22nd National Award for Excellence in Energy Management-2021

Presented By :

1. *Mr. Abhinav Prakash Trivedi (Sr. GM – Operation & TS)*
2. *Mrs. Pratibha Pathak (Chief . Manager –O&E)*
3. *Mr. Vipin Dubey (Manager – O&E)*

DB Power Ltd

LEADERSHIP | Visionary Promoters Dedicating Complete Energy and Resources Towards Achieving the Power Business Vision

Power Business

Girish Agarwal
Managing Director,
DB Power

Sector: *Power*

- Committed US$320m of equity in the power business
- Leading one of the youngest power stations.
- Outstanding Entrepreneur' at Asia Pacific Entrepreneur Awards.
- Over 25 years of experience in print media and new business development.
- E&Y Entrepreneur of 2006 in Media Category.
- Active member of Indian Newspaper Society (INS), he was the youngest chairman of INS MP.
- Under his leadership, Divya Bhaskar won the 'Best in Print' at IFRA Asia Pacific Awards

Print Media and Other Businesses

Sudhir Agarwal
Managing Director, DB Corp

Sector: *Print Media*

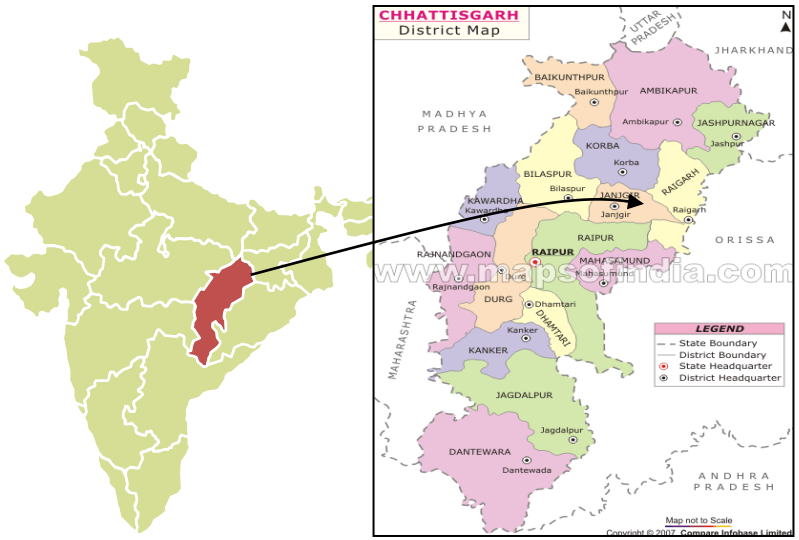
- Over 26 years of experience in print media
- Responsible for formulating DB Corp's long-term vision, monitoring performance and devising business strategy
- Under his leadership, DB Corp has progressed to become one of largest read newspaper of India

Pawan Agarwal
Managing Director, FM Radio

Sector: *Print Media / FM Radio*

- Been on the Board of DB Corp since December 2005
- Also actively leading the radio business and the DB Digital business within the group

Plant Location Overview



Location	Village- Badadarha, Tehsil – Dabhra, District – Janjgir Champa, State – Chhattisgarh.
Nearest Town	Raigarh – 24 km
Nearest Railhead	Robertson 12 km
Approach Road	All weather road
National Highway	NH 200 – 10km

COD U#1 :- 3rd Nov'2014

COD U#2 :- 26th Mar'2016

Land
- **255 Ha (630 Acre)**

Coal
- **Requirement = 6.33 MMTPA**
- Long-term FSA for 2.5428(ACQ) MMTPA from SECL
- Balance by E-Auction purchases

Water
- **23 MCM per annum - Kalma Barage at Mahanadi River, thru cross country pipe line of 28.4 Km**

Power Evacuation
- **Thru 18.5 Km Double Circuit 400 KV line to PGCIL Pooling Station Kotra, Raigarh**

Mission

To Generate Safe, Reliable, Eco Friendly and Cost Effective Power.

TURBINE –(BHEL)

- Design Turbine Heat rate : 1944 Kcal/KWh
- Main steam pressure 170 bar
- Steam temperature (MS/RH) 537 / 537 deg C.

:**Rated load**: 600 MW, Max load: 630.303 MW

BOILER (BHEL)

- Pulverised Coal 2000 TPH boiler.
- Controlled Circulation, Single Drum, Balanced Draft. Tilting/Tangential Burners.
- Design Efficiency 86.32%

OTHERS

- Wagon Tippler (L&T)-2 Nos.
- Natural draft Cooling Towers

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Current Year Performance –FY22 Till July-21

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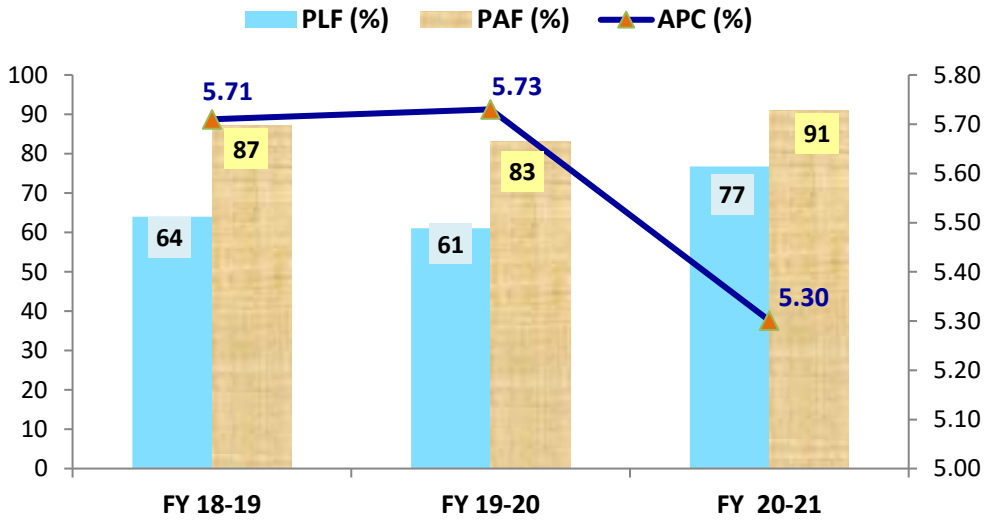
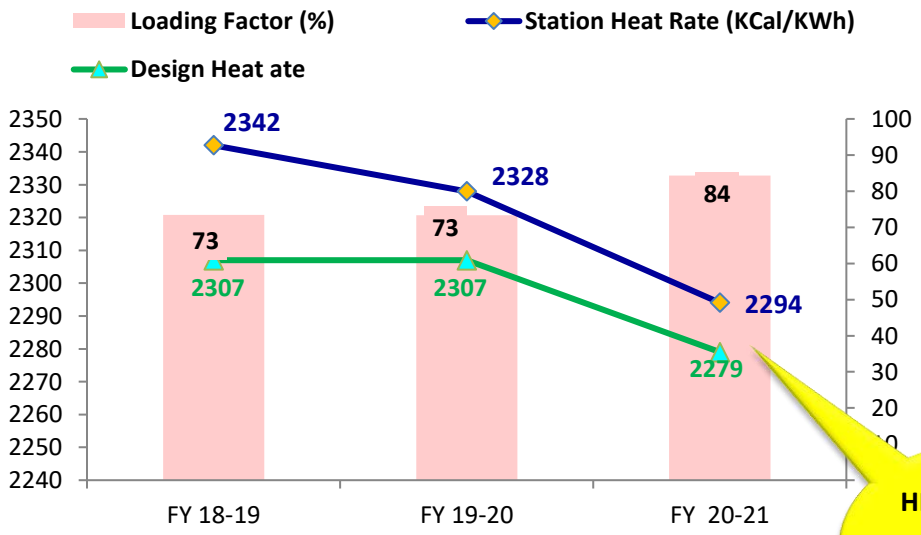
KPI'S





APC:

- **APC Improved in FY 20-21 by 7.5% as compared to FY 19-20**
- Improved Loading Factor
- VFD installation
- APC optimisation by intensive monitoring
- CHP Conveyor belt loading factor utilisation
- Implementation of improvement & encon project

Availability
:Reason For variations in FY 20-21

- **For Availability Loss w.r.t 100% :**

FY	2018-19	2019-20	2020-21
Planned Outage	0.0	9.4	1.77
Forced Outage	2.6	2.1	3.33
Low Schedule (Covid)	0.1	0.0	3.9
Coal shortage	10.2	5.3	0.0

HEAT RATE:

- **HR Improved in FY 20-21 from 0.91 % operating margin to 0.66% as compared to design**
- **Improved Loading Factor**
- **Combustion optimisation**
- **Best practices adopted**

HR improved by 1.46% compared to Last year

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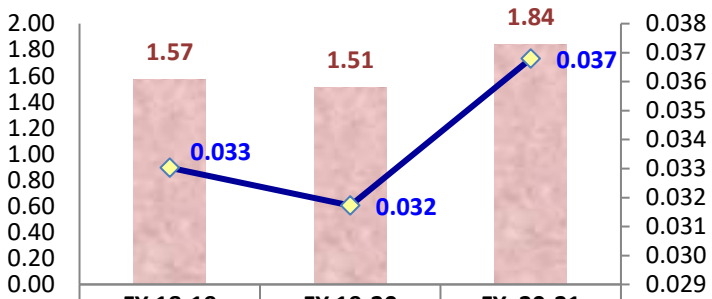
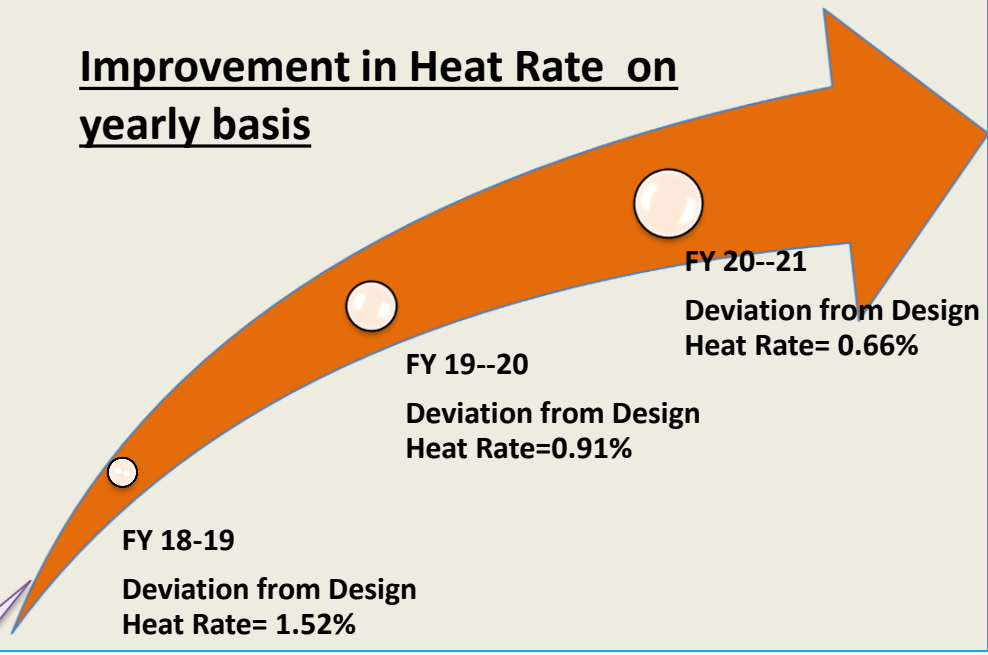
Sp. Energy Consumption

Thermal & Electrical energy consumption in MToe



	FY 18-19	FY 19-20	FY 20-21
Thermal Energy Consumption	1.57	1.51	1.84
Electrical energy consumption	0.033	0.032	0.037

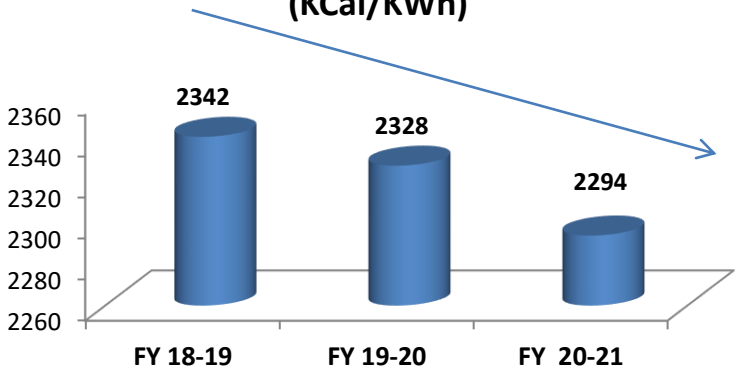
Improvement in Heat Rate on yearly basis



Major Factors contributing for Heat Rate Improvement in FY 20-21

1. AOH in FY 19-20
2. Combustion optimisation (reduction in excess air- Design O2 % -3.5 and actual operating at 2.8 % .
3. DM make-up optimisation.
4. Loading Factor improvement

Thermal specific energy Consumption (KCal/KWh)



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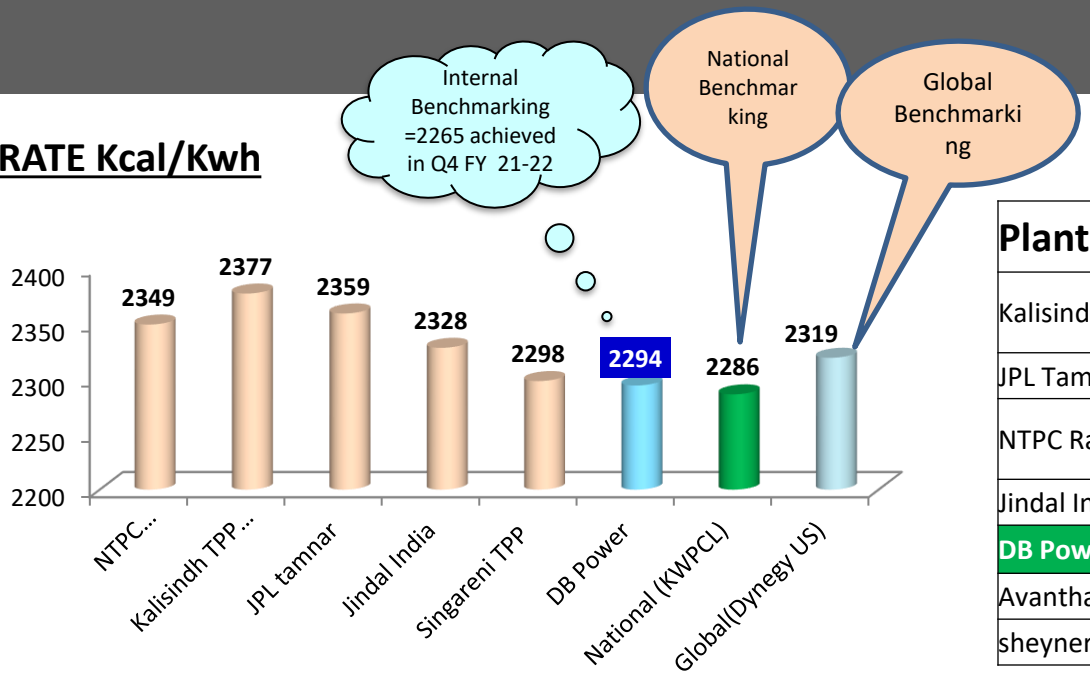
Energy Benchmarking

Data Source (PAT Notification & others)

HEAT RATE Kcal/Kwh



Aux Power Consumption (%)

Plant	APC %	Source
Kalisindh TPP (RRVUNAL)	6.82	Industrial chronical Encon book
JPL Tamnar	6.14	PAT notification
NTPC Ramagundam	6.88	Industrial chronical Encon book
Jindal India	5.64	FY 20-21 year report
DB Power	**5.3**	**FY 20-21 year report**
Avantha Power(National)	5.3	PAT notification
sheynery shanghai(Global)	5.0	1000 MW capacity

	GHR (kCal/kWh)	APC (%)
Targets for FY -22	**< 2302**	**< 5.37**

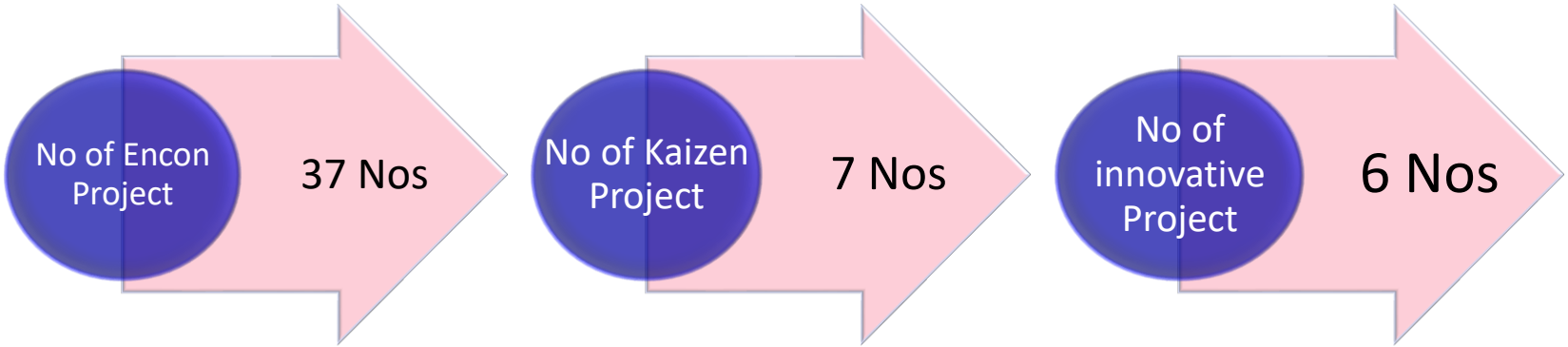
Road Map To Achieve Target/Benchmark

- To run the unit at design parameters.
- Mandatory Energy Audit completed. Recommendations to be implemented.
- Insulation survey , high energy drains passing survey and air leakage survey is conducted on regular basis to minimize unaccounted losses.
- Unit-1 COH- Overhauling of HP,IP & LP. Air Preheater basket replacement. Condenser jet cleaning. Cooling tower fill pack replacement.
- CAVT for combustion tuning.

LIST OF MAJOR ENCON PROJECTS PLANNED (2021-22)

S N	Project Details	Annual Electrical Saving (Million kWh)	Annual Thermal Saving (Million Kcal)	Investment (Rs in Million)	Remark
1	Installation of 132 KW VFD on BA Overflow pump	0.109		0.45	Installation of VFD in Existing Fluid coupling Bottom ash overflow Pump -Innovative idea
2	Installation of 90KW VFD (with bypass panel) in LDO Forward pump	0.151		0.45	In house Assessment/ Brain Storming
3	Installation of 110KW VFD on 110 KW LP water pump-2 motor to optimize the energy to match with variable flow requirement.(min 600 m3/hrs to max 1000 m3/hrs)	0.3		0.5	In house Assessment/ Brain Storming
4	To prepare monitoring system with software to identify optimum crushing element changing hours in crusher.	0.38		2.8	Energy Audit Recommendations
5	LORV to be taken into service		168		Time in synchronisation will be minimised by ensuring Oil gun reliability during start up
6	LP turbine Diaphragm Modification for revival time reduction of ruptured diaphragm	0.048			For ease of maintenance
7	LPBP spray valve opening position optimization	2.56			In House Assessment/Brain storming
8	a) Replacement of 150W HPSV lamp by 50W LED lamp (350 Lamps in FY 2021-22) b)Replacement of 40 W tube light by 16W LED tube light (500 lamps in FY 2021-22) c) Replacement of 250W HPSV high bay lamp by 120 W LED lamp (50 lamps in FY 2021-22) d) Replacement of 900 W HPSV flood lamp by 450 W LED lamp-yellow in High Mast (5 High Mast in FY 2021-22) e) Replacement of 250W HPSV LED lamp by 120 W LED street lamp(100 street lights in FY 2021-22) f) Replacement of 125 W HPSV lamp by 30 W LED lamp(100 lights in FY 2021-22) g) Replacement of 70 W HPSV lamp by 30 W LED lamp-Yellow colour(400 lights in FY 2021-22)	0.53		2.31	In house assessment and Energy Audit Recommendations
9	To prepare monitoring system/Software to identify the best path (Reclaiming, Stacking and Bunkering)	0.38		3	Energy Audit Recommendations
10	Boiler Surface Heat Loss reduction by applying proper Insulation.		142	0.35	Energy Audit Recommendations
11	Installation of VFD in Seal air fan-132 KW	0.24		0.45	Learning from GMR Energy during CII Award
12	Improvement in Heat rate by 16 kcal/kWh after unit-1 COH by improvement in performance of cooling tower, condenser, air pre heater, insulation, heaters and cylinder efficiency etc.		64000	160	Unit-1 Capital Overhauling
13	Improvement in APC by 0.2% after unit-1 COH.	0.425			
Total		**5.125**	**64310.0**	**170.3**	

Energy Saving projects implemented in last three years

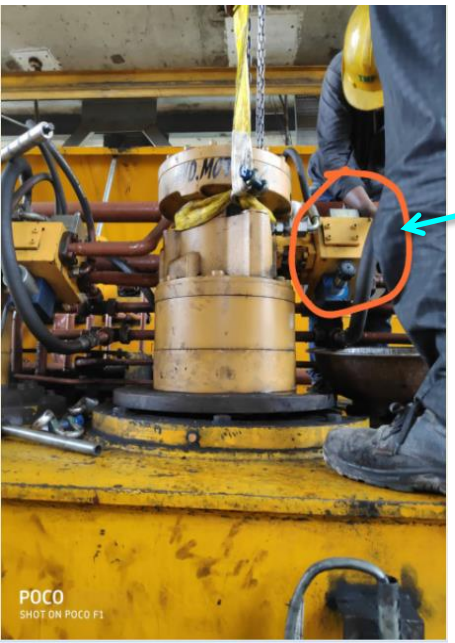


Year	No of Energy saving Projects	Investment (INR Millions)	Electrical Saving (Milllions Kwh)	Thermal Saving (Millions Kcal)	Saving (Rs. Million)
2018-19	5	**0.045**	16.890	65288	109
2019-20	18	5.01	10.270	3616	36
2020-21	14	1.98	6.106	15177	32
Total	**37**	**7.035**	**33.266**	**84081**	**177**

INNOVATIVE PROJECTS

Innovative- Modification in Wagon Tipplers to reduce the Turnaround Time (TAT)

Background: Two sets of Wagon tipplers and Side arm chargers (SAC) are installed in DBPL. SAC are driven by 4 hydraulic motors in sequential operation. Free wheeling valves are provided in hydraulic system to cut off oil flow to 3out of 4 motors in return travel of SAC when the torque requirement is low. Premature failure of SAC hydraulic motors observed causing non availability of WT/SAC. To avoid the failure of high value hydraulic motors, freewheeling valves of hydraulic motors were removed. However, the reliability of the system got increased but overall cycle time for unloading a wagon increased due to reduce in speed of SAC and tippling rate decreased from 23 tips/Hrs to 15 tips/Hrs.



Freewheeling valve removed

RCA of Hydraulic Motor failure: It was found that, during closing of oil flow from **free wheeling valve**, required cylinder's retracting cage pressure inside the Hydraulic motors was not generating. Due to that its internal parts got damaged prematurely. Therefore, it was decided to remove the free wheeling valves from the hydraulic motors.

To overcome this reduced speed of SAC, modification done in wagon placement philosophy through SAC

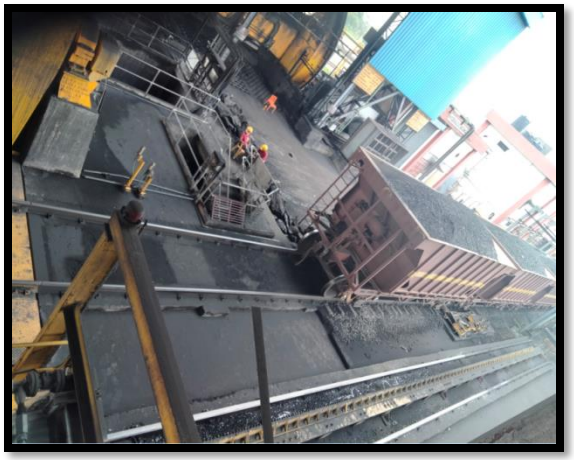
Cont.....

Innovative- Modification in Wagon Tipplers to reduce the Turnaround Time

100% replicable

Before

After



After

Modification: It was observed that the distance between In-haul wheel choke positions to Wagon tippler Platform is 17.5 m. It is possible to accommodate one wagon in this length. It is decided to bring the wagon nearer to WT by applying wheel choke on rear wheels of the wagon instead of front wheels. This reduces the travel time of SAC by one wagon length i.e. 11.5 m. in both ways and SAC movement reduces by 23 m. This experiment was carried out with modifying the limit positions in field and logic in the SCADA after considering all safety aspects.

Cycle time reduced from 4 min per wagon to 2.7 Minutes and tippling rate increased to 24-25 tips/ hour.

Beyond OEM thought process, we have done successfully this modification in operating philosophy of wagon placement. L&T (OEM) also appreciated this modification.

Benefits: Loss recovery/Saving of 1hr in each rake unloading, reduced APC and Demurrage charges. Cost Saving = 93.6 Lacs/Annum (Including Demurrage charges).

Improvement Project– optimisation :Emission level Nox Reduction by combustion

Contin.....

Project Details

- Reduction of Nox carried out by combustion tunning , Performance study & DAP test(Dirty air flow & mill fineness) carried out by consultancy.

Reason for Selection

- To meet the environment norms for Nox < 450 mg/N3
- Nox was on higher side continuously above 450 mg/Nm3 at full load operation at different mill combination and coal quality .

➢**After tuning the parameter as per recommendation ,we have sucessusfully brought NOx emission to below the limit of 450 mg/Nm^3 :-**

➢**Coal fineness for this coal –> 75% passing thru 200 Mesh and 0.25% passing thru 50 mesh acceptable.**

➢**Minimum Mill outlet temperature –> 75-80 Deg C – It should not exceed 90 C**

➢**PA / Coal ratio –> Recommended value is ~1.70 -1.8**

➢**Over fire air damper operation is based on NOx emission level & HRH temperature consideration**

➢**O2 should be maintained less than 3.0% :- O2 set point kept 2.75 %@ full load ,further it varies based on coal quality & load variation.**

➢**. Secondary air flow rate / PA flow rate ratio >1.6 and < 2.0 :-Being operated in recommended range**

➢**. The minimum coal pipe velocities should be 20 m/s and should not exceed maximum 27 m/s.**

Contin.....

:Emission level Nox Reduction by combustion optimisation

- **Soot blowing frequency and quantity of steam consumption is an important aspect of water wall heat transfer to reduce FEGT. : Daily once soot blowing & Daily Selected LRSB operation being followed**
- **Burner tilt should be decided as per the requirement RH & SH spray quantity and NOx consideration**
- **APH air in leakage should be less than 8%**
- **Mill air flow rate and coal balance per pipes within ± 5% of the mean :Dirty pitot test done by Tfugen , found within range.**

❖The following parameters are kept and achieved
❖NOx level below the emission limit and improve HRH temperature

Upto 0.70 SPCC

1	UOFA Damper	%	85
2	LOFA Damper	%	95
3	PA/Coal Ratio		1.75-1.8
4	Excess O2	%	2.75 - 3.00
5	WB Dp	mmwc	> 80
6	Burner Tilt	%	5-10 Plus
7	Top Mill Opn H or J	%	100
8	HRH Temp	Deg C	530 - 535

> 0.7 SPCC

1	UOFA Damper	%	100
2	LOFA Damper	%	100
3	PA/Coal Ratio		1.75
4	Excess O2	%	2.75
5	WB Dp	mmwc	> 80
6	Burner Tilt	%	0 -5
7	Top Mill Opn. H or J	%	50
8	HRH Temp	Deg C	525-530

Nox value Before Combustion Tuning

Date	Stack 1 No of Blocks		
	425 to 450	450 to 475	> 475
01-Jan-21	24	1	4
02-Jan-21	38	29	10
03-Jan-21	5	7	38
04-Jan-21	12	12	2
05-Jan-21	33	6	1
06-Jan-21	2	9	51
07-Jan-21	9	6	20
08-Jan-21	SD	SD	SD
09-Jan-21	9	7	14
10-Jan-21	42	7	0
11-Jan-21	24	17	11
12-Jan-21	11	7	30
13-Jan-21	21	10	9
14-Jan-21	6	2	2
15-Jan-21	14	19	5
16-Jan-21	4	1	3
17-Jan-21	13	26	44
18-Jan-21	4	3	41
19-Jan-21	2	4	60
20-Jan-21	2	6	27
21-Jan-21	17	36	33
22-Jan-21	11	11	48
23-Jan-21	15	27	29
24-Jan-21	4	19	64
25-Jan-21	18	20	43
26-Jan-21	15	11	43
27-Jan-21	11	38	19
28-Jan-21	13	7	31
Total	379	348	682

Nox value After Combustion Tuning

Date	Stack 1 Nos of Bolck		
	425 to 450	450 to 475	> 475
01-Feb-21	20	2	1
02-Feb-21	2	1	0
03-Feb-21	0	0	0
04-Feb-21	2	1	0
05-Feb-21	3	3	2
06-Feb-21	3	0	0
07-Feb-21	0	0	0
08-Feb-21	16	1	0
09-Feb-21	10	7	1
10-Feb-21	0	0	0
11-Feb-21	2	0	0
12-Feb-21	2	1	2
13-Feb-21	7	2	0
14-Feb-21	10	0	0
15-Feb-21	3	0	0
16-Feb-21	7	8	18
17-Feb-21	29	6	30
18-Feb-21	SD	SD	SD
19-Feb-21	SD	SD	SD
20-Feb-21	0	5	0
21-Feb-21	5	0	0
22-Feb-21	0	0	0
23-Feb-21	0	1	0
24-Feb-21	0	0	0
25-Feb-21	0	0	0
26-Feb-21	0	0	0
27-Feb-21	0	0	0
28-Feb-21	0	0	0
Total	121	38	54

Date	Nos of Block		
	425 to 450	450 to 475	> 475
01-Jul-21	0	0	0
02-Jul-21	0	0	0
03-Jul-21	0	0	0
04-Jul-21	0	0	0
05-Jul-21	0	0	0
06-Jul-21	0	0	0
07-Jul-21	0	0	0
08-Jul-21	0	0	0
09-Jul-21	0	0	0
10-Jul-21	0	0	0
14-Jul-21	0	0	0
15-Jul-21	0	0	0
16-Jul-21	0	0	0
17-Jul-21	0	0	0
18-Jul-21	0	0	0
19-Jul-21	4	2	6
20-Jul-21	5	1	0
21-Jul-21	0	0	0
22-Jul-21	0	0	0
23-Jul-21	0	0	0
24-Jul-21	1	0	0
25-Jul-21	0	0	0
26-Jul-21	0	0	0
27-Jul-21	0	0	0
28-Jul-21	0	0	0
29-Jul-21	0	0	0
30-Jul-21	0	0	0
Total	10	3	6

Substitution Of Conventional Energy With Renewable Energy

- **03 Nos. Projects Implemented. Installed Capacity – 1.48 KW.**
- **Solar (PV) Onsite Annual Generation (Million kWh) – 0.0238**

	Technology (electrical)	Type of Energy	Onsite/Offsite	Installed Capacity(MW)	Generation (million kWh)	% of overall electrical energy
FY 2018-19	Installation of 1KW Solar Power	Solar	Onsite	0.00148	0.00648	
FY 2019-20	6 nos street light	Solar	Onsite	0.006	0.00867	
FY 2020-21 *					0.00867	

	Technology (Thermal)	Type of Energy	Onsite/Offsite	Installed Capacity(MW)	Generation (million kWh)	% of overall electrical energy
FY 2020-21	Electrical (Battery) vehicle inside plant premises	Battery	Onsite		0.008295	

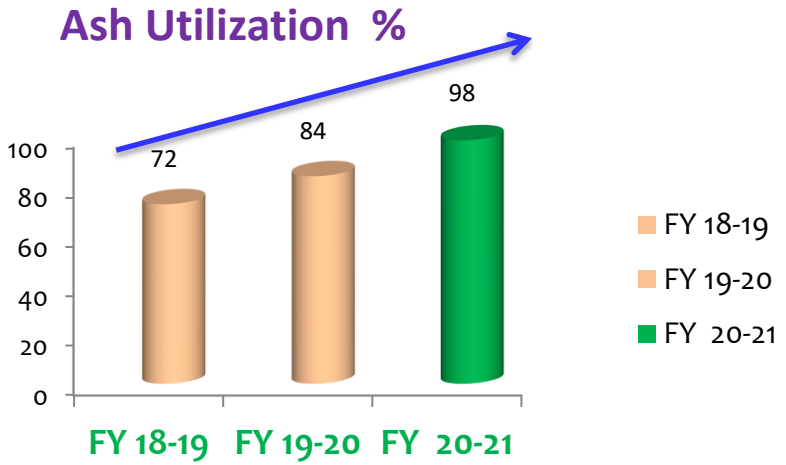
PV Solar Panel Installed at Intake Pump House

PV Solar Street Light Inside Plant

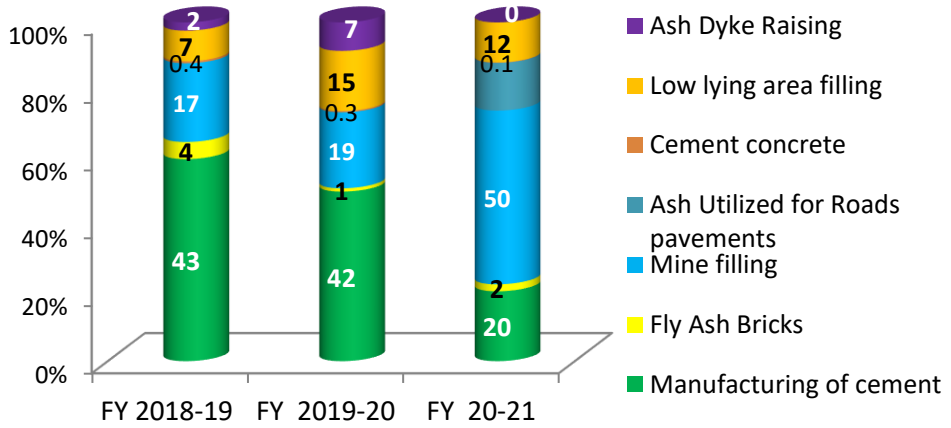
*** FY 20-21 Due to Covid-19 situation ,we delayed to implement planned renewable project 1. Electric battery car for fuel saving 2. Kitchen food waste biogas plant**

Environment Management – Ash Utilization

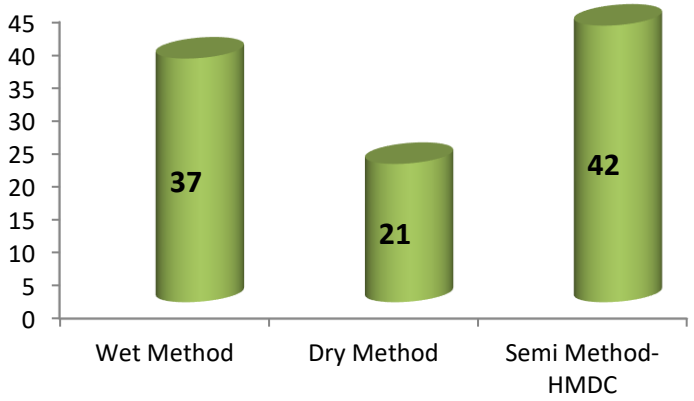
Ash Utilization (%)



Ash Utilization –Break up (%)



Ash Handling Pattern



Best Practices:

- PAZO software is used to ensure proper disposal of ash at designated location only.(Tracking by GPS)
- Ash transportation to cement plant by Railway wagons started .
- I magic software implemented for unmanned weighbridge for Coal & Fly ash truck weighment .

8. Environnent Management- Ash Utilisation

Particulars	UOM	2018-19	2019-20	2020-21
Ash Stock in Plant (yard + pond)	Tons	1948402	2283984	2328855
Ash Generated	Tons	1984787	2072253	2645733
Ash Utilization	%	72.5	83.8	98.3
Ash Utilized in manufacturing of cement/concrete – other similar products	%	43.24	41.96	20.28
Ash Utilized in Fly Ash Bricks	%	3.66	0.82	2.03
Ash Utilized in Mine filling	%	16.85	18.75	50.42
Ash Utilized for Roads pavements	%	0	0.09	13.86
Ash Utilization in Other Areas – Please mention below	%			
Part replacement of cement in concrete	%	0.42	0.29	0.12
In reclaimation of low lying area	%	6.55	14.85	11.6
In ash Dyke Raising	%	1.76	7.05	0
Expenditure on Ash Utilization (annual)	**INR (Lakhs)**	**1956.0**	**2259.6**	**3445.1**

	UOM	% in Method
Ash Handled (Wet)	%	**18**
Ash Handled (Dry Method)	%	**19**
Ash Handled (semi wet)	%	**63**

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Environment Management – Emissions Monitoring

Particulars	UOM	2018-19	2019-20	2020-21	21-22 (Till Jul'21)
Total CO2 Emissions Per kW of Generation	Ton/kW	0.887	0.890	0.847	0.862
Current SOx Emissions at Full Load	mg/Nm^3	1370.5	1411	1258	**1325**
Current NOx Emissions at Full Load	mg/Nm^3	484	443.5	407	362
Particulate Matter	mg/Nm^3	39	39	41	**40**
Mercury	0.01	0.01	0.007	0.0055	**0.004**

Inventorisation OF GHG in 2020-21		
Gases	**Consumption (Kg)**	**Balance stock (Kg)**
Refrigerant R22	78.5	51.5
Refrigerant R410a	2	3
Refrigerant R407a	55.5	64.5
Refrigerant R134a	0	60
Refrigerant R32	8	0
SF6 Gases	Nil	20
CO2 in fire system	27	708
Co2 in Inergen fire system	0	9792

- Approx 10000 nos. of sapling planted in near by villages under Harihar Chattisgarh programme.

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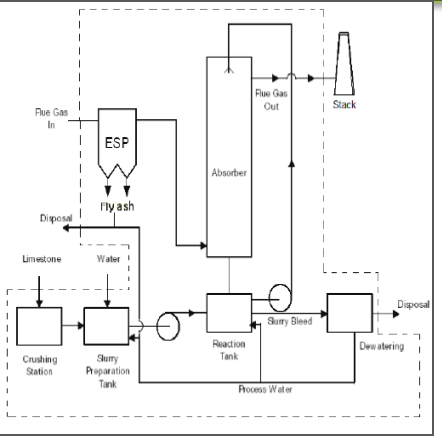
Action Plan To Meet The Latest Emission Norms

SO_2 Norms – Status of FGD Implementation



❖**LOI for FGD issued on 13 June 2019 and Contract awarded on 26th September 2019.**

EPC Vendor-*Zhejiang TUNA Environmental Science & Technology Co., Ltd.*

❖Drawing/Design Consultant-Black & Veatch

❖**Present status :- 70% Engineering Completed,**

❖**Civil Work started .**

Project Execution timeline : Unit-1 & U#2 :- 31.12.2024

NOx- Norms (Based on 450 mg/Nm3)

❖Combustion optimisation & DAP(Dirty Pitot test) study is done by SPENERGY Tech consultancy . After implementing its recommendation ,reduction of NOx achieved by 50-60 mg/Nm3.

❖At present NOx in both Units are within the limit .(Limit <450 mg/Nm3)

Best Practices Adopted for emission Control and Monitoring

❖Continuous monitoring of emission parameter

❖Continuous Ambient Air Quality Monitoring System.

❖ Dust extraction system (DE) and Dust suppression system (DS) at CHP

❖Turbine is housed in specially designed acoustic insulated enclosures.

❖Green belt development inside the plant.

❖Ash utilization started through rake where all wagons are completely covered with Tarpaulin sheet .

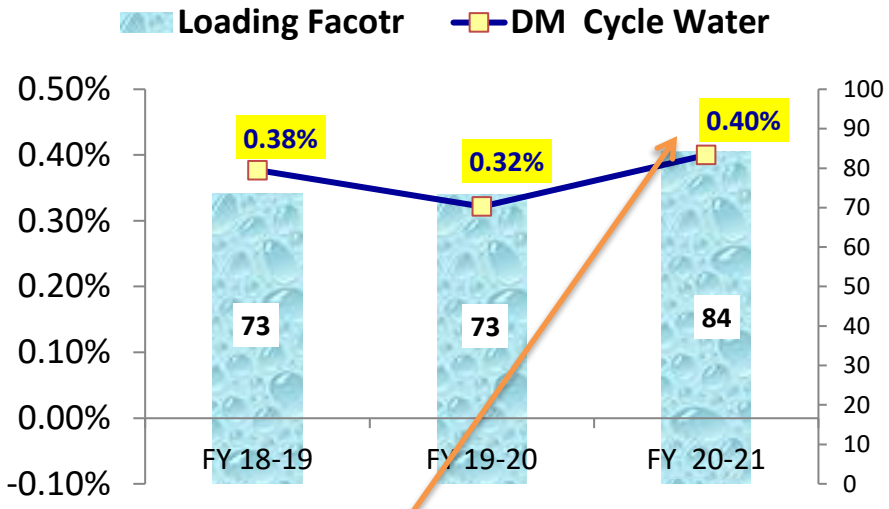
❖Plant boundary wall is being constructed by fly ash bricks

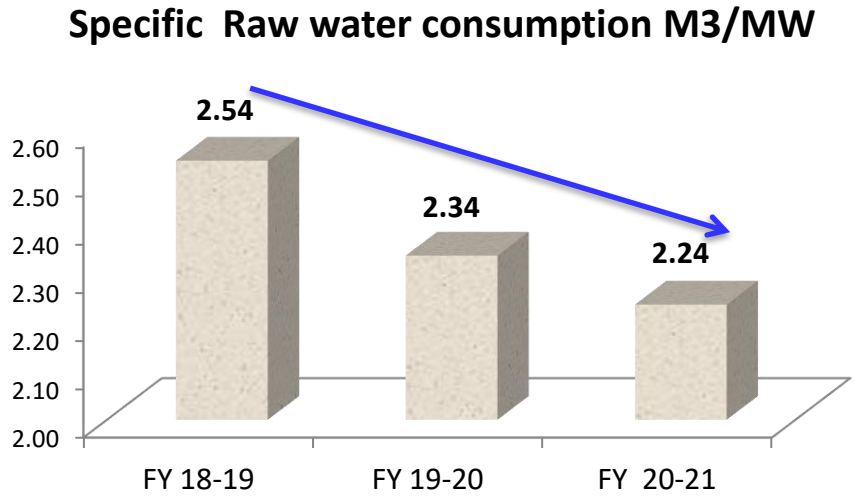
❖Transportation of ash through jumbo bags by train mode

❖PAZO software is used vigilance for proper disposal of ash at designated location.(Tracking by GPS)

Best Practices in Water Management

The plant is designed for zero liquid discharge.





1.DM Make up water % calculated based on BMCR Flow ,with increase in Higher Loading DM make will be increased .

2. Selected LRSB operation started on daily basis to avoid clinkering & Flame failure .Previous two year it was on weekly or requirement basis.

BEST PRACTICES :

- Adopting suitable treatment (AVT –R to AVT –O)
- COC of circulating cooling water increased from 5.0 to 7.0
- Ash Water Recovery System :Ash Dyke overflow is treated and re-circulated to ash water sump for reuse.
- CPU output between regeneration increased from 135000 M^3 to 190000 M^3
- No ground water extraction for any industrial & domestic purpose.
- Treated water of ETP is reused for green belt irrigation and in ash handling plant.
- Constructed guard pond for reuse and to avoid discharge outside the plant

BEST Practices in the Plant :

Flexible Operation	Maintenance and Reliability	Digitisation	Asset Management
➢Technical minimum load operated at 330 MW (as per the regulation 55% achieved) however trial taken of 40% technical minimum load operation. ➢Load Ramp up & Down 1% is being done (90 Mw /Block /unit) ➢Flame stabilisation achieved at low load operation.	➢Occurrence Analysis (RCA) in for categories - 1)Unit Tripping, 2)Equipment Outage3)BTL 4)Near miss. ➢Predictive Maintenance – Condition monitoring of equipments i.e. Vibration, MCSA, DGA, Lube Oil analysis, thermograph, Ultrasonic leak detection, Noise level ➢Pooling of spares - Sharing of High value spares with nearby station	▪Udyoge software is used for complete coal analysis of fired coal & received coal (No manual intervention in results.) ▪I magic system is used for Coal & Fly ash truck weighment ,unman-weighbridge developed. ▪PAZO software is used vigilance for proper disposal of ash at designated location.(Tracking by GPS) ▪Coal sampling & analysis through bar coding & Decoding system ▪Safety App use for highlighting safety related issues & Near miss incident	➢Monitoring and Tracking the health of plant Assets ➢ Prevent asset downtime by continuous monitoring ▪Raw material acquisition Planning ▪ Spare Management ▪Internal and Third party audit for Asset healthiness

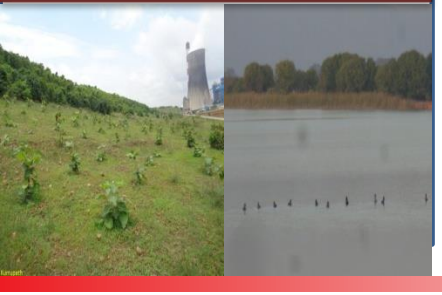
BEST Practices in the Plant :

Biodiversity

➢Kurupath hill situated near plant is having flora & fauna. Additional tree planted in coordination with local forest team at Kurupath hill and restricted tree falling to conserve biodiversity of this area.

➢ 2.Inside plant project area, plantation of local species, fruit species for improvement of eco system.

Kurupath hill is situated near plant –
having flora & fauna



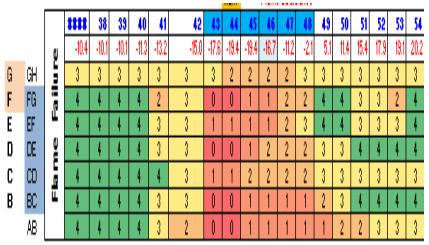
Afforestation

➢Survived tree plantation upto March 2021 is 2,75.330 (covering 1/3rd of total area of 630 acres with survival rate of 86%.) .

➢Low lying areas in the project area is being developed for further greenbelt development.

Research

Developed tool in excel sheet to find out the flame failure analysis, where we can find out from which **Corner & Elevation** disturbance started and how flame disturbance moved towards other corners in Boiler



New Initiatives:

▪In-house card repairing (Skill development)

▪Reduction of start up oil consumption by delay & revival report analysis

▪Development for the testing of HAD (Hydraulic actuating devices) PA & FD fans on site (In-house skill development, to reduced maintenance time, Saving repair & maintenance cost.

Teamwork, Employee Involvement & Monitoring

➢**Review & Reporting**

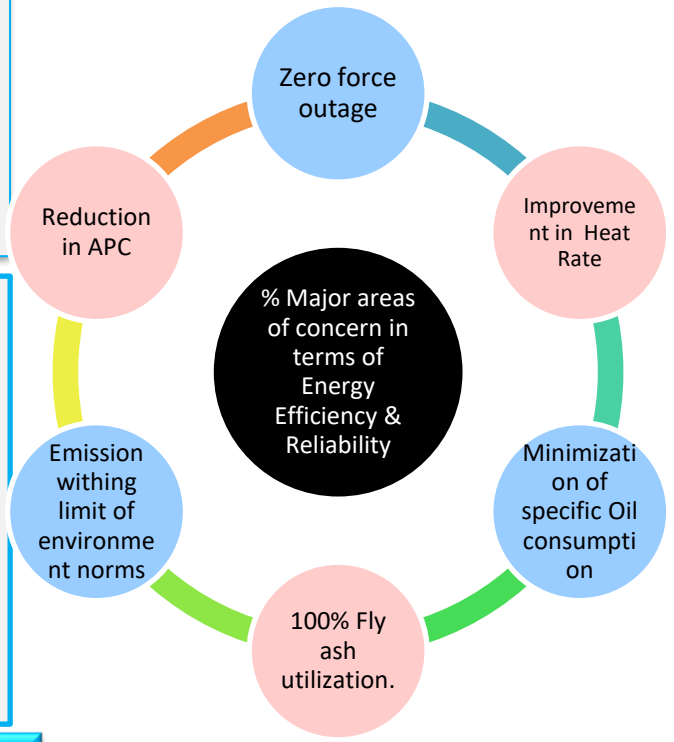
- **Daily O&M Meeting - By HOD & Plant Head**
- **Monthly ORT and Review by MD**
- **Quarterly suggestion & Improvement project Competition**

➢**Awareness Training Programme:**

- Online training attended on Boiler Performance Improvement in 20-21
- Combustion optimization & reduction of Nox training by Kavi Das sir.
- Performance & Efficiency assessment ,GAP Analysis & Identification of action plan (External)
- Boiler Lowe Nox Technology (External- GE Alstrom)
- Boiler Combustion Optimization(External)
- Plant Lubrication practices by HPCL (External)

➢**Project Through Kaizen :**

1) HRSCC-3 tank overflow line diverted to fore-bay to utilize the over flow water from tank.
2) In all the cable cellars rooms, common MCB switch for light ON-OFF provided at door, for energy conservation.
3) Commissioning of MUH Vibro- feeder to run in remote mode from CHP CCR .
4) Shifting of ILMS panel 1A & 1B to MCR building in switchgear room. (It will increase reliability & saving by permanent 2nos 2T split AC switch off)



Amount Invested In EnCon Projects FY21 — **Million 4.01**

Budget allocation for EnCon Projects in FY22 — **Million 5.5**

Investment 0.014 % on turn over

Learning from CII Energy Award 2020

Sr.No.	Learning from CII award/ Summit/Other	Plant Name	Status of Implementation	Remarks
1	VFD installation in seal air fan for both units	GMR Energy	Procurement is in process.	
2	Optimization of CEP Flow	Nabha Power	Implemented	Total Energy saving of 2.56 million kWh (Rs. 76 lacs per year)
3	Coal mill LOP power optimization	JSW Ratnagiri	Being followed	Total Energy saving of 0.020 million kWh (Rs. 0.60 lacs per year)
4	Provision of NDCT makeup water through gravity line	Nabha Power	Implemented	
5	VFD installation in LDO supply pump	Nabha Power/ GMR Energy	Procurement is in process.	
6	Online GPS tracking of fly ash disposal trucks though PAZO software.	Process Industry	Implemented	Dumping of fly ash at exact location.

❖IMPLEMENTATION OF ISO 50001/GREEN CO/IGBC RATING :

- **Implementation of IMS is getting delayed due to Covid-19 situation ,as plant was in running condition with minimum manpower.**

- **Target date :Mar'22**

Certification /Award

Ministry of Power -2nd Position- Meritorious for Early Construction of 600 MW Unit #1 Award

GREAT PLACE TO WORK AWARD

Mission Energy Award for :Power Plant performer" in western region

CII award won in FY 2020-21 under category of " Excellence Enegy efficient Unit " & Innovative Project

Ltd

Best Practices In Other Areas of Plant – Asset Management

Monthly Review Meeting

1.Monitoring and Tracking the health of plant Assets
2. Prevent asset downtime by continuous monitoring

1.Preventative & Predictive maintenance planning
2. Routine condition based maintenance (costs, availability, risks)
3. Raw material acquisition Planning
4 Spare Management

Internal and Third party audit for Asset healthiness

1. Monitoring of power plant performance
2. Energy-technological Adoption.
3. Preservation of spares.
4. Timely procurement of spares

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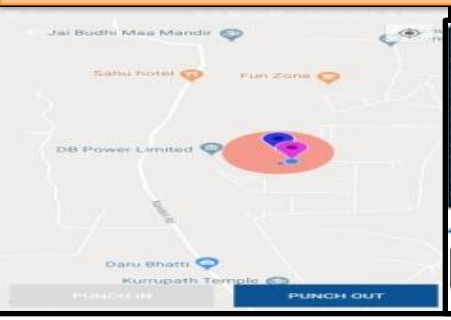
Best Practices In Other Areas of Plant – Digitization

All Reports & MIS on cloud – Can be seen and update anywhere

ABT System

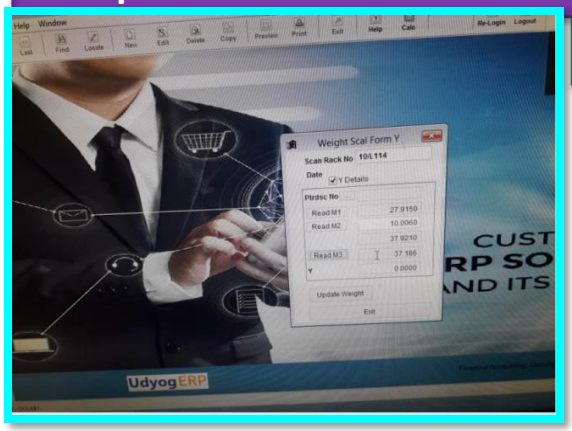
SAP –PP,PM and DMS Implemented.

Employee Attendance- HONO HR APP

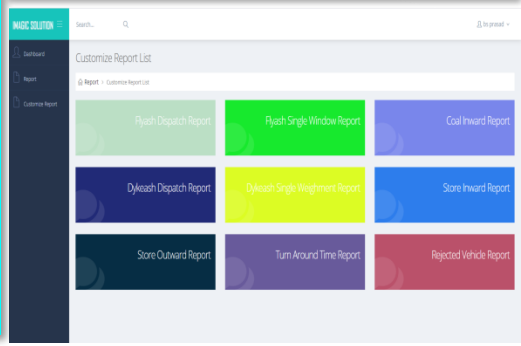


HONO HR
HAPPY PEOPLE

Implementation of Unmanned Weigh bridge completed FY 20-21

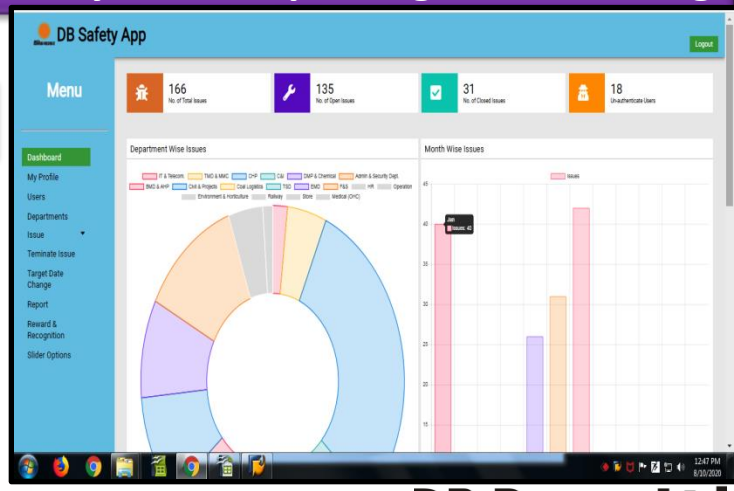


I Magic Software for



Coal sampling & analysis through bar coding

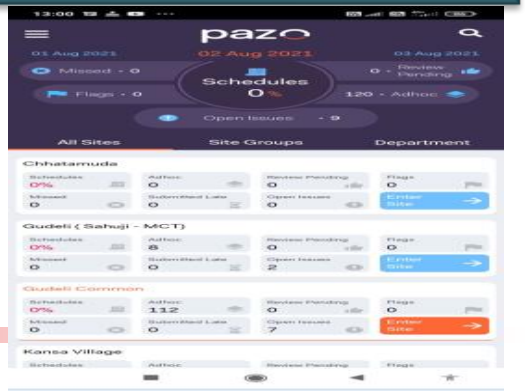
Safety APP –Reporting & Monitoring



E-Learning APP

FREE ONLINE EDUCATION
swayam

Pazo



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New Initiatives : Flame stabilisation at low Load Operation to avoid Flame failure

Project Details

- Operation Parameter Tuning /adoption of practices to avoid the Flame failure during low load operation & load ramp /down.

Reason for Selection

DBPL units tripped 13 times on flame failure since beginning .(Out of 13 ,7 times trips occurred at low load operation)

- **Coal quality dictates low load operation FC/VM ratio <1.2**
- **Primary Air flow rate has to be maintained at 1.8 (PA/Coal Ratio)**
- **SA/PA ~ 1.5 for flame stability (Low load only)**
- **Coal VM should be >22% - Flame stability is expected at low load**
- **O2 is greater than > 5.5% at 45% TMCR load operation**
- **Expected delayed Combustion due to high Primary Air velocity**
- **Low VM (<22%) Coal causes unit trips or flame failure during low load & cycling**
- **Ramp down from higher load to low load at 10 MW/ Min**
- **Ramp rate should be maintained > 5 - 6 MW / Min – Controlled Circ. units**
- **A minimum of 3 Mills should be in service at low load operation**
- **Monitoring of SADC damper position checking in local & DCS ,maintaining separate logbook**
- **Furnace temperature mapping**
- **Soot blower operation frequency based on coal quality**

Results: There is no tripping on Flame failure after combustion tuning & Flame stabilisation

वक्त है नॉलेज के
रंग में रंगने का

नॉलेज आपकी सोच को
— बनाता है स्मार्ट —

दैनिक भास्कर

एक स्मार्ट सोच

Thank You

DB Power Ltd

EnCON Project of FY 18-19

Rs in Million

S N	Project Details	Investments	Savings	Payback (Months)
1	Excess Air-Now set at 2.8 for full load against design is 3.49 2018-2019	0.000	35.12	0.00
2	Alum dosing point diverted from distribution chamber to stilling chamber in PT plant 2018-2019	0.005	0.03	0.00
3	Deludge valve system transformer yard-pneumatic actuation converted into hydraulic 2018-2019	0.040	0.10	0.00
4	Modulated sliding pressure operation for enhanced heat aborption in first pass for reduction of FGET and SH Spray 2018-2019	0.000	23.41	0.00
5	Optimized running of CW Pumps 2018-2019	0.000	50.54	0.00

EnCON Project of FY 19-20

Rs in Million

S N	Project Details	Investments	Savings	Payback (Months)
1	2 Kcal/kwh Heat Rate reduction by optimizing Main Steam Temperature and Spray (Set point 545 C)	0.00	2.57	0.0
2	Advancement in existing gland quality ACW pump by replacement with 100%GFO (goretexfibre) Printed for reduction of APC and reduce the wear and tear of the shaft sleeve	0.06	0.41	0.0
3	Optimization of compressed air for MRHS system to reduce auxiliary power consumption.(Cycle time optimised for Mill Reject Handling system for both units)	0.00	0.96	0.0
4	Shifting of ILMS panel 1A & 1B to MCR building in switchgear room	0.00	0.12	0.0
5	Main plant compressor 1 no Stoppage, Optimization of Instrument Air compressor & Service air compressor running by reducing leakages, intensive monitoring.	0.00	5.15	0.0
6	Bottom Ash overflow discharge line interconnection with slurry discharge line	0.49	4.51	0.0
7	Steam Trap in TDBFP & Main TG gland seal line (Total 10 nos)	0.60	0.74	0.0
8	Prevention of LP atmospheric relief diaphragm,by providing additional air receiver tank for (air to open)vacuum breaker valve	0.40	10.80	0.0
9	TG roof exhaust fan modification by increasing the height of discharge cover	0.05	0.24	0.0
10	One stage reduction in CEP (Unit-2)	1.36	2.75	6.0
11	Silo Drain Pump & Separate line lying 100 NB up to Ash Dyke	0.50	0.41	0.0
12	Energy conservation by replacement of conventional tube light by LED tube light (Target = 4000 Nos ,3200 Completed)	1.03	2.84	6.0
13	Energy conservation by load shedding of ESP Top lighting load during normal operation	0.00	0.46	0.0
14	Energy conservation by modification in scheme of Lighting Distribution Transformer	0.00	1.71	0.0
15	Energy Conservation by providing ON/OFF switch near door for cable seller lights near door	0.02	0.62	0.0
16	Energy conservation by replacement of 250W SV lamp from 120/160KW LED lamp in TG Hall.	0.45	0.19	0.0
17	AVGF pump discharge line diverted to ash dyke directly also provision of recovery through HRSCC No.-3	0.05	0.29	0.0
18	Mill reject Chocking Improvent modification in booster line	0.00	1.15	0.0

EnCON Project of FY 20-21

Rs in Million

SN	Project Details	Investments	Savings	Payback (Months)
1	Delta to Star connection modification in all exhaust fan up to rating 3.7KW for energy saving.	0.0	0.05	0.0
2	Optimization of running hours of Main Oil centrifuge, TDBFP Centrifuge, Control Fluid.	0.0	0.22	0.0
3	Reduction in Auxiliary power consumption AHP by optimising conveying cycle, monitoring slurry pump operation and silo blower optimization.	0.0	5.56	0.0
4	Ultra Air filtration unit (Air washer) During high humidity and low outdoor temperature (ambient) water spray pumps can be stopped.(Saving of 4*5.5=528 kW per day)	0.0	0.29	0.0
5	Reduction in O2% from 3.49 % to 2.75 % ,and there by reduction in Nox by 40-50 mg/nm3	0.0	8.83	0.0
6	3 Kcal/kWh Heat Rate reduction by optimizing Main Steam Temperature set point and Spray (Set point 543 C) (for Apr'2020 to 15th June'2020 gain considered for calculation).	0.0	5.30	0.0
7	Replacement of Old inefficient Lamp by Energy Efficient LED Lamp (FY 2020-21) 1) Replacement of 2x400 watt HPSV to 350 watt LED Lamp first phase 12 numbers. 2) Replacement of 70 watt HPSV to 30 watt LED Lamp first phase 400 numbers	0.0	0.09	5.3
8	Shifting of ILMS panel 1A & 1B to MCR building in switchgear room. (It will increase reliability & saving by permanent 2nos 2T split AC switch off)	0.0	0.12	0.0
9	Reducing Start up Aux. power consumption, during SD & BTL	0.0	0.06	0.0
10	Reduction in Auxiliary power consumption (by 5 %) of CHP by increasing the utilization factor of conveying System	0.0	3.03	0.0
11	Installation of VFD in Potable water pump-15KW	0.0	0.12	4.0
12	Installation of 110KW VFD on 110 KW LP water pump-1 motor to optimize the energy use which happened due to variable flow requirement.(min 600 m3/hrs to max 1000 m3/hrs)	0.5	0.90	6.7
13	One stage reduction in CEP (Unit-1)	1.4	6.18	2.7
14	Silo Blower Optimization through running of three blowers for four silos in AHP.	0.0	1.70	0.0