
AVEVAWORLD

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transforming for good

HINDUSTAN ZINC
Zinc & Silver of India

HINDUSTAN ZINC

Christopher Kiddle - Cerebulb
Jevin Makadia - CereBulb

SAFE SMART SUSTAINABLE

Hindustan Zinc Limited - Global Leader

Vedanta Group Company with Mines & Smelting Operations Across Rajasthan

US$ 35.37 Billion Market Capitalization

INR 13,677 Crores (US$ 1.6 Billion) EBITDA FY24

INR 28,932 Crores (US$ 3.4 Billion) Revenue from Operations FY24

~75% Market Share in India's Primary Zinc Industry

3rd Largest Silver Producer Globally

World's Largest Integrated Zinc-Lead Smelter at Chanderiya, Rajasthan

World's Largest Underground Mining Operations at Rampura Agucha, Rajasthan

World's 2nd Largest & the Only Integrated Producer of Zinc, Lead & Silver in India

Our Fully Integrated Operations

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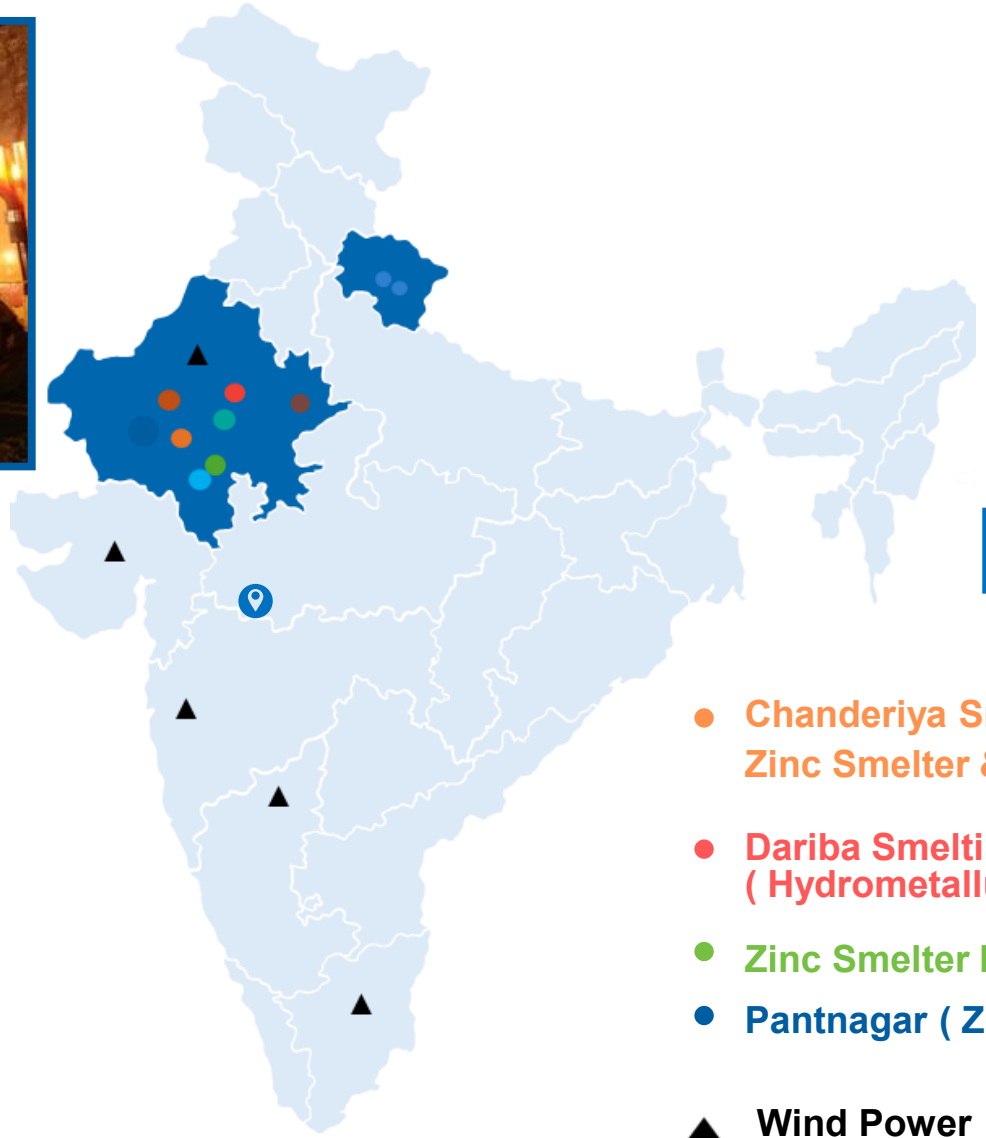

Mine

- Rampura Agucha Mine
- Sindesar Khurd Mine
- Rajpura Dariba Mine
- Zawar Group of Mines
- Kayad Mine

Smelters & Refineries

- Chanderiya Smelting Complex (Pyrometallurgical Lead Zinc Smelter & Hydrometallurgical Zinc Smelter)
- Dariba Smelting Complex (Hydrometallurgical Zinc Smelter & Lead Smelter)
- Zinc Smelter Debari Hydrometallurgical Zinc Smelter
- Pantnagar (Zinc, Lead & Silver refinery)

▲ Wind Power

Our Capacities

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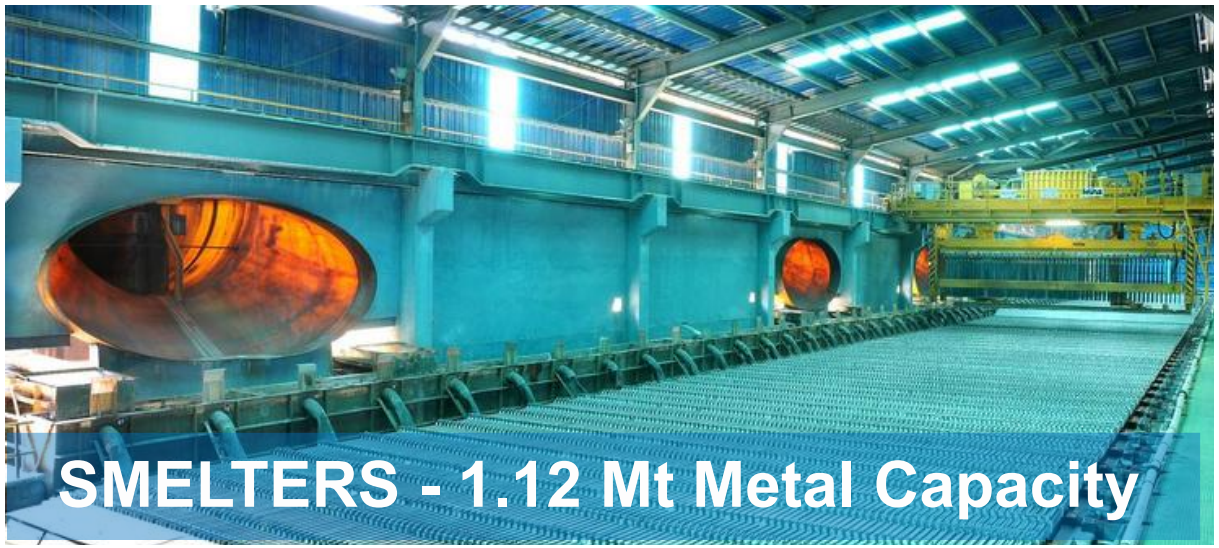

Metal Production Volumes FY24

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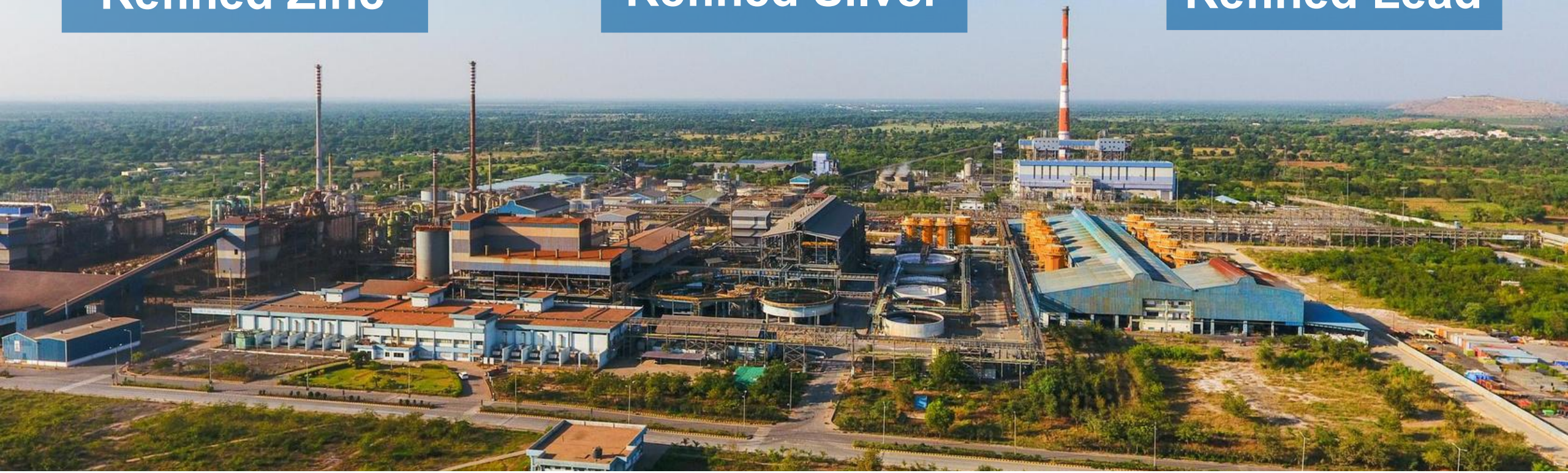
Protecting & Preserving for an AatmaNirbhar Bharat...

817 Kt
Refined Zinc

746 MT
Refined Silver

216 Kt
Refined Lead



Zinc Portfolio – Amongst World's Largest

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Production Capacity – 913 KT

SHG (Special High Grade)

Special High-Grade Jumbo

New

EcoZen – Asia's 1st Low Carbon 'Green' Zinc

Zinc Alloys Production Capacity – 30 KT

New

Hindustan Zinc Die Casting Alloy 3

High Grade Jumbo

HIgh Grade Zinc

Continuous Galvanizing Grade Jumbo

New

Hindustan Zinc Die Casting Alloy 5

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Our Diverse Product Portfolio

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Lead

Features

Versatile metal with high malleability,
Resistant to corrosion

Applications

Automotive batteries, Pigments,
Cable sheathing

Silver

Features

Highest thermal conductivity & lowest contact resistance

Applications

High- end Electronic devices, Printed circuits,
Production of mirror & coatings, Solar Technology

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Unmatched Protection for Steel

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Why is Zinc the Game-Changer in the Metal Industry?

Protecting Critical Infrastructure | Strengthening Automobiles | Driving the Global Energy Transition | Amping Up Defence | Powering Modern Electrical and Electronic Systems | Fortifying Food Security

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From Underground to Above the Ground

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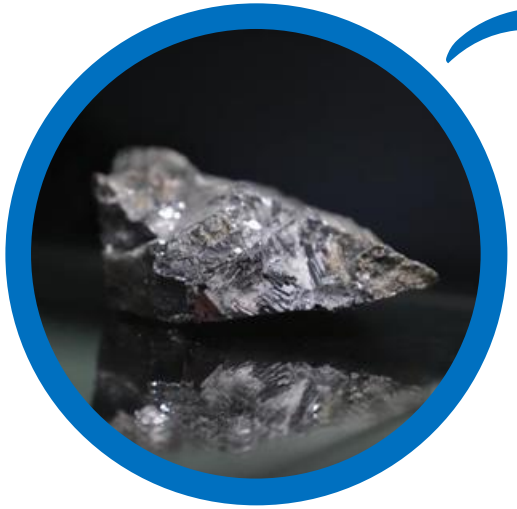
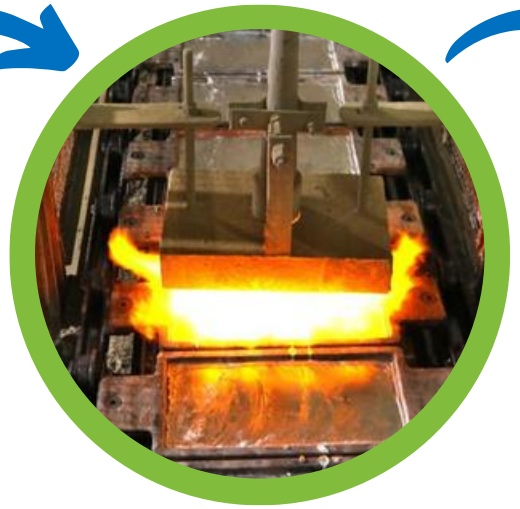
MINING



Ore extracted from mines

SMELTING



Extracted ore being processed at smelters

ZINC INGOTS

Zinc ingots made at smelters

DIVERSE APPLICATIONS

Zinc used across industries from aerospace to defence

Sustainability

S&P Global

The World's Most Sustainable Metals & Mining Company

as per S&P Global Corporate Sustainability Assessment 2023 & 2024 consecutively for the past 2 years

2.41 times Water Positive

70% of total energy needs to be sourced using Renewable Power by 2027

100% renewable power for Pantnagar Metal Plant, Uttarakhand

India's 1st all-women underground mine rescue team 1st underground BEV

Producing Asia's only Low Carbon 'Green' Zinc - EcoZen

Transforming the lives of 20 lakh people across 4,000 remote villages

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Digitalization Journey & AVEVA PI System

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Applicability of AVEVA PI System

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Data Efficiency

- Single source of truth
- Quicker response
- Automated shift reports
- Event based email notifications
- Easy to communicate with various DCS and ERP platforms to have end-to-end business visibility
- Mobility capability

People

- Data-based live feed discussions
- Manpower engagement to value-added work and future prospects
- Performance monitoring & training identification
- Analytical based capability measurement and appraisals

Asset

- Data- & analysis-based RCA
- Model-based predictive maintenance and material planning
- Improved safety and reduction in unscheduled breakdown

Cost

- Real-time consumables tracking
- Cost control – real-time consumables optimization
- Building cost consciousness to bottommost layer

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Digital Architecture

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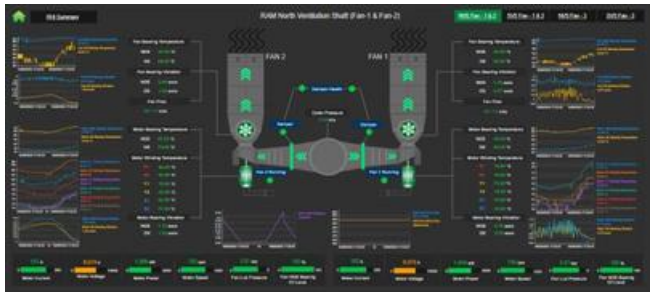

AVEVA PI Vision

Microsoft Azure
AI/ML Platform

Other Visualization Tools

Power BI

OPTIMINE

mobilaris

AVEVA PI SYSTEM

Optimine Database

Certiq Database

Normet

Other SQL DB

DCS / PLC / SCADA / APC

Manual Data Loggers

Mine Wi-Fi Network

LOADSCAN
accurate payload measurement

Rockwell Automation

ABB

SAP

Honeywell

GE

IOT Sensors

Woodgrove TECHNOLOGIES INC.

metso Outotec

SANDVIK

Epiroc

CAT

normet

MINTEK

LIMS

UG Fleet Tracking and Telemetry

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Use Cases with AVEVA PI System

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Condition-Based Monitoring of Critical Assets

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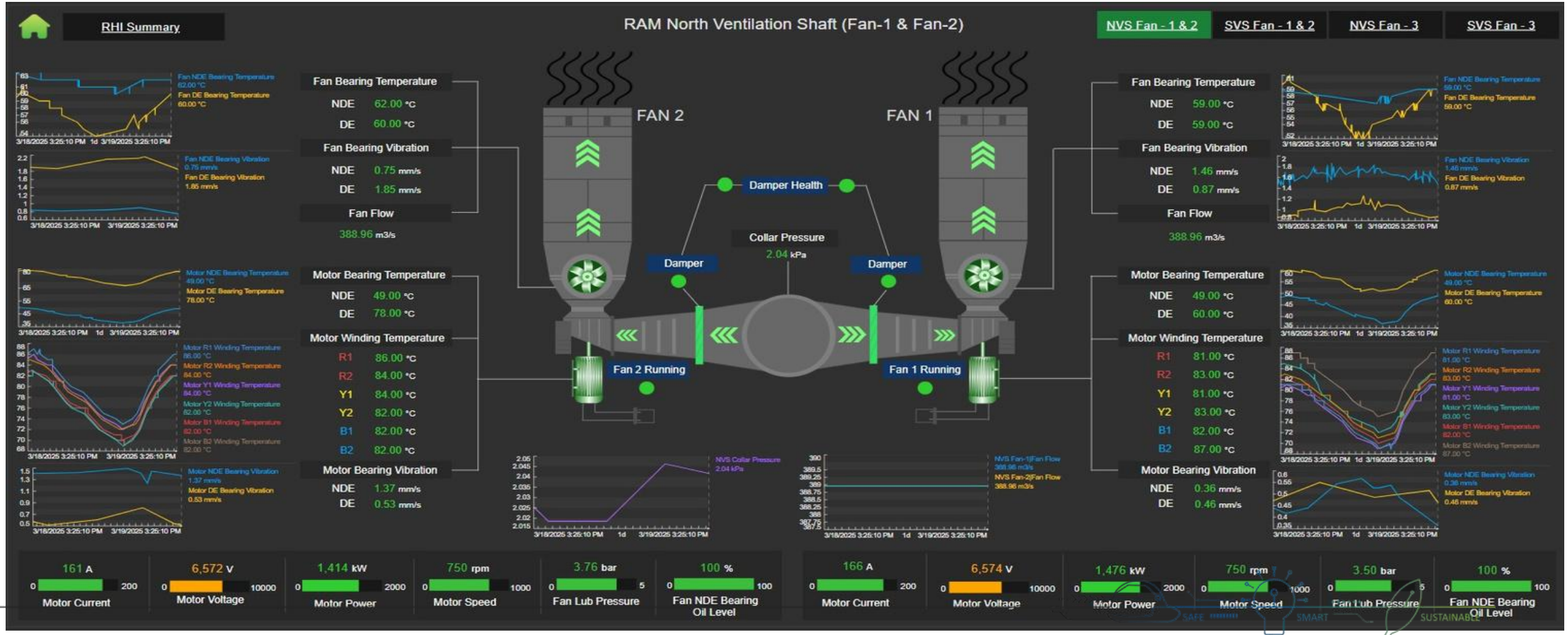
Challenge	Solution	Value
• No operational visibility of critical assets	• Condition-based monitoring using key operational parameters. Auto-triggered trip notifications and alerts based on AL & WL	• Reliability improvement



Performance Monitoring of Critical Assets

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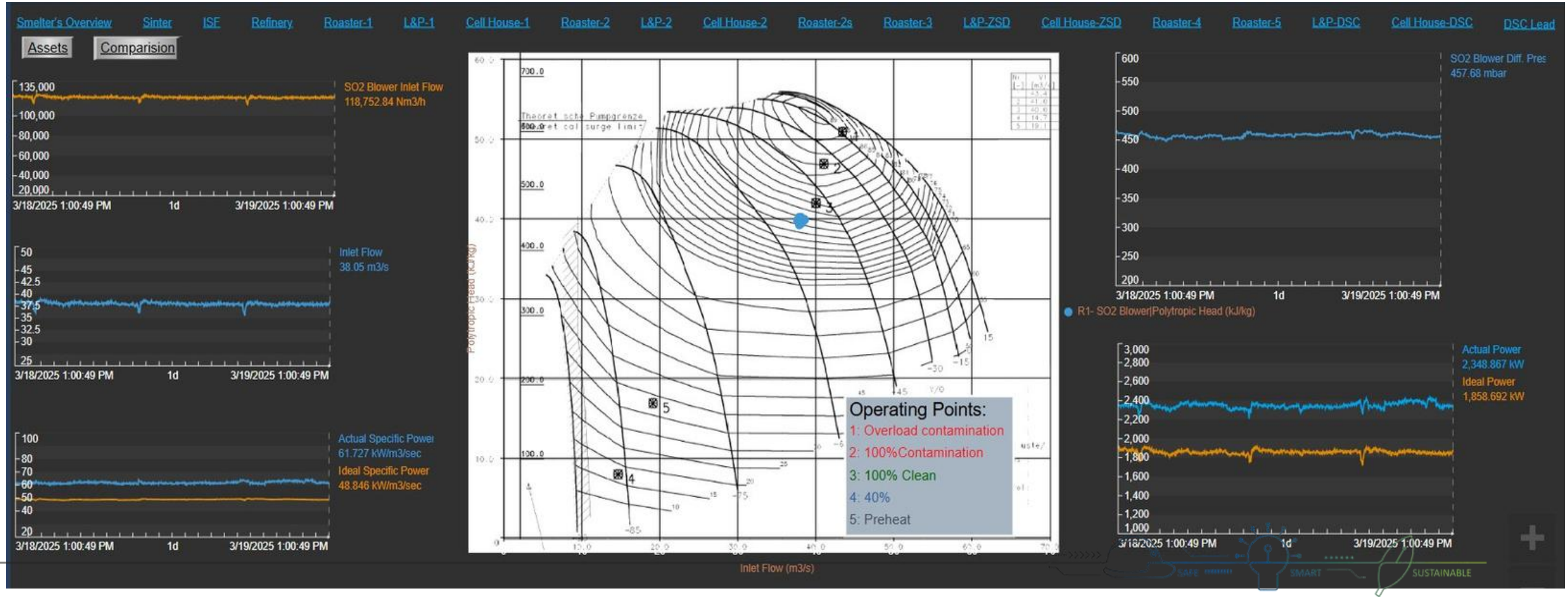
Challenge	Solution	Value
• Operational Efficiency not known	• Real time Monitoring of Efficiency based on analytics using theoretical performance curve • Ideal vs Actual Power Consumption analysis	• Potential reduction in Specific • Energy Consumption by 5%



Operational Efficiency Improvement

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Challenge

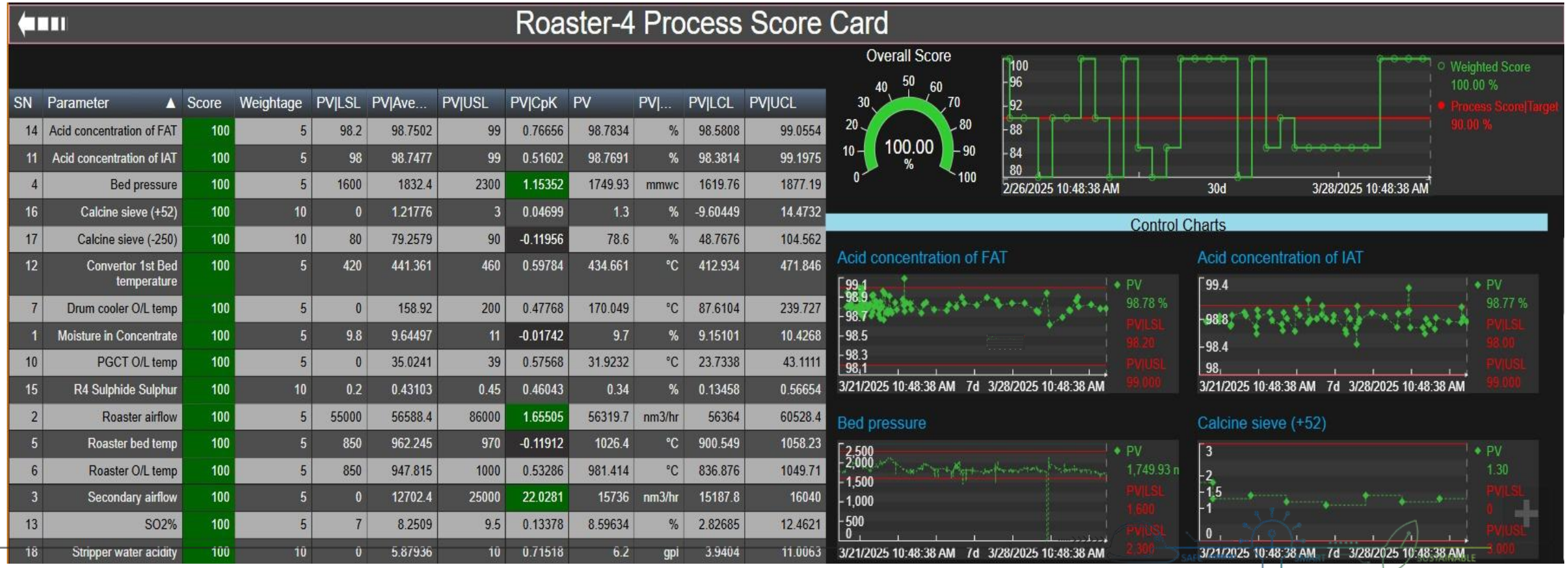
- Process Capability and Score analysis are done offline Control Charts were not available on real-time basis

Solution

- CpK and Score card analysis done in PI AF. Real time dashboards developed along with SPC
- Charts Notification and deviation alerts configured

Value

- Potential Improvement throughput by 0.5-1% Improvement in Standard deviation of
- CTP/CTQ



SN	Parameter	Score	Weightage	PV|LSL	PV|Ave...	PV|USL	PV|CpK	PV	PV|...	PV|LCL	PV|UCL
14	Acid concentration of FAT	100	5	98.2	98.7502	99	0.76656	98.7834	%	98.5808	99.0554
11	Acid concentration of IAT	100	5	98	98.7477	99	0.51602	98.7691	%	98.3814	99.1975
4	Bed pressure	100	5	1600	1832.4	2300	1.15352	1749.93	mmwc	1619.76	1877.19
16	Calcine sieve (+52)	100	10	0	1.21776	3	0.04699	1.3	%	-9.60449	14.4732
17	Calcine sieve (-250)	100	10	80	79.2579	90	-0.11956	78.6	%	48.7676	104.562
12	Convertor 1st Bed temperature	100	5	420	441.361	460	0.59784	434.661	°C	412.934	471.846
7	Drum cooler O/L temp	100	5	0	158.92	200	0.47768	170.049	°C	87.6104	239.727
1	Moisture in Concentrate	100	5	9.8	9.64497	11	-0.01742	9.7	%	9.15101	10.4268
10	PGCT O/L temp	100	5	0	35.0241	39	0.57568	31.9232	°C	23.7338	43.1111
15	R4 Sulphide Sulphur	100	10	0.2	0.43103	0.45	0.46043	0.34	%	0.13458	0.56654
2	Roaster airflow	100	5	55000	56588.4	86000	1.65505	56319.7	nm3/hr	56364	60528.4
5	Roaster bed temp	100	5	850	962.245	970	-0.11912	1026.4	°C	900.549	1058.23
6	Roaster O/L temp	100	5	850	947.815	1000	0.53286	981.414	°C	836.876	1049.71
3	Secondary airflow	100	5	0	12702.4	25000	22.0281	15736	nm3/hr	15187.8	16040
13	SO2%	100	5	7	8.2509	9.5	0.13378	8.59634	%	2.82685	12.4621
18	Stripper water acidity	100	10	0	5.87936	10	0.71518	6.2	gpi	3.9404	11.0063

Operational Efficiency Improvement

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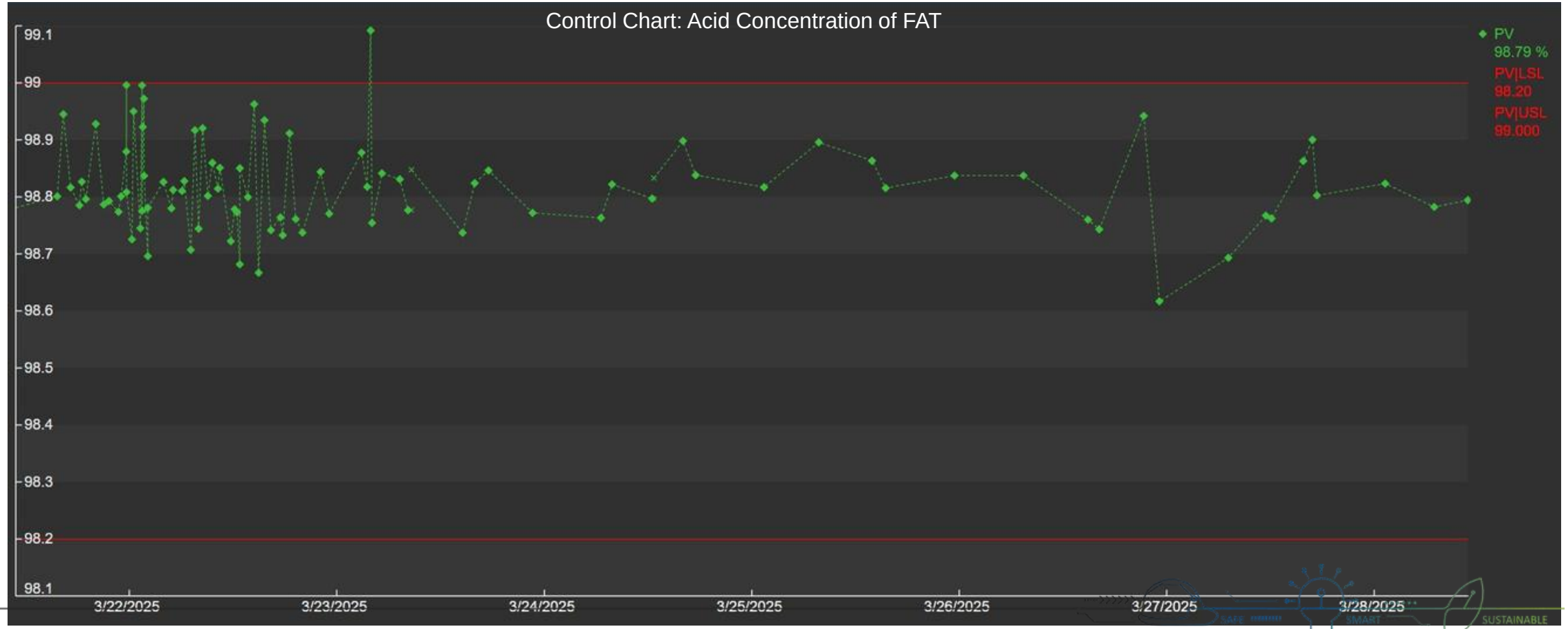
Challenge	Solution	Value
• Process Capability and Score analysis are done offline Control Charts were not available on real-time basis	• CpK and Score card analysis done in PI AF. • Real time dashboards developed along with SPC • Charts Notification and deviation alerts configured	• Potential Improvement throughput by 0.5-1% Improvement in Standard deviation of CTP/CTQ



Soft Sensor for Predicting P80 in Mills

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Challenge	Solution	Value
No visibility of P80 in the mills (P80: Fineness of the ore; acts as key performance indicator in grinding section in milling process)	Developed an AI/ML model (Regression) using the key operational parameters. PI System being used for: •Data collection & validation using PI Datalink (Training) & PI WebAPI (Live-Data) •Deployment of Model into Control system using PI WebAPI via Python scripting Dashboarding using PI Vision	Grinding Media & Power Specific Consumption reduction

Energy Management System

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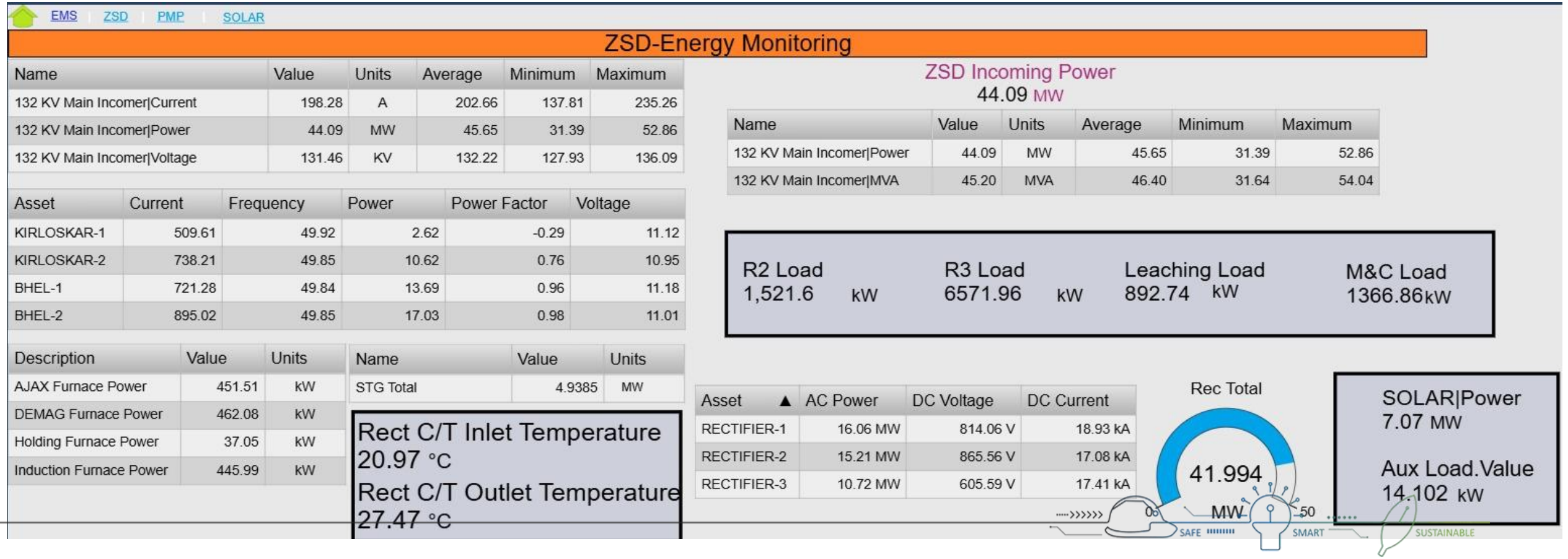
Challenge	Solution	Value	Way Forward
Huge Deviation in Actual vs Planned Load Schedule resulting in Penalty on the account of over/under withdrawal and injection	• Integration of Energy Monitoring devices across HZL with PI System • Real time dashboard of actual power consumption • Auto alerts considering 15-Min block schedule deviation	Potential saving Rs 5-10 Lacs/month	Automatic Scheduling based on Load forecast Solar power generation prediction



Potential Benefits Industries

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Potential Benefits Industries can target using AVEVA PI System

5-10%

Process Efficiency

10-15%

Asset Productivity

5-10%

Production Increment

10-15%

COP Reduction

10-15%

OEE Improvement

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Deployment of PI System Across HZL

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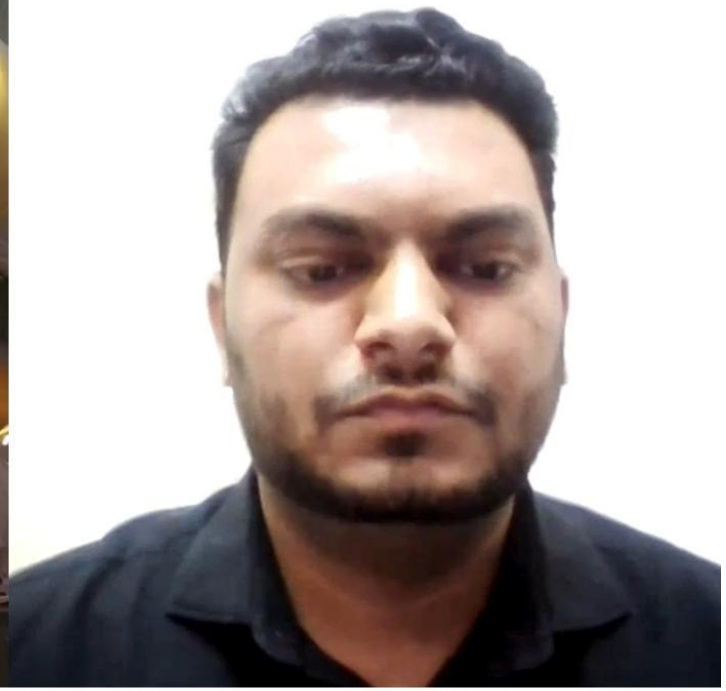
Change Management Across Workforce



Use Cases on PI System

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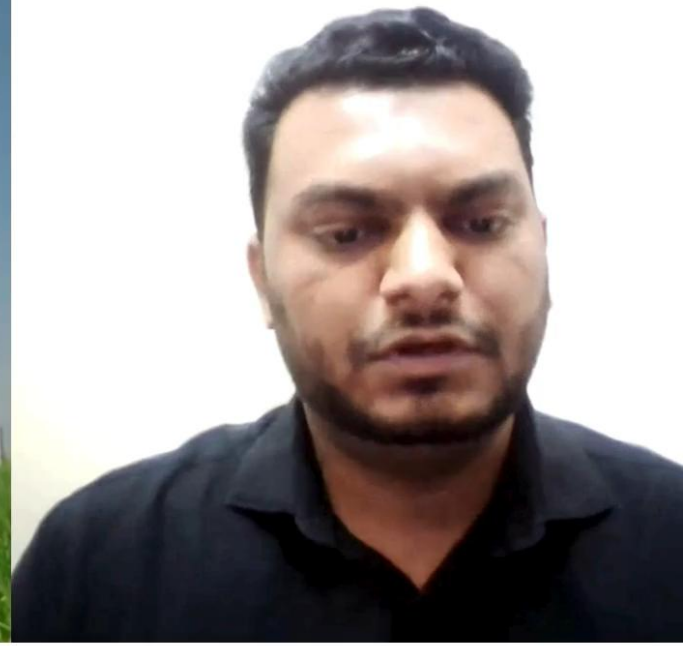

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Way Forward at HZL

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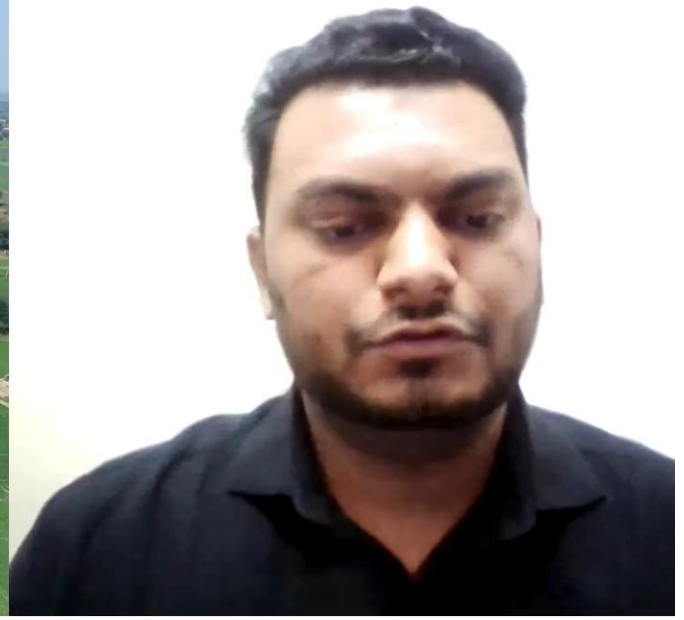

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Capabilities AVEVA PI System should have

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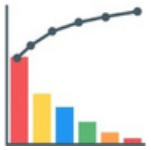
Android, IOS & windows-based App development

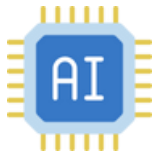
Notification Counter & Closure Analysis

Automated PI Vision display development

Mail subscriptions with exported display in PDF format



Pareto Chart & other advance visualization capability in PI Vision



In-built AI/ML based Analytical Engine

MMM | India

Rock to Revenue: HZL's Future Ready Plant

Challenge

- Data Silos & Lack of Real-Time Visibility
- Inefficient Asset Performance Monitoring & Maintenance
- Energy Management & Sustainability Compliance
- Manual Reporting & Change Management

Solutions

- End to End Plant Digitization from Mines to Metal Processing
- Integration with Multiple OEM Data Sources.
- Integration with SAP for Production Output Management

Result

- Increase in Process efficiency by **5-10%**
- Asset Productivity output boosted by **10-15%.**
- OEE Improved by **10-15%.**

THANK YOU

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