

## VEDANTA LIMITED – JHARSUGUDA

Asia's 1<sup>st</sup> ISO-50001 certified Smelter

# 25<sup>th</sup> National Award for Excellence in Energy Management – 2024



### TEAM MEMBERS

1. **VIMAL O S C BABU**
2. **LOKESH SAHU**
3. **GAURAV NAYAN**

## CORE PURPOSE



Vedanta is a globally diversified natural resources company with low-cost operations. We empower our people to drive excellence and innovation to create value for our stakeholders. We demonstrate world class standards of governance, safety, sustainability and social responsibility.

## OUR VALUES



*Safety*



*Excellence*



*Trust*



*Care*



*Entrepreneurship*



*Innovation*



*Integrity*



*Respect*

## Vedanta Limited, Jharsuguda





## Smelter 1

- ✓ GP – 320 Prebake Technology
- ✓ No. of Lines – 2
- ✓ No. of Pots – 608
- ✓ Pot Amperage – 325 KA
- ✓ Design Capacity – 500 KTPA

- ✓ GAP – 2 Paste Plants (Outotec GMBH, Germany)
- ✓ Bake Oven – 4 Bake Furnaces
- ✓ Anode Rodding Plant

- ✓ Ingot Casting Mill – 3 Lines
- ✓ Wire Rod Mill – 2 Lines
- ✓ Billet Casting Mill – 1 Line
- ✓ Slab Casting – 1 Line

## Smelter 2

- ✓ GP – 340 Prebake Technology
- ✓ No. of Lines – 4
- ✓ No. of Pots – 1322
- ✓ Pot Amperage – 340 KA
- ✓ Design Capacity – 1250 KTPA

- ✓ GAP – 2 Paste Plants (Outotec GMBH, Germany)
- ✓ Bake Oven – 6 Bake Furnaces
- ✓ Anode Rodding Plant


- ✓ Ingot Casting Mill – 4 Lines
- ✓ Wire Rod Mill – 2 Lines
- ✓ Billet Casting Mill – 3 Line
- ✓ Cast Bar Mill – 2 Lines
- ✓ SOW Cast – 1 Line



## 4x600 MW TPP



**Coal Source** - Mahanadi Coal Fields  
**Water Source** - Hirakud Reservoir  
**Customer** - U#1,3,4-1.25 MTPA Al Smelter,  
U#2-SLDC Odisha



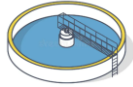
**BOILER- HARBIN BOILER CO LTD**  
2060 TPH (BMCR) Pressure 17.5 MPa




**TURBINE - DONGFANG ELECTRIC CO LTD**  
600 MW rated (642 MW Peak)



**CHP – McNally Bharat**  
Capacity 3000 TPH



**DM Plant – Sichuan Electric Power**  
283m<sup>3</sup>/hr X 2



**AHP – Hybrid ESP with SPM < 50 mg/Mn<sup>3</sup>  
& HCSD system**

## 9x135 MW CPP

**Coal Source** - Mahanadi Coal Fields  
**Water Source** - Hirakud Reservoir  
**Customer** – 0.5 MTPA Al Smelter

**BOILER – SHANGHAI ELECTRIC CO LTD**  
440 TPH (BMCR) Pressure 14.29 MPa

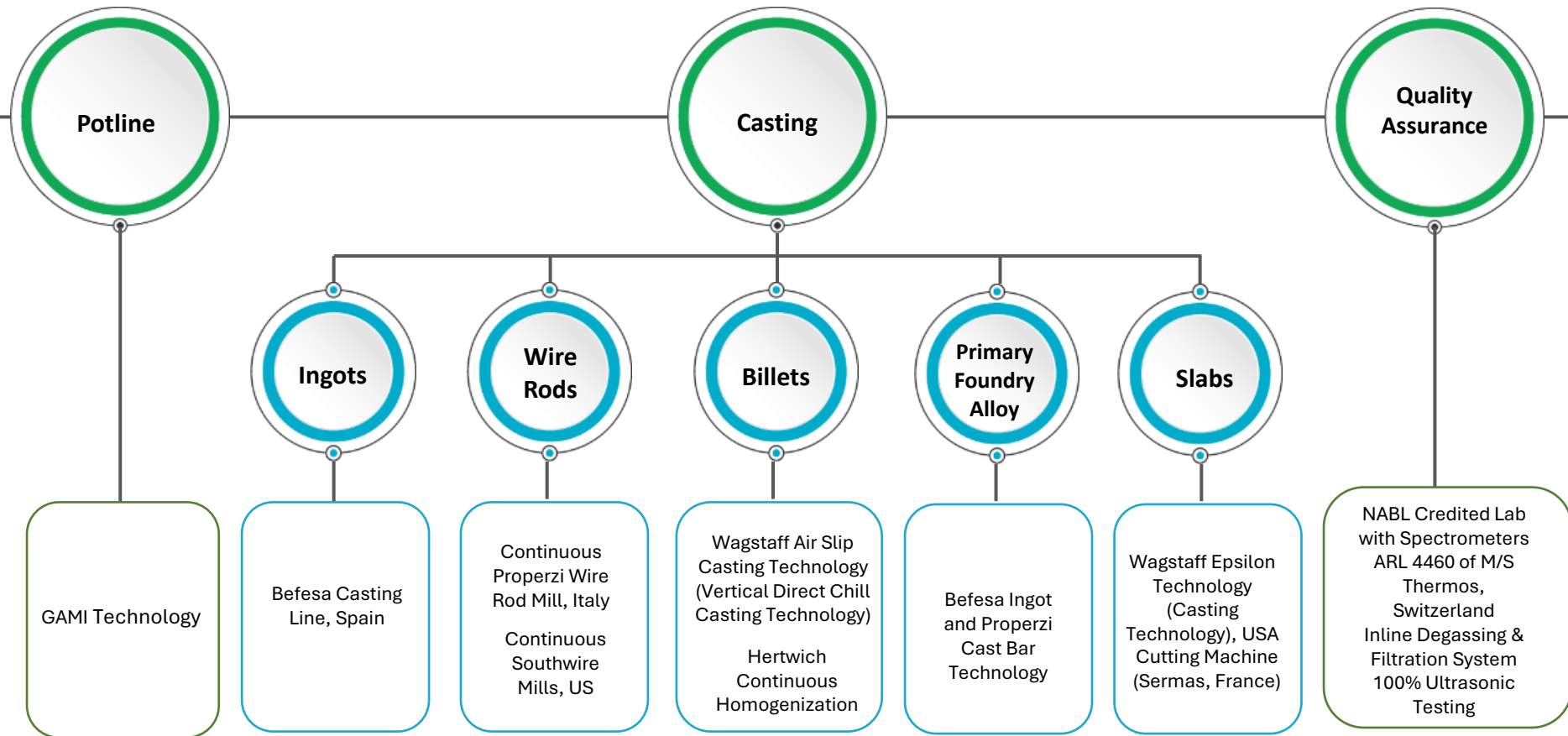
**TURBINE - SHANGHAI ELECTRIC CO LTD**  
135 MW rated (158 MW Peak)

**CHP – McNally Bharat**  
Capacity 1000 TPH

**DM Plant – Sichuan Electric Power**  
120 m<sup>3</sup>/hr X 3

**AHP – Hybrid ESP with SPM < 50 mg/Mn<sup>3</sup>  
& HCSD system**

## TECHNOLOGY & EQUIPMENT



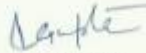


## VEDANTA LIMITED, JHARSUGUDA Energy Policy

The Aluminium Smelter Plant-1 & Plant-2(SEZ) of Vedanta Limited-Jharsuguda, a leading player in its sector, strives to build world class capabilities in every facet of its business operations and affirms its commitment to:

- ⓐ Continual improvement in energy performance by providing necessary resources and information required to achieve energy management objectives and targets.
- ⓑ Ensure compliance of all necessary and applicable legal and other requirements related to organization's use, consumption and efficiency.
- ⓒ incorporate energy efficient designs, equipment and process in all the future projects.
- ⓓ Purchase of energy-efficient products on merit basis as per life cycle costing.
- ⓔ Create awareness towards energy conservation in the organization.

Date: 31.03.2022

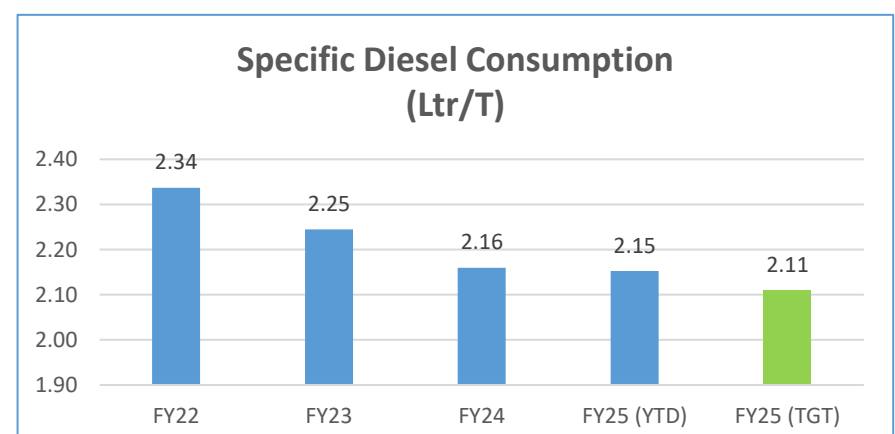
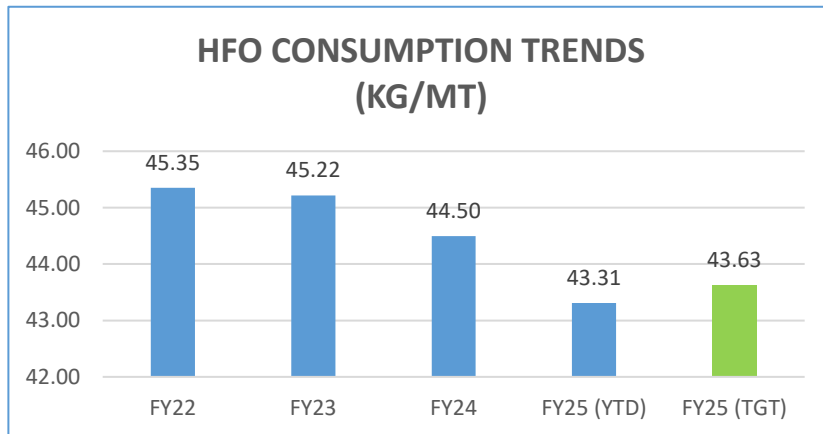
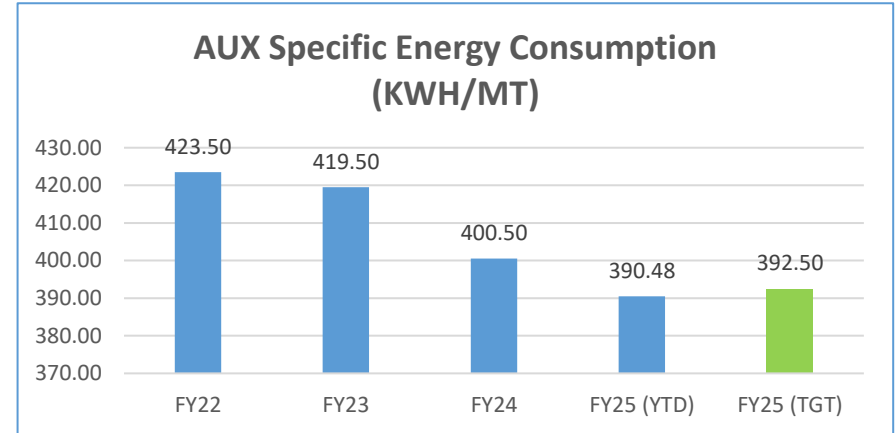
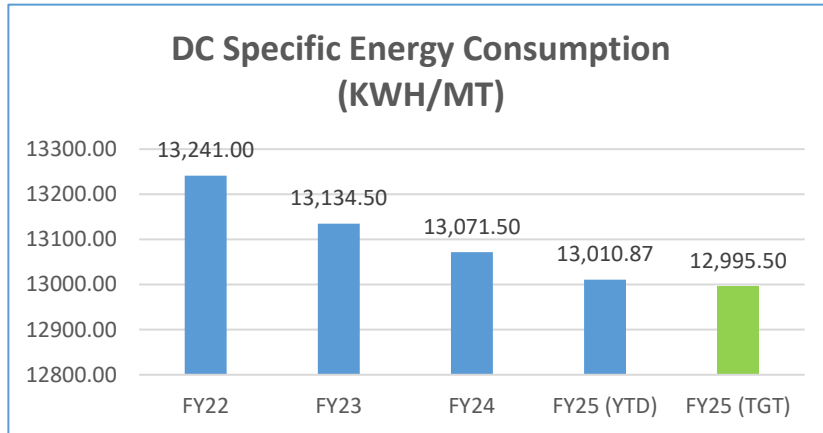
  
**Sunil Gupta**  
CEO, VL-Jharsuguda

## ENMS OBJECTIVES

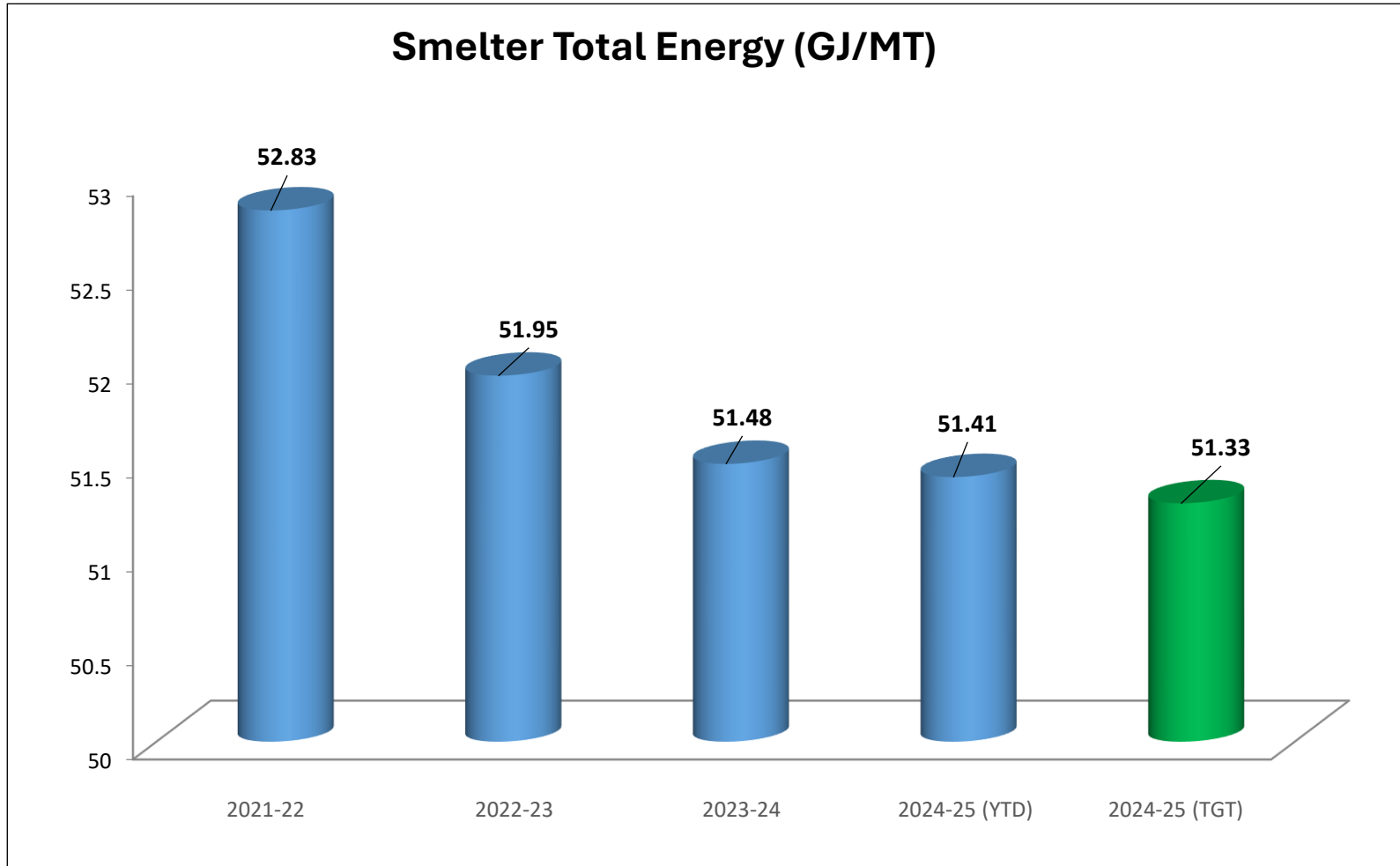
- Reduce DC Energy Consumption
- Reduce Auxiliary Energy Consumption
- Reduce HFO Consumption
- Reduce Diesel consumption



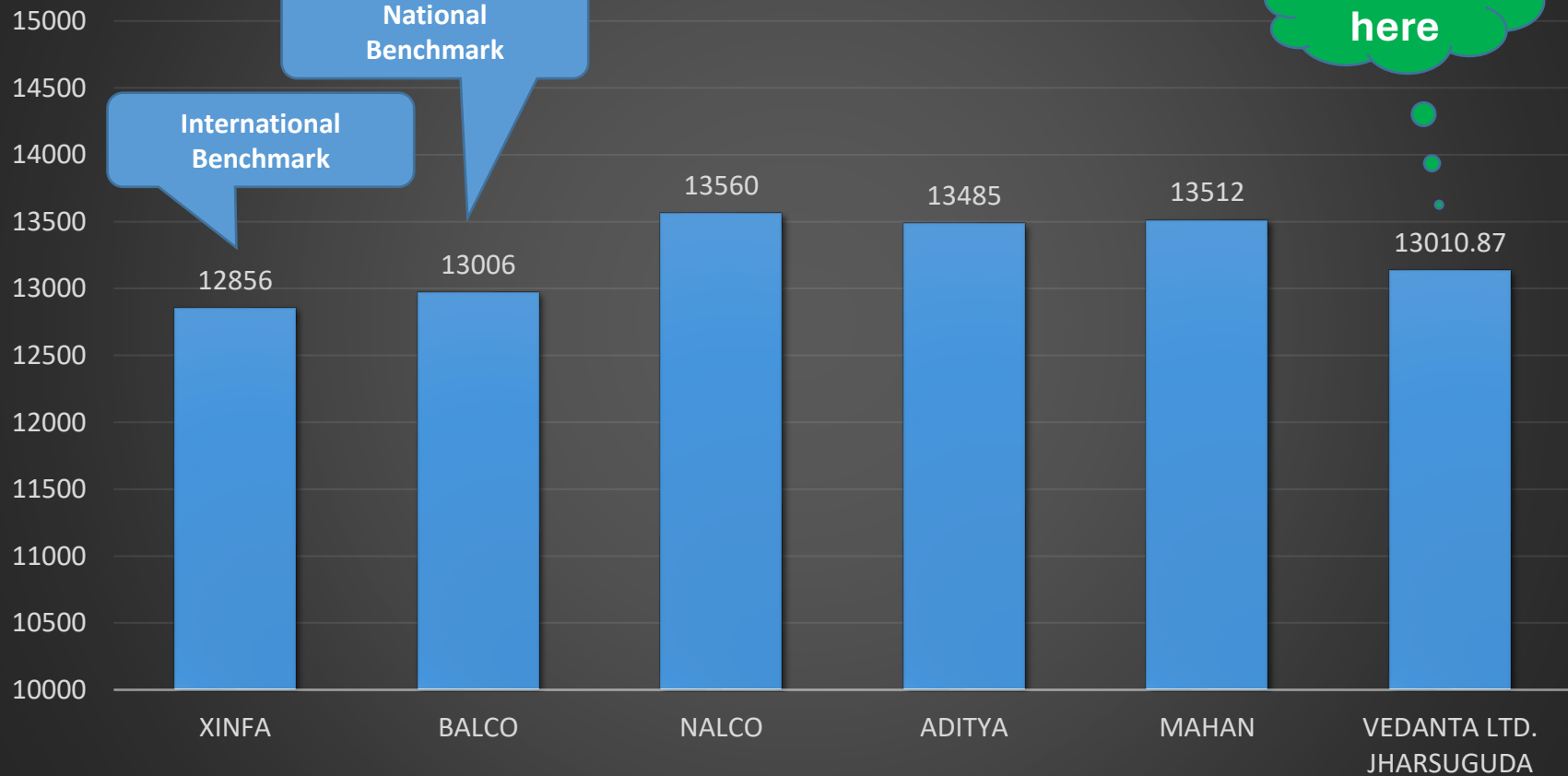
## SPECIFIC ENERGY CONSUMPTION TRENDS- SMELTER







## Specific DC Energy consumption kWh/MT (Best Achieved figures)



**One measurement is worth a thousand expert opinions**

Sl. No.	Project description	Annual energy saving in Million kwh	Cost saving in Million	Investment in Million	Payback (Years)
1	100% Graphitized Cathode Implementation	18.357	113.077	82.8	0.73
2	Mill roller replacement for 6 unit	4.7	16.25	24	1.47
3	Elimination of potential business risk in plant-1 by separation of air discharge header for cast house and carbon area.	1.977	73.490	0.13	0.13
4	Energy Efficient Pump Installation of CWP-5	0.087	0.380	0.35	0.92
5	U#1 APH seal & sector plate replacement	4.08	12.24	9	0.73
6	Ball Mill power optimization	0.898	2.793	4	1.43
7	Installation of led light in shop floor.	0.055	0.207	0.2	0.97
8	FTP-3 By pass duct replacement to stop draft loss	0.998	4.69	0.6	0.12
9	BFP cartridge replacement of 2 units	1.15	3.93	8	2.03
10	2nos. of 350KW VFD installation in Casthouse-2 Pump house	0.49	1.225	2	1.63



Sl. No.	Description of energy efficiency improvement measure	Investment in Million	Cost saving in Million	Annual energy saving in Million kwh	Payback (Years)	Remarks
1	HT Motor Overhauling at HP 1 in Reduction Compressor House	0.46	0.52	0.15	1.13	Completed in Oct'23
2	HP 3 compressor overhauling at Reduction Compressor House	0.10	0.57	0.16	5.48	Completed In Jun'23
3	PNLD Installation On Two Compressor (HP 1 and HP 3) at Reduction Compressor House	0.10	1.34	0.33	12.84	Completed in Jan'24
4	VFD installation for Cold well Pumps	1.10	0.63	0.17	0.57	Completed
5	Hydrojet cleaning of airlift blower pipe	1.86	6.04	1.61	3.25	Completed
6	Graphitized pots installation at potline	2268.00	95.65	27.33	0.04	162 no.s pots installed in FY24
7	RUC implementation in pots	32.40	10.48	2.99	0.32	Completed
8	VLD implementation in pots	264.00	34.57	98.76	0.13	Completed
9	CWP drive installation in Casthouse-2 Pumphouse	1.50	1.51	0.61	1.01	Completed
10	BR & CR motor replacement with IE3 motors at Bake Oven	0.65	0.55	0.14	0.85	Completed
11	LED light installation at shop floor	17.65	0.88	0.24	0.05	Completed

S.No	Project Description	Category	Units	Status of implementation
1	Implementation of VLD in smelting pots	Electrical	KWH	Planned In FY 25
2	Implementation of RUC in smelting pots	Electrical	KWH	Planned In FY 25
3	Implementation of VPC	Electrical	KWH	Planned In FY 25
4	Pot cooling fan installation for pot sheet cooling	Electrical	KWH	Planned In FY 25
5	54 No of old BR/CR motor to be replaced with IE3 motor	Electrical	KWH	Planned In FY 25
6	HP#1 COMPRESSOR Overhauling	Electrical	KWH	Planned In FY 25
7	HP#4 MOTOR Overhauling	Electrical	KWH	Planned In FY 25
8	VFD installation in furnace ID fan	Electrical	KWH	Planned In FY 25
9	VFD installation in 19P9 A ID fan	Electrical	KWH	Planned In FY 25
10	Installation of VFD in pit pump motor	Electrical	KWH	Planned In FY 25
11	Installation of Energy efficient IE3 350 KW CWP Motors	Electrical	KWH	Planned In FY 25
12	Automatic Soaking Calculator Programmimg to stop oil pushing in Auto	Electrical	KWH	Planned In FY 25
13	Replacement of energy efficient DM Motor	Electrical	KWH	Planned In FY 25



## Key Driven Projects in Vedanta Jharsuguda

Sl No.	Initiatives
1	Vedanta Lining Design (VLD2.0)
2	Vedanta Pot Controller (VPC)
3	Hydro Jet Cleaning of Airlift Pipe in FTP
4	100 % Graphitization Journey-13000 KWH/MT
5	Induced Draft Mist Cooling Tower
6	Separation of Air Discharge Header
7	India's largest Electric Forklift Fleet Deployed- Step Towards Net Zero emission
8	Environment Initiative

# Vedanta Lining Design (VLD2.0)

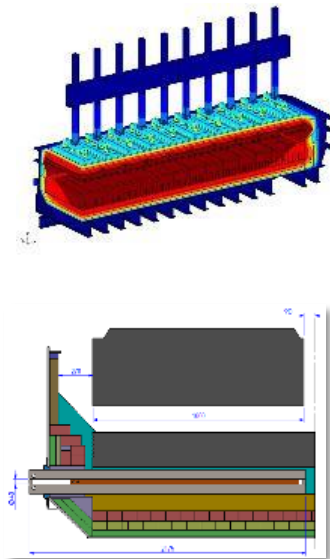
**Objective:** To Scale-up of Indigenously developed lining design for capacity enhancement with existing set-up and improved pot performance in terms of Specific Power Consumption (SPC), Volume growth, Pot life and stable pot operation.

**Approach:**

- Designing of lining structure with optimized thermal balance, optimized voltage drop
- Trial and design validation **Ongoing**
- Horizontal implementation during pot relining

**Potential Gain:**

- Reduction in specific energy consumption by 50 KWH/MT in comparison with VLD design. Total Gain: 300 KWH/T (DC: 12700 KWH/MT in comparison with 13000 KWH/MT for standard graphitized cathodes)
- Reduction in GHG emission by 0.29 TCO<sub>2</sub>e/MT-Al, Reduction of energy consumption by 540 MU after 100% implementation
- Total potential GHG emission reduction: 0.52 million tonnes CO<sub>2</sub>e /year after 100% scale up



**VLD 2.0 Journey & Scale-up Plan**



## Vedanta Pot Controller (VPC)

**Objective:** Scale-up of Vedanta Pot Controller for getting business benefits, improving current efficiency and specific power consumption.

### Approach:

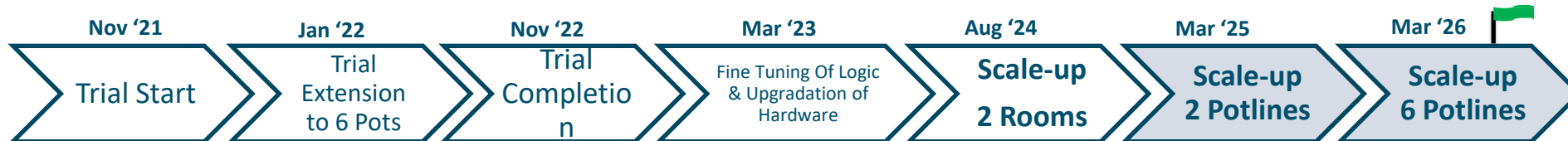
- Collaboration with HART & LMRC for Vedanta pot controller development **[Completed]**
- Trial and design validation **[Completed]**
- Phase wise implementation as per plan **[On Track, completed 1 potline, 17% of total pots]**

### Potential Gain:

- Reduction in specific energy consumption by 50 KWH/MT over existing design.
- Reduction in GHG emission by 0.05 TCO<sub>2e</sub>/MT-Al, Reduction of energy consumption by 90 MU after 100% implementation
- Total potential GHG emission reduction: 0.09 million tonnes CO<sub>2e</sub> /year after 100% scale up



### VPC Scale-up Plan





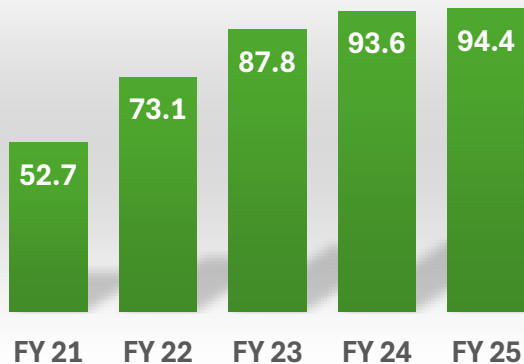
## 100 % Graphitization Journey-From 13470(design) to 13000 KWH/MT

Since 2018, Graphitization journey was initiated at Vedanta potline by replacing Graphitic and 50% graphitized cathode with 100% graphitized cathode block. Resistance of the 100% graphitized blocks are less than the graphitic cathodes which significantly reduces energy consumption.

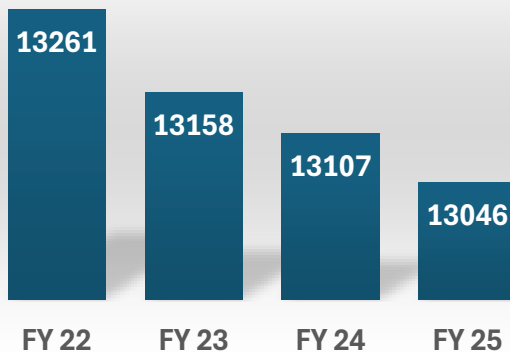
### Benefits of implementation:

- Resistivity reduced from **26 ohm-cm to 12 ohm-cm**.
- Operating Voltage decreased from **4.206 V to 4.110 V**
- CVD (Cathode voltage drop) decreased from **385mV to 265mV**.

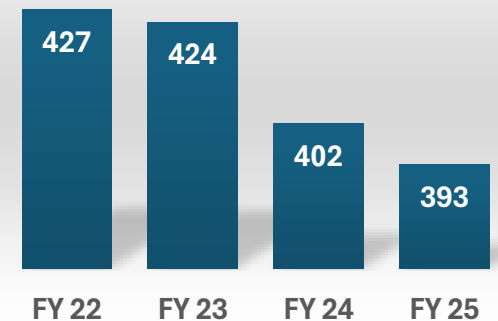
Graphitization Journey (%)



SPDC(KWH/MT) Trend



Aux energy (KWH/MT) Trend



## Induced Draft Mist Cooling Tower

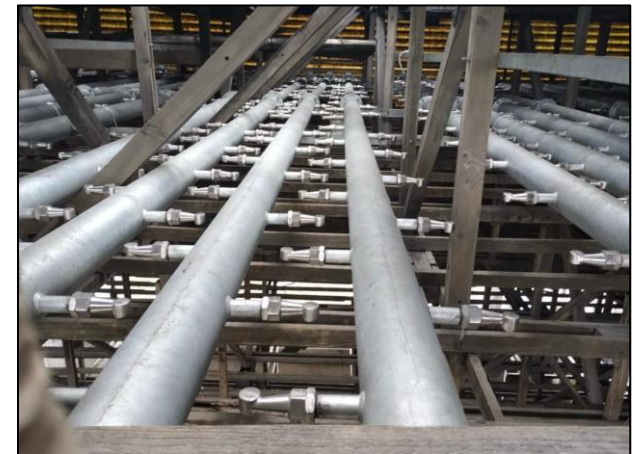
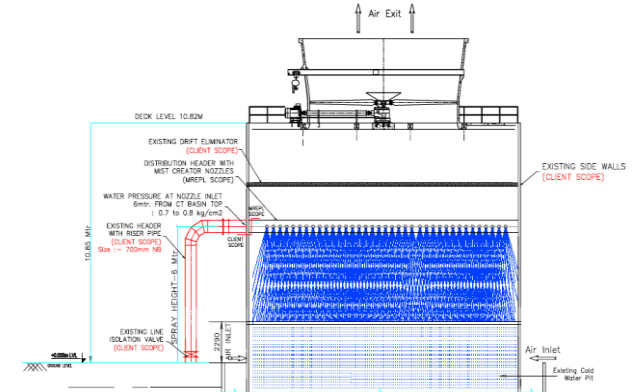
**Objective:** To improve the cooling tower efficiency, delta T, approach, energy saving, complete elimination of hazardous PVC fills and improve the structural reliability.

### Approach:

- Complete elimination of PVC fills.
- Installation of high-efficiency mist type nozzles.
- Installation of HDGI Header and Branch pipes.

### Potential Gain:

- Increased delta T from 5degC to 8degC.
- Improved approach from 6degC to 4degC.
- Power saving of 513 KWH/day and 187MWH/year.



## Hydro Jet Cleaning of Airlift Pipe in FTP

**Problem:** Due to the scale formation in the airlift pipe, lifting capacity of the blower is reduced significantly. Therefore, two blowers were running continuously, leads to twice energy consumption. Besides, there is no standby blower available, which creates problem during scheduled maintenance

**Solution Implemented:**

- Cleaning of airlift pipe by very high-pressure water supply (~700 bar) which thorough cleans the pipes and provides increases cross sectional area

**Potential Gain:**

- Only one blower is in operation post cleaning and energy saving of 4342 KWH/day
- Reduction in specific energy consumption by 1.34 KWH/MT, 2.4 MU annual savings
- Availability of one more blower as standby
- Total potential GHG emission reduction: 2312 MTCO<sub>2e</sub> /year after 100% scale up



**Pipe condition before cleaning**



**Pipe condition After cleaning**



## India's largest Electric Forklift Fleet Deployed- Step Towards Net Zero emission

As a step towards net zero emission, it is planned to use battery operated forklift in place of diesel operated. Vedanta Jharsuguda is India's largest deployer of electric forklifts at a single location.

59 Lithium-ion battery powered electric forklift being operationalized.

For the first time in India, 10-ton forklifts are deployed in metals and mining industry.

Potential for GHG emissions reduction – 2160 MT of Co2 annually.

Reduction in diesel consumption up to 800KL



Vedanta Jharsuguda expands India's largest fleet of electric forklifts, bolstering sustainable operations





Ultra filtration  
project

**2010**



ETP 2  
Commissioning

**2011**



Eco ventilator  
commissioning

**2013**



Conversion of  
ESP to hybrid  
ESP

**2013**



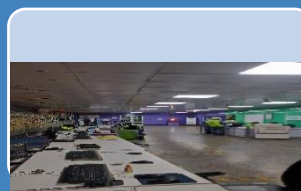
APH Modified  
Basket  
Installation

**2014**



Modified CT  
Fills installation

**2017**



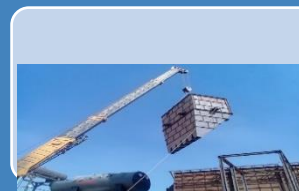
Conventional  
lights replaced  
with LED

**2018**



Operational  
Excellence  
through digital  
initiative OSI-Pi

**2020**



Renovation &  
Modernization

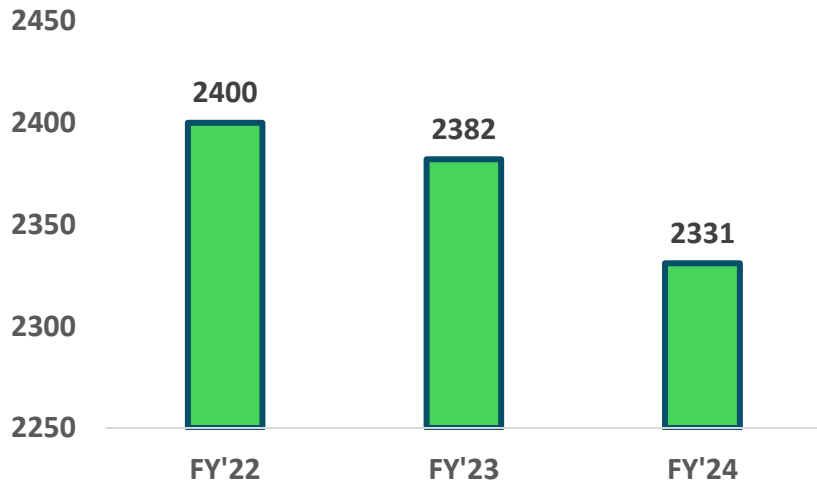
**2022**



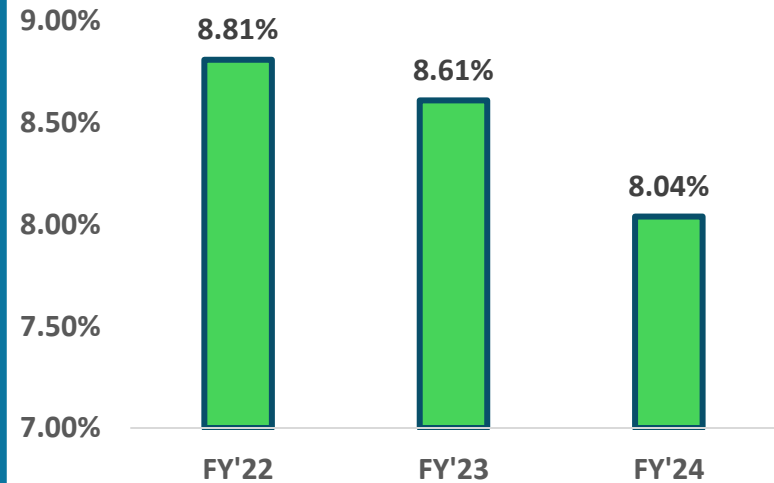
SPL consumption  
Additional CT cell  
installation  
Solar projects  
Turbine efficiency  
improvement  
Turbine capacity  
enhancement



### Station Heat Rate (KCal/KWh)



### Auxillary Power Consumption (%)



■ TPP ■ CPP

<p>3 Units R&amp;M done to improved operational KPI &amp; to strengthen Reliability</p>	<p>CT fills replacement to improve vacuum thereby reducing specific coal consumption</p>	<p>Scale ban introduced as a ZLD to optimize raw water consumption , water saving of 3300 m3/day</p>	<p>Boiler penthouse sealing modified from hard refractory to flexible air sealing CT fills ,APH basket replacement</p>
<p>Installation of ultra filtration &amp; RO system</p>	<p>HIP carrier refining to improve Turbine efficiency</p>	<p>Conversion of conventional ESP to hybrid ESP</p>	<p>ABT implementation for real time energy exchange monitoring</p>
<p>Operational excellence through digital initiatives OSI-Pi</p>	<p>Modified APH basket with advance heat transfer profile</p>	<p>Cinter casted Roller replacement in Mill Conversion of CT blades from GRP to FRP</p>	<p>BioMass Co-firing /Solar Projects</p>



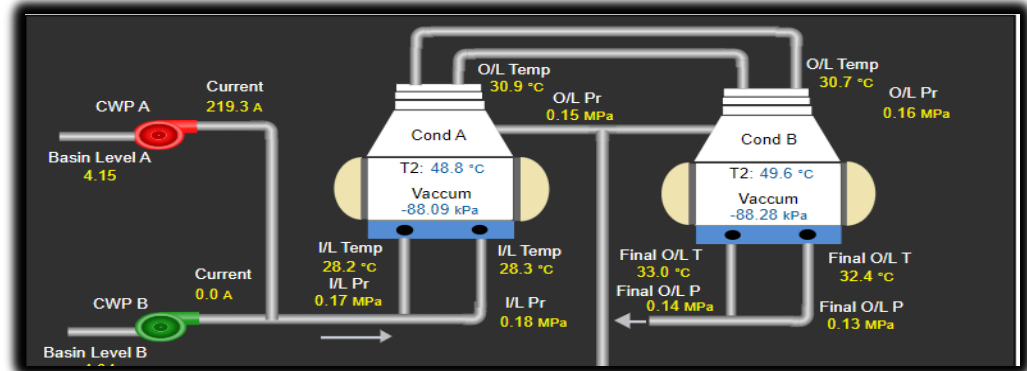
## Boiler Penthouse Air Sealing

Thermal Savings – 4 Kcal/KWh



## CW Pump Star to Delta Conversion

Electrical Savings – 4000 KWh



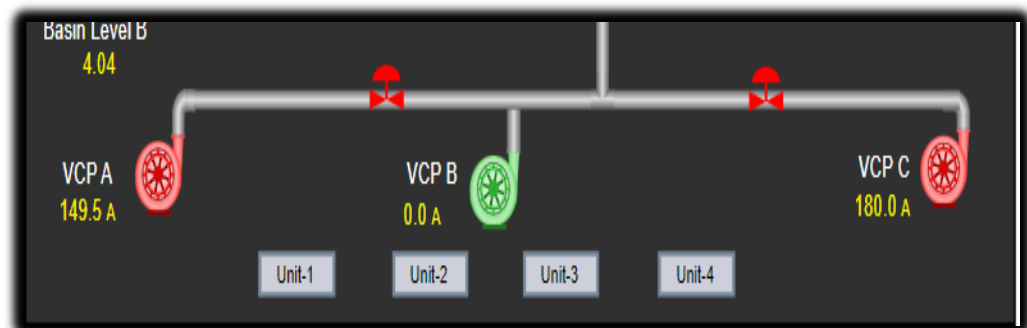
## Turbine Refining

Thermal Savings – 20 Kcal/KWh



## Vacuum Pump Suction Header Modification

Thermal Savings – 8 Kcal/KWh





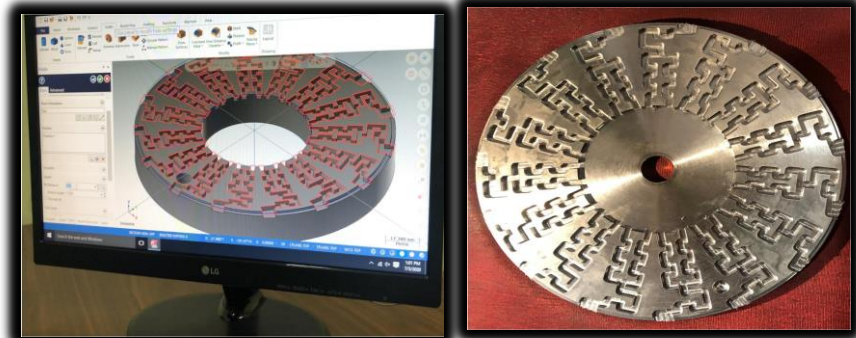
## Compartment wise FF DP Monitoring

**Electrical Savings – 110 KWhr**

Unit-1 FF DP & PT Monitoring															
vedanta transforming for good															
A Pass (Pa)				B Pass (Pa)				C Pass (Pa)				D Pass (Pa)			
LHS		RHS		LHS		RHS		LHS		RHS		LHS			
1,244		1,305		1,576		1,613									
PT(Bar)	DP(Pas)	PT(Bar)	DP(Pas)	PT(Bar)	DP(Pas)	PT(Bar)	DP(Pas)	PT(Bar)	DP(Pas)	PT(Bar)	DP(Pas)	PT(Bar)	DP(Pas)		
4	1,313	-3	1,031	-3	1,066	3	2,063	4	885	4	26	3	1,155	10	1,469
4	8,730	-3	1,039	17	1,005	14	930	-3	1,313	132		4	1,151	3	1,178
-2	1,058	-3	945	4	1,016	0	1,041	5	1,369	-3	1,264	5	893	5	1,440
5	1,001	4	975	-3	877	0	1,071	5	1,331	-2	1,208	4	1,370	0	1,327
5	934	-3	956	-2	893	3	2,063	18	1,313	-3	1,249	5	1,296	2	1,298
4	877	1	874	-3	919	-3	1,039	3	1,324	2	1,185	5	1,296	4	1,245

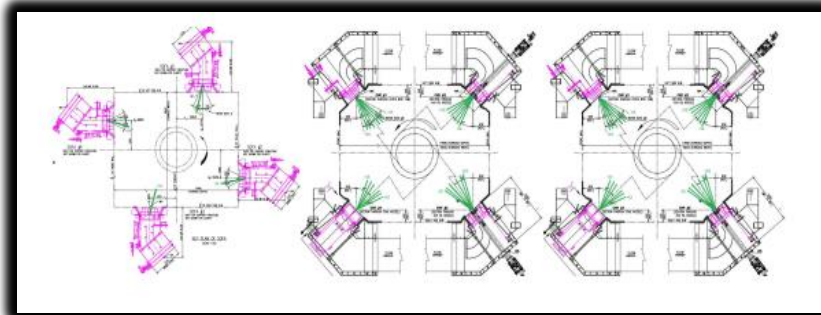
## BFP RC control valve upgradation

**Thermal Savings – 5 Kcal/KWh**



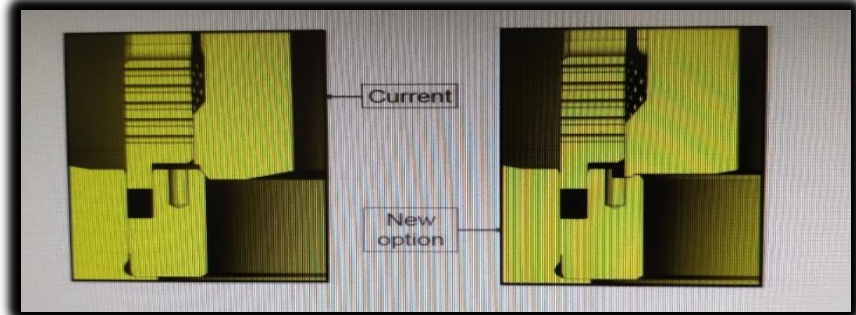
## SOFA Installation in Boiler

**Thermal Savings – 9 Kcal/KWh**



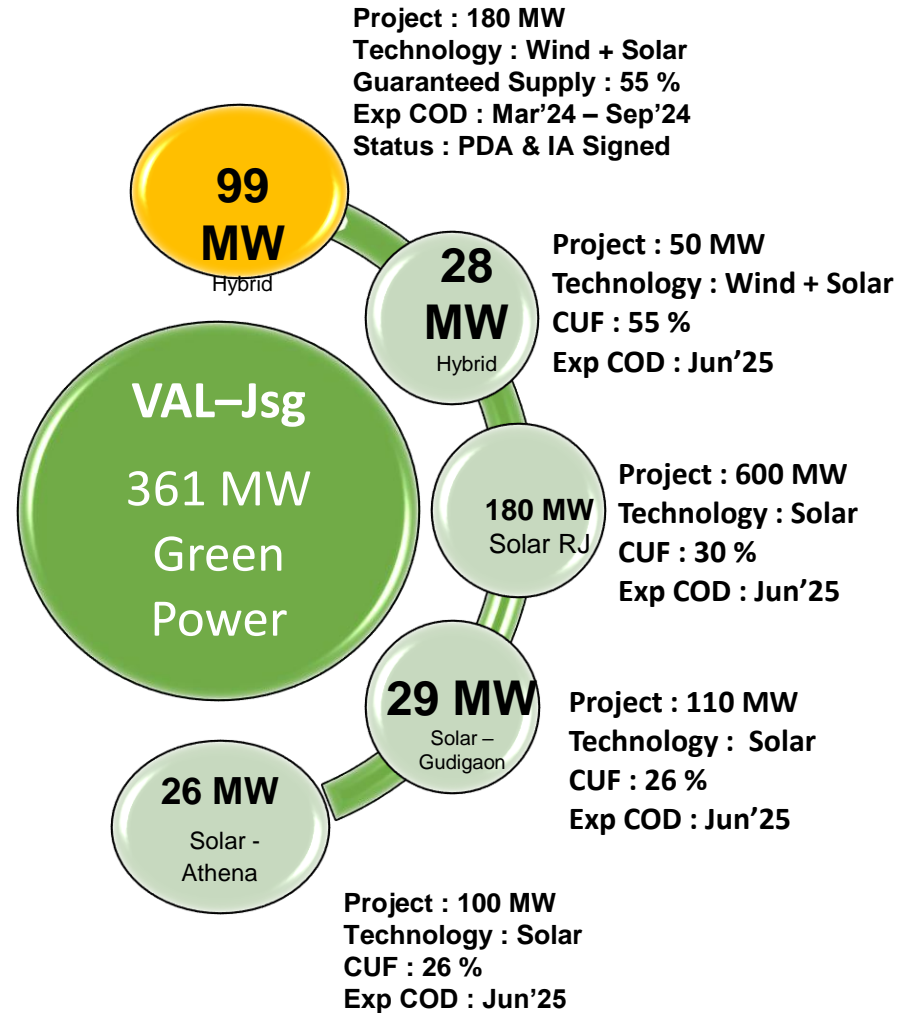
## LP Bypass Control Valve Upgradation

**Thermal Savings – 4 Kcal/KWh**



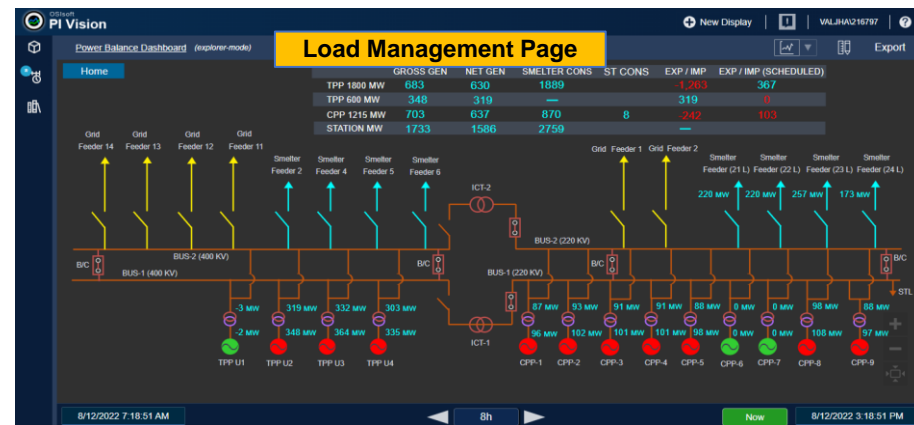
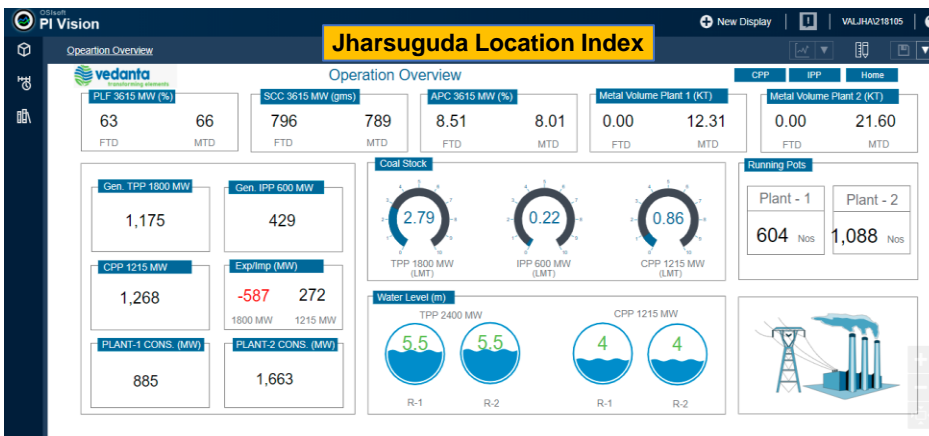
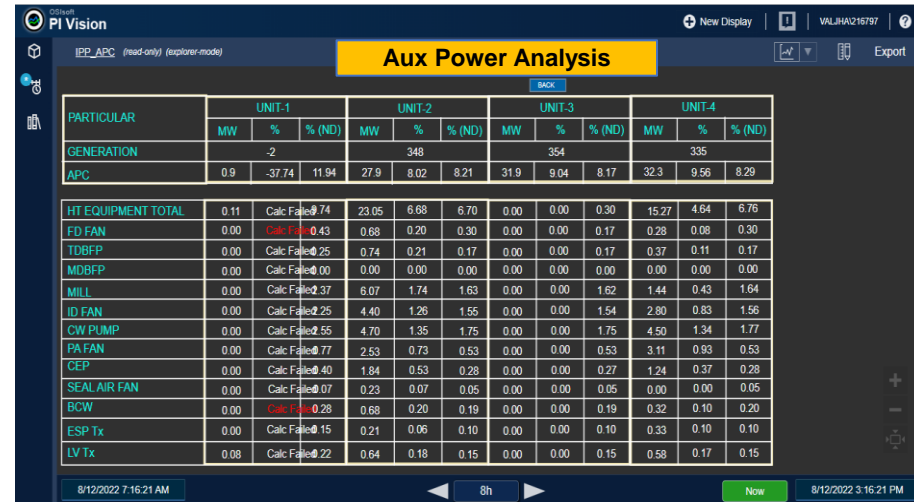


Particulars	UOM	Vedanta Jharsuguda
Complex Power Requirement	MW	2900
30% Green Power Target (FY-30)	MW	863
RE lined up	MW	361
Balance RE Power Potential	MW	502



## Digital Initiative for Energy Efficiency Monitoring through Osi Pi

- Implemented energy monitoring system through OSI-PI System is a suite of software applications that allows for collecting, historicizing, finding, analyzing, delivering and visualizing data.
- The PI System unlocks operational insights and new possibilities. The PI System enables digital transformation through trusted, high-quality operations data. Collect, enhance, and deliver data in real time in any location. Empower engineers and operators. Accelerate the work of analytics & energy monitoring on real time basis



# Digital Initiative for Energy Efficiency Monitoring through Osi Pi

### Unit-3 Combustion Optimizer

Combustion Optimizer

Parameters	UOM	Expected	Actual	Weightage	Score	Parameters	UOM	Expected	Actual	Weightage	Score
Load	MW	586	586			Steam Temp	degree	538	537		
O2 at APH Inlet	%	2.63	2.78	5	5.00	RE Heater Temp	degree	538	542		
O2 at APH Outlet	%	3.67	5.02	5	0.69	SH Spray Flow	TPH	0	22.26	2.5	2.42
Total Air Fuel Ratio	-	5	3.59	5	3.91	RH Spray Flow	TPH	0	0.75	2.5	2.50
Primary Air Fuel Ratio	-	2	1.13	5	1.21	APH A Efficiency	%	70	60.3	5	4.02
Coal GCV	%	3300	3,277	5	4.36	APH A X Ratio PA	-	83	64.5	5	3.46
Furnace OIL Temp Avg	%	698	706	5	4.88	APH A X Ratio SA	-	80	69.5	5	3.96
Furnace OIL Temp Dev Avg	PA	20	30.4	5	4.48	APH A Leakage	%	6.0	14.3	5	1.81
Furnace To Wind Box DP	PA	101	111	5	5.00	APH B Efficiency	%	70	60.3	5	4.03
Furnace Drought	PA	50-100	-59	5	5.00	APH B X Ratio PA	-	83	64.4	5	3.46
FGET Corrected	deg	140	151	5	2.83	APH B X Ratio SA	-	80	69.7	5	3.98
CO in Flue Gas	-	<50	21.60	5	5.00	APH B Leakage	%	6.0	16.0	5	0.89

Combustion Index **72.89**

8/27/2024 2:11:30 AM

### HP Heater Performance

Heater Performance		UOM	TTD	DCA		Temp Rise	
	Actual	Ref	Actual	Ref	Actual	Ref	
HPH-1	°C	4.2	-1.7	9.0	5.6	32.9	30.8
HPH-2	°C	3.5	0	7.8	5.6	28.7	30.7
HPH-3	°C	0.0	0	14.8	5.6	32.2	33.7
LPH-5	°C	1.1	2.8	3.8	5.6	20.2	18.1
LPH-7 A&B	°C	-4.1	2.8	6.4	5.6	20.6	17.1
LPH-8 A&B	°C	-8.0	2.8	3.4	5.6	52.8	54.1

Loss due to FW temp: 26.8 Kcal/KWh

Status	Unit	Boiler	UOM
Gross Gen	587.1		MW
Turbine Heat rate	2,065.6		Kcal/KWh
Boiler Efficiency %	89.7		%
Unit Heat rate (Gross)	2,319.0		Kcal/KWh
Unit Heat rate (Net)	2,515.9		Kcal/KWh

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### Unit-3 Mill Index

Parameters	UOM	Target	Mill A	Mill B	Mill C	Mill D	Mill E	Mill F	Average	Weightage	Score
Average Classifier OIL Temp	Deg	>80	0.0	73.1	70.8	76.0	70.7	0.0	72.7	10	0.0
Mill Loading	TPH	>90	0.0	70.8	71.0	69.0	59.2	0.0	67.5	10	0.0
Level DP	Pa	300-800	10.3	418.7	384.8	501.2	255.7	20.7	392.8	10	10.0
Noise Level	%	<35	-0.1	17.8	12.1	12.8	37.0	-0.3	19.8	10	10.0
Coal Velocity Corner 1	-	-	-9.5	586.3	694.9	Bad	Bad	Bad	-	-	-
Coal Velocity Corner 2	-	-	-	74.6	1,170.9	Bad	462.8	335.8	33.1	-	-
Coal Velocity Corner 3	-	-	-	13.2	541.0	550.5	492.5	1,133.2	6.1	-	-
Coal Velocity Corner 4	-	-	-	Bad	593.7	586.0	1,037.0	1,091.3	16.6	-	-
Standard Deviation	-	-	-	-	-	-	-	-	202.3	10	0.0
Mill Running	No	5	0.0	1.0	1.0	1.0	1.0	0.0	4.0	10	10.0
PA Header to Mill Inlet Temp Drop	Deg	-	-	-	-	-	-	-	-	10	-
Cold Air Opening	%	0	-	-	-	-	-	-	-	10	-
PA Header to Mill Inlet Pressure Drop	Kpa	<1	0.0	0.6	0.6	0.6	1.5	0.0	0.8	10	2.0
Mill Current	A	110-120	0.0	116.6	117.0	117.2	115.1	0.0	115.9	10	5.9

Mill Index **37.9**

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### Compressors

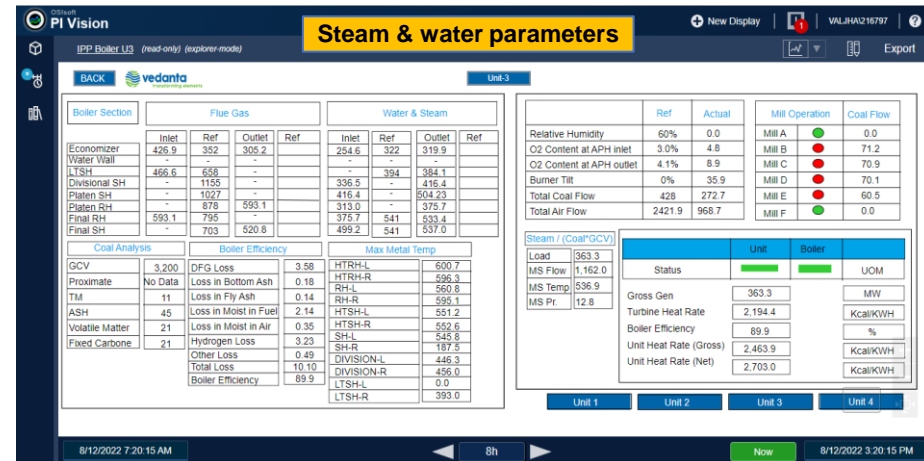
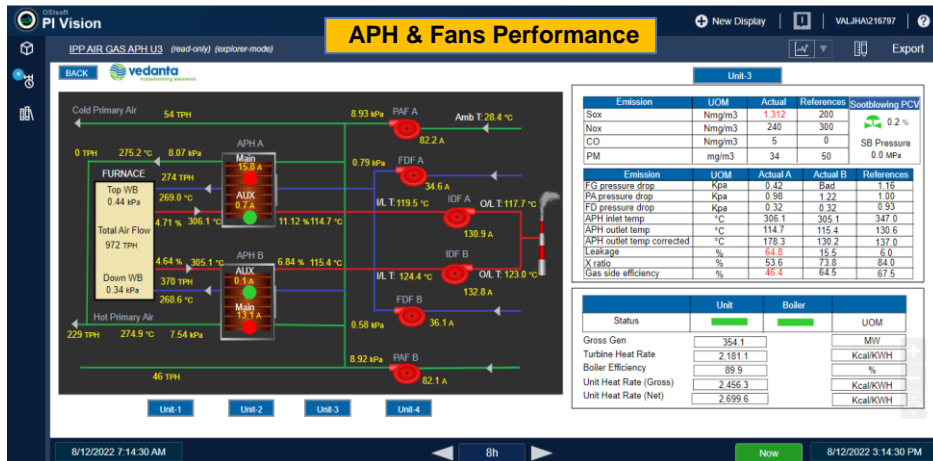
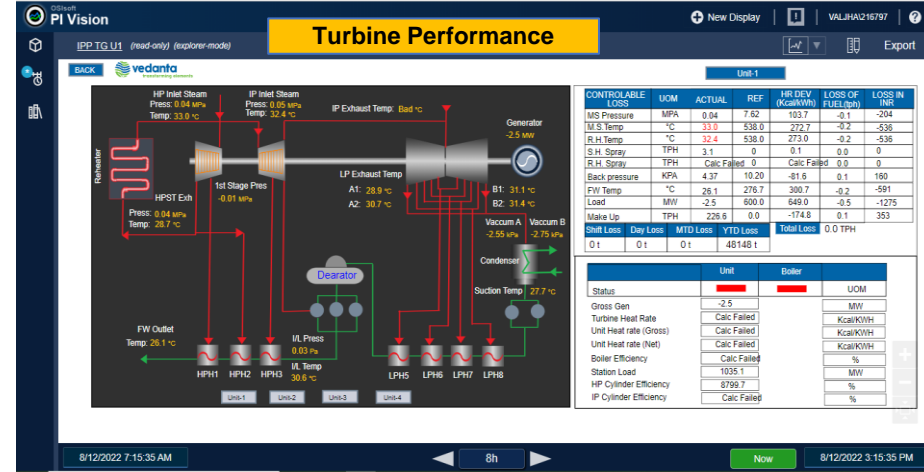
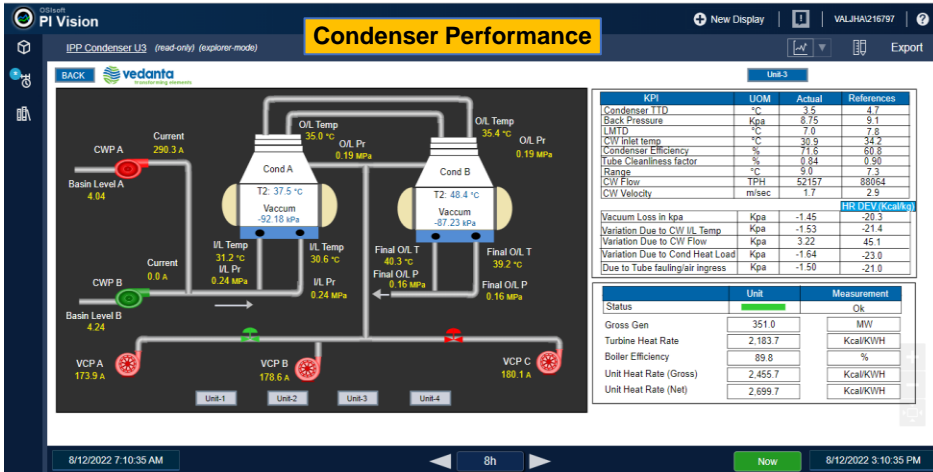
PH-1 POWER GENERATION	PH-1 TOTAL COAL FLOW	NO. OF COMP RUNNING	NO. OF INST. COMP	NO. OF SERVICE COMP	DEW POINT (INST)	DEW POINT (SERVICE)
347	261	6	2	4		

PH-2 POWER GENERATION	PH-2 TOTAL COAL FLOW	NO. OF COMP RUNNING	NO. OF INST. COMP	NO. OF SERVICE COMP	DEW POINT (INST)	DEW POINT (SERVICE)
698	543	6	2	4		

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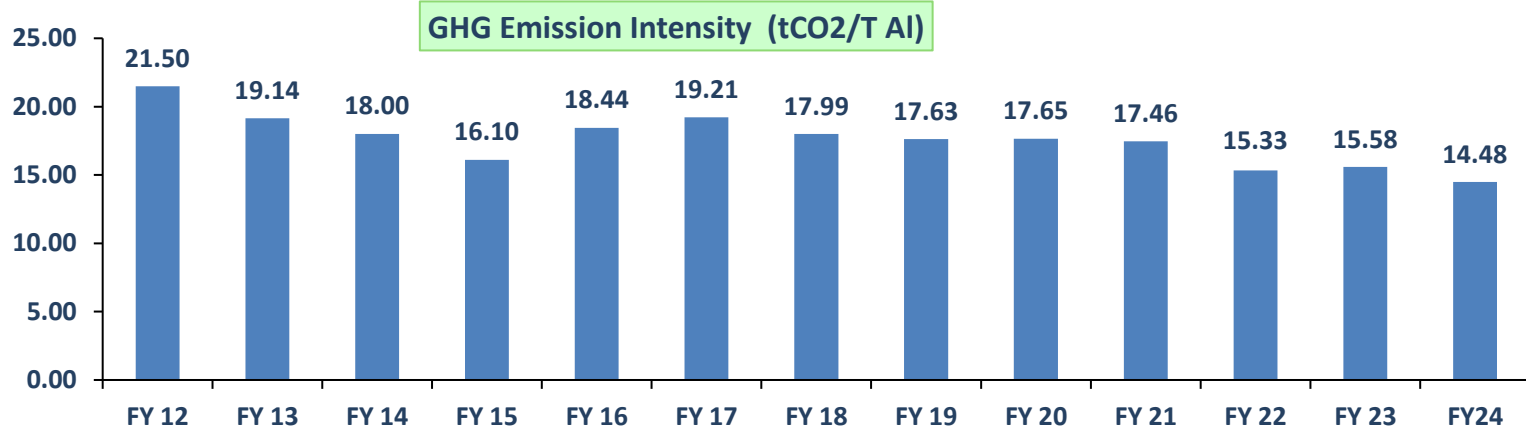


# Digital Initiative for Energy Efficiency Monitoring through Osi Pi



## JSG Complex GHG emission and roadmap – FY 2050

JHARSUGUDA COMPLEX					
Year	Scope 1 emissions	Scope 2 emissions	Scope 3 emissions	CO2e MT	Specific GHG Emission
	CO2e (MT)	CO2e (MT)	CO2e (MT)		(TCO2e/MT of Al.)
2020-21	23926260	510837	3827783	28264880	20.19
2021-22	23894744	1956916	5005929	30857589	18.29
2022-23	21398809	5399730	5567124	32365663	18.82
2023-24	22310180	3486195	5236078	31032453	17.40



GHG emission intensity (tCO<sub>2</sub>e/MT) -Jharsuguda

# ENVIRONMENT INITIATIVES

## Inaugurates Fill-Less Cooling Tower Technology

**Initiative details:** Commissioning of Fill-less Induced draft Mist Cooling Tower of 2500 m3/hr capacity. First-of-it's-kind technology in aluminium sector that will lead to reduced waste generation, improvement in energy efficiency, improved structural integrity & reliability and reduced water consumption.

**Impact:** a) Eliminates the use of PVC plastic fills.  
b) Energy savings upto 480 KWh/day/cell.  
c) Maximization of cooling efficiency.

Vedanta Jharsuguda Inaugurates Fill-Less Cooling Tower Technology



## Decarbonization of Industrial Fleet

**Initiative details:** Vedanta Jharsuguda is India's largest deployer of electric forklifts at a single location with a total of **59 Lithium-ion forklifts**. Moreover, for the first time in India, 10-ton forklifts are deployed in metals and mining industry.

**Impact:** a) Reduced diesel consumption up to 800 KL, leading to reduction of 2160 MT of CO2 emissions per annum.  
b) Longer life than conventional lead-acid batteries

Vedanta Jharsuguda expands India's largest fleet of electric forklifts, bolstering sustainable operations



## ASI Certification

**Initiative details:** Vedanta Jharsuguda – SEZ smelter is now **"ASI certified"** and received **"EPD Certification"** against our initiative to ESG compliance and complying with the best people and business practices.  
**ASI Chain of Custody (CoC) (V2 2022) Standard Certification** also obtained for Vedanta Jharsuguda SEZ Smelter.

ASI CERTIFICATION  
PERFORMANCE  
STANDARD



PRESENTED TO

**VEDANTA LIMITED**  
ALUMINIUM BUSINESS  
(SEZ SMELTER- JHARSUGUDA)

CERTIFICATE  
NUMBER  
279

ASI  
STANDARD  
PERFORMANCE  
STANDARD  
(V2 2017)

CERTIFICATION  
LEVEL  
FULL  
CERTIFICATION

ASI  
ACCREDITED  
CERTIFICATION  
VERIFIKA

DATE OF ISSUE  
14 APRIL 2023

DATE OF EXPIRY  
13 APRIL 2026

CERTIFIED SINCE  
14 APRIL 2023

AUTHORIZED BY

  
Aluminium Stewardship Initiative Ltd  
ACN 606 661 126, Australia  
info@aluminium-stewardship.org

Validity of this Certificate is subject to continued  
conformance with the applicable ASI Standard  
and can be verified at  
[www.aluminium-stewardship.org](http://www.aluminium-stewardship.org)

CERTIFICATION SCOPE

Manufacture and supply of all primary aluminium product in the form of billets, semi rod, primary foundry alloys (PPA), ingot and sows from the Vedanta Aluminium Smelter located within the Special Economic Zone (SEZ) at Jharsuguda, Odisha, India. This also includes low carbon primary Aluminium, i.e. Restora and Restora Ultra.

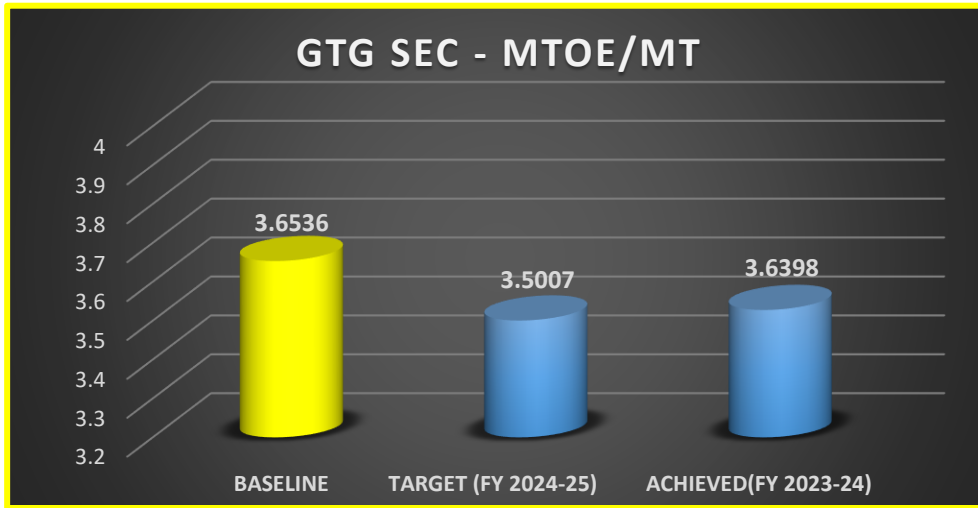


# INTERNATIONAL CERTIFICATION

<p><b>ASI CERTIFICATION PERFORMANCE STANDARD</b></p> <p>PRESENTED TO</p> <p><b>VEDANTA LIMITED</b> ALUMINIUM BUSINESS (SEZ SMELTER- JHARSUGUDA)</p> <p>CERTIFICATE NUMBER: 276 DATE OF ISSUE: 14 APRIL 2023</p> <p>ASI STANDARD: PERFORMANCE STANDARD (V2 2017) DATE OF EXPIRY: 13 APRIL 2026</p> <p>CERTIFICATION LEVEL: FULL CERTIFICATION CERTIFIED SINCE: 14 APRIL 2023</p> <p>ASI ACCREDITED AUDITOR: CETIZION VERIFICA</p> <p><b>IDENTIFICATION SCOPE</b> Manufacture and supply of all primary aluminium product in the form of sheets, wire and primary foundry alloy (PFA), ingot and wire from the Hindalco Aluminium Smelter located within the Special Economic Zone (SEZ) at Jharsuguda, Odisha, India. This also includes hot carbon primary aluminium, i.e. Hotchips and Recharge Alloy.</p> <p>Manufactured by: <i>[Signature]</i> Aluminium Stewardship Initiative (ASI) ACN 506 691 100, Australia asi@aluminium-stewardship.org www.aluminium-stewardship.org</p>	<p><b>vedanta</b> transforming for good</p> <p><b>EPD</b> THE INTERNATIONAL CERTIFIED</p> <p><b>Environmental Product Declaration</b></p> <p>In accordance with ISO 14025 for: <b>PRIMARY ALUMINIUM</b></p> <p>From: VEDANTA ALUMINIUM</p> <p>Programme: The information of EPD System, www.epdinc.com Programme operator: EPD International AG EPD registration number: 5-7-08-00 Publication date: 2023-04-19 Valid until: 2028-04-30</p>	<p><b>ASI CERTIFICATION CHAIN OF CUSTODY STANDARD</b></p> <p>PRESENTED TO</p> <p><b>Vedanta Limited</b> Aluminium Business (SEZ Smelter – JHARSUGUDA)</p> <p>CERTIFICATE NUMBER: 383 DATE OF ISSUE: 7 MARCH 2024</p> <p>ASI STANDARD: CHAIN OF CUSTODY (V2 2022) DATE OF EXPIRY: 6 MARCH 2027</p> <p>CERTIFICATION LEVEL: FULL CERTIFICATION CERTIFIED SINCE: 7 MARCH 2024</p> <p>ASI ACCREDITED AUDITOR: CETIZION VERIFICA</p> <p><b>IDENTIFICATION SCOPE</b> Manufacture and supply of all primary aluminium products in the form of sheets, wire rolls primary foundry alloys (PFA), ingot and wire from the Hindalco Aluminium Smelter located within the Special Economic Zone (SEZ) of Jharsuguda Odisha India. This also includes Hot Carbon Primary Aluminium (Hotchips &amp; Recharge Alloy).</p> <p>Manufactured by: <i>[Signature]</i> Aluminium Stewardship Initiative (ASI) ACN 506 691 100, Australia asi@aluminium-stewardship.org</p>
<p><b>ASI Certification -Performance Standard</b></p>	<p><b>Environmental Product Declaration for Primary Aluminium</b></p>	<p><b>ASI Certification Chain of Custody Standard</b></p>



## Plant-1 + CPP 1215MW -ALM0008OR



### Mandatory Energy Audit(MEA)

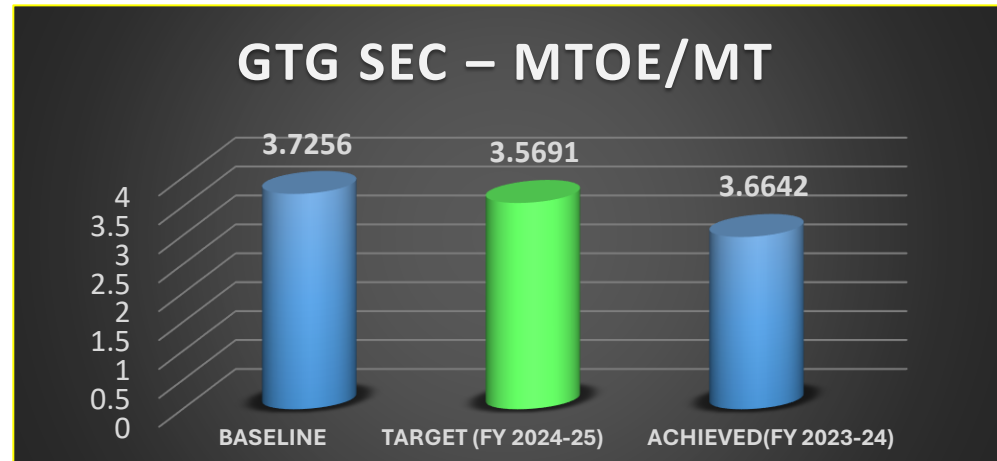
- Plant-1 + CPP 1215MW, already 3nos of Energy Audits were completed.
- 4<sup>TH</sup> Energy Audit completed in FY25.

Got Best Performer Award in 'PAT CYCLE#1'

## Plant-2 + CPP 1800MW -ALM0014OR

### Mandatory Energy Audit(MEA)

- In FY21 1<sup>st</sup> Energy audit was conducted.
- In July'22 PAT M&V Audit done.
- 2<sup>nd</sup> Energy Audit completed in FY25.





### Events Conducted:-

1. Energy awareness campaign in plant by different departments
2. Online quiz competition for Vedanta employee
3. Awareness training for school children
4. e-paper presentation for school
5. best energy conservation idea competition for contract partner,



## ENERGY CONSERVATION WEEK CELEBRATION-2023



Working towards a **30%** share of **renewable** energy in our power mix by 2030



#WorldEnvironmentDay

Nearly **15 billion** litres of water recycled in FY 24



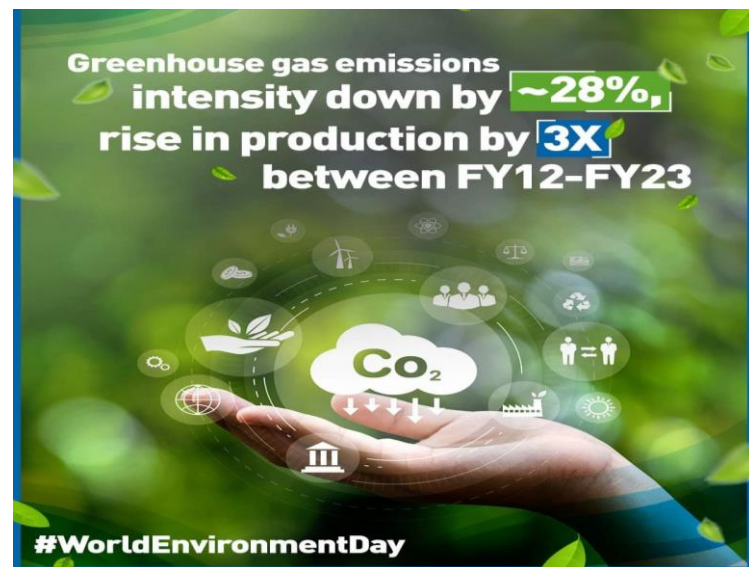
#WorldEnvironmentDay

Ranked **1<sup>st</sup>** on the S&P Global Corporate **Sustainability** Assessment 2023



#WorldEnvironmentDay

Greenhouse gas emissions intensity down by **~28%**, rise in production by **3X** between FY12-FY23



#WorldEnvironmentDay



**Thank You...**