recovery Plant (SRP).
- Eliminated the operation of Chilling Plant and steam saving as well.
- Solvent recovery improved from approx. 80 % to >96%.
- Eliminated the re-boiling of reject water stream as separation is in gas phase and water is removed.
- Capacity is increased from 10 KL to 30 KL without enhancing electrical loads.

Project costs **Rs. 150 lakhs**



## 6. Energy Saving projects implemented in last three years

### Projects Executed without investment FY 2020-21

S No	Project Details	Annual Electrical Saving (kWh)
1	Installation of Sequential Timer Logic for reduction in running hours of ETP Aerators (47.5HP motor)	245280
2	Installation of interlocking system between Primary pump and Compressor Unit to avoid idle running of equipment	115128
3	Optimization of Energy Consumption by executing energy recommendation of chillers by periodical descaling activities, increasing the set point of Evaporator in Refrigeration Plants, maintaining adequate gas pressures and various preventive and predictive measures	5117330
4	Installation of Auto ON/OFF timer for AHU units for optimizing the running of Equipment	281777
5	Optimized the operation of Cooling Tower fans by installing auto cut off system with temperature control to avoid running during low load on cooling tower.	340000
<b>Total</b>		<b>6099515</b>

# 7. Innovative Projects implemented

## To Enhance units generation from STG and improve Boiler efficiency

### Trigger for implementation :

- Utility-4 higher HP loads are loaded on STG-2 but due to high steam demand the higher HP loads are loaded to grid power due to which units consumption of STG-2 dropped.
- If at any time of load relief & loading we have sudden peak loading on STG-II which is not feasible/reliable
- The efficiency and availability of the 35 TPH boiler is reduced

### Requirements :

- Connect lower HP motors so that effective loading and load reduction is possible.
- Arrange change over switch to the existing circuit of one of the MCC having smaller HP motors and higher HPs at N-Block which are on grid power.
- To improve boiler parameters, unburnt ash % to be reduced and bed coils replacement

### Replicability :

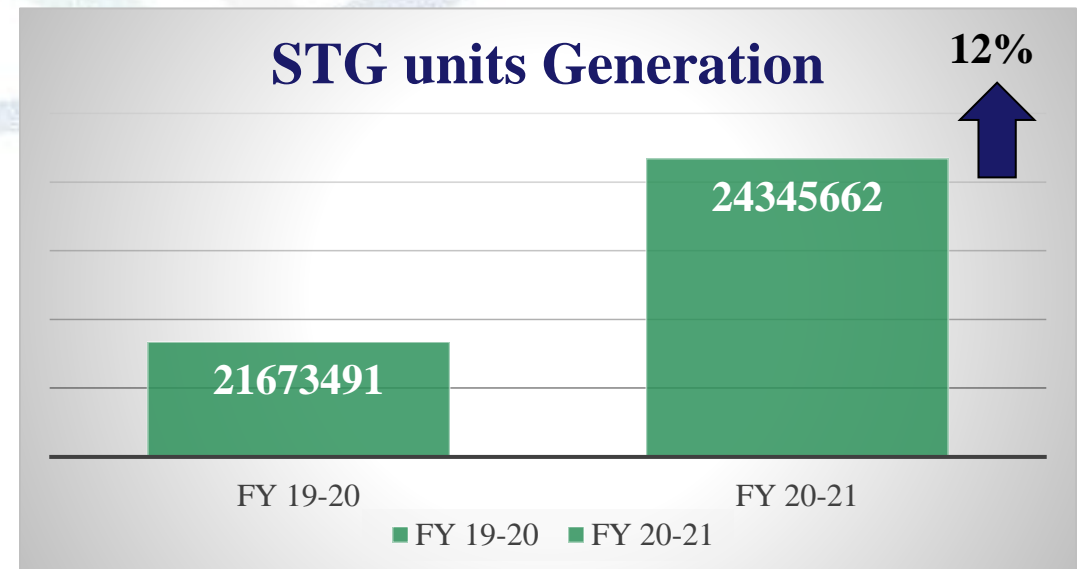
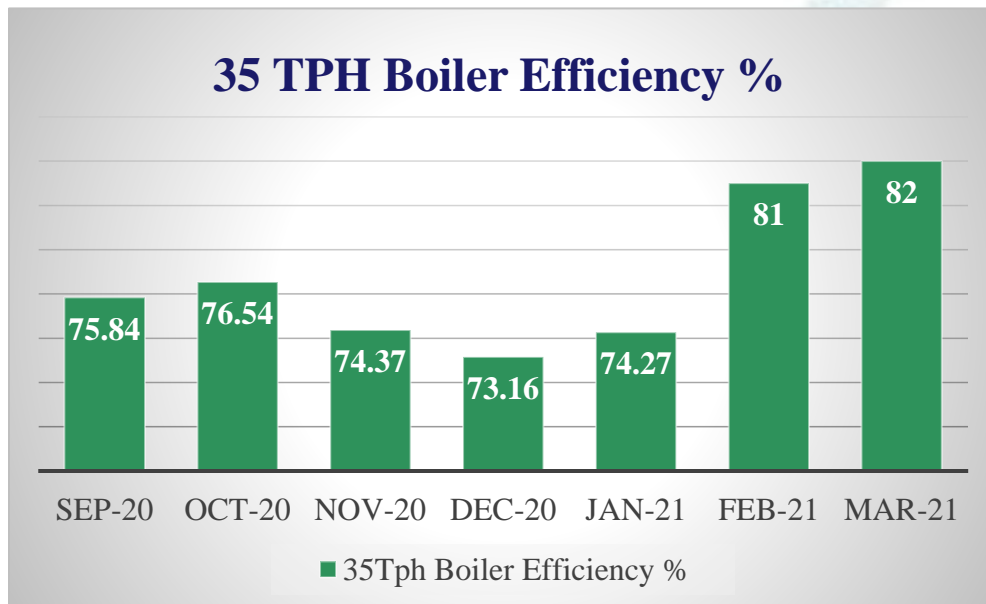
- Yes, huge replication opportunities
- To STG's where loaded with high rated motors which are over the requirement
- Taken up for implementation



# 7. Innovative Projects implemented

## Results :

- Effective usage of power & gradual increase , decrease of load is achieved on STG-2.
- The efficiency of 35 TPH Boiler is achieved where unburnt ash reduced from 12% to less than 8% (Loss of Ignition), By installing magnetic separator sieving machine and reduce the iron content in the drained bed material reduced from 30% to 8%.
- Steam-Fuel ratio increased from 4.03 to 4.5 resulting coal consumption reduction
- Units consumption on AP Transco reduced by 8000 units per day on average YTD.



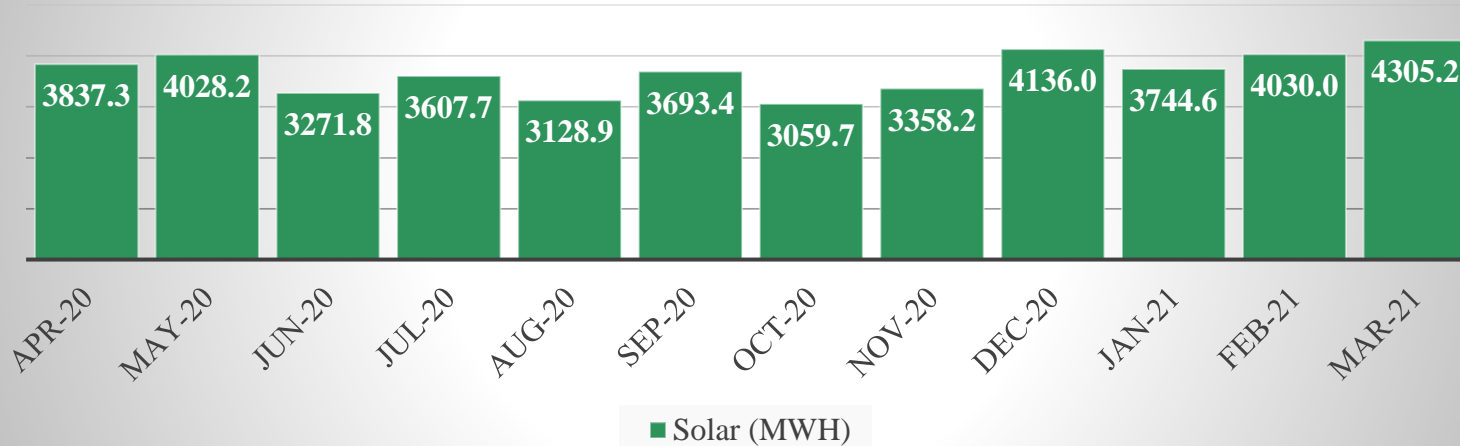
## 8. Utilisation of Renewable Energy sources

### Installed 30 MW Solar Power Plant

Year	Technology (electrical)	Type of Energy	Onsite/ Offsite	Installed Capacity (MW)	Generation (million kWh)	% of overall electrical energy
FY 2018-19	Solar PV	Solar	Offsite	24	41.73	-
FY 2019-20	Solar PV	Solar	Offsite	24	39.97	-
FY 2020-21	Solar PV	Solar	Offsite	30	44.20	-



### Solar (MWH)



## 9. Waste utilization and management

S No	Type of waste generated	Quantity of waste generated (MT/year)			Disposal method
		2020-21	2019-20	2018-19	
1	Plastic waste (Poly bags)	134	138	35	Disposed through authorized scrap dealers for recycling
2	Bio-medical waste	5	0.18	1	Incineration / Landfill
3	Hazardous waste	2,220	2,544	1,779	TSD / Landfill

Year	Type of Waste	Quantity	GCV mkcal/kg	Waste as percentage of Fuel
2018-19	Hazardous waste (Organic Waste) from Pharma industry	4258	21290	-
2019-20	Hazardous waste (Organic Waste) from Pharma industry	4626	23130	-
2020-21	Hazardous waste (Organic Waste) from Pharma industry	4067	20335	-

Waste with heat value is not utilised directly in the plant where it is being sent to the Cement industry / Co-Processing units where it is used as an alternate fuel

The Bio-medical waste is being sent to the M/s Rainbow where it is used as an alternate fuel

# 9. Waste utilization and management

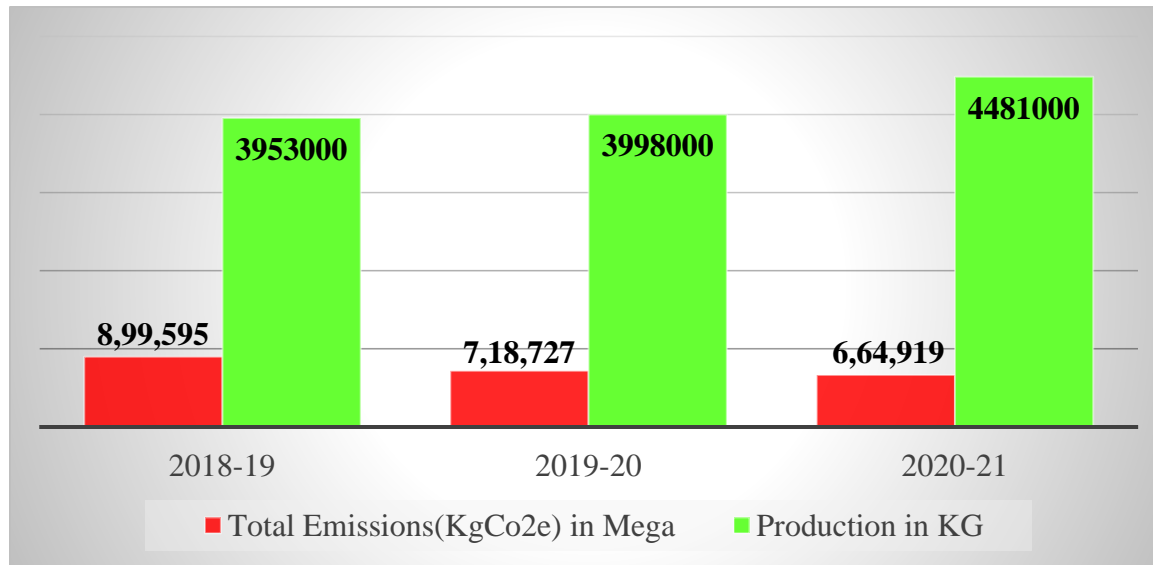
## INITIATIVE:

- **Membrane Bio Reactor** which includes both biological treatment and membrane filtration, enabled us to achieve TSS & COD values on regular basis, without any non compliance.
- **Project costs Rs. 800 lakhs**

MBR characteristics	Suspended Solids mg/l	COD mg/l
MBR Feed	~ 300	~ 450
MBR Permeate	~ 21	~ 120



# 10. GHG Inventorisation



- Aurobindo is in process of publishing maiden Sustainability Report for the year FY 2021-22.
- Sustainability performance targets defining is in progress and same shall be disclosed in the Sustainability Report FY 21-22.

Year	Scope 1 emissions kgCO2 / Turn of Final Products	Scope 2 emissions kgCO2 / Turn of Final Products	Scope 3 emissions kgCO2 / Turn of Final Products	Total kgCO2 / Turn of Final Products Tons / Turn of final Product
2018-19	1,46,256	28,649	-	1,74,905
2019-20	1,27,441	30,855	-	1,58,296
2020-21	1,20,133	27,917	-	1,48,050

# 11. Green Supply Chain Management

S.No	Projects Implemented	Benefits Achieved	Description
1	Shipper Stuffing Project	Rs 190 Million	Increased loading by 30% to 33% extra optimization in container with shipper stuffing, saved freight on additional container had it not been shipper stuffed. It enables no dependency on the wooden pallets.
2	Double Stacking Injectable Project		Successfully implemented with 50% extra space optimization with shipping Injectable with double stacking.
3	Paperless / Digital Logistics Execution – OTM Project	Decreased Paper consumption and paper less / Digital transactions	First Pharma company in India to adopt OTM. This is a cloud Based Solution having control Tower for Shipment Processing and Tracking. In this Freight Payments linked from OTM to ERP. OTM Go Live by Jul'2022. OTM to be implemented and rolled out for the US and EU subsidiaries.
4	AIR vs SEA – Mode Control	Decreased Carbon Emissions	Increased Sea transportation over Air transportation by pallet systems. Decreased air Tonnage from 572 Tonnage to 456 Tonnage
5	GST e-Invoicing	Decreased Paper consumption and paper less / Digital transactions	E-invoicing' or 'electronic invoicing' is a system, invoices are authenticated electronically and hence becomes Paperless Transactions. All invoice information will be transferred from the portal in real-time. Govt. Initiatives for ease of doing business such for the ease of exporters/importers to ease and streamline the business ecosystem
6	AEO (Authorized Economic Operator) Certification	Less paper / Digitalization	This initiative requires limited physical/ hard copy as per the initiative taken by Govt of India. It requires no physical examination for AEO T2 certified , and hence less paperwork. All documents needs to be upload to ICEGATE through e-Sanchit. This supports Airlines/ Ocean Liners for the Paperless transactions
7	IMO 2020 Adoption for less pollution-free marine ecosystem.	Less Pollution Free - Marine eco System	This initiative seek to control airborne emissions from ships operating outside of ECAs including sulphur oxides (SOx), nitrogen oxides (NOx), ozone depleting substances (ODS) and volatile organic compounds (VOC) from to limit sulphur emission to 0.50 percent m/m from 01.01.2020 which is 85.7 % reduction from the current 3.5 percent m/m limit.

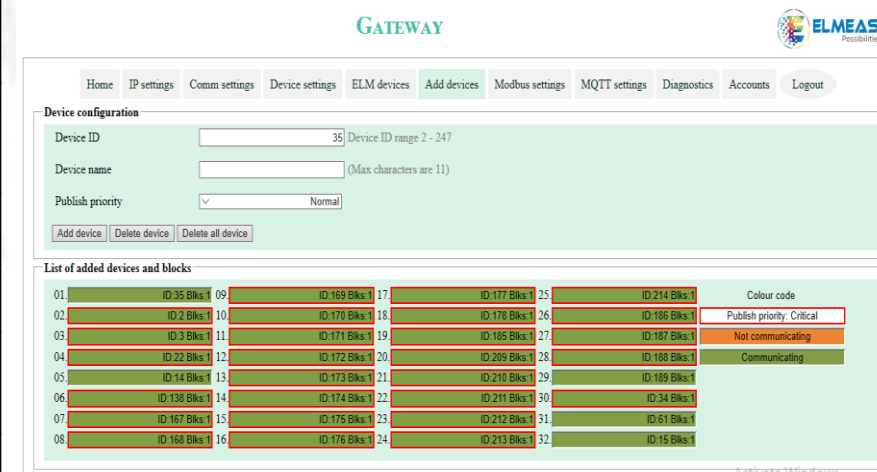
# 12. Teamwork, Employee Involvement & Monitoring

- Energy Monitoring Systems Implemented across all Power Control Centres – 400 No's - Daily Monitoring, Reporting and Reviewing
- Energy Cell given technical training programmes on all utility systems to all engineering teams. During the training, shop floor measurement and performance evaluation was taught to all team for frequent checking of performance.
- Review meeting on day to day energy consumption and benchmarking targets



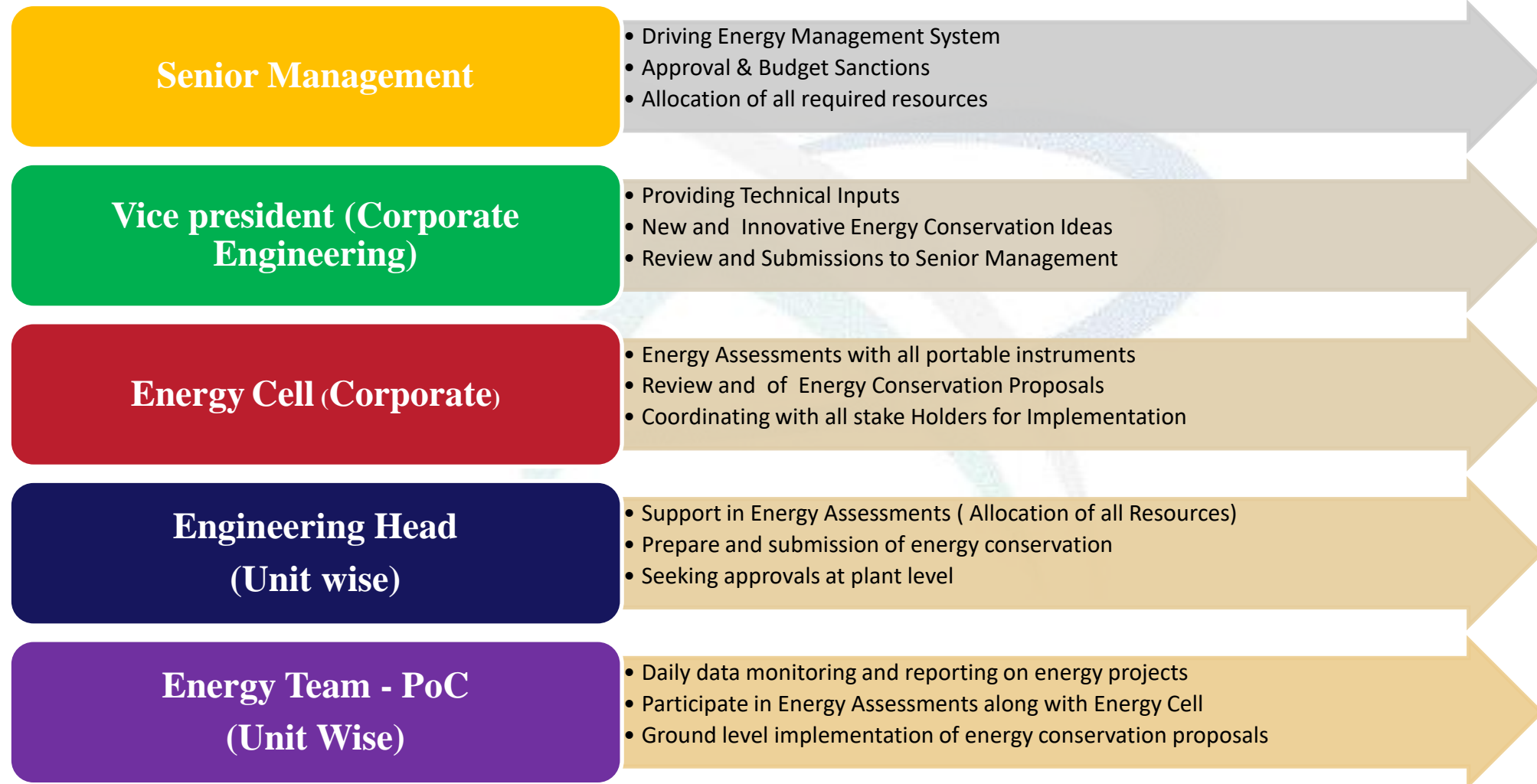
## Summary of Projects/KAIZENS implemented 2020-21

S No	Initiative department	Initiatives	Completed	To be completed	Investment	Savings /Annum Rs.	ROI in months
1	Mechanical	7	4	0	0	229850	0
2	Utility & Boiler	7	4	0	0	1818230	0
3	Electrical & Instrumentation	11	11	0	224326	2614182	1.0
<b>Total</b>		<b>22</b>	<b>22</b>	<b>0</b>	<b>224326</b>	<b>4662262</b>	<b>0.6</b>



# 13. Implementation of ISO 50001/Green Co/IGBC Rating

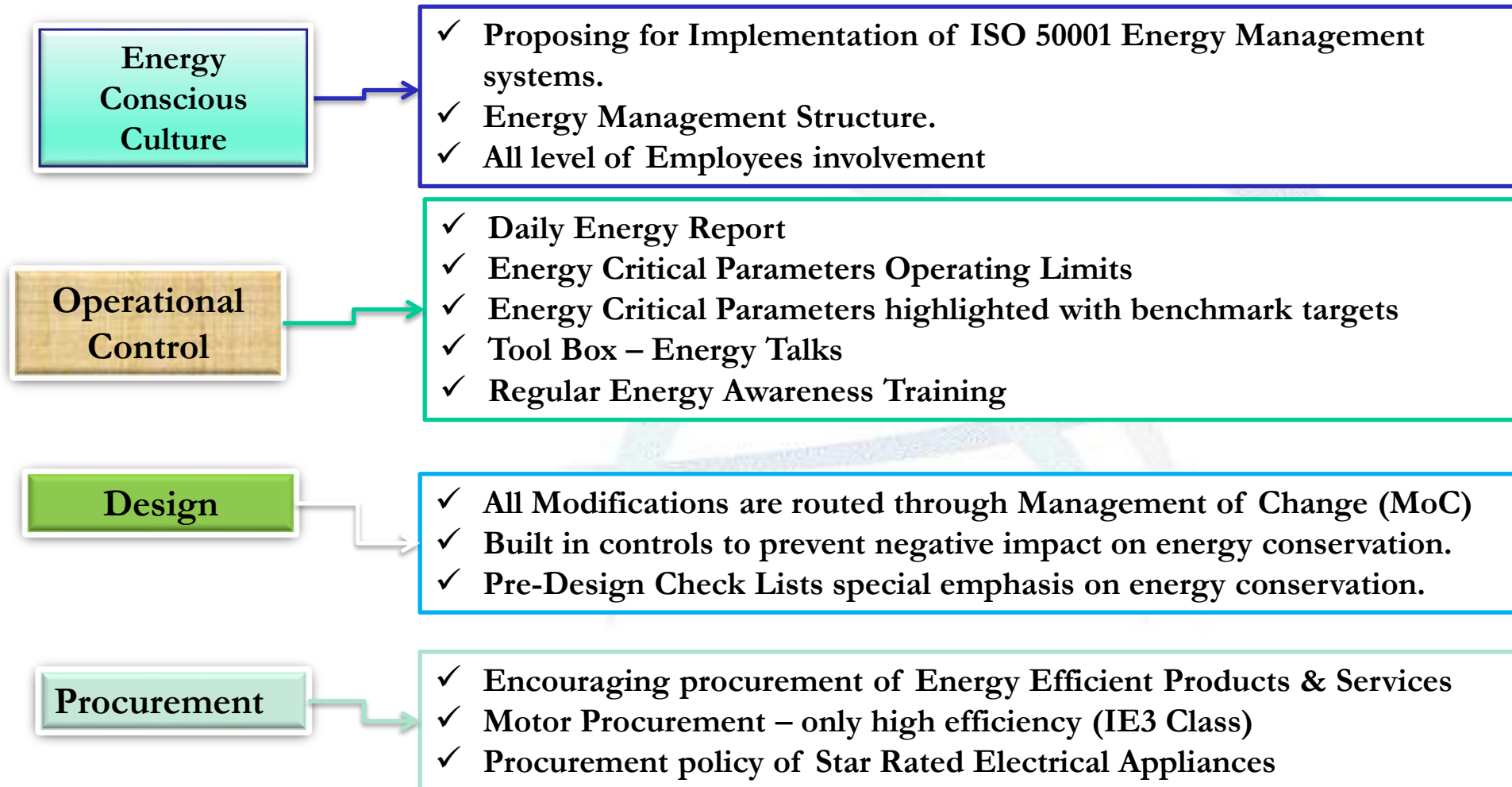
## Energy Management Hierarchy:





# 13. Implementation of ISO 50001/Green Co/IGBC Rating

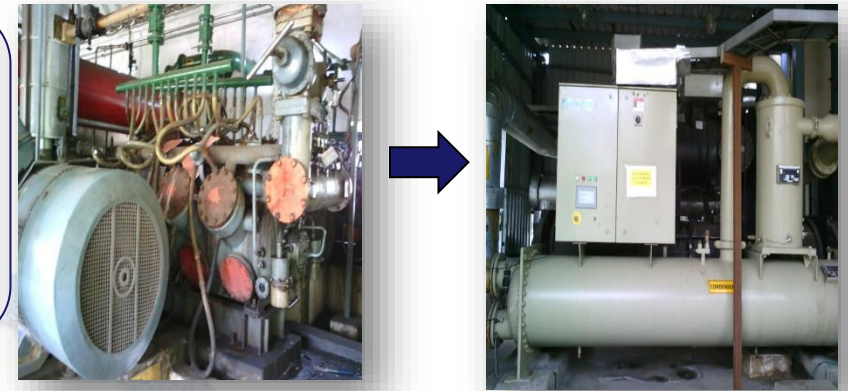
## Energy Management System:



# 14. Learning from past CII award programs

## I Replacement of inefficient of chillers with higher efficiency chillers

With the installation of Energy Efficient Screw Refrigeration Systems by Replacing the Old Reciprocating System CMU015



## II Vertical pump with IE3 motor Installation

Initiated and installed vertical pumps with IE3 motors at SRS-V  
Energy efficient and low maintenance.  
Low transmission & vibration losses with  
Reduces mechanical seal failures.

## III Implementation of Online Energy Monitoring System

Installed 400 meters across all power control centres in all phases which allows continuous monitoring, reporting and reviewing of power consumption all over the plant  
Online data monitoring



# 15. Awards & Celebrations



Best Energy Conservation project



Energy Conservation Week Celebrations



Training on Energy Efficiency in Utility Systems



**Intensive look for Energy Savings**

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**THANK YOU**