Confederation of Indian Industry
125 Years: 1895-2020

CII National Award for Excellence in Energy Management 2022

Hindalco Industries ltd.
Unit : Mahan Aluminium, Singrauli (M.P)

Team members:
Mr. S.P. Singh – General Manager – Technical Service
Mr. Vijay Bansal - Sr. Manager – Technical Services

Company Profile –Hindalco Mahan

Singrauli (M.P) - Hindalco Mahan Aluminum Limited

Production Volume

Hot Metal :- 370 KTPA

Power Generation:- 900 MW

- A flagship company of the Aditya Birla Group
- First unit was commissioned in March,2013 and last unit in September,2016.

150x6 = 900 MW

Mahan CPP – Journey towards Excellence

2009-10

Foundation Laid 9th July 2009

2013-14

- First Unit Sync.
- First Metal Production

2015-16

- Full load generation
- Full Production 3.59 MTPA
- Energy management Team formation
- PAT-II cycles enrollment

2016-17

- 2016 -17
- NECA Award

2017-18

- Carbon & Energy Policy
- Energy Audit- MEA

2018-19

- Mahan Road Map & Guidelines
- Unit Energy policy
- PAT-II cycle Audit by BEE partners

2019-20

- BEE Energy Manager Exam

2nd Rank holder from CPP

- 4 engineers qualified as EM
- ISO 50001 Energy management certification by DNV

2020-21

- MEA by External Agency
- " Energy Efficient plant" by CII
- Best Energy efficient plant in Eastern Region Coal by Mission Energy Foundation

2021-22

- " Excellent Energy Efficient plant" by CII
- Runner Up Sustainability Award from Econour

Integrity | Commitment | Passion | Seamlessness | Speed

Energy Consumption Overview _Thermal

FY 20-21

- Coal Energy -13,363,812 m-kcal
- Oil Energy 5,528 m-kcal
- Total Energy 13,369,340 m-kcal

FY 21-22

- Coal Energy -13,254,096 m-kcal
- Oil Energy 6,238 m-kcal
- Total Energy 13,260,334 m-kcal

Total Energy Reduction ~ 0.8%

FY 20-21 (Achieved)	FY 21-22 (Achieved)	FY 22-23 (Target)
Sp. energy :157.55 GJ/T	Sp. energy :154.03 GJ/T	Sp. energy : 154.32 GJ/T
Sp. energy :3.76 TOE/T	Sp. energy : 3.68 TOE/T	Sp. energy : 3.69 TOE/T
Sp. emission : 16.10 tCO2/t	Sp. emission : 15.76tCO2/t	Sp. emission : 15.81 tCO2/t

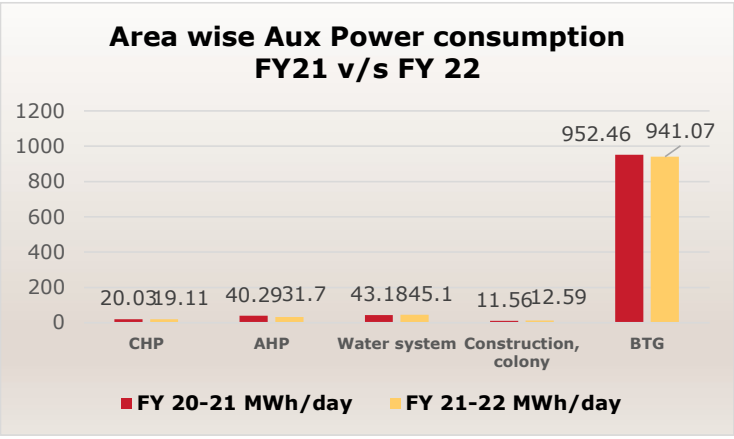
Energy Consumption overview _Electrical

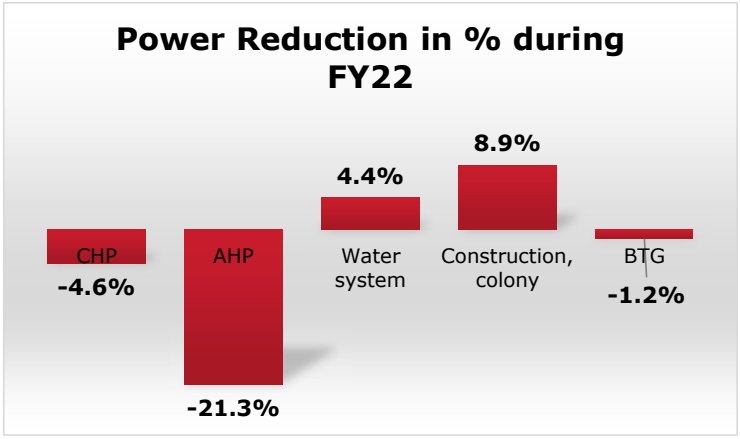
Area	FY 20-21 MWh/day	FY 21-22 MWh/day	Reduction in MWh/day	% Reduction in Auxiliary Power consumption
CHP	20.03	19.11	-0.92	
AHP	40.29	31.70	-8.59	
Water system	43.18	45.10	+1.92	
Construction, colony	11.56	12.59	+1.03	
BTG	952.46	941.07	-11.39	
Total	1067.52	1049.57	-17.95	1.7%

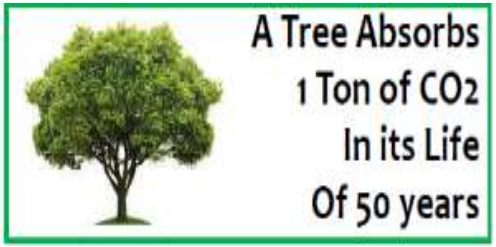
FY 20-21 Average Aux power ~ 1067.52 MWh

FY 21-22 Average Aux power ~ 1049.57 MWh

Saving of 18 MWh ~ 1.7% of average Aux power



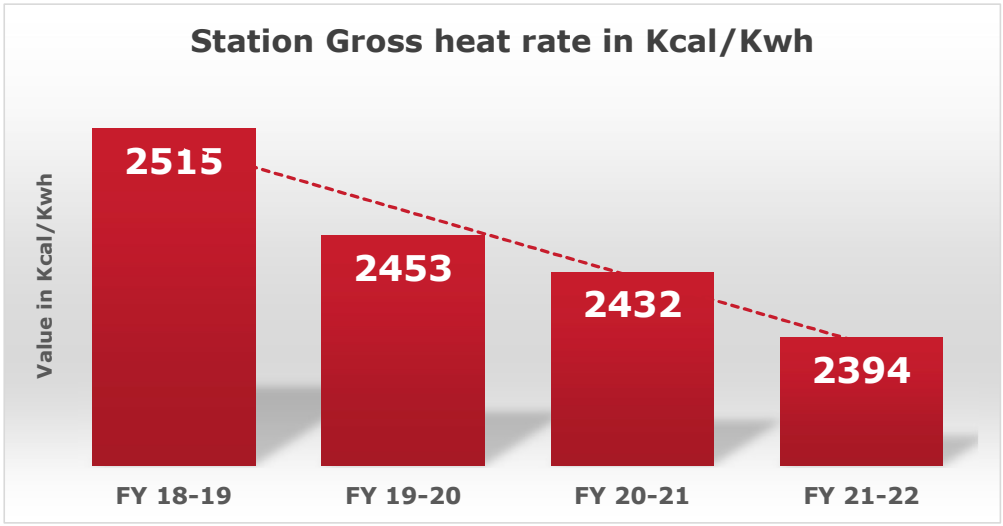


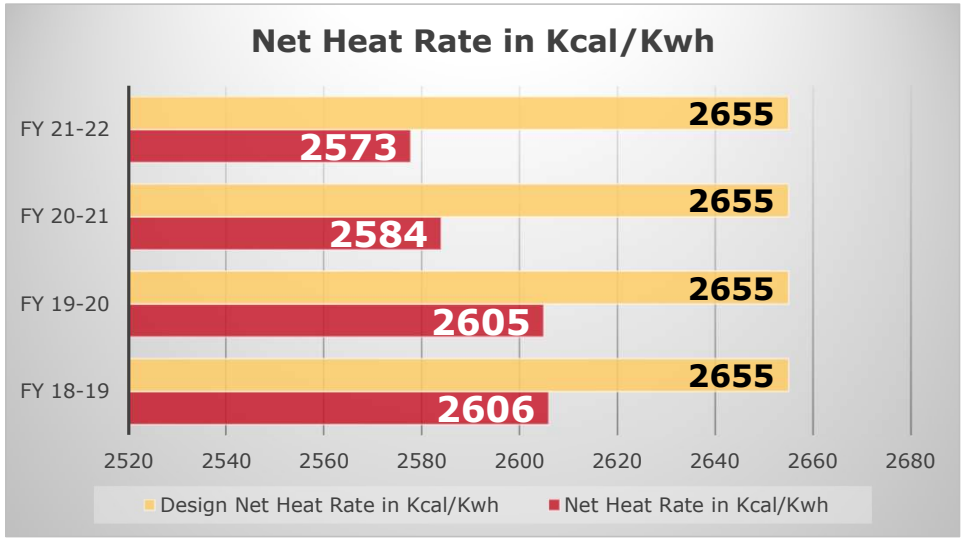


CPP Performance: FY21 vs FY 22

Parameters	unit	FY 21	FY 22
Power Generation	MU	5451	5576
Plant Load Factor	%	69.1	70.73
Plant Availability	%	83.75	83.44
Gross Heat Rate	Kcal/kWh	2432	2394
Auxiliary Power Cons	%	7.11	6.95
Boiler Efficiency (Station wise)	%	86.23	86.34
Turbine Efficiency (Station wise)	%	2068	2071
Specific DM water cons.	%	0.62	0.52
Raw water cons.	ltr/kWh	2.351	2.289
Specific Oil Cons.	ml/kWh	0.10	0.12

Mahan CPP – Sp. Energy Consumption (FY 19-FY 22)

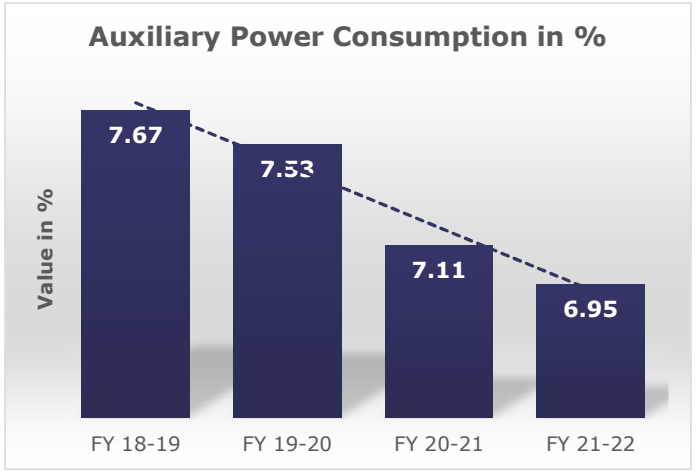


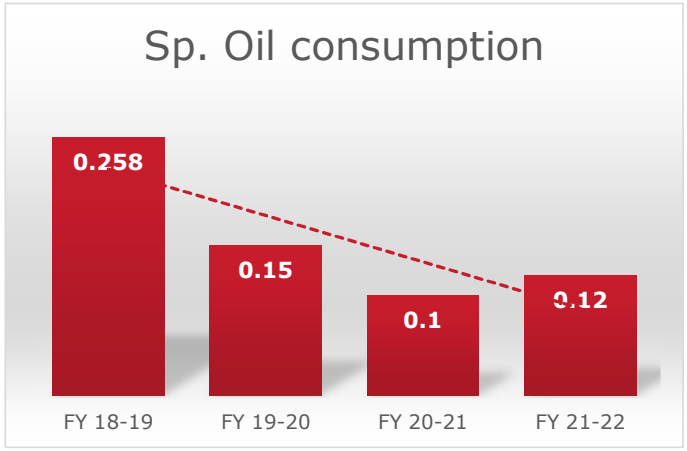


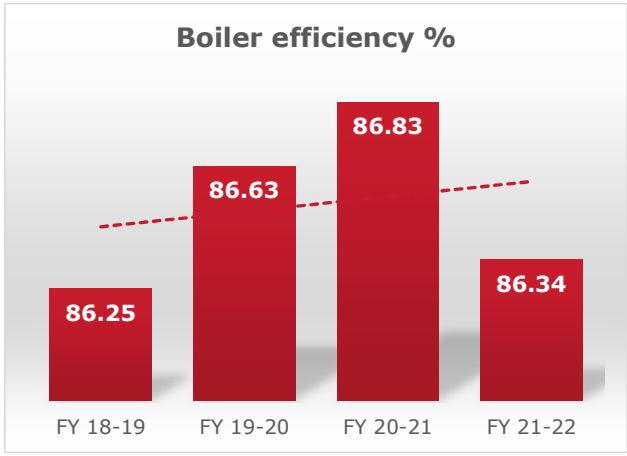
Heat Rate Improvement initiatives taken during FY 22

1. Condenser vacuum improvement (5 mm Hg) by arresting air ingress from LP area, Cooling Tower fills cleaning, modification of cooling water pumps impellers and optimization of CT fan blade angle.
2. Vacuum improvement by improving CW water quality through NOB(Non oxidizing biocide) and hypo dosing.
3. Condenser backwashing during unit running condition.
4. Boiler Efficiency improved (0.2%) by arresting the air ingress across APH, sealing the gap between baskets, coal burner tip replacement/repairing.
5. Net Heat rate reduced from previous year due to improved auxiliary power consumption.

Mahan CPP – Sp. Energy Consumption (FY 19-FY 22)







A. APC Initiatives

- Mill operation reduced from 4 to 3 based on feeding coal quality
- Operation of 1 pumps in each unit
- Optimizing main plant compressors power consumption.
- Increasing coal feed factor of CHP conveyors
- Reduction of AHP specific power consumption

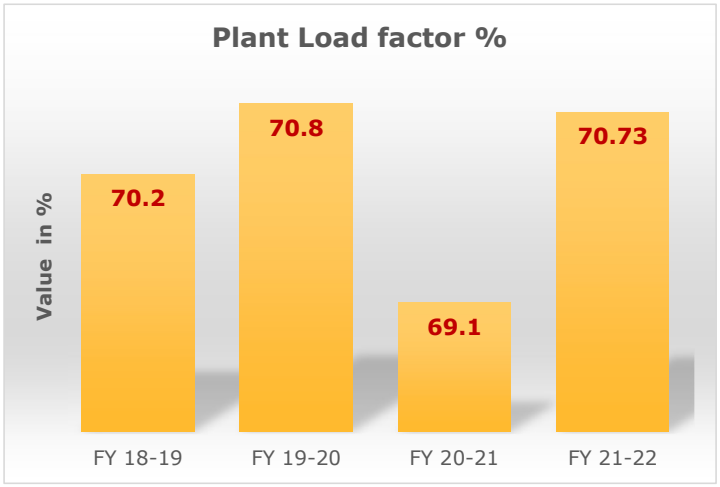
B. Specific Oil Consumption

- *Reduction in unit startup time by hot water flushing, condensate dumping & erection of bypass line for main steam silica*
- *Clubbing oil gun trial with PM activity*
- *Ensure air blaster healthiness of coal bunkers in rainy seasons*
- *Periodic Coal bunker cleaning*
- *Covering coal heaps during monsoon*

C. Boiler Efficiency

- Reduction in Dry flue gas losses
- Reduction in Unburnt losses
- Reduction in Mill reject losses
- Reduction in cycle make up

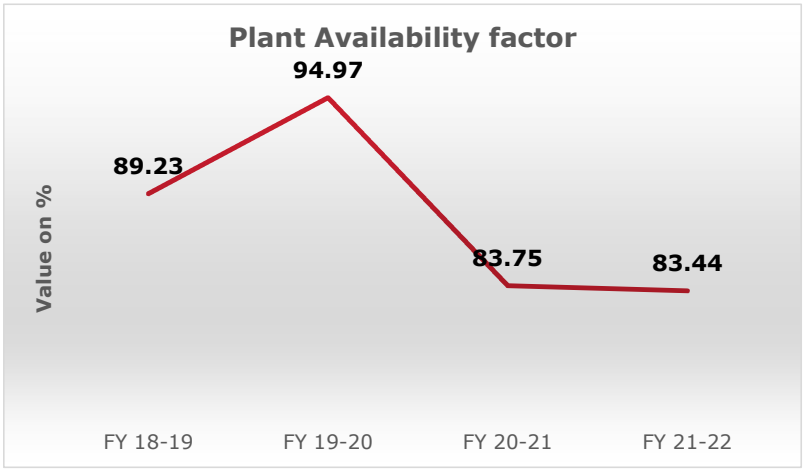
Mahan CPP – Sp. Energy Consumption (FY 19-FY 22)

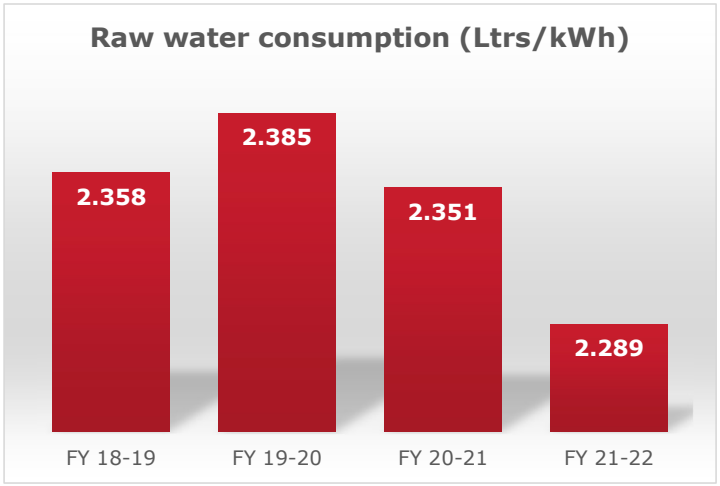


Highlighter

A. PLF is high due to high smelter demand compared to previous year

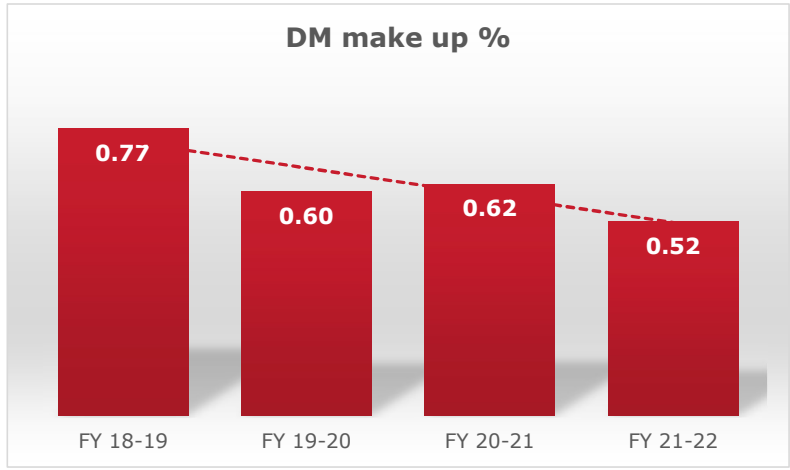
B. Unit#1 shutdown for DCS Server maintenance work.
Unit#2 shutdown for Generator Vibration rectification work





C. Raw water consumption has reduced with compared to FY 20-21.
1. No fresh water make up for AHP operation
2. De- ashing time changed from 8 hrs. to 12 hrs.
3. Water Audit on monthly basis.

***D.* Cycle make up has reduced compared to previous year**



Benchmarking for 150 MW for FY 22

National Benchmarking

PARAMETERS	UOM	National Best	Mahan Aluminium FY 22	Reference
Gross Heat Rate	Kcal/kWh	2450	2394	Ref: BEE Improving Thermal power Sep 18
Turbine Heat Rate	Kcal/kWh	1970	2071	
Aux Power consumption	%	6.92	6.95	
Plant load factor	%	80	70.73	Reference 135-150 MW range
Plant availability factor	%	84	83.44	
Sp. Oil consumption	ml/kWh	0.1	0.12	

Short term Goal:

- Implementation of EnCon Projects as per MEA audit.
- Industry 4.0 -Digitalization
- Exploring latest technologies and advanced software
- 100% Ash utilization
- Commissioning of 35 MWe Solar PV plant
- Commissioning of FGD system
- Installation of 7MWe Floating Solar power plant
- DCS upgradation
- Exploring feasibility for utilization of natural gas from GAIL

Internal Benchmarking for 150 MW

		Aditya		Mahan		RSG		HKD	
KPI	UOM	FY22 Actual	FY22 P&B	FY22 Actual	FY22 P&B	FY22 Actual	FY22 P&B	FY22 Actual	FY22 P&B
Gross Power Generation	MU	5623	5648	5576	5568	6270	6159	3029	3004
Overall PLF	%	71.33	71.6	70.7	70.6	86.7	84.8	74.0	73.4
Overall Boiler Efficiency	%	85.96	85.90	86.34	85.4	86.1	85.8	86.3	86.1
Overall Plant Heat Rate	Kcal/KWH	2419	2420	2394	2443	2585	2584	2738	2625
Auxiliary Power Consumption	%	7.18	7.75	6.95	7.44	7.83	8.01	9.08	9.11
Specific Oil Consumption	ml/KWH	0.12	0.24	0.12	0.20	0.21	0.31	0.08	0.08
Fired Coal GCV	Kcal/Kg	3430	3571	3755	3700	3975	3739	3342	3217

Roadmap to achieve National Benchmark

GROSS HEAT RATE

- Replacing of fill pack of cooling towers- 1 CT fills replaced
- Overhauling of Boiler & APH seal replacement

SP. OIL CONSUMPTION

- Further optimization of unit start up time
- Hot water flushing
- Sustaining the unit without oil support in case of top mill tripping

AVAILABILITY

- 100% PM compliance
- Root cause analysis of repeated failures
- Training to maintenance team on RCM (Reliabity centered Maintenance)

1

AUXILIARY POWER CONSUMPTION

- De – staging of boiler feed water pump-01 No completed
- Duct modification by CFD study to reduce ID fan power

2

3

SP. DM WATER CONSUMPTION

- Arresting valve passing during unit overhauling
- Reduction of unit start up time
- Optimization of soot bowing

4

5

SP. RAW WATER CONSUMPTION

- Installation of flow meters at Major consumers
- Water audit
- Survey of under ground pipelines
- Water Pinch Study

6

Energy Saving Projects planned in FY 23

Details of initiatives	Potential Gain	Target Date	Status till July,22
LED replacement in BTG & CHP	20 kW	Mar'22	Completed
VFD installation in LDO Forwarding pump	8 kW	July'22	Completed
ASTRO Timer installation in High mast and outdoor lighting	8 kW	Oct'22	23/41 Completed.
Installation of VFD in AHP - Seal water pump or LP pump	15 kW	Mar'23	Taken in FY'23 Capex
Increasing 5A/B conveyor loading factor	100 kW	Apr'22	PO raised material not received, Loading factor is 1227 TPH up to 01.04.2022.
Increasing 7A/B conveyor loading factor	100 kW	Mar'22	Completed
Boiler -5&6 Duct modification by CFD to reduce ID fan Power	150 Kw for 2 unit	Unit#5- Apr'22 Unit#6 –Sep'22	Completed Unit#5
Efficiency improvement of raw water pumps	40 kW, Capex proposed	Sep'22	PO Pending
De staging of boiler feed pump	1000 kW for 5 units	March'23	Completed in BFP-4A, 190 KW saving achieved.

Total Estimated Saving : 1440 kW (0.15% reduction)

Energy saving projects implemented during FY 19-FY 22

FY 19-20

- No. of projects :13
- Saving in lakh Kwh:142.29
- Total savings in Million Rs :135.13

FY 20-21

- No. of projects :12
- Saving in lakh Kwh:84.8
- Total savings in Million Rs :89.54

FY 21-22

- No. of projects :3
- Saving in lakh Kwh:29.99
- Total savings in Million Rs :3.46

Innovative Project: Heavy vehicle tracking & fuel optimization

Background of problem :

- Mahan CHP is handling 3.8 million tons of coal per annum. We are equipped with heavy earth moving equipment like Bull Dozers (05 Nos.), Excavator (01 No), Front wheel loader (01 No), skid steer loader (02 Nos.) for coal yard management activities such as stacking, loading, heap compaction, heap shaping, mill rejects handling, dozing coal into hoppers etc.,
- In order to carryout mentioned activities, 754 KL of High-speed diesel is been used for HIL owned equipment and 117 KL in Hired equipment for a period of 12 months (April 2021 to Mar 2022).
- Mahan may spend around 8.39 Crores on diesel which is ~38% of CHP Annual budget
- Unnecessary idling time, bad driving habits, pilferage if any may reduce fuel efficiency minimum by 5-10% which is a big potential loss

Solution :

Activity Sensor

- Magnetic based sensor, Not connected to any power of Machine
- Working on the basis of Machine Vibration to calculate Activity & Idle time of battery

GPS Sensor

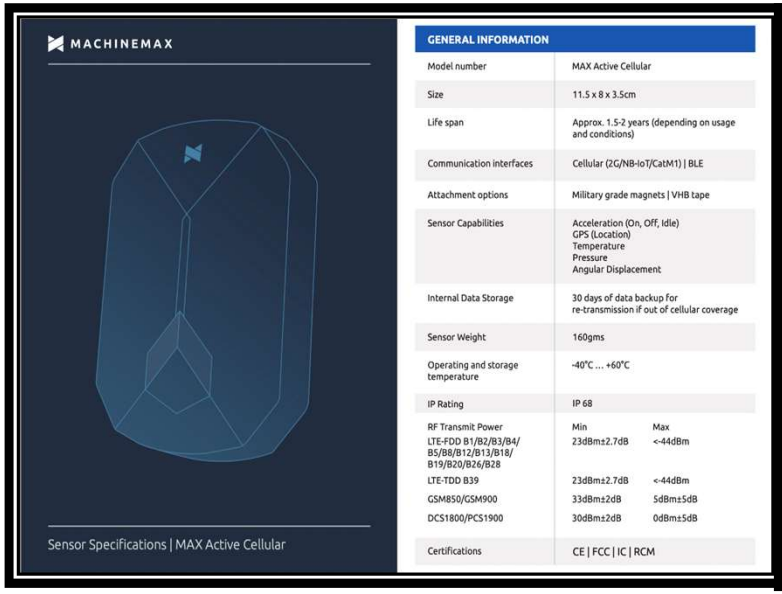
- 12/24 V Power connected to machine battery
- Bluetooth connection is available to connect with Fuel sensor

Fuel Sensor

- Connected through Bluetooth
- Calibration required according to fuel tank

Innovative Project: Potential financial benefits after project implementation

- **Diesel cost incurred for 12 months in HIL owned vehicles – Rs. 6.56 Cr.**
- **Diesel cost incurred for 12 months in Hired vehicles – Rs. 1.12 Cr.**
- **If HIL is providing diesel to Hired vehicles, a savings of Rs. 9.04/- per liter on account of R&M cost will get reduced which is in a tune of Rs. 11.53 lakhs per annum will be saved.**
- **Considering recovery of predicted 3% potential loss, we can save Rs. 25 lakhs per annum as a minimum in other terms 29 KL of diesel consumption.**
- **A total of Rs. 36.53 lakhs recurring savings per annum can be done with Overall cost of 21 no's equipment subscription & analyst charges (one time) – Rs. 16.14 lakhs per annum**



7. Utilization of Renewable energy sources

Project – Renewable Solar Power - 35 MW

Commissioning Target : Commissioned sync permission awaited

Technology : Solar Energy Photovoltaic cell

Jobs completed : Yes

Status: Synchronization Permission pending

Technology (Electrical)	Type of Energy	Installed Capacity (million kCal)	Usage (million kCal)	% of overall thermal energy
Electrical	Solar Energy	NA	NA	NA

Beginning of Transformational Journey : Reduction in carbon footprint at Hindalco Mahan

" Successful development of solar operated vehicle and solar pump "

Team CPP mechanical made the solar operated vehicle from the scrap available at site under "waste to wealth scheme " with mere investment in Solar panel only. This prototype has been made to built up the confidence of team and to have a sustainable development towards reduction in carbon footprint at Hindalco, Mahan. Team is now geared up to make the "solar operated vehicle for passenger movement and material movement for plant and township team "

"At Hindalco, we have invested in renewable energy, rainwater harvesting, waste recycling, green products and more. We are working steadily towards Net Zero carbon, Net Zero waste to landfill and Net Water Positive by 2050.

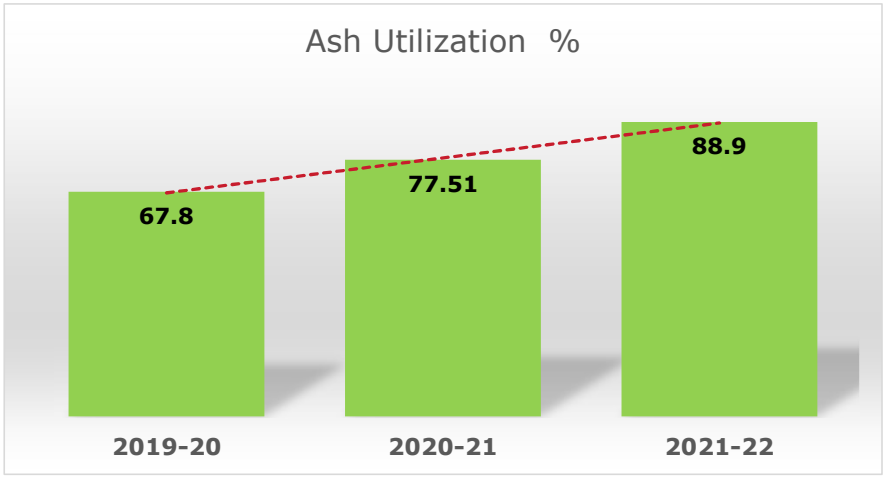
Going ahead, Team CPP mechanical has made operational the inhouse made solar operated passenger and loader vehicle with all safety features at Hindalco Mahan after successful trial run of prototype vehicle on 26th Jan'22 under waste to wealth scheme

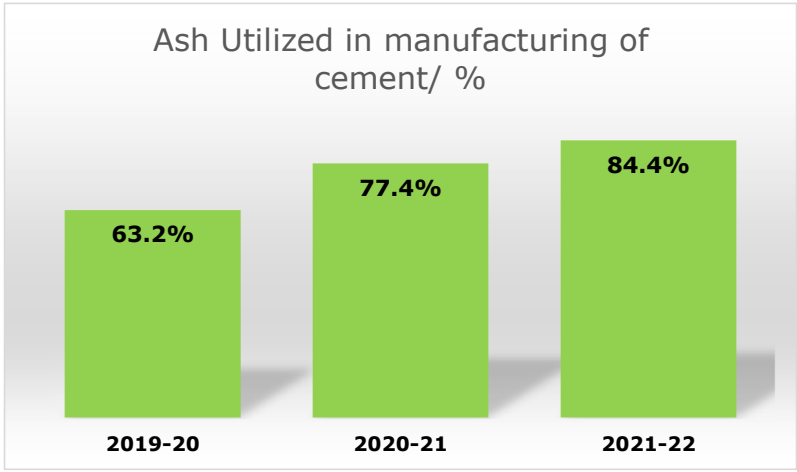
Team has also commissioned solar operated pump for recycling of water in remote locations, a step towards reduction in carbon footprint.

Looking forward to deployed a multi-pronged approach to limit our carbon footprint for sustainable development while ensuring Hindalco been a "Manufacturing company that is greener, smarter, and better"."

A STEP TOWARDS THE REDUCTION IN CARBON FOOT PRINT AT HINDALCO , MAHAN

8. Environment Management -Ash Utilization





1st Fly ash disposal through Rake started on 28th Oct'20. Total 44 rakes dispatched during the year.

In House Fly ash brick manufacturing plant. Fly ash Brick plant commissioned on 27th Jan'21

8. Environment Management -Ash Utilization

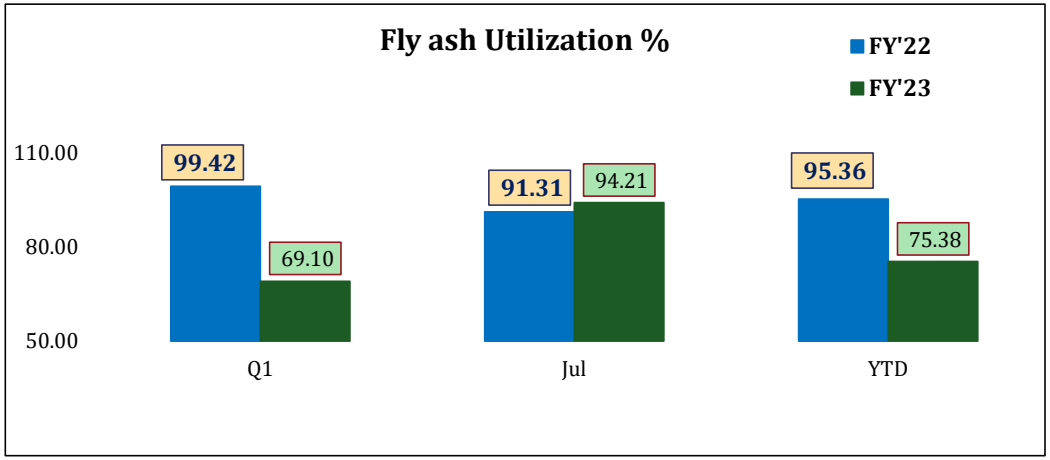
Particulars	UOM	2019-20	2020-21	2021-22
Ash Stock in plant(Yard+pond)	Tons	2028910	1820231	**1845439**
Ash Generated	Tons	1294050	1274115	**1154915**
Ash Utilization	%	67.8	77.51	**88.9**
Ash Utilized in manufacturing of cement/	%	63.2%	77.4%	**84.4%**
Ash Utilized for Fly ash Brick	%	0%	0.11%	**.001%**
Ash Utilized for Mine Filling	%	0%	0%	**4.3%**
Ash Utilized for Road pavment	%	4.63%	0%	**0.199%**
Ash Utilized in other areas	%			
Ash loading side bed leveling	%	0	0	0
Internal construction activities	%	0	0	0

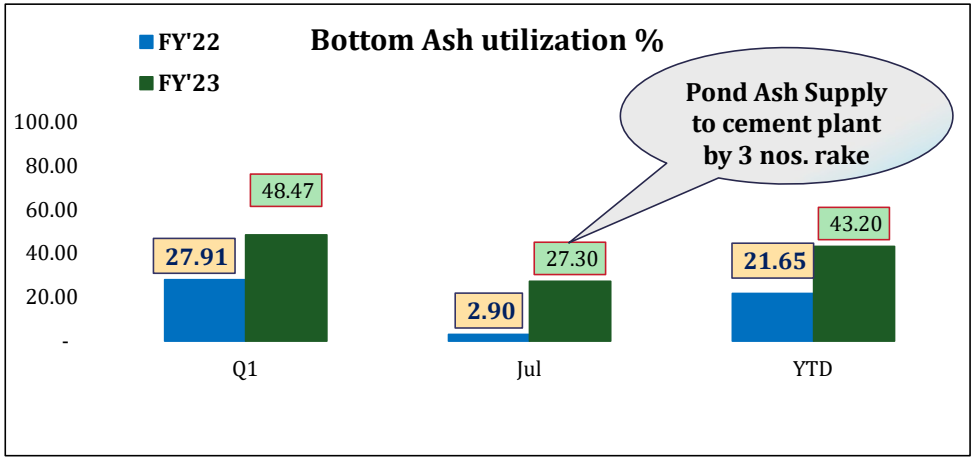
Ash Handling through Various Methods		
Ash Handling through (Wet Method)	%	10
Ash handled (Dry Method)	%	90
Ash handled (Semi wet))	%	0

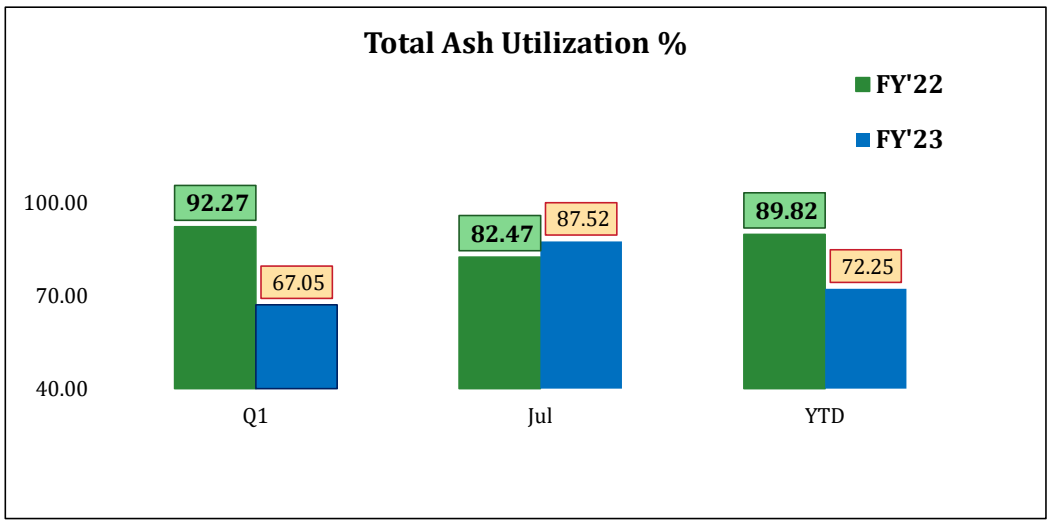
Salient Features:-

- Long term agreement with M/s. Prism cement and UltraTech cement.
- Ash utilization in land reclamation and road construction
- Ash utilization in brick plant .

Ash Generation & Utilization comparison:







100% Fly ash utilization :

- Entire fly ash supply to cement vendors through bulkers & rakes
- Use of fly ash in brick plant -10 lakhs bricks per annum
- Technical support to near by external fly ash brick manufacturers

To increase Bottom ash utilization

- More bottom ash utilization in road construction
- Rake disposal to cement plants – 10 rakes per month

TARGET ASH UTILIZATION FY-22: 95%

Best practices – Afforestation at Mahan

- Total area of the plant and township is 3104 Acre .
- Area required for green belt development (33% of 3104) acre is 1024.32.
- Green belt and garden developed in 1050.68 Acre.
- Compliance status as on July,2021 is 33.85 %.
- Planted 10.29 Lakhs trees in 1013.3 Acre.
- The average survival of green belt is 74.15 %
- We have developed landscape garden in 37.65 Acre.








8. Environmental Management - Emission

Particulars	UOM	2019-20	2020-21	2021-22
Specific CO2 Emission per MWh Generation	Ton/MWh	1.03	1.01	0.977
Current SOx Emissions at Full Load*	mg/Nm3	444.0	370.0	315.0
Current NOx Emissions at Full Load*	mg/Nm3	222.0	191.0	174.0
Particulate Matter *	mg/Nm3	38.0	40.0	43.0
Mercury* *	mg/Nm3	0	0	0

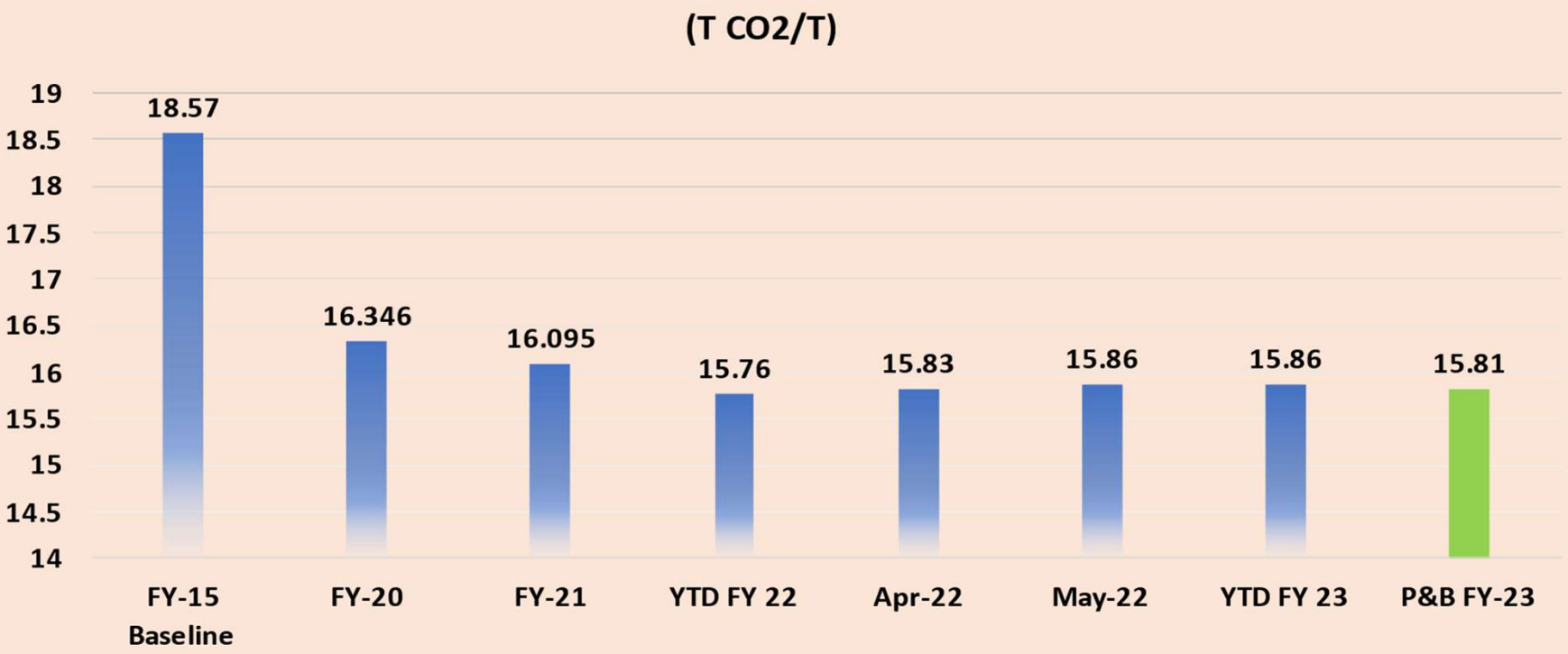
Best practices adopted for Emission control and monitoring

- **Continuous Emission monitoring system**
- **Separate Over Fire Air (SOFA) system**
- **Burner modification**
- **Coal nozzle tip modification**
- **Dust suppression system at CHP.**

8. Environmental Management – Emission @unit level

Scope 1&2 energy	FY 20	FY 21	FY 22
Equivalent Production (MT)	365892	358646	369790
Fuel Type	Thermal Energy (Million kCal)		
Coal	13865550	13363781	13254096
LDO-Power Plant	7779	4998	6238
HSD-Power	736	515	528
HSD-Material Handling	15607	16431	15559
FO-Process(CH)	23257	18595	23898
FO-Process(Anode)	88915	89228	89283
Propane	2309	1631	1688
Total Thermal (Million kCal)	14004152	13495179	13391291
Absolute emission (LT Co2)	59.808	57.724	58.279

Monthly T CO2/T

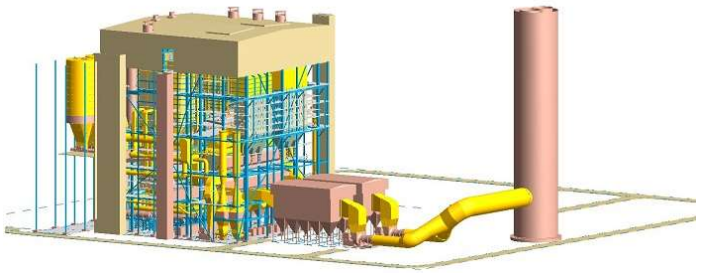


8. Environmental Management - Emission

Flue gas Desulphurization (mg/Nm^3)

- Purpose-To Control the Sox level below 600 mg/Nm^3
- Technology :Semi Dry Flue gas Desulphurization system
- Target Commissioning –Sep' 22
- Target Emission:- 600 mg/Nm^3

Status : Implementation is under progress



Suspended Particulate Matter (mg/Nm^3)

To Control the spm below 50 mg/Nm³

- Technology : High frequency three phase transformer & Micro pulse
- Emission: Below 50 mg/Nm³

Status: Completed

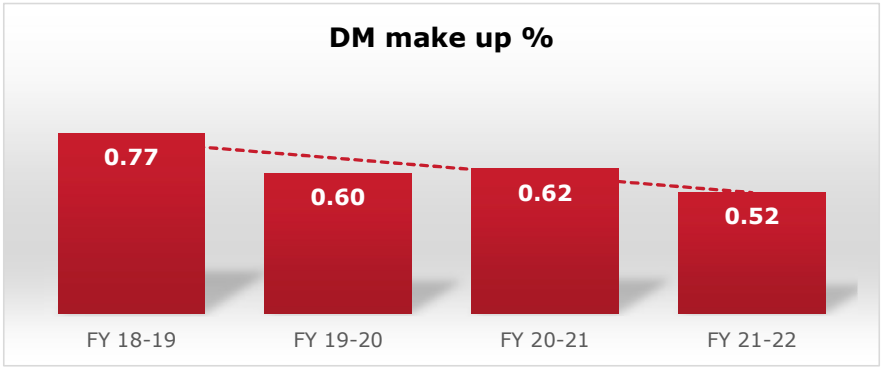
Project – De- Nox (mg/Nm^3)

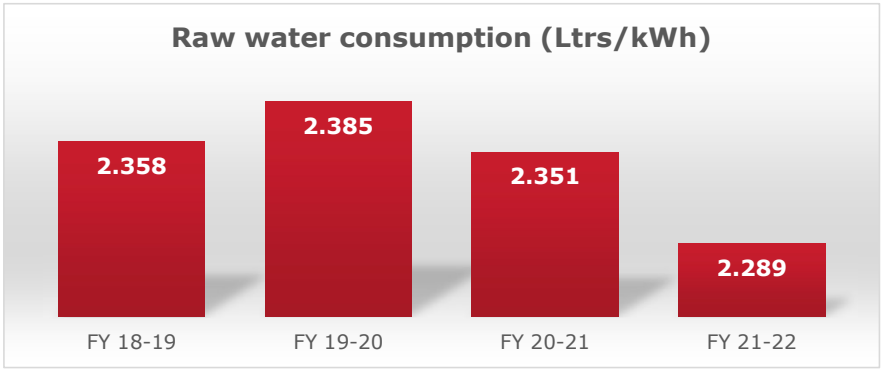
To control the Nox below 290 mg/Nm³ @ 6 % O_2

Technology : The new combustion system consists of new Burner tips and Separate Over Fire Air (SOFA) system. Completed in Unit#3

Status: Completed (Presently Nox value in other units is within limit)

Environmental Management - Water





Our plant is ZLD plant.

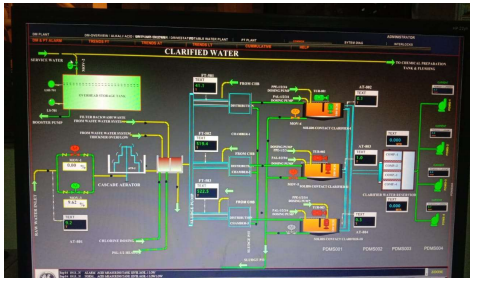
Initiatives to reduce water consumption :

Silica analyzer commissioned for Strong Base Anion(SBA) and Mixed Bed at DM Plant for Online Monitoring of Silica.

New Turbidity meter installed and commissioned for Raw Water for online monitoring

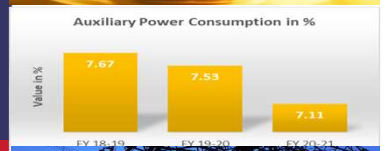
MOV installed & commissioned for AUTO operation at CHP pump house service water line to reduce the water overflow and wastage of service water.

Real Time View of Water Flow on SCADA at DM Plant



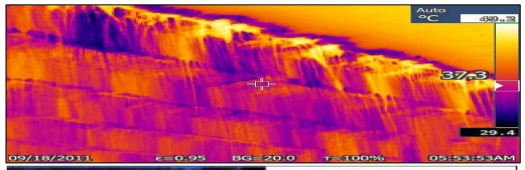
9. Best Practices –O&M Excellence

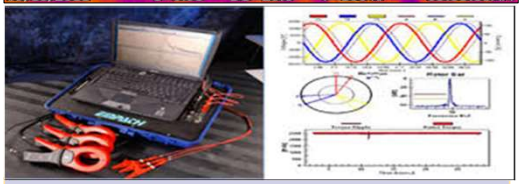
1	Boiler Tube Leakages reduction	By ensuring 100% RT of weld joints and application of Plastic Refractory in burner area.
2	Effective Coal Management and Accounting	Drone survey on weekly & Total Station survey on monthly basis
3	100% PM & CBM Compliance	ZERO critical equipment in RED ZONE since last 1 year
4	Sp. Oil reduction program	Sp.oil consumption has reduced from 0.26 ml/kWh to 0.1 ml/kWh
5	Reduction in Auxiliary Power Consumption	By optimizing the operational procedures
6	Electrical system audi Before monsoon	No black out due to electrical fault

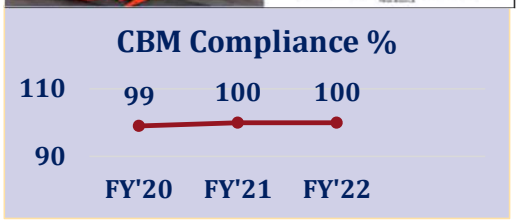


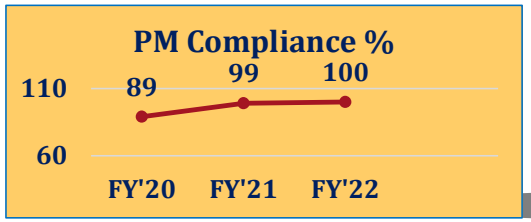
best practice

9. Best Practices –O&M Excellence









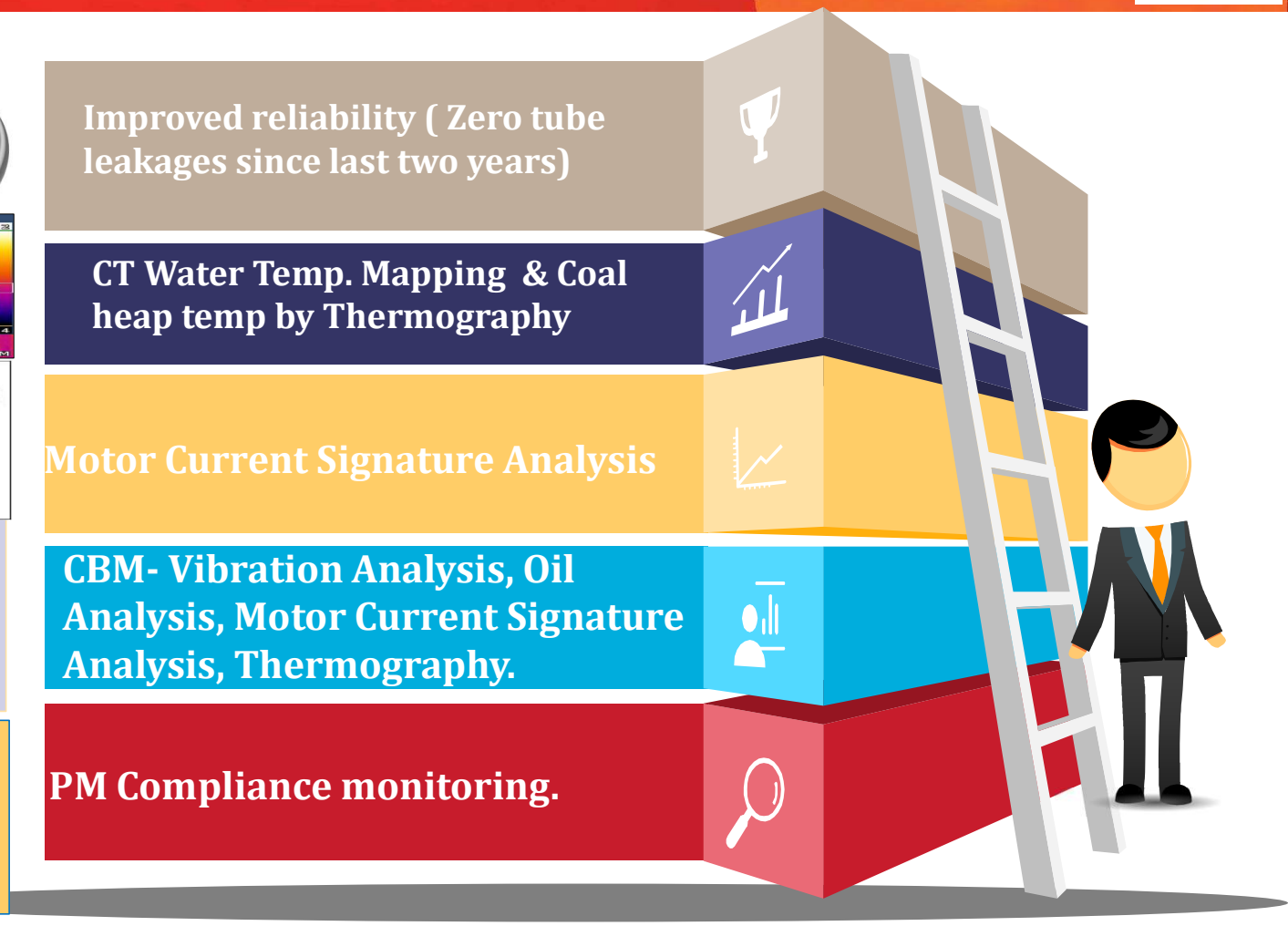
Improved reliability (Zero tube leakages since last two years)

CT Water Temp. Mapping & Coal heap temp by Thermography

Motor Current Signature Analysis

CBM- Vibration Analysis, Oil Analysis, Motor Current Signature Analysis, Thermography.

PM Compliance monitoring.

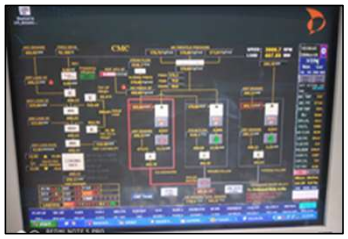


9. Best Practices - Digitalization

Digitalization

Coal Supply chain tracking system

LIMS software for coal system mgmt.



- On line Energy Monitoring system

01 02 03 04 05 06

3rd Edition-CII National LCA (Low Cost Automation) Circle Competition 2021
Live Presentation Competition
Monday – Tuesday; 26-27 April 2021, CII Virtual Platform

This is to certify that **Hindalco Industries Limited, Mahan, Aluminium** is position holder (as per below details) in 3rd Edition - CII National LCA (Low Cost Automation Circle Competition) 2021 held from 26 - 27 April 2021 On CII's Virtual platform.

Award Category : Best Case Study on Innovative Application of LCA
Position : Winner

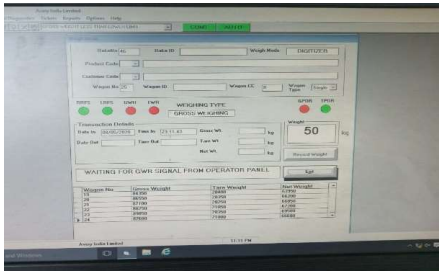
Issuing Date: 28 April 2021
Certificate No. ME-COM-270421_06

Pikender Pal Singh
Executive Director, Confederation of Indian Industry
Head, CII – Centre of Excellence for Competitiveness for SMEs

Winner of LCA circle Award by CII

Installation of new BARCO make LVS

•KPI Tracking Dashboard



- Auto capturing of weight of wagon tippler

9. Best Practices - CSCTS

From Mines to the end use of point

Dashboards & Control Tower

Reporting Layer

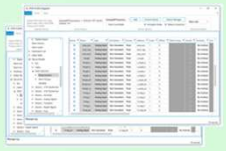
Intelligence and Processing Layer

Application Data Staging and Unification Layer

WebUI

HHD

Auger and LIMS Systems



SCADA and Databases

Operating Interface

Systems and Databases

Field IoT Devices

Awards and Accolades FY 22

CII
Confederation of Indian Industry

22nd National Award for
Excellence in Energy Management 2021

This is to certify that

Hindalco Industries Limited, Mahan Aluminium

has been recognized as

"Excellent Energy Efficient Unit"

This acknowledgement is based on the evaluation by panel of judges at the "National Award for Excellence in Energy Management" held during 24 - 27 August 2021.

K S Venkatagiri
Executive Director
CII - Godrej GBC

Ravichandran Purushothaman
Chairman, Energy Efficiency Council
CII - Godrej GBC

Mahan CPP – Won 22nd National Award for "Excellent Energy Efficient Plant" in Energy Management 2021" from CII

Mahan CPP received the Best Energy Efficient Plant Award from Mission Energy Foundation in February 2021

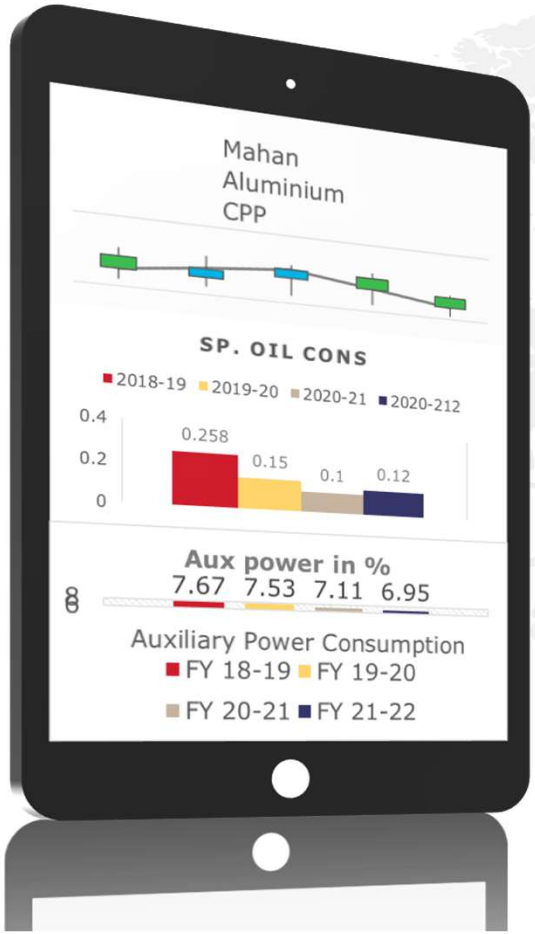
CII National Poka Yoke Competition 2022

Won Gold and Silver prize in CII National office Innovation Competition 2022

Hindalco Mahan -Energy Monitoring

1	Daily Energy Generation report	2	Daily online TG Heat rate and Boiler Efficiency calculation	3	Daily Coal MIS and deviation analysis
4	Daily Area wise Aux power consumption report	5	Monthly Turbine and Boiler performance	6	Monthly condenser performance study
7	Boiler & TG performance before and after overhauling	8	Daily review of deviation in PHR and Boiler efficiency	9	Quarterly insulation survey
10	Monthly review with Unit Head and Corporate Team	11	Online monitoring of APH outlet O2	12	Weekly Water, Air, Steam, Oil leakages survey

Mahan CPP- Energy Monitoring



- **Daily Plant Meeting**
- Daily HOD meeting
- **Monthly CPP performance review**
- Unit Level Monthly Energy review meeting
- **Monthly status review of Energy conservation Projects at CPP**

ISO : 50001 EnMs System and Policies

DNV·GL

MANAGEMENT SYSTEM CERTIFICATE

This is to certify that the management system of

Hindalco Industries Limited

Mahan Aluminium, N.H. 75E, Orgari, Village: Bargawan, Taluka: Devsar, District: Singrauli – 486889, Madhya Pradesh, India

has been found to conform to the Energy Management System standard:
ISO 50001:2018

This certificate is valid for the following scope:
Aluminium Smelter Plant to produce Molten Aluminium, with facilities to produce Carbon anodes and Cast House to produce Ingots, Wirerod & Billet along with Coal based Captive Power Plant 6 x 150 MW

bsi.

Best Implementation of ISO50001 Energy Management System (Large Category)

Winner

"Hindalco Industries Ltd. Mahan"

DCs Under PAT Sector Specific Circle Competition (11 Sector)

1st Runner Up

"Hindalco Industries Limited, Mahan"

Mahan has achieved ISO certification in 2016 & confirming to ISO 9001:2015, ISO 14001:2015 certification in the year 2018 .
Listed in London Metal Exchange in 2016. Also got certification in ISO 50001:2018 & ISO 45001:2018 in year 2019.

ISO 50001 : 2018 | ISO 27001 : 2013 | ISO 20001 : 2011 | ISO 9001:2015 | ISO 14001:2015 | ISO 45001:2018

Awareness & Development

Mahan has aligned its Sustainability Strategy with the group's sustainability matrix.

Sustainability Strategy

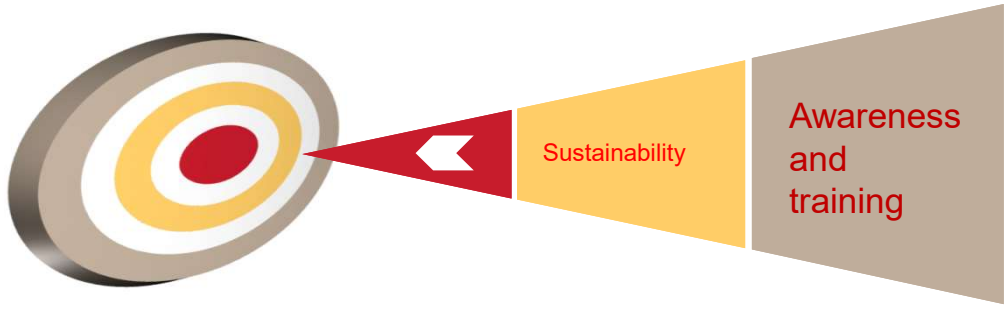
- Business goals and Sustainability goals are shared regularly
- Monthly Energy Webinar for metal Business
- Monthly performance review at Corporate level
- Participation in Biennial ABG *Energy Stride* Competition
- Participation in annual ABG Sustainability Conference

Awareness and Training

- Annual Energy Conservation Day celebrations on 14th December every year .
- Training on PAT cycle
- Training on Energy Conservation Measures & projects
- Awareness program on ABG Energy and Carbon policy
- Young engineers encouragement for Energy Auditors / Managers certification examinations.

Competitive Environment

- PRIDE Awards
- Employee of the month award at supervisory level
- Instant Shabashi award at Supervisory level
- Quarterly Kaizen Competition at workmen level
- Best Small Group Awards at Staff & workmen level
- Award for contractual workmen on Independence & Republic day



Learning from CII 2021 & Way Forward

Provide Uninterrupted Power to smelter a lowest cost.

PAT Certificates

Skill Development

Implementation of EnCon Projects

- Continual improvement in operation & process – (3C+ 2S concept)

.

Employee Engagement, KaiZen for improvement Projects

Benchmarking within business and National Benchmarking

Implementation of Renewable Energy Solar Project

Implementation of Emission control projects- FGD.

To comply with all legal requirements

Digitalization

100% utilization of Ash.

- Focus on operational cost

Integrity | Commitment | Passion | Seamlessness | Speed

Thank You