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Mission Energy 2022- GOA
Theme: -Strategies for Superior Performa

# Best O&M Practices
# 1740MW
# Thermal Power Plant Operati
# Maintenance

Manas Mishra & Manish Lakl

# We are

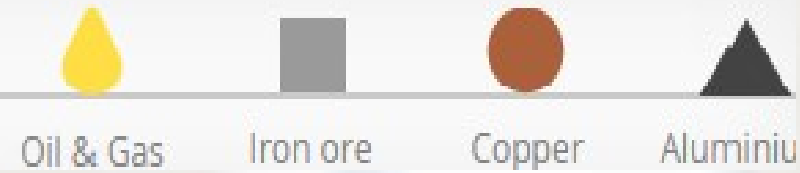
esources Limited is a globally diversified Natural Resources with interests in zinc-lead-silver, Iron ore, Steel, Copper, Power, Oil and Gas.

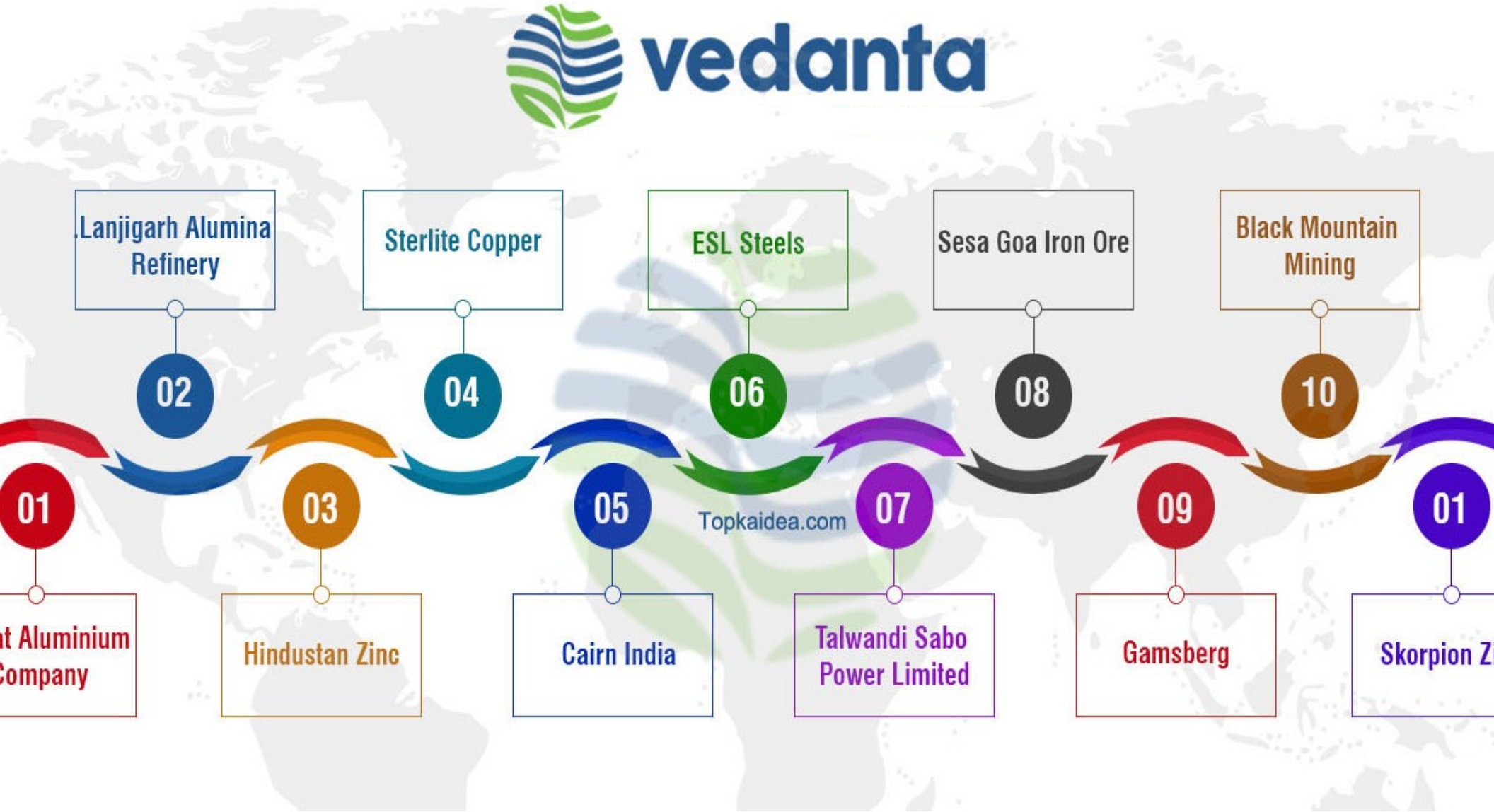
ic portfolio follows a history of consistent geological discovery, al advancement and sustainable development. With a business used on growth, expansion and value creation for our rs, positive impact on the community, we operate in and leave pride.

ally, our operations are centered in India, Africa and Australia 5,000 employees.

lues are vital part of our culture and an essential underpinning th and success.

powered to drive excellence and innovation; we demonstrate standards of governance, safety, sustainability and social ty. Our business was built with a simple mission envisioned by s Chairman, Mr. Anil Agarwal – "To create a leading global ource company."

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Lanjigarh Alumina Refinery
Sterlite Copper
ESL Steels
Sesa Goa Iron Ore
Black Mountain Mining
02
04
06
08
10
01
03
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01
t Aluminium Company
Hindustan Zinc
Cairn India
Topkaidea.com
Talwandi Sabo Power Limited
Gamsberg
Skorpion Z

**at Aluminium Company** (BALCO) has made significant contributions as the **1st PSU** dia's Aluminium sector Incorporated in 1965, **BALCO** is India's first integrated inium business.

of the first disinvestments of the Government of India. It now a part of Vedanta ed, with 51% stake held by Vedanta Limited and 49% held by Government.

is based in Chhattisgarh State having Captive Bauxite mines in Mainpat and rdha, Captive coal mines in Chotia, 2010 MW power generation capacity and 5.7 Aluminium Smelting capacity at Korba Complex.

produces Wire Rods, Ingots, Alloy Rods, Alloy Ingots and Rolled Products. Balco is selling Power to State Utilities & own sister concerns.

has been India's first to have - Captive Power Plant, to venture into +300 kA ake pots, to produce Alloy Rods for conductors used in power transmission stry, to roll material for Aerospace Industry, online riser replacement, busbar ation in Pot Room, single beam implementation and holds patent for aluminium cell technology.


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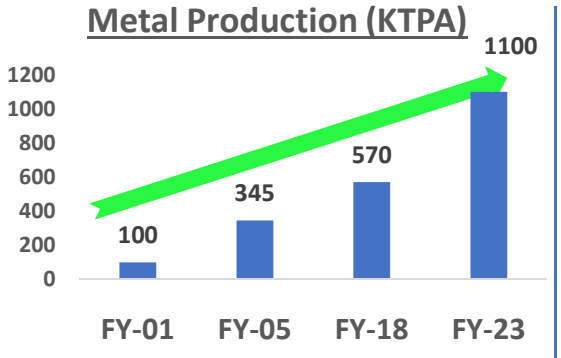
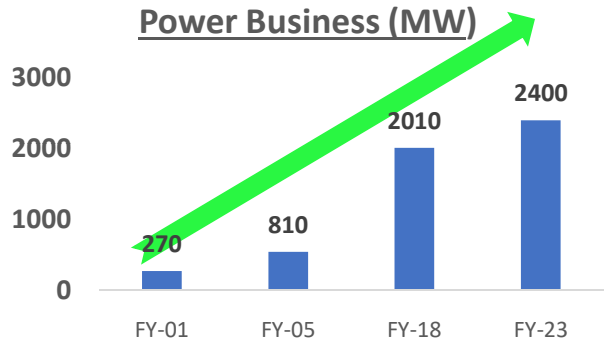
## Our sion

"To be a world class integrated Aluminium and Power producer generating sustainable value for all stakeholders"




## Our Core Values

- Care
- Respect
- Innovation
- Excellence
- Integrity
- Trust
- Entrepreneurship

## Our ission

- To be amongst top decile in global cost curve.
- Operational Excellence.
- Ensure resource security with efficient supply chain.
- Effective collaboration with stakeholders.
- Unleash employee potential.
- Build and strengthen brand equity.

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MW power generation capacity and 5.7 LTPA Aluminum Smelting capacity at Korba Complex.

## Plant Overview (1740 MW)

Number of units – 8

Capacity of each unit – 4*300 MW & 4*135 MW

Single drum, Natural Circulation, Pulverized Fuel fired, Single Reheat, Balance Draft, and Tangentially Corner Fired, Fabric Filter @ AHP

Reheat, Double steam exhaust, two casing condensing steam turbine.

# y Indicators – Power 1740MW

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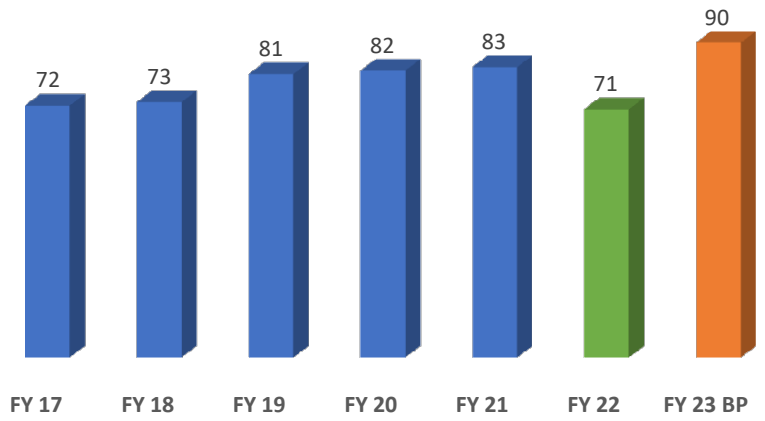
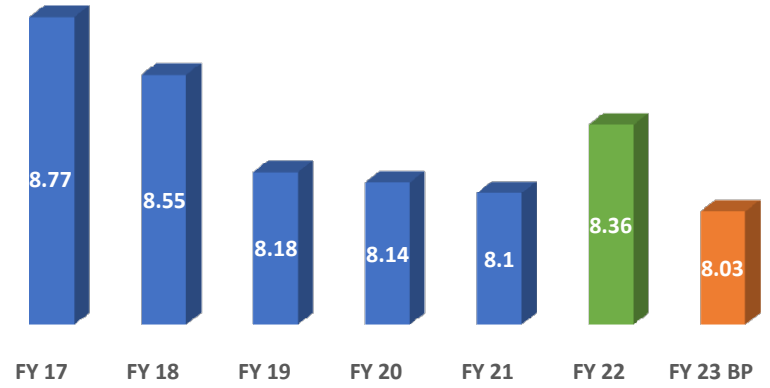
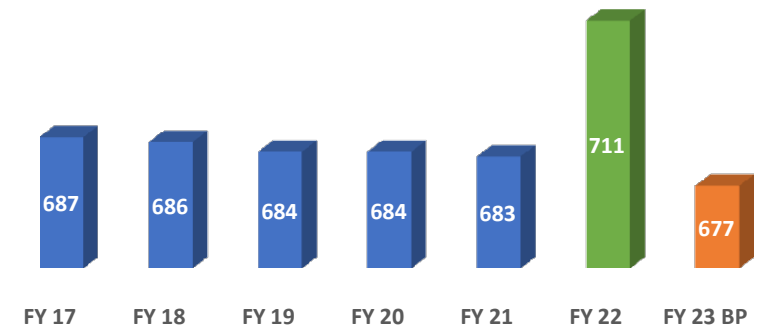
## PLF



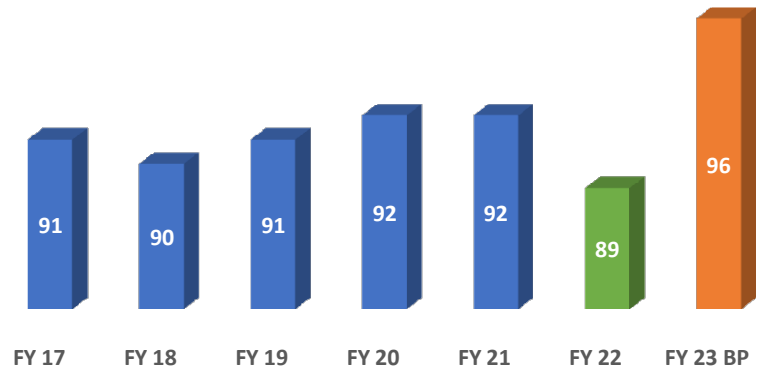

## APC




## SCC




## Availability



# oject 1: CW Interconnection

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## tle:

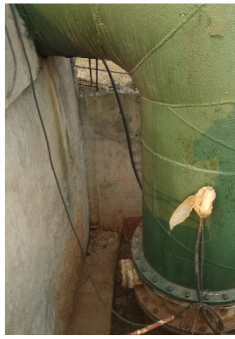
ction of CW discharge line of units

## etails:

540MW each unit have two CW pump (capacity -
Cub Meter) which provides cooling water to
ser, run in closed cycle.
cation done in CW pump discharge line by providing
nnection line between two units(U#1 and U#2) (U#3
4)
nnection line equipped with three No's of MOV
ed from remote with logic for better reliability of
.
viding the interconnection line one Cooling water
an be stopped without having major impact on
and process parameter thus having total energy
of 730 KW.
se design & modification with spare pipe line &
shed valves with project cost of INR 3 Lacs

MOV 1

CW interconnection line with MOV 2



MOV

## Result

Stoppage of one CW pump

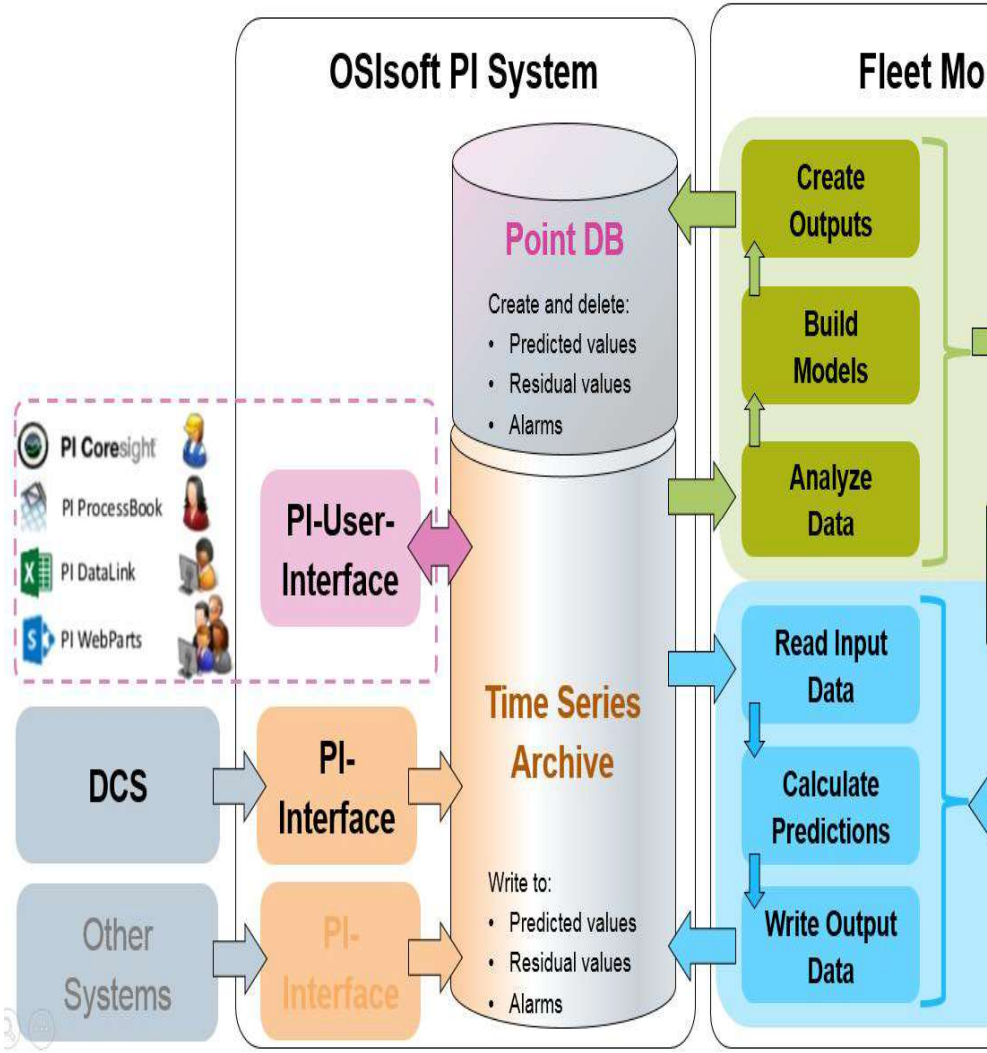
Auxiliary Power Consumption reduced by 730KW

Saving of 15.914 Million INR/ year due to reduction in auxiliary p
consumption.

**lization** : DCS, PLC & EMS data integration in real with PI server for visualization and history database.

**ment Modelling** : Modelling of equipment on us aspect to detect the anomaly and initial fault ction.

**integration** : Integration of vater, vibration, thermography and SAP data and ts.



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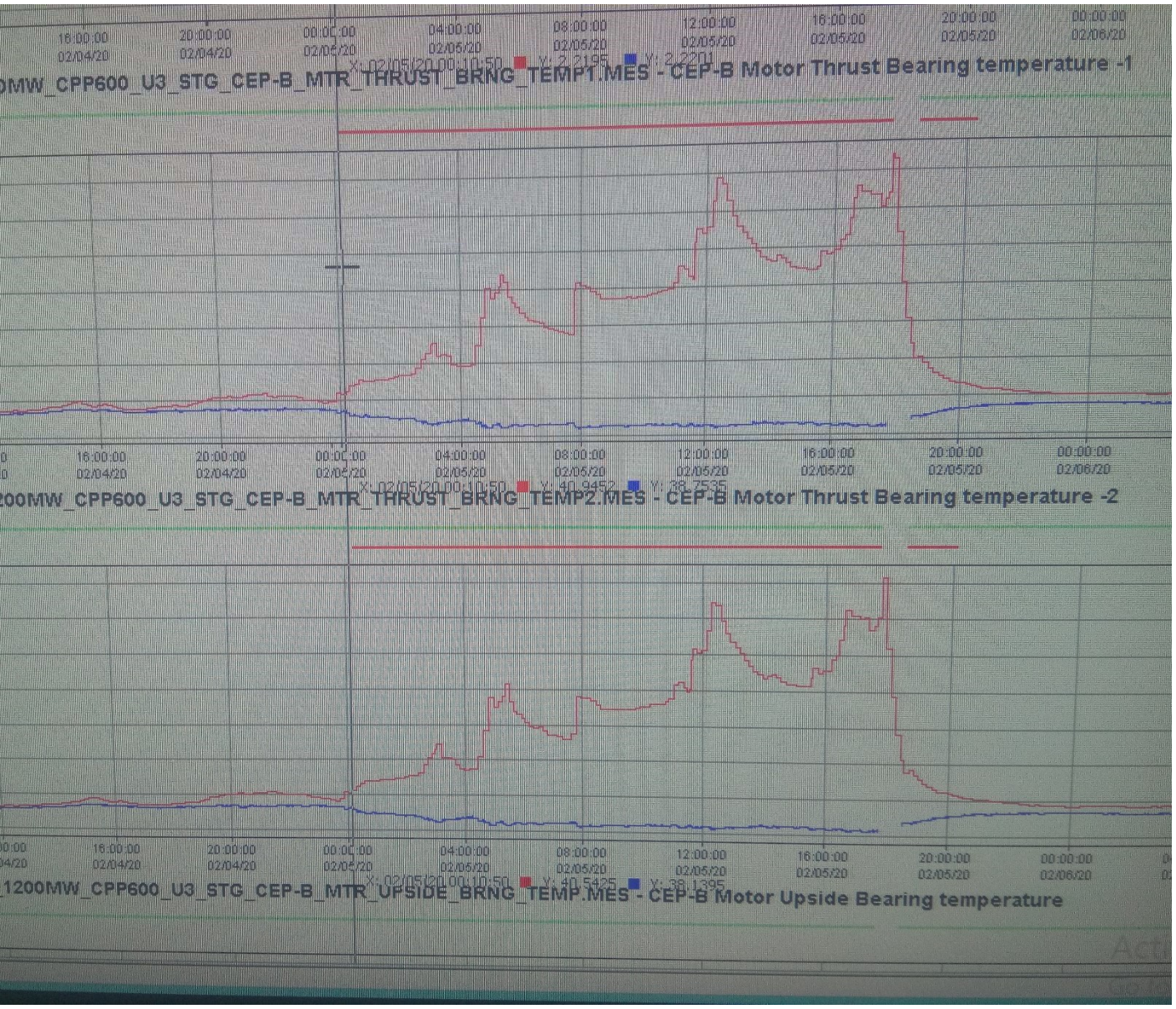
| PROCESS/ EQUIPMENT | CORRELATING PARAMETERS | CASE | POTENTIAL BENEFI |
|---|---|---|---|
| A Fan 2A | Bearing Vibrations/Temp, IGV, CURRENT, LUBE OIL TEMP,MTR WNDG TEMP | PA Fan 2A Fan bearing Temp started rising at 15:30 Hrs on 14-Feb-20, same was restored by 17:30hrs. according to fleet monitoring it is showing alarm on temp from 16:00 hrs | SAVING ON UNIT PLF: (.15*24*2.5)*10^6=**0.9 cr** Spare Cost- **2.0 lakh** |
| EP 3B | Motor Bearing Temp, Winding Temp, Discharge Pressure, Pump Current | CEP 3B , which have been trained on past data, was stopped on 05.02.2020 at 5:47 p.m. for high motor thrust bearing temp. According to the training Fleet Motoring is showing alarm on thrust bearing temp from 5th Feb'20, 12:30 a.m. and it had reached alarm limit of DCS around 5:30 p.m. | APC SAVING(Stage Reduct Rs. **12,345.69 per d** Spare Cost- **1.0 lakh** |
| D fan 2B | IGV, Fan Bearing Temp/Vibrations, Current, Suction Temp, Motor Bearing Temp, Lube Oil Temp, Motor Winding Temp, Fan Discharge Pressure/Temp | ID fan 2B, stopped at 5:45 p.m. as fan bearing metal Temp was high (DTD : 10.02.2020). ID fan 2B was trained on past data and according to that, it is showing alarm on temp from 8:15 a.m. and it had reached alarm limit of DCS around 2:50 p.m. | SAVING ON UNIT PLF: (.15*24*2.5)*10^6=**0.9 cr** Spare Cost- **2.25 lakh** |
| D Fan 1A | IGV, Fan Bearing Temp/Vibrations, Current, Suction Temp, Motor Bearing Temp, Lube Oil Temp, Motor Winding Temp, Fan Discharge Pressure/Temp | Fan tripped on 21.01.2020 at 8:50 a.m. due to high NDE bearing temp. According to the training Fleet Motoring is showing alarm on NDE bearing temp from 21th Jan'20, 8:36 a.m. and it had reached alarm limit of DCS around 8:49 p.m. | SAVING ON UNIT PLF: (.15*24*2.5)*10^6=**0.9 cr** Spare Cost-**2.25lakh** |
| eal air Fan 1A | Fan Discharge Pressure, Bearing Vibrations/Temp, IGV, Motor Bearing Temp, Motor Winding Temp | Seal Air fan B was in permit and Seal air fan A tripped | SAVING ON UNIT PLF: (.15*0.5*2.5)*10^6=1,87,5 Spare Cost- |
| GET U#4 | APH Inlet/Outlet Temp, Economizer Inlet/Outlet Temp, Secondary Air Temp, DP Across APH | | Zonal soot blowing done in |
| IST U#4 | Unit Load, Main Steam Pressure/Temp, Coal Flow, Super Heater Attempt Spray | | Auto loop done for spray c |
| #4 Turbine Bearing arameters | Lube Oil Press, MOT Temp, CW Inlet /Outlet Temp, Bearing Temp/Vibrations, CV % For MOT Oil Cooling Water | Turbine Bearing 5 return oil temp fluctuating in range 90-94.8^C | Auto loop tuning done for I cooling line CV |

# Case Study: - CEP#3B




CEP 3B , which have been trai
past data, was stopped at 5:47 p
high motor thrust bearing
According to the training Fleet M
is showing alarm on thrust bearin
from 12:30 a.m. and it had r
alarm limit of DCS around 5:30 p.r

# Project 3 : Bio-Mass Co-firing

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**jective**

I. To fulfill MOP compliance of 5% biomass co-firing.
II. To reduce GHG emission from by .43 Mn tons inline with Vedanta de-carbonization and carbon neutrality plan
III. Use of alternate green fuel in thermal power plant.
IV. To meet Non solar RPO compliance.

**ategy**

I. To map & identify the biomass suppliers and start trial with market available Quantity.
II. To invite vendors to establish biomass pallets manufacturing Balco to reduce transportation cost.
III. To encourage vendors to connect with Vedanta Green spark Channel in long term.

**tion**

I. Mapping of available biomass in nearby area.
II. Identification of Suppliers.
III. Initiation of biomass purchase in short time interval before schedule date.
IV. Initiated biomass firing in current countrywide coal crises situation.


**pact**

I. Start Reducing the Steam coal consumption which is 30-35% higher cost than biomass in current market scenario.
II. Technically co-fired biomass successfully in 540 MW unit.
III. Start increasing the onsite renewable energy portfolio.
IV. Incorporated biomass vendors in coal supply System for smooth operation.
V. Creation of circular economy for farmers with agro waste supply chain.

**ure Plan**

I. Gradually increasing the supply of biomass to achieved the 5 % mark.
II. Horizontally deployment of biomass co-firing in all units of 1740 MW PP.

# Mill Logic Modification for Biomass Co-firing

| escription(OLD) | Parameter | Consequences |
|---|---|---|
| parator O/L temp | >85 C | Mill O/L temp High Alarm |
| | >95C | Mill trip |
| temp | N.A. | |
| ss Co-firing) | | |
| escription(NEW) | Parameter | Consequences |
| parator O/L temp | >70 C | Mill O/L temp High Alarm |
| | >75C | Mill trip |
| temp | >185 | Temp High Alarm |
| temp | >190 | Auto closing of HAD |

# logy Absorption: UI Gain

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OF PROJECT:

charges

STATEMENT:

per tracking system of export schedule with block average was not available.

AN:

en prepared for better monitoring of UI charges for block sed on grid frequency with respect to coal cost.

change indicator prepared for under and over injection block of for timely reversal of polarity .

g block export with respect to schedule with reason.

cross subsidy charges.

ed generation as per schedule.

vised as per available generation.

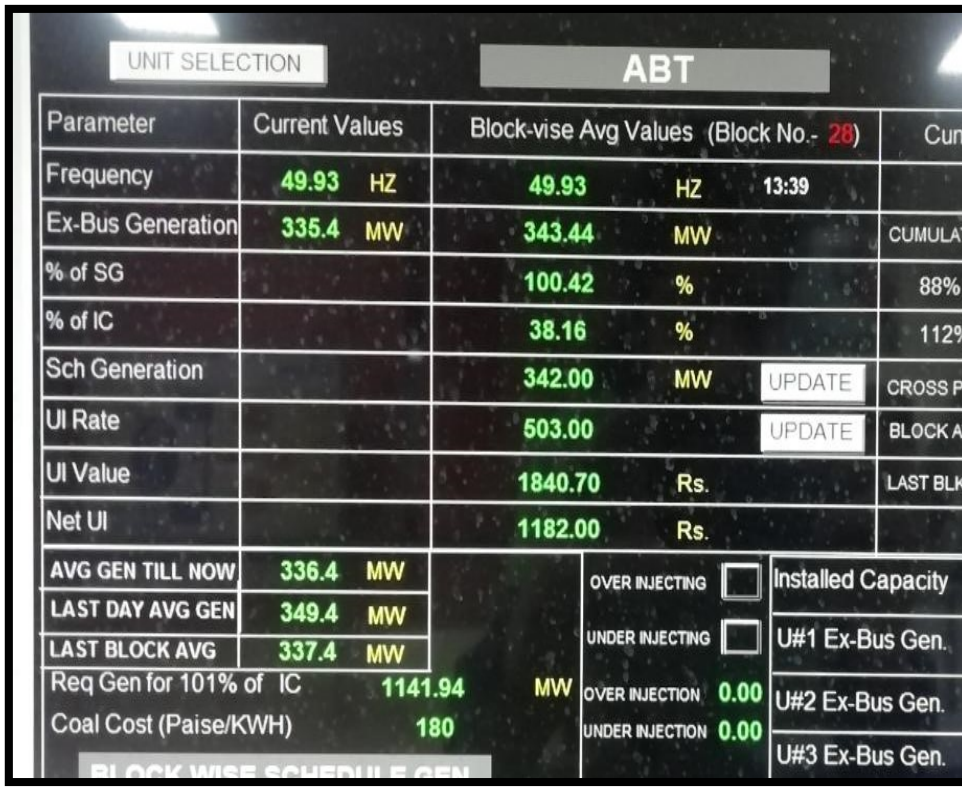
ordination with GIS during load throw off of smelter.

COST: IN HOUSE MODIFICATION

**S:**

rupees - 12.748 crores till Aug 2020 for this FY 20-21

**Flow Diagram**



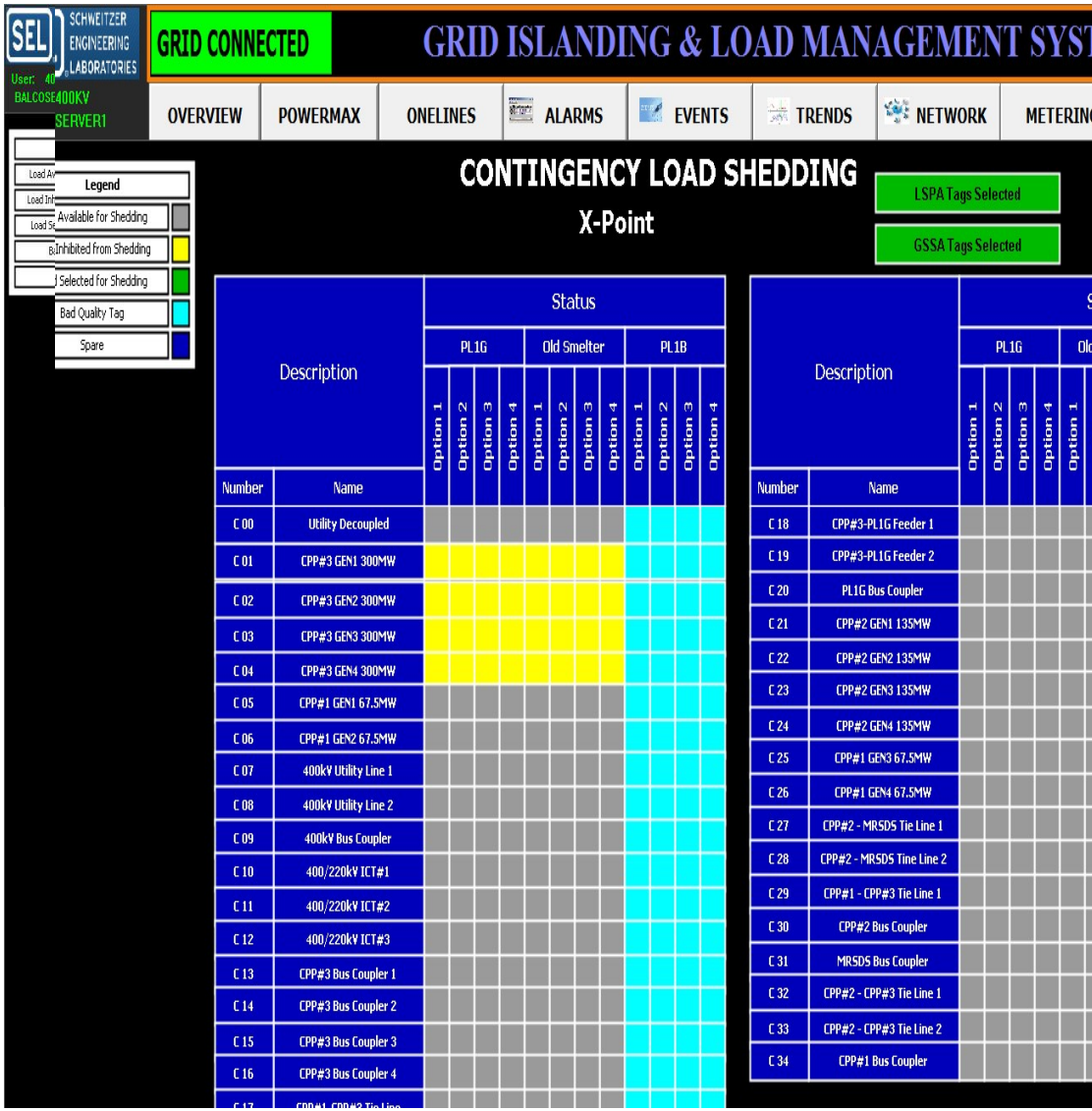
GILMS in place of CILMS to Manage the Generation Vs
ng Grid contingency

STATEMENT:
ckout/Grid Outage Load management is the biggest challenge
h a big load as a Aluminum Sector.

AN:

ack logic for matching the Generation V/s Load.
ation Shedding Management.
hedding Management.
gency Logic
oupling & Decoupling System.

**complex was survives 3 times during grid outage.**



Pilot Project  for reliability

Project on BTL detection System

city enhancement in same frame from 300MW to 330MW and 135MW to 140MW.

# Certifications

| iption | Certification | Benefits |
|---|---|---|
| y management system | ISO 9001:2015 | Enhanced customer satisfaction and improved customer loyalty leading to repeat business , Increased revenue and market share obtained through flexible and fast responses to market opportunities, Consistency in the delivery of your product or service. |
| onment Management m | ISO 14001:2015 | Identify cost savings with greater emphasis on resource, waste and energy management, Demonstrate compliance with current and future statutory and regulatory requirements. |
| pational Health & Safety gement System | OHSAS 45001:2018 | Give signals to our clients and stakeholders that our organization is committed to protecting the needs of all our stakeholders. |
| y Management System | ISO 50001:2018 | Increase energy cost savings for the organization by reducing costs via a structured approach to managing our energy consumption. |
| ty Management System e automotive industry. | IATF 16949 | Ability/helps to enter auto manufacturing market. |
| nation Security gement System(ISMS) | ISO/IEC 27000:2013 | Safeguard our valuable data and intellectual property |
| accredited Lab | ISO 17025:2005 | Reliable testing, measurement and calibration services |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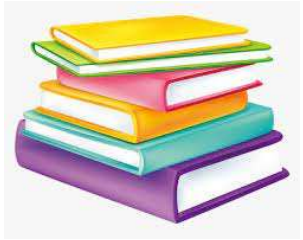
3 Districts
123 Villages



6163 children benefitted

45,000+ covered under curative & preventive healthcare services

33,000+ Women & Men on Menstrual He

1.50 Lakh lives touched

Farmers efitted

9000+ Youths Skilled

72,000 Covid beneficiaries

5000 SHG Women

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Strengthened **393** SHG's.

**1500+** linked to IGA.

**4292** Women benefitted under project

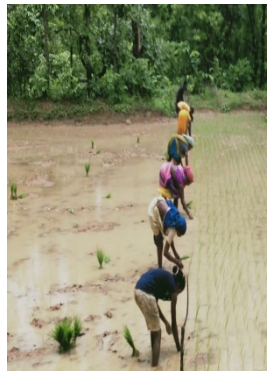
Established Bio-flock for fisheries.

**803** acres brought under secured irrigation.

SRI Cultivation in **450+** acres

Wheat Cultivation in **190+** acres

No. of farmers benefitted: **790**



aining to youths in 6 trades.

rained and **47** placed.

days training program.

ng **10.5 K** per month

Door to Door awareness

Formations. Digital Av

Reached out to **24 K ber**

**28** Adolescent girls grou

Currently running **5** Rural Health Post

Catering to the needs of more than **60** villages.

**5000+** people benefitted through RHP

**12000+** people covered through HIV awareness.

**800+** benefitted through programs on women & child.

d out to **72,440** people through various COVID relief initiatives

**vel –**

hed **Vedanta Cares 100-Beded Field Hospital** in Raipur

to the District administration - medicines & medical equipment

**Level –**

ous **Sanitization drive** in **30 communities**

anitation Kits (Soap, Sanitizer & mask) in **30 communities**

**ood – 71K +** masks stitched by 122 Unnati SHG women earning

**lakh**

**vel –**

**& Digital/Print Awareness activities** about Do's & Don'ts,

tion and testing in both Rural & Urban areas

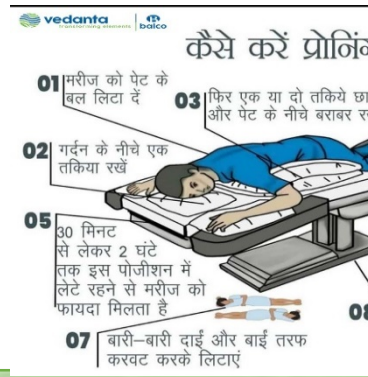
**status** –

**ccination** – 95% of population above 45 years of age ,15% of

pulation between the age group 18-45 years of age.

sualties – 28; Active Cases – 25 to 30





# Award FY 21-22

Leading
ward


International Green Apple Award in Environment Category

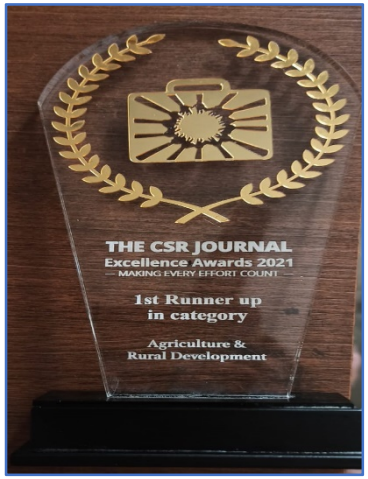

Golden Peacock Award for Energy Efficiency


Consecutive "Gold Medal" at National Award for Manufacturing Competitiveness


ICC Social Impact Awards in 2 dive Categories


uxite mines won
afety Awards


SABERA Award, 2021 in the category of "Responsible Business of the year"




CSR Journal Excellence Award


Kalinga Environment Excellence Award


BALCO 1200 MW unit w Excellence award

# Award FY 21-22


conomic Times
Workplaces for Women


India's Best Workplaces in Manufacturing 2022

Great Manager Awards 2021


tech Transformative Human
rce Award 2021



5 team won Par excellence Award and BALCO won valuable participation award at ICQCC 2021


Employees rewarded for their Exemplary Work

# THANK YOU


Chanakya Finalists
with EXCO Team
gs in business are never
ne by one person.
one by a group of people


Families visit Balco Plant unde
'Project Family Connect'