40 Years

INDIAN IMMUNOLOGICALS LIMITED

of Saving Lives

CII National Award

for Excellence in Energy Management -2024

INDIAN IMMUNOLOGICALS LIMITED

Gachibowli Unit

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INDIAN IMMUNOLOGICALS LTD

राष्ट्रीय डेरी विकास बोर्ड
NATIONAL DAIRY DEVELOPMENT BOARD

INDIAN IMMUNOLOGICALS LIMITED
40 Years of Saving Lives

Indian Immunologicals Limited was set up by National Dairy Development Board (NDDB) in 1982 with the objective of making vaccines available to farmers at an affordable price.

Indian Immunologicals Ltd (IIL) is the market leader in veterinary and human biologicals in India. It manufactures over 150+ products.

IIL operates one of the largest plants in the world for veterinary vaccines. IIL has adequate infrastructure and cold chain distribution capability to reach out to various parts of India and world market..

IIL is a major player in the human vaccine market in India, focusing on the pediatric and rabies vaccine segments. IIL is also a major supplier of pediatric vaccines to India's large Universal Immunization Program

Indian Immunologicals Ltd (IIL) has emerged as the India's largest manufacturer of Foot and Mouth Disease (FMD) vaccine & World's Largest producer and supplier of the human Rabies vaccine.

IIL Exports

Animal and Human vaccines to more than 50 countries

Several billion doses	150+
of vaccines sold	Registered Products

Facility & major equipment

Manufacturing of Vaccines

- **Animal Vaccines**
- **Human Vaccines**

25 Manufacturing blocks
100 KL+ of fermenters volume

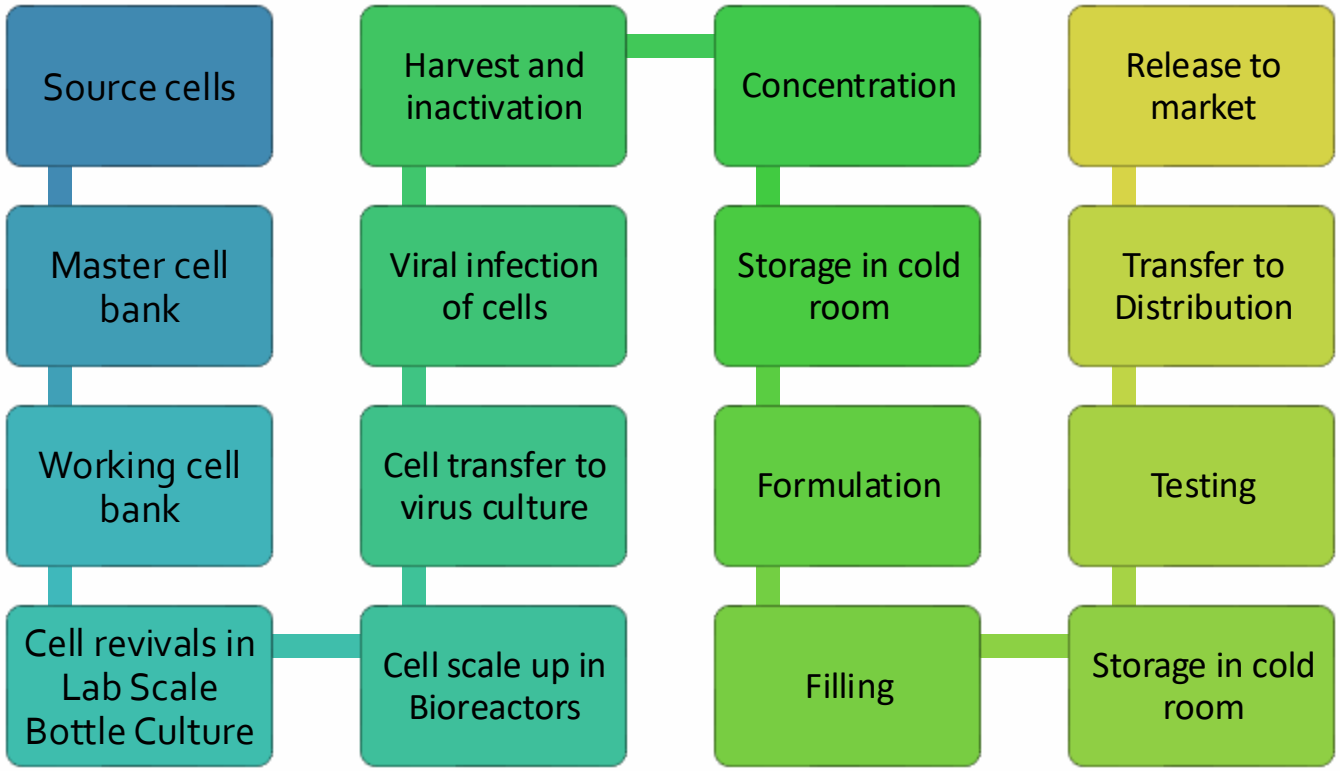
Major Equipment's

- ❑ Air Handling Units
- ❑ Chillers and cooling towers
- ❑ Boilers
- ❑ Air Compressors
- ❑ 50+ Fermenters
- ❑ 500+ Vessels
- ❑ 40+ Autoclaves
- ❑ Continues discharge Centrifuge
- ❑ TFF system
- ❑ Chromatography system
- ❑ Pure steam generators
- ❑ Cold stores






Manufacturing process



Energy demand & consumption

Electrical Energy

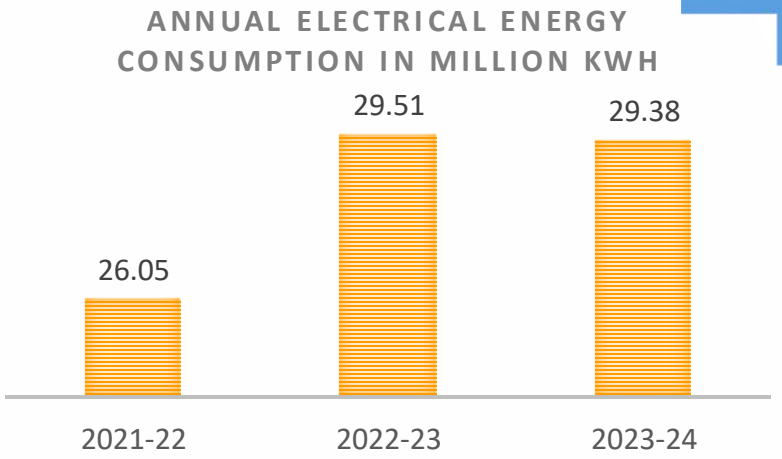
- Power Demand : **4925 KVAH**
- Connected Load : **24106 H.P.**
- Source of Power : Grid Power & Captive Generation
- Intensive Area : Chilling Plants , Air Compressors,
  Vacuum Pumps, Utility Pumps, AHU Systems

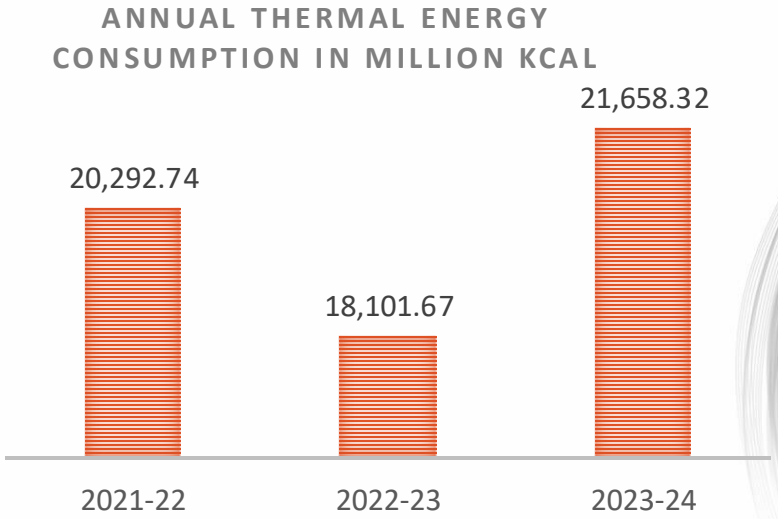
Thermal Energy

- Thermal Energy Demand : **6 TPH**
- Total Boiler Capacity : **17 TPH**
- Intensive Area : Process (Fermenters, Vessels, continuous discharge centrifuge),
  Clean Utilities(Pure steam generator, Water for Injection), ETP (MEE & ATFD)

Annual Energy consumption in last 3 years

Parameters	Unit	2021-22	2022-23	2023-24
Annual Electrical Energy Consumption	million kWh	26.05	29.51	29.38
Annual Cost of Electricity Consumed	million INR	178.81	235.14	219.35
Annual Thermal Energy Consumption	million kcal	20,292.74	18,101.67	21,658.32
Annual Cost of Thermal Energy Consumed	million INR	221.59	248.38	238.09
Specific Electrical Energy Consumption	kWh/dose	0.068	0.065	0.054
Specific Thermal Energy Consumption	Kcal/dose	53.17	40.11	39.75

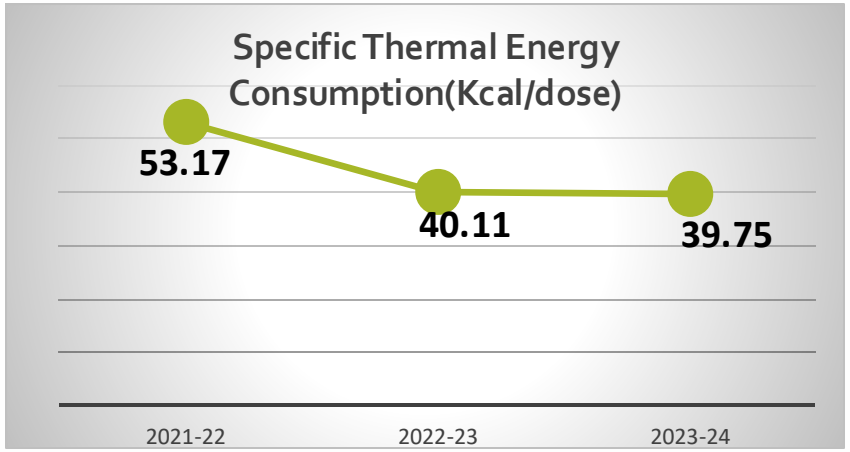


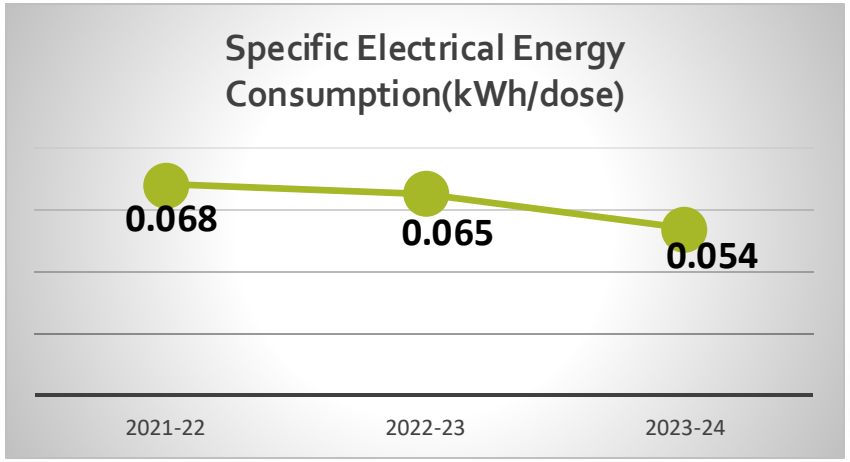


Specific energy consumption

Parameters	2021-22	2022-23	2023-24
Specific Thermal Energy Consumption(Kcal/dose)	53.17	40.11	39.75
Variation in %	↓ 18.13	↓ 24.01	↓ 0.9

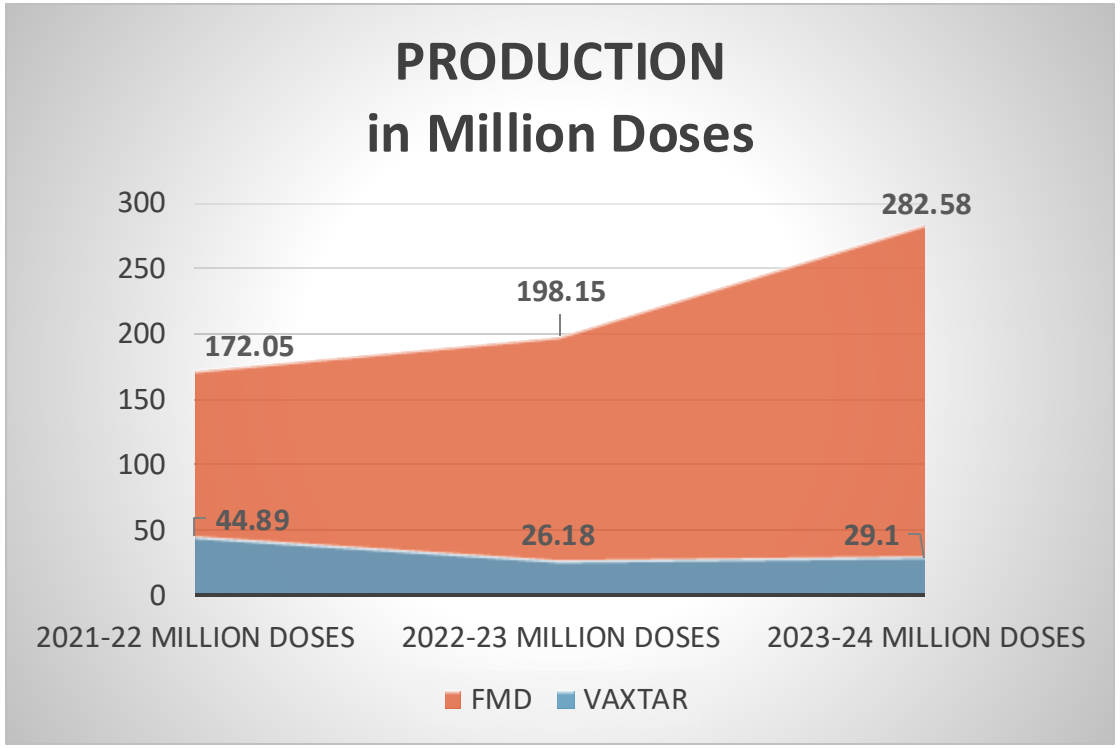
Parameters	2021-22	2022-23	2023-24
Specific Electrical Energy Consumption(kWh/dose)	0.068	0.065	0.054
Variation in %	↓ 8.1	↓ 4.41	↓ 16.9





Production data

PRODUCT	2021-22 Million doses	2022-23 Million doses	2023-24 Million doses
FMD	172.05	198.15	282.58
VAXTAR	44.89	26.18	29.10

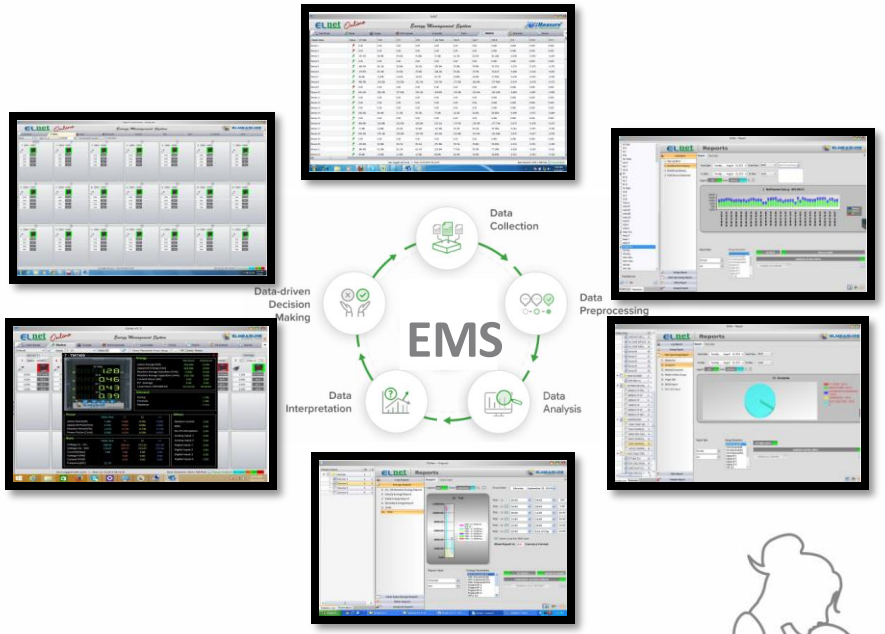


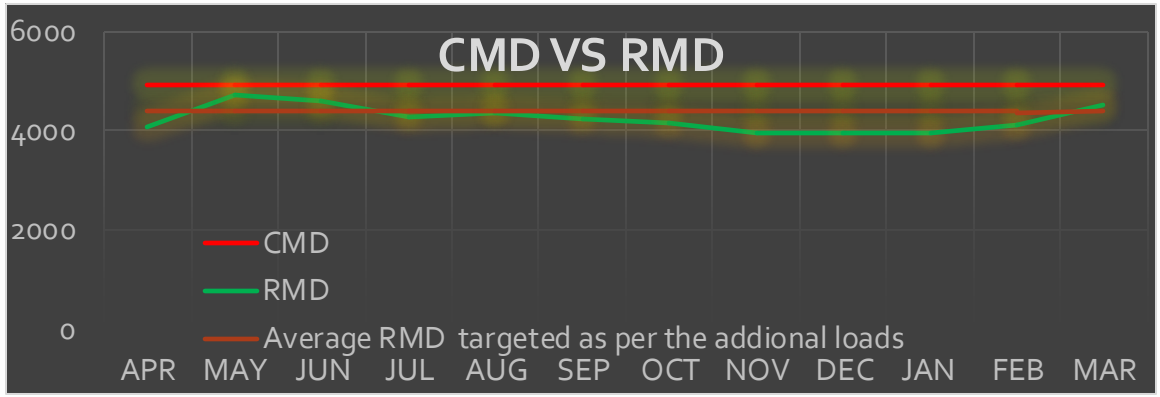
Benchmarking

- FY 2024-25 targeted benchmark was based on FY 2023-24 actuals energy consumption.
- We have targeted to reduce Thermal energy consumption by 10% and Electrical consumption by 5% FY 2025 - 26.
- We can achieve the targeted benchmark by commissioning of the Natural gas fuel to boiler and effective implementation of energy saving activities and with continuous monitoring of load demand.
- Usage of renewable energy source from solar by last year recommendations from CII.
- By implementation of few collective measures we had achieved 16% Electrical saving's.

Energy Management system

- Energy consumption monitoring and spikes / fluctuations data is captured CMD vs OMD vs RMD obtained with the help of data analytics with EMS.
- Power quality in reduction of Harmonics.
- Load trends , Faults or any failures of UPS are being monitored in online .



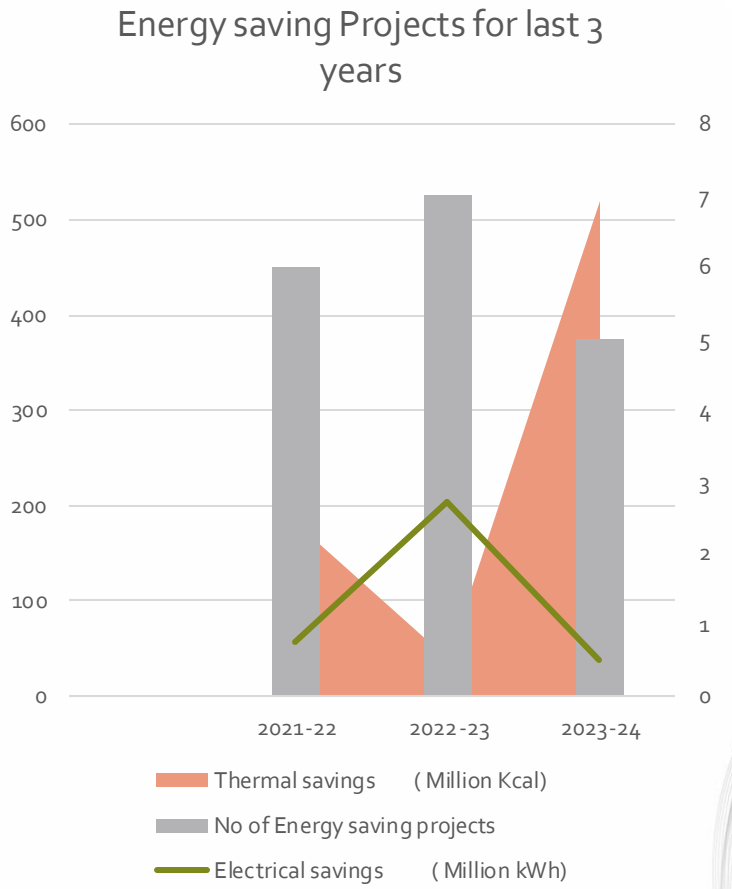


FY 2023 - 24

PARAMETERS	STANDARD	ACTUAL VALUE
VOLATGE HARMONICS	5 % THD	3 %
CURRENT HARMONICS	8 % THD	6%
POWER FACTOR	1	0.999

Energy saving projects implemented

Year	No of Energy saving projects	Investment (INR Million)	Electrical savings (Million kWh)	Thermal savings (Million Kcal)	Total Savings (INR Million)	Payback period (in months)
2021-22	6	2.05	0.76	180.71	7.4	4
2022-23	7	16.4	2.71	39.477	23.56	9
2023-24	5	11.1	0.49	519.25	10.31	72.12



List of ENCON projects planned 2024-25

S.no	Title of Project	Annual Electrical Saving (Million kWh)	Annual Thermal Saving (Million Kcal)	Investment (Rs in Million)
1	1MW solar power plant	1.38	0	55
2	Active harmonic filters installation at load ends (MCC's) – to reduce load amps and losses.	0.02	0	1
3	Shifting of Capacitor banks at MCC Panels Load center areas (AH Plant)	0.06	0	0.25
4	BLDC / EC blower for selected AHU's	0.05	0	2.5
5	Installing a new high-pressure reverse osmosis (RO) system to process primary RO reject		1376	2.1
6	Installation of DG SYNC panel for 3 no genet's		18.92	15
7	Procuring IE4 motors for replacing the old IE2 for selected AHU's and Fermenters.	0.12		
8	Replacing the five reciprocating air compressors with a single 800 CFM screw air compressor to save on electrical energy and reduce operating costs.	0.044		10

Fuel saving by DG sync panel

DG (Diesel Generator) synchronization panel is crucial for managing multiple diesel generators in parallel, ensuring they operate in harmony. optimisation of load sharing on each genset & increased the dg utilisation efficiency by 0.6 % and resulted in getting fuel saving of approx. 2KL / year , parallel reducing carbon generation of 5 tons/ year.

DG sets Synchronization panel	Diesel consumption Ltrs / hour	kW/ltr
Before Installation	202.46	3.03
After installation	188.2	3.63
Difference	14.26	0.6 ↓

Solar 1 MWp power plant

Commissioning of 1MW Solar on Ground mounted and rooftop system for selected buildings.

Ground mounted area as shown in the layout and annual generation of 13,86,423 units / year.

Environmental Impact: Reduces carbon footprint of 1,109 Tons of C02/ year and reliance on fossil fuels.

Energy Savings: Provides a stable source of energy with low operating costs once installed.

ENCON 2023-24

Title of Project	Annual Electrical Saving (kWh)	Annual Electrical Cost Saving (Rs million)	Annual Thermal Saving		Annual Thermal Cost Saving (Rs million)	Total Annual Savings (Rs million)	Investment Made (Rs million)	Payback (Months)
			TOE(Tonnes of Equivalent)	million kCal*				
Implemented a system to collect reject water from the Multiple-Effect Distillation Process (MCDP) and supply it to the boiler as feed water	0	0	18.885	188.85	2.24	2.24	1.2	6.43
Condensate recovery system for P4 block	0	0	9.44	94.4	1.12	1.12	0.5	5.36
Installed a new 6TPH (tones per hour) dual-fired boiler to optimize energy usage and enhance operational efficiency.	0	0	23.6	236	2.8	2.8	6	25.71
Shifting of Capacitor banks at MCC Panels Load center areas (AH Plant)	371905	3.11			0	3.11	0.4	0
BLDC / EC blower installed for B9 block AHU's	124132	1.04			0	1.04	3	34.62

Installed PNG / HSD oil fired 6 TPH boiler

6 TPH PNG/ HSD FIRED BOILER

- New 6TPH energy efficient boiler installed with dual fired burner of PNG / HSD to reduce the fuel consumption & carbon emissions in place of the existing HSD fired 5+3 TPH boilers (2nos.)

Equipment type	Fuel consumption per year (KL)
5 + 3 TPH boiler running	2372
6 TPH boiler running	2153 ↓

- Around 2.5 % of annual cost savings.
- 6TPH boiler & 15 to 20% of carbon emissions reduction can be achieved with PNG. (PNG line is under installation)

Fuel	Fuel consumption per year (KL)	CO2 emission per year in Tons
Diesel	2372	6167 ↑
Natural gas	2298	5056 ↓

MCDP reject water heat recovery

- Reject water from the Multicolumn Distillation plant (WFI plant) is pump backed to the boiler feed tank to reuse as boiler feed water.
- Annual reject water received from MCDP is 16000 KL.

Million kCal	ToE	Diesel ltrs	Savings in millions
188.85	18.885	22753.26	2.24

WFI (MCDP) plant

Carbon reduction from air compressors

Air Compressors running hours per year	Reciprocating compressor (212 kw) CO2 emissions (Ton) per year	Screw compressor (160 kw) CO2 emissions (Ton) per year
7,300	1,321 ↑	992 ↓

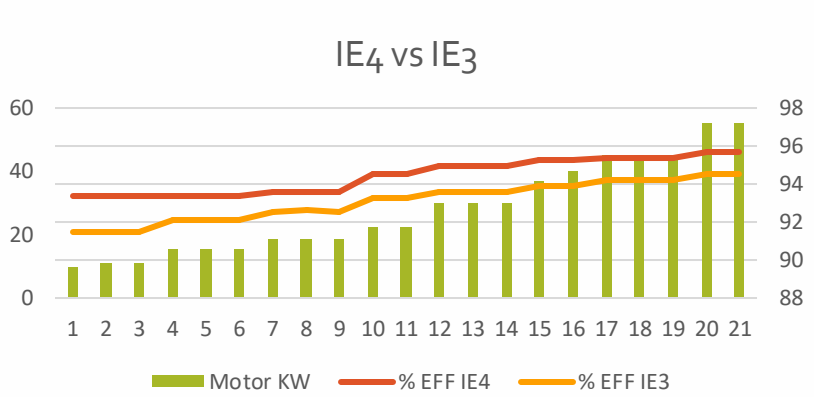
Total CFM	Running hours / month	KW	Total KW / month	Total Running cost /month	Cost Saving
1247 (Total – 5 Compressors) ↑	620	204	1,26,480	10,11,840	
800 ↓	620	132	81,840	6,54,720	3,57,120 / month

800 CFM screw air compressor

- Installed a new energy efficient 800 CFM screw compressor in place existing five reciprocating compressors.
- Reduce energy consumption , cost & carbon emissions

Energy Savings

ENERGY SAVINGS /Year		
1	KW savings through installation of 3 no's of AHF panels at Load distribution and utility area	5,32,556 KW
2	CMD VS RMD Load analysis savings in KVA	2562.4 KVA
3	IE5 EC blower implementation for 2 no of selective AHU's	1,24,132 KW
4	Load Balancing from distribution end & reducing losses	13,829 KW
5	Power optimization with DG sync panel and reduction of DG fuel consumption /year on average.	2KL diesel
6	Selected 21 numbers of IE3 motors replaced with IE4 motors in Process & Utility area.	70,956 KW



	IE4	IE3	Savings
KW / HR	420.52	428.62	8.1
KW / Day	10,092.48	10,286.88	194.4
KW/YEAR	36,83,755.20	37,54,711	70,956

ENCON 2022-23

Title of Project	Annual Electrical Saving (kWh)	Annual Electrical Cost Saving (Rs. million)	Annual Thermal Saving	Annual Thermal Cost Saving (Rs. million)	Total Annual Savings (Rs. million)	Investment Made (Rs. million)	Payback (Months)
			Quantity				
Operating new energy efficient chiller 450TR by switching off old 300 TR chiller	1,58,752	1.27	0	0	1.27	7	67
Operating new energy efficient chiller 350TR by switching off old 250TR & 150 TR chillers	4,20,480	3.36	0	0	3.36	7	25
Reduced the RMD spikes	2,326	0.5	0	0	0.5	0	0
Stopped air cooled chiller and lined up from water cooled chiller	1,52,886	1.S22	0	0	1.22	0.1	1
Installed heat exchanger for heating feed water in boiler	0	0	4,404 (Litres)	0.54	0.54	0.1	3
Replaced old pumps with new energy efficient pumps in refrigeration plant	81,768	0.65	0	0	0.65	1.2	23
Shifting of capacitor banks at MCC panel load center areas	20,12,876	16.02	0	0	16.02	1	1

Energy savings by installing 350 TR water cooled chiller

- Installed Freon 134A refrigerant based 350 TR screw chiller with VFD in place of Ammonia based refrigerant chiller (250 + 150TR).
- Ammonia is a carcinogenic in nature requires additional maintenance & storage.
- Freon 134A is a non carcinogenic refrigerant , copper is used as transfer medium , low in maintenance and compact in design.

350 TR WATER COOLED SCREW CHILLER

Title of Project	Annual Electrical Saving (kWh)	Annual Electrical Cost Saving (Rs million)	Investment Made (Rs million)	Payback (Months)
Operating the new energy efficient chiller 350TR by switching off old 250TR & 150 TR chillers	4,20,480	3.36	7	25

Energy savings from plate heat exchanger

- Installed a Plate Heat Exchanger at boiler feed water line to pre heat the feed water by using the raw steam as heat exchange medium to reduce fuel burning cost.

Feed water temperature & HSD oil consumption without Heat Exchanger

Feed water Temperature (°C)	HSD oil consumption (KL) / day	Steam Generated / day
55	6.8	96 Tons

Feed water temperature & HSD oil consumption with Heat Exchanger

Feed water Temperature (°C)	HSD oil consumption (KL) / day	Steam Generated / day
81	6.3	98 Tons

- Initial investment made of 0.1 million.
- ROI-2.22 months.

Plate Heat Exchanger installed at boiler feed water line

Energy savings by installing energy efficient pumps in refrigeration plant

- Replaced old pumps with new Energy Efficient pumps (IE3) in refrigeration plant
- Initial investment made of 1.2 million.
- Running with old pumps Condenser pumps 2No's, Primary Pump 1No, Secondary pump 1 No.

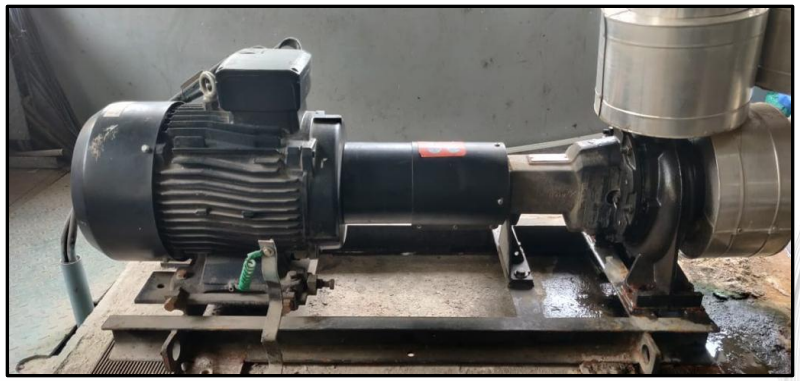
Pumps running hours/year	Pumps KWH/year	Pumps Power cost million/year
2,920	2,57,456	21.67

- Running with new Energy Efficiency condenser pumps 2 No's, Primary Pump 1 No., Secondary pump 1 No.

Pumps running hours/year	Pumps KWH/year	Pumps Power cost million/year
2,920	1,96,545	16.54

- ROI- 23 months.
- Ataining min of 20 % energy saving .

REPLACED CONDENSOR PUMPS WITH ENERGY EFFICIENT MOTORS.



REPLACED PRIMARY & SECONDARY PUMPS WITH ENERGY EFFICIENT MOTORS.

ENCON 2021-22

Title of Project	Annual Electrical Saving (kWh)	Electrical Saving (kW)	Annual Electrical Cost Saving (Rs. million)	Annual Thermal Saving		Annual Thermal Cost Saving (Rs. million)	Total Annual Savings (Rs. million)	Investment Made (Rs. million)	Payback (Months)
				Quantity	Unit of Measurement				
Condensate recovery from fill & finish in P11 block.	0	0	0	0.219	million Kcal	0.25	0.25	0.6	29
New condensate recovery pump installed at Antigen B9 block	0	0	0	0.219	million Kcal	0.25	0.25	0.6	29
Shifting of Capacitor banks at MCC Panels Load center area (HH Plant)	3,55,472	2.542	0	0		0	2.542	0.6	3
Dismantling of Exhaust fan at AH plant 1. Capacitor panel room 2. Laundry	3,892	0.028	0	0		0	0.028	0	0
R&D block MCC Panel Unbalanced Load balancing	45,644	0.326	0	0		0	0.326	0	0
Shifting of Capacitor banks at MCC Panels Load center areas (AH Plant)	3,63,840	2.606	0	0		0	2.606	0.8	4

Energy savings by installing 450 TR chiller

- Operating new energy efficient 450TR centrifugal chiller with VFD in place of 300 TR chillers(2nos) with soft Water and Auto tube cleaning system.
- This 450TR chiller has auto tube cleaning system which will increase efficiency.
- Installed energy efficient (IE2) condenser pumps to reduce electrical loads.

Title of Project	Annual Electrical Saving (kWh)	Annual Electrical Cost Saving (Rs million)	Investment Made (Rs million)	Payback (Months)
Operating new energy efficient chiller 450TR in place of old 300 TR chiller.	1,58,752	1.27	7	67

450 TR WATER COOLED SCREW CHILLER

AUTO TUBE CLEANING SYSTEM

Innovative projects implemented

Distributed Control System (DCS) for CIP & SIP

- Implemented a Distributed Control System (DCS) for controlling and monitoring the process, Clean-in-Place (CIP), and Sterilization-in-Place (SIP) cycles in Fermenters.
- By automating the control of CIP, SIP & Process cycles through the DCS, streamline these critical processes, reduce manual intervention, and minimize the process variations
- **Saving water, chemicals and energy through accurate, repeatable and automatic actions resulting in reducing the effluent generation at source.**
- Automated cleaning protocols with predefined cleaning agents and chemical concentrations, ensuring the same level of cleanliness every time. Reducing human errors which can lead to mistakes, such as using the wrong cleaning solution concentration, or not thoroughly rinsing equipment.
- Improved health and safety by reducing or preventing employee exposure to cleaning chemicals.
- Greater operational efficiency as less production time is lost during cleaning, and employees are not required to spend long periods cleaning equipment.
- Improved product quality and consistency and less contamination of product.
- Annual Savings **10 lakhs**, Investment 60 lakhs & ROI 6 years

Cycle time reduction in continuous discharge centrifuge

- We have conducted several trials aimed at reducing operational time while maintaining the same product quality, especially considering the current G-force parameters. CSC20 bowl was replaced with CSC 30 Bowl.

- The adjustments made have shown promising results, and lead to more efficient processes without compromising the quality standards

.

- We had increased the flow rate from 1000 to 2000 ltrs/hr.

- Changes in the operating procedure and increased feed flow rate for continuous discharge centrifuge. by this we had reduced the process batch time from 10 hrs to 05 hrs .

- Annual KW savings : 36,000 KWH.
- Carbon reduction : 30 Tons/ year.

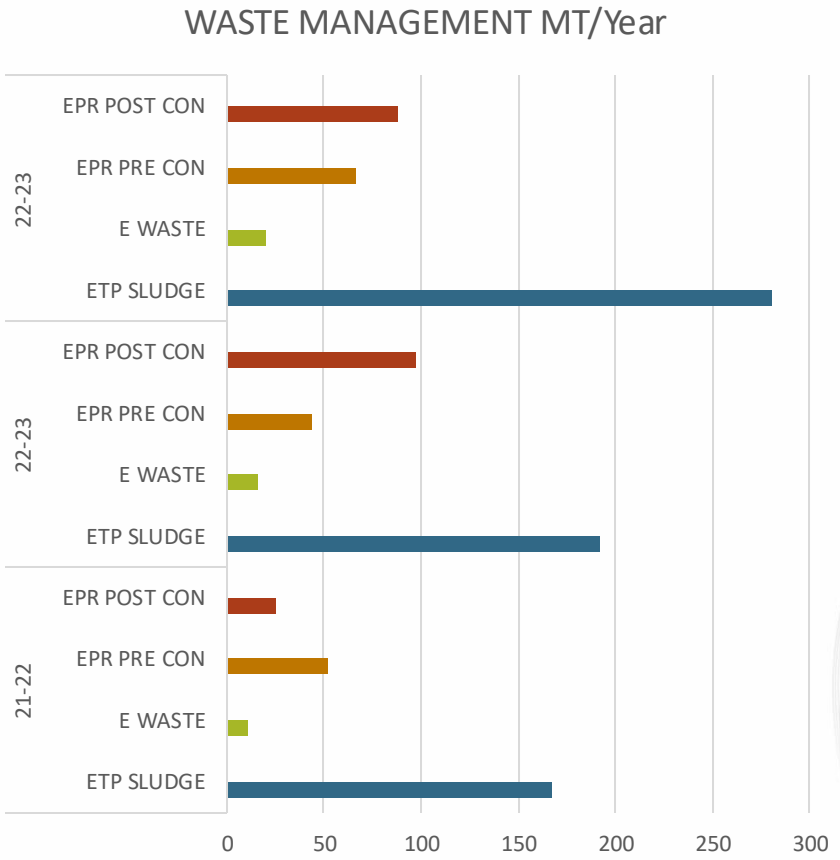
GHG Emissions

Year	Scope 1 emissions (Kg CO2/ million doses)	Scope 2 Emissions (Kg CO2/ million doses)	Scope 3 Emissions (Kg CO2/ million doses)	Total GHG Emissions (Kg CO2/ million doses)
2021-22	15,422	47,778	-	63,200
2022-23	11,636	46,501	-	58,137
2023-24	11,529	38,609	1,762.5	51,900

- Employees commuting, Water usage, Wastewater treatment considered for Scope3 emissions.
- Digital documentation & communication reduces paper usage.
- Phasing out HCFC refrigerant usage by 2030.

Waste management

- Aimed at repurposing the Sludge waste as an alternate fuel source by Reducing the Moisture content in solid waste to 30-40% through a dryer.
- Lowering the moisture content can enhance the calorific value of the waste, making it more efficient as a fuel.
- Canteen Food waste , dry leaves and Grass are recycled as manure for use in plants in GCH premises using composting machine



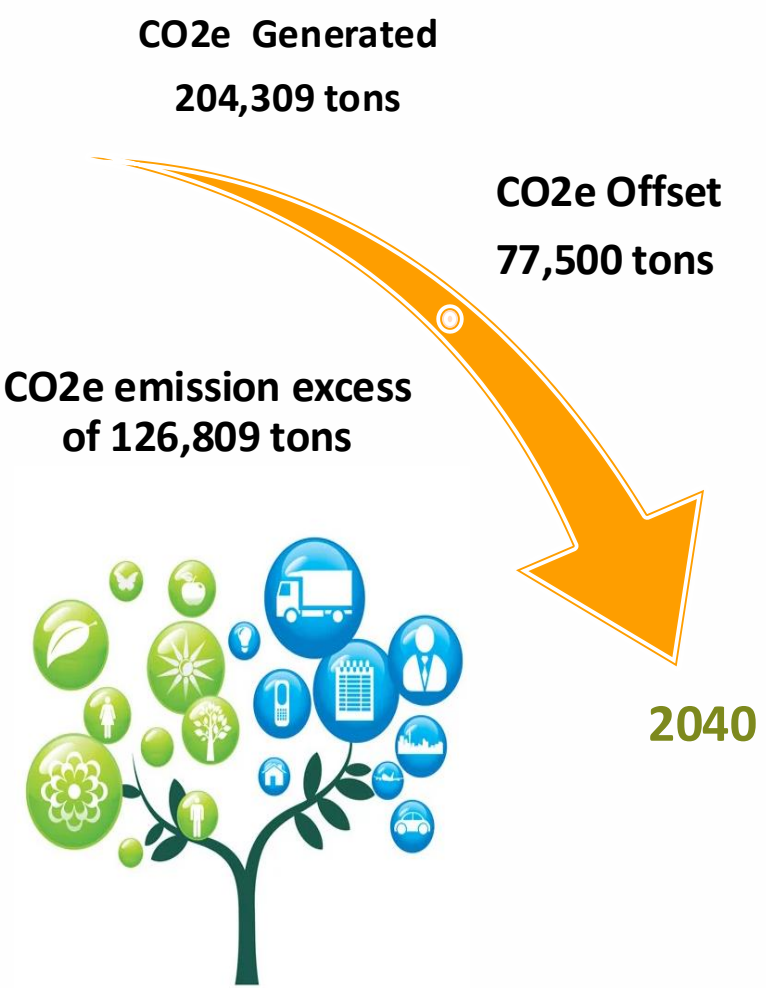
Green supply chain Management

- **Less paper / Digitalization**
- Limited physical/ hard copy as per the initiative taken by Govt of India.
- Paper less by implementation of all the trainings through online portal .
- Digital invoices are in utilization.
- Govt. Initiatives for doing business exporters/importers to ease and streamline the business ecosystem .

- **Efforts on purchasing the batteries with the buyback options.**
- **Purchase of BEE star rated electrical items, usage of LED & energy efficient motors.**
- **Choosing material from suppliers with lesser plastic/polymer content.**
- **Conducting awareness programs on GSCM & EMS.**
- **Green Supply Chain- Replaced Diesel vehicles with 15 no's of EV for raw materials & finished goods internal transportation.**

Net Zero

- Road map for reduction of carbon Footprint of 70% by 2040.
- Out of 200 acres land 60% of our site being maintained with green belt with major trees of **9,100** numbers.
- The existing green belt has offset 15,000 tons of CO2e / year.
- Plantation of 1,000 no's by FY 2024 -25.
- Till date we reduced the CO2e up to 37 % as we had implemented multiple Energy efficient saving methods



Learnings from CII

1 MW solar plant with 560 - 600 Wp Bifacial PV modules

Installed IE5 EC blower for selective Ahu's & achieved 20 % energy savings

CG APEX Series IE4 motors of 21 numbers procured for replacement of old IE2 motors

Solar Inverter with Power Optimiser, RPS & online energy monitoring

1MW solar plant Targeted to complete by Mar -25 & start the utilization for plant operations.

Corporate Social Responsibility

Adopting Schools

Gift Milk Programme Under NDDB Foundation for Nutrition

Goushala – Free Vaccination and Deworming (Over 1 Lakhs Animals in 75 Goushalas)

Supply of Vaccines for Stray Dogs

Supporting Rabies Free Thiruvananthapuram, Kerala

Awards & Certification

DAkkS
Deutsche
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D-ZM-18590-01-00

Thank You