ADITYA BIRLA
CHEMICALS

Welcome to CII

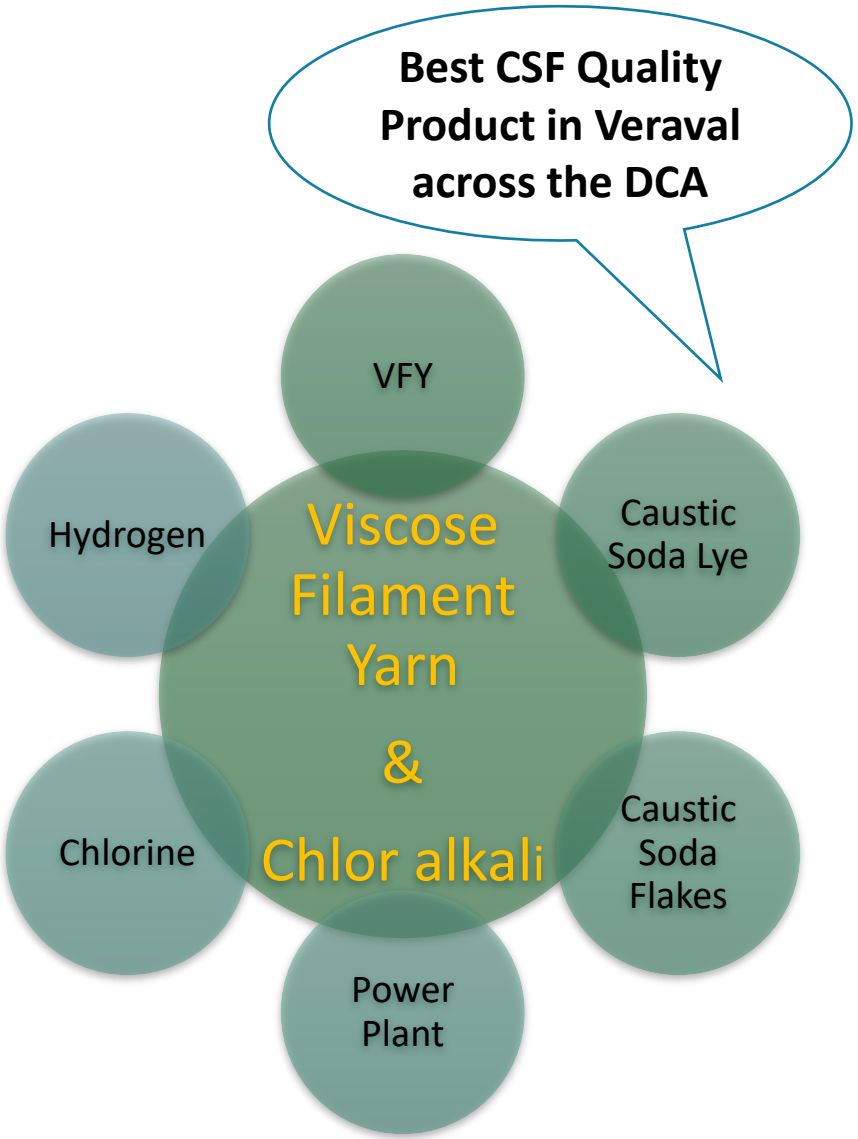
24th National Award for Excellence in Energy Management 2023

INDIAN RAYON

Participants

- Mr. Mayank Shukla
- Mr. Anand Kumar
- Ms. Sanjana Jotangiya

Integrated Operation & Major Products

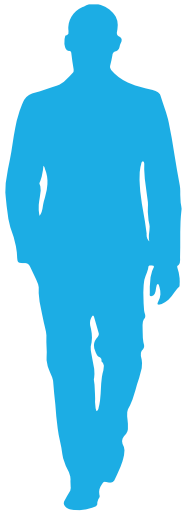


Integrated Operations for Cost Effectiveness

Product	UOM	Capacity	Uses
Caustic Soda Lye	TPD	250	In process, Dye, Detergent Chemical
Caustic Soda Flakes	TPD	160	Cosmetics, Pharma ,Paints,glass,ceramics,
Hydrogen	NM3	73500	As a fuel
Chlorine	TPD	223	Used in Bleach, chemical process
VFY	TPD	60.75	Textile Apparel , Satin, Sarees
Captive Power Plant	MW	38	Captive (VFY + Caustic)

32 % Caustic Soda Lye use as a Raw material for captive utilization in VFY.

Our Journey so far…



1996-1998

Backward Integration

1996- Installed 16.5 MW Captive Power Plant

1997- Installed 100 TPD Caustic Soda Plant.

2000-2004

100 TPD

CPP Expansion

2004 - Indian Rayon became a unit of ABNL

2006- Erection of 18.5 MW Captive Power Plant

2006

2008-2017

250 TPD

Expansion

2008- 1st Expansion of Caustic Soda Plant (up to 250 TPD)

2017- Merger of ABNL with Grasim

2019-23

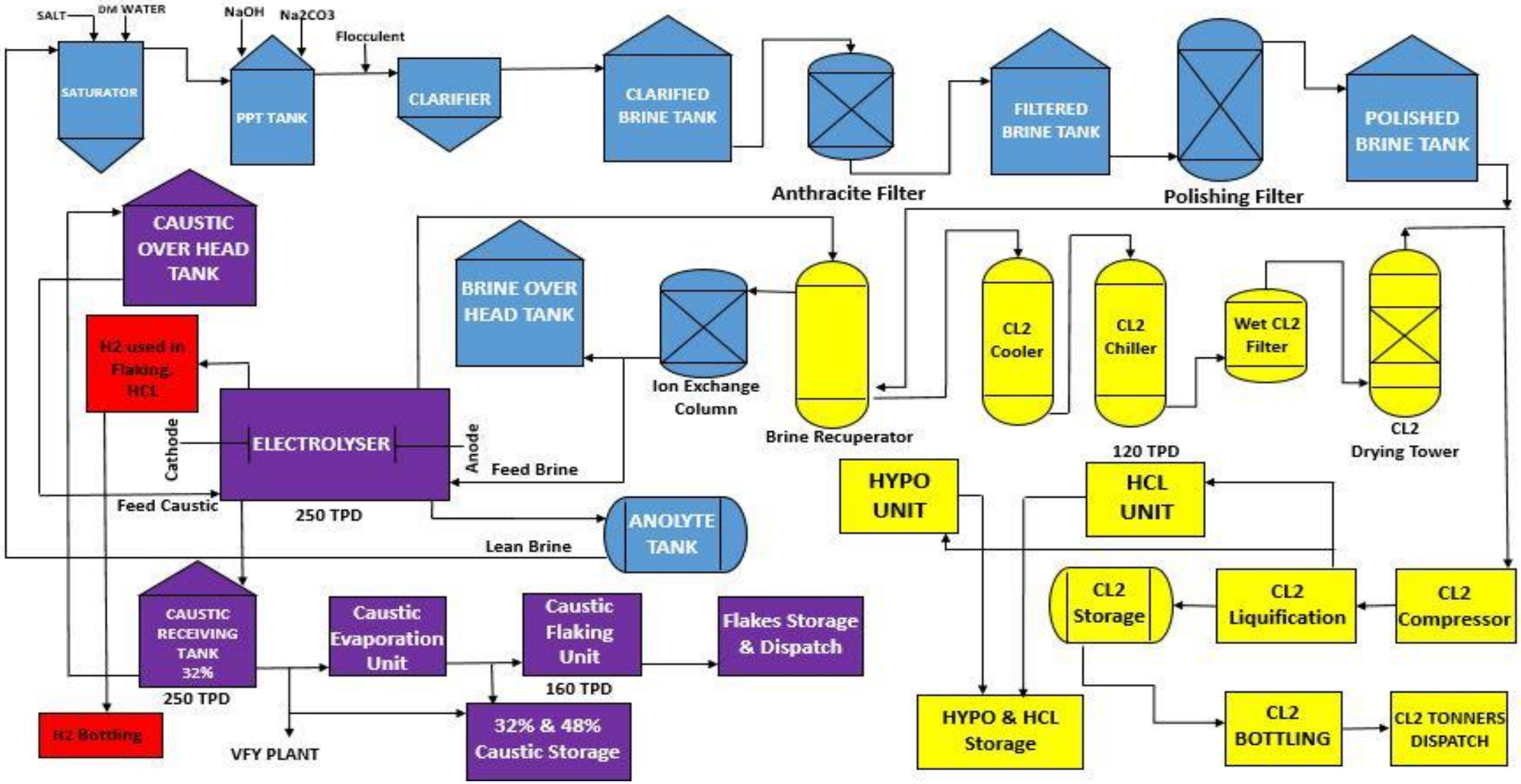
250 TPD

Continuous Progress

2021-20.0 MW Turbine installed

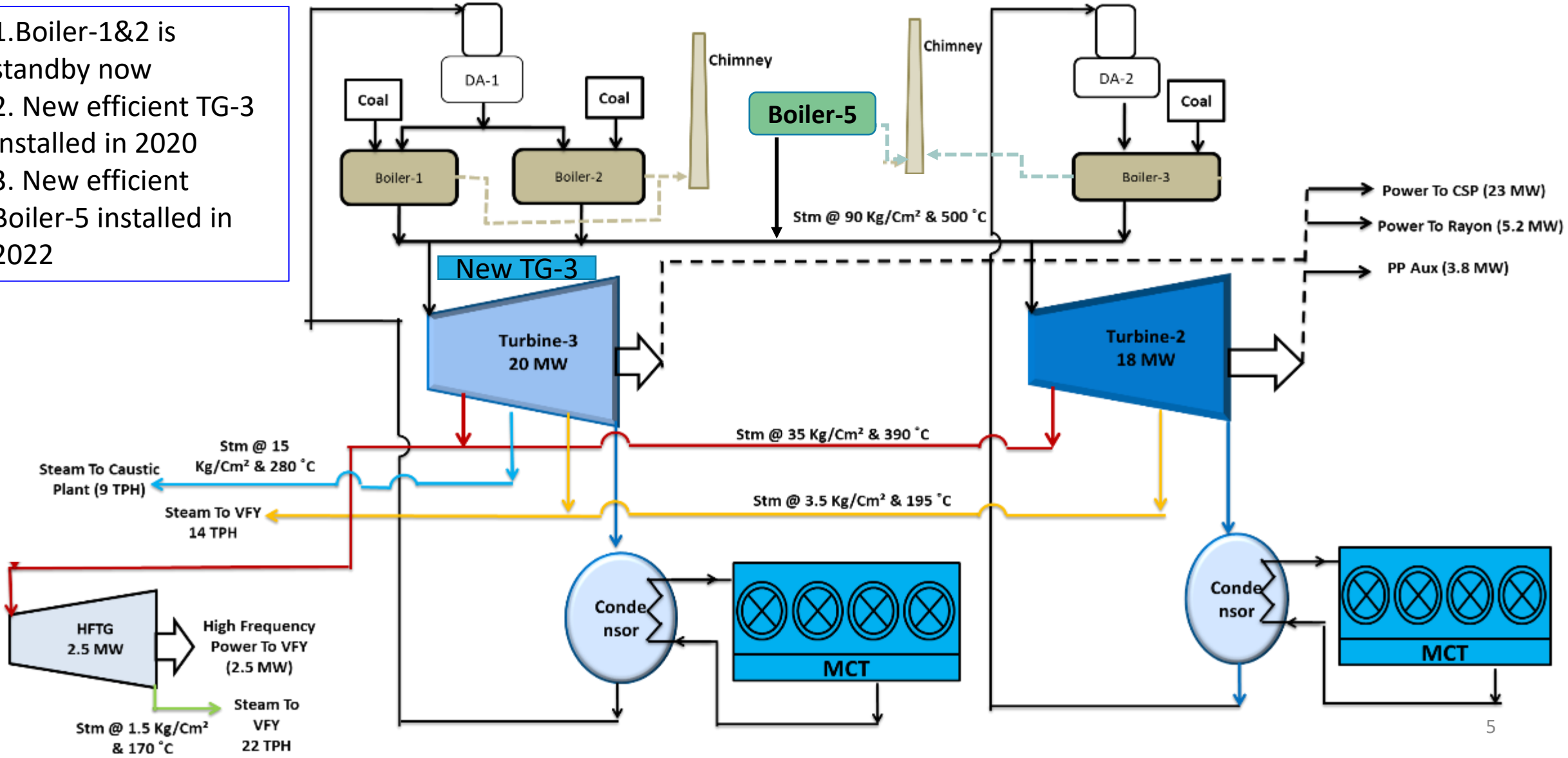
2022- 110 TPH Boiler installed

Process Flow Diagram- Chlor Alkali Plant

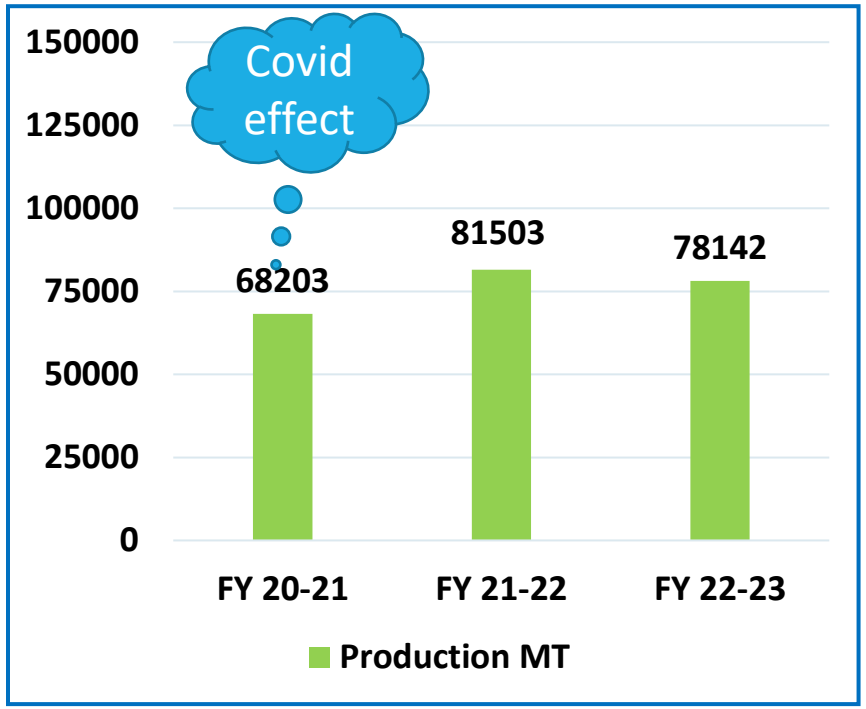


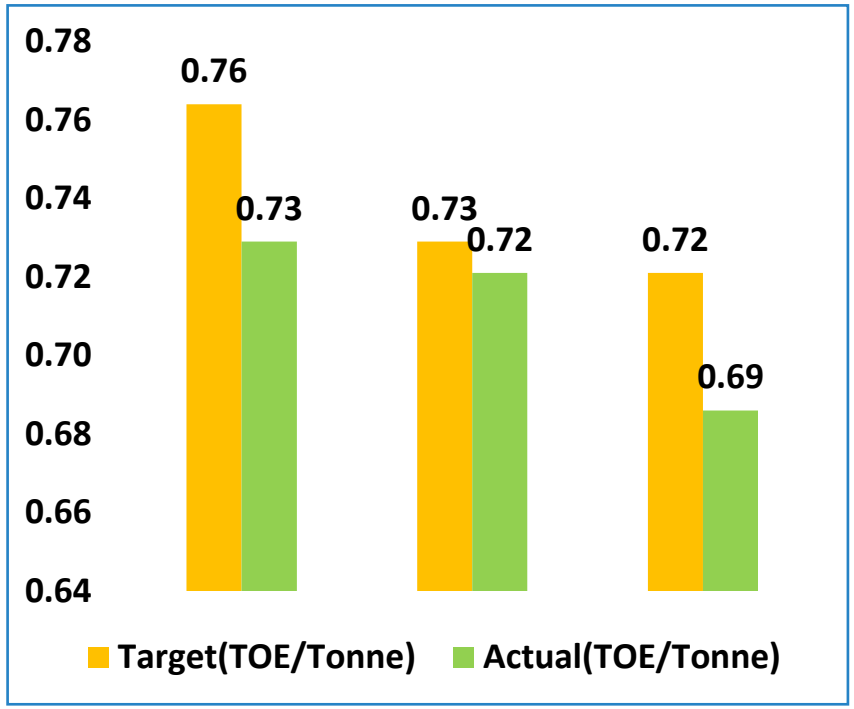
Process Flow Diagram- CPP

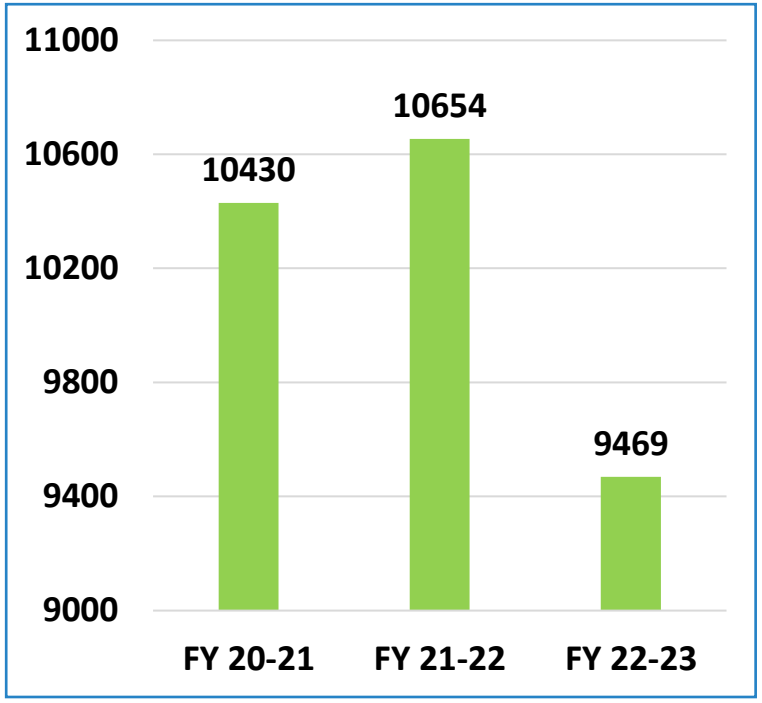
1.Boiler-1&2 is standby now
2. New efficient TG-3 installed in 2020
3. New efficient Boiler-5 installed in 2022



Production & Specific Energy consumption







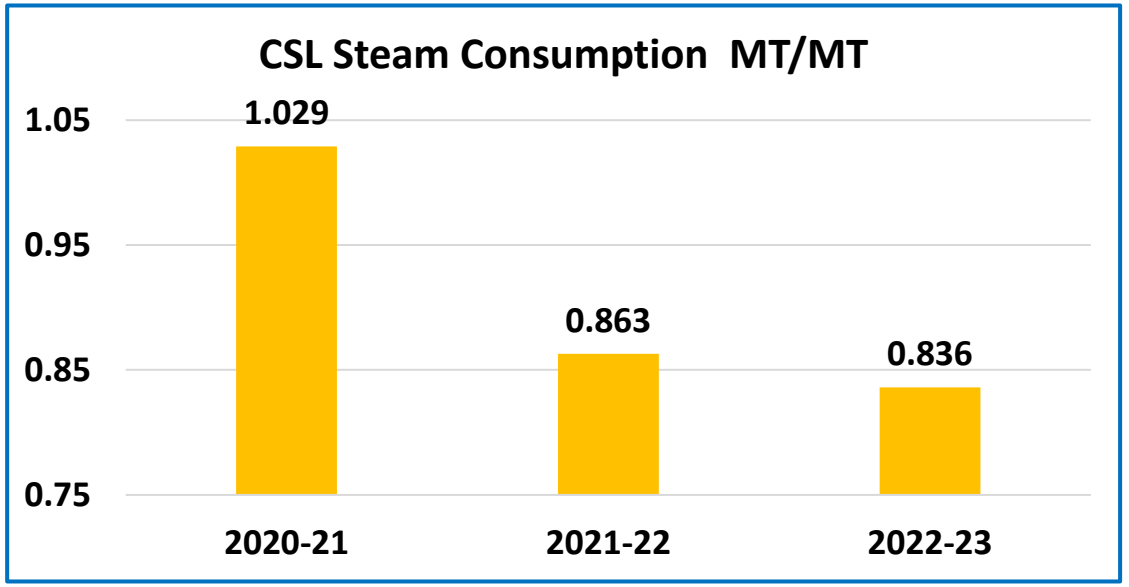
FY	FY 20-21	FY 21-22	FY 22-23
Production MT	68203	81503	78142

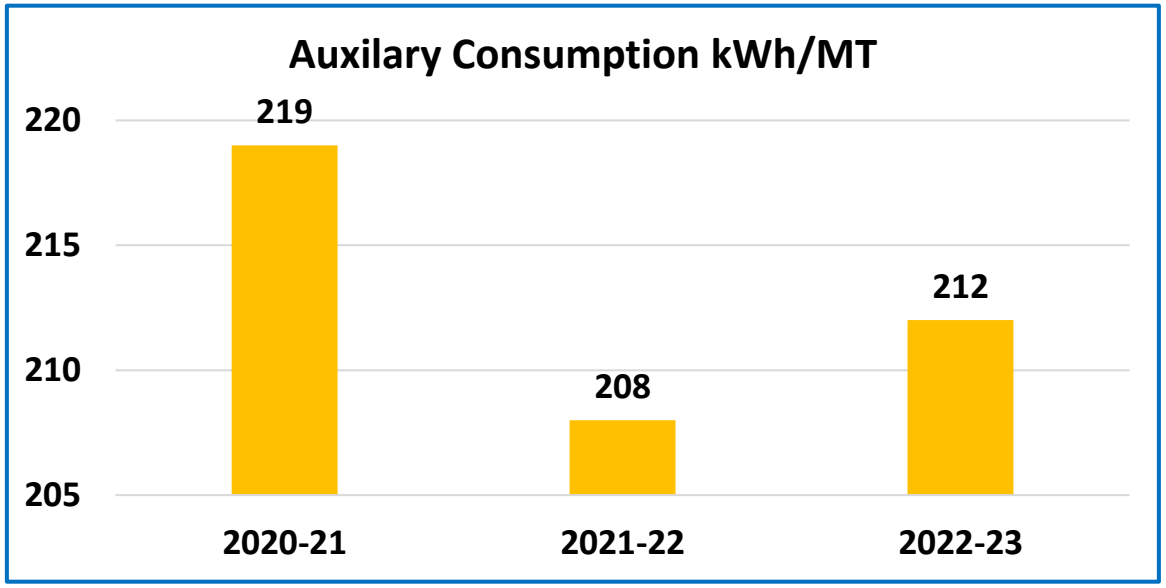
Specific Energy Consumption	FY 20-21	FY 21-22	FY 22-23
Target(TOE/MT)	0.76	0.73	0.72
Actual(TOE/MT)	0.73	0.72	0.69

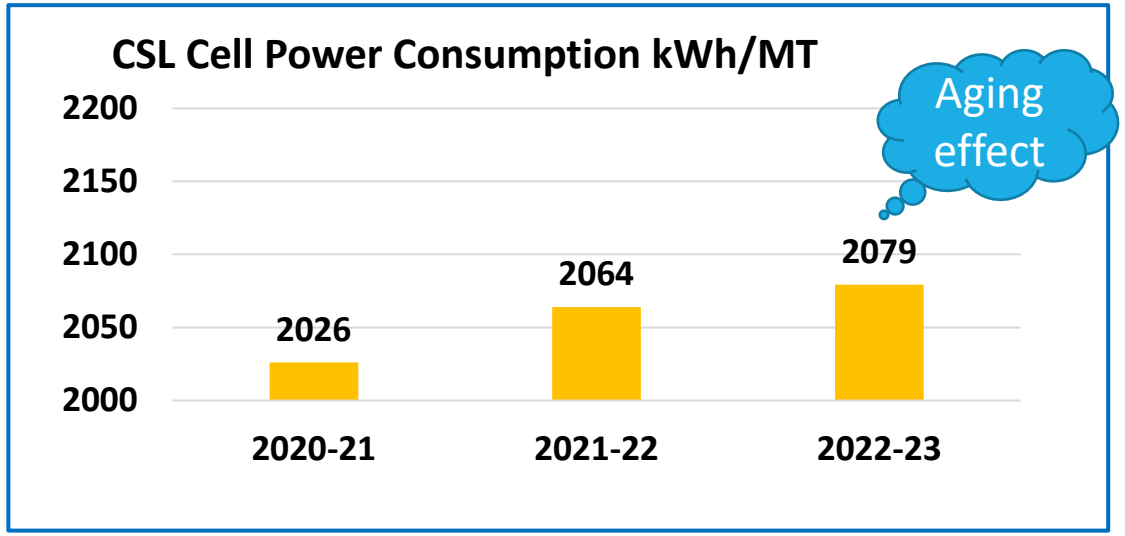
FY	FY 20-21	FY 21-22	FY 22-23
Specific Thermal Energy Consumption mKcal/MT	10430	10654	9468

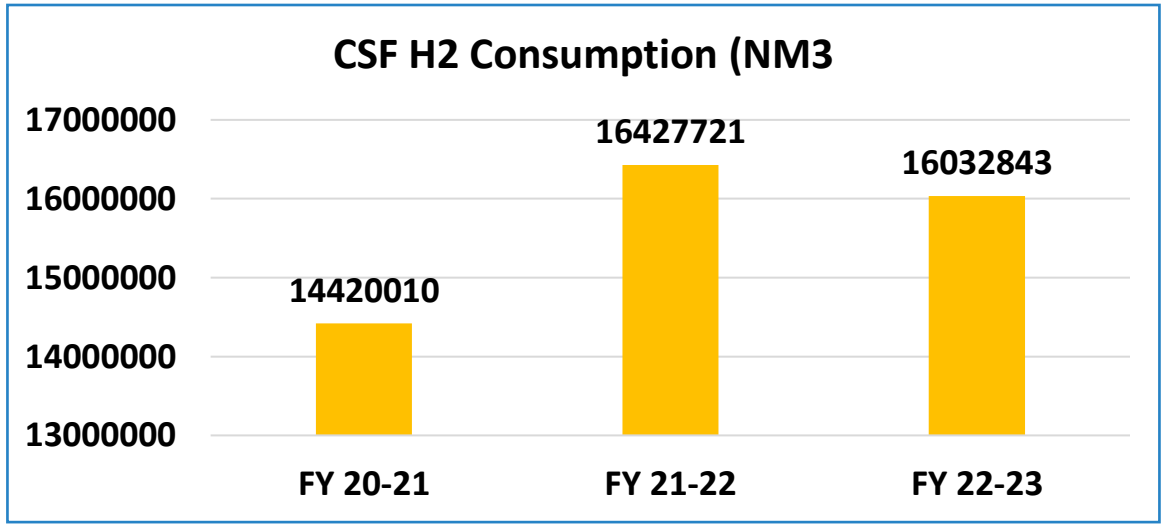
Due to established system of monitoring, verification and auditing we have achieved significant reduction in SEC

CA Key performance indicators



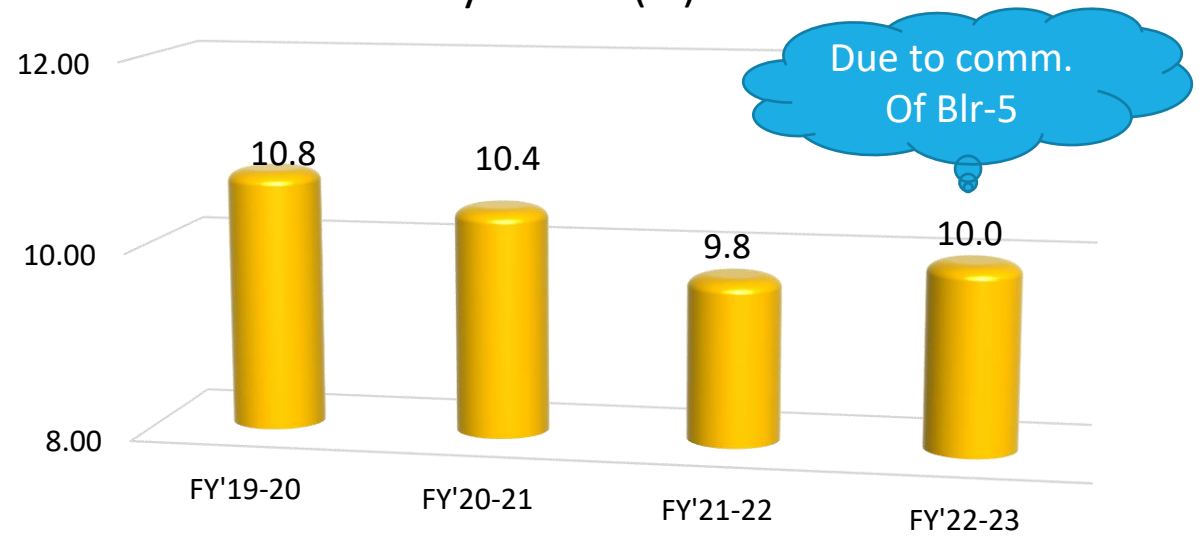




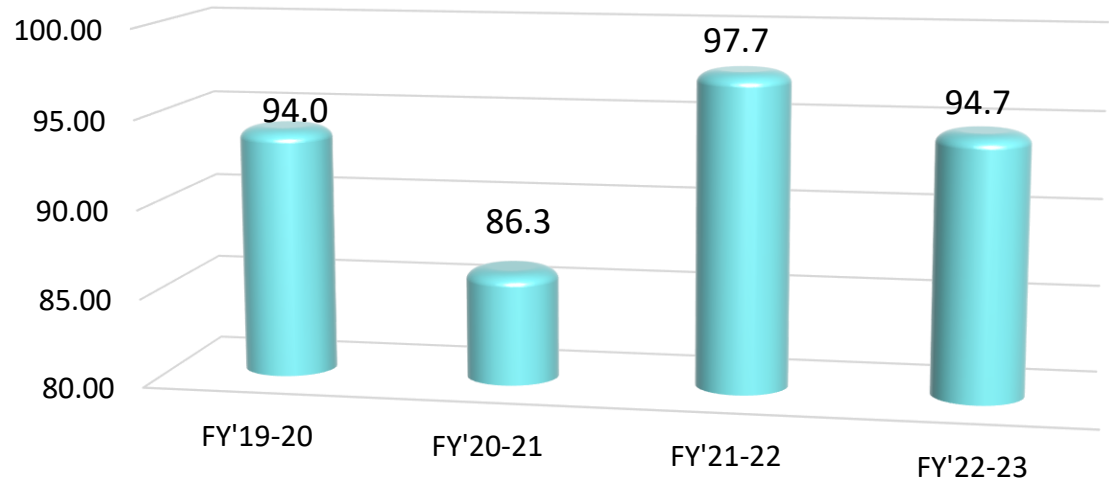


Key Performance Indicators

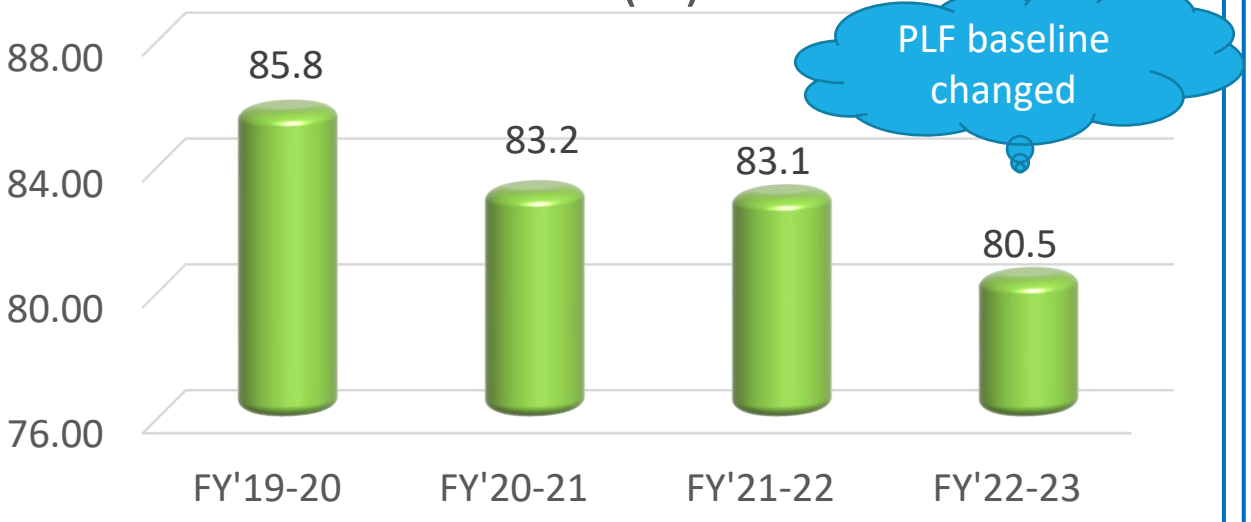
Auxiliary Power (%)



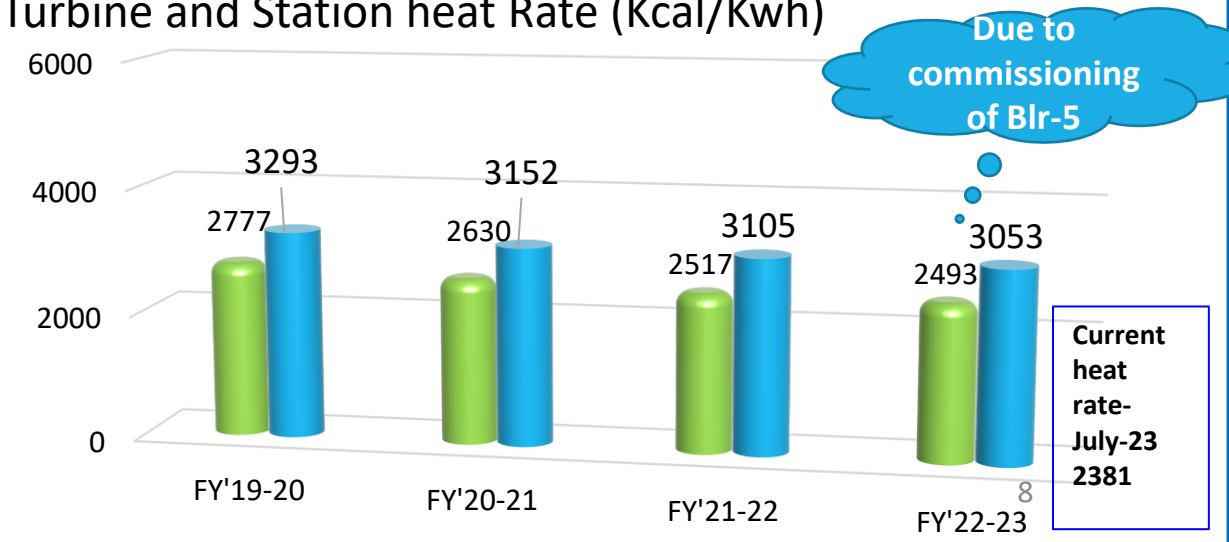
Plant Availability Factor (%)



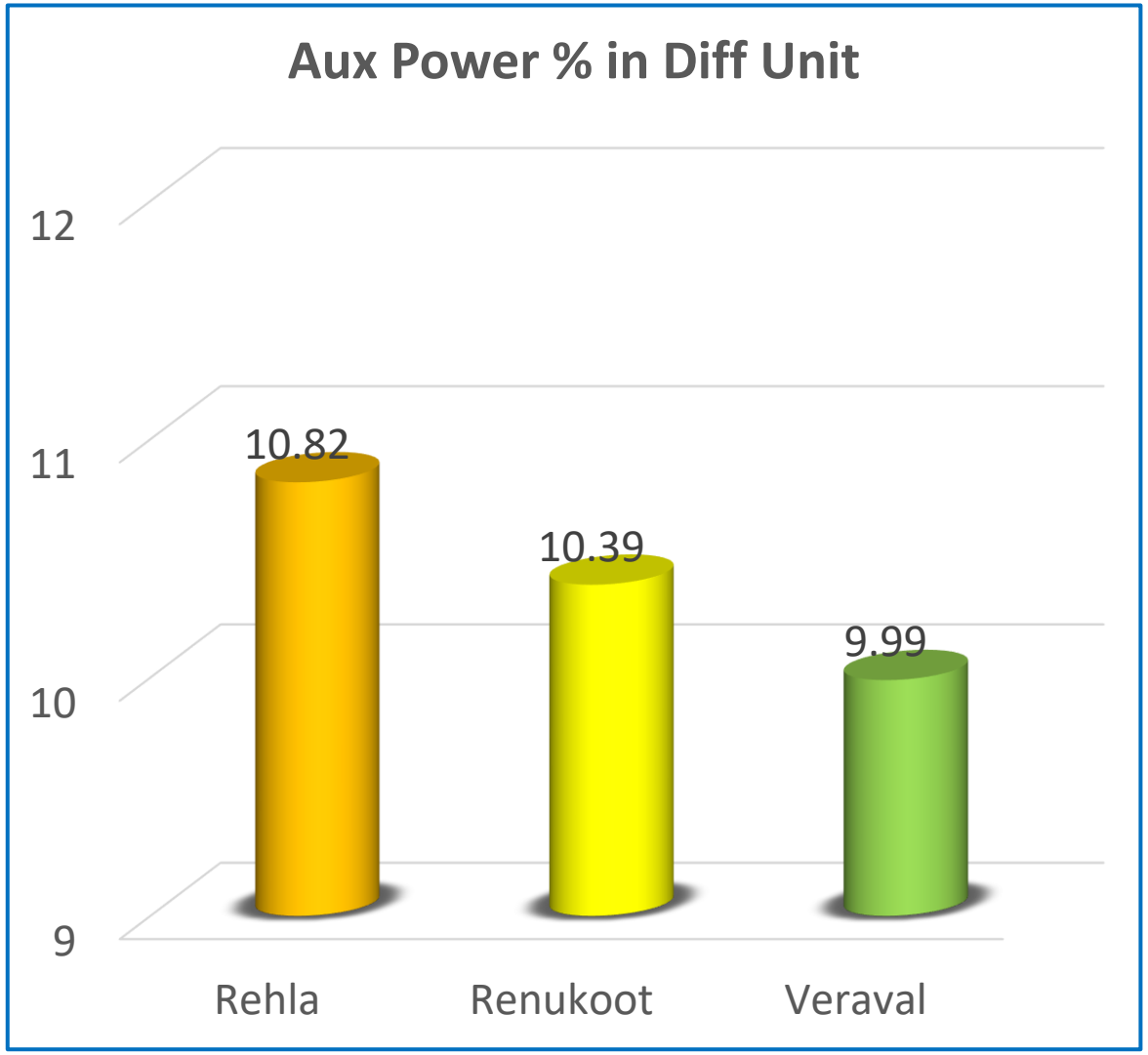
PLF (%)

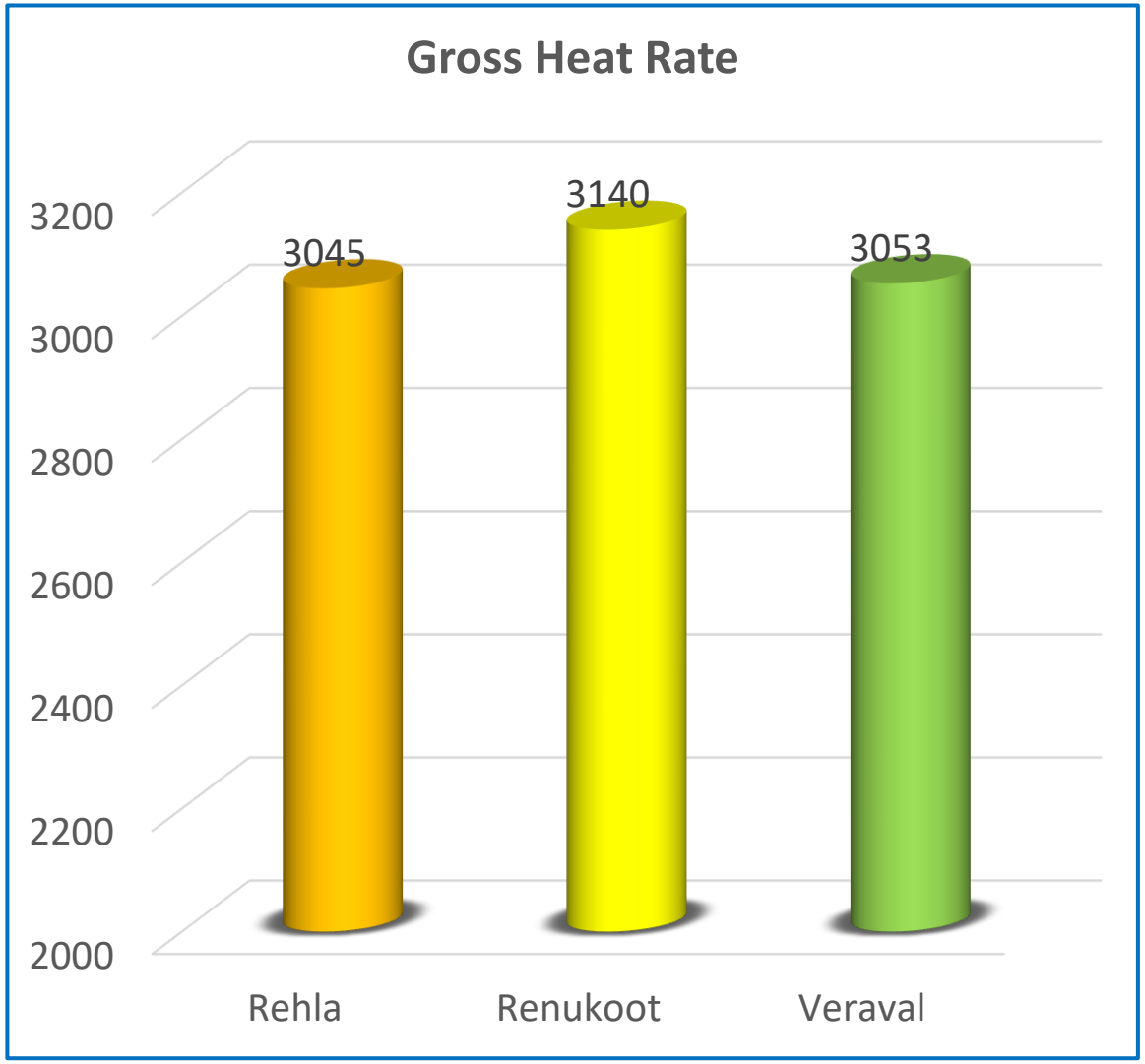


Turbine and Station heat Rate (Kcal/Kwh)

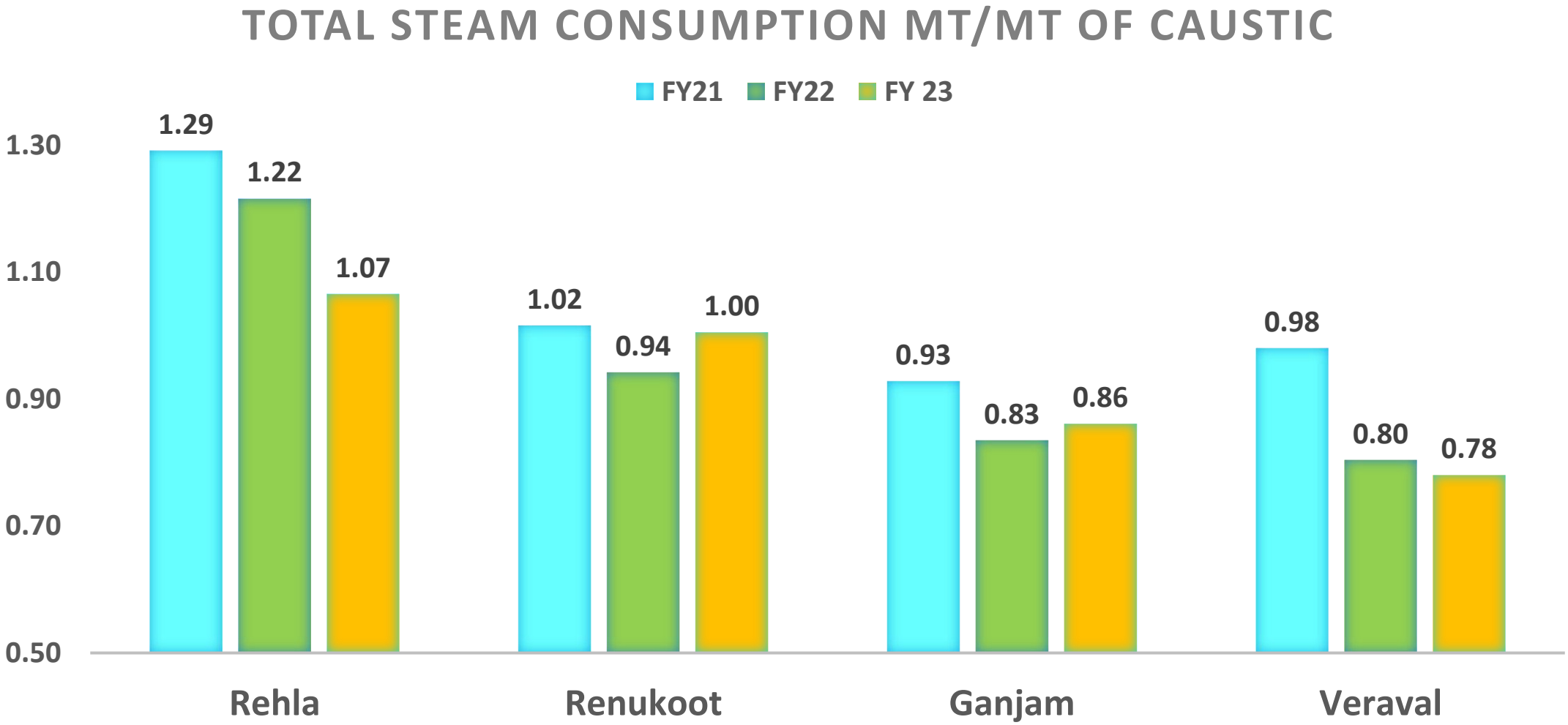


Internal Benchmarking (CPP)

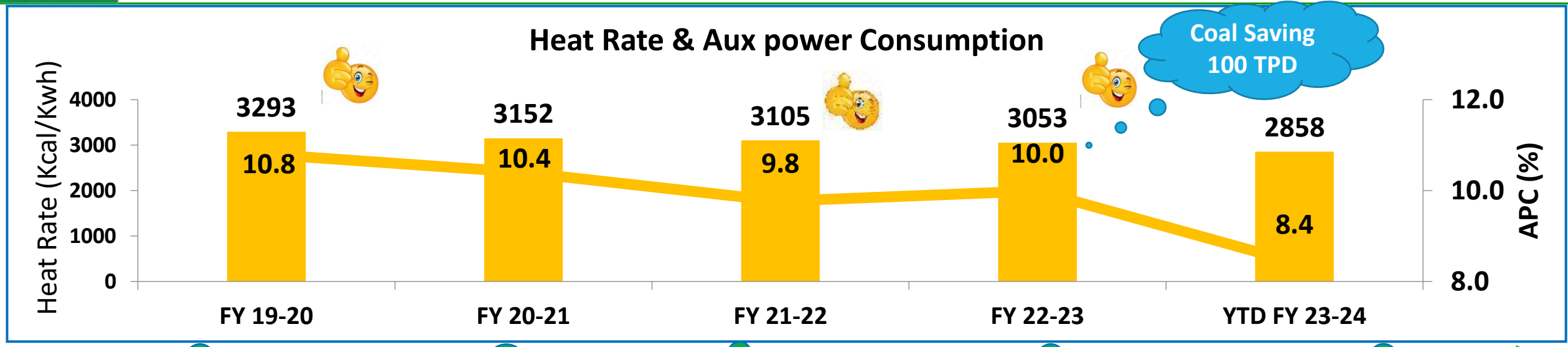




CA Internal Benchmarking across DCA



Heat Rate & APC Roadmap



- **Replacement HT fans with LT fans with VFD**.
- Installation of VSFC in Boiler Feed pump.
- SA header pressure Reduction.
- IE-3 Motor Installation in MCT pump.

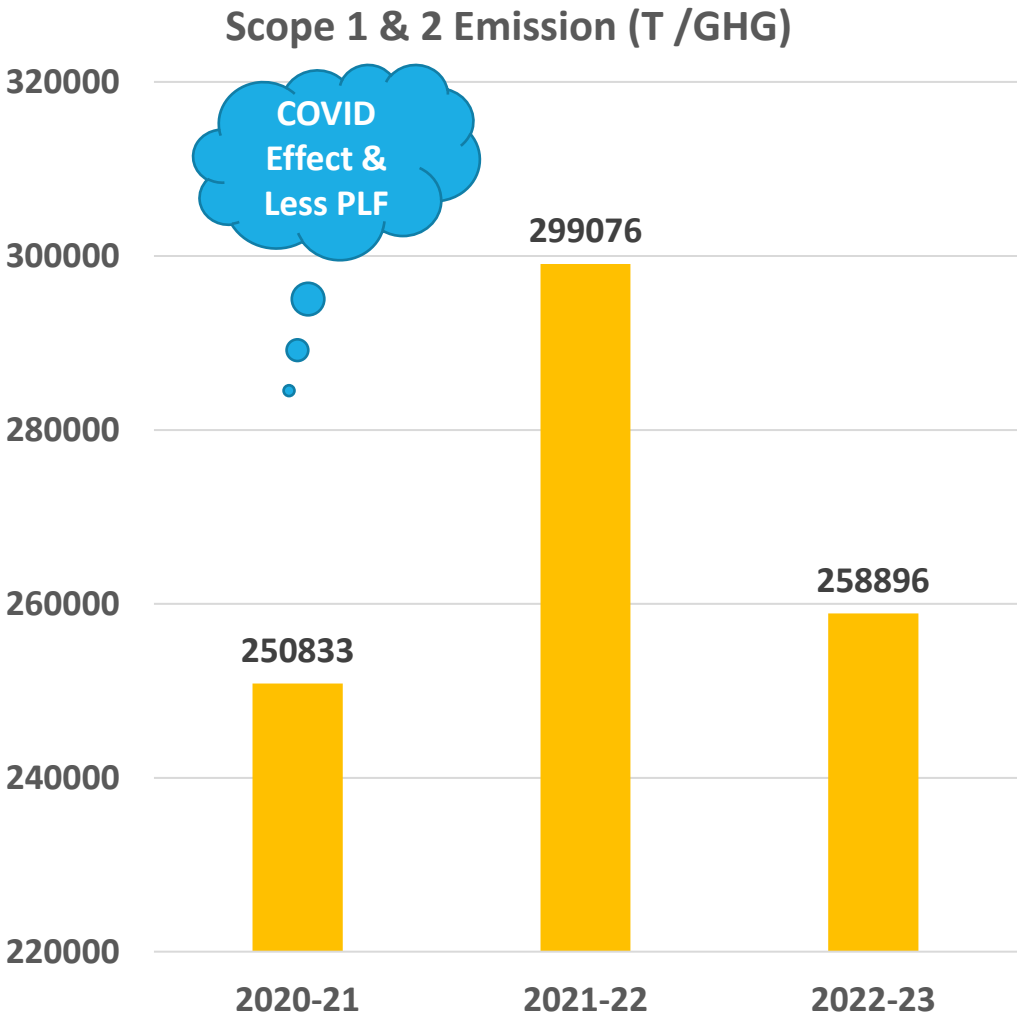
- Energy efficient ACT pump in unit-2.
- Stoppage of one inst. Compressor,
- Incorporated start-stop logic in ACT fan on cooling water temperature of unit-2

- **300 Kcal/Kwh decrease in TG heat rate after new TG installation**
- Overhauling of HFTG & Improved specific steam consumption from 11.4 Kg/KWH to 10.8 Kg/Kwh
- Stoppage of Ash handling compressor for 4 hrs.'/shift.

- **Commissioning of new Boiler (100 TPD coal saving).**
- Installation of water cooled rotary bed ash cooler
- VFY condensate recovery
- Installation of efficient single ACT pump instead of two pumps
- Installation of efficient CT fans.
- Installation of single MCT pump with VFD

- Power optimization in BFP
- Power Optimization in Boiler PA fans
- Installation of new Pultruded cooling towers with energy efficient fans

GHG Emissions



Categories considered for Scope 3:
UPSTREAM VALUE CHAIN
1. Purchased Goods and Services
2. Capital Goods
3. Upstream transportation and distribution
4. Waste generated in operation
5. Business Travel
6. Employee Commuting
DOWNSTREAM VALUE CHAIN
1. Downstream Transportation and distribution
GHG Emission Intensity (Kg CO2 / Ton of Product) FY23 : 3.31

The scope 3 emission of CA & CPP for FY23:- 38,116.06 T CO2e

Green supply chain management

ADITYA BIRLA
GRASIM

SUPPLY CHAIN MANAGEMENT POLICY

Grasim Industries Limited, Unit-Indian Rayon (IR) is committed to build a Sustainable Supply Chain for the growth and sustenance of businesses, develop a strong relationship with suppliers and build their capabilities to improve the Supply Chain performance. We shall endeavor to work with suppliers on improving their process and practices to attain and maintain a Sustainable, robust and viable Supply Chain.

Indian Rayon, Veraval endeavors to achieve this by:

- Carry out responsible procurement with Integrity, Respect and maintain high Ethical standards
- Comply with all applicable legal requirements within the supply chain
- Create a supply chain that is resilient and viable in presence of risks and opportunities
- Promote resource conservation, use of alternative materials and renewable energy, water stewardship, safety, health, respect for human rights and elimination of child and forced labour across the supply chain
- Build capability within the supply chain and work towards creating best in class supply chain solutions
- Adhere to the principle of traceability to the origin of materials throughout the supply chain
- Influence suppliers to adopt our supply chain management's sustainability framework policies and standard and encourage them to develop an equivalent management system throughout the supply and value chain
- Actively communicate and disclose our approach and achievements to suppliers

This policy will be reviewed periodically for its suitability and updated as necessary.

Shashank Pareek
Unit – Head

Date: 01-12-2020

- **GHG Inventorisation : We are maintaining GHG inventory for Scope 1 Emission (All fuels consumed and owned by our unit) , Scope 2 Emission (Non-renewable GRID Electricity Purchased) and Scope 3 Emission (Upstream and downstream Value chain) .**
- **Public disclosure: The unit is disclosing data publically at the Grasim Level in an integrated sustainability reporting.**
- **Scope 1 and Scope 2 Emission are in accordance to the GRI framework and BRSR principles.**
- **Scope 3 Emission are disclosed in accordance to Carbon Disclosure Project (CDP).**
- **Also third party limited assurance for GRI indicators (305-1- Direct GHG emission (Scope 1) ; 305-2- Indirect GHG emissions (Scope 2); 305-3- Other Indirect GHG emissions (Scope 3) and BRSR principle (BRSR Principle 6-E6) was done for FY23.**

CA Energy Savings Projects Planned (2023-24)

Sr. No.	Initiative	Annual Electrical Saving (Million kWh)	Investment (Rs in Million)	Projected Saving	Target Date	Status
1.	**Recoating & Remembraning of Elect - G (56 No's)**	0.97	26	0.97	31.08.2023	Elements Accessories received and 53 elements sent for recoating at Denora,Goa
2.	**Remembraning of Electrolyser - C**	0.45	15	0.45	31.03.2024	-PR Done, PO Awaited
3.	**Remembraning of Elect - G (70 No's elements)**	0.13	10	0.13	31.08.2024	Elements Accessories received and 53 elements sent for recoating at Denora,Goa
4.	**Installation of new cooling tower with energy efficient fans & pumps**	0.5	45	0.50	31.06.2024	Civil work started

Energy Savings Projects Implemented

Year	No. of Energy Saving Project	Investment (INR Million)	Electrical Energy Saving Annually (MWh)	Thermal Energy saving (mKCal/annually)	Saving (INR Million)
FY 2022-23	13	874	7713	32567	606
FY 2021-22	10	22	2307	3922	9
FY 2020-21	12	198	3751	11133	179

Major Energy Savings Projects Implemented

Year	Name of Energy saving projects	Investment (INR Million)	Electrical savings (kWh)	Thermal savings	Total Savings (INR Million)	Payback period (in months)
FY 22-23	Installation of new 110 TPH CFBC boiler	700	-	32300 MT Coal annually	323.6	25.9
FY 21-22	Stoppage of Boiler house when caustic running@225TPD Total stoppage day-43 days 50 Kcal/kwh and 260 KW energy and power saving	0	165000	2120 MKcal	4.3	0
FY 20-21	Successful Commissioning of New TG-3. Combine heat rate of TG's, decreased by 390 Kcal/Kwh	193.2	-	11133 TOE	162.6	14.3

We have started taking Hybrid Power from 20th -June-2023

Innovative Project-1

SAVE SPECIFIC HYDROGEN CONSUMPTION IN COMBO UNIT OF 120 TPD CCU AND 95 TPD FLAKING PLANT

Excellence in process through reengineering & reorganizing the controls

- **why innovative :** The project is unique idea to change design mode of operation and to reduce specific hydrogen consumption by 80 NM3/Ton. This project also led to improvement in productivity from 95 TPD to 105 TPD. To utilize the excess vapor vented to the atmosphere internally in the CCU/CSF plant to increase the temperature and concentration of the caustic feed
- There was 3.5 Crore / annum saving potential and 10 TPD productivity improvement

Operational Efficiency	
Increase in Production	5 MT
Reduction in Hydrogen consumption(in Nm^3/t)	80 Nm^3/Ton

Finance (report both in Cr INR and Mn USD)	
CAPEX employed*	Nil
Overall Rupee/Dollar Value Saved*	3.5 Cr./Annum
Increase in Revenue / EBITDA*	3.5 Cr./Annum

Innovative Project-2

CENTRAL MANUFACTURING COCKPIT ASPEN ONE-CENTRAL MONITORING & IMMEDIATE ACTION TAKING

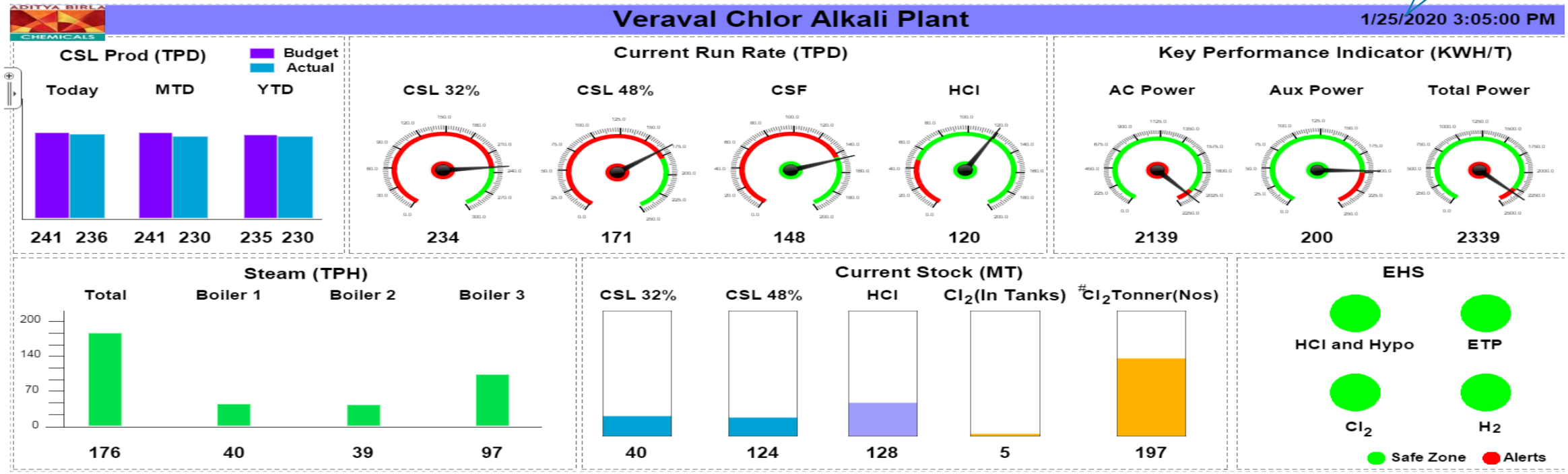
Benchmarking, Norms and Standardize Operational Functions

KPI Dashboards, Trends, Alerts, Reports

Reporting and Analysis automation
Real-time Data Visibility and Notifications on Mobile

Reports, KPI Dashboards, Fault Trees, Trends, Alerts

Industrial 4.0 & CMC



Innovative Project-3

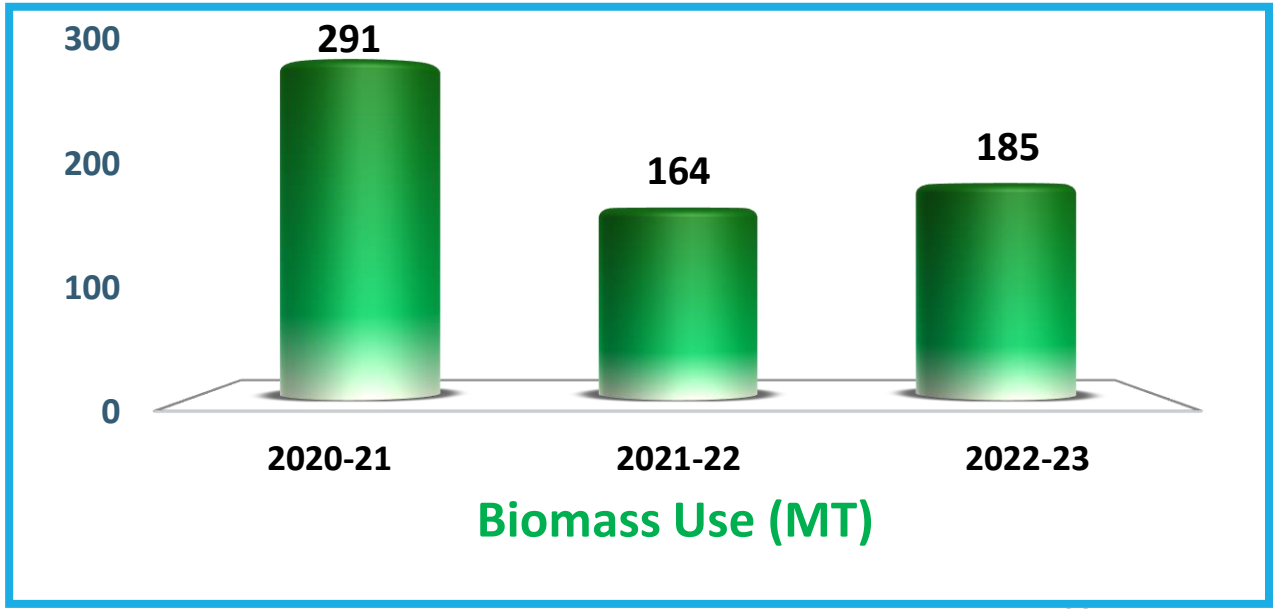
BOILER-3 ESP FIELD EXTENSION

- **why innovative** : Extra one field installation in existing ESP having innovative design due to space constraint
- N-1 operation philosophy for ensuring compliance of stricter emission norms.
- Investment: 170 Lakhs

Utilization of renewable energy sources

Year	Technology (electrical)	Type of Energy	Onsite/Offsite	Installed Capacity (MW)	Generation (million kWh)	% of overall electrical energy
FY 2020-21	Solar-PV	Solar	Onsite	0.05	0.065	0.024
FY 2021-22	Solar-PV	Solar	Onsite	0.05	0.063	0.027
FY 2022-23	Solar-PV	Solar	Onsite	0.05	0.067	0.025

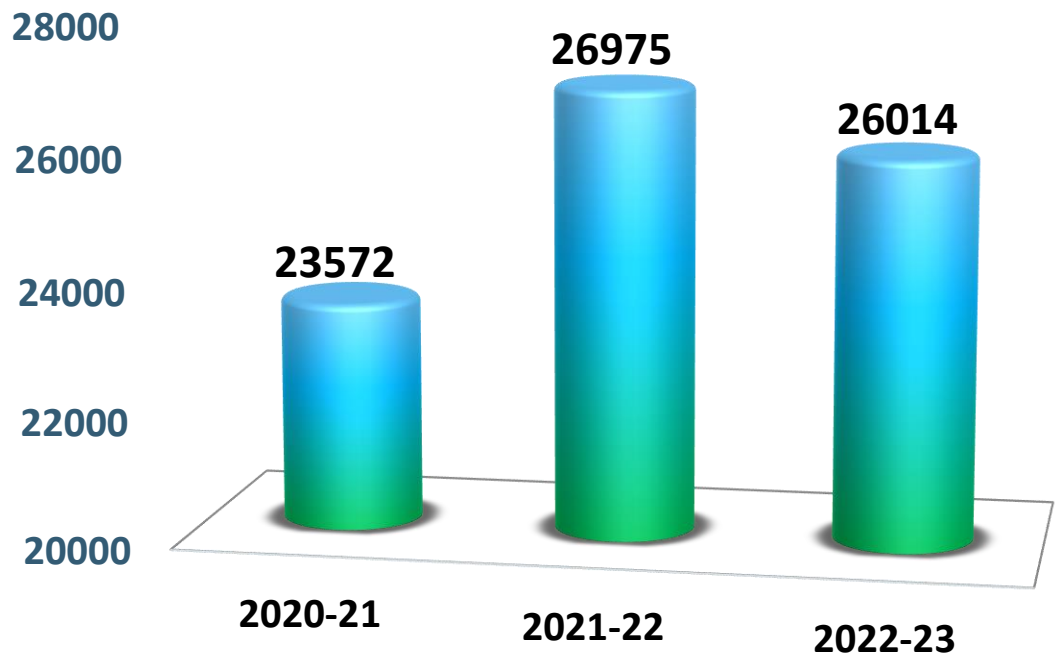
1. We have 50 kWp rooftop solar installation on VFY rooftop
2. We have ordered hybrid power in 2022-23
3. We have started taking Hybrid Power from 20th -June-2023
4. Biomass feeding facility is ready



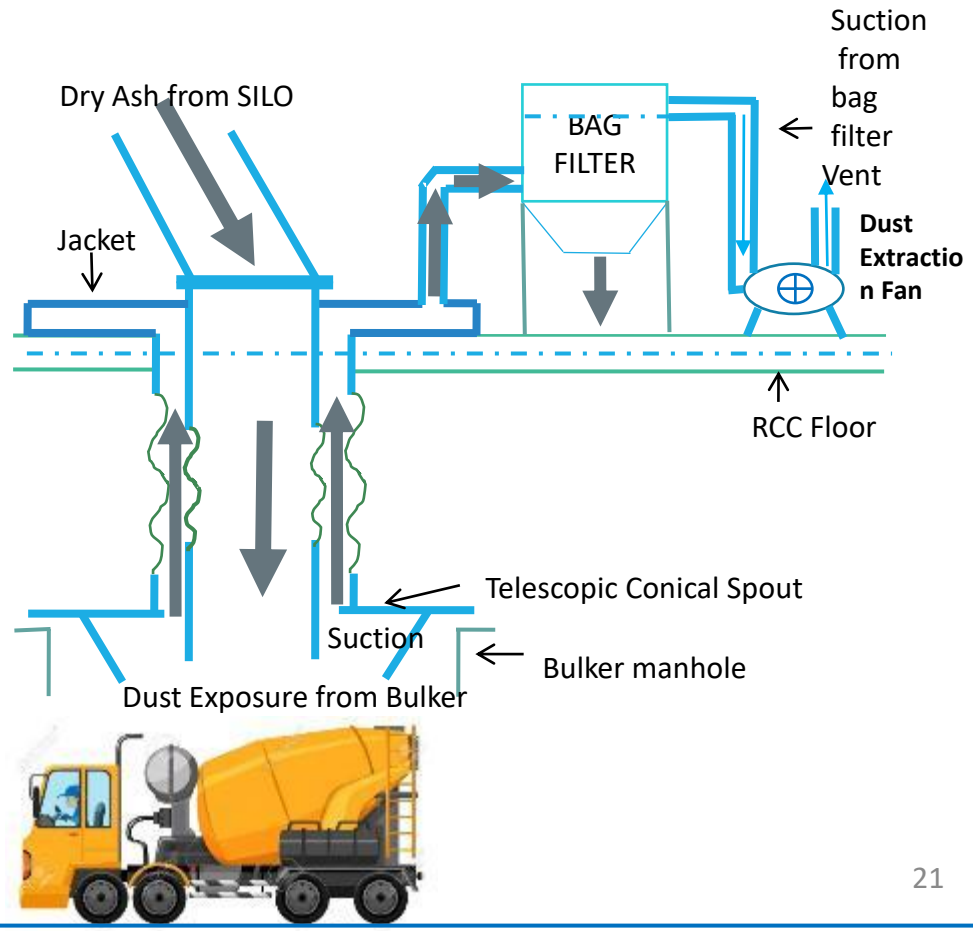
Fly Ash generation & Utilisation

Method of Ash Unloading: 100% Dry ash unloading through Telescopies spout

100 % fly ash utilization in cement manufacturing & is sent to our unit Ultratech Cement & Ambuja Cement

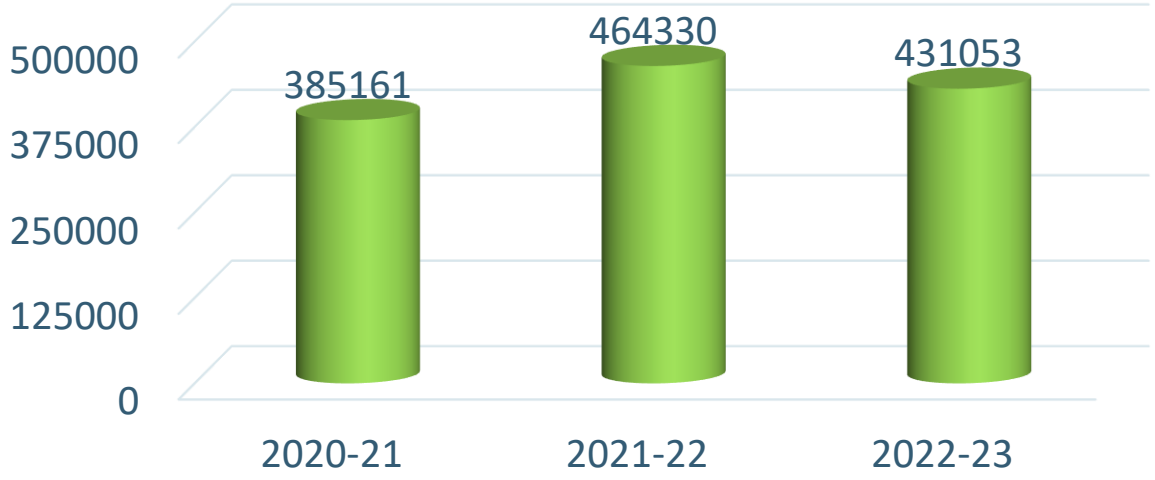


Fly Ash Generation (MT/Year)

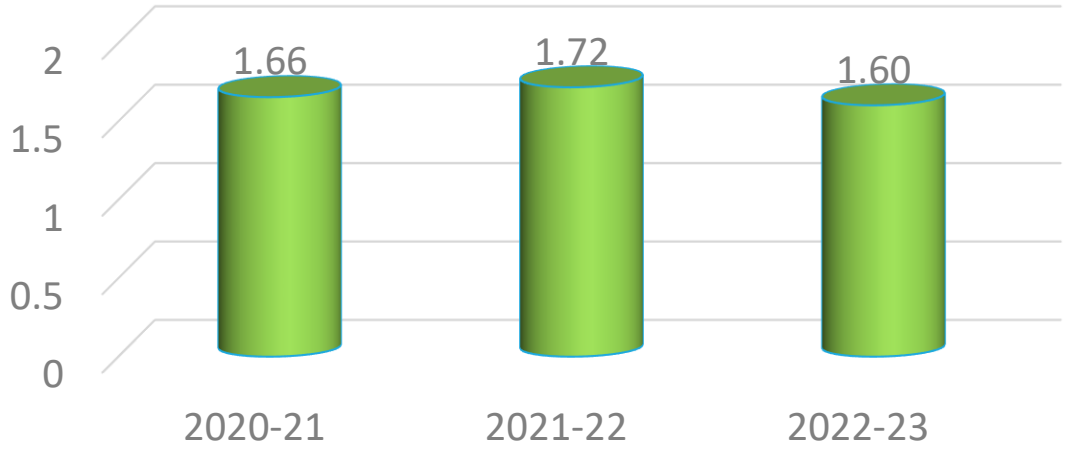


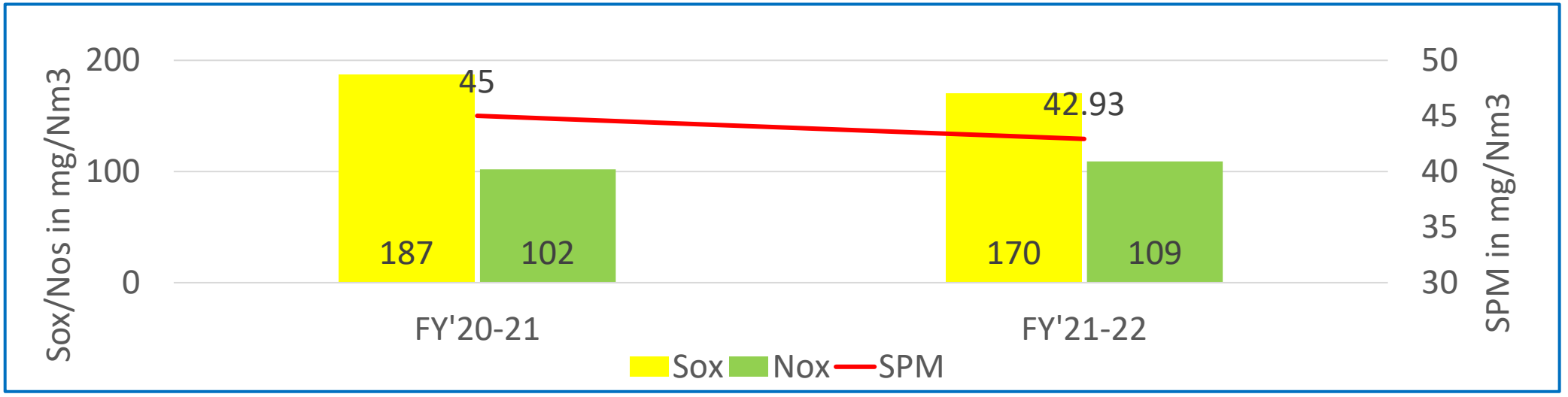
Environment Management- Emission

TONS OF GHG EMMISSION



TONS/MWH OF GHG EMMISSION





Environment Management-Water

Parameters	UOM	2020-21	2021-22	2022-23
DM Water Consumption	M3/MT	2.31	2.03	2.09
Filter Water consumption	M3/MT	1.60	1.96	1.94

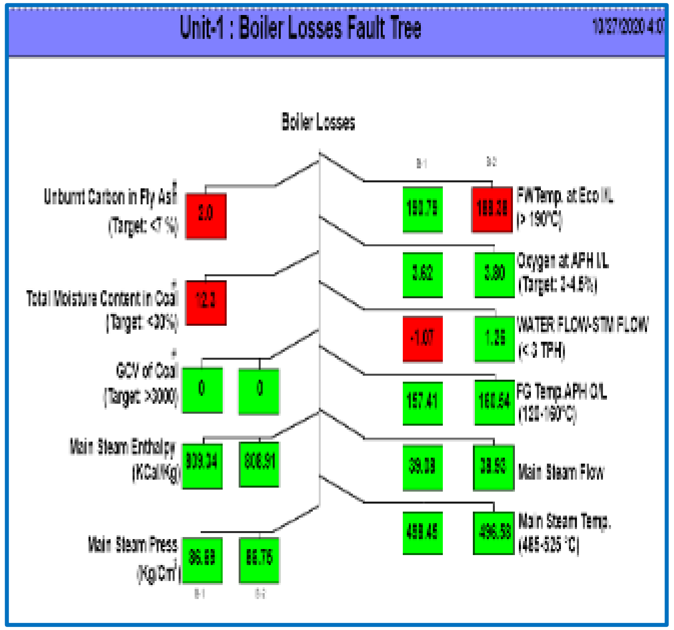
- **Utilization of 100% steam & vapor condensate water in CA plant.**
  Reduction in fresh DM water consumption

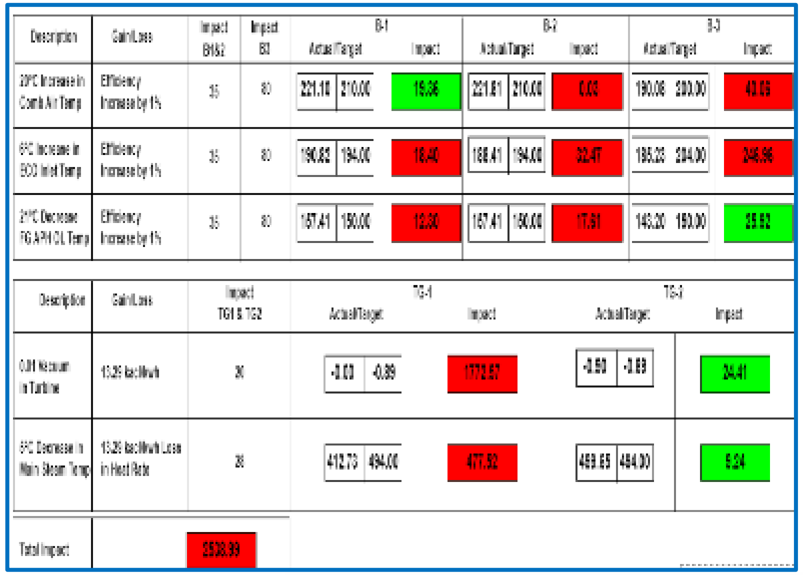
- **Utilization of STP/Blow down Water.**
  Utilization of STP/Blowdown Water in Tyre washing and coal handling plant rain gun system. Approx. filter water saving is 40 M3/Day. Zero water discharge plant & Utilization of STP/Blowdown water for floor cleaning.

- **Utilization of boiler water which is drained after hydro test.**
  Earlier we used to drain water of water walls in Boiler-1&2 after hydro test. We have connected all header drains to underground condensate recovery tank

Best Practices – Daily Monitoring

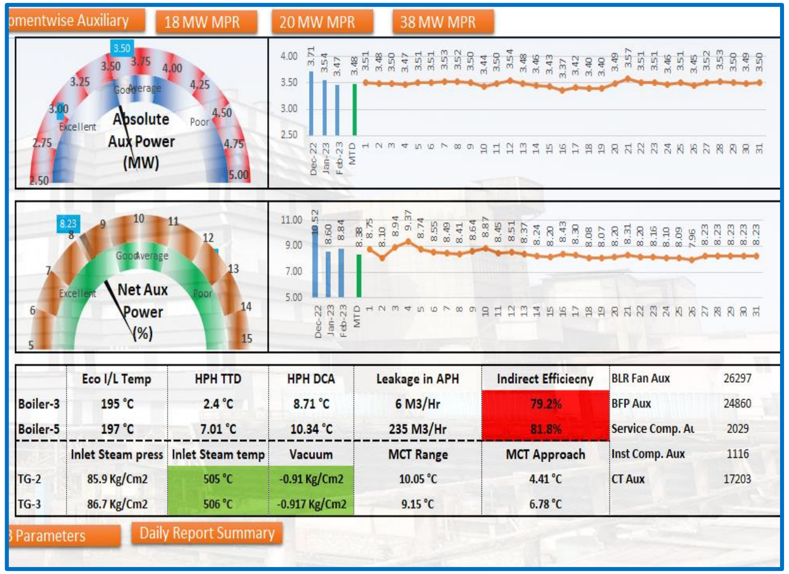
1. **Continuous monitoring of losses due to various performance parameters**
2. **Daily online monitoring of auxiliary power by using cockpit**
3. **Daily heat rate and Auxiliary Power Consumption monitoring**
4. **Daily Equipment wise auxiliary power comparison**



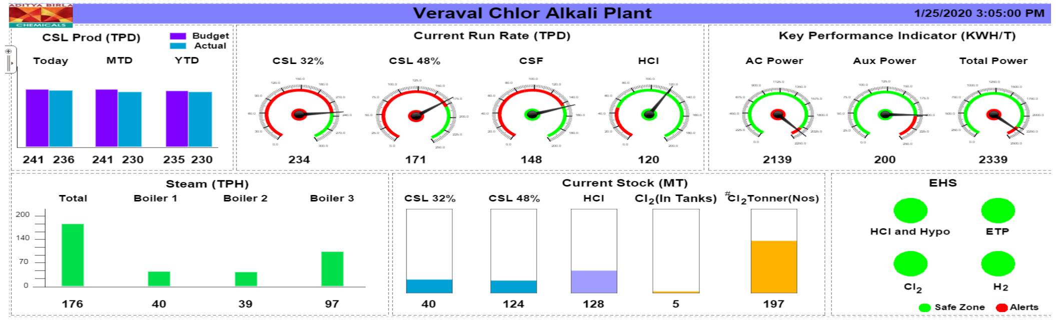


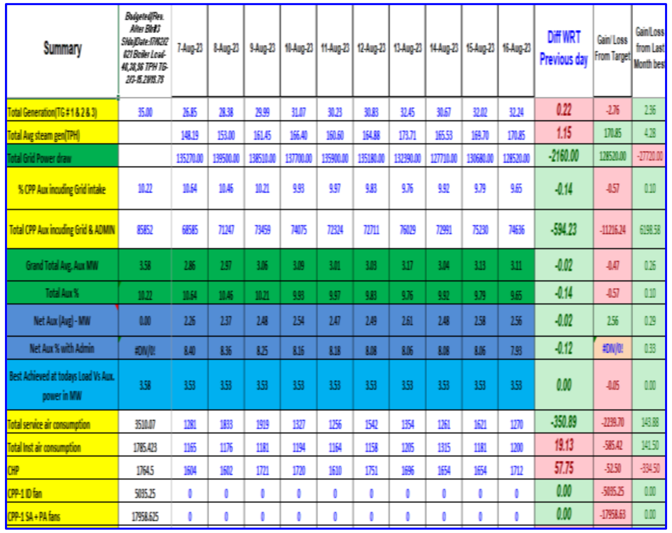
Description	Gain/Loss	Impact B1&2	Impact B3	B-1 Actual/Target	B-1 Impact	B-2 Actual/Target	B-2 Impact	B-3 Actual/Target	B-3 Impact
20°C Increase in Comb Air Temp	Efficiency Increase by 1%	35	80	221.10 / 210.00	19.36	221.81 / 210.00	0.03	190.08 / 200.00	42.09
6°C Increase in ECO Inlet Temp	Efficiency Increase by 1%	35	80	190.82 / 194.00	18.40	188.41 / 194.00	32.47	195.23 / 204.00	246.96
2°C Decrease FG APH O/L Temp	Efficiency Increase by 1%	35	80	157.41 / 150.00	12.30	157.41 / 150.00	17.61	143.20 / 150.00	25.82

Description	Gain/Loss	Impact TG1 & TG2	TG-1 Actual/Target	TG-1 Impact	TG-3 Actual/Target	TG-3 Impact
0.01 Vacuum in Turbine	13.29 kcal/kwh	30	-0.90 / -0.89	1772.67	-0.90 / -0.89	24.41
5°C Decrease in Main Steam Temp	13.28 kcal/kwh Loss in Heat Rate	28	412.73 / 494.00	477.52	469.65 / 494.00	5.24
Total Impact		2538.39				



	Eco I/L Temp	HPH TTD	HPH DCA	Leakage in APH	Indirect Efficiency	BLR Fan Aux	26297
Boiler-3	195 °C	2.4 °C	8.71 °C	6 M3/Hr	79.2%	BFP Aux	24860
Boiler-5	197 °C	7.01 °C	10.34 °C	235 M3/Hr	81.8%	Service Comp. Air	2029
	Inlet Steam press	Inlet Steam temp	Vacuum	MCT Range	MCT Approach	Inst Comp. Aux	1116
TG-2	85.9 Kg/Cm2	505 °C	-0.91 Kg/Cm2	10.05 °C	4.41 °C	CT Aux	17203
TG-3	86.7 Kg/Cm2	506 °C	-0.917 Kg/Cm2	9.15 °C	6.78 °C		





Other Best Practises

- All meetings start with safety contact ,followed by Energy contact
- Energy review is part of every daily performance meeting
- ESP field extension
- Synergy meetings
- Dedicated two battery operated car (carts) are used within plant premises for internal transport
- TKIC(Technical Knowledge Integration Council)teams formation
- CPP Conclave
- Energy Champions (Shop floor persons involvement)
- Energy Review through monthly Energy & Carbon Emission Committee.
- Energy saving Thumb Rules display across the plant
- Idea portal- Z idea
- Dust suppression system in CHP
- Flooring in coal yard
- Scraping of inefficient boiler
- On the spot award & Shabbash card distribution
- ISO:50001 training

Implementation of ISO 50001

ISO 50001

Energy Management

TÜV NORD

CERTIFICATE

Management system as per

ISO 50001 : 2018

The Certification Body TÜV NORD CERT GmbH hereby confirms as a result of the audit, assessment and certification decision according to ISO/IEC 17021-1:2015, that the organization

GRASIM INDUSTRIES LIMITED
Corporate Office
Birla Aurora Tower, 10th floor, Near Century Bhavan,
Dr. Annie Beasant Road, Worli Mumbai - 400 030,
Maharashtra,
India

operates a management system in accordance with the requirements of ISO 50001 : 2018 at the location

GRASIM INDUSTRIES LIMITED.
Chemical Division, Veraval, Indian Rayon Plant
Junagad, Veraval road, Veraval - 362 266,
District Gir Somnath,
Gujarat, India

will be assessed for conformity within the 3 year term of validity of the certificate.

Scope -

Manufacture and Dispatch of Viscose Rayon Filament Yarn, Caustic Soda Lye and Flakes, Sulphuric Acid, Carbon Di Sulphide Anhydrous Sodium Sulphate, Sodium Sulphide, Hydrochloric Acid, Liquid Chlorine, Compressed Hydrogen and Sodium Hypochlorite, Captive Power Generation

Certificate Registration No. 44 784 22383483-008
Audit Report No. 2.5-10668/2021

Valid from 29.06.2022
Valid until 28.06.2025
Initial certification 2022

Certification Body
at TÜV NORD CERT GmbH

Mumbai, 29.06.2022

This certificate is valid in conjunction with the main certificate.

TÜV NORD CERT GmbH Am TÜV 1 45307 Essen www.tuev-nord-cert.com

TUV India Pvt. Ltd., 801, Raheja Plaza – 1, L.B.S. Marg, Ghatkopar (W), Mumbai - 400 086, India www.tuv-nord.com/in

IAF DAkkS

Grasim Industires Limited,
(Unit: Indian Rayon)
Veraval, 362266

Raysil

ENERGY & CARBON POLICY

We, Grasim Industries Limited, Unit Indian Rayon, Veraval recognize energy consumption and carbon emissions as the most important issues currently affecting the planet. We understand the risk of dependence solely on fossil fuels and associated carbon emissions related to our operations. We are committed to demonstrate excellence in Energy and Carbon Management Performance on continual basis.

To achieve this, we shall endeavor to:

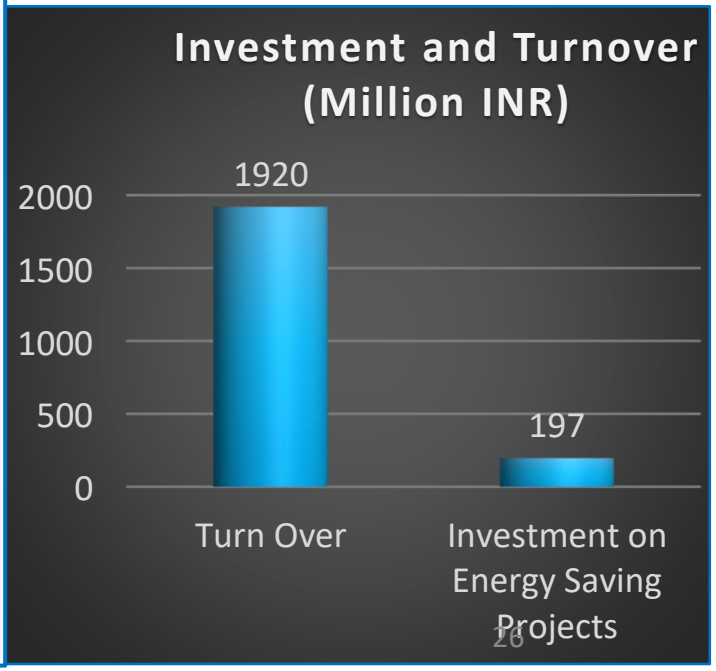
- Maintain positive legal compliance to energy and carbon regulations and other requirements;
- Raise awareness to encourage efficient use of energy resources, with a focus on reducing its energy intensity and carbon footprint;
- Increase the use of renewable energy wherever possible;
- Promote research and development for cleaner and efficient technologies to support the adoption of low carbon solutions;
- Evaluate technically and financially feasible and cost-effective options to reduce potential carbon emissions during the construction and operation of new projects;
- Conserving the natural resources in Power generation and reducing significant energy usage of VFY and chlor-alkali processes;
- Continuous up-gradation of process with energy efficient and Eco-friendly technology to optimize the energy cost;
- Continually improve energy and carbon management within and across the supply and value chains by adopting internationally accepted and economically viable Management Systems and best practices;
- Engage internally and externally with its stakeholders and wider communities to understand and collaborate on actions promoting reduced energy intensity and low carbon approaches to benefit both the Business and associated communities;
- Actively communicate and disclose our approach and achievements to stakeholders and regularly seek feedback through stakeholder forums;
- Provide necessary resources and information to achieve objective and targets and support the purchase of energy efficient product or services; and
- Monitor measure and report energy usage and carbon emissions in compliance with internationally recognized protocols.

This policy shall be reviewed periodically for its suitability and updated as necessary.

Date: 01.12.2020

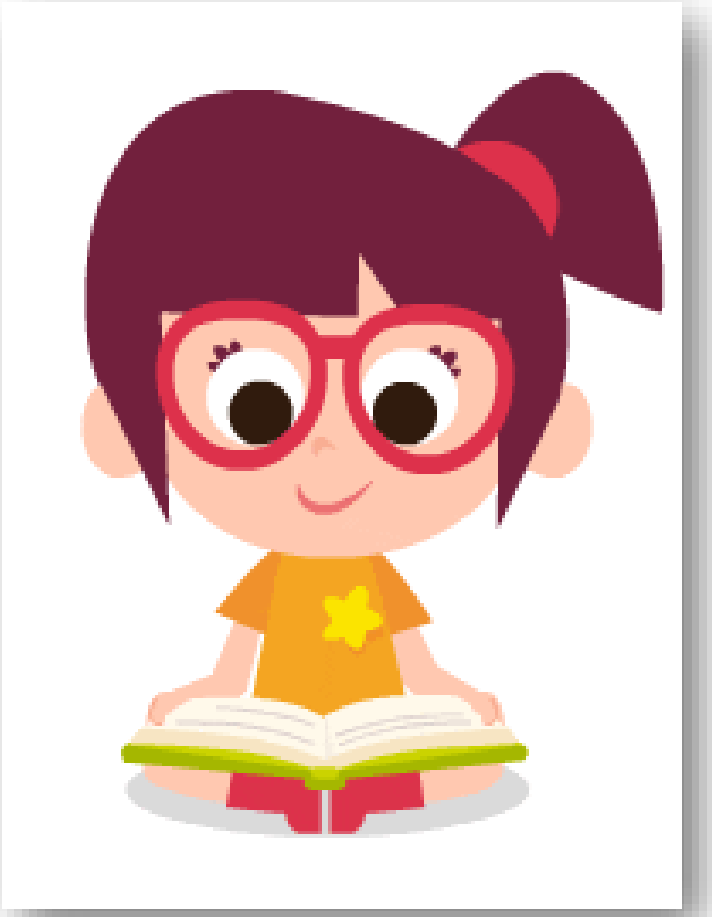
Shashank Pareek
Unit Head

10.2 % investment in energy Saving projects



Learnings from CII energy awards

- Reviving the Boiler water treatment to improve quality & reduce cost.
- BLDC ceiling fans use for energy saving.
- Compressed air audit through Forbes Marshall
- VSFC use in Boiler feed pumps for energy saving
- Monthly steam trap audit done and identify not working steam trap. Total 8 steam traps in FY 23-24 (Q-1) replacement done.
- Desuperheater shifting from PowerPlant to CA end to reduce steam loss.(Saving Approx. 8-9 MT/Day).
- Refurbishing existing flange joint valves by weld end valves to prevent frequent breakdowns.
- Identify skin losses equipment wise and optimization of skin losses by providing insulation.
- We implemented the project of increasing the concentration of evaporation plant from 57% to 60% NaOH and temperature from 145 to 1640C. We have reduced the hydrogen consumption from 390 Nm3/Ton of flakes to 310 Nm3/Ton of flakes
- Installation of venti light pipe in new TG building



Employee Involvement

NATIONAL ENERGY CONSERVATION DAY CELEBRATION 14TH DEC'2022

Energy & Carbon Emission Meeting

Energy Champion - Energy Saving awareness to shop floor person

National Energy Conservation day Rally

Tree Plantation

Leak Free walkthrough drive for Steam, HSD, Exposed Hot Surface & Compressed Air leakage identification

Quiz

Slogan & Poster Competition

CFI Safety & Sustainability Goals & Target :

Goal 1 – Safety	Reduce LTIFR below 80% by 2025 (over the base year of FY17)
Goal 2 – Water	Reduce specific freshwater consumption of the main product by 30% by FY25 (over the base year of FY17); all units to be ZLD in water stressed area by FY25
Goal 3 – Carbon Emission	Reduce GHG emission of the main product by 30% by 2030 (over the base year of FY17) by utilising energy-efficient technologies, improving operational efficiencies, and increasing the share of renewable energy and other energy initiatives.
Goal 4 -Diversity and inclusion	Increase woman employees in Management Cadre by three times (over the base year of FY19) to FY25.
Goal 5 – Employees engagement	100% of employees to receive Code of Ethics training; Minimum 1 training day per employee per year
Goal 6 – Community development	100% of our facilities to participate in community engagement.

We have undertaken the target to achieve Net Zero by FY50

Awards

Indian Rayon CPP won Energy Efficient unit at 20th & 22nd & 23rd National Award for Excellence in Energy Management.

CII award, Energy Efficient unit 2019

CII award, Energy Efficient unit 2021

CII award, Energy Efficient unit 2022

Indian Rayon Team Awarded gold at ICQCC'19 held at Tokyo Japan on dated 23.09.2019

Achievements

The less you burn, the more you earn.....

Sh. Madhukar Datt Sharma
Asst. Vice President
Grasim Industries Ltd, Unit-Indian Rayon, Veraval
madhukar.sharma@adityabirla.com
9904291444