Raysil
The fashion yarn

ADITYA BIRLA
GRASIM

Welcome to CII

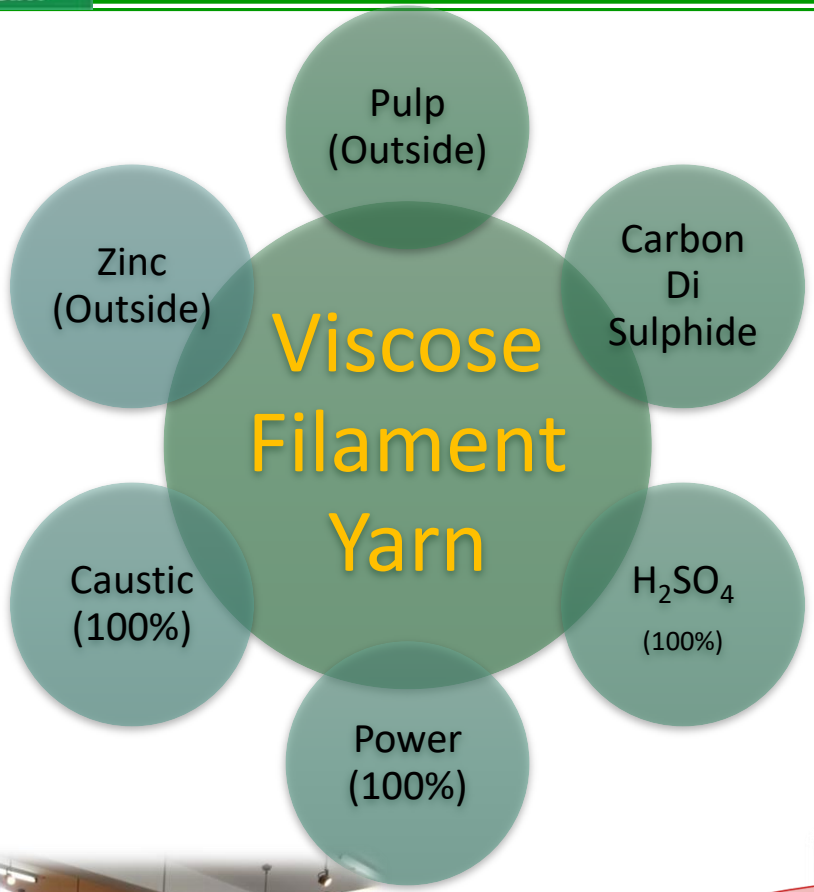
22nd National Award for Excellence in Energy Management 2021

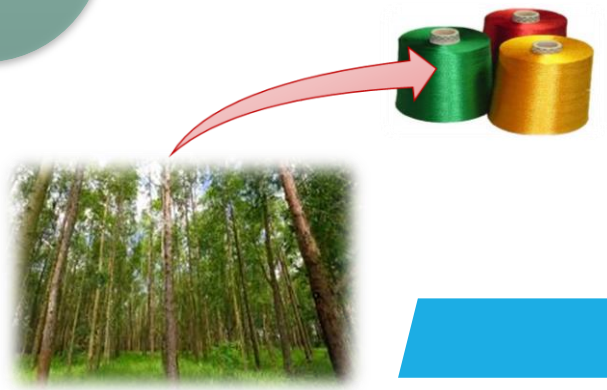
Participants

- ***Mr Ramesh Rao (AGM-Operation)***
- ***Mr Ummed Verma (Deputy Manager)***

INDIAN RAYON

Integrated Operation & Major Products



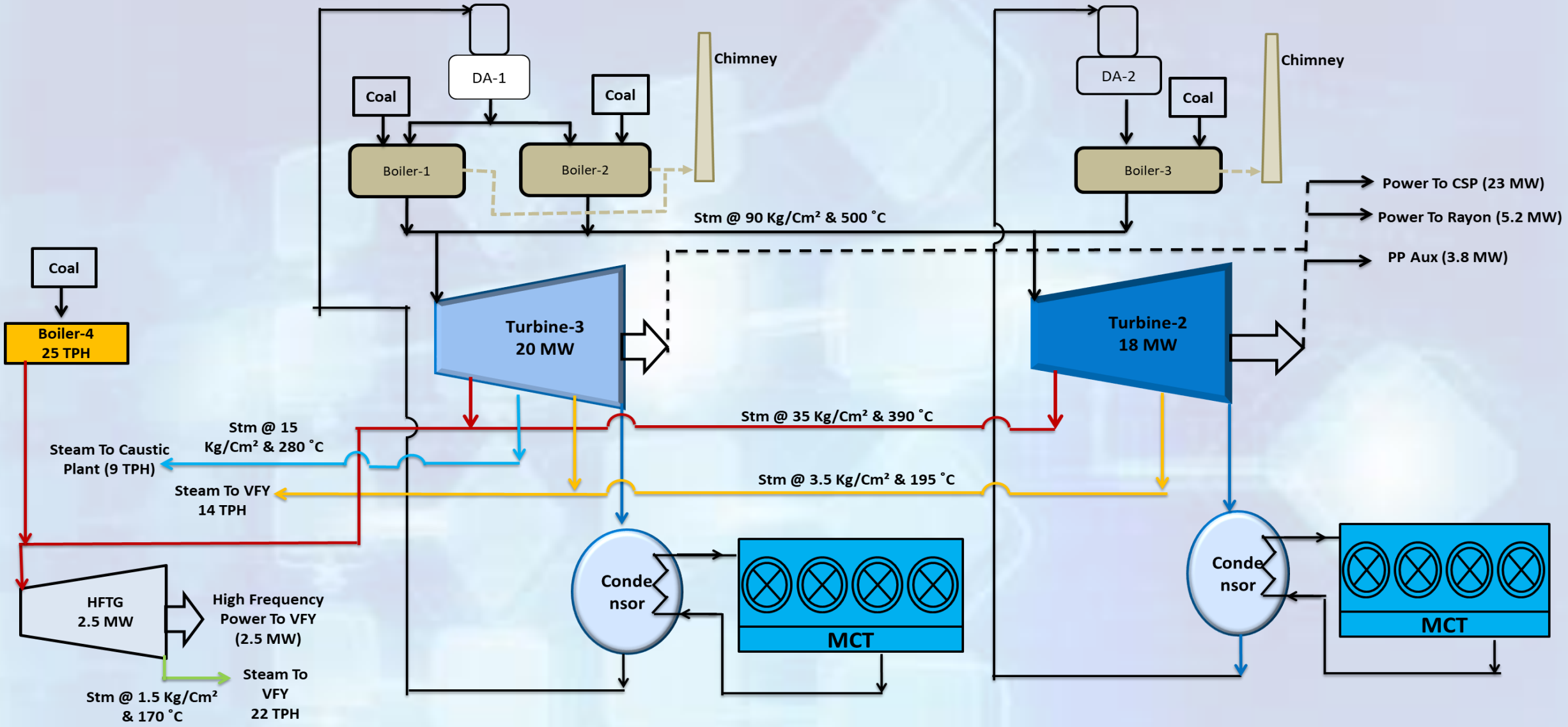


Integrated Operations for Cost Effectiveness

Product	Capacity	Uses
VFY	60.75 TPD	Textile Apparel , Satin, Sarees
Sodium Sulphate	35 TPD	Dye, Organic Chemical
Sulfuric Acid (H_2SO_4)	100 TPD	Captive for VFY
Carbon di Sulphide	27 TPD	Captive for VFY
Captive Power Plant	38 MW	Captive (VFY + Caustic)
Caustic	250 TPD	In process, Dye, Detergent Chemical

Other than Pulp and Zinc, key Raw Materials are produced in house

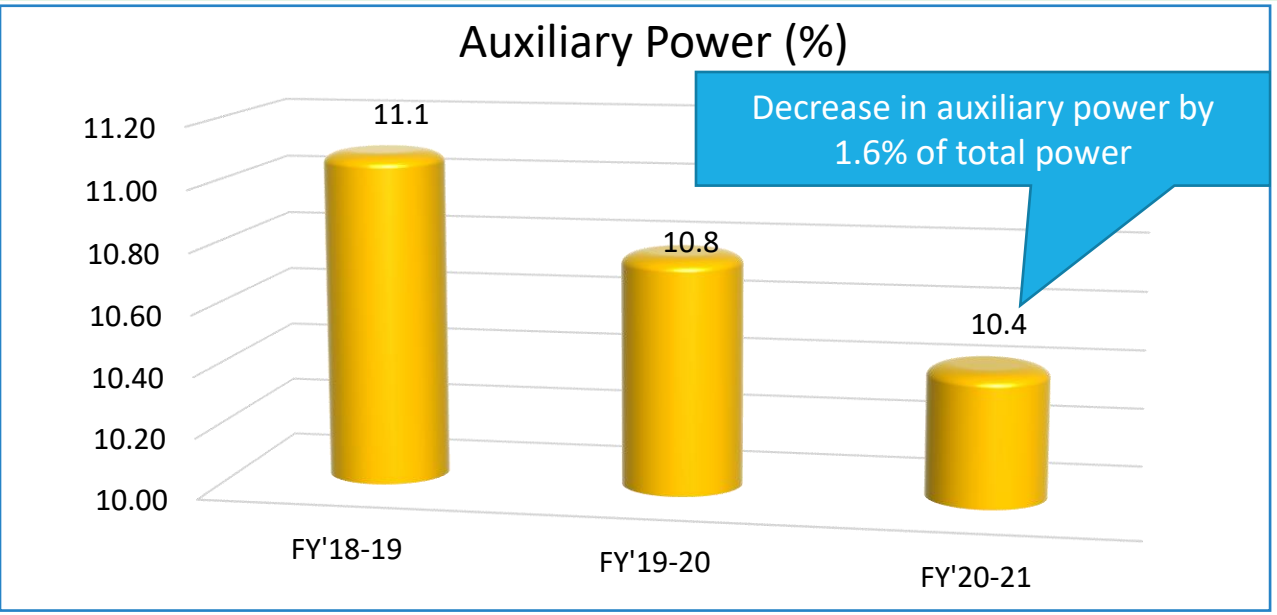
Process Flow Diagram

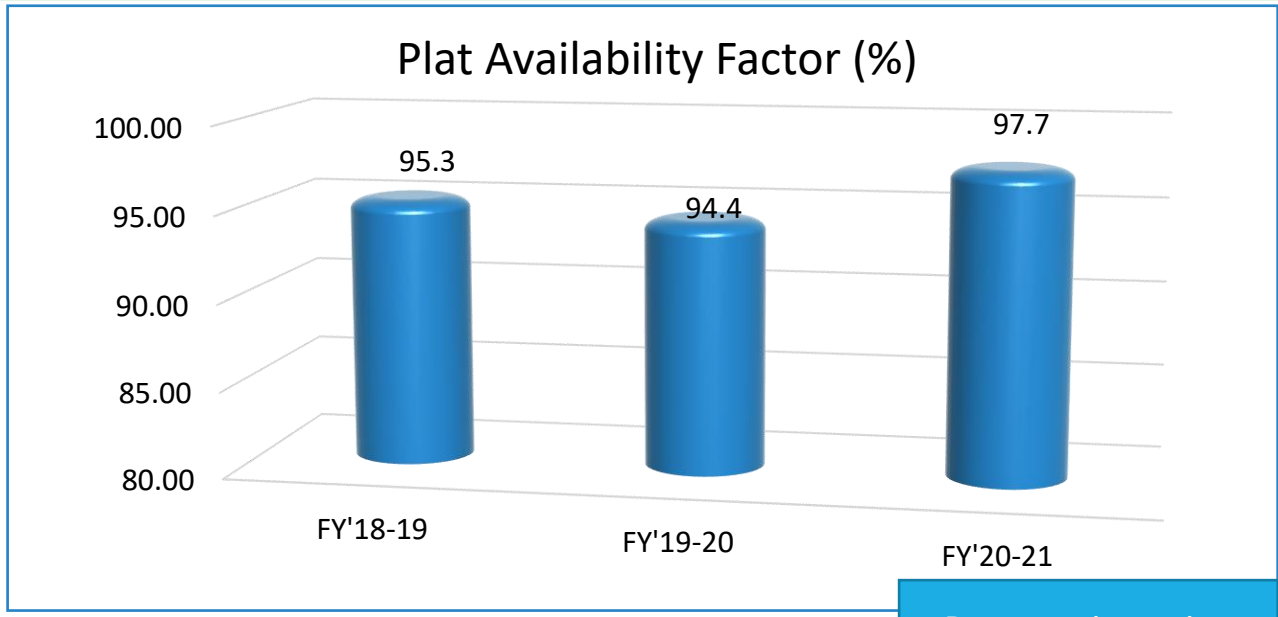


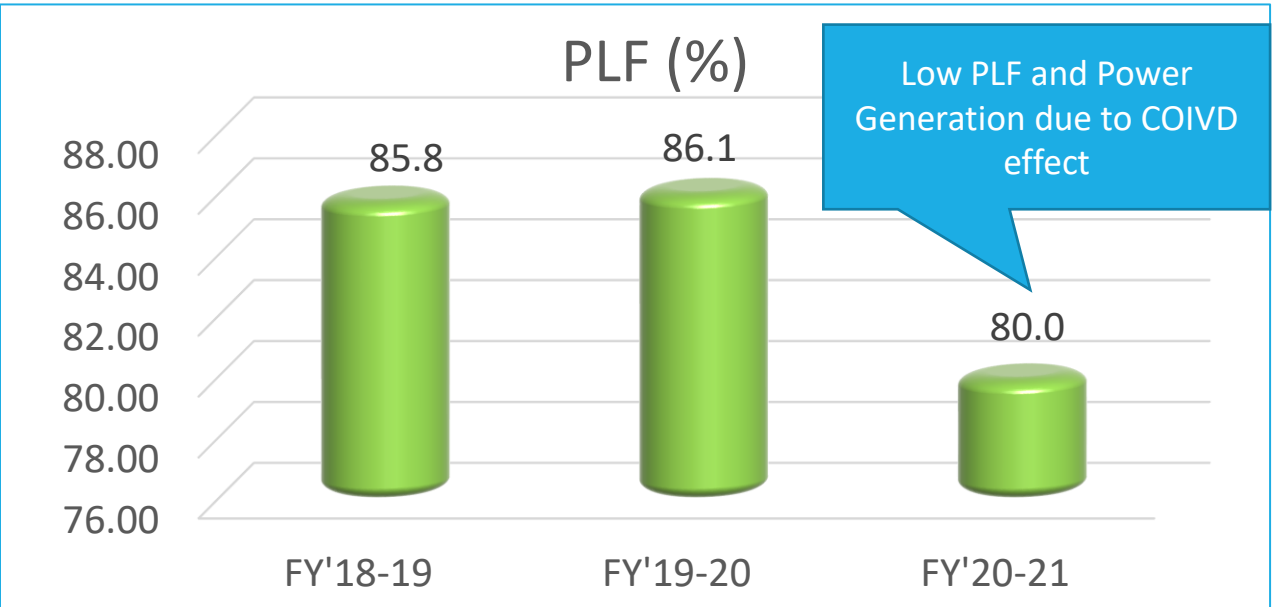
Energy Consumption Overview

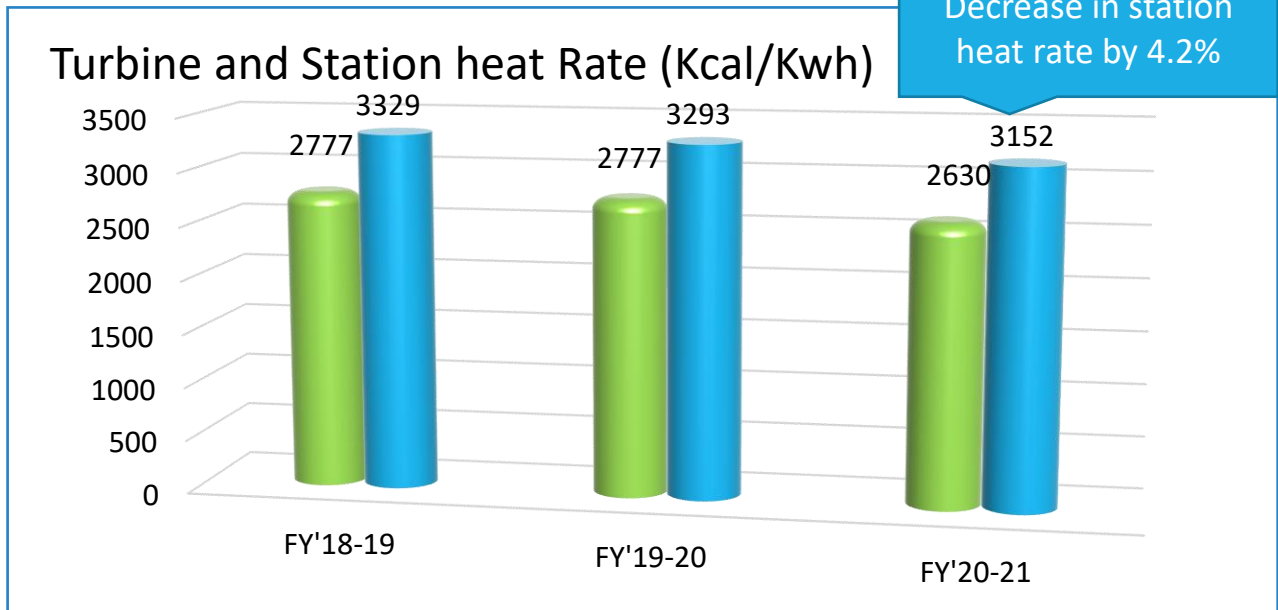
Parameter	UOM	FY 2020-21
Annual Power generation	MW	25.85
PLF	%	79.96
Availability	%	97.69
Gross Heat Rate	Kcal/KWh	3152
Auxiliary Power	%	10.43
Boiler Efficiency	%	83.44
Turbine Heat Rate	Kcal/KWh	2630
DM Water Consumption	%	3.81
Raw Water Consumption	%	1.88
Specific Oil Consumption	L/MWH	0.018

Key Performance Indicators

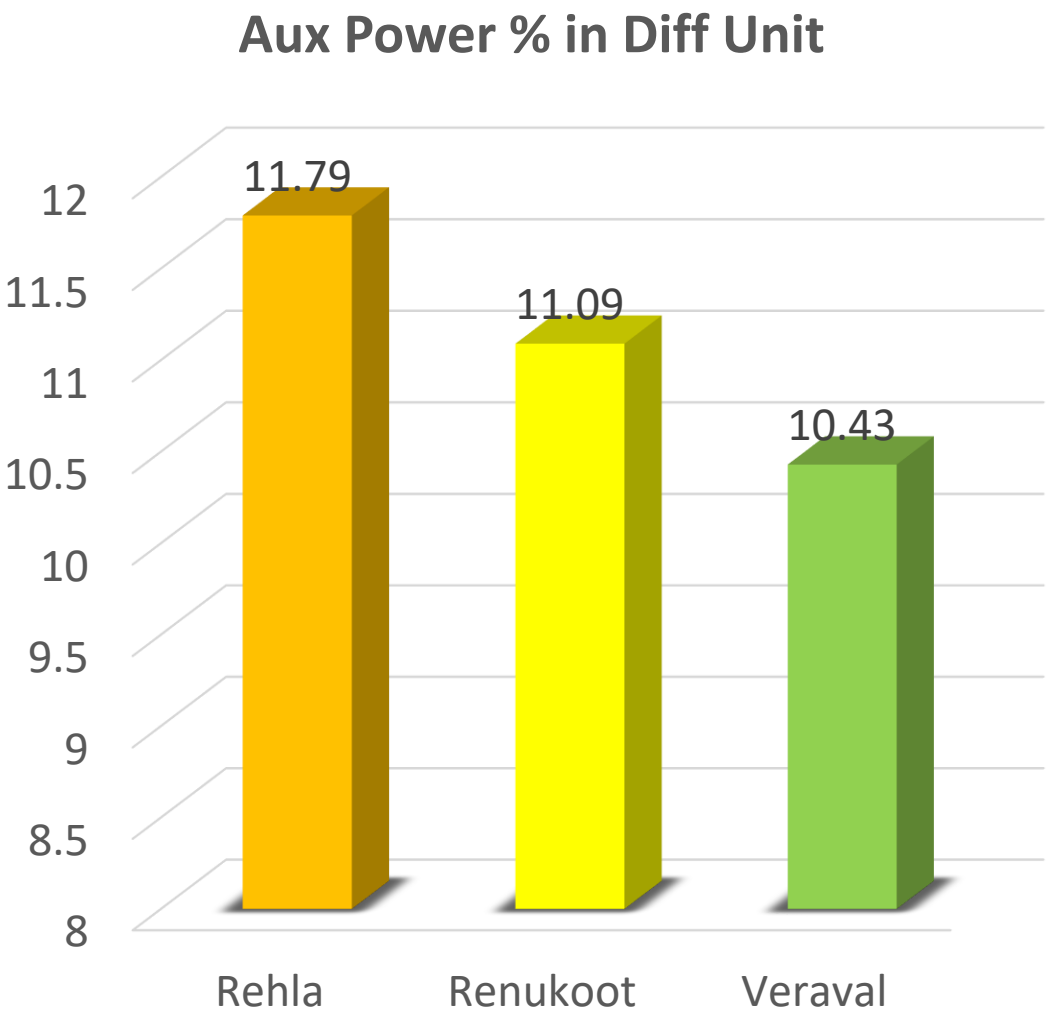


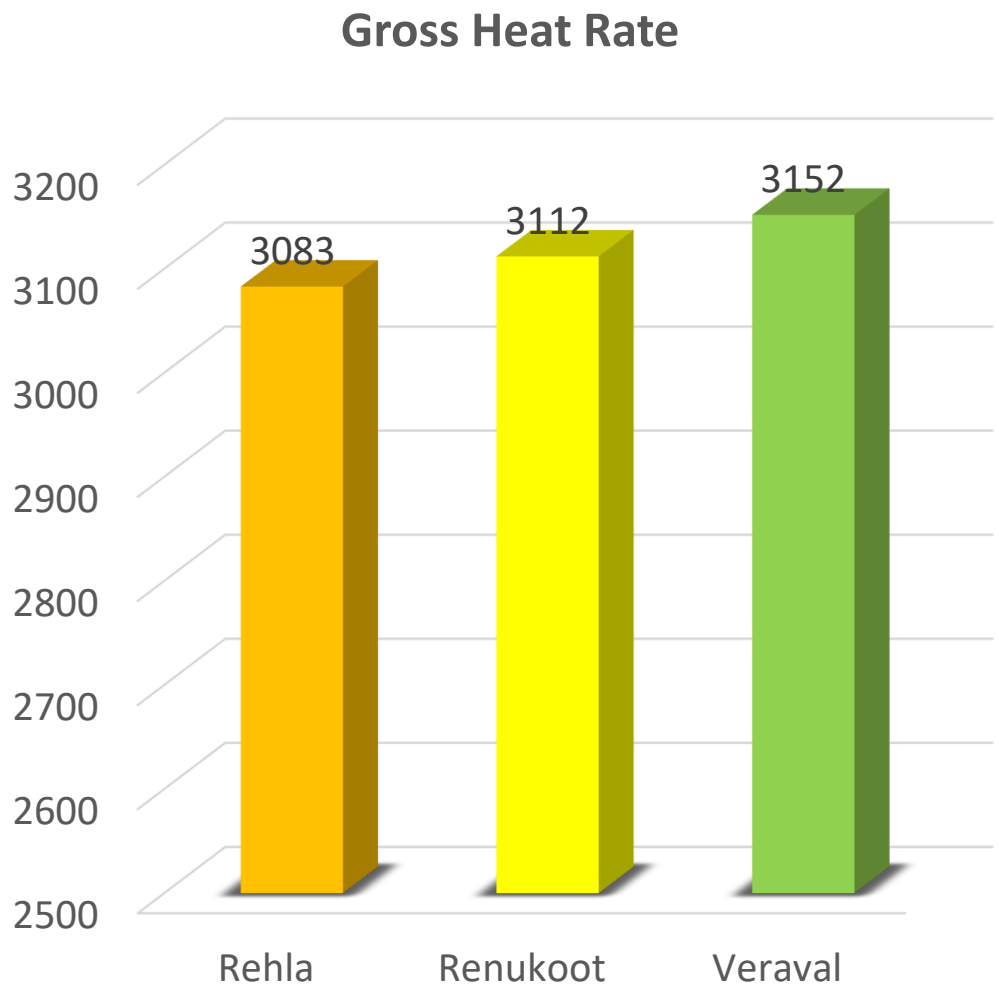






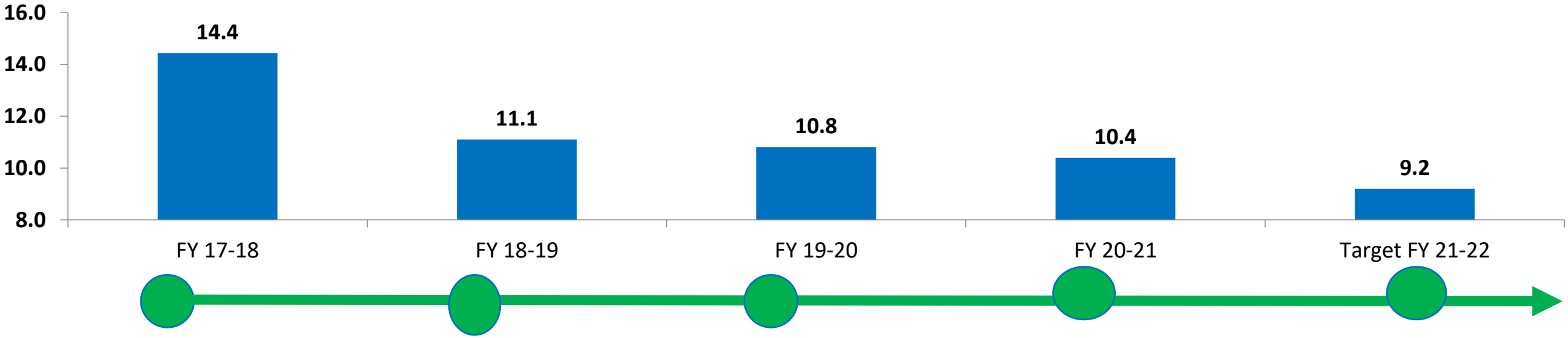
Benchmarking





Auxiliary Power Roadmap

Aux power Consumption



- ESP-3/3 TR set & controller retrofitting from 2 Phase to 3 Phase
- LED light fixing work
- Applying corrocoat in MCT Pumps
- MCT fan motor replaced with higher energy efficient motors

- Replacement of 2x100 % HT motors run fans with 2x50% Fans with VFD run LT motors in Boiler no#3
- Installation of VSFC in Boiler Feed pump
- Reduction in SA header pressure of Boiler no#3
- Energy IE-3 Motor Installation in main cooling water pump

- Installed & commissioned energy efficient auxiliary cooling water pump in unit-2
- Stoppage of one instrument compressor by optimizing the air vent of dryer & air blaster operation
- Incorporated start-stop logic in ACT fan on cooling water temperature of unit-2

- Installation of New efficient TG-3 in place of old TG 1. Aux power reduction would have been better but due to low PLF its appearing slightly lesser
- Overhauling of HFTG & Improved specific steam consumption from 11.4 Kg/KWH to 10.8 Kg/Kwh after overhauling
- Stoppage of Ash handling compressor for 4 hrs /shift in accordance to low ash

- Installation of new 110 TPH CFBC Boiler and stop old inefficient 2X50 TPH CFBC Boilers & 1x25 TPH stoker fired boiler
- Installation of VFD in main cooling water pumps for 18 MW TG –Condenser
- Installation of energy efficient single auxiliary cooling water pump instead of two pumps

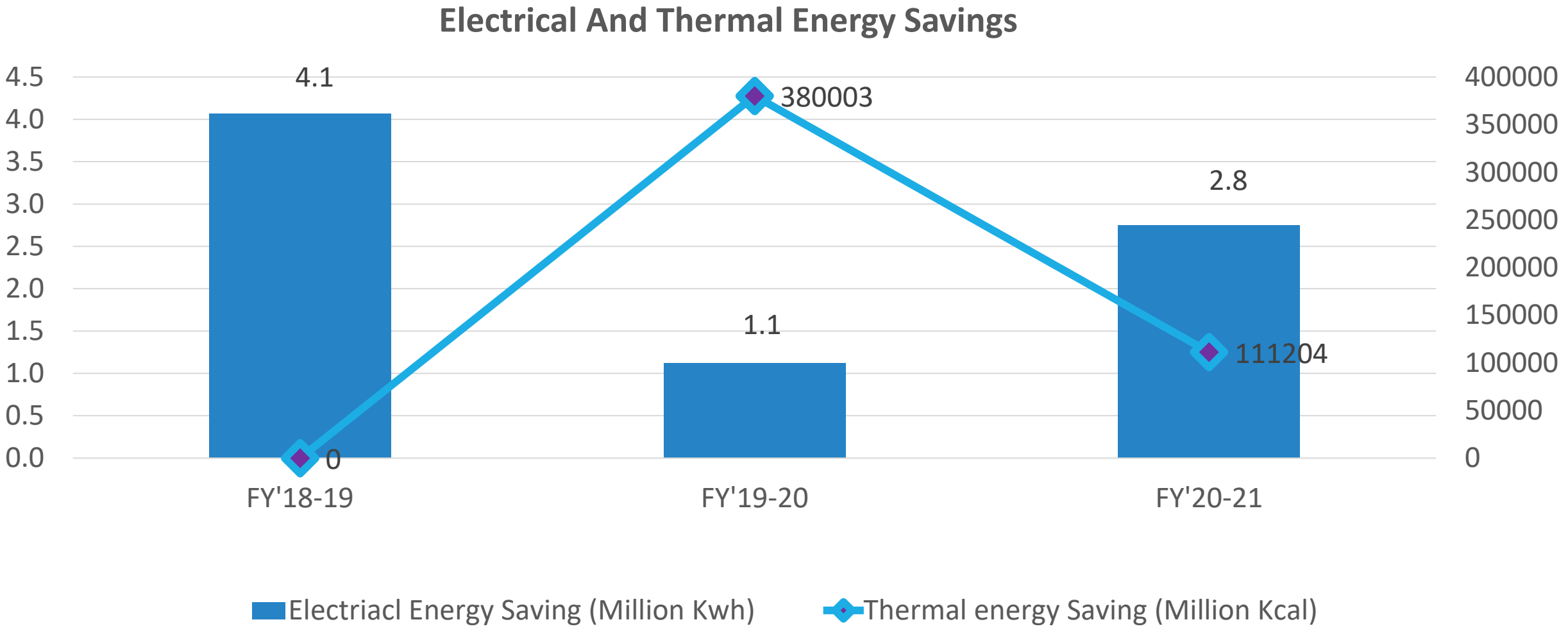
Energy Savings Projects (2021-22)

SN	Energy Saving Projects	Saving Achieved			Investment (Rs. Million)	Pay back Month
		Electrical Energy (KWH)	Thermal Energy (Million Kcal/Year)	(Rs. Million)		
1	Installation of new 110 TPH CFBC Boiler and stop old inefficient 2X50 TPH CFBC Boilers & 1x25 TPH stoker fired boiler.	0	23928	274	700	30
2	Installation of VFD in main cooling water pumps for 18 MW TG -Condenser	126000	0	0.69	0.6	10
3	Installation of energy efficient single auxiliary cooling water pump instead of two pumps	33000	0	1.81	4.2	28
4	Recovery of condensate water from VFY plant & utilize its energy to save steam & DM water in deaerator	0	1200	25.94	0.5	0

Energy Savings Projects Implemented

Year	No of Energy Saving Project	Investment (INR Million)	Electrical Energy (Million Kwh)	Thermal Energy (Million Kcal/Year)	Saving (INR Million)
FY 2018-19	4	16.15	4.07	0	22.39
FY 2019-20	7	15.9	1.12	38003	23.12
FY 2020-21	12	196.6	2.75	111204	188.28

Energy Savings Projects Implemented



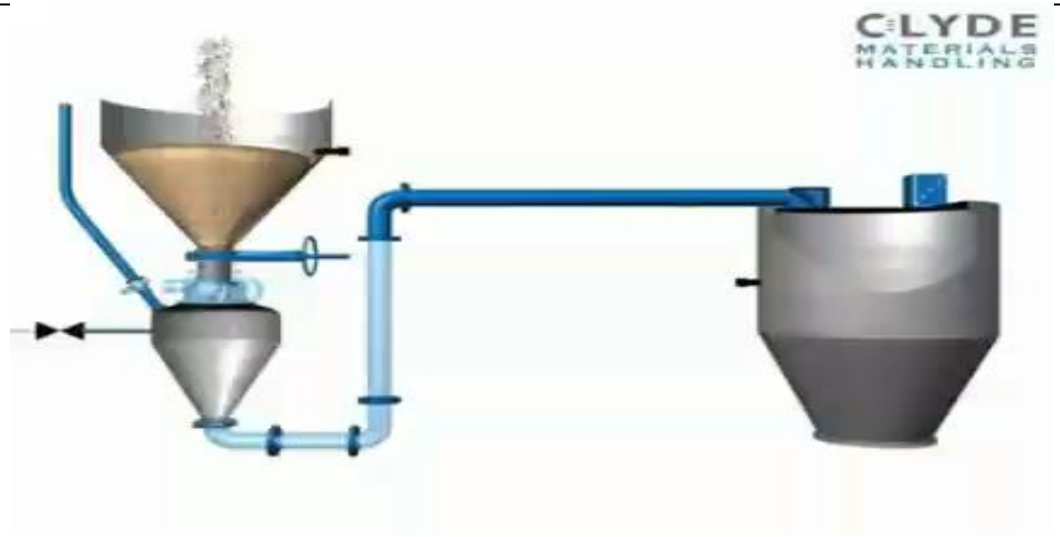
Innovative Projects Implemented

Trigger for implementing the project:

- During ESP conveying system monitoring on routine basis , we observed that the ESP hoppers are mostly empty & conveying system are operating in idle.

Modification Adoption:

- Since our unit is operated on imported coal with low ash % & the total ash generation throughout the day is low. To utilize this opportunity, We have analyzed and found that idle time was more than 50% in all the conveying system.
- We started intermittent stoppage of compressor with safe ESP hopper level . To ensure safeguard of our system, we installed draft transmitters in ESP hopper for Real-time monitoring of hopper level drafts. further installed pressure transmitter to indicated vessel back pressure, so that conveying system healthiness can be monitored on real-time basis.
- Provided separate arrangement for service air requirement other than pneumatic conveying



System ON Command

Conveying Air valve opens 60 Sec

Dome valve Opening 10 Sec

Conveying Air valve Closed

Dome valve closing

Gap time timer starts 80 Sec

Innovative Projects Implemented

Idea Sharing:

We shared this idea in our synergy meeting and now it is being replicated in our sister companies at their Rehla and Renukoot Units

Saving:

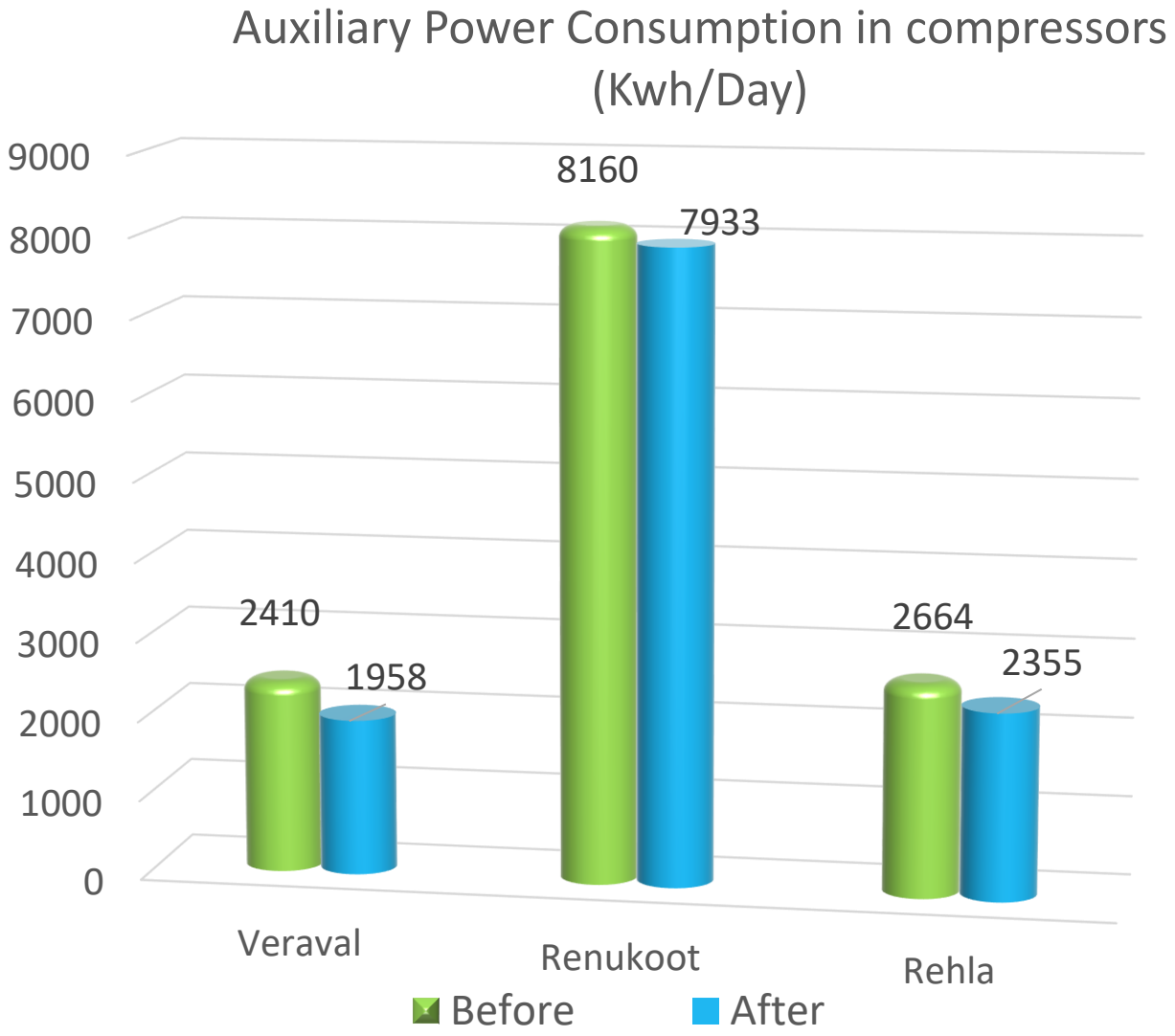
We successfully achieved stopping service air compressor for 10 hrs in a day

Electrical Energy Saving = 452 KWH/Day

Cost Saving = Rs. 8.5 Lakhs/Annum

Electrical energy saving at Renukoot unit = 227 Units/Day

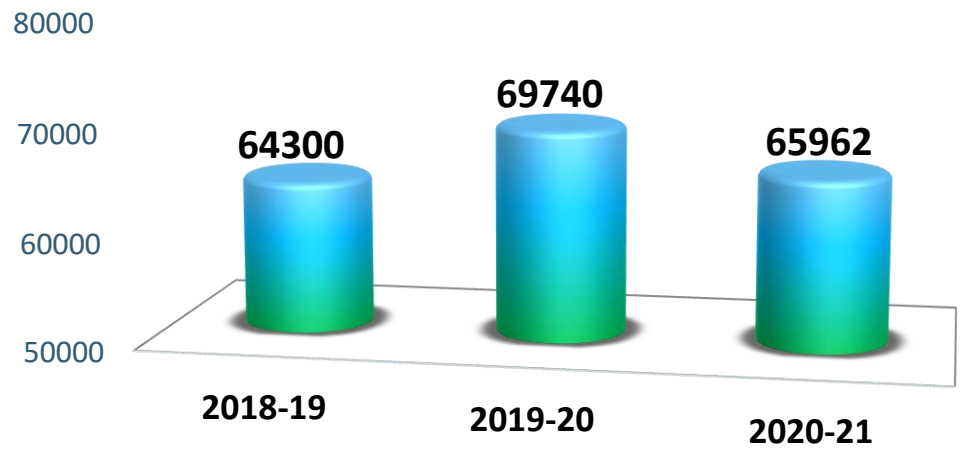
Electrical energy saving at Rehla unit = 309 Units/Day



Utilization of renewable energy sources

Usage of renewable energy for lighting at TPP HSD Area:

- *Installed Solar Power Generation : 50 KiloWatts*
- *Solar energy : 0.03 % of total power share*

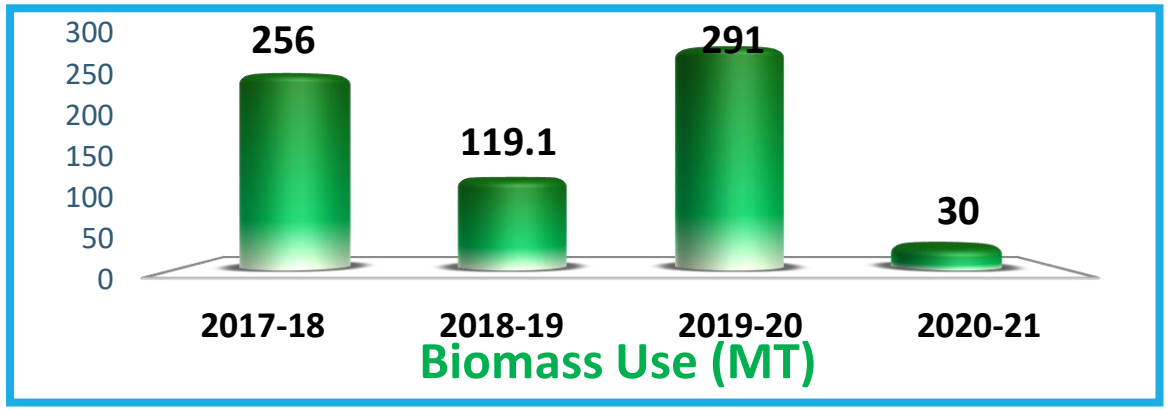


Solar Unit Generation (kwh)

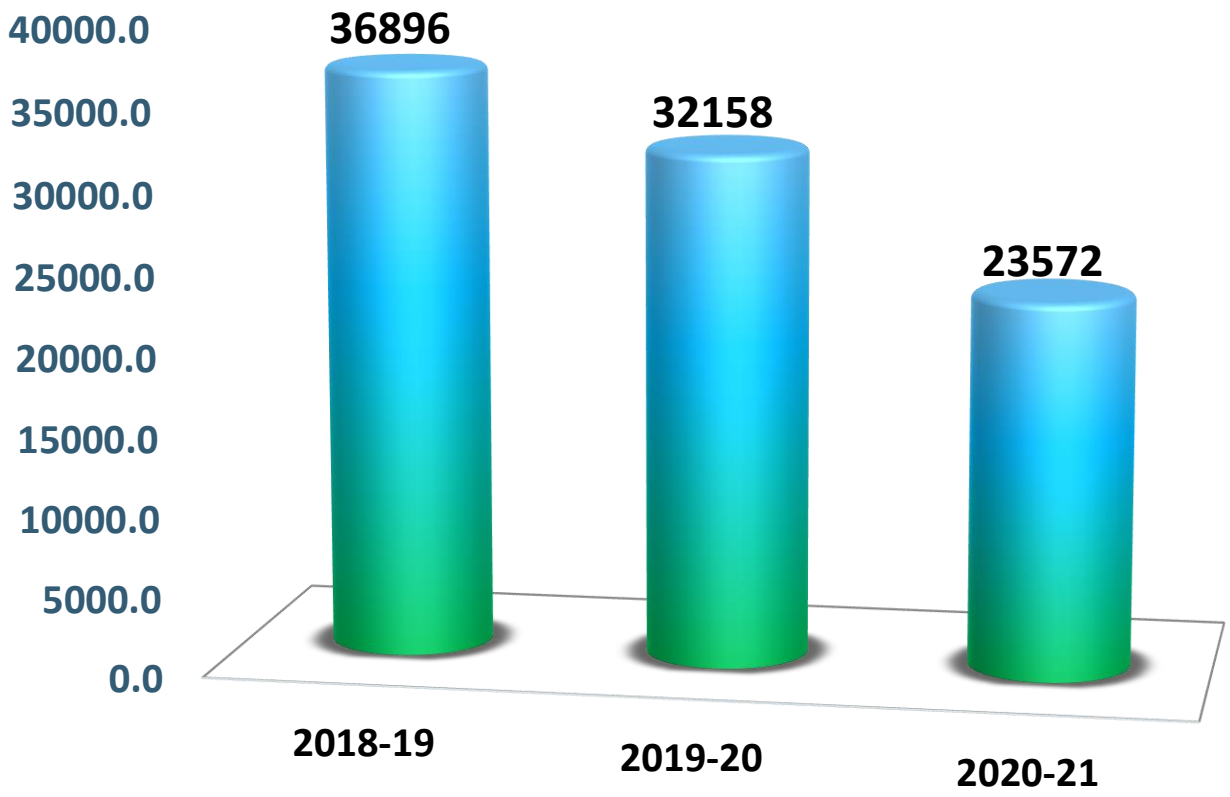
Use of Waste as Fuel (Biomass)

Usage of Biomass:

- *Explored biomass usage & started using it as fuel*



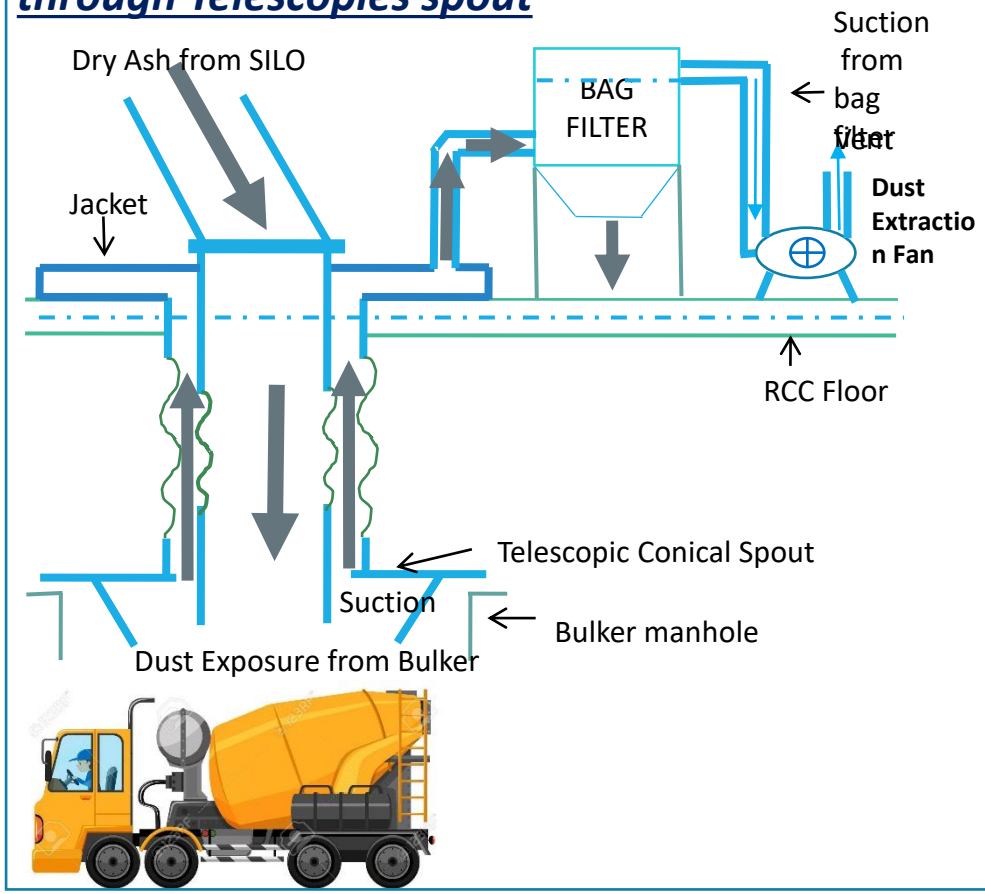
Fly Ash generation & Utilisation



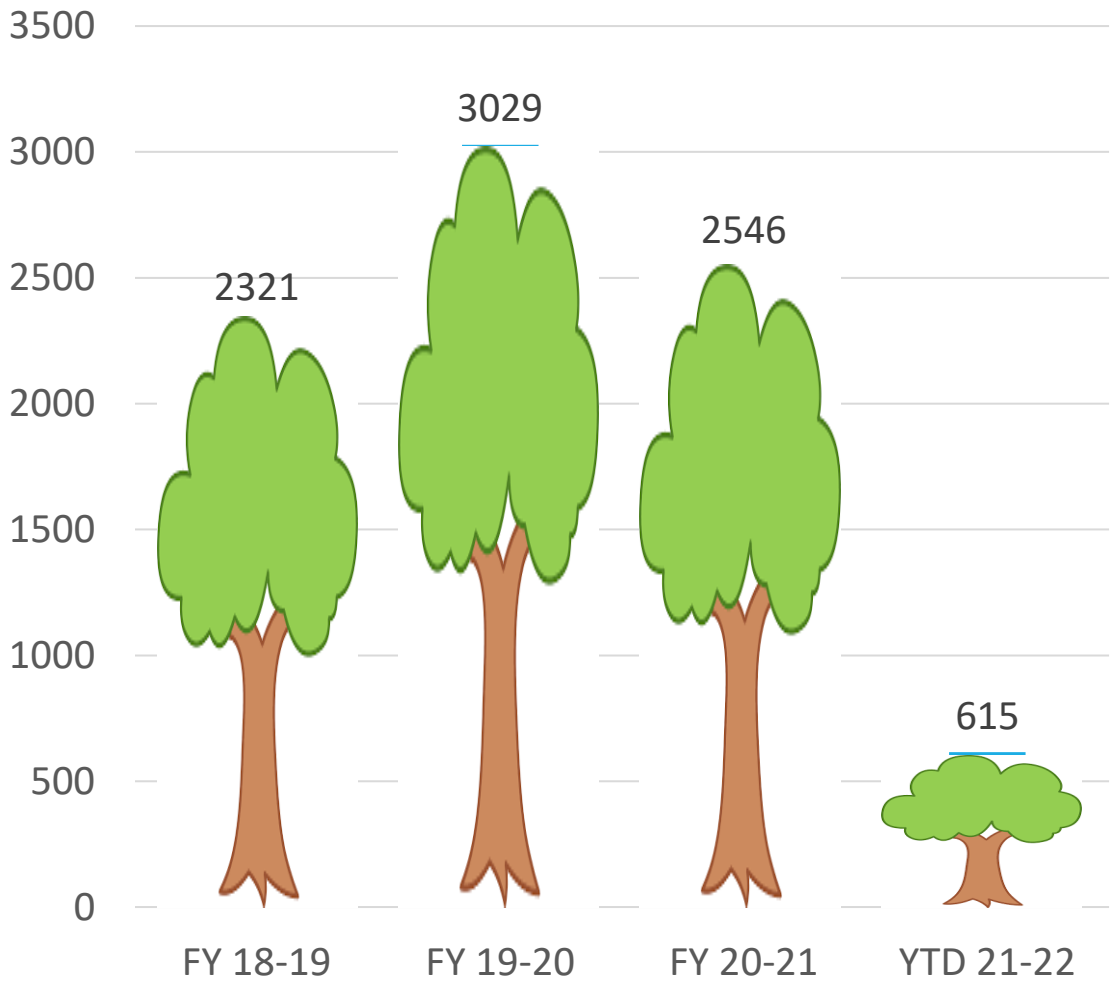
Fly Ash Generation (MT/Year)

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

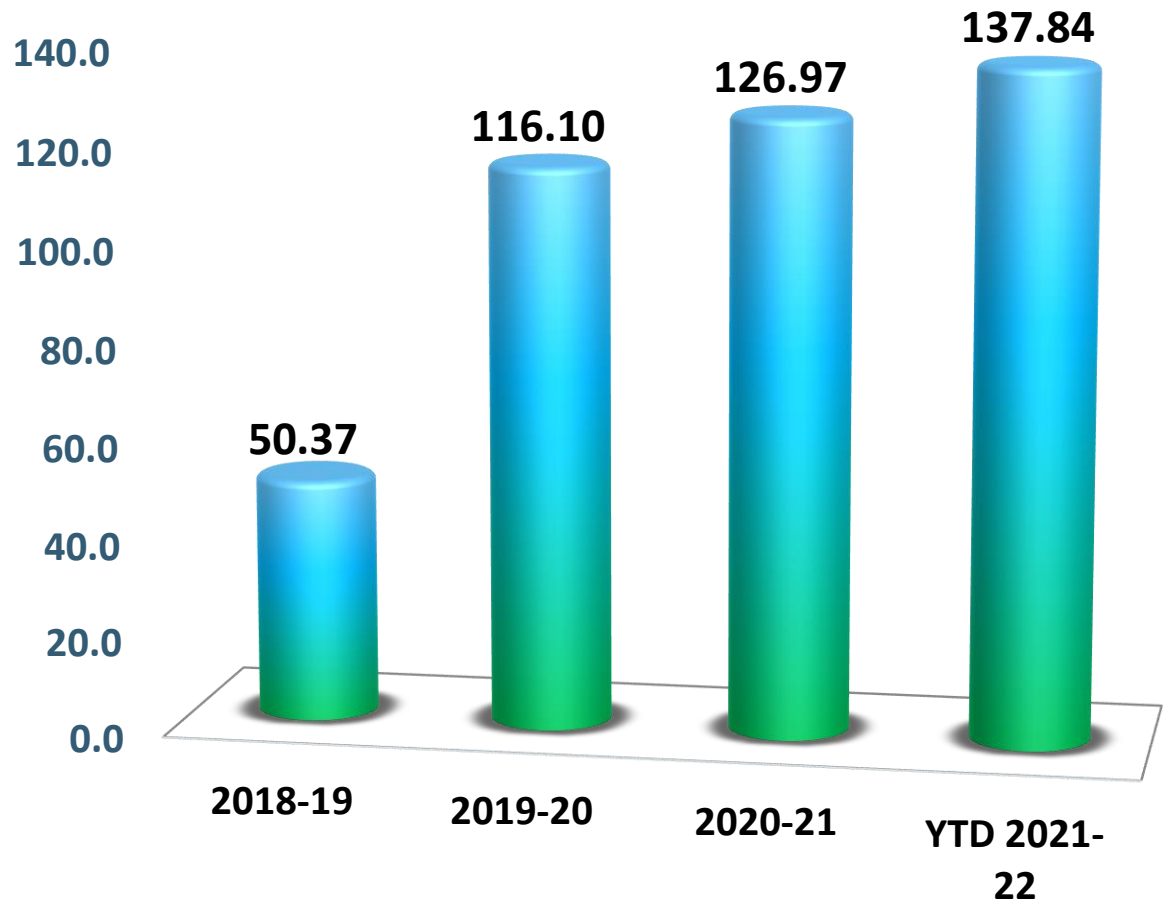
Method of Ash Unloading: 100% Dry ash unloading through Telescopies spout



Green Belt Development (Plant & Colony)



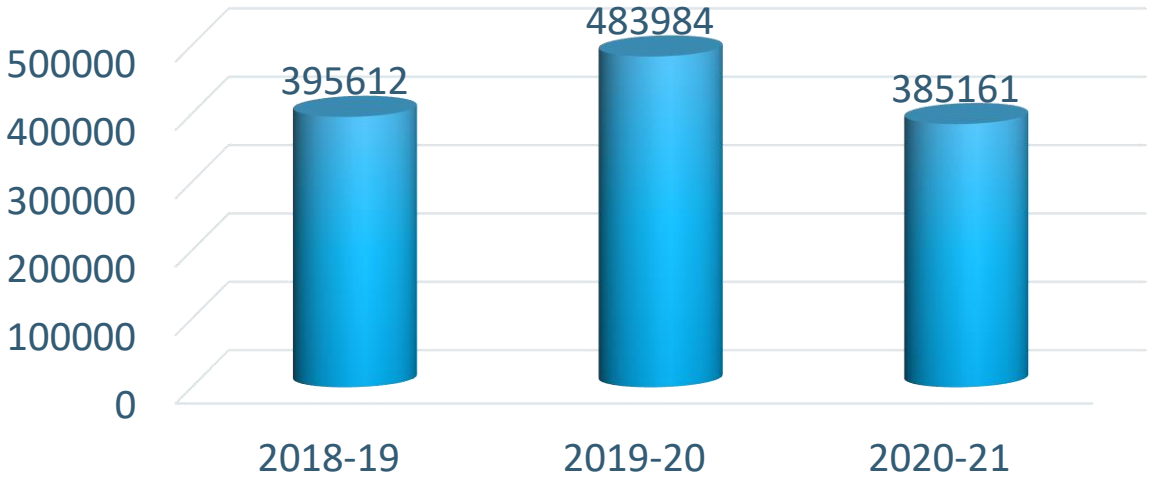
No of tree planted



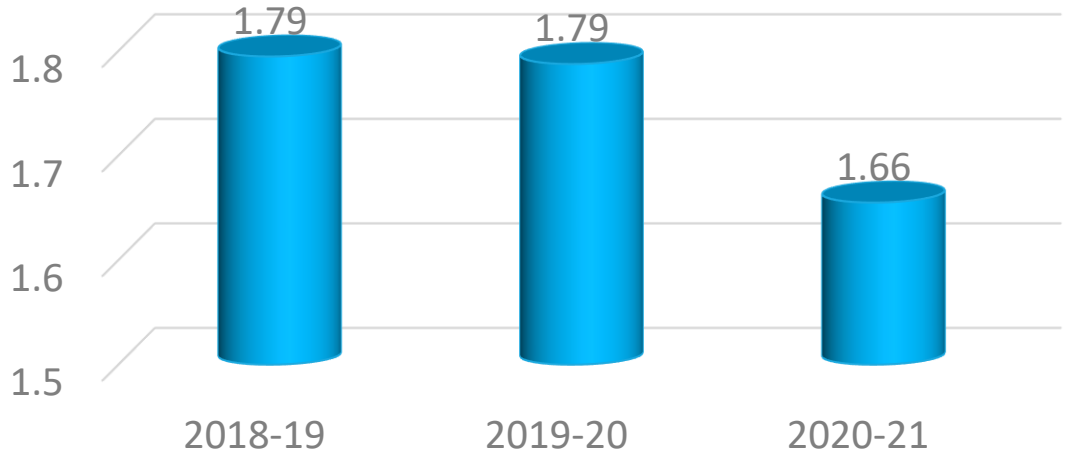
CO2 Absorption by Trees(MT/Year)

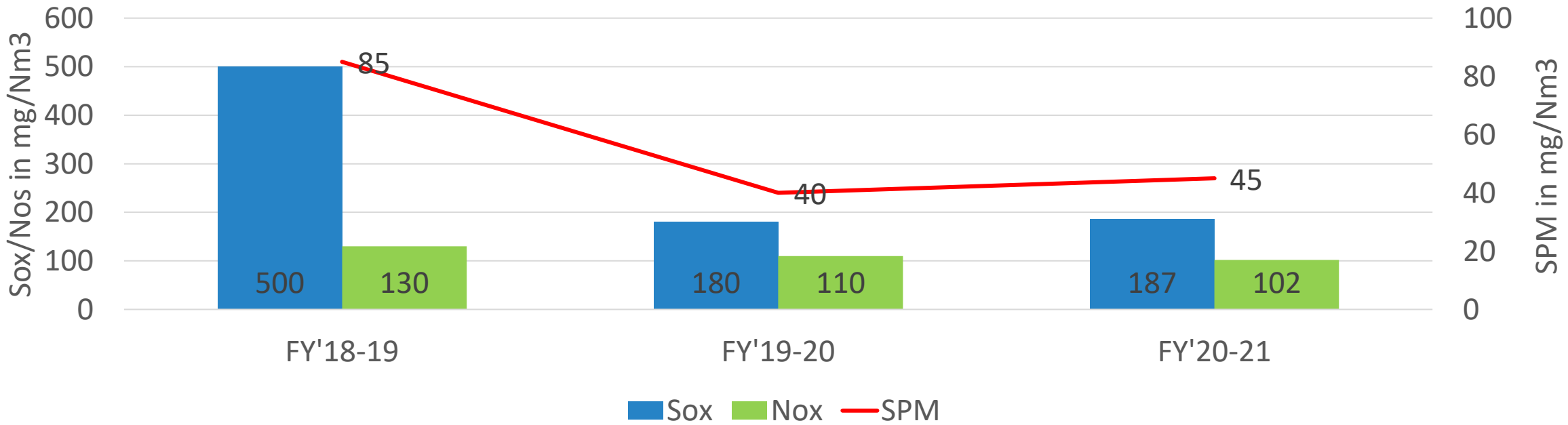
Environment Management

TONS OF GHG EMMISSION



TONS/MWH OF GHG EMMISSION

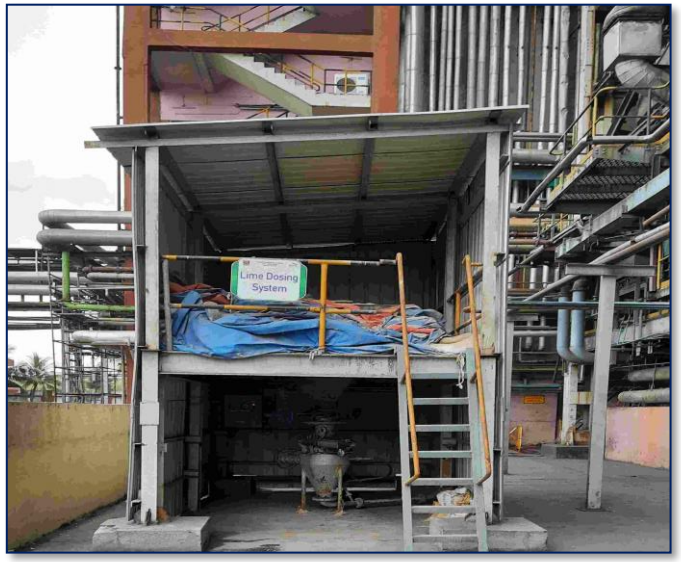




Environment Management- Best Practices

01 Stopped feeding high Sulphur content coal (lignite coal) to reduce Sox emission

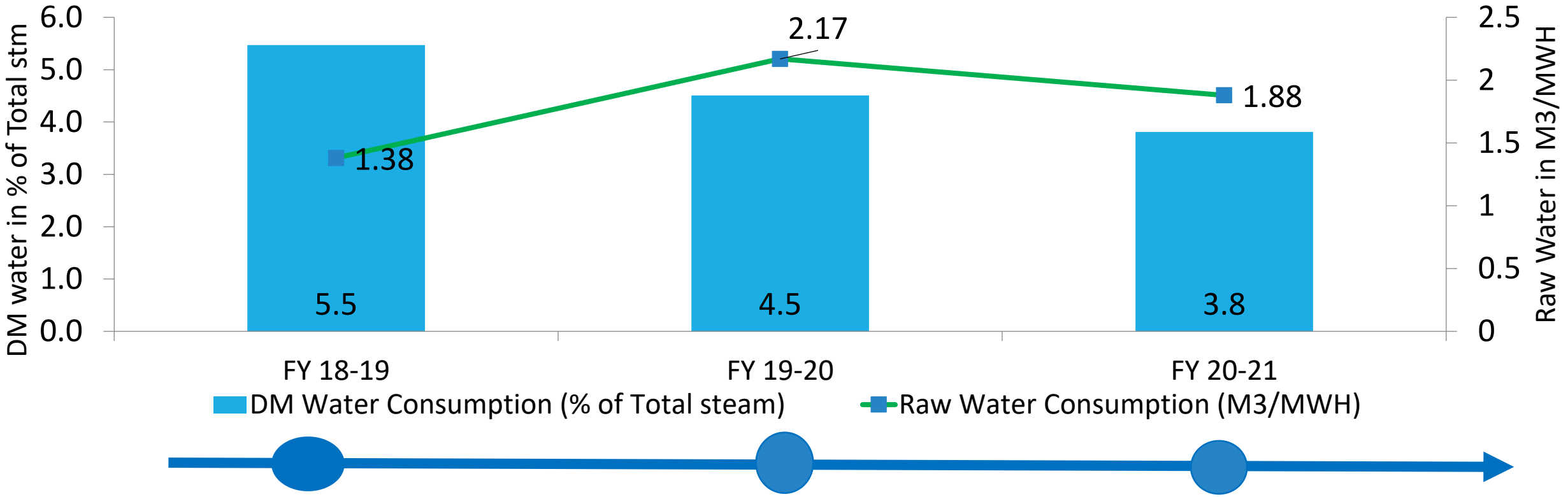
02 Installed Wheel washing system to reduce dust emission in road side area



03 Using limestone to control Sox Emission

04 Using battery operated vehicle for movement in factory premises

Water consumption



- Replacement of valves
- Orifice provision in Dearator
- Recovery of soot blowing steam in dearator

- Installation of RO System at inlet to DM Plant and taking its reject water to Cooling Tower under wave
- Dain trap condensate recovery in deaerator through condensate recovery tank-15-20 m3/day

- SSY plant condensate recovery & utilization - 120 m3/day
- Drain trap condensate recovery in deaerator through condensate recovery tank-5 m3/day
- ETP RO recovering water usage in cooling tower as make-up -300 m3/day

Implementation of ISO 50001

ISO 50001

Energy Management

DNV

MANAGEMENT SYSTEM CERTIFICATE

Certificate no.: 10000157406-MSC-RvA-IND | Initial certification date: 11 June 2015 | Valid: 11 June 2021 – 10 June 2024

This is to certify that the management system of

Grasim Industries Limited, Unit - Indian Rayon

Junagadh - Veraval Road, Veraval, District: Gir Somnath - 362266, Gujarat, India

has been found to conform to the Energy Management System standard:

ISO 50001:2018

This certificate is valid for the following scope:

Manufacturing of viscose rayon filament yarn, sulphuric acid, carbon disulphide anhydrous sodium sulphate, sodium sulphide, caustic soda lye, caustic flakes, hydrochloric acid, liquid chlorine, compressed hydrogen, sodium hypo and power generation for captive use

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

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;

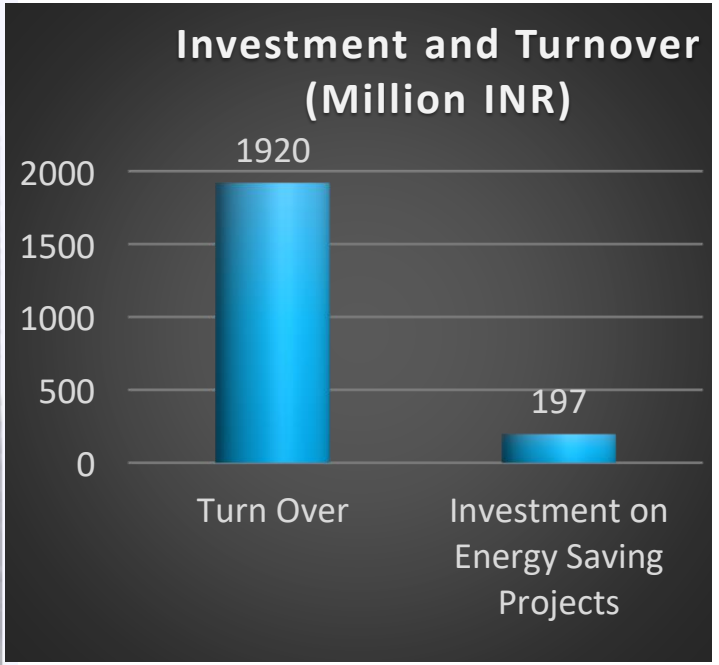
- Maintain positive legal compliance to energy and carbon regulations and other requirements;
- Raise awareness to encourage efficient use of energy resources, with a focus on reducing its energy intensity and carbon footprint;
- Increase the use of renewable energy wherever possible;
- Promote research 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



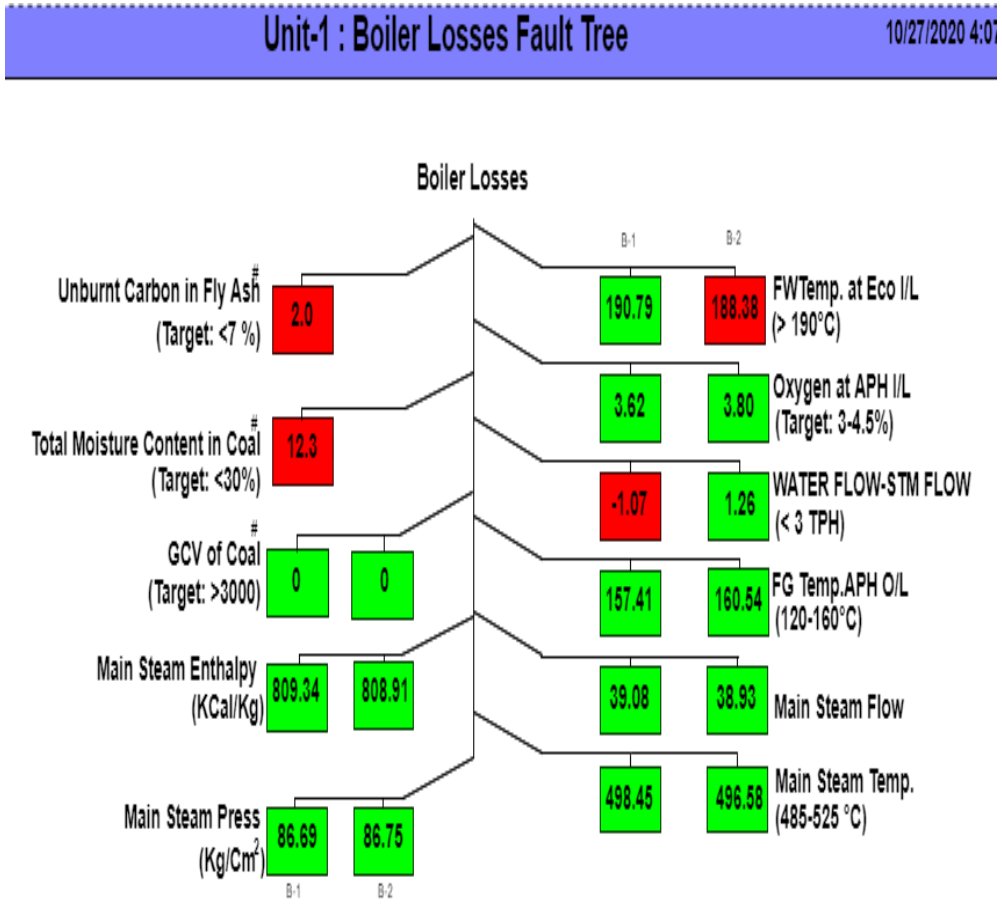
Best Practices – Daily Monitoring

Continuous monitoring of losses due to various performance parameters

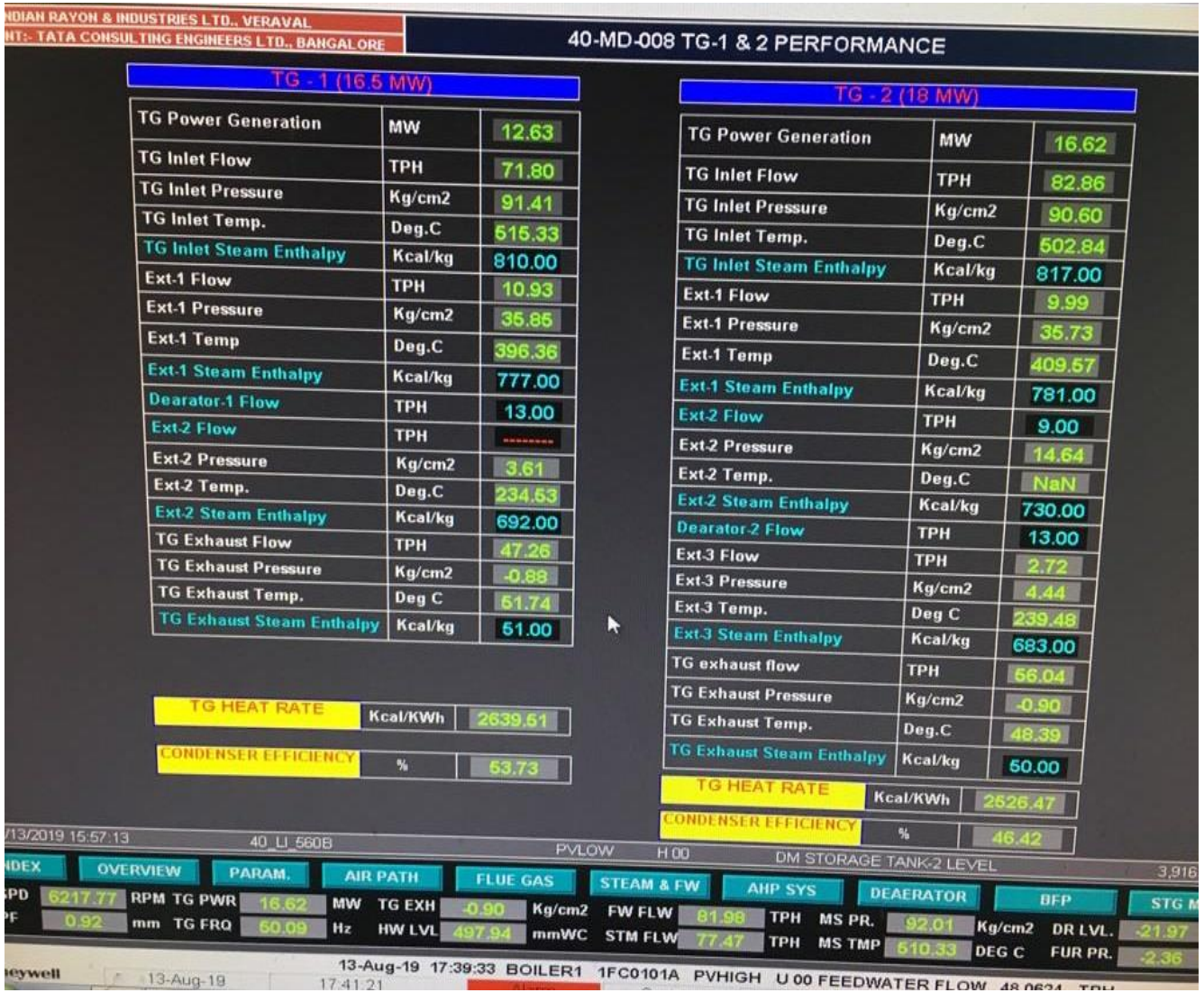
Description	Gain/Loss	Impact B1&2	Impact B3	B-1 Actual/Target	B-1 Impact	B-2 Actual/Target	B-2 Impact	B-3 Actual/Target	B-3 Impact
20°C Increase in Comb Air Temp	Efficiency Increase by 1%	35	80	221.10 / 210.00	19.36	221.81 / 210.00	0.03	190.08 / 200.00	40.06
6°C Increase in ECO Inlet Temp	Efficiency Increase by 1%	35	80	190.82 / 194.00	18.40	188.41 / 194.00	32.47	185.23 / 204.00	246.96
21°C Decrease FG APH OL Temp	Efficiency Increase by 1%	35	80	157.41 / 150.00	12.30	157.41 / 150.00	17.61	143.20 / 150.00	25.92

Description	Gain/Loss	Impact TG1 & TG2	TG-1 Actual/Target	TG-1 Impact	TG-2 Actual/Target	TG-2 Impact
0.01 Vacuum in Turbine	13.29 kacl/kwh	20	-0.00 / -0.89	1772.57	-0.90 / -0.89	24.41
5°C Decrease in Main Steam Temp	13.29 kacl/kwh Loss in Heat Rate	28	412.73 / 494.00	477.52	499.65 / 494.00	9.24
Total Impact		2538.99				

Daily online monitoring of auxiliary power by using cockpit



Daily monitoring system



Online live heat rate display in DCS

CPP Area Wise Auxiliary Break up

Summary	Budgeted(Rev. After Bir#3 S/dn)	24-Mar-19	25-Mar-19	26-Mar-19	27-Mar-19	28-Mar-19	29-Mar-19	30-Mar-19	31-Mar-19	Gain/Loss from budgeted	Diff WRT Previous day
Total Generation(TG # 1 & 2)	32.62	6.31	4.83	8.84	8.50	8.46	8.72	7.52	7.52	-25.10	0.00
Total AuY. Power (TG # 1 & 2) including Grid intake	93000	49069	43192	46730	47384	47711	48682	48673	48138	-44862.00	-535.00
CPP Avg. AuY .(MW)	3.875	2.04	1.80	1.95	1.97	1.99	2.03	2.03	2.01	-1.87	-0.02
CPP Avg. AuY .with Admin(MW)	3.94	2.13	1.89	2.04	2.07	2.08	2.12	2.13	2.11	-1.83	-0.02
% CPP AuY incuding Grid intake	11.88	32.40	37.26	22.03	23.23	23.50	23.26	26.97	26.67	14.79	-0.30
Total CPP AuY incuding Grid & ADMIN	94600	51097	45279	48974	49699	49953	50924	51001	50611	-43989.00	-390.00
Grand Total Avg. AuY MW	3.94	2.13	1.89	2.04	2.07	2.08	2.12	2.13	2.11	-1.83	-0.02
Total AuY % with Admin	12.08	33.74	39.06	23.08	24.36	24.60	24.33	28.26	28.04	15.96	-0.22
Total service air consumption	3000	3792	3890	3700	3790	3859	3743	3578	3517	517.00	-61.00
Total Inst air consumption	2000	1635	2217	1990	1873	2000	1991	1812	1770	-230.00	-42.00
CHP	2212	600	481	866	866	802	806	926	937	-1275.00	11.00
CPP-1 ID fan	5807	5563	4963	6154	5741	5898	6066	6056	6279	472.00	223.00
CPP-1 SA + PA fans	10217	13835	12988	17557	17426	17542	17674	17774	17703	7486.00	-71.00
CPP-2 Blr fans	16500	0	0	0	0	0	19	0	0	-16500.00	0.00
Area Wise											0.00
CPP-1											0.00
CPP#1 Generation (MW)	13.32	6.31	4.83	8.84	8.50	8.46	8.72	7.52	7.52	-5.80	0.00
Actual Declared AuY. KWH	44000	38089	37192	41730	42584	43111	43882	43973	43138	-862.00	-835.00
AuY. Avg./Hr	1.833	1.587	1.550	1.739	1.774	1.796	1.828	1.832	1.797	-0.04	-0.03
% of AuY.	13.76	25.15	32.08	19.67	20.87	21.23	20.97	24.36	23.90	10.14	-0.46
COMPRESSORS (CPP-1)	2196	2713.50	3053.50	2845.00	2831.50	2929.50	2867.00	2695.00	2643.50	447.50	-51.50
ID FAN # 1	2170	1777	1163	2377	2064	2059	2272	2327	2458	288.00	131.00
PA FAN # 1	4150	2378	2383	4093	4264	4521	4703	4804	4852	702.00	48.00
SA FAN # 1	772	374	432	1102	836	791	775	727	719	-53.00	-8.00
ID FAN # 2	1600	1968	2114	2314	2305	2491	2373	2258	2402	802.00	144.00
PA FAN # 2	3411	3786	3810	3777	3677	3839	3794	3729	3821	410.00	92.00
SA FAN # 2	1150	1108	1155	1170	1196	1181	1177	1165	1169	19.00	4.00
BFPs	11645	9975	9018	11192	11130	11049	11019	11078	10963	-682.00	-115.00
CT and ACT	11143	9124	9160	9311	9258	9523	9668	9428	9385	-1758.00	-43.00
TG AuY.	1058	848	820	904	917	907	902	885	879	-179.00	-6.00
Other AuY.(RB+ Silo + ESP 1 & 2)	2300	1640	1619	2076	2060	2077	2106	2112	2091	-209.00	-21.00
CHP	1106	600.0	481.0	866.0	866.0	802.0	806.0	926.0	937.0	-169.00	11.00
AuY.(ADM)	800	1014.0	1072.5	1122.0	1191.5	1121.0	1121.0	1164.0	1236.5	436.50	72.50
Total AuY. Power (EMS)	43501	37306	36271	43149	42596	43291	43583	43298	43556	55.00	258.00
CPP-2											0.00
CPP#2 Generation(MW)	19.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-19.30	0.00
Actual Declared AuY. KWH	49000	10980	6000	5000	4800	4600	4800	4700	5000	-44000.00	300.00
% of AuY.	10.58	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
AuY. Avg./Hr	2.04	0.46	0.25	0.21	0.20	0.19	0.20	0.20	0.21	-1.83	0.01
COMPRESSORS (CPP-2)	2196	2713.50	3053.50	2845.00	2831.50	2929.50	2867.00	2695.00	2643.50	447.50	-51.50
NEW ID FAN 3/1	2293	0	0	0	0	0	0	0	0	-2293.00	0.00
NEW PA FAN 3/1	3476	0	0	0	0	0	0	0	0	-3476.00	0.00
NEW SA FAN 3/1	2577	0	0	0	0	0	19	0	0	-2577.00	0.00
NEW ID FAN 3/2	1867	0	0	0	0	0	0	0	0	-1867.00	0.00
NEW PA FAN 3/2	3506	0	0	0	0	0	0	0	0	-3506.00	0.00
NEW SA FAN 3/2	2750	0	0	0	0	0	0	0	0	-2750.00	0.00
BFPs (BFP-4&5)	13357	0	0	0	0	0	0	0	0	-13357.00	0.00
CT and ACT	12261	4857	1188	0	0	0	0	0	452	-11809.00	452.00
TG AuY.	1007	974	177	0	0	0	0	0	0	-1007.00	0.00
Other (DM +ESP+Coal Feeder)	1350	676	706	608	615	602	594	613	606	-744.00	-7.00
CHP	1106	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1106.00	0.00
AuY.(ADM)	800	1014.0	1014.0	1122.0	1123.0	1121.0	1121.0	1164.0	1236.5	436.50	72.50
Total AuY. Power (EMS)	48546	10235	6139	4575	4570	4653	4601	4472	4938	-43608.00	466.00
Compressor Break Up											0.00
Total CPP-Compressor-power	4393	5427	6107	5690	5663	5859	5734	5390	5287	894.00	-103.00
Running Compressors										0.00	0.00
Ins-1 (45 KW)		0	36	8	0	18	26	0	0	0.00	0.00
Ins-2 (45 KW)		0	67	14	0	258	944	959	954	954.00	-5.00
Ins-3 (45 KW)		930	890	902	893	667	22	0	0	0.00	0.00
Inst-4-/Ash Com-1-(160 KW)		0	0	0	0	0	0	0	0	0.00	0.00
Inst-5-/Serv Com-1-(75 KW)		0	845	1055	980	843	613	0	0	0.00	0.00
Inst-6-/Serv Com-2-(75 KW)		0	366	11	0	214	386	853	816	816.00	-37.00
Inst-7-/Serv Com-3-(75 KW)		705	13	0	0	0	0	0	0	0.00	0.00
Total Inst air consumption	1393	1635	2217	1990	1873	2000	1991	1812	1770	377.00	-42.00
Ash Com-2-(160 KW)		2481	177	260	0	0	0	0	0	0.00	0.00
Ash Com-3-(160 KW)		0	0	0	0	0	0	0	0	0.00	0.00
Screw Comp-3 (160KW)		0	0	0	0	0	0	0	0	0.00	0.00
Screw Comp-4 (160KW)		1311	3713	3440	3790	3859	3743	3578	3517	3517.00	-61.00
Total service air consumption	3000	3792	3890	3700	3790	3859	3743	3578	3517	517.00	-61.00
Comp-Grand Total	4393	5427	6107	5690	5663	5859	5734	5390	5287	894.00	-103.00
Remarks		TG# 2 & Boiler -3 is under maintenance	TG# 2 & Boiler -3 is under maintenance	TG# 2 & Boiler -3 is under maintenance	TG# 2 & Boiler -3 is under maintenance	TG# 2 & Boiler -3 is under maintenance	TG# 2 & Boiler -3 is under maintenance	TG# 2 & Boiler -3 is under maintenance	TG# 2 & Boiler -3 is under maintenance		

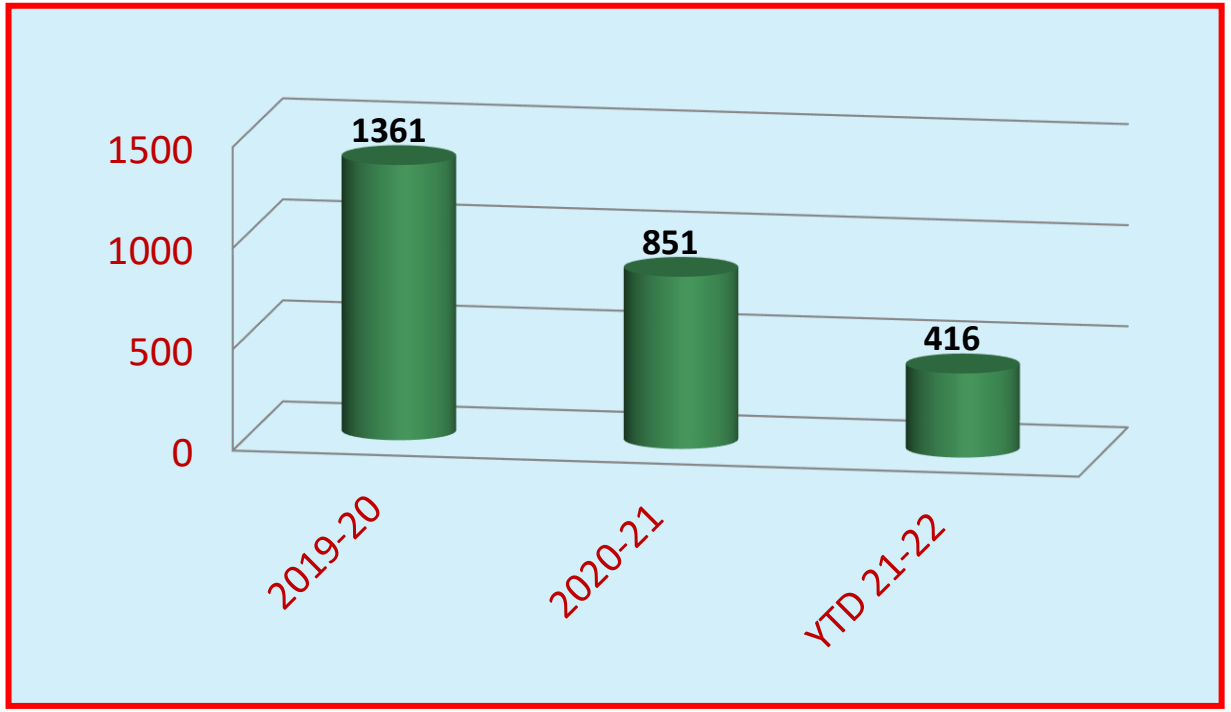
Daily Auxiliary Power Consumption Tracking

Project implementation through Kaizen

FIELD OPERATOR AND WORK MAN → CONCERN (dpt) ENGINEERS → EVALUATION TEAM → APPROVER COMMITTEE

Suggestion and kaizen steps

1st Prize in Annual Kaizen Competition Kaizen Award



Kaizen Submission

Employee Involvement

NATIONAL ENERGY CONSERVATION DAY CELEBRATION 14TH DEC'2020



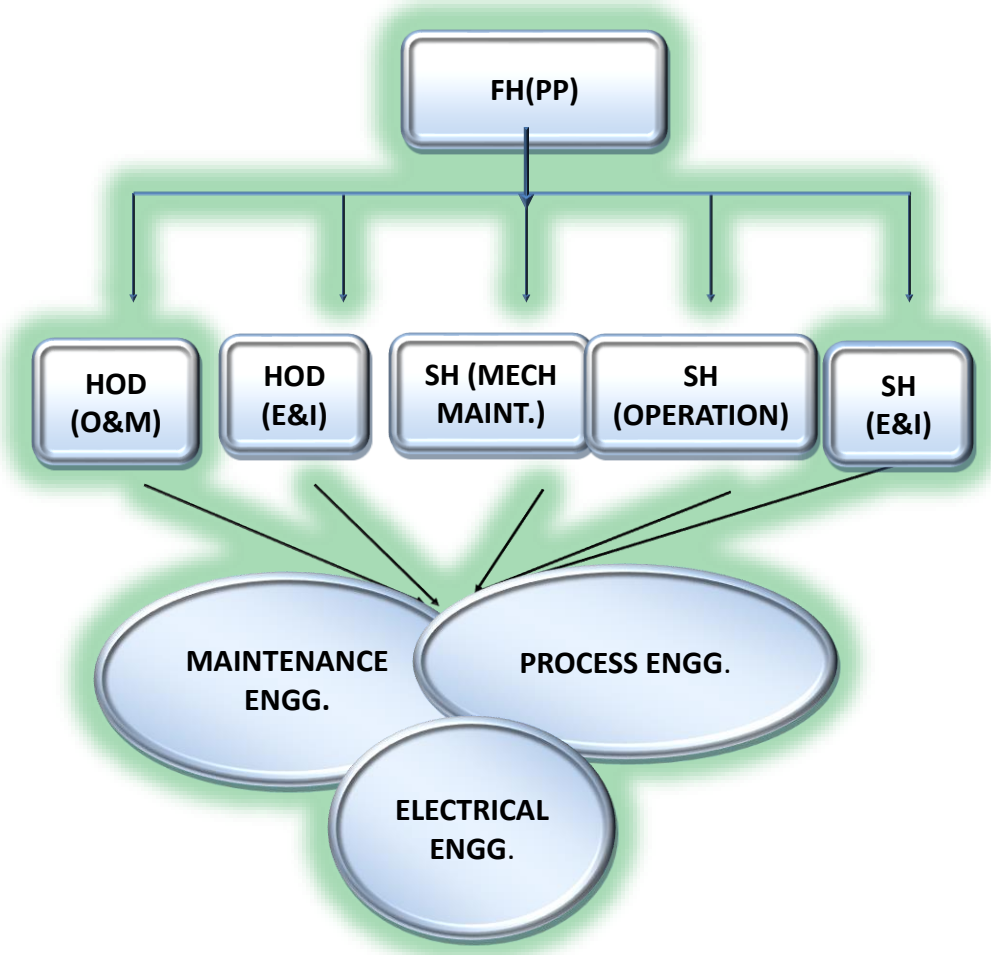
Energy Oath



Employees Using bicycle

Review meeting

- Well Established energy management cell headed by FH-PP
- Daily monitoring of Heat rate and Aux. power deviation report.
- Analysis of equipment performance for deviation.
- Identification of energy conservation scope.
- Theme base suggestions/Kaizens scheme under "Energy Saving "."Bachat scheme"
- Feasibility study of suggestions & submit proposal for sanction.
- Preparation of detail action plan.
- Benefits analysis after project implementation.



DAILY MEETING STRUCTURE

Other Best Practises

1. All meetings start with safety contact ,followed by Energy contact
2. Energy saving Thumb Rules display across the plant
3. Idea portal- Z idea
4. Ad-hoc budget of 50 Lakhs for Energy Saving
5. Teams like Bachat, PMG, Sustainers & Sanchayan
6. On the spot award & Shabbash card distribution
7. Installation of wireless trans receiver call bell with 200 mtr range at weighing station
8. Installation of remote vibration monitoring sensors in cooling water pumps for online condition monitoring
9. Installation of anemometer with alarm for generating alert during high winds for safe work practice
10. Installation of in house constructed stone removal wheel for online removal of stones, plastics from the belt conveyor without manual interruption.

Energy Conservation awareness & world Environment Day

Energy Conservation & Carbon Emission Campaign in Industry

World Environment Day Celebration

Awards

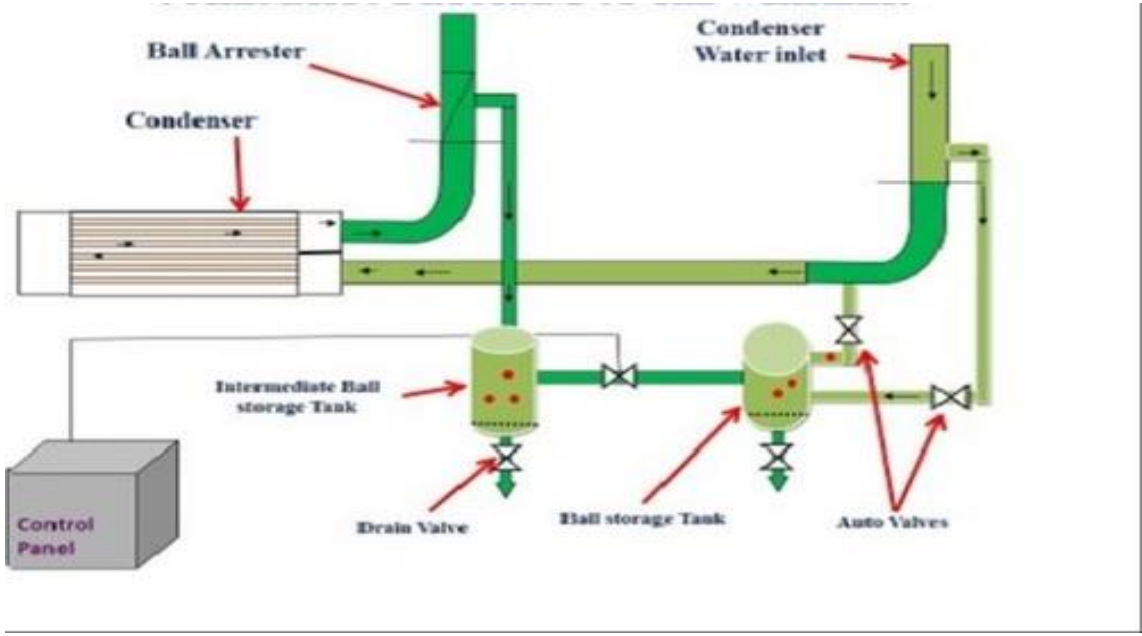
Indian Rayon CPP won Energy Efficient unit at 20th National Award for Excellence in Energy Management 2019: at Hyderabad on dated 18.09.2019

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

Learnings from CII energy awards

Installation of online cleaning system in condenser:

We have installed online ball cleaning system in condenser-2. We took trial with different ball sizes. But system has failed due to stuck-up of balls at corner points



Reviving the Boiler water treatment to improve quality & reduce cost.

Refurbishing existing flange joint valves by weld end valves to prevent frequent breakdowns

Installation of venti light pipe in new TG building

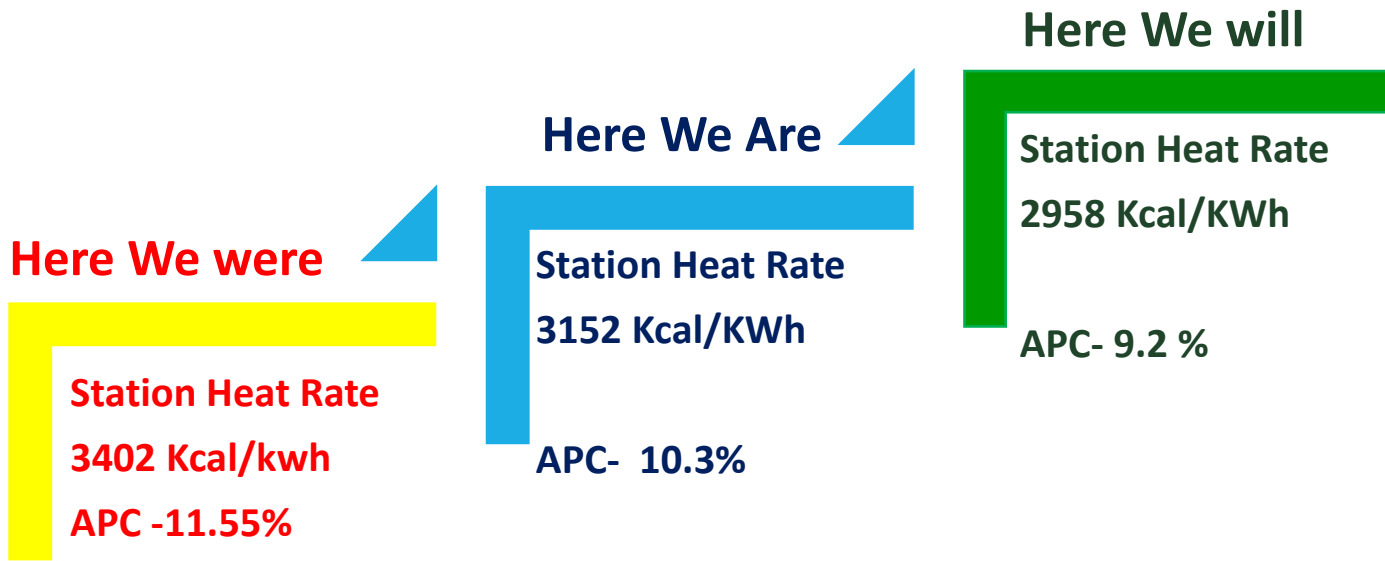
Way forward

01 Installation of new 110 TPH CFBC Boiler and stop old inefficient 2X50 TPH CFBC Boilers & 1x25 TPH stroker fired boiler.

02 Installation of water cooled BAC and utilizing its heat for heating DM water through PHE

03 Installation additional ESP field in Boiler-3 to sustains emission norms even with one field out of service

04 Installation of SOx reduction system with flue gas heat recovery system and heating DM water



Sincere Thanks..

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Power Plant

THANK YOU