23rd National Award for Excellence in Energy Management-2022

Presented By :

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

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 27 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*

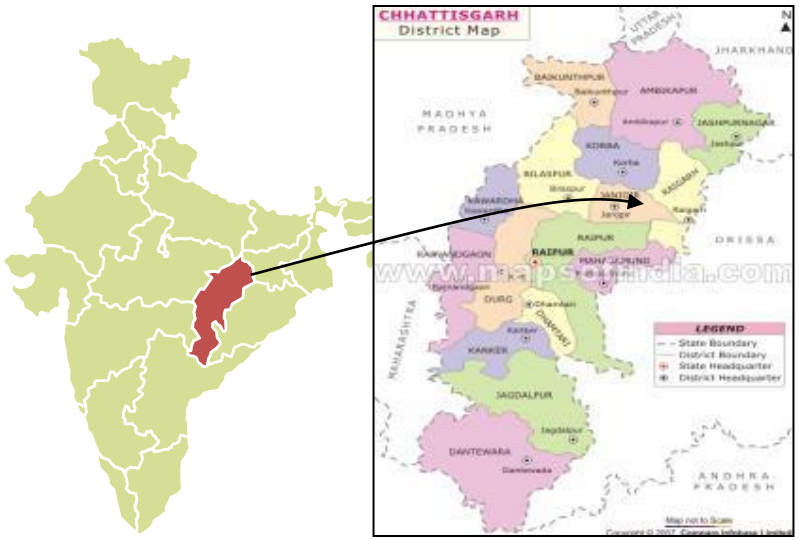
- Over 28 years of experience in print media
- Responsible for formulating DB Corp's long-term vision, monitoring performance and devising business strategy
- Under his leadership, DB Corp has progressed to become one of largest read newspaper of India

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

Plant Capacity -1200 MW (2*600 MW)

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

DB Power Ltd

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

- CHP & Wagon Tippler (L&T)-2 Nos.
- Natural draft Cooling Towers
- Balance of Plant (L&T)

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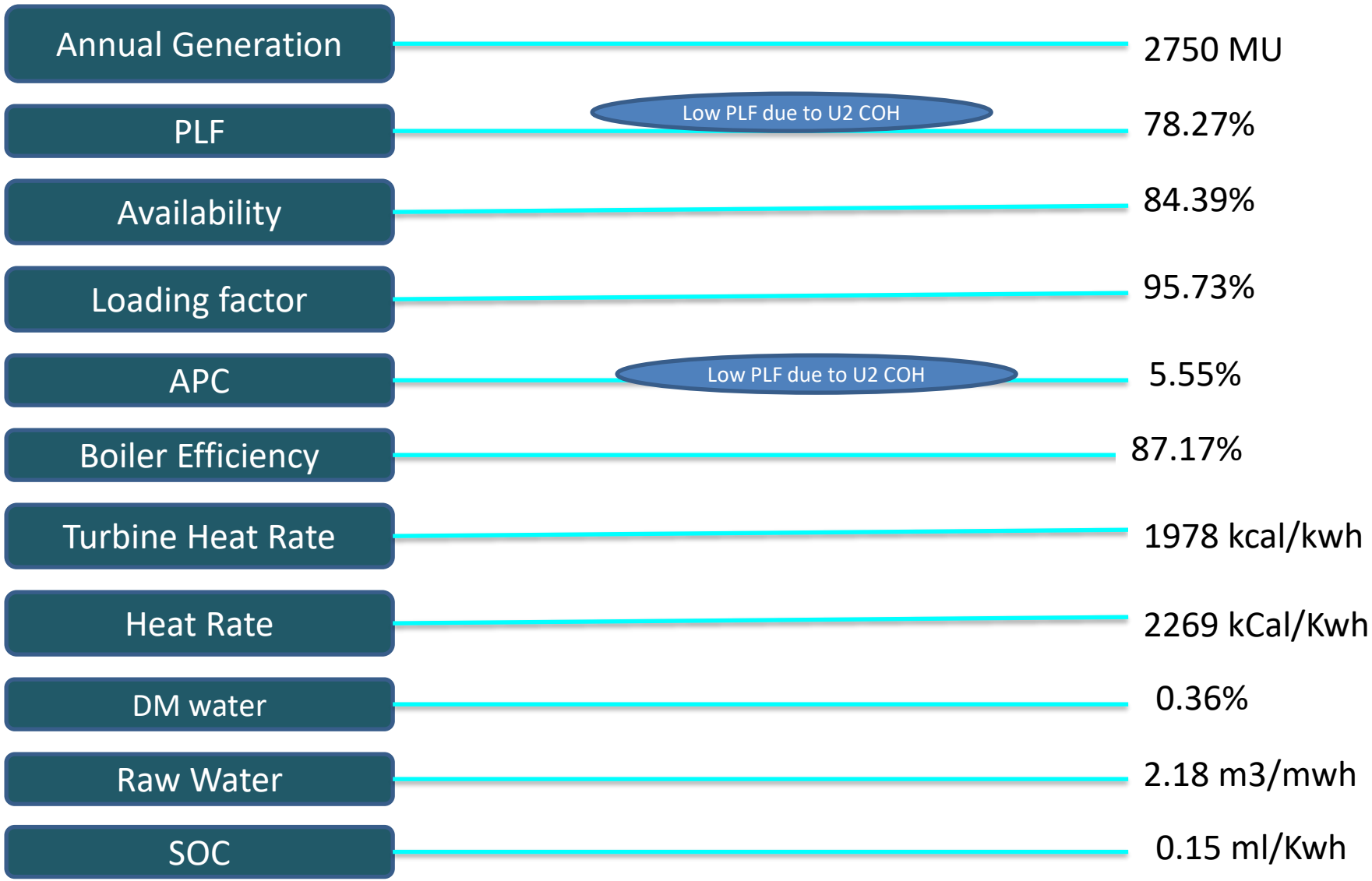
Current Year Performance –FY22 Till 31st July-22



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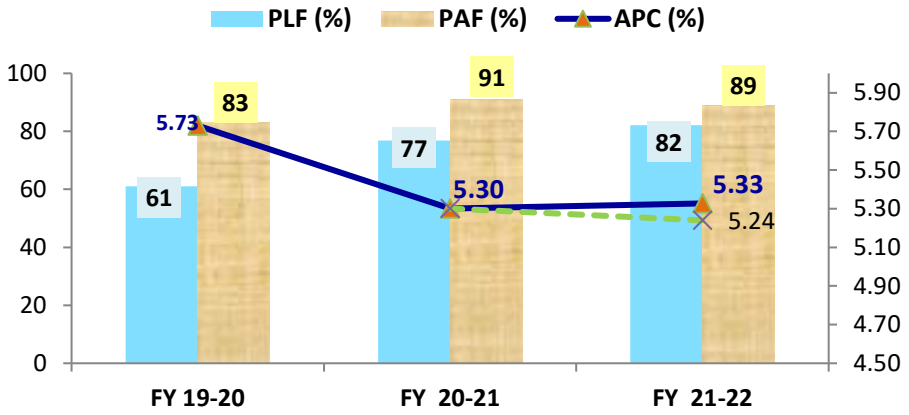
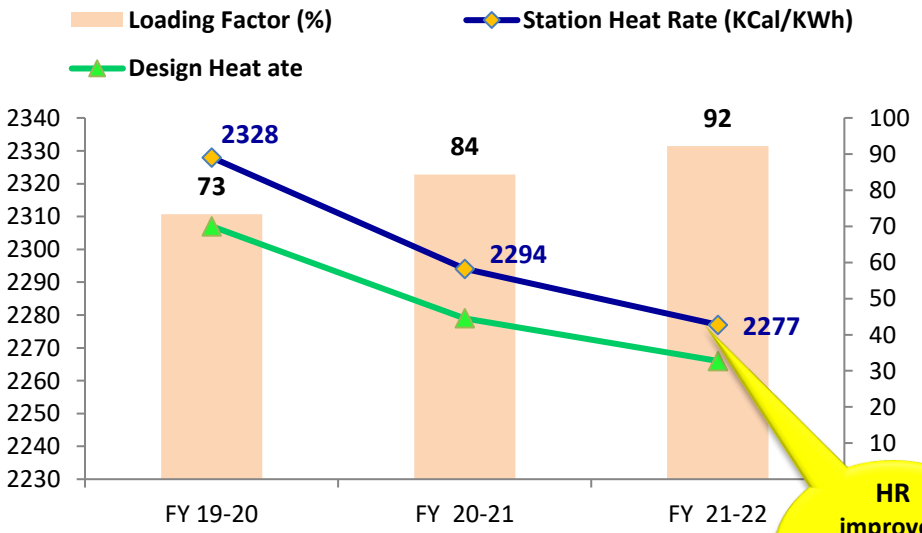
KPI'S





HR improved by 0.74 % compared to Last year

APC:

- Deemed APC achieved for the year 21-22 =5.24%, Improved by 1.1 % as compared to previous year FY 20-21 (Excluding COH period -45 Days)
- Loading Factor improved by 8%
- VFD installation
- U#1 Capital Overhauling done
- APC optimisation by intensive monitoring
- CHP Conveyor belt loading factor utilisation
- Implementation of improvement & encon project

Availability =89%(21-22)

:Reason For variations

- Planned outage = 7.81%
- Forced Outage reduced from 5.18% to 2.66%

FY	19-20	20-21	21-22
Forced Outage	20	21	14

HEAT RATE:

- HR Improved in FY 21-22 from 0.66% operating margin to 0.49 % as compared to design
- U#1 Capital Overhauling done
- Loading Factor improved by 8%
- Combustion optimisation
- Best practices adopted

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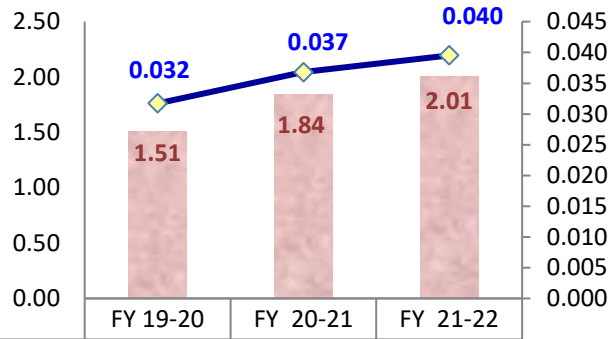
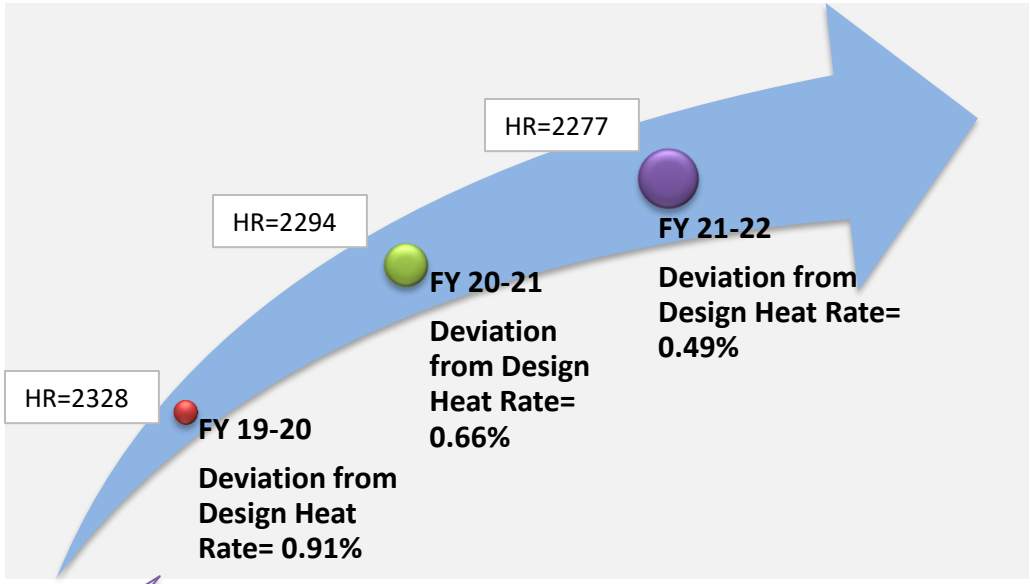
Sp. Energy Consumption

Thermal & Electrical Energy Consumption in MToe



	FY 19-20	FY 20-21	FY 21-22
Thermal Energy Consumption	1.51	1.84	2.01
Electrical Energy Consumption	0.032	0.037	0.040

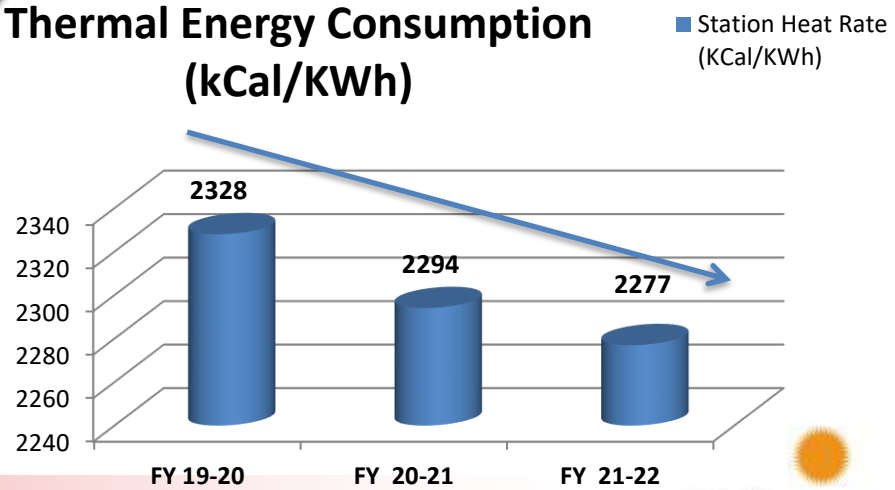
Improvement in Heat Rate on yearly basis



Major Factors contributing for Heat Rate Improvement in FY 21-22

1. U#1 COH FY 21-22 (22 kCal/Kwh gain obtained)
2. Combustion optimisation (SA/PA ratio, fuel air ratio,O2 SP, LOFA/OFA position optimisation as per unit loading
3. DM make-up optimisation- Selected Wall blower ,LRSB operation & online leakage rectification (AMC)
4. Loading Factor improvement by 8%

Thermal Energy Consumption (kCal/KWh)



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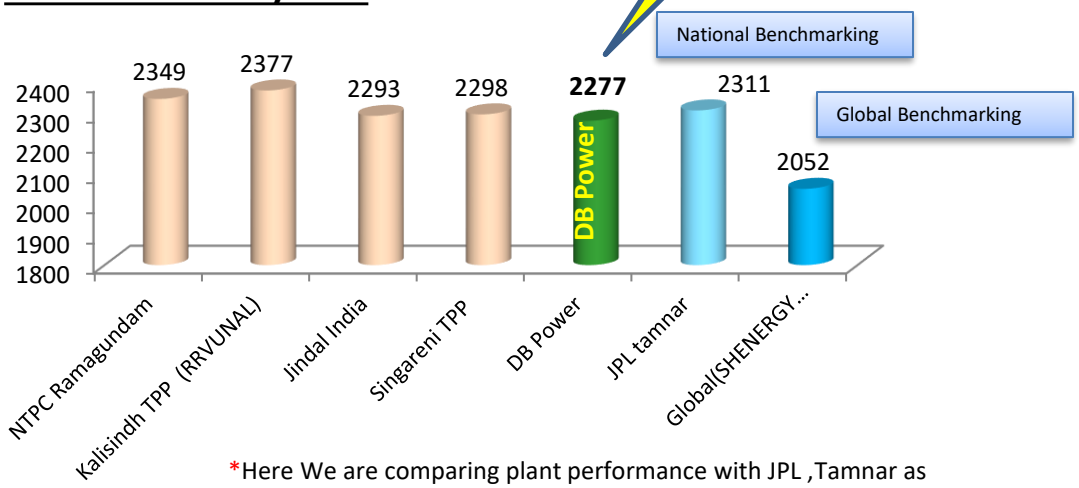
Energy Benchmarking

Data Source (PAT Notification & others)

HEAT RATE Kcal/Kwh



*Here We are comparing plant performance with JPL ,Tamnar as National benchmarking .(DB Power plant is replica of JPL,Tamnar)

Aux Power Consumption (%)

Station Name	APC	Source
NTPC Ramagundam	6.88	Industrial chronicle Encon book
Kalisindh TPP (RRVUNAL)	6.82	Industrial chronicle Encon book
JPL Tamnar *	6.14	FY 21-22 report
Singareni TPP	5.83	FY 21-22 report
Jindal India	5.65	FY 21-22 report
DB Power	**5.33**	**FY 21-22 report**
Global(SHENERGY COMPANY LIMITED'S SHANGHAI WAIGAOQIAO NO. 3 POWER GENERATION CO., LTD)	4.5	Industrial chronicle Encon book

	GHR (kCal/kWh)	APC (%)
Targets for FY -23	**2280@87% PLF**	**5.34**

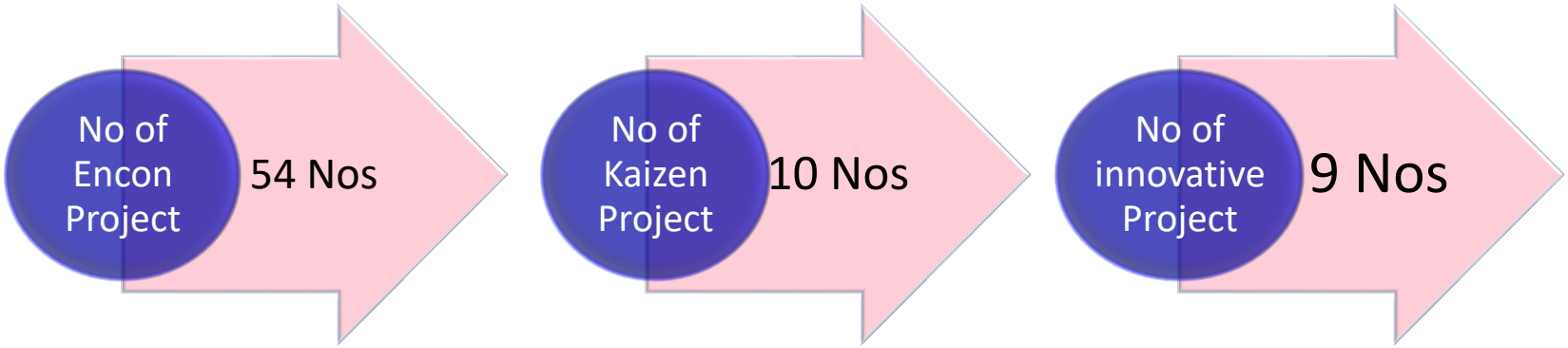
Road Map To Achieve Target/Benchmark

- U#2 Capital Overhauling (Overhauling of HP,IP & LP Turbine , Air Preheater basket replacement. Condenser jet cleaning)
- Improvement Project & Encon projects Implementation
- To run the unit at design parameters.
- Insulation survey , high energy drains passing survey and air leakage survey is conducted on regular basis to minimize unaccounted losses.
- U#1 AOH

LIST OF MAJOR ENCON PROJECTS PLANNED (2022-23)

S.No.	Title of Project	Annual Electrical Saving (Million kWh)	Annual Thermal Saving (Million Kcal)	Investment Made (Rs million)	Remark
1	To prepare monitoring system with software to identify optimum crushing element changing hours in crusher.	0.38	-	2.8	Energy Audit Recommendations
2	Installation of VFD in Seal air fan-132 KW(2 Nos)	0.24	0	0.45	Learning from GMR Energy during CII Award
3	To prepare monitoring system/Software to identify the best path (Reclaiming, Stacking and Bunkering)	0.38	-	3	Energy Audit Recommendations
4	LP turbine Diaphragm Modification for revival time reduction of ruptured diaphragm	0.05		0.125	U#2 COH (For ease of maintenance)
5	Installation of vacuum transmitter in boiler 8.5 meter	0.06	1.33		U#2 COH
6	Implementation of digital solution for plant performance monitoring	1.40	7.78	6	Equipment wise detail tracking for APC & Immediate corrective action for heat rate loss for controllable parameter
7	Ten numbers of High mast conventional illumination changes to LED high efficient light, long life .	2.63		1	In house Assessment/ Brain Storming
8	Installation of 132 KW VFD on BA Overflow pump	0.11		0.45	Installation of VFD in Existing Fluid coupling Bottom ash overflow Pump -Innovative idea
9	20 kcal/kWh heat rate improved after unit-2 COH by improvement in performance of cooling tower, condenser, air pre heater, insulation, heaters and Turbine cylinder efficiency etc.	14.92	210	140	U#2 COH (Investment considered for APC & Heat rate improvement jobs)
10	Reduction in Auxiliary power consumption (by 5 %) of CHP by increasing the utilization factor of conveying System	1.01			Based on coal inflow ,trying to further optimized
11	Reduce CW pump Power Consumption by Pump Coating to increase pump efficiency for CW Pumps	3.72		1.8	Energy Audit Recommendations
12	Reduce Power Consumption by Pump Coating to increase pump efficiency for Raw Water Pumps	0.03		0.3	Energy Audit Recommendations
13	Use of IFC controller for Compressed Air	1.23		1.6	Energy Audit Recommendations
14	COST Economics by improving Bapcon & Rapcon System for ESP	5.36		3	Energy Audit Recommendations
15	Tap Changing for Lighting Transformer	0.01			In house Assessment/ Brain Storming
16	Common Duct for DMCW pumps - TG	1.10		0.9	In house Assessment/ Brain Storming
	Total	**32.6**	**219.3**	**161.4**	

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)
2019-20	18	5.01	10.27	3616	36
2020-21	14	1.98	6.10	15177	32
2021-22	22	163 (including U#1 COH)	18.70	235845	232.41
Total	**54.00**	**169.99**	**35.07**	**254638**	**300.41**

Modification in WT clamping system to avoid oil leakage

Replica- Yes

Existing system:

In Wagon Tipplers the wagons are tippled after firmly hold from Top with the help of Top hydraulic Clamps supported by side pad.

After getting Command from control room the Tippler table takes turn from horizontal position i.e. “0 degree to 160 “degree with different sequences like side pad operation, tippling up to 15 degree and clamp movement start to hold firmly from top.

During operation in hydraulic pressurized system, sometimes the hoses of the Clamp get ruptured due to hit by the coal /stone boulders which result hydraulic oil get spilled till the system is on.

During oil leakage the Loaded Wagon on the tippler table is made to return back the tippler to the 0 degree position for restoration of the oil leakage issue. By that time the oil continue to leak as clamp pump is under operation as this pump is interlock with the main pump of Tippler. There was no provision of stopping clamp pump individually in control philosophy during tippling/return operation

Modification:

1) Provision of Protection V type clamps and Metallic Spring rolls on hose pipes
2) Logic modified, Incorporated clamp pump “off” for 70 sec during tippling return back operation, if leakage observed. To avoid the huge oil leakage from hose pipes.

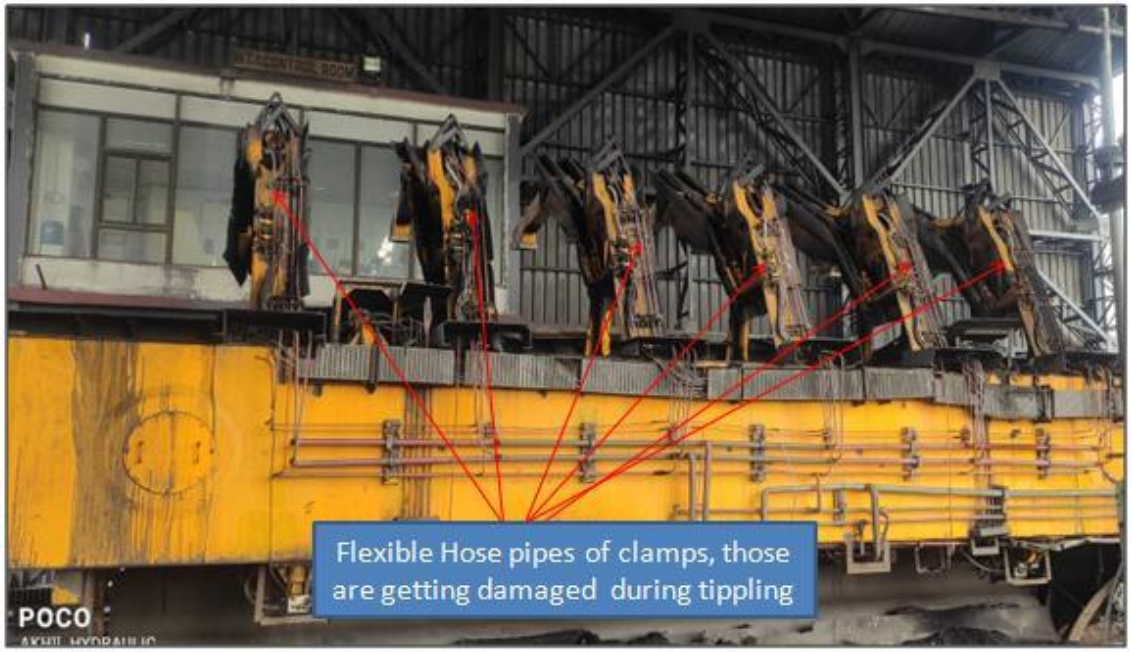
Benefits

Before proving of protection clamps, facing 6-8 times oil leakage issues in a month
After modification it has been reduced up to 1-2 times

After modification Saving in lubricant cost- approx. 5.0 lakhs/ years

After modification Saving in demurrage charge cost- approx. 10 lakhs/ years

Modification in WT clamping system to avoid oil leakage



V type clamps and Metallic Spring rolls on hose pipes provided

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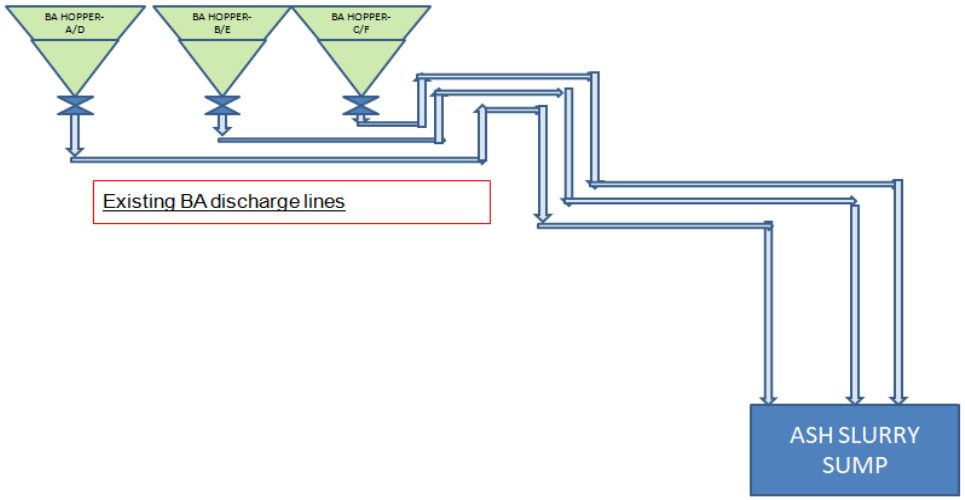
Optimization of BA deashing Time

Replica- Yes

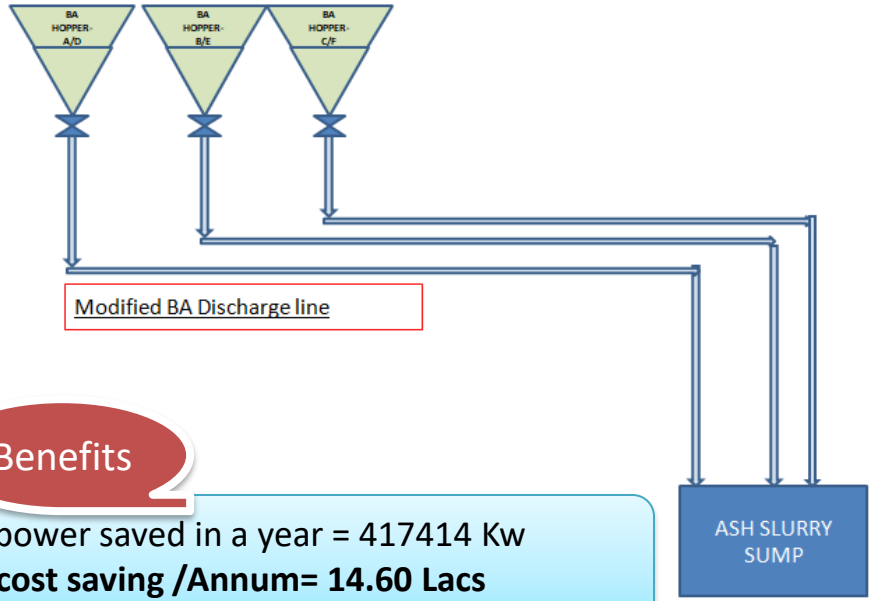
Existing system:- Unit#1 Bottom Ash hopper deashing Time 02:00 hrs. in every shift with running of following equipments:-



Running Auxiliaries during the bottom deasing process				
Sl.no.	Equipments Name	Nos.	Drive rated(Kw)	Power consumption
1	HP Pump	1	350	280
2	Ash Slurry Pump	2	285	228x02=456
3	Clinker Grinder	3	11	8.8
4	Seal Water Pump	1	22	17.6

Before Modification		After Modification	
Power Consumed in 03 times deashing in a day	Total Water consumed in a day 390 x 02 hrs.x 03 times	Power Consumed in 03 times deashing in a day	Total Water consumed in a day 390x1.5 hrs.x 03 times
4574.4	2340 mcu	3430.8	1755 mcu

Modified System :- After modification of bottom ash hopper discharge line by lifting up approx 01 mtrs. above the existing layout & reduce 03 nos. bend, reduce the deashing time from 2 hrs to 1.5 hrs. in every shift with running of following equipments:-



Benefits

Total power saved in a year = 417414 Kw
Total cost saving /Annum= 14.60 Lacs

Total water saving in a year = 213525 mcu
Total cost saving by water 12.81 lacs

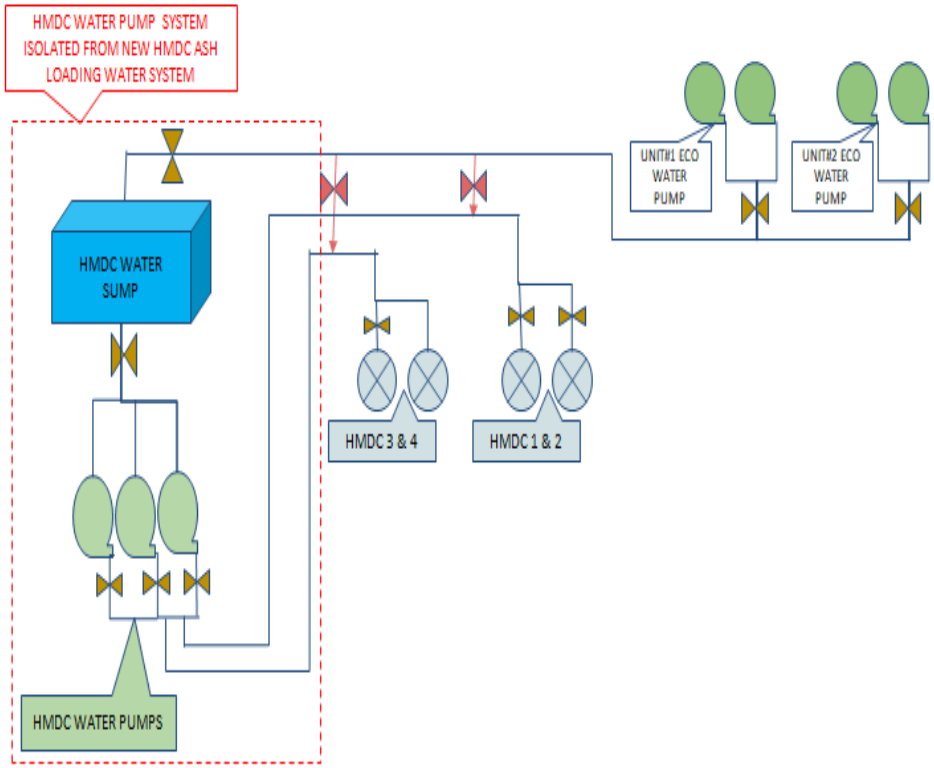
Total saving (Power consumption +water consumption)=28 Lacs

Stopping operation of HMDC water pump

Replica- Yes

Existing system:- In existing system meeting the water requirement for Hydro Mix dust conditioner(HMDC) for wet ash loading on open truck was being done through ECO water Pump .Eco pump fills the HMDC water Sump and further it goes through HMDC water Pump to HMDC.

Modification system:-Provided two Interconnection valve between HMDC sump filling line and HMDC Water Pump Discharge line at silo-2&3 with isolation valves at both ends.
To avoid Multiple Pumping and to use existing header pressure for HMDC Sump filling which is sufficient to provide water in HMDC system for Dust conditioning.



Benefits

Power saving by stopping operation of HMDC water pump running (2 Nos).
= 2* 22 Kw * 16hrs in day
Cost saving =6.05 lacs/Annum

Total Maintenance cost saved approx= 3.00 Lcs

Total saving=9 Lacs/Annum

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Substitution Of Conventional Energy With Renewable Energy

- **05 Nos. Projects Implemented. Installed Capacity –0.00232 KW.**
- **Solar (PV) Onsite Annual Generation (Million kWh) – 0.030**

	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	0.001	0.00648	
FY 2019-20	6 nos street light	Solar	Onsite	0.00132	0.00867	
FY 2020-21 *					0.00867	
FY 2021-22	5 nos street light	Solar	Onsite		0.0063	

	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	
FY 2021-22	Electrical (Battery) vehicle inside plant premises	Battery	Onsite		0.008295	
FY 2021-22	Kitchen food waste biogas plant	Biogas	Onsite			

Solar Power plant(29 MW)-

Land identified. Further Study is being done for power evacuation through 132 /400 kV .

PV Solar Panel Installed at Intake Pump House

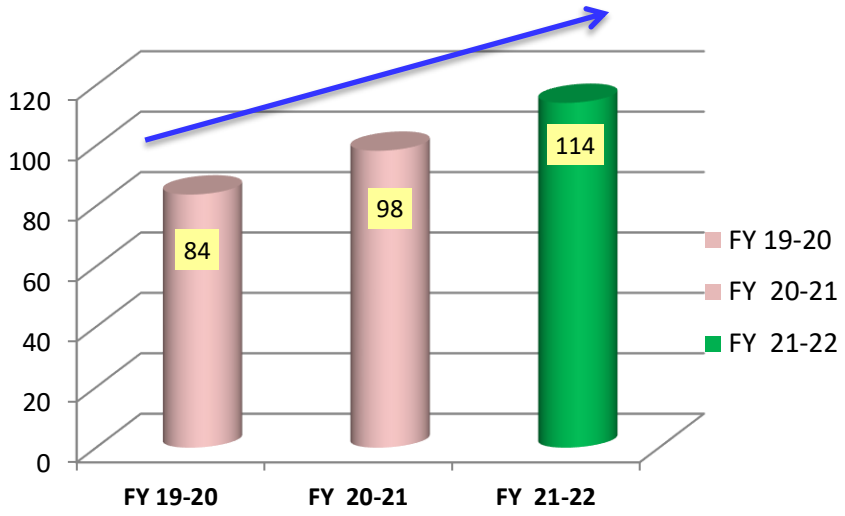
PV Solar Street Light Inside Plant

Kitchen food waste biogas plant

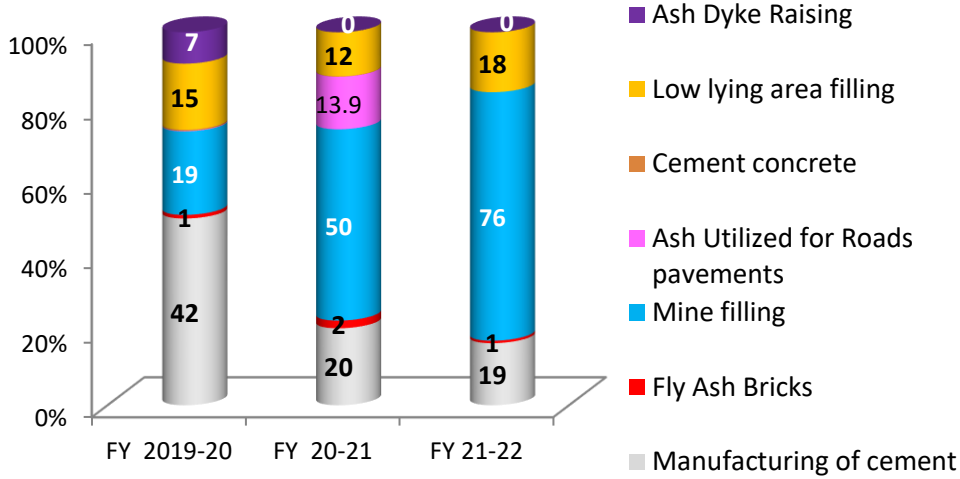
* Due to covid-19 project was delayed..

Environment Management – Ash Utilization

Ash Utilization (%)



Ash Utilization –Break up (%)



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 .
  First time started in C.G ,Ash dispatched = 58 rakes /2.20lacMT
- I magic software implemented for unmanned weighbridge for Coal & Fly ash truck weighment .

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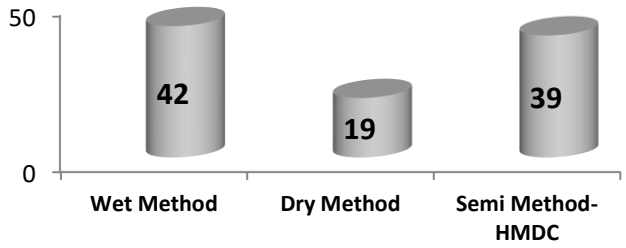
8. Environnent Management- Ash Utilisation

Particulars	UOM	2019-20	2020-21	FY 21-22
Ash Stock in Plant (yard + pond)	Tons	2283984	2328855	1906353
Ash Generated	Tons	2072253	2645733	2985053
Ash Utilization	%	83.8	98.3	114
Ash Utilized in manufacturing of cement/concrete – other similar products	%	41.96	20.28	19
Ash Utilized in Fly Ash Bricks	%	0.82	2.03	1
Ash Utilized in Mine filling	%	18.75	50.42	76
Ash Utilized for Roads pavements	%	0.09	13.86	0
Ash Utilization in Other Areas – Please mention below	%			
Part replacement of cement in concrete	%	0.29	0.12	0
In reclaimation of low lying area	%	14.85	11.6	18
In ash Dyke Raising	%	7.05	0	0
Expenditure on Ash Utilization (annual)	**INR (Lakhs)**	2278	4470	9513

Ash Handling Pattern



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Environment Management – Emissions Monitoring

Particulars	UOM	2019-20	2020-21	21-22
Total CO2 Emissions Per kW of Generation	Ton/kW	0.890	0.847	0.860
Current SOx Emissions at Full Load	mg/Nm^3	1411	1258	1240
Current NOx Emissions at Full Load	mg/Nm^3	443.5	407	321
Particulate Matter	mg/Nm^3	39	41	39
Mercury	0.01	0.007	0.0055	0.004

Best Practices Adopted for emission Control and Monitoring

- ❖Green belt development inside the plant.
- ❖Ash Utilization>100% for Fy 21-22
- ❖Continuous monitoring of emission parameter
- ❖Continuous Ambient Air Quality Monitoring System in service.
- ❖ Dust extraction system (DE) and Dust suppression system (DS) at CHP
- ❖Specially designed acoustic insulated enclosures for Turbine.
- ❖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)
- ❖Hazardous waste, e- waste, battery waste, biomedical waste send to authorized recycler.

Approx 10500 nos. of sapling planted Inside plant h2 plant , store & outside boundary area

Action Plan To Meet The Latest Emission Norms

Among the private sector DB Power is in advanced stage for FGD Implementation

➢SO2 Norms – Status of FGD Implementation- (Overall 43 % completed)

❖**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 :- 86% Engineering Completed.**
❖**Construction progress -31%**

- **Project Execution timeline/ :**Unit-1 & U#2 :- Mar-23
- **As per Notification timeline-2024**

As per initial design, existing chimney is to be utilized with glass flake lining .For lining of the chimney(275 mtr) it required **unit shutdown approx. 3 months. Integration of the FGD with existing unit only 2 days shutdown required.**
To avoid long s/d of the unit it has been decided to go with absorber top chimney after several round discussion with EPC contractor & design consultant.

***Booster fan power cons will be reduced by 452 Kwh(14.5%)**

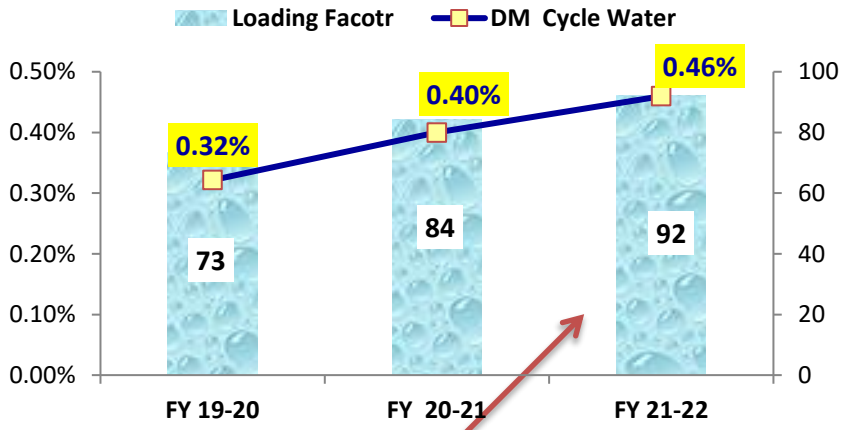
Damper erected	Absorber	Complex Building	Elect Control Building
			

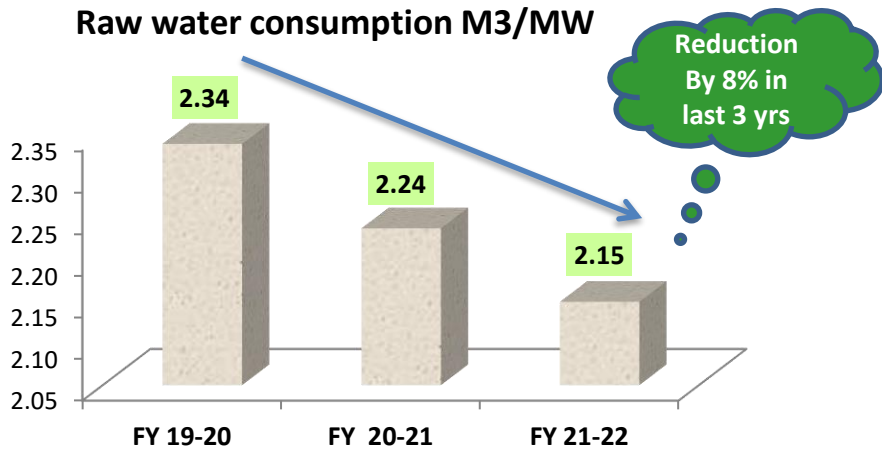
➢NOx- Norms (Based on 450 mg/Nm3)

❖Combustion optimisation & DAP(Dirty Air 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 <400 mg/Nm3)

Best Practices in Water Management

The plant is designed for zero liquid discharge.





1. Major reason For High DM make up in FY 21-22 - GSC pressure was high due to gland seal steam leakage at Bearing no -2.
   Attended after three months in U#1 COH (U#1 operated at 450 MW load due to heavy gland steam leakage at higher load)
2. Selected LRSB operation started from FY 20-21 on daily basis to avoid clinkering & Flame failure. Previously it was on weekly or requirement basis.
3. Drum safety valve passing (U#2 COH S/d Job)

BEST PRACTICES :

- AMC for online leakage rectification to arrest at the earliest.
- 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

➢Combustion tuning & Flame stabilisation achieved at low load operation- study done by SPEntech consultancy

➢Technical minimum load trial taken at 40% load for approx. 45 min ,all parameters found normal.(3 Mills were in operation)

➢Load Ramp up & Down 1% is being done (90 MW /Block /unit)

(Offer received from BHEL,GE & Siemens for further study of flexible operation)

➢Bio massing firing trial completed (5%) in one unit as per guideline

Maintenance and Reliability

➢**Adoption of Best practices** shared by NTPC,CII & other power plants.

➢**Occurrence Analysis** (RCA) in for categories - 1)Unit Tripping
2)Equipment Outage
3)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

Digitisation

- **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)
- **Bar coding & Decoding system** for Coal sampling & analysis
- **HONO HR app** for HR process
- **Automation of coal logistics and coal Lab** (Under progress with Udyog ERP system))

Asset Management

➢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

Conti..

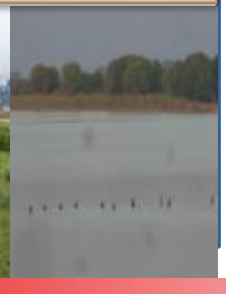
BEST Practices in the Plant :

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.

➢ 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 2022 is 2,10,000 (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

▪In-house card repairing (Skill development)

▪Installation of 84 no's of RTD on top and bottom stator bar of each core slot for stator bar primary water temperature monitoring.

New Initiatives:

▪In COH new practices adopted like **PAUT (Phased Array Ultrasonic Testing**) for Boiler Tube joints. **Plastic refectories** in coal burner areas.

▪ **Borescope** inspection for inlet header of Reheater ,SH ,LTSH & platen.

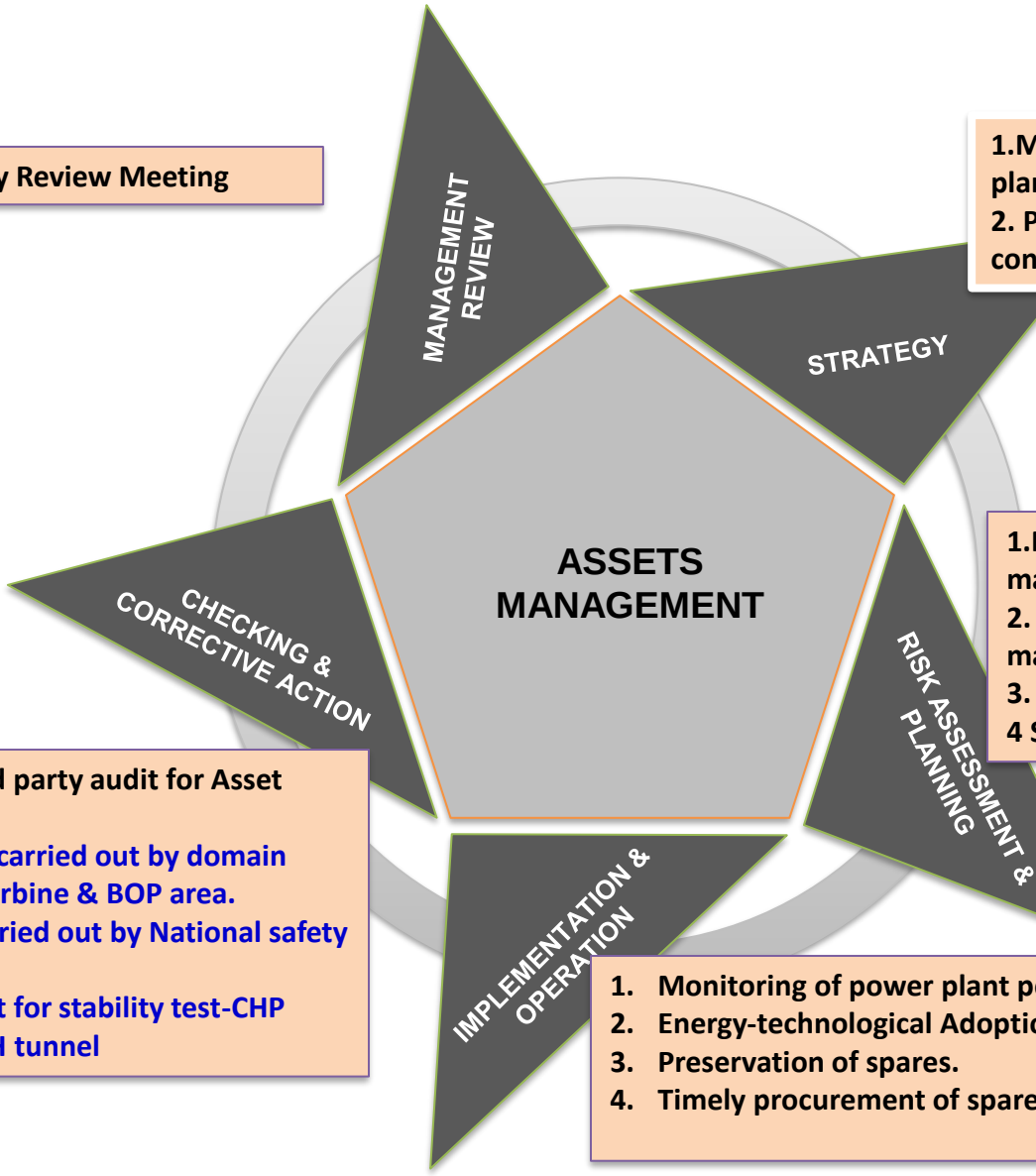
▪Used of **Acoustic Camera** for Early detection for air leakage during generator ATT in COH (time saved by 10- 12 hrs) .

▪Crusher - Speed monitoring / logging(Data analysis and operate can take action before actual tripping due to ZSS)

▪Provision of variable scoop coupling in drive system of BC-1A/B in place of traction type fluid coupling to avoid frequent start/stop of HT motor

▪ Headspace sampler for gas chromatograph-To avoid use of mercury(a banned metal for use).Auto injection will enhance reliability and accuracy in measurement.

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.Technical audit carried out by domain expert –Boiler, Turbine & BOP area.
2.Safety audit carried out by National safety council
3. Structural audit for stability test-CHP structures & MUH tunnel

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

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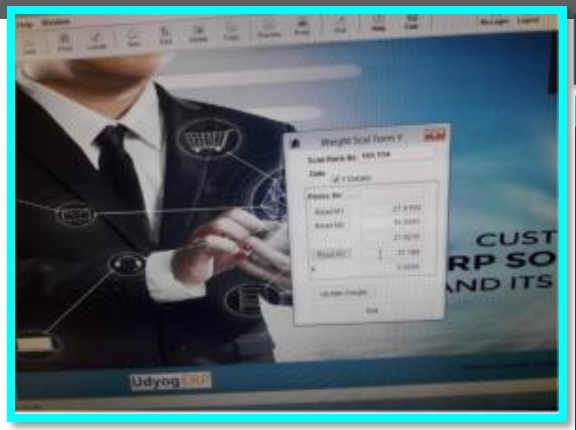
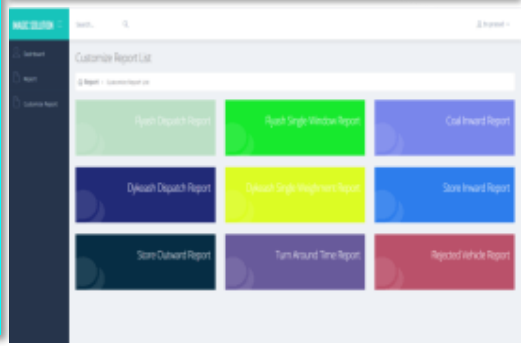
Best Practices In Other Areas of Plant – Digitization

- ➢All Reports & MIS on cloud – Can be seen and update anywhere
- ➢ABT System
- ➢SAP –PP,PM and DMS Implemented.
- ➢Coal sampling & analysis through bar coding
- ➢Implementation of Unmanned Weigh bridge completed



I Magic Software for

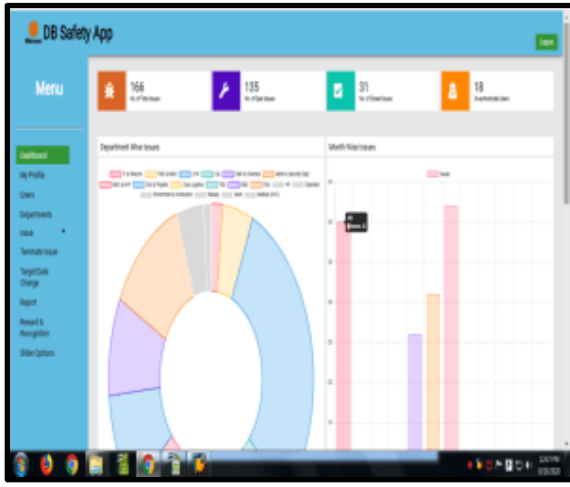


Employee Attendance- HONO HR APP

HONO HR
HAPPY PEOPLE

Pazo- Ash utilization

Safety APP –Reporting & Monitoring



E-Learning APP

FREE ONLINE EDUCATION
swayam

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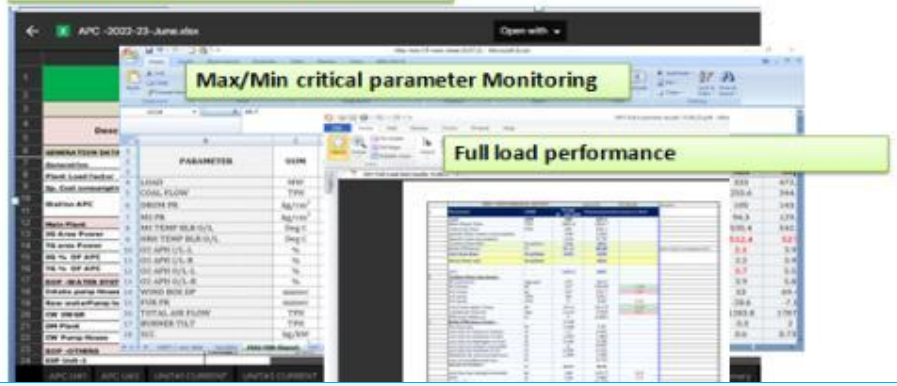
Teamwork, Employee Involvement & Monitoring

➢**Review & Reporting**

- Daily O&M Meeting - By HOD & Plant Head
- Weekly /Monthly ORT and Review by CEO
- Quarterly suggestion & Improvement project Competition
- Energy management cell: Review on monthly basis

➢**Monitoring :**

APC equipment wise monitoring



➢**Awareness Training Programme:**

- Coal Blending online session
- Online Boiler combustion optimisation session
- Power Plant cycle & losses
- Boiler Efficiency & Its performance awareness (Internal).
- Energy conservation week celebration awareness training conducted area wise ,poster /suggestion competition programmed drive.(105 suggestions received)

Energy conservation week celebration

Amount Invested In EnCon Projects FY21-22 — **Million 4.5**

Budget allocation for EnCon Projects in FY22-23 — **Million 12**

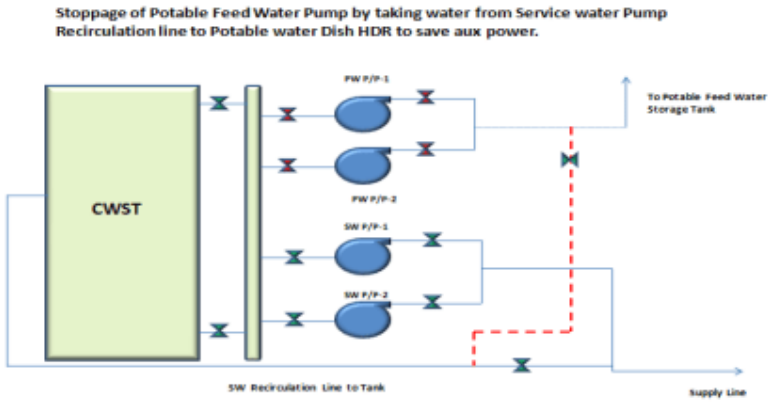
Investment 0.013 % on turn over

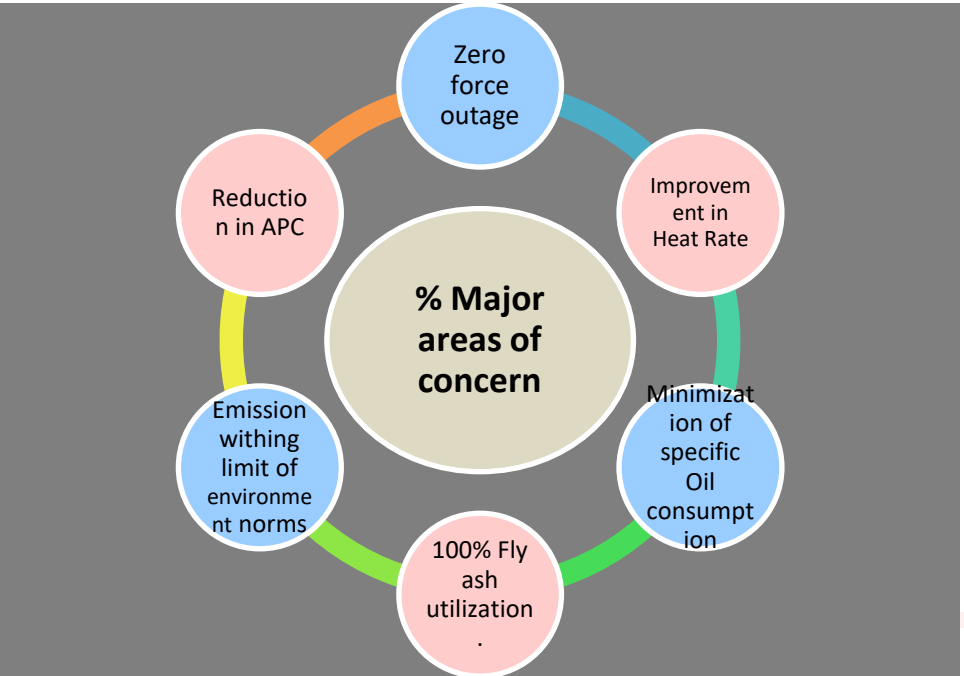
Project through Kaizen & Major Areas Concerns

➢Project Through Kaizen :

1. Stoppage of Potable feed pump by taking water from Service Water pump
2. Providing drain line in Service Air Line Header near Unit # 2 boiler lift
3. Modification of KGV-3 reject line to enhance the reliability of MRHS System
4. Metal pipe replace with flexible hose pipe -to avoid the frequent damage of pipes near joints of discharge pipes of SAC as a result delayed in rake unloading

Stoppage of Potable Feed Water Pump by taking water from Service water Pump Recirculation line to Potable water Dish HDR to save aux power.





Learning from CII Energy Award 2021

Sr.No.	Learning from CII award/ Summit/Other	Plant Name	Status of Implementation	Remarks
1	**VFD installation in LDO supply pump**	Nabha Power/ GMR Energy	Implemented (FY 21-22)	
2	**VFD installation in seal air fan for both units**	GMR Energy	Being installed in U#2 COH	
3	**Optimization of CEP Flow by closing LPBP spray**	Nabha Power	Implemented (FY 20-21)	Total Energy saving of 2.56 million kWh (Rs. 76 lacs per year)
4	**Coal mill LOP power optimization**	JSW Ratnagiri	Being followed (FY 20-21)	Total Energy saving of 0.020 million kWh (Rs. 0.60 lacs per year)
5	**Provision of NDCT makeup water through gravity line**	Nabha Power	Implemented	
6	**Online GPS tracking of fly ash disposal trucks though PAZO software.**	Process Industry	Implemented (FY 20-21)	Dumping of fly ash at exact location.
7	**Intelligent flow controller (IFC) installation in Compressed Air System**.	GMR,Warora	FY 22-23(U/P)	Dec'22

IMPLEMENTATION OF ISO 50001 :

- **ISO team formed, Internal audit preparation under progress.**(Delayed due to U#2 COH activities)
- **Order placed to IQMS ,New Delhi for Consultancy**
- **Target date : Dec'22**

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Certification /Award

Conti...

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

Certification /Award

CII award won in FY 2021-22 under category of " Excellence Enegy efficient Unit" (FY 21-22)

"Excellence in water management award in eastern Region By Council of Enviro Excellence (FY 21-22)

"Fly ash utilization award (runner Up) By Mission Energy award (FY 21-22)

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वक्त है नॉलेज के
रंग में रंगने का

Thank You

Email Id: abhinavprakash.trivedi@dbpower.in
Mob no-7898905060

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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

EnCON Project of FY 21-22

SN	Project Details	Investments	Savings	Payback (Months)
1	LORV to be taken into service		0.72	
2	LP turbine Diaphragm Modification for revival time reduction of ruptured diaphragm	0.125	0.14	0
3	Boiler Surface Heat Loss reduction by applying proper Insulation.	0.35	5.03	1
4	LPBP spray valve opening position optimization	0	7.68	0
5	20 kcal/kWh heat rate improved after unit-1 COH by improvement in performance of cooling tower, condenser, air pre heater, insulation, heaters and Turbine cylinder efficiency etc.	160	197.66	10
6	Installation of 90KW VFD (with bypass panel) in LDO Forward pump	0.45	0.45	12
7	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)	0.5	0.9	7
8	Monitoring of BFP R/c valve downstream temp and do r/c valve maintenance	0.15	11.31	0.01
9	Replacement of 150W HPSV lamp by 50W LED lamp (350 Lmps in FY 2021-22)	0.21	0.54	
10	Replacement of 40 W tube light by 16W LED tube light (500 Lmps in FY 2021-22)	0.15	0.18	
11	Replacement of 250W HPSV high bay lamp by 120 W LED lamp (50 Lmps in FY 2021-22)	0.27	0.1	
12	Replacement of 800 W HPSV flood lamp by 400 W LED lamp-yellow in High Mast (5 High Mast in FY 2021-22)	0.1	0.03	3.26
13	Replacement of 250W HPSV LED lamp by 120 W LED street lamp(100 street lights in FY 2021-22)	0.6	0.2	
14	Replacement of 125 W HPSV lamp by 30 W LED lamp(100 lights in FY 2021-22)	0.05	0.16	
15	Replacement of 70 W HPSV lamp by 30 W LED lamp-Yellow color(200 lights in FY 2021-22)	0.08	0.12	
16	Installation of vacuum transmitter in boiler 8.5 meter	0.05	4.12	
17	Providing drain line in Service Air Line Header near Unit # 2 boiler lift		1.2	
18	Modification in operational philosophy of clamping system to avoid huge oil leakage during rupture of hose pipe in unloading time. Clamp pump should be off in maintenance mode operation during returning of tippler from 160 to 0 degree.		0.25	
19	Develop a page on DCS indicating impact of parameter deviation on Heart rate- Continuous basis		0.94	
20	Intensive Monitoring OF Aux power consumption of equipment tracking-Vaccum Pump C & ACW Pump 2A,& ID fan current reduced		0.635	
21	Stoppage of Potable feed pump by taking water from DM feed pump		0.036	