



Hindalco Industries Ltd Hirakud Power

Presenters:

Mr. Rajeev Kumar- GM (Technical Services, Energy Manager)

Mr. Kailash Pradhan – GM (Operation)

Mr. Nimai Mahapatro – AVP (Operation , Energy Auditor)



1993-94



2004-05



2005-06



2006-07



2012-2013

Agenda

About Hindalco

Hirakud CPP at a Glance

Plant Performance

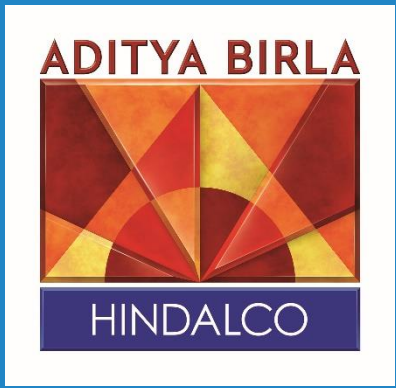
Energy Conservation Initiatives

Renewable Energy & Environmental Initiatives.

Best Practices in Plant

CSR @Hirakud

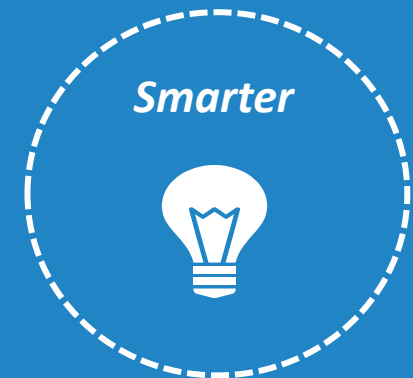
Awards & Accolades



Our Purpose

Why we exist, why we do it & what we do?

WE MANUFACTURE MATERIAL THAT MAKE THE WORLD



About Hindalco



Integrated Aluminium

- Alumina 3.9 Million TPA
- Primary Aluminium – 1.3 Million TPA
- VAP - 481 KT

Copper Major Player in India

- Copper Cathode - 376 KT
- DAP - 301 KT

Aluminium Downstream

- #1 Rolled Product Supplier Worldwide
- Shipments – 3.1 MT
- Global leader in aluminium recycler
- Focused on premium segment



Novelis
Largest aluminium FRP producer globally



Aditya & Mahan
1st quartile cost producer of Aluminium



Utkal
amongst the lowest cost producers of Alumina



One of the **largest custom copper smelter** at single location in Asia



Global operations across **11 countries**



Revenue of **USD 17 billion**

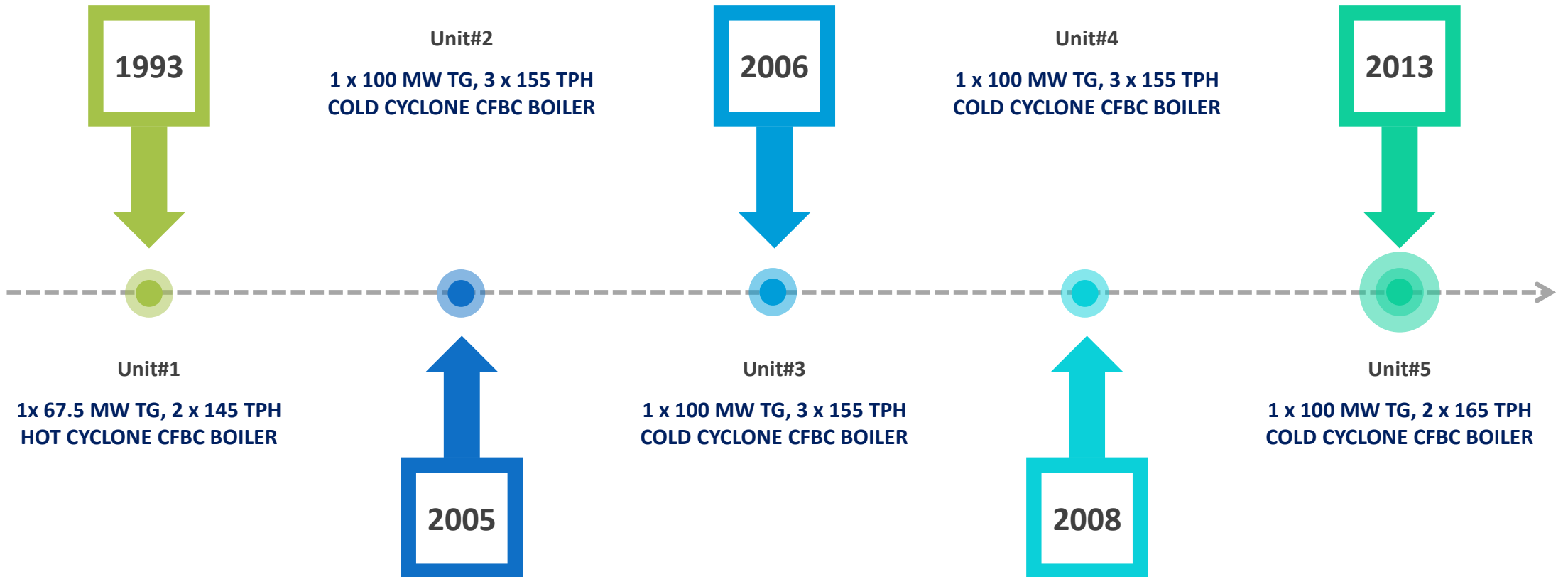


EBITDA of **USD 2.2 billion**



~35,000 employees across the world

Journey So Far



First Ever @ Hirakud



First in World (In 85 kA) to use copper in cathode lining

First in India to provide Aluminum for Hindalco's Bulkler & Freight Trailer

First CPP in Asia to install environment friendly CFBC boiler.

First CPP in India to operate complete dry ash management & disposal system

First in India to install RO based ETP

First in state for installing state of Art Polycrack Machine which converts Oil from Waste

First Time State Of The Art Technology Installed At Hirakud Smelter For Recovering Of Aluminium From Dross(hw)

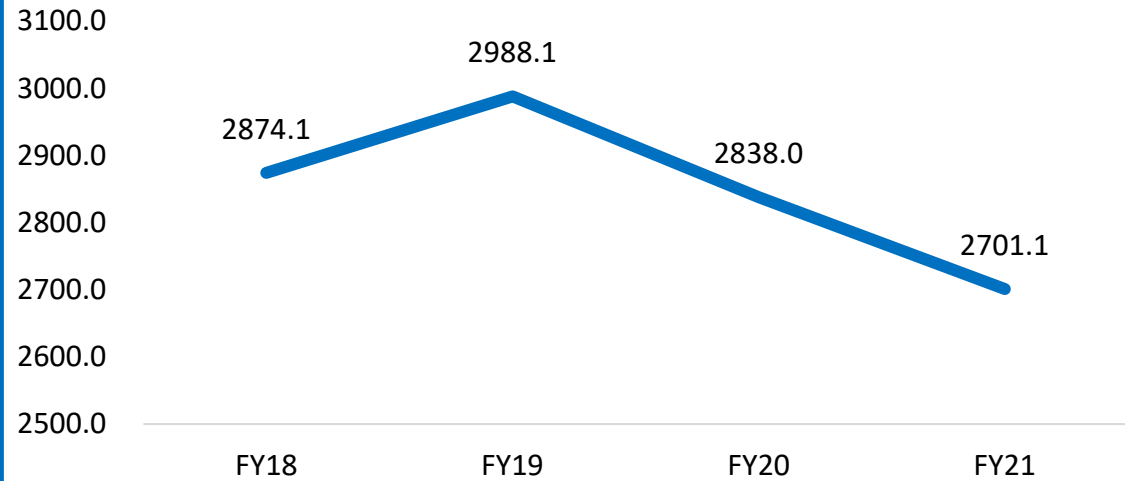
First in ABG group to install HFTR in ESP for emission Control

First in State to install online HF & ambient air monitoring system

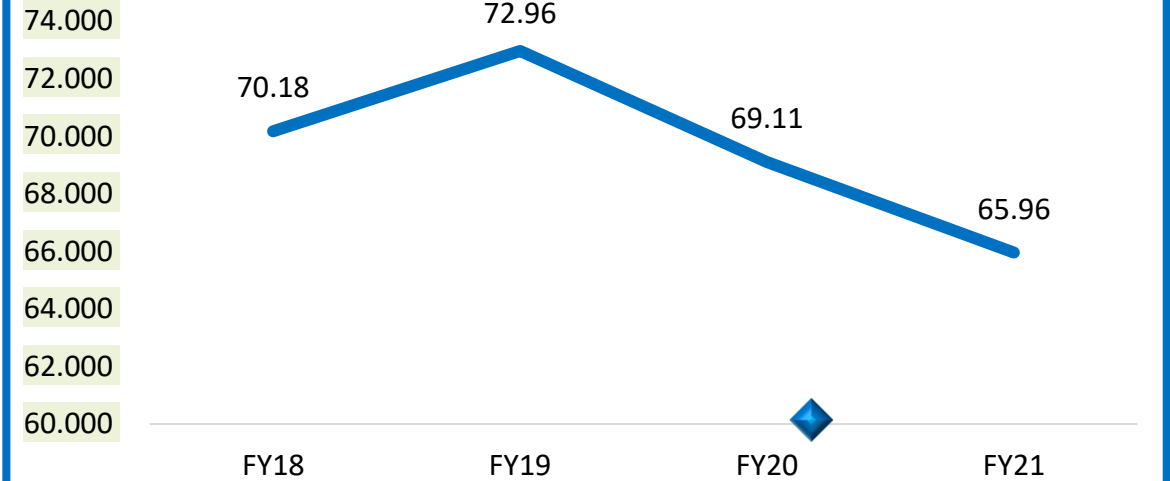
1st in Hindalco Aluminum Business to achieve ISO – 50001 Certification.

Plant Performance

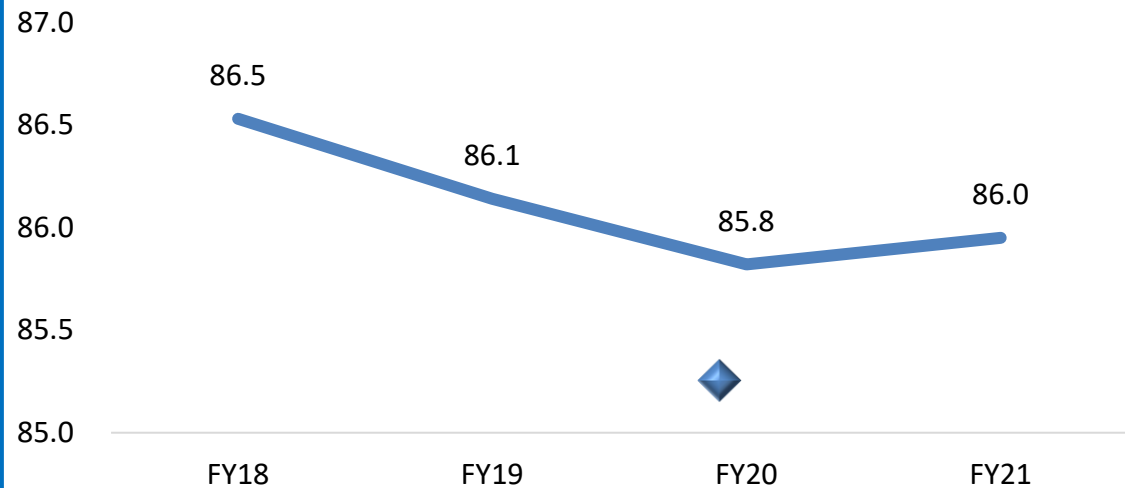
CPP – Generation (MU)



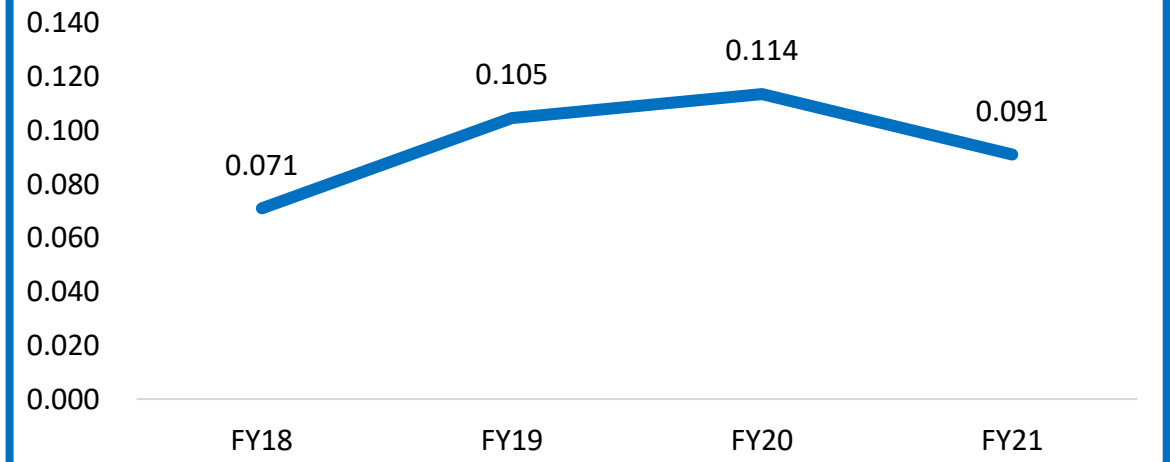
Plant Load Factor (%)



Boiler Efficiency (%)

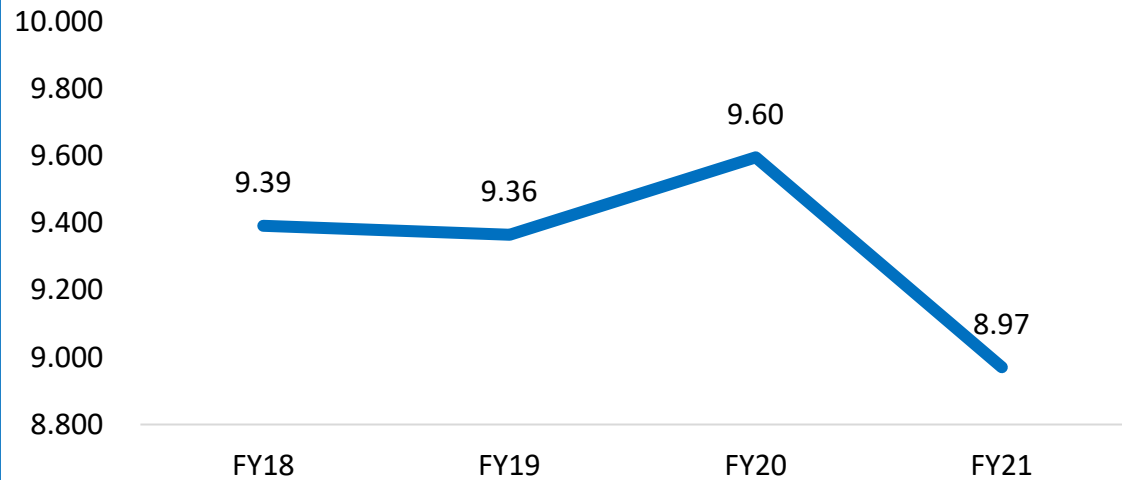


Sp.Oil Cons. (ml / kWh)

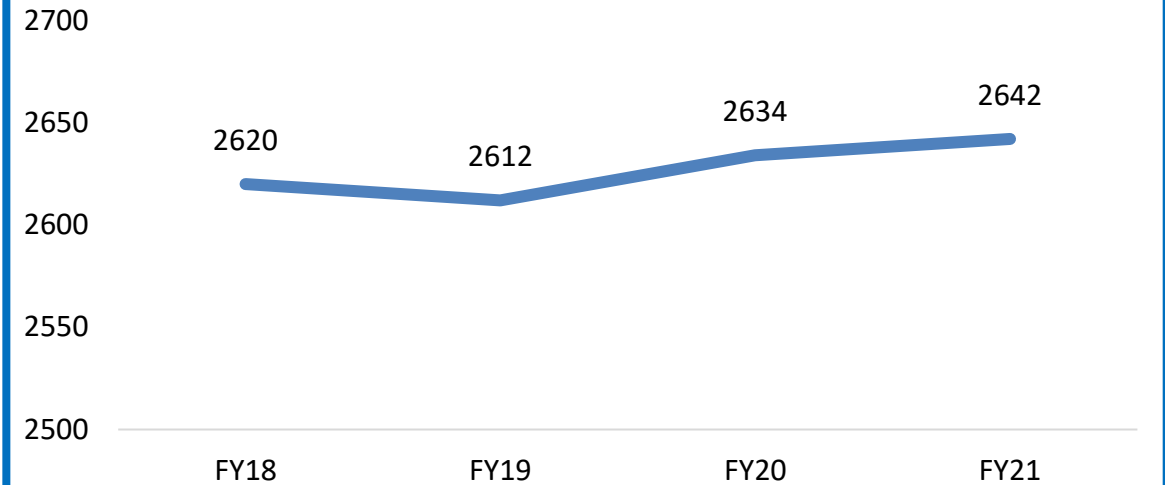


Plant Performance

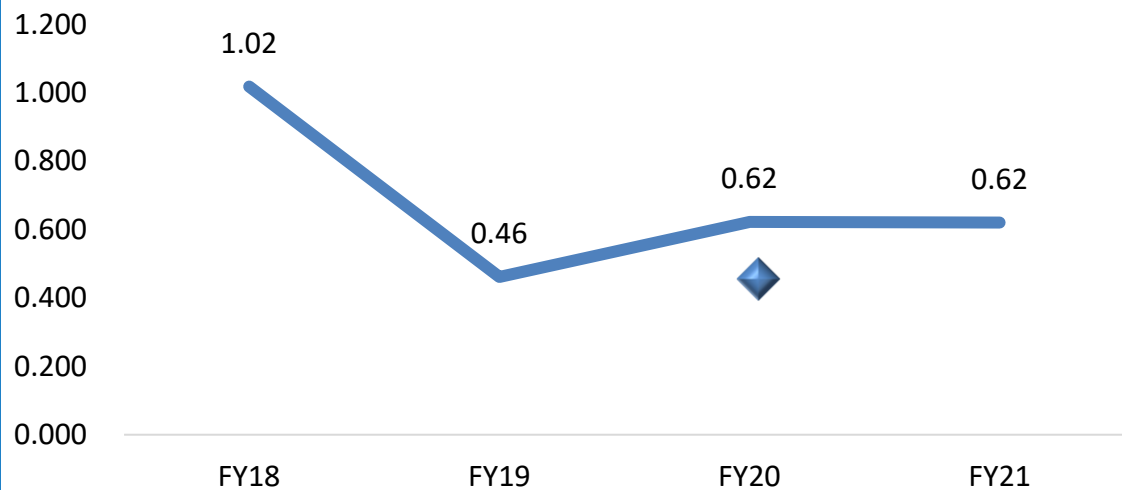
Auxiliary Energy Cons. (%)



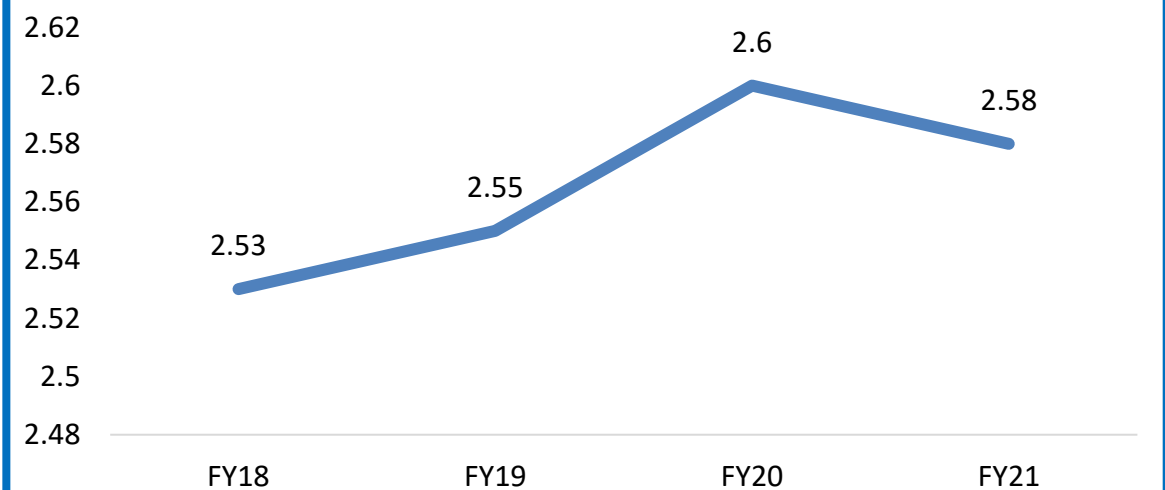
Plant Heat Rate (kCal / kWh)



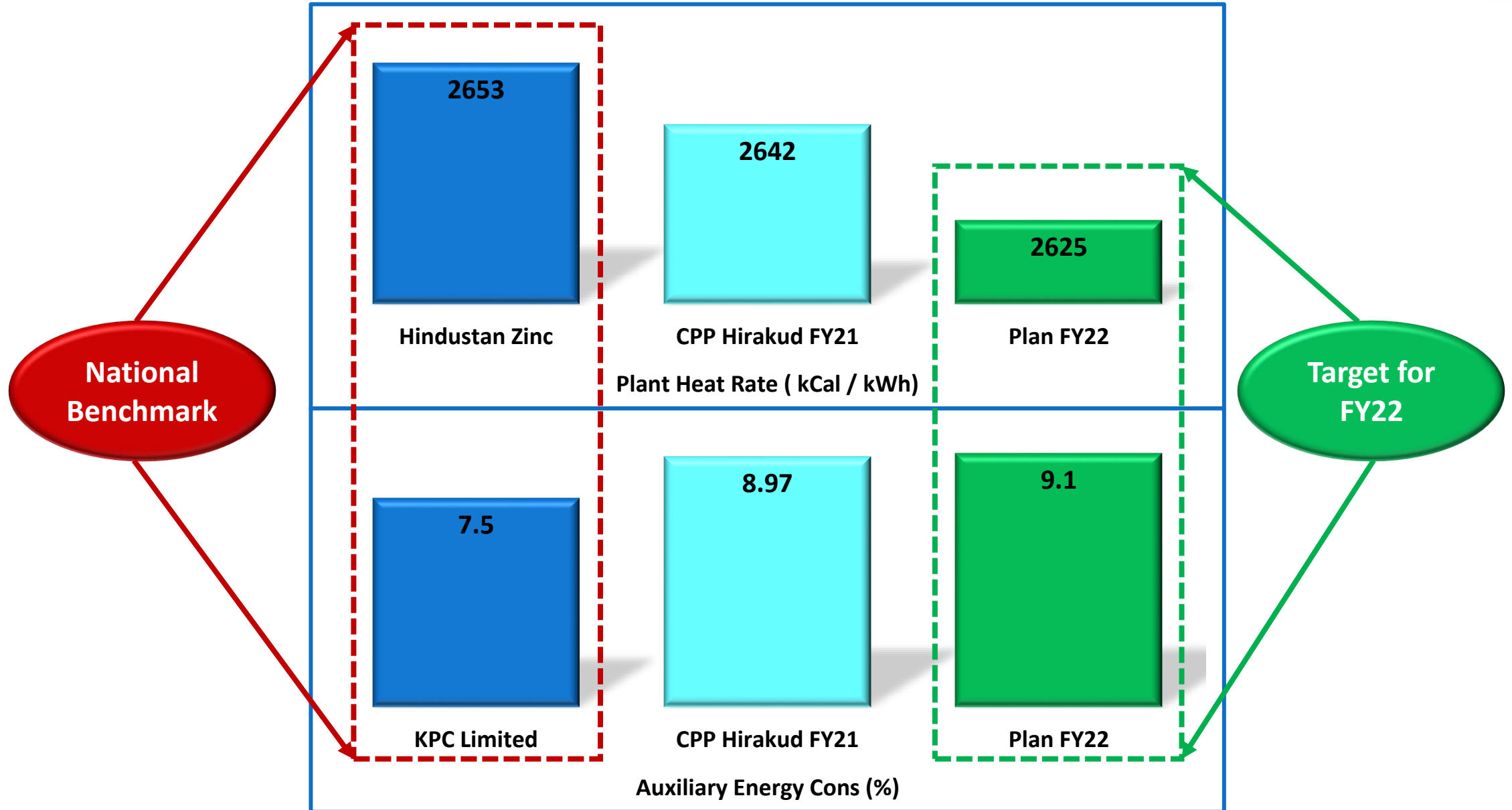
DM Water Cons.(%)



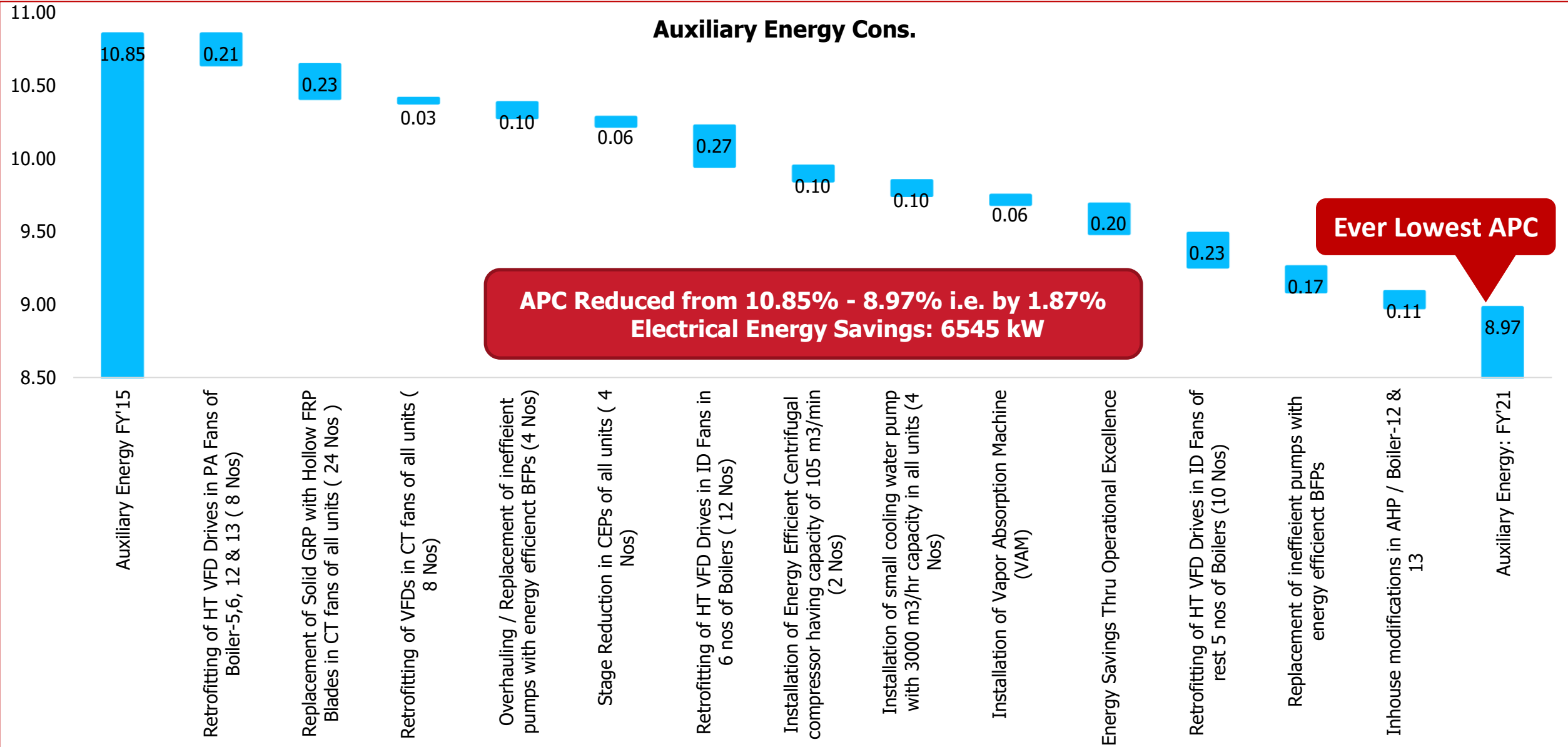
Raw Water Cons (Lit / kWh)



Benchmarking



Our Encon Journey in APC Projects:



Encon Projects Implemented – FY'18:



Auxiliary Energy Improvement Initiatives: FY'18

SL.No	Initiatives	Execution Month	Annualized Electrical Energy Savings	Annualized Cost Savings	Cost Involved (Rs in Cr.)	Remarks
			MU	Rs in Cr.		
1	Stoppage of 2 nos of Cooling water pumps for part load operation of units.	Apr'17-Aug'17	4.70	1.79	Nil	
2	Removal of one stage in condensate extraction pump of Unit-5, CEP-1	Apr'17	0.31	0.12	0.00	
3	Installation & replacement of less efficient M/s Sulzer make pump with M/s KSB make BFP pump in 4 BFP-3 under the supervision of OEM	May'17	0.59	0.22	0.80	
4	Installation of Centrifugal compressor having capacity of 105 m3/min 2 nos (Phase-I)	May'17	1.15	0.44	1.75	
5	Retrofitting VFD in 2 number of ID fans in Blr 6.	Jul'17	0.89	0.34	1.11	
6	Stoppage of a set of ID fans & SA Fans in Boiler-9	Jul'17	0.15	0.06	Nil	
7	1 no.of stage removal (Out of 4 nos) in 4-Condensate Extraction Pump-1	Aug'17	0.37	0.14	0.00	
8	Retrofitting VFD in 2 number of ID fans in Blr 8.	Aug'17	0.94	0.36	1.11	
9	Retrofitting VFD in 2 number of ID fans in Blr 7	Oct'17	0.69	0.26	1.11	
10	Stoppage of 4 nos of Cooling Water pump in unit-2, 3,4,5 for winter impact / Part load operations	Nov'17- Mar'18	8.62	3.27	Nil	
11	Stoppage of 4 nos of Cooling tower fans in Unit-2,3,4 & 5 for winter impact	Nov'17- Feb'18	0.72	0.27	Nil	
12	Stoppage of a set of ID fans & SA Fans in Boiler-5	Nov'17-Feb'18	0.31	0.12	Nil	
13	Suction Header of Unit#4 and Unit#5 Raw Water discharge pump modification from 450 NB to 600 NB, resulted in Stoppage of Unit #3 Raw Water Pump	Jan'18	0.12	0.05	0.01	
14	Installation of small cooling water pump with 3000 m3/hr capacity (2 CWP-1)	Dec'17	0.09	0.03	0.70	
15	Retrofitting VFD in 2 number of ID fans in Blr 9	Feb'18	0.09	0.04	1.11	
16	Retrofitting of HT VFD drive in Unit-3, CEP-1	Mar'18	0.01	0.00	0.50	
17	Installation of Centrifugal compressor having capacity of 105 m3/min 2 nos (Phase-II)	Mar'18	0.08	0.03	1.75	
Totalized Savings:			19.81	7.53	9.94	

Encon Projects Implemented – FY'19:

Auxiliary Energy Improvement Initiatives: FY'19

SL.No	Initiatives	Execution Month	Annualized Electrical Energy Savings MU	Annualized Cost Savings Rs in Cr.	Cost Involved(Cr.)	Remarks
1	Retrofitting of HT VFD drive in Unit-3, CEP-1	Mar'18	0.317	0.13	0.45	
2	Stoppage of 3 nos of Cooling Water Pumps for Partial Load operations in TG-2,4 & 5.	Apr-May	2.660	1.06	Nil	
3	Stoppage of 2 nos of Cooling water pumps for Partial load operations in TG-2 & 4	Jun'18	1.812	0.72	Nil	
4	Retrofitting of variable frequency drives in Induced Draft Fans 11A & 11B by replacing of existing hydraulic coupling in Boiler-11	Apr'18	1.065	0.43	1.110	
5	Retrofitting of variable frequency drives in Induced Draft Fans 10A & 10B by replacing of existing hydraulic coupling in Boiler-10	May'18	0.534	0.21	1.11	
6	Retrofitting of HT VFD Drives in 2 CEP-2	May'18	0.310	0.12	0.45	
7	Retrofitting of HT VFD Drives in 4 CEP-2	May'18	0.504	0.20	0.45	
8	Replace M/s Sulzer make Unit#3 BFP-1 with M/s KSB make because of low discharge flow and high Aux. Power Consumption	May'18	0.547	0.22	0.80	
9	Retrofitting of HT VFD Drives in 5 CEP- 2	Jun'18	0.088	0.04	0.45	
10	Operation of single BFP (Instead of 2 BFPs) in Unit-3 for Partial Load operations of TG	Aug'18	1.123	0.45	Nil	
11	Installation of small cooling water pump with 3000 m3/hr capacity (2 CWP-1)	Dec'17	0.329	0.13	0.500	
12	Stoppage of 1 no of CWP in TG Side as per Operational requirements & to meet Generation Demand after 5 nos of Boiler failures	Oct'18	1.110	0.443	Nil	
13	Stoppage of 1 no of CT fan thru out the day and an additional CT fans in night for Unit 235	Nov'18	0.108	0.043	Nil	
14	Stoppage of CWP in Unit-2 & 4 for Partial load operations (Before TG-4 SSD)	Nov'18	0.310	0.124	Nil	
15	Stoppage of 2 nos of CT Fans each in Unit-2,3,4,5 for winter impact	Dec'18 - Jan'19	0.893	0.357	Nil	
16	Installation of Small CW Pump of Capacity 3000 m3/hr in 4 CW Pump-1	Dec'18	0.434	0.173	0.50	
17	Stoppage of 1 CWP in Unit-2,3 & 5 for partial load operations / Winter Impact	Dec'18 / Jan'19	2.187	0.874	Nil	
18	Installation of small capacity pump of capacity 3000 m3.hr in 5 CW Pump-3	Jan-19	0.138	0.055	0.50	
19	Stoppage of 1 CWP in Unit-2,3,4,5 for partial load operations / winter impact	Jan'19	1.044	0.417		
20	Modified M/s KSB Make Pump with 11 stages instead of existing 12 stages in 2 BFP-3	Feb'19	0.053	0.021	0.13	
21	Retrofitting of variable frequency drives in Induced Draft Fans 13A & 13B by replacing of existing hydraulic coupling in Boiler-13	Mar'19	0.050	0.020	0.45	
22	Installation of small capacity pump of capacity 3000 m3.hr in 3 CW Pump-3	Mar'19	0.170	0.068	0.50	
Totalized Savings:			15.79	6.31	7.40	

Encon Projects Implemented – FY'20:



Auxiliary Energy Reduction Initiatives: FY'20

SL.No	Initiatives	Execution Month	Annualized Electrical Energy Savings MU	Annualized Cost Savings Rs in Cr.	Cost Involved(Cr.)	Remarks
1	Retrofitting of HT VFD drives in ID Fans of Boiler-12B by replacing the existing hydraulic couplings	Apr'19	0.385	0.146	0.60	
2	Stoppage of 1 CWP in either Units-2,3,4 & 5 as per operation requirements for Partial load operations of TGs	Apr'19 - Dec'19	4.488	1.705	0.00	
3	VFDs installed in CCCW Pump of Unit-2	Jul'19	0.051	0.019	0.10	
4	VFDs installed in CCCW Pump of Unit-3	Jul'19	0.034	0.013		
5	Retrofitting of HT VFD drives in ID Fans of Boiler-4 by replacing the existing hydraulic couplings	Sept'19	0.339	0.129	1.20	
6	Retrofitting of HT VFD drives in ID Fans of Boiler-5 by replacing the existing hydraulic couplings	Nov'19	0.305	0.116	1.20	
7	Replacement of Inefficient M/s - Sulzer Make pump by energy efficient M/s-KSB Make pump with stage reduction in 3 BFP-2	Nov'19	0.141	0.054	0.70	
8	Operational Excellence thru Stoppage of 2 nos of CT Fans in Unit-2,3,4 & 5 for seasonal benefit	Nov'19	0.426	0.162	0.00	
9	Operational Excellence thru Stoppage of CT Fans in Unit-1, 4 & 5 for seasonal benefit	Dec - Feb	0.474	0.180	0.00	
10	Replacement of Inefficient M/s - Sulzer Make pump by energy efficient M/s-KSB Make pump with stage reduction in 5 BFP 1	Jan'20	0.402	0.158	0.70	
11	Retrofitting of HT VFD drives in ID Fans of Boiler-3 by replacing the existing hydraulic couplings	Jan'20	1.548	0.588	1.20	
12	"Providing Clarified return from unit - 2 & 3 bed ash coolers as make up for unit - 1 cooling tower."	Feb'20	0.010	0.004	0.00	
Totalized Summary			8.60	3.27	5.70	

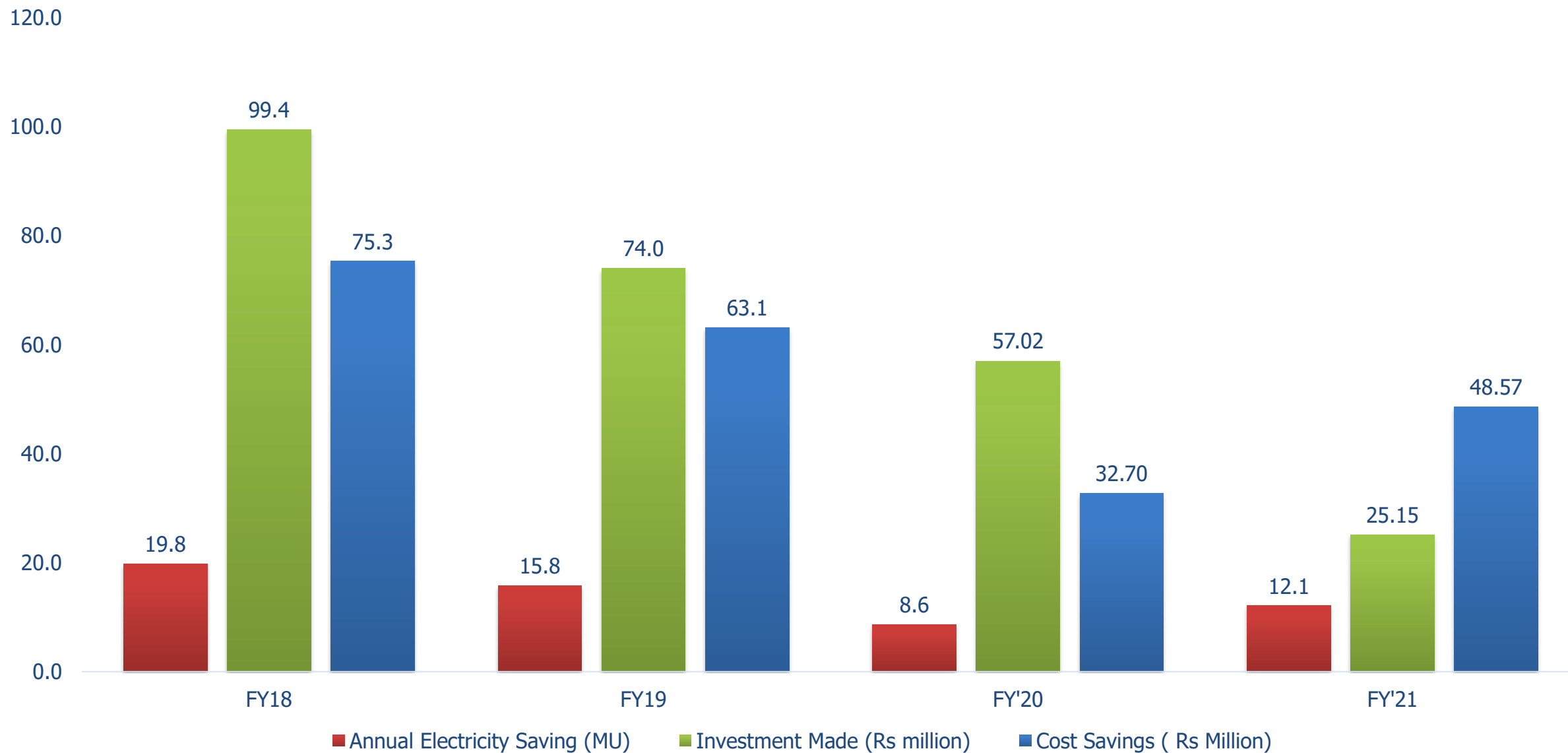
Encon Projects Implemented – FY'21:



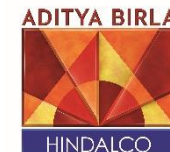
Auxiliary Energy Reduction Initiatives: FY'21

SL.No	Initiatives	Execution Month	Annualized Electrical Energy Savings MU	Annualized Cost Savings Rs in Cr.	Cost Involved(Cr.)	Remarks
1	Direct Unloading of Ash by providing a 200 NB bypass drain line with plate valve and thereby stopping the pneumatic conveying of ash has resulted in stoppage of 2 nos of CAC Compressors for 8 Hrs in a day in Unit-1,2,3 & Unit-4 & 5 Cluster	5th May'20	0.461	0.18	0.006	
2	Isolation valve provided at SA Air line outlet of SA Receiver in Unit-4 & 5	30th May'20	0.788	0.32	0.002	
3	Retrofitting of HT VFD drives in ID Fans of Boiler-12A by replacing the existing hydraulic couplings	6th Jun'20	0.411	0.16	0.691	
4	stopping Instrument air supply to syphon after carrying out modifications in nozzle area of Boiler-12 & thereby reduction in APC of IA Compressors un Unit-4 & 5	Jun'20	0.301	0.12		
5	eliminating use of Instrument air supply to syphon after carrying out modifications in nozzle area of Boiler-12 & 13.	Jul'20	0.724	0.29	0.006	
6	Boiler-12 Aux. Maintenance including identification of damaged APH / Air Ingress across APH / System, Post PG test evaluations	Nov'20	0.330	0.13	0.143	
7	Boiler-8 HT VFD Drives in both PA Fans & Auxiliary Maintenance (8A was in bypassed condition earlier)	Nov'20	0.292	0.12	1.058	
8	Stoppage of 2 Nos of CT fans in Each Units (Unit-345) for seasonal benefit	Nov'20 - Mar21	1.674	0.67	0.0	
9	Operation of 1 big (7500 m3) and 1 small (3000 m3) in Unit-345 for seasonal benefit	Nov'20 - Mar21	4.458	1.78	0.0	
10	Operation Of TG-1 @ Part load (26 MW) without CT fans in service	Nov'20 - Jan21	0.353	0.14	0.0	
11	Stoppage of 3 Nos of CT fans in Each Units (Unit-345) for seasonal benefit	Dec20 - Feb21	1.996	0.80	0.0	
12	Replacement of old BFP with energy efficient BFP in 5 BFP-1	Feb'21	0.298	0.12	0.77	
13	3rd Phase commissioning of VAM in Unit-123 Cluster	Feb'21	0.006	0.00	0.0	
14	Boiler-10 Aux. Maintenance including identification of damaged APH / Air Ingress across APH / System, Post PG test evaluations	Mar'21	0.050	0.02	0.04	
Totalized Summary			12.14	4.86	2.72	

Journey Towards Energy Conservation:



Encon Projects Implemented / Way Forward – FY'22:

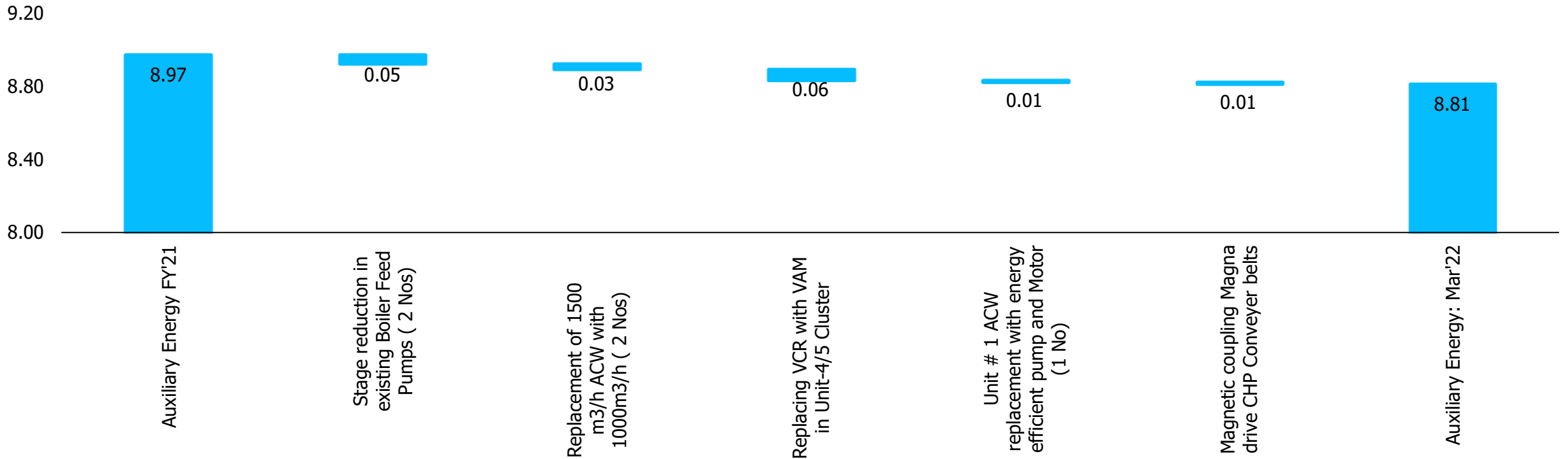


SI No	Details of Major Projects (Completed)	Responsibility	Investment (Rs in Crs)	Savings (kW)	Execution Month
1	Replacement of Old BFP with energy efficient KSB Make Boiler Feed Pump in 4 BFP-2	Deepak Singh	0.77	240	Apr'21 (Comp)
2	Stage reduction in existing Boiler Feed Pump 2 of Unit-2	Deepak Singh	0.02	80	Apr'21 (Comp)
3	Retrofitting of HT VFD drive in Unit-1 CEP	Anshu Babu	0.50	45	May'21 (Comp)
Annualized Savings			1.29	365	

SI No	Details of Major Projects (Way Forward)	Responsibility	Investment (Rs in Crs)	Expected Savings (kW)	Execution Month
1	Stage reduction in existing Boiler Feed Pump 3 of Unit-1	Deepak Singh	0.02	80	Ongoing
2	Stage reduction in existing Boiler Feed Pump 4 of Unit-3	Deepak Singh	0.02	80	Ongoing
3	Replacement of 1500 m3/h ACW with 1000m3/h (2 nos)	Deepak Singh	0.40	90	Sept'21
4	Replacing VCR with VAM in Unit-4/5 Cluster	Rajeev Ranjan / Deepak Singh	3.0	200	Jun'22
5	Unit # 1 ACW replacement with energy efficient pump and Motor (1 No)	Rajeev Ranjan / Deepak Singh	0.30	28	Mar'22
6	Magnetic coupling Magna drive CHP Conveyer belts	Nagendra Thakur	0.22	30	Dec'21
7	Unit # 1 BFP replacement with energy efficient pump and Motor(1 no)	Rajeev Ranjan / Deepak Singh	2.2	180	Mar'23
Annualized Savings:			6.16	688	

Proposed APC:

Auxiliary Energy Cons.



In the Current FY,
We have Proposal to:

Execute 6 nos of Major Energy
Savings Projects.

Reduce Overall Absolute Energy
Cons by 508 kW i.e. by 0.16 %

Invest Rs 3.96 Crs in achieving
improvement in APC.

Short Term: Heat Rate Improvement Initiatives

SI No	Initiatives	Expected Improvement in Heat Rate	Execution Month	Remarks
1	Unit-4 Short Shut down for Auxiliary Maintenance & execution of Condenser Water Jet Cleaning, HPH-5 short circuit rectification & HPBP Passing Issues & rectification	10.1	20 th Aug – 30 th Aug	Under Progress
2	Unit-5 Short Shut down for Auxiliary Maintenance & execution of Condenser Water Jet Cleaning & HPBP Passing Issues & rectification	21.0	2 nd Sept-10 th Sept	
3	Unit-3 Short Shut down for Auxiliary Maintenance & execution of Condenser Water Jet Cleaning, HPBP Passing Issues & rectification and HPH-4 Short Circuit Rectification	17.4	15 th Sept – 25 th Sept	
4	Capital Overhauling of TG-2	116	Oct'21 – Nov'21	
5	Capital Overhauling of TG-5	54	Feb – Mar'22	
Annualized Savings		218.5		

Glimpse: TG-1 Renovation & Modernization

Existing Turbine is Impulse Reaction Turbine which has 1 Control Stage & 43 Reaction Stages comprising of HP Flow in one direction & LP flow in Reverse direction.

Proposed Turbine will be fully (**44 Stages**) Reaction turbine to increase Isentropic Efficiency.

The Reaction type blades will help to lower rates of water droplet erosion since steam velocity and the extent of steam deflection are relatively low.

The exiting 1st stage Partial Arc Steam admission section will be modified to Full Arc Steam admission for minimizing of throttling losses leading to improved Efficiency & better Heat Rate.

The New Design will facilitate improved Steam flow path clearances by using New Sealing arrangements i.e. Brush Seal.

Glimpse: TG-1 Renovation & Modernization



Unit-1 Existing 67.5 MW Turbine Rotor

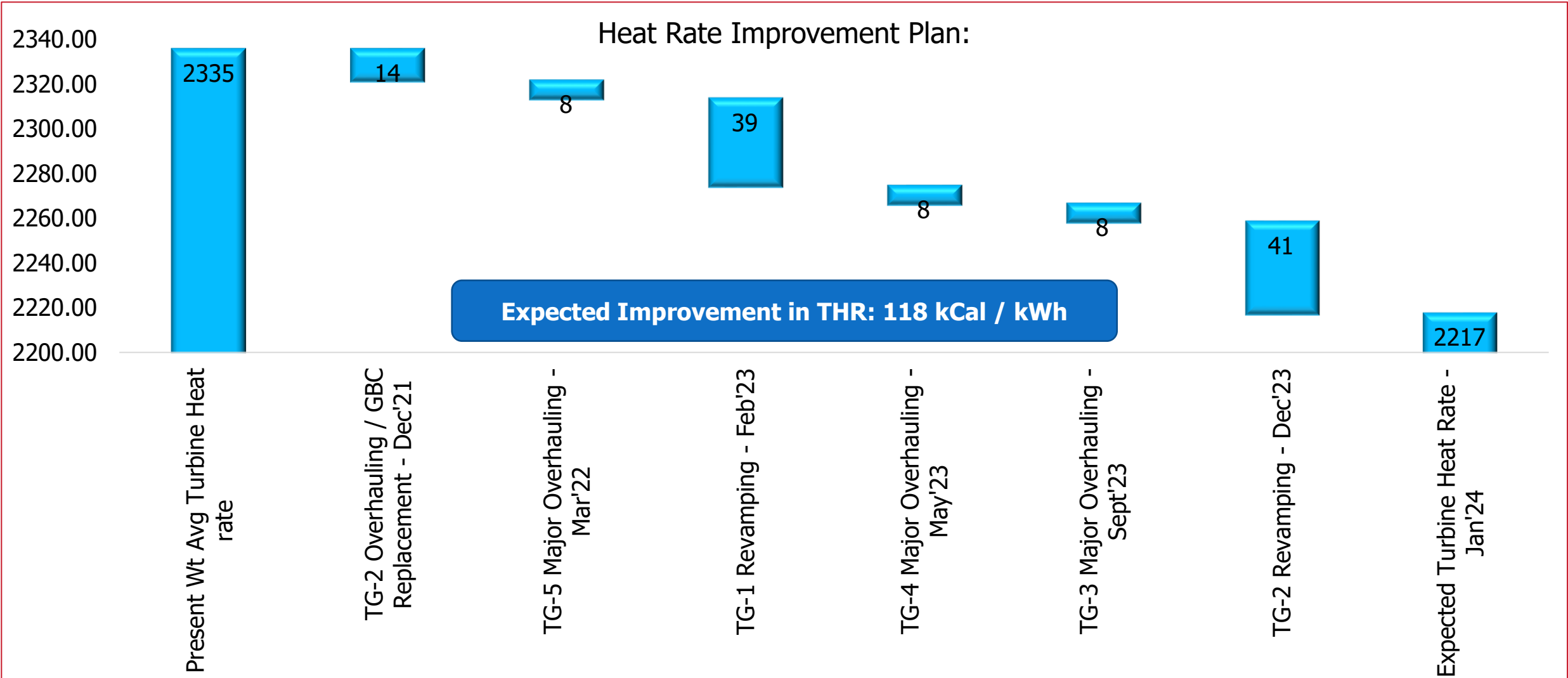


Unit-1 Proposed 77 MW Turbine Rotor

Long Term: Heat Rate Improvement Initiatives

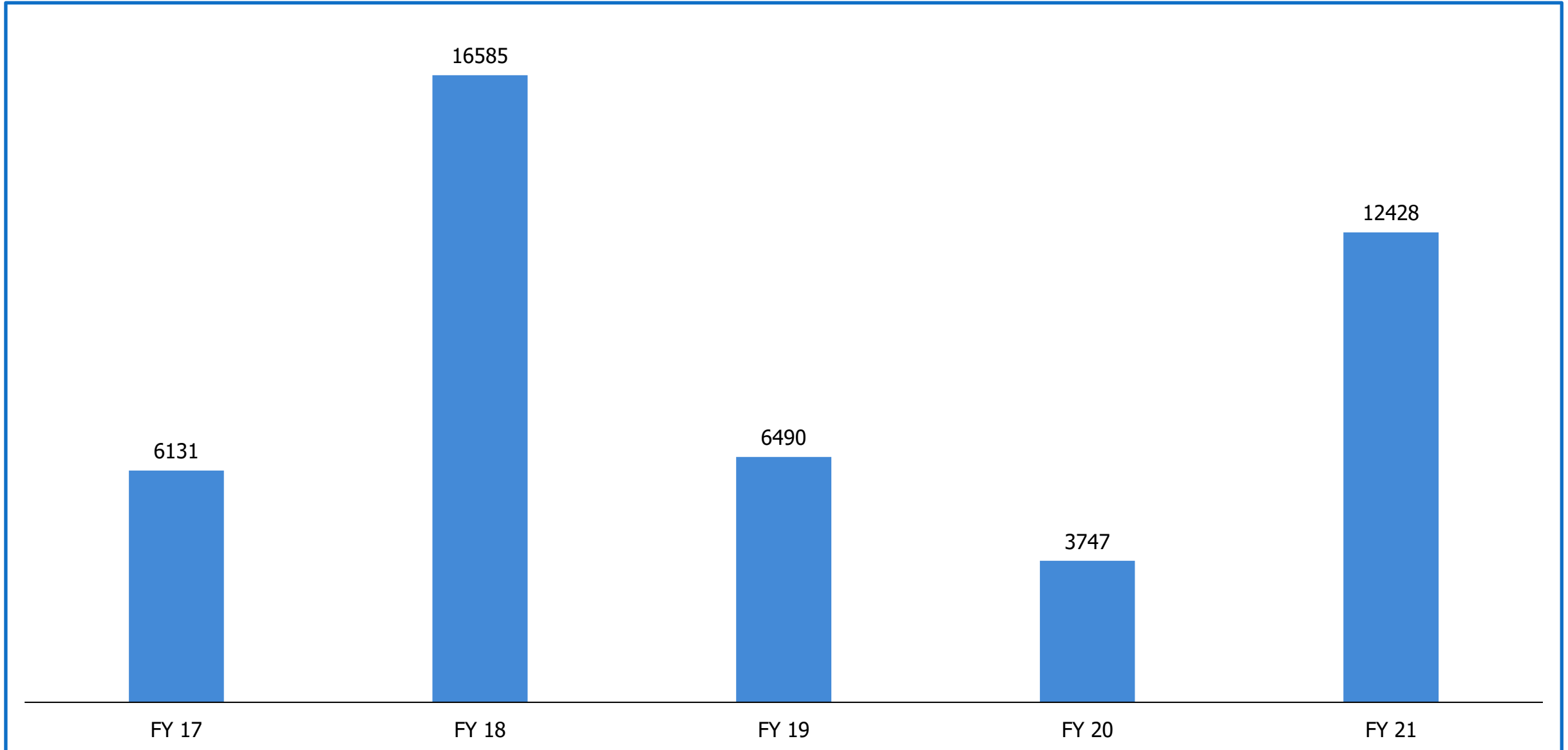
S.N	Unit	Activity	Target Date	Capital Investment (Rs in Crs)	Expected Heat Rate (After MOH and R &M)
1	TG #2	Major Overhauling	Oct-Nov'21	9.97	2291 Kcal/Kwh
2	TG #5	Major Overhauling	Feb'22	7.63	2290 Kcal/Kwh
3	TG#4	Major Overhauling	Oct'22	5.5	2295 Kcal/Kwh
4	TG#3	Major Overhauling	Oct'23	5.5	2250 Kcal/Kwh
5	TG#1	Renovation & Modernisation	Feb'23	40.0	2146 Kcal/kwh
6	TG#2	Renovation & Modernisation	Jan'24	50.0	2145 Kcal/Kwh

Expected THR:

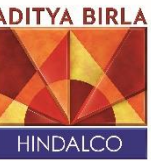


Expected Plant Heat Rate by Jan'24: 2569 kCal / kWh.

Use of Alternative Fuel – Rice Husk (MT / Annum)



Innovative Project: Addition of ECO-1 Coil in Blr-12 & 13



Introduction:

Unit#5, 100 MW unit had been commissioned in June 2013. There are 2X 165 TPH CFBC Boilers (Boiler#12 & Boiler#13) are feeding steam to 100 MW TG set. These two Boilers are connected to Unit#4 Boilers through Feed Water as well as steam side interconnection. Since commissioning, both the Boilers (Boiler#12 & 13) were having high dry flue gas temperature (155-162 Deg C) while leaving Air Heater of Boiler. This was resulting in high dry flue gas loss in Boiler efficiency and causing more coal consumption compared to other Boilers.

Technical Details			
S. N	Parameters	UOM	Boiler#13
1	Make		CFBC
2	Type		Cold cyclone
3	MS Flow	TPH	165
4	MS Temp @ Boiler outlet	Deg C	515
5	MS Pressure @ Boiler outlet	Kg/cm2	90.2
6	Flue gas Temperature @ AH Outlet (Design)	Deg C	140
7	Flue gas Temperature @ AH Outlet (Actual)	Deg C	155-162

Project Description

HIL Technical Team started discussion with OEM i.e M/s TKIIPL to resolve the high temperature of exit flue gas from Air heater. In spite of several efforts from both HIL and TKIIPL teams, the issue could not be resolved. Then Technical Team suggested M/s TKIIPL to check the possibility of adding extra ECO-1 coil in both the Boilers. The suggestion was based on study of water, steam and flue gas temperature profile study and finding space availability in Economiser block. After several technical discussions, M/s TKIIPL agreed to adding extra ECO-1 coil to the Boiler #12 and Boiler#13.

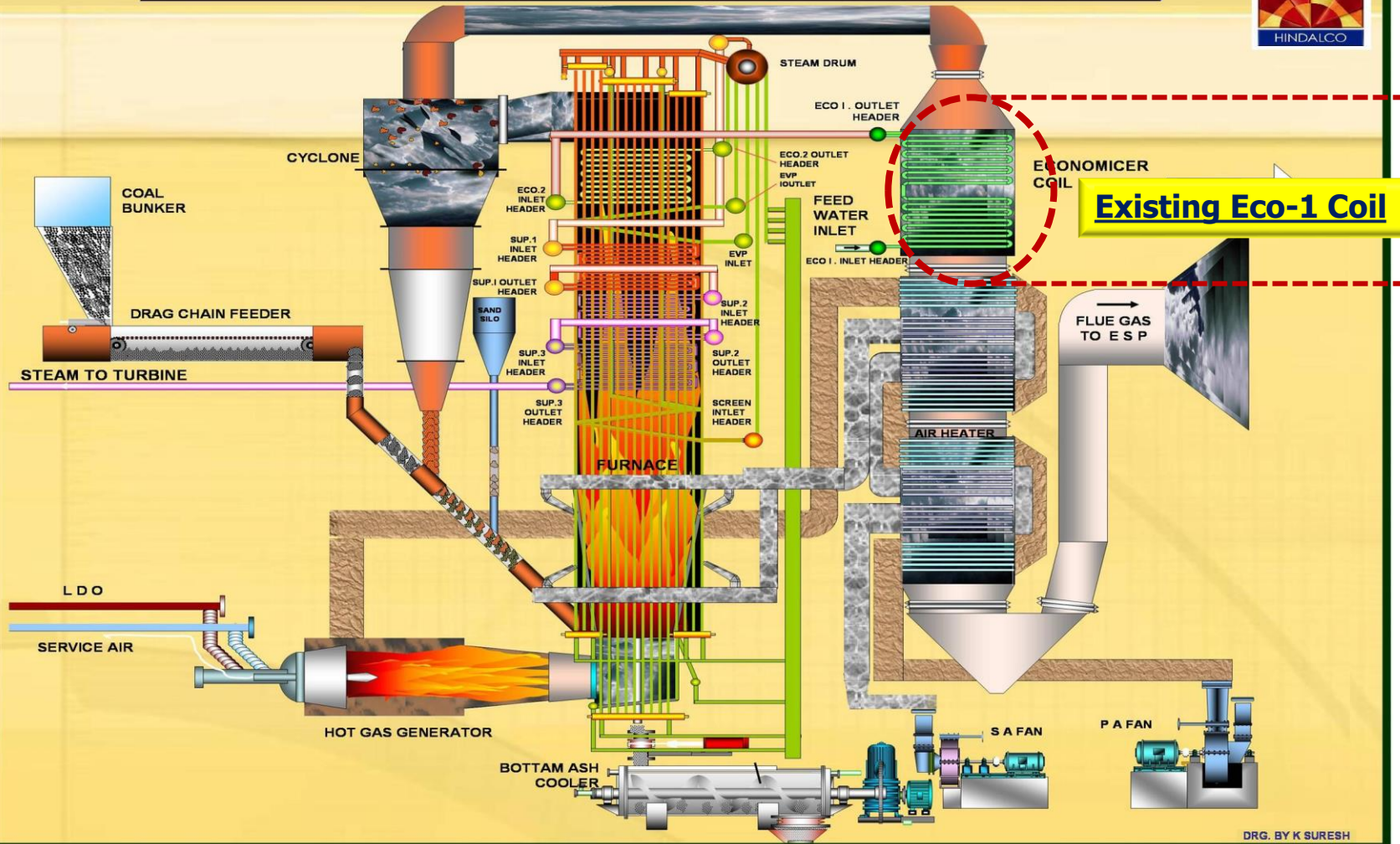
Project Execution:

Based on successful techno-commercial discussion, the PO was placed to OEM i.e M/s TKIIPL to add extra ECO-1 Coil to the Boiler #12 and Boiler#13 through PO No. P/PO/NBN/1920/0095 and P/PO/SRV/1920/0809dt 23Dec 2019 and 30th Dec 2019 respectively. According the Coil addition was done during the planned overhauling of Boiler#13 from 22nd Dec 20 to 19th Jan 21.

Innovative Project: Addition of ECO-1 Coil in Blr-12 & 13

Addition of ECO-1 Coil in Boiler#12/13 for reduction in Back End Temp.

HINDALCO HIRAKUD POWER 165 TPH BOILER PROCESS



Existing Eco-1 Coil

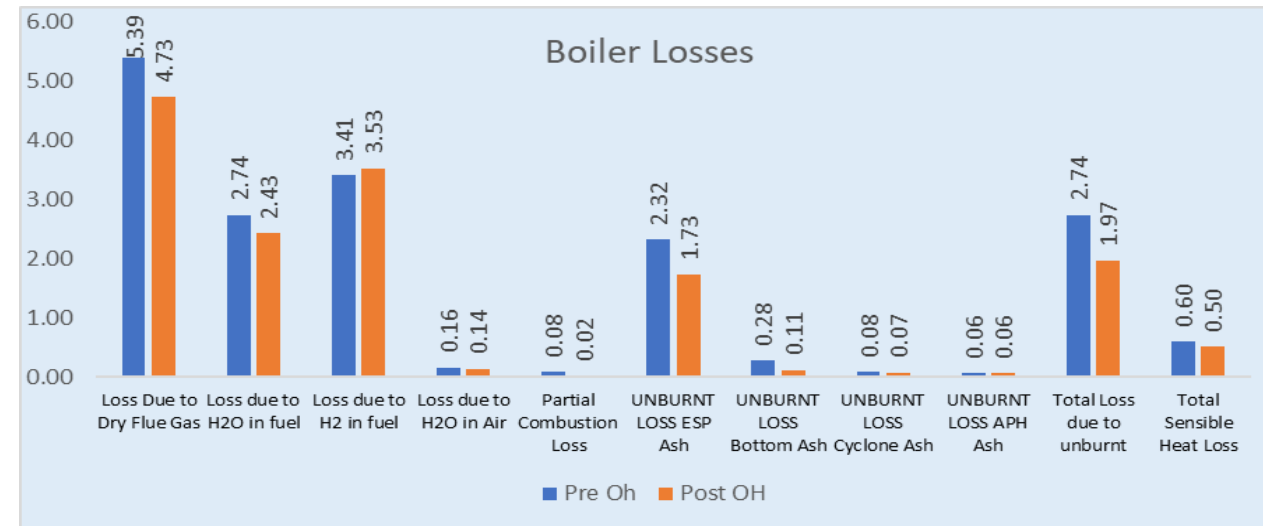
Innovative Project: Addition of ECO-1 Coil in Blr-12 & 13

(Considerations: @ Same Load @ 159 TPH, GCV / Moisture Corrections.

- APH exit Flue gas temperature reduced to **143 Deg C** from **157 Deg C**.
- Dry flue gas loss reduced by **0.67 %**.
- The dry flue gas loss for before coil addition was 5.39 % which was higher than design dry flue gas loss of 4.43%. Now, dry flue gas loss reduced to 4.73 % which is nearer to design value.
- The unburnt carbon loss in fly ash was (2.32 %) on the higher side as compared to design loss (1.43%). After overhauling, the loss reduced to 1.73 %.
- Overall Boiler Efficiency increases by **1.31 %** in which contribution of Coil addition is **0.67 %** whereas contribution of overhauling is **0.64 %**
- APH Leakage is satisfactory.
- Benefits in Power consumption by **153.6 KW**.
- Overall Heat Rate Improvement by **21.05 kCal/kWh**.

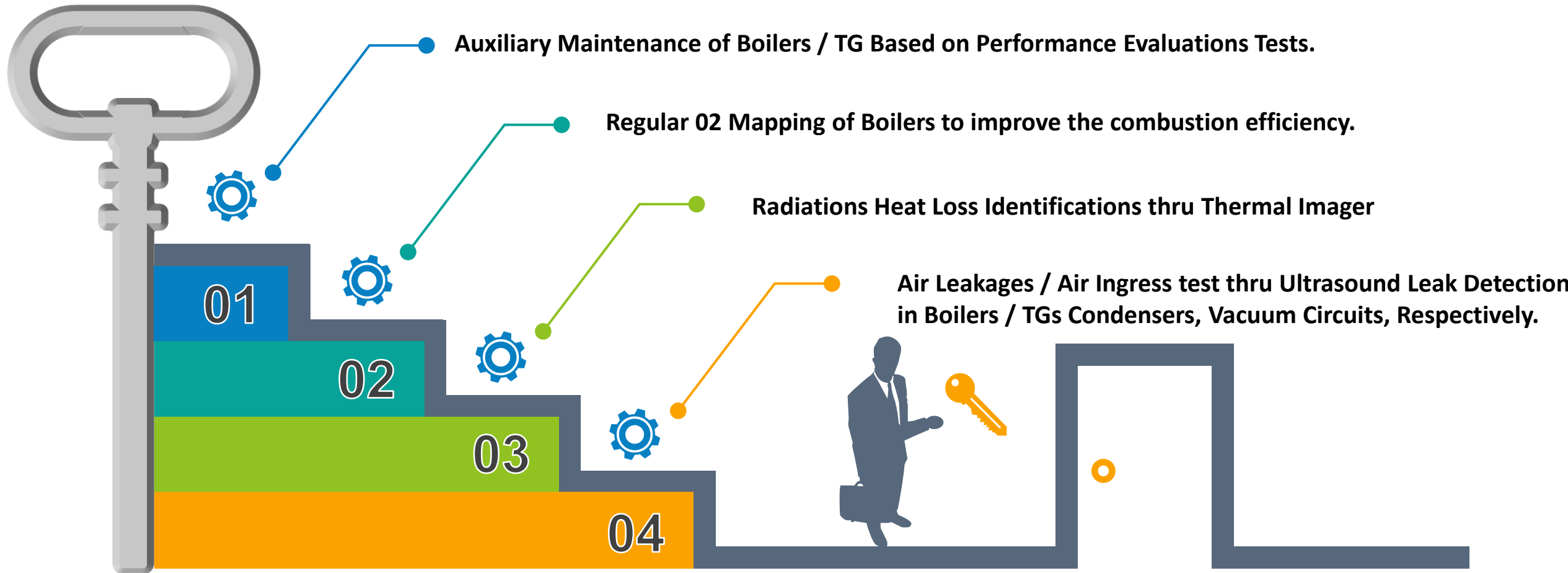
Financial Gain:

- *Saving due to improvement in Boiler efficiency by **Eco-1 Coil addition: Rs 0.79 Cr***
- *Saving due to improvement in Boiler efficiency by **Overhauling Rs. 0.75 Cr**.*
- *Saving due to reduction in Aux. Power consumption: **Rs. 0.48 Cr**.*
- *Total Saving : **Rs. 2.02 Cr/ Annum**.*



Planning to Replicate in Unit-3
Boiler-6,7 & 8 were APH O/L Temp
are 145~150 Deg.C

Best Practices - Energy Efficiency:



Best Practices - Energy Efficiency:

Performance Evaluations based Auxiliary Maintenance of Boilers

- Boiler-12 was recommended for Auxiliary Maintenance Post PG Test & APC Performance.
- Planned shut down from 5th Nov – 21st Nov for Auxiliary Maintenance Activities.
 - 574 nos of damaged tubes replaced due to leakage.
 - ATT Post Aux Maintenance & rectification of identified air ingress / leakage points.
 - Reduction in Air Ingress Across APH by 0.69%
 - Benefits: Reduction in APC by 188 kW.**



DATE	AVG	AVAIL.	UTILIZ.	STEAM	FEED	AVG BED	AVG	APH	OXYGEN		GCV	ID Fan 12 A	ID Fan 12 B	PA Fan 12 A	PA Fan 12 B	SA Fan 12 A	SA Fan 12 B	Total
	TPH O/P	FACTOR	FACTOR	PRODC.	WATER	TEMP	BED PRES	O/L TEMP	L	R	kCal / kWh	KW/Hr	KW/Hr	KW/Hr	KW/Hr	KW/Hr	KW/Hr	KW/Hr
Average Pre SD	148.95	100.00	0.00	3,572.88	147.21	862.87	941.09	128.36	3.13	3.20	3,213.15	215.18	224.11	222.86	248.33	119.71	116.71	1,146.90
Average Post SD	152.60	100.00	0.00	3,660.90	150.12	864.61	940.44	148.36	2.91	3.04	3,236.24	170.63	175.46	195.79	224.25	97.56	95.08	958.77
Difference	3.65	0.00	0.00	88.03	2.91	1.74	-0.66	19.99	-0.22	-0.16	23.10	-44.56	-48.65	-27.07	-24.08	-22.15	-21.63	-188.13

Best Practices - Energy Efficiency:

**TG-4 was recommended for Auxiliary Maintenance Post Performance Evaluation Test.
Condenser Cleaning & Inspection of High-Pressure Heaters during Auxiliary Maintenance Activities**

Pre-Condenser Cleaning



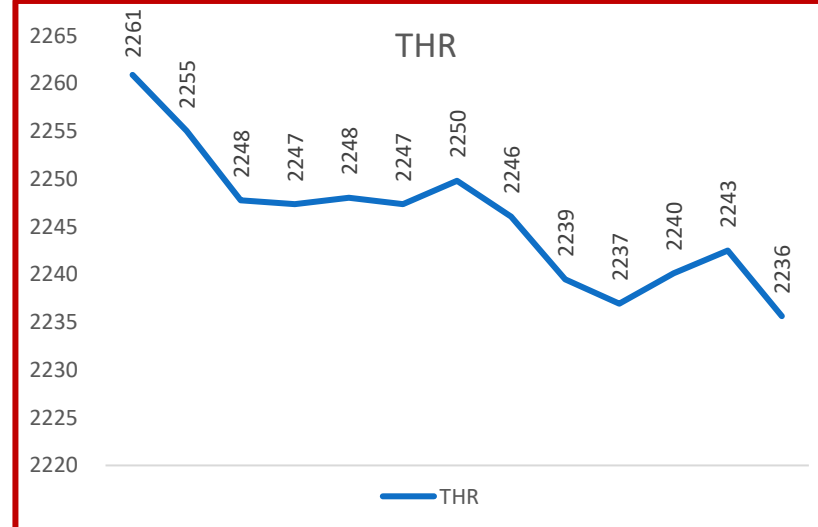
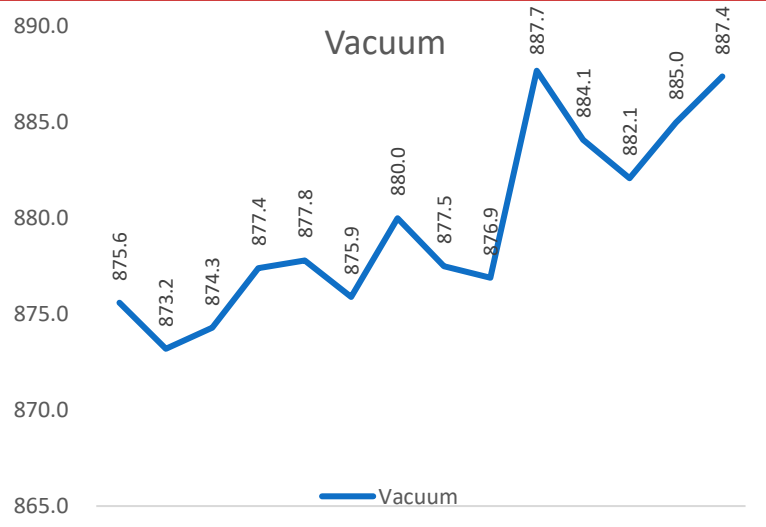
Post Condenser Cleaning



Debris from Condenser



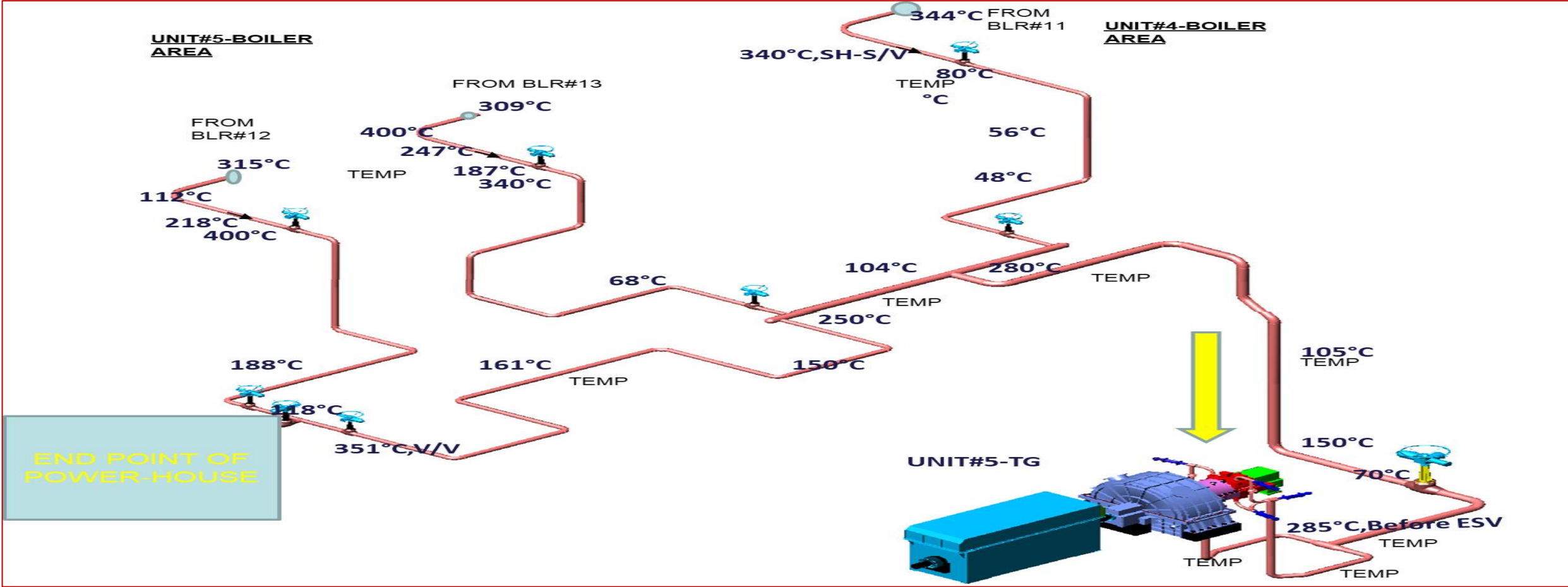
HPH-4 Rectification



Outcome of TG-4 Short Shut Down:

- Improvement in Vacuum by **9.1 gm / cm²**.
- Improvement in THR: **8 kCal / kWh**
- Improvement in PHR: **9.3 kCal / kWh @ Blr Eff of 85.87%**

Best Practices - Energy Efficiency:

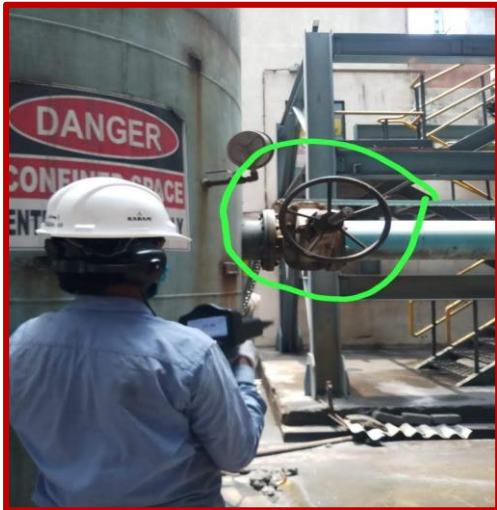


Thermal Mapping of MS Line

Mean velocity measurement and calculating "Radiation Loss"

Best Practices - Energy Efficiency:

Identification of Compressed Air Leakages thru UE Leak Detection System



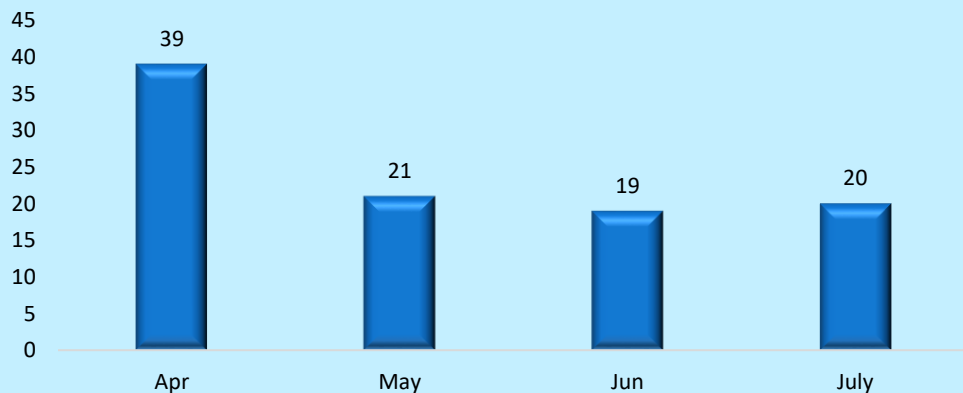
Ultrasonic Technology

- > Compressed Air Audit
- > Partial discharge/ arcing/tracking
- > Throttled Valves & Drains passing
- > Air Ingress in TG Circuits
- > Boilers FG leakages / Ingress test

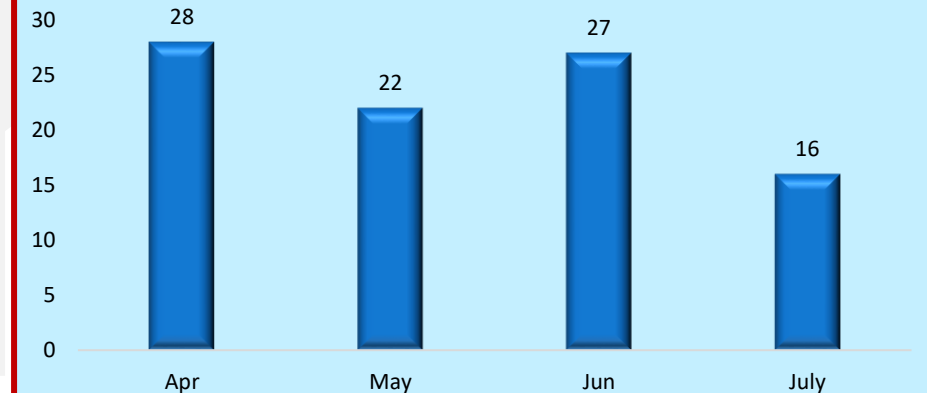
Identification of Air Ingress in TG / Condensers & Vacuum Circuits of TG & Auxiliaries.



Compressed air leakages (Nos)



Air Ingress Points in TG Circuits



Encon Projects Completed:

Project Title: Capital Overhauling of TG # 2 & 3



TG-3



Rotor Thread out



Rotor Sand Blasting



Guide Blade Carrier



HPH-5 Internal Inspection

Project Title: Performance improvement in Condenser & Cooling Tower in TG # 2 & 3



Condensers Opening



Condensers O/H



Cooling Tower



V Bars & drift eliminators in CT

Encon Projects Completed

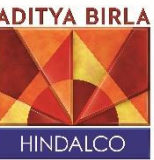
➤ Boiler-8 Opportunity Shut Down jobs:

- Retrofitting of Old Boiler#8 PA Fan VFDs (ABB – Make) with new one (Siemens – Make), commissioning completed and taken in service.
- Auxiliary Maintenance of Boiler-8 including identification & rectification of damaged APH Tubes.
- ATT Post Auxiliary Maintenance.
- **Benefits: Reduction in APC by 102 kW / Reliability Improvement**



- VAM 3rd Phase commissioning @ Satellite Control room
Ducting jobs completed for ID fan VFD room, MCC and control room.
- **Benefits: Reduction in APC by 58 kW.**

Digitalization Projects



Key Performance Indices Under Digitization Project Commissioning Completed ,Under which The major KPI Parameter Of TG and Boilers including Smelter loads can be seen online through android app in Mobile platform.

Home Page

Active PWR		Reactive PWR	
Unit-1	0.00 MW	Unit-1	-0.05 MVAR
Unit-2	96.01 MW	Unit-2	31.21 MVAR
Unit-3	0.00 MW	Unit-3	0.00 MVAR
Unit-4	99.28 MW	Unit-4	26.52 MVAR
Unit-5	100.53 MW	Unit-5	27.29 MVAR

Total generation	295.87 MW
Smelter Pot Room Load	249.57 MW

Active power imp/exp	-5.61 MW
Reactive power imp/exp	14.09 MVAR

System voltage 132 KV	135.89 KV	System frequency 132 KV	49.86 HZ
Grid voltage 220 KV	223.63 KV	Grid frequency 220 KV	49.95 HZ

GRID CONNECTED

HIL-HKD LOAD **BOILER/TG STATUS**

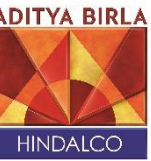
Boiler / TG Running Status

BOILER STATUS		BOILER STATUS	
Boiler-1	Shutdown	Boiler-8	Shutdown
Boiler-2	Shutdown	Boiler-9	Running
Boiler-3	Running	Boiler-10	Running
Boiler-4	Running	Boiler-11	Running
Boiler-5	Running	Boiler-12	Running
Boiler-6	Shutdown	Boiler-13	Running
Boiler-7	Shutdown		

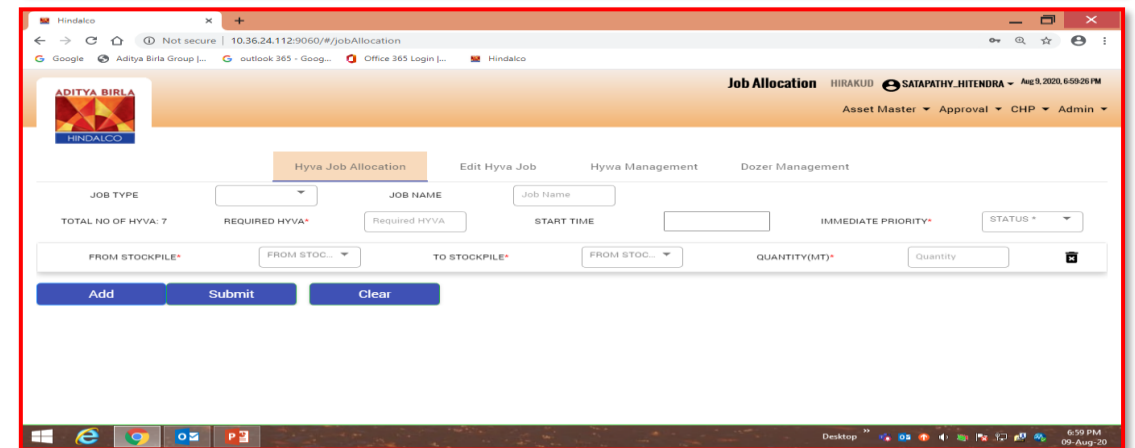
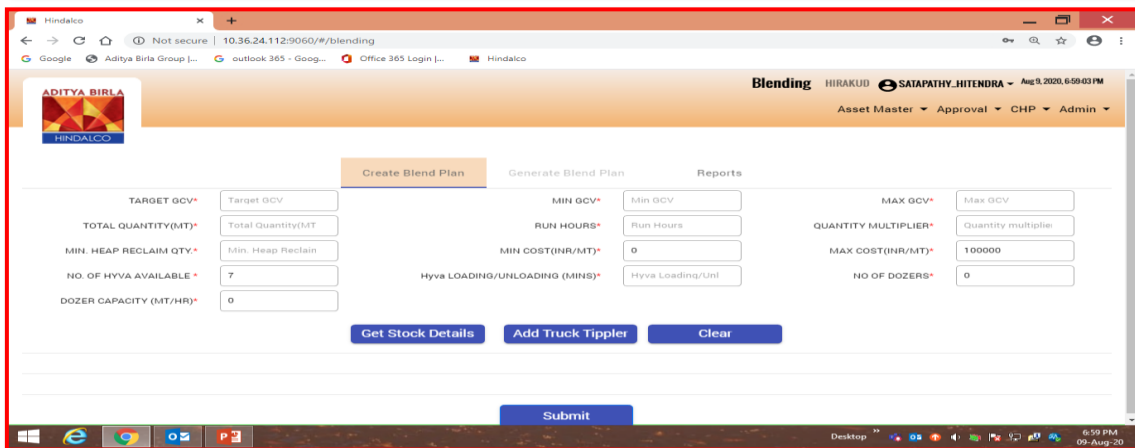
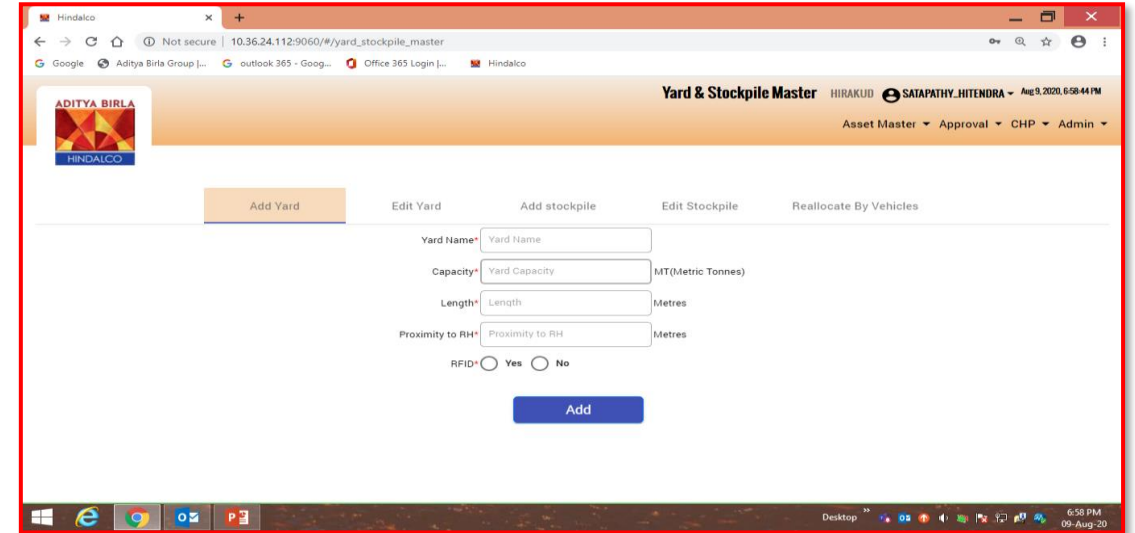
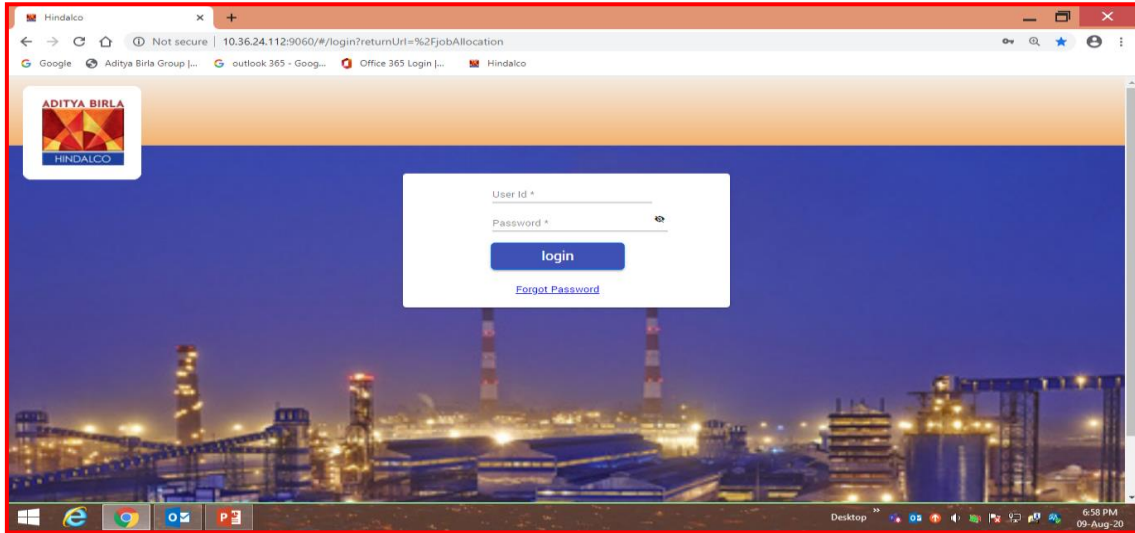
TURBINE STATUS	
Unit-1 TG Status	Stopped
Unit-2 TG Status	Running
Unit-3 TG Status	Stopped
Unit-4 TG Status	Running
Unit-5 TG Status	Running

HIL-HKD LOAD **HOME PAGE**

Digitalization Projects



Started Using the Coal Digital tool by M/s Accenture for Blending, Job Allocation & Yard Management



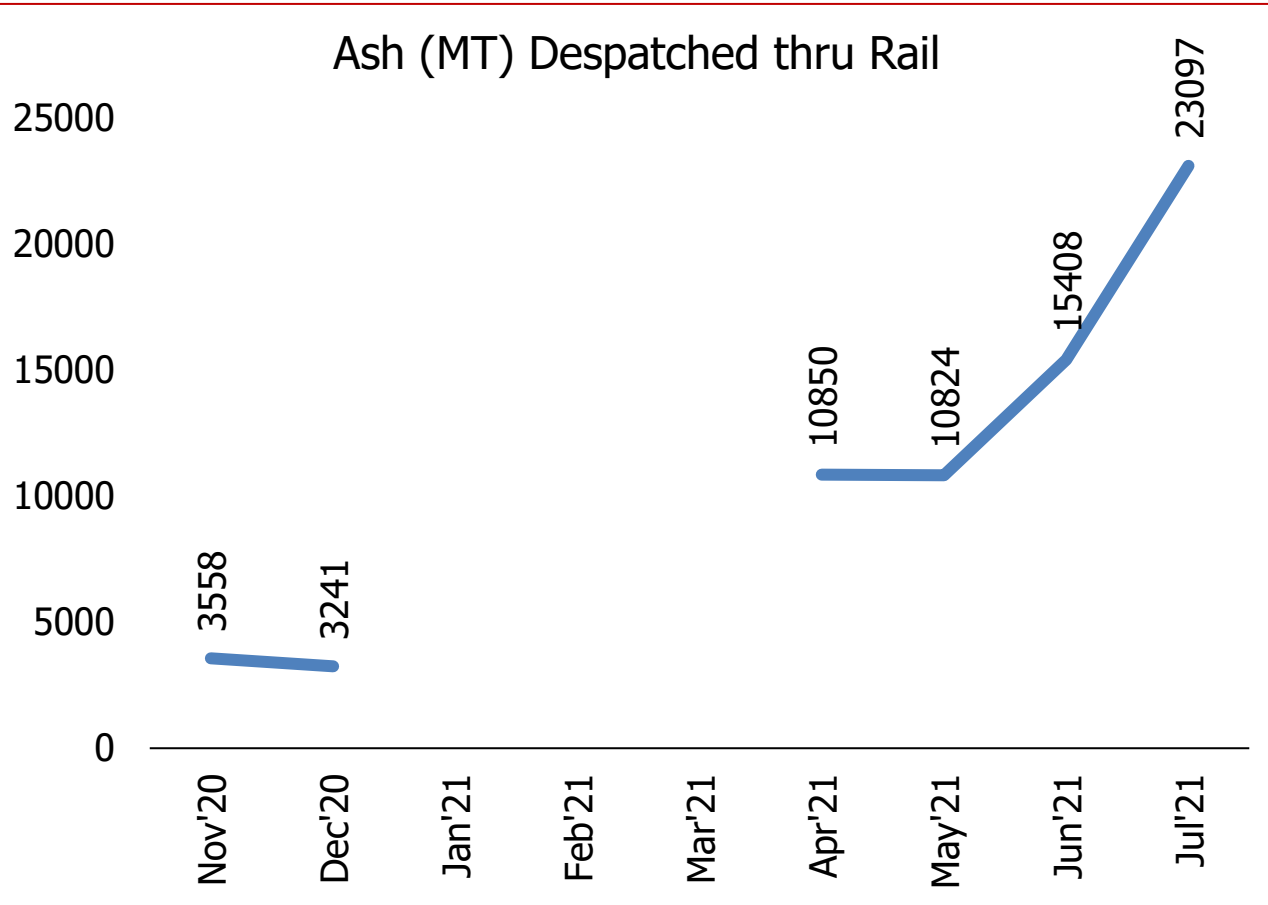
Renewable Energy Sources:



30 MW Solar Plant at Aditya Aluminium within Same Cluster

Milestone @ CPP – Ash Utilization

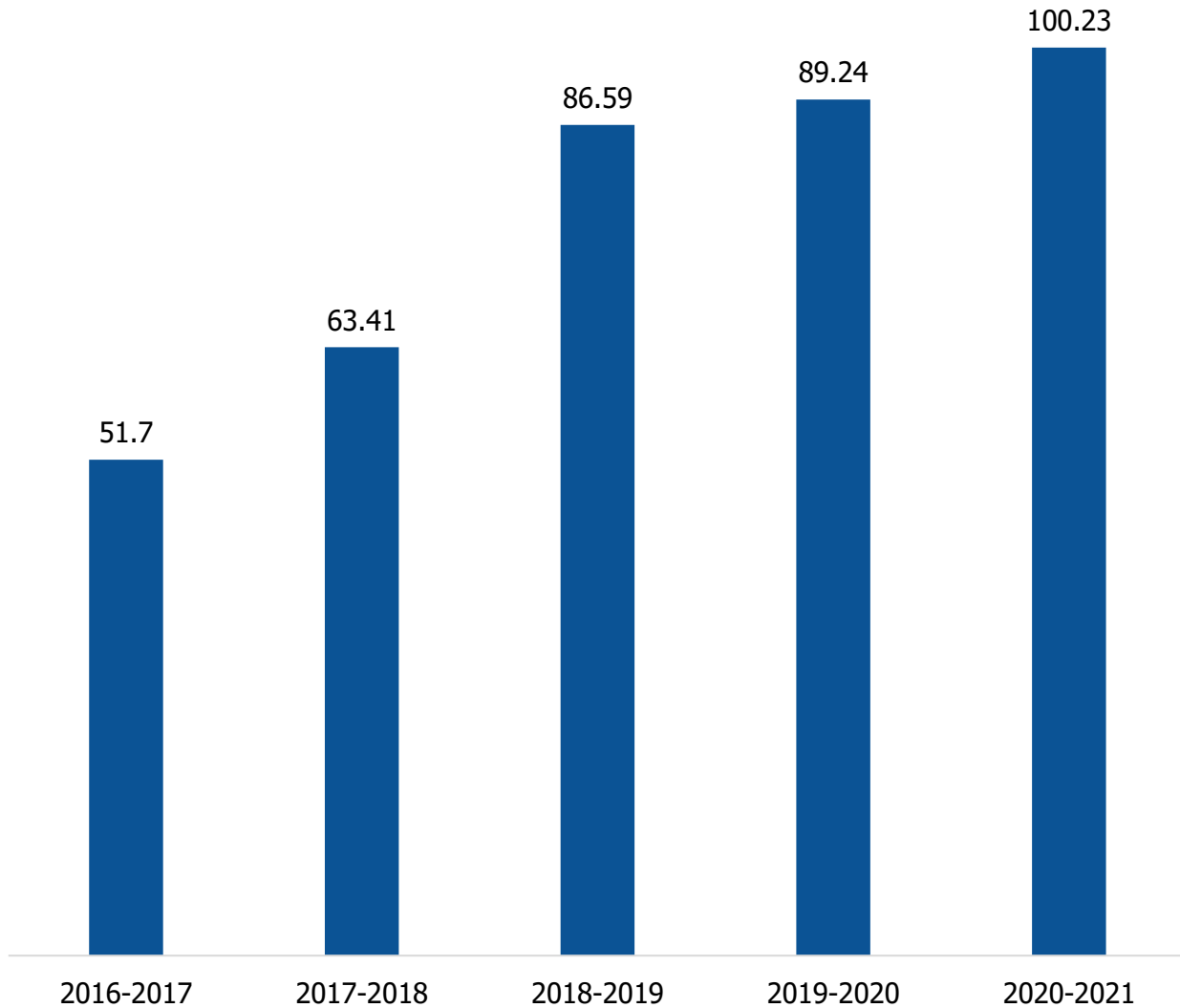
1st Ash Trip unloaded at Railway Siding on 8th Nov'20 for Dispatch thru Rail to Dalmia Cement Assam.



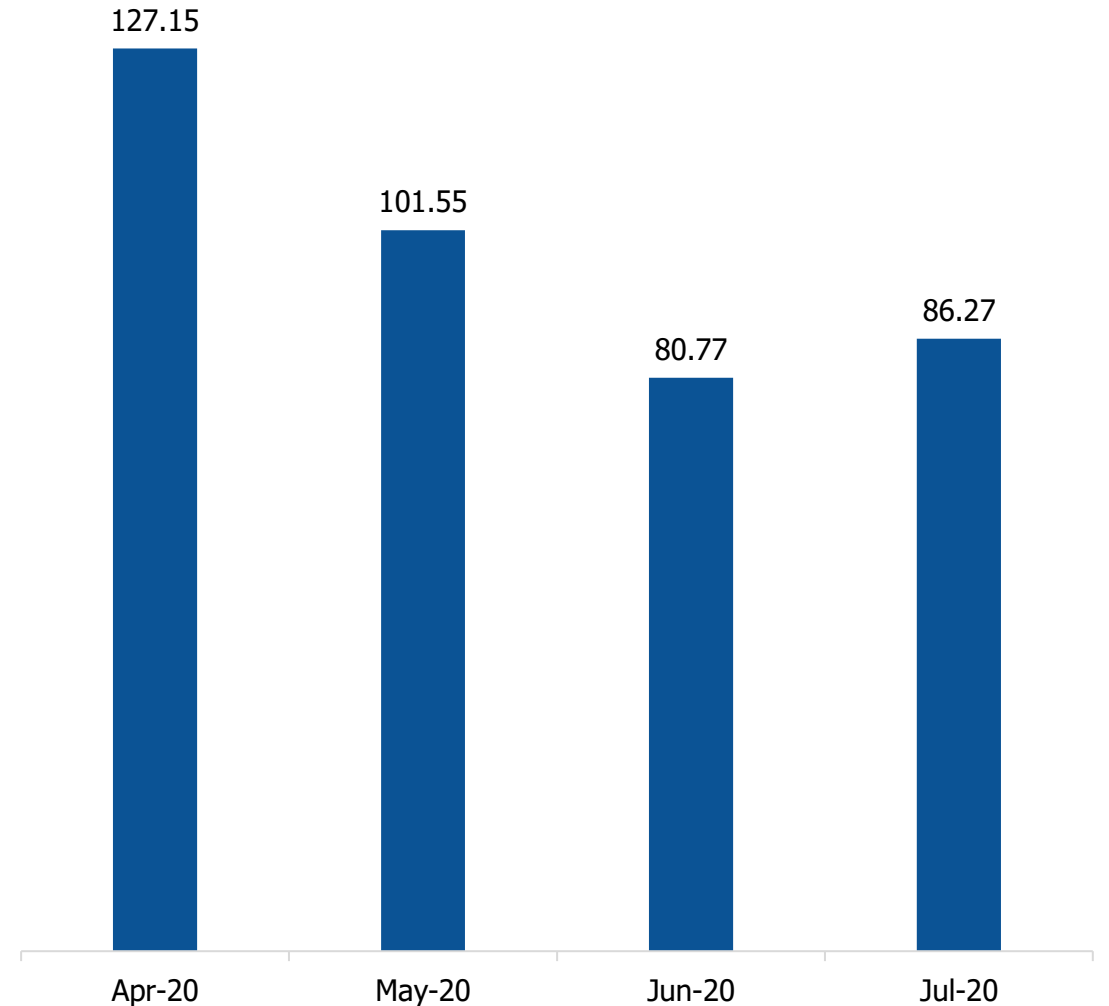
Total 66978 MT of Ash Have been dispatched thru Rail.

Ash Utilization (%)

Yearly Utilization in %

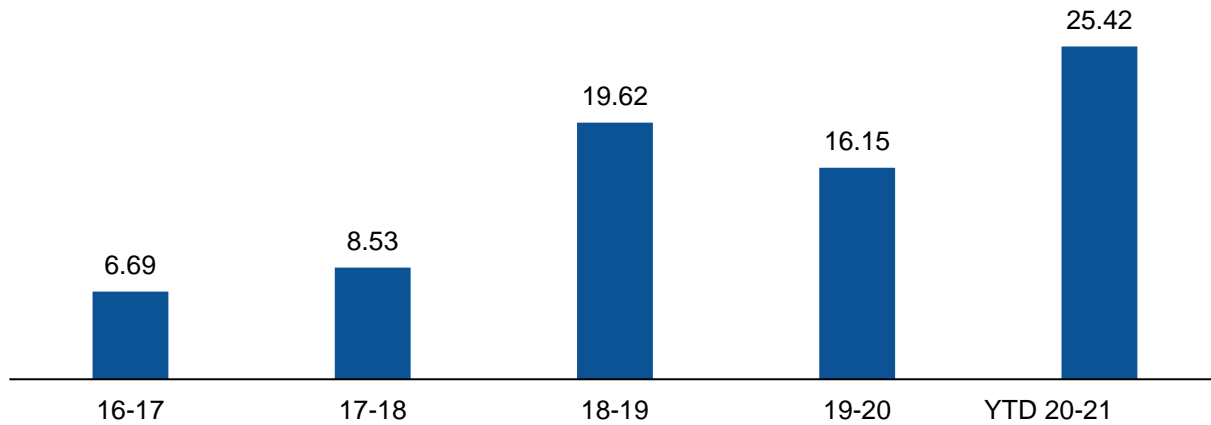


Monthly Utilization in %

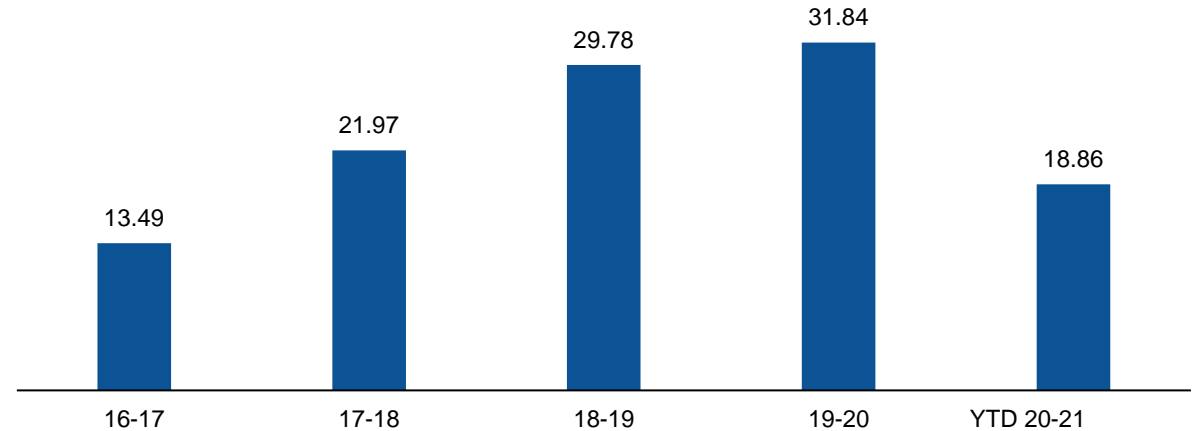


Ash Utilization (%)

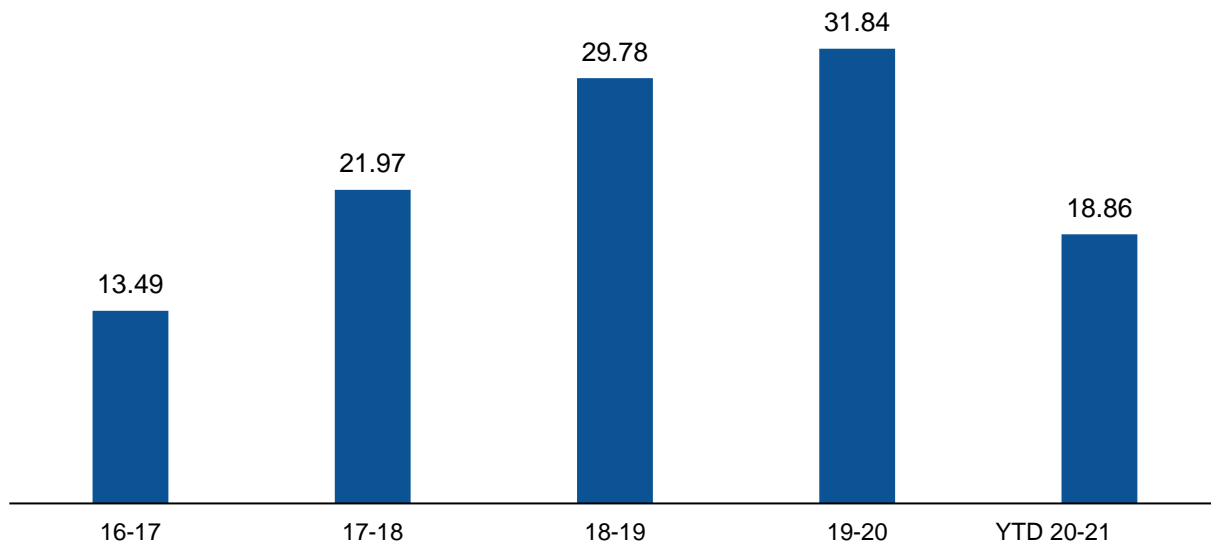
Ash Utilisation in Cement %



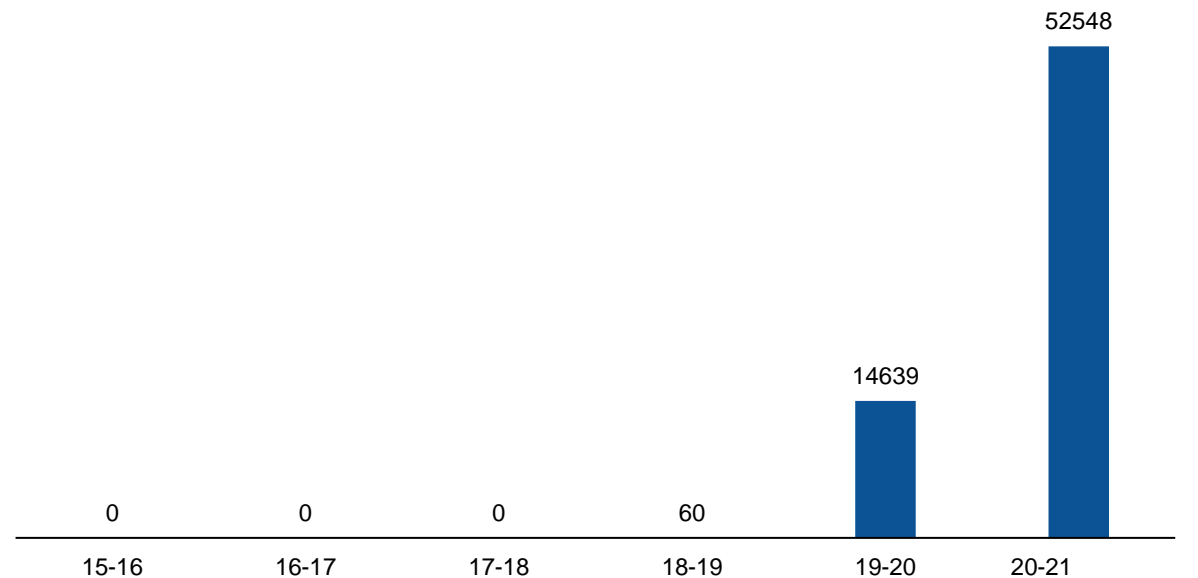
Ash Utilisation in Low Land & Road



Ash Utilisation in Low Land & Road



Legacy Ash Evacuation in MT



Captive Brick Plant @HIL



Road to Rail:

Coal unloading platform developed and the siding notification for coal unloading obtained in 2018.

Controlling measures by reducing the road transportation.

We started our Coal Transportation through Railways since 2018 as per below.

Years	Nos of Rake	RR Qnty in MT	Reduction of Trucks on Road
2018	8	31440.79	1048
2019	64	249912.350	8330
2020	49	189976.700	6333
2021	51	195083.00	6502
TOTAL		676,411.00	22,213

Total Qty dispatched [QTY]		Mt	22834
1st Scenario	From Hirakud to Vizag [A]	Per Mt	2580
	Loading Charges at Hirakud [B]	Per Mt	30
	Hirakud to Vizag [C = A+B]	Per Mt	2610
	Total Inland Freight [C x QTY]	Rs.	5,95,97,995
2nd Scenario	From Hirakud to Aditya [A]	Per Mt	326
	Loading Charges at Hirakud [B]	Per Mt	30
	Unloading Charges at Aditya [C]	Per Mt	41
	Stuffing Charges at Aditya [D]	Per Mt	120
	Container Lashing [E]	Per Mt	14
	From Aditya to VZP/KOL [F]	Per Mt	1195
	Hirakud to Vizag [G = A+B+C+E+F]	Per Mt	1726
	Total Inland Freight [G x QTY]	Rs.	3,94,12,314
Total Inland Freight Saving (1st Scenario - 2nd Scenario)		Rs.	2,01,85,681

Road to Rail: Benefits & Impacts

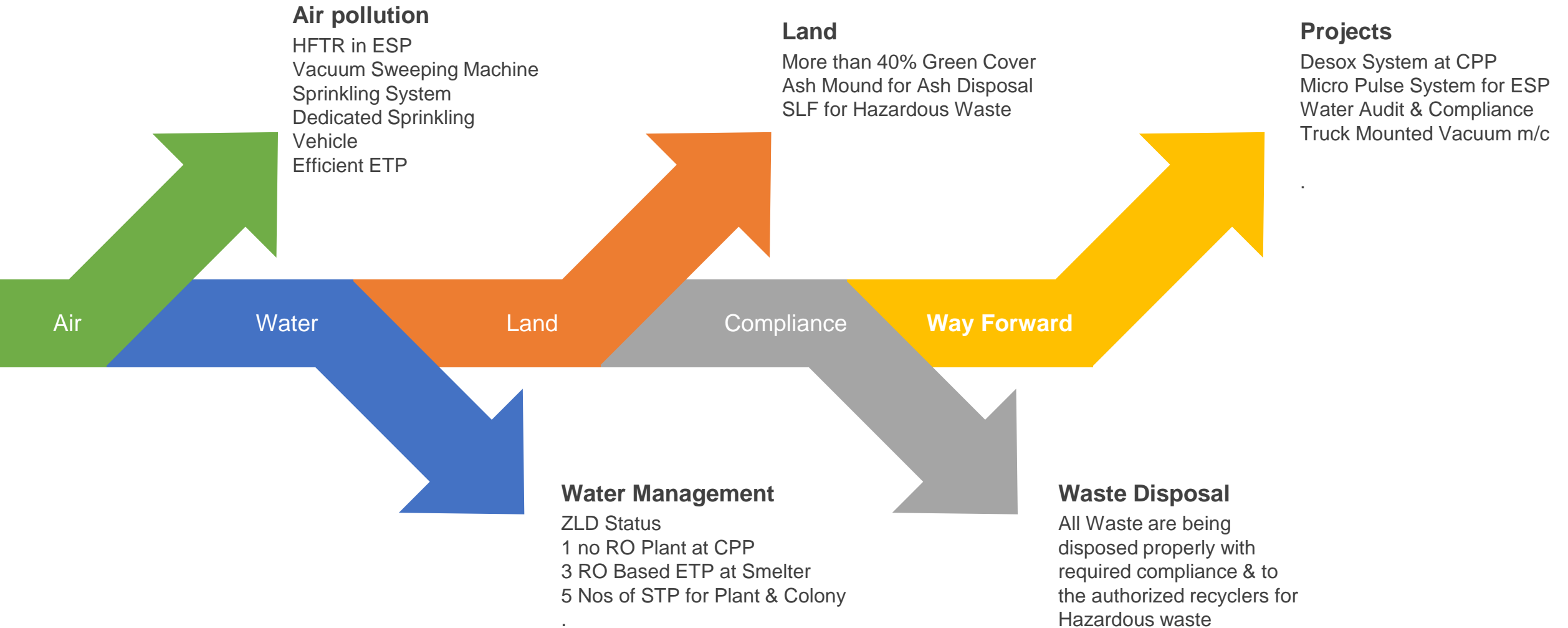
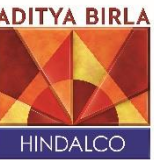
- Prevented loss of sale of material worth Rs. 310.073Cr.
- Ensured customer satisfaction by fulfilling customer requirements.
- Delivered 100% accuracy with nil customer complaints.
- Non interrupted production at Hindalco Hirakud.
- Total Qty. Dispatched: 22834mt(914Nos of Containers).
- Total inland Freight Saving Approx. 2Cr.
- Coal Cess Refund 15.45Cr.
- Safe delivery of material to Export customer.
- Reduction in overall process time.
- Error free documentation process.
- Safe handling of material.
- Easy to access & Reduced vehicle movement inside FG Yard.

BENEFITS

- Accuracy in movement of required material as per Customer.
- Reduction in Container Ageing.
- Improved responsiveness in the system.
- Understood the dynamics of complexity of varying practices in transportation.
- Estimating / anticipating the test conditions and Handling with strategy.

IMPACT

Environment Initiatives



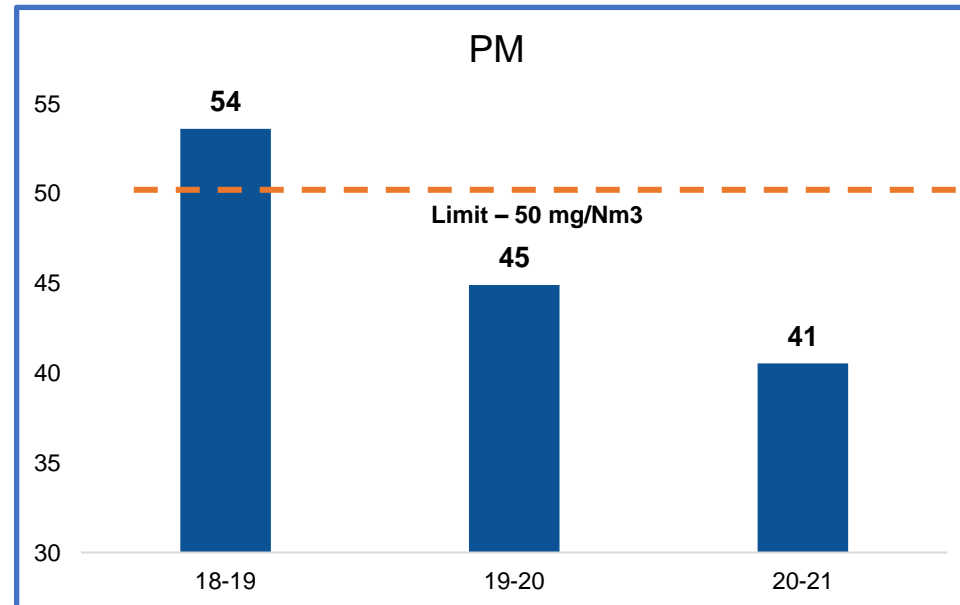
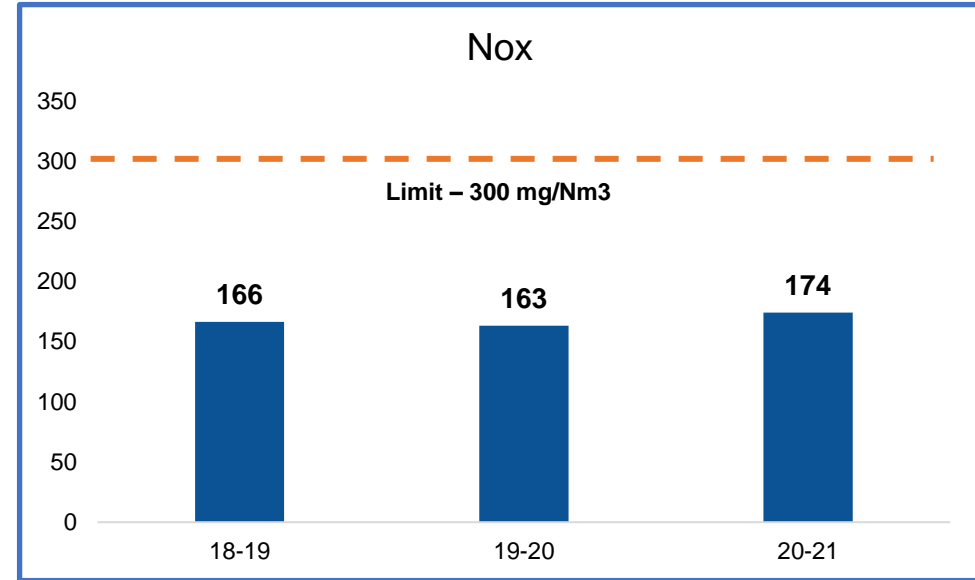
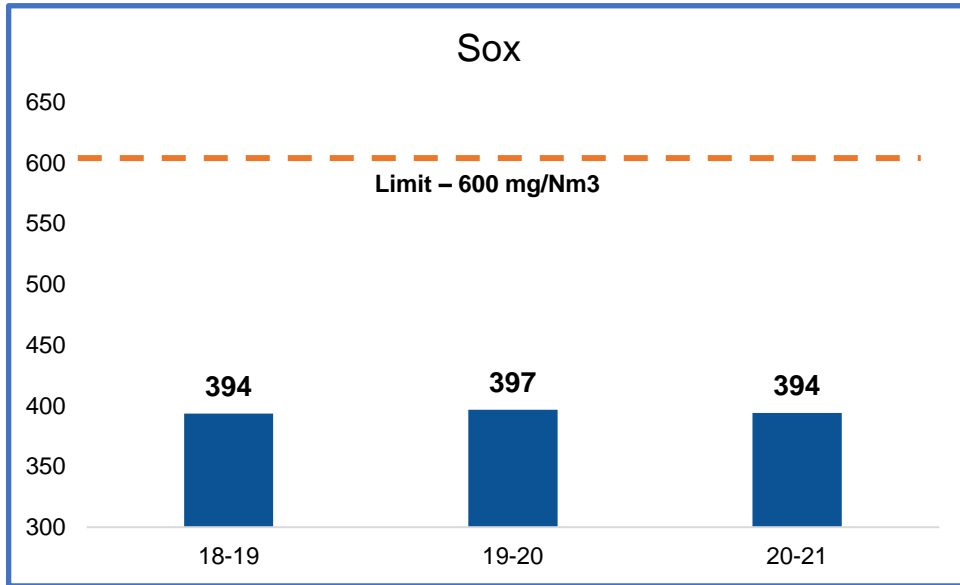
Green Cover – Ash Mound



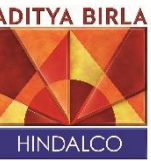
Google Map Top View Shows Impeccable Green Cover



Emission Level @ Hirakud



Pollution Control Measure



Water Pollution Control System adopted

- CPP RO plant – 120 m³/hr
- Effluent Treatment Plant Installed - RO based 2×250KLD and 1 × 50KLD
- Sewage Treatment Plant Installed(P&S) - 1×100KLD, 1×500KLD, 1×300KLD, 1×400KLD
- Zero discharge concept adopted in non-monsoon period, as per CTO.
- Online effluent water monitoring system with Real Time Data communication to SPCB & CPCB sever.

Air Pollution Control System adopted

- 13 ESP in which 11 Boilers are fitted with HFTR technology to control Emission

Environmental Monitoring System

Online emission monitoring system installed in all stack with Real Time Data communication to SPCB & CPCB sever

5 nos of Continuous Ambient Air Quality monitoring System (CAAQMS) installed in Smelter & Power complex with Real Time Data communication to SPCB & CPCB sever.

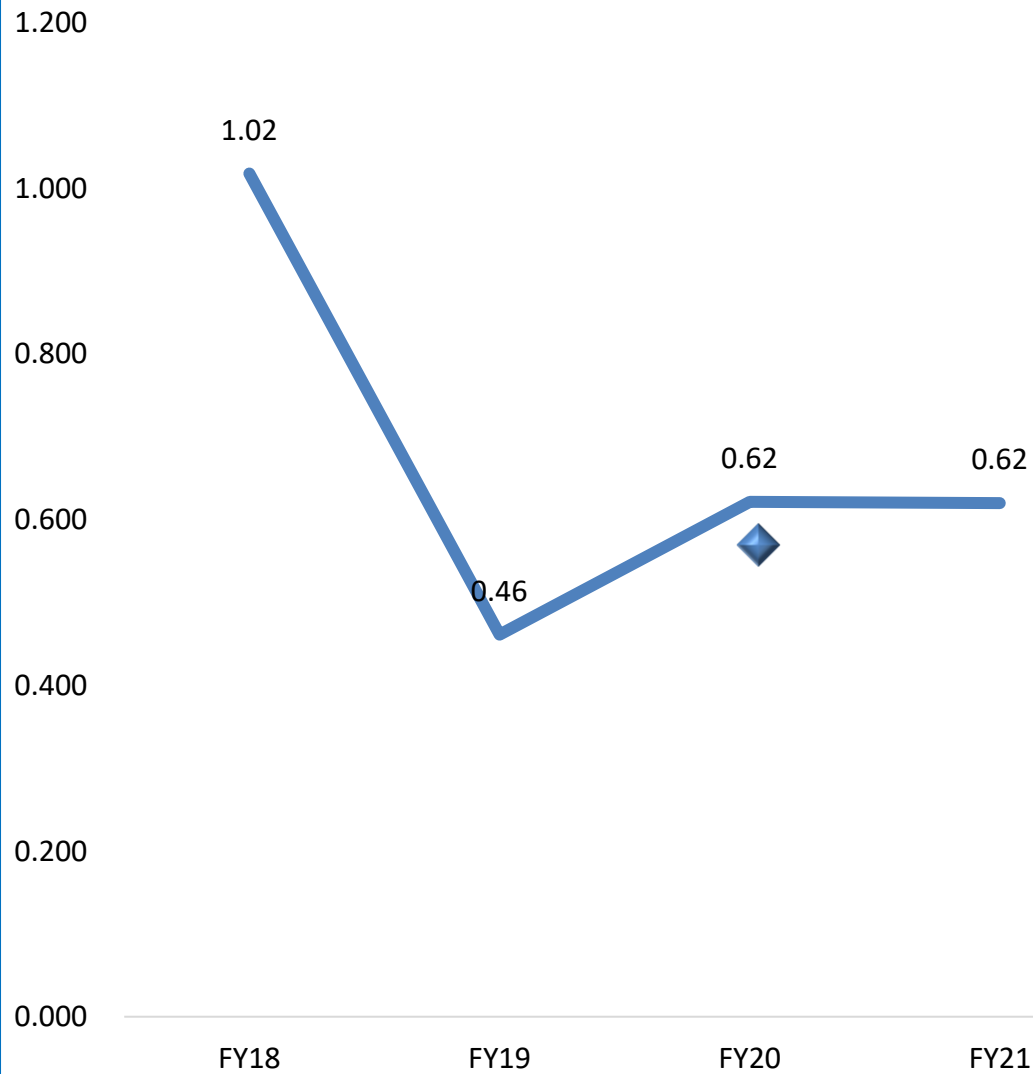
10 nos of Continuous Emission monitoring System (CEMS) installed in Smelter & Power complex with Real Time Data communication to SPCB & CPCB sever.

6 EQMS (Effluent Quality Monitoring System) installed in Smelter & Power complex with Real Time Data communication to SPCB & CPCB sever.

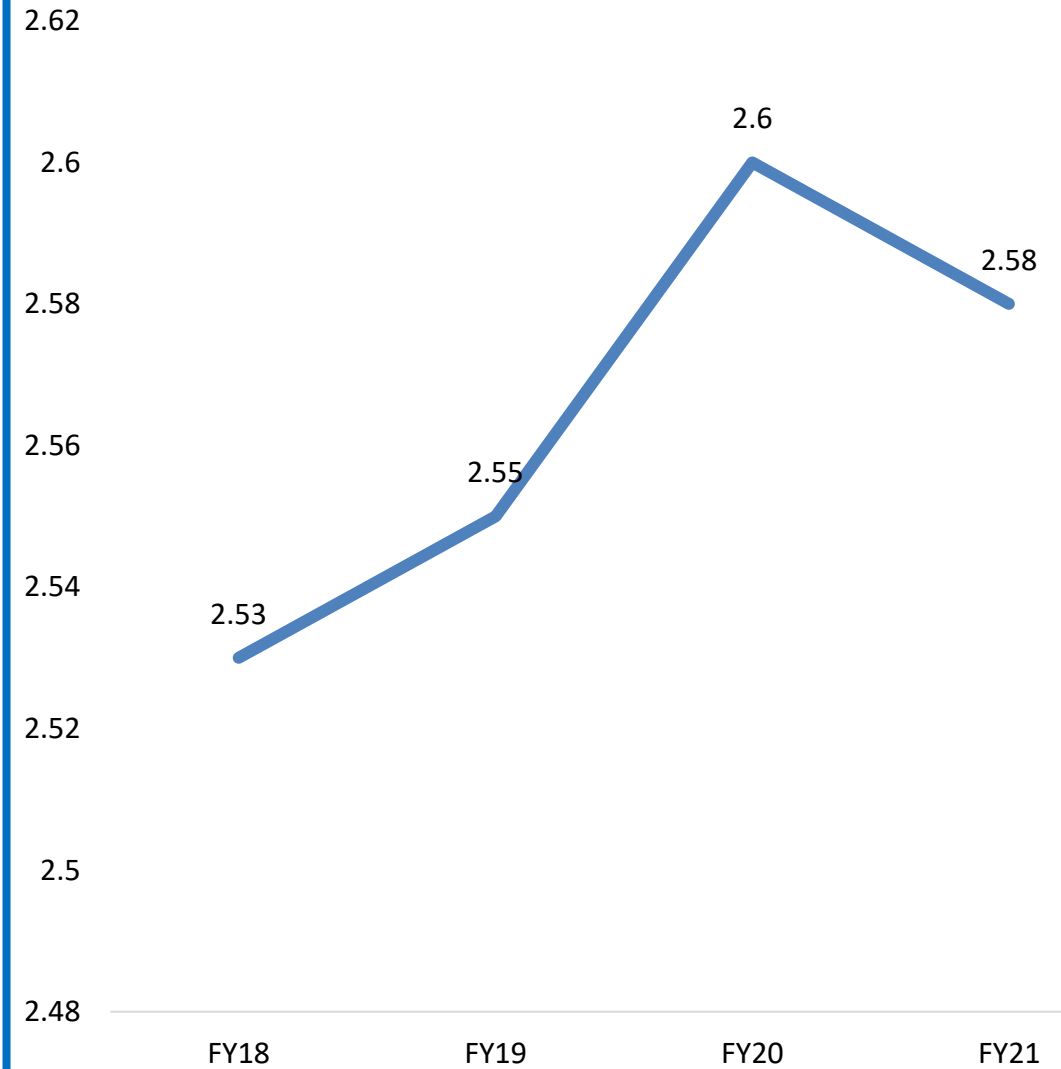
2 nos. Mercury Analyzer installed in CPP

Environment Management - Water

DM Water Cons.(%)



Raw Water Cons (Lit / kWh)



Water Saving Initiatives:

Pipe line laid to divert PSF,ACF vessel Back Wash water in DM plant to Cooling Tower -1 & 2.

Water Saving : 62.7 Cum / Day.

RO Based ETP plant to treat effluent from cooling tower blow down and recycle as make up to cooling tower thus reducing fresh water drawl from river. Water Saving : 1200 Cum / Day.

RO reject water with high total dissolve solids (TDS) content is utilized in Ash conditioning and dust suppression.

Water Saving : 160 Cum / Day.

One pipe line from Main colony & CPP Colony Sewage treatment plant (STP) are laid to Cooling tower # 2 to recover STP treated water instead. Water Saving : 750 Cum / Day.

Pipe line laid to provide cooling tower blow down water for Plant and colony gardening , Brick plant, Plant Road spray inclusive ash mound requirement etc as measures of recycling waste water. Water Saving : 2448 Cum / Day

Increasing Cooling Tower Cycle of concentration from (COC) 4 to 6 with suitable chemical treatment to reduce blow down and make up water requirement . Water Saving : 1872 Cum / Day

**Total Water Savings due to
mentioned Initiatives:6493 Cum /
Day i.e. 271 Cum / Hr.**

Environment Management – Water Management

We have taken following initiatives to conserve water which ultimately resulted in reduction in specific water consumption-

Modernization of our 2 RO based ETPs of having capacity 250 KLD & 50 KLD

Upgradation of RO stream & UF stream of CPP RO plant of capacity 120 m³/hr

Utilization of blow down water instead of clarified water in Gardening/Dust Supression

Construction of Nalgonda pit for pre treatment of water

Utilization of RO reject in ash quenching/conditioning

Water Rationing concept adapted by internal Task Force

Equipment/ System	History	Current Status	Way forward
Raw Water System	There are two pipelines of size 450 and 600 mm from the Intake Chamber and water flows through gravity.	The total raw water received is 1000 – 1050 and just sufficient to meet the current requirement of CPP, Smelter and FRP	<ol style="list-style-type: none"> 1. Receiving end pumping station need to be completed which can bring 1400 m³/Hr water by flooded suction. 2. Third raw water pipeline needs to be completed

Water Management System:

ISO 46001: 2019 (Water Efficiency Management System) :

- Scope of Work Finalization
- Timeline finalization
- Technical Discussion done with BSI & BVIL



Technical Discussion along with “British Standard Institution (BSI)” & “Bureau Veritas” for Implementation & Certification of ISO 46001:2019 @ Hirakud Power

HIL is Planning to achieve the “ISO – 46001 Certification Water Management System” by Oct’21

Energy Monitoring

Well Established Energy Management Cell headed by DH-CPP.

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”.

Feasibility study of suggestions & submit proposal for sanction.

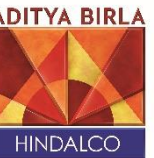
Preparation of detail action plan.

Weekly review to monitor project progress.

Benefits analysis after project implementation.

Sustainability of the project

Energy Monitoring



Energy Monitoring System
Hindalco Industries Limited, Hirakud



Schneider Electric

Back

6.6 KV Unit Switchgear U#2

7/08/2020 12:37:59.000 P1

Next

FEEDERS	VLL (Avg)	CURRENT (A)			KVA	KW	KVAR	PF	FREQ.	KVAH	KWH
Inc1_UT	6,728.8	424.5	427.5	426.9	4,977.8	4,722.9	1,613.8	0.9	49.9	48,350,613.5	44,424,155.1
Inc2_OSB	...	...	...	...	...	...	...	...	...	...	...
2UAT1	6,792.5	37.6	37.5	37.6	442.4	367.7	166.7	0.8	49.9	1,808,088.3	1,448,876.3
2UAT2	6,802.0	36.0	35.3	36.2	422.5	356.9	225.9	-0.8	49.9	6,113,167.2	5,165,982.7
3_IDFAN_1A	6,822.4	10.9	11.0	11.0	129.5	127.2	24.3	1.0	50.0	37,303,926.8	26,185,334.8
3_IDFAN_1B	6,825.3	11.2	11.3	11.2	133.0	130.1	27.4	1.0	49.9	600,603.6	587,011.5
4_IDFAN_1A	6,818.8	12.8	12.9	12.9	151.9	148.8	29.0	1.0	49.9	9,913,731.1	7,246,279.7
4_IDFAN_1B	6,796.2	12.1	12.1	12.2	142.6	139.6	26.4	1.0	50.0	40,140,419.1	28,600,821.8
5_IDFAN_1A	6,815.2	10.0	10.2	10.1	119.6	117.1	23.8	1.0	49.9	21,442,068.5	15,209,585.7
5_IDFAN_1B	6,801.3	10.5	10.4	10.6	123.7	131.7	23.9	1.0	50.0	40,325,390.3	29,000,437.8
3_PAFAN_1A	6,798.6	14.3	14.4	14.5	170.0	161.6	51.2	1.0	50.0	18,484,076.5	16,434,035.7
3_PAFAN_1B	6,801.2	14.3	14.4	14.7	170.9	162.2	51.6	0.9	50.0	32,838,592.5	28,689,469.4
4_PAFAN_1A	6,817.5	14.2	14.4	14.6	169.9	157.7	54.8	0.9	50.0	4,064,141.1	3,858,949.1
4_PAFAN_1B	6,816.4	14.4	14.2	14.3	168.6	158.1	56.0	0.9	49.9	238,283.4	226,385.9
5_PAFAN_1A	6,818.4	15.6	15.6	15.7	187.0	177.5	56.5	0.9	50.0	18,560,317.4	16,316,189.7
5_PAFAN_1B	6,779.0	14.4	14.4	14.4	169.4	164.9	36.8	1.0	50.0	35,893,854.2	31,250,188.3
BFP1	6,811.1	92.6	93.4	91.1	1,089.5	1,012.5	406.6	0.9	49.9	32,101,871.6	29,776,220.2
BFP2	6,812.7	93.7	94.6	92.7	1,105.6	1,028.6	411.7	0.9	49.9	28,519,426.0	26,448,642.0
BFP3	6,702.5	91.6	92.9	90.7	1,064.7	0.0	394.1	0.9	49.6	35,650,129.9	33,082,310.7
CEP1	6,822.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	49.9	2,059,630.7	1,559,985.3
CEP2	6,813.2	22.0	22.1	21.8	259.0	253.4	56.5	1.0	49.9	544,106.2	530,296.4
U2_C_COMP_1	6,813.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	49.9	8,785,415.2	7,837,499.4

DAILY REPORT FROM THE DESK OF THE SHIFT-IN-CHARGE

FORMAT NO : 20100B06
Date : 16-Aug-20
Dam Level [FT]: 615.35

UNIT#	GEN.	HP SENT OUT	OPP CONS.	IMPT CRP-GRD	ADR. CONL MU	ADR. CONL %	P.L.F. %	100% PUF. NO.	AGG. GEN.	STP CONE.	Frip Schedule [Mw Hrs]: 0.00	Frip Actual[Mw Hrs]: 9.67		
DAILY	0.000	0.000000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00				
MONTHLY CUM	0.000	0.000000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00				
YEARLY CUM	21.276	19.662000	0.000	0.000	1.614	1.614	7.59	9.52	0.00	6.42				
DAILY	2.340	2.101300	0.000	0.000	0.239	10.21	97.50	23	99.12	0.000012				
MONTHLY CUM	37.695	33.805935	0.000	0.000	3.889	10.32	98.16	23	98.16	0.000263				
YEARLY CUM	319.531	287.262394	0.021	0.000	32.269	10.10	96.48	23	96.48	0.002874				
DAILY	0.000	0.000000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.000012	RD(m3): 1,044.00	RD Run hour: 22.35		
MONTHLY CUM	0.000	0.000000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.000171				
YEARLY CUM	0.000	0.000000	2.530	0.000	0.000	0.00	0.00	0.00	0.00	0.001572				
DAILY	2.386	2.161500	0.000	0.000	0.225	9.43	99.42	13	99.42	0.000012	Linkage 18.866	GP Coal : 0.000		
MONTHLY CUM	37.732	34.193337	0.002	0.000	3.539	9.38	98.26	13	98.26	0.000263	Rice Husk:02.117	Pet Coke : 0.000		
YEARLY CUM	322.120	293.595171	0.005	0.000	28.525	8.86	97.26	13	97.26	0.002874	Purchase:6022.717	Import: 0.000		
DAILY	2.386	2.197600	0.000	0.000	0.188	7.88	99.42	6	99.42	0.000012	1	5	27.00	6.98
MONTHLY CUM	38.275	35.248183	0.000	0.000	3.027	7.91	99.67	6	99.67	0.000171	22	429	545.80	122.84
YEARLY CUM	290.140	268.224457	0.024	0.000	21.916	7.55	87.60	21	87.60	0.001572				
DAILY	7.112	6.460400	0.000	0.000	0.652	9.17	63.50	0	296.3	0.050	0.040	0.040	2.1	99.48
MONTHLY CUM	113.702	103.247446	0.002	0.000	10.457	9.20	63.45	0	296.1	0.844	0.567	0.567		99.45
YEARLY CUM	953.067	868.74602	2.580	0.000	86.900	9.12	61.66	0	287.8	5.520	3.707	3.707	1.67	98.43

CONDENSING STOCK (MT) 181696.119
 COAL FED TO ENTS (MT) 0.000
 COAL FED TO ENTS (MT) 1895.690
 COAL FED TO ENTS (MT) 0.000
 COAL FED TO ENTS (MT) 2071.510
 COAL FED TO ENTS (MT) 2057.110
 TOTAL COAL FEED (MTH LOSS) (MT) 6024.340
 COAL RECEIVED (MT) 4566.230
 COAL LOSSES (MT) 180201.863
 UNCLASIFIED STOCK (MT) 90.43
 UNCLASIFIED STOCK (MT) 90.43

CLARIFIED WATER
 pH [-] 8.10
 CONDUCTIVITY (µS/cm) 10390
 FREE CHLORINE AS Cl2 (ppm) NA
 CaAS CaCO3 (ppm) NA
 MgAS CaCO3 (ppm) NA
 MANGANESE AS CaCO3 (ppm) NA
 TURBIDITY (NTU) NA
 T-HARDNESS AS CaCO3 (ppm) NA
 SILICA (ppm) NA

DM WATER
 pH [-] 7.5-8.1
 CONDUCTIVITY (µS/cm) <200
 FREE CHLORINE AS Cl2 (ppm) 0.2-1.1
 CaAS CaCO3 (ppm) <25
 MgAS CaCO3 (ppm) <10
 MANGANESE AS CaCO3 (ppm) <5
 TURBIDITY (NTU) 5.0-8
 T-HARDNESS AS CaCO3 (ppm) <30
 SILICA (ppm) NA

CONDENSATE WATER
 pH [-] 9.0-9.4
 CONDUCTIVITY (µS/cm) <10
 T-HARDNESS AS CaCO3 (ppm) NA
 HYDRAZINE (ppm) <0.05
 DISSOLVED O2 (ppb) <8
 COND Deaer carbon column (µS/cm) NA

DRUM WATER
 pH [9.1-9.8] B1
 CONDUCTIVITY (µS/cm) [20-50] B1
 PHOSPHATE (ppm) [2-7] B1
 HYDRAZINE (ppm) <0.01 B1
 T-HARDNESS (ppm) [0] B1
 PALMOLIN (ppm) [0.3-8] B1
 SILICA (ppm) <1.0 B1

MAIN STEAM
 pH [9.1-9.4] B1
 CONDUCTIVITY (µS/cm) <10 B1

Energy Monitoring



GENERATION DATA AND
CRITICAL PARAMETER



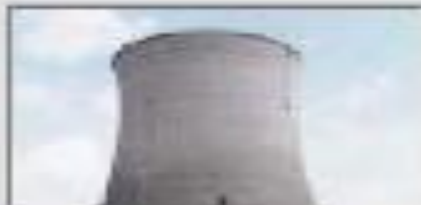
COAL QUALITY



UNBURNT IN FLY-ASH



SIEVE ANALYSIS



RAW AND COOLING
WATER QUALITY



BOILER WATER AND
STEAM QUALITY



EQUIPMENT EFFICIENCY



REPORTS



EMISSIONS



SEWAGE TREATMENT
PLANT



WATER / CHEM CONS.



DATA IN

ONLINE

VIB

Digitalization Initiatives

Digitalization Project List for Hirakud Power

S. No.	Project List	Status
1	Digital Twin implementation at unit-4 and scale-up in Hirakud Power	Implemented successfully and potential savings observed in Last Quarter of FY-21 was 4 Lacs. Now Scaling up Digital Twin in other 4 units also.
2	Coal Supply Chain Tracking System	HHD is used for driver & vehicle registration, vehicle inspection, Blend tool run already started. RFIDs to be installed in 5000 trucks.
3	VEDA implementation for the Hirakud with GDNA for Post Covid 19 solutions	Plan to implement till Dec-21
4	Real Wear device for Remote Assistance	Deployed during Covid-19 for remote assistance and saved the logistic cost around 1.5 lacs in FY-21
5	Augmented reality development for the Hirakud	1.Built Boiler Lit-Up AR Model for Learning purpose. 2.Motor dismantling Model under progress. 3.Barring gear assembly model under progress.
6	Safety Kiosk installation at Power plant main gate	Installed for Visitors safety training and gate pass
7	KPI data monitoring of Hirakud Power through Android application.	Installation complete and all stakeholders are using for KPI Monitoring
8	Volumetric Coal Stock measurement by drone	After POC will go for purchasing the drone
9	Advance Process Control revival in Boiler-7	After site survey and monitoring potential benefits order will release.
10	Remediation of Cyber Security deficiency on OT Network at Hirakud Smelter and Power	Techno-commercial discussion with all stakeholders
11	Online CBM solution using IOT enabled vibration sensors	Under progress
12	Confined space monitoring (RFID card punching, 24*7 Gas detection)	Planning for POC (5 days)

Plantation Details

YEAR	NO. OF SAPLINGS PLANTED	SPECIES PLANTED
Up to 2006 – 07	419865	
2007 – 08	33,000	Chakunda, Gambhari, Sisam, Krushna Chuda, Radha Chuda, Jammun & Neam
2008 – 09	25,200	Chakunda, Gambhari, Sisam, Krushna Chuda, Radha Chuda, Jammun & Neam
2009 – 10	31,000	Chakunda, Gambhari, Sisam, Krushna Chuda, Radha Chuda, Jammun & Neam
2010 – 11	30,000	Chakunda, Gambhari, Sisam, Krushna Chuda, Radha Chuda, Jammun & Neam
2011 – 12	25,200	Chakunda, Gambhari, Sisam, Krushna Chuda, Radha Chuda, Jammun & Neam
2012 – 13	25000	Neam, Karanja, Sisam, Krushna Chuda, Radha Chuda, Cassia Fistula, Alstonia & Kadamba
2013 – 14	30000	Neem, Karanja, Sisam, Cassia Fistula, Alstonia, Kadamba, Mango, Jamun etc
2014 – 15	12000	Neem, Karanja, Sisam, Cassia Fistula, Alstonia, Kadamba, Mango, Jamun etc
2015 – 16	10000	Bamboo, Sisoo, Karanja, Alstonia, Chhatiana, Mango, Jamun etc
2016 – 17	21175	Bamboo, Ficus, Alstonia, Champa, Plumeria Alva etc
2017 – 18	13500	Krushnachuda, Radhachuda, Acassia, Ficus, Jamun, Arjun, Ashok etc
2018 - 19	10500	Bamboo, Sisam, Cassia Fistula, Alstonia, Kadamba, Mango, Jamun
2019 - 20	8400	Alstonia, Champa Bamboo, Sisam, Alstonia, Kadamba, Mango, Jamun
2020 - 21	1058	Arjun, Radhachuda, Krushnachuda, Jamun, Ficus, Debdaru, Baula
Total	695898	



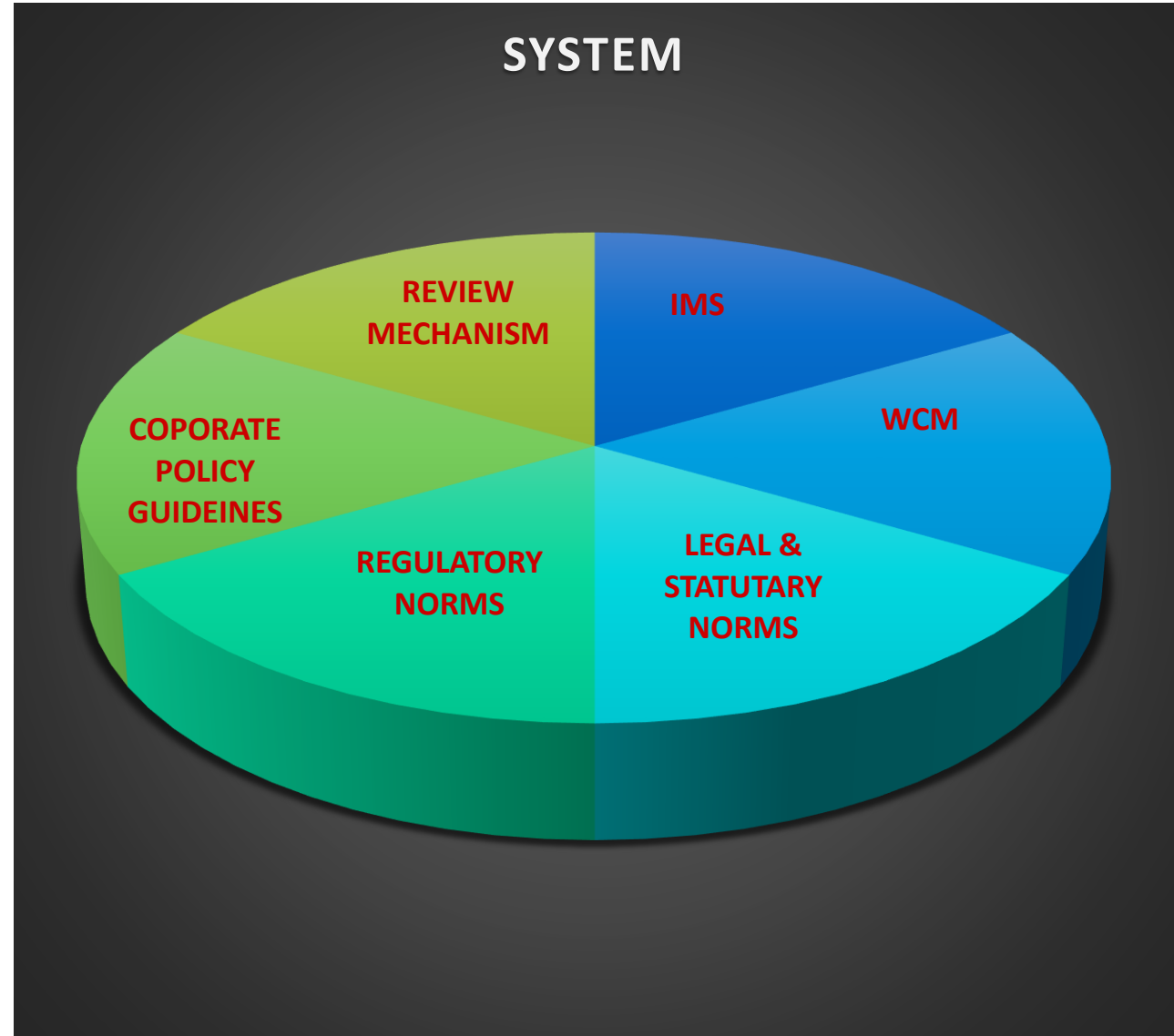
Green Belt Cover @Hindalco



Systematic Approach



Certification	Year
ISO 9001	2008, 2015
ISO 14001	2004, 2015
ISO 18001	2007
ISO 45001	2017
ISO 50001	2015, 2020



Maintenance & Reliability:

Advanced Condition Monitoring

Condition monitoring activities transformed into many folds, by using ultrasonic technology, thermography.

Maintenance KPI

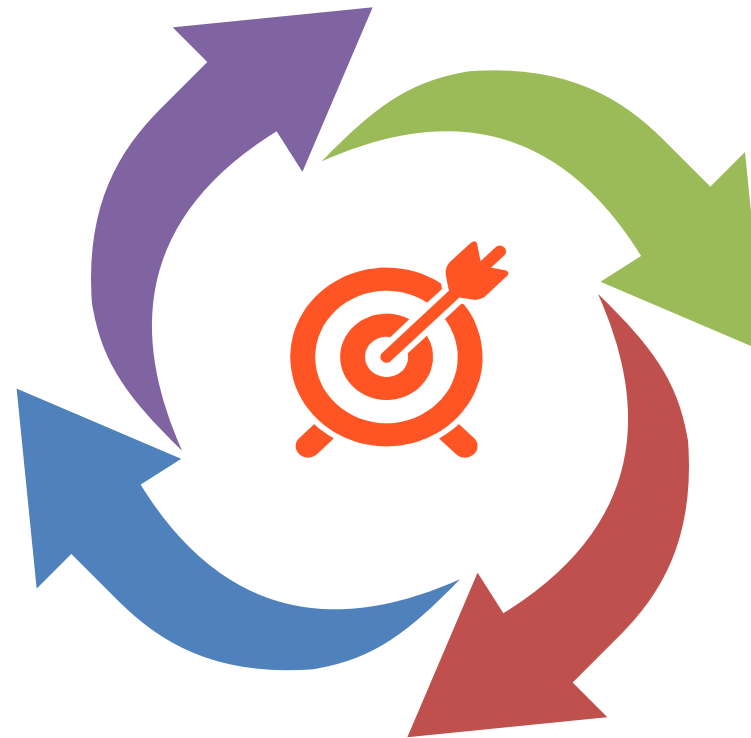
Monitoring KPIs i.e., EEA, MTBF, PM compliance on monthly basis and tracking and monitoring all major equipment's maintenance with proper review

Performance Monitoring & Gap Analysis

Monthly TG, Boiler & equipment's performance monitoring as per standards ASME PTC 4.0 for gap analysis and suggesting improvement plan.

Shutdown / Overhauling Monitoring

Review of every major shutdown & overhauling with deviation and gap analysis thru Grant Chart for better execution.



Maintenance & Reliability:



Ultrasonic Technology

- > Compressed Air Audit
- > Partial discharge/ arcing/tracking
- > Air Ingress/ Valves & Drains passing
- > Flow measurement



SPM Technology

- > Vibration Monitoring
- > Advanced analytics
- > Dynamic Balancing
- > Motor Current Signature Analysis



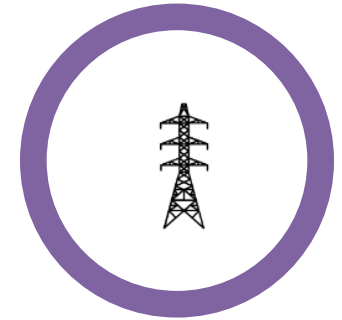
Lube Oil Analysis

- > Mechanical Impurities
- > Viscosity Testing
- > NAS
- > Moisture
- > TAN



Thermography

- > Hot Spot
- > Boiler Insulation
- > Bearing
- > Terminal Box



HT Side Testing

- > Tan Delta
- > DGA
- > LA 3rd Harmonic
- > PID Testing
- > Contact Resistance measurement

Maintenance & Reliability:

S No	Project Name	Category	Block Cost (In Lacs)	Status
1	Unit # 1 Heat rate improvement and capacity Upgradation	Heat Rate Improvement	4000.00	Enquiry given to BHEL , GE and Siemens. All inputs provided to Vendors as per their requirement. M/s Siemens and M/s GE visited Hirakud. Offer expected by 10 th August. CP to be raised by 20 th August.
2	TG#2 Overhauling along with replacement of GBC#6 for PHR improvement	Heat Rate Improvement	992.00	Planned in Oct'21
3	Unit 5 Turbine capital Overhauling	Heat Rate Improvement	739.00	Planned in Feb'22
4	Installation of 6nos Micro pulse for Stack emission reduction in Unit-2, 3 & 4	Sustainability	699.00	CP Raised on 1st Jun 2021, under approval.
5	Addition of ECO-1 Coil in Boiler #6	Heat Rate Improvement	250.00	Techno-commercial offer received from OEM i. e TKI IPL. CP to be raised by 5 th Aug
5	Installation of De Sox Systems to meet Boiler flue gas Sox emission as per MOEFCC norms by limestone injection	Sustainability	2900.00	Civil foundation work for Unit- 4&5 is under progress. Unit - 2&3 excavation under progress.
6	Tower Diversion at Ash dyke	Sustainability	668.00	17/19 tower foundation & erection completed. Work under progress for 18th. Target completion-Dec-21
7	Installation of screen in Unit# 3 Secondary Crusher houses to control coal fines and improve Boiler Efficiency	Heat Rate Improvement	200.00	PO confirmed to Thermax.
8	Coal Sampling Shed through Augur mechanism	Sustainability	175.00	Foundation job complete. Fabrication completed by 75%. Peripheral drain job is under process. Structural erection will start after getting crane at site. Target completion- Dec-21, Supplementary CP raised for additional approval
9	Installation of Raw Water Pumping Station inside CPP	Sustainability	169.00	Pump received civil work to be started
10	3rd raw water pipeline	Sustainability	200.00	1.2 km completed out of 1.7 Km. Waiting for clearance from legal department for resumption of the work.

Asset Management:

Warranty card for all the critical equipment's.

Standardization & Development of OPL format / MP Design Formats

Model area Identification, development action plan, criteria, system / process implementation.

Several new equipment of NDT are introduced for better break down analysis & condition monitoring.

03 No of RCM projects has been successfully completed i.e. Boiler Feed pump (2B), Secondary crusher & Intermediate silo

Training on RCM has been given to total 06 person as on day.

10 No of job has been handed over to operation for Autonomous Maintenance.

Asset Criticality Review, Asset Record & Tag no display on every equipment.

Digitalization of all documents & drawings,

Strengthening of PM & CM through On-line (Oracle),

Skill level enhancement on Problem solving tools, Improvement in MTTR & MTBF.

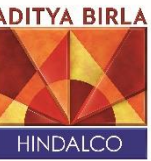
Optimization of Inventory level, Strengthening of Ownership Culture, Model area development, Reliability Centered Maintenance.

R&D @ Hiralud – Summary of Brain Storming

Nos of Improvement ideas captured Post Brainstorming Session with Cross Functional Team Members

Sr no	Area	Reliability	Safety	Sustainability	Performance	Operation flexibility	Cost Saving	Total Projects	Approved project from List	High priority	Medium priority	Low priority
1	Boiler	15	1	6	4	2	2	30	6	5	13	11
2	Turbine	5	3	0	7	0	6	21	4	6	9	5
3	CHP	7	1	2	2	1	0	13	3	2	5	7
4	AHP	4	1	2	2	1	0	10	3	1	6	4
5	BOP	7	6	7	6	1	7	34	9	2	10	22
8	Electrical	30	2	1	3	0	3	39	16	4	22	13
9	CPP	7	1	6	1	0	0	15	2	4	7	4
10	Inst	11	1	1	1	2	0	16	12	0	11	5
11	Others	1	0	0	0	1	0	2	0	0	1	1
	Grand Total	87	16	25	26	8	18	180	55	24	84	72

Research & New Initiatives @ CPP Hirakud



Project #1 – Black Start DG (Project Cost: Offers Awaited)

Project #2 – New Turbine Rotor(Siemens) (Project Cost: 50 Crs)

Project #3 – Installation of 300 TPH CFBC Boiler in place of Boiler#2 (Project Cost: 100 Crs)

Project #4 – Capacity Enhancement of Emergency Reservoir (Project Cost: 10 Crs)

Project #5 – Achieve PM Emission Level up to 30 mg/Nm³ (Project Cost: 25 Crs)

Project #6 – Capacity Enhancement of RO Plant (Project Cost: 15 Crs)

Project #7 – Double Bus System for Main Receiving Station. (Project Cost: 30 Crs)

Project #8 – New Coal Yard (Project Cost: 5 Crs)

Project #9 – Unit#3 & 4 Main Steam Header Interconnection (Project Cost: 20 Crs)

- Hindalco, Hirakud works in 23 villages, which are under Dhankauda block of Sambalpur Districts in the state of Odisha. We have reached out to a rural Population of about of 46145 till March2021 (2020-21).
- During the financial year 2020-21 a total of Rs. 315.50 lakhs has been expensed for CSR activities where our contribution is Rs. 202.50 lakhs and Rs.113.00 lakhs has been mobilized from Govt. & other sources.

Our focused interventions are in the field of:



CSR Activities



Scholarship to Meritorious Students



Immunization Programme



Family Planning Camp

5. Eye Screening & Cataract Operation Camp:



Eye Screening & Cataract Operation Camp

CSR Activities

9. Awareness on COVID-19:



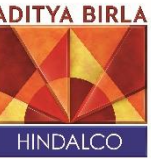
8. Pulse Polio Rally & Immunisation Programme:



12. Aditya Birla Skill Centre



CSR Activities



CSR Budget is now more than doubled to provide service to community that were in last 5 years back. Currently the Budget is 261 Lakhs in comparison to 108 Lakhs in 5 years back.

Strengthening women empowerment activities with currently 61 SHG with 749 members with a deposit of more than 74 lakhs as well as 17 SHGs are involved in Income generation activities by taking a loan from banks in comparison to 36 SHGs in 5 years back with 6 SHGs were involved in IGP.

We are focusing more on the health care programme by organising different camps like, Eye, dental, family planning and other this year up to 3rd qtr we have done an expenditure of more than 57 lakhs in Health sector in comparison to 14.77 lakhs in the year 2015-16.

We have travelled a journey from frequent disturbance by the local villagers at our site before 2015 to zero surprises now

Awards & Accolades



CPP – I G M C Awards in 2021



CPP -Energy Efficient Unit by CII in 2020



CPP –Most Innovative Project by CII in 2020



CEM Insight Award to CPP in 2020



Reprism in 2019



Gold Award in NAMC 2018

Thanks!

Mr. Rajeev Kumar- AGM (Technical Services) -9090090209 , [rajeev.kumar @ adityabirla.com](mailto:rajeev.kumar@adityabirla.com)
Mr. Kailash Pradhan – GM (Operation)-9090064304 , kailash.padhan@adityabirla.com
Mr. Nimai Mahapatro – AVP (Operation)-9090079516 , Nimai.Mahapatro@adityabirla.com