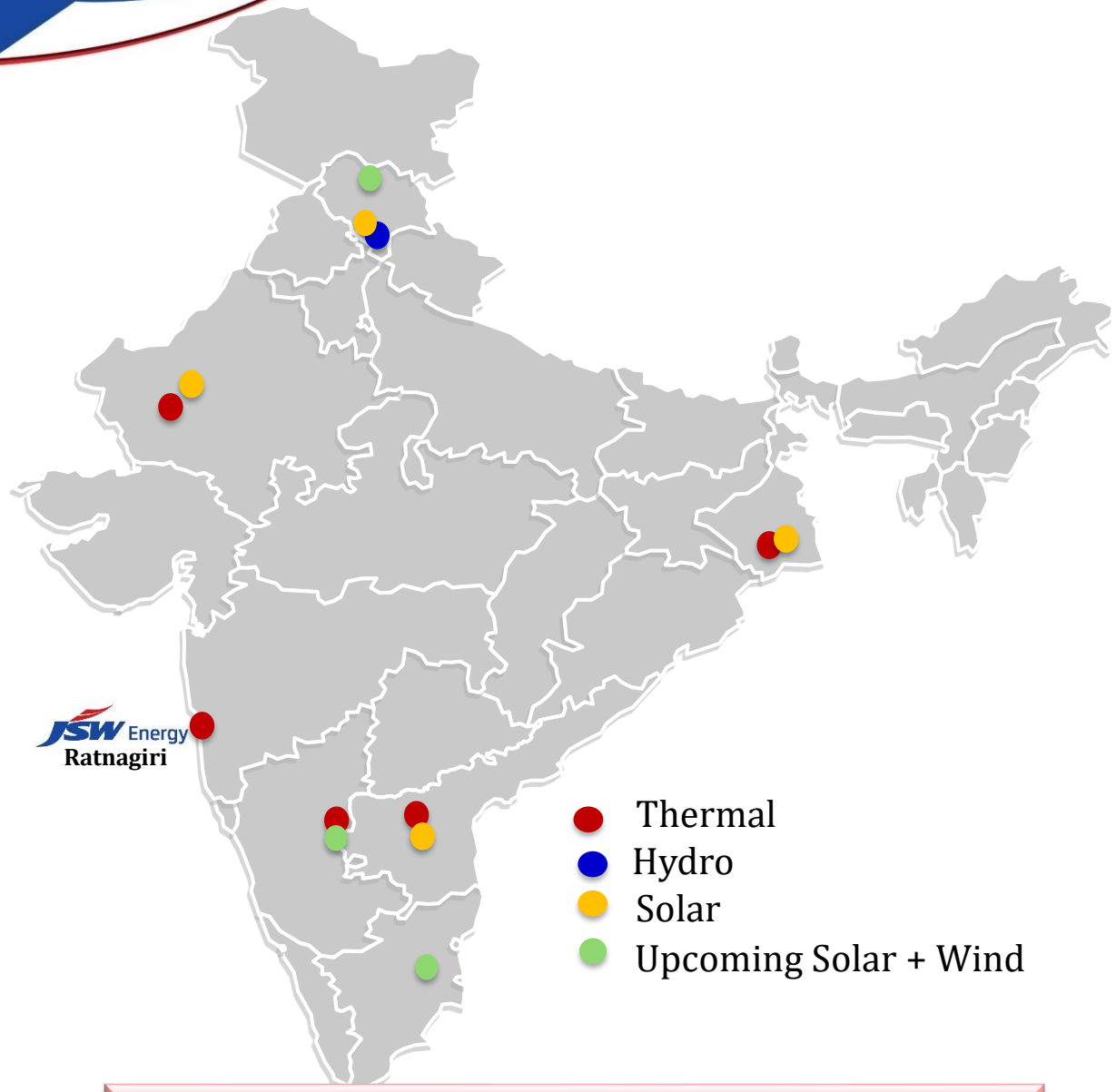
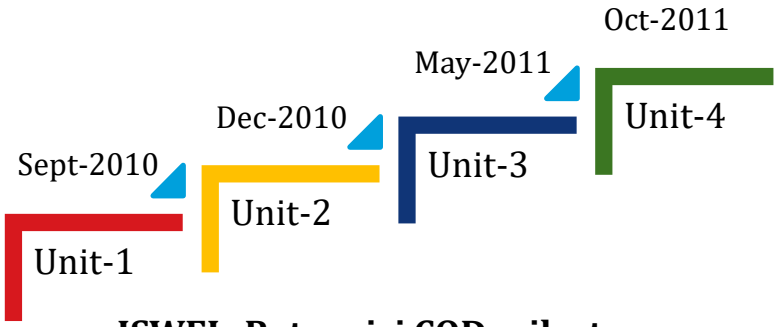
CII-National Award for Excellence in Energy Management 2021

JSW Energy Ltd, Ratnagiri

1. Brief Introduction – JSW Energy Ltd.

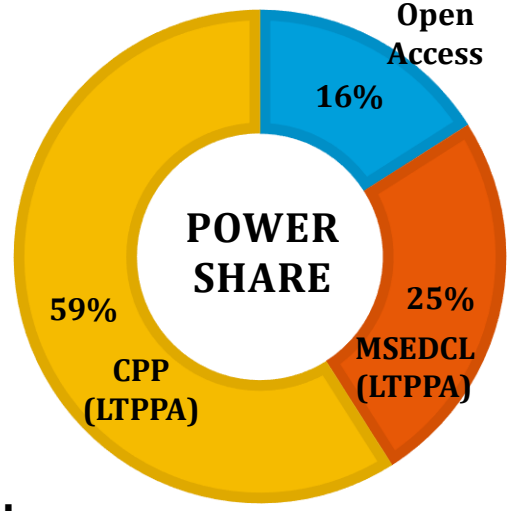


Total Present Operational Capacity : 4559 MW
Upcoming Capacity Addition : 1275 MW (Renewables)



JSWEL, Ratnagiri COD milestones

4 x 300 MW



SALIENT FEATURES OF THE PLANT :

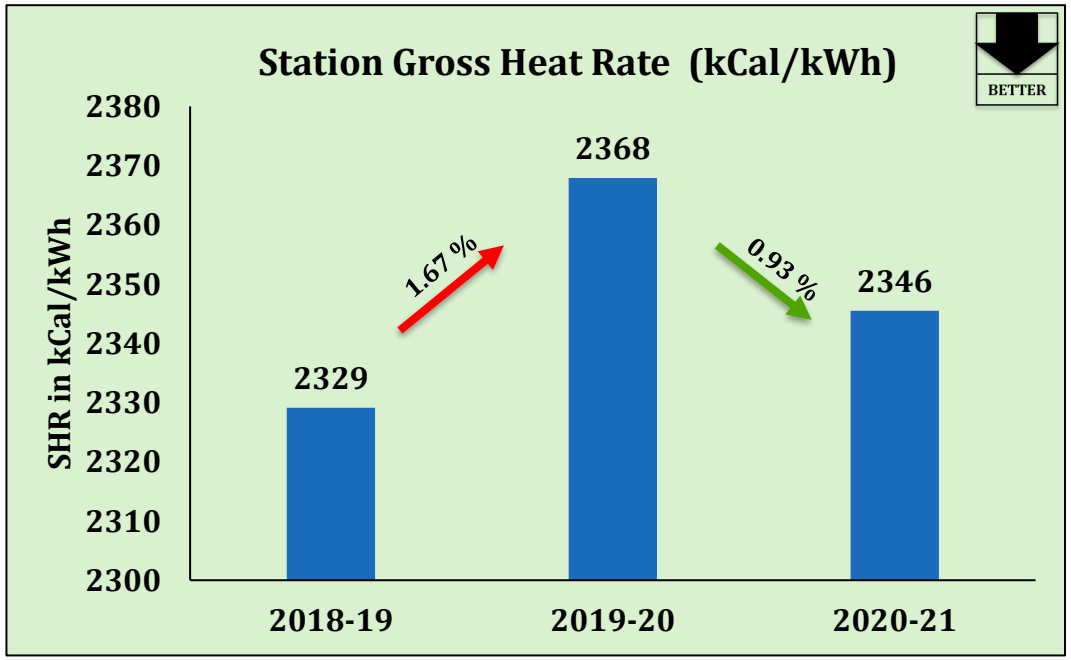
- 1st TPP installed at *Konkan* belt of Maharashtra {MOU}
- India's largest covered coal shed with 3 lakh MT cap.
- Gas Insulated Switchyard (GIS)
- Sea Water Based FGD system installed since inception
- Closed loop sea water cooled condenser & FRP cooling tower
- Power evacuation through 4 x 400 kV transmission line

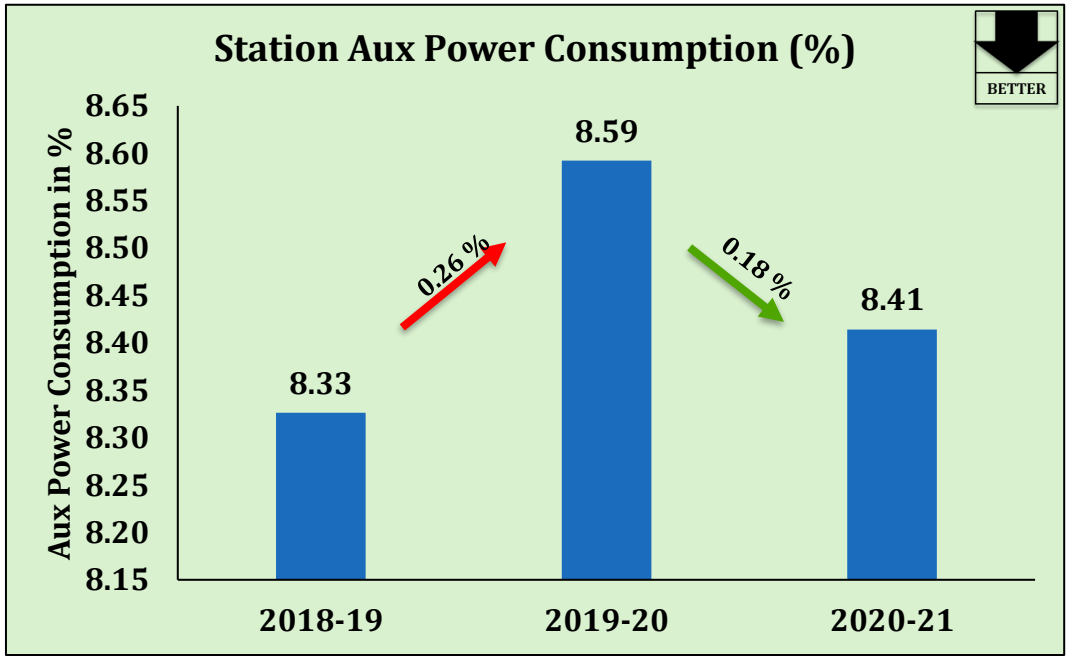
2. Energy Consumption Overview – FY 2020-21

Annual Generation	6199 MU
Plant Load Factor	59 %
Availability	74 %
Gross Heat Rate	2337 kCal/kWh
Turbine Heat Rate	2030 kCal/kWh
Boiler Efficiency	87.53 %
DM Water Consumption	0.48 %
Raw Water Consumption	138 m^3/MU
Sp. Oil Consumption	0.09 ml/kWh

With FGD	Aux Power Consumption 8.41 %
W/O FGD	Aux Power Consumption 8.15 %

3. Specific Energy Consumption in last 3 years





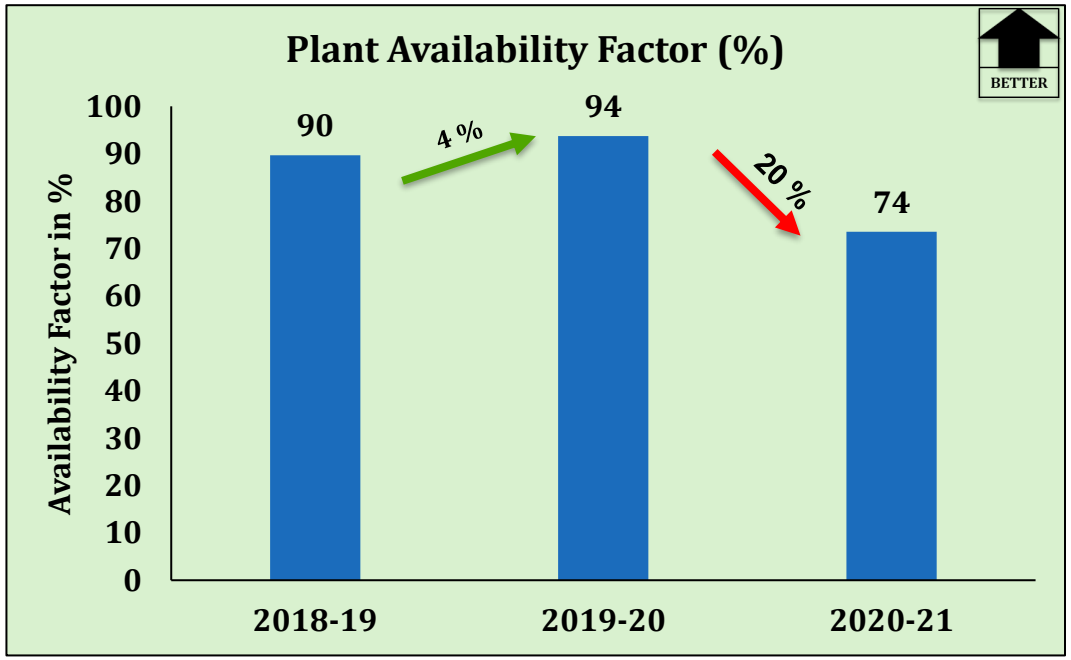
Reason for variation :

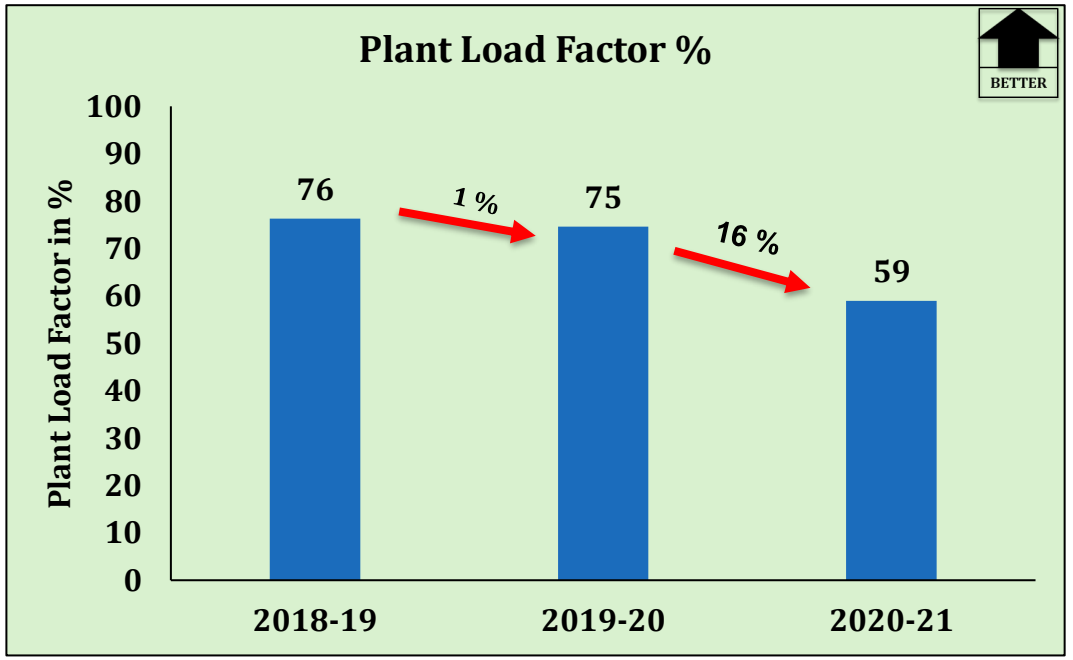
- There was a change in coal GCV by more than 100 kCal/kg for FY19 & FY20, also the loading factor was less by 5 % in FY20 compared to FY19
- In spite of lower PLF in FY21 compared to the previous year, with number of improvements, the heat rate was successfully reduced by 0.93 %

Reason for variation :

- In spite of lower PLF in FY 21 compared to that in previous year, the aux power consumption was successfully reduced with number of improvement steps.

3. Specific Energy Consumption in last 3 years





Reason for variation :

- The major decrement in availability is due to planned shutdown of units (AOH)

Reason for variation :

- Lower demand from captive consumers as a result of prevailing market conditions resulted in lower plant load factor

4. Information on Competitors & Benchmark

Parameter	UOM	JSWEL Ratnagiri	GWEL Warora	RPG Dhariwal	Lanco Amarkantak
Availability	%	**73.57**	84.1	98.28	94.12
Plant Loading Factor	%	**58.97**	74.87	80.46	86.93
Loading Factor	%	**80.16**	88.99	81.86	92.36
Aux Power Consumption	%	**8.41** **(8.15 excluding FGD)**	8.20	7.67	8.16
Sp Oil Consumption	ml/kWh	**0.09**	0.15	0.05	0.09
DM Water make up	%	**0.48**	0.14	0.20	0.32
Heat Rate	kCal/kWh	**2337**	2310	2332	2363

4. Information on Competitors & Benchmark

Roadmap to achieve benchmarks

01 AVAILABILITY

- **RLA study** of critical equipment's
- Change in **AOH/COH philosophy**

02 GROSS HEAT RATE

- Replacement **of CT Fans in U-3 & 4**
- Replacement of APH baskets in U-3 & U-4

03 PLANT LOAD FACTOR

- Increase in PLF by **augmentation of CPP power.**

04 SPECIFIC OIL CONSUMPTION

- Installation of **mini oil gun**
- Conversion of **HFO to LDO**

05 AUX POWER CONSUMPTION

- Installation of **VFD in Primary Air Fans**.
- Installation of **ESP smart controller**
- Installation of **VFD in LDO pumps**

06 SPECIFIC DM CONSUMPTION

- Conversion of **HFO to LDO**

4. Major *Encon* Projects Planned for FY 21-22

Sr No	Title of project	Annual Electrical Savings	Annual Thermal Savings	Total Annual Savings	Investment Made	Payback	Status / Timelines
		kWh	MT	Rs million	Rs million	Months	
1	Improvement in air pre heater performance by changing profile of baskets in Unit-3	2102400	3209	28.22	18.4	8	Completed
2	Improving Unit-3 cooling tower efficiency by redesigning cooling tower fan blades	0	1099	7.14	11.5	19	March-22
3	Improvement in air pre heater performance by changing profile of baskets in Unit-4	0	3209	20.86	18.4	11	In Progress
4	Reduction in power consumption of boiler feed water pump by de-staging	1430333	0	5.01	2.50	6	Oct-21
5	Solarization of Raw Water (Nivali) Pump House	438000	0	3.07	9.10	36	March-22
6	Replacement of RH spray CV with modified design (single stage to multistage) so as to avoid its passing and reduce RH spray & RH temperature losses	0	1025	6.66	1.60	3	Completed in U3, Work in progress for U4
7	Elimination of HFO guns by replacement with LDO guns in Unit-4	0	1831	11.90	0.02	0	Implemented in U1 & U4

5. Energy Saving Projects Implemented in last 3 years

Summary of Energy Saving Projects

FY	Number of Proposals	Investments (INR million)	Savings (INR million)
2018-19	22	78.57	719.98
2019-20	11	22.30	97.82
2020-21	**08**	**0.52**	**101.65**

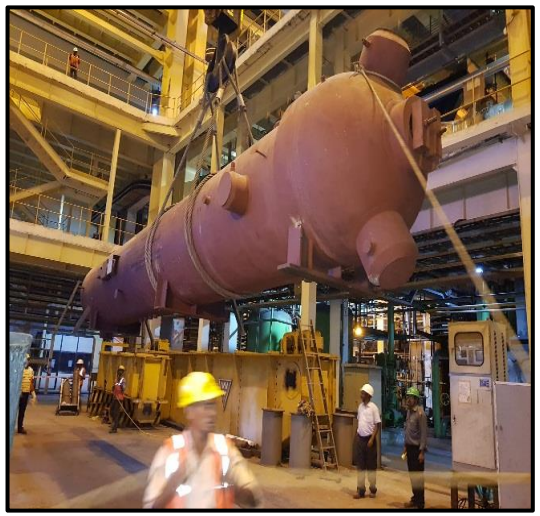
5. Energy Saving Projects Implemented for FY 18-19

Sr No	Title of Project	Annual Thermal Savings (MT of coal)	Annual Electrical Savings (kWh)	Total Annual Savings (INR million)	Investment (INR million)	Payback Period (Month)
1	Improvement in air pre heater performance by high pressure water jet cleaning and changing profile of baskets.	3689	2673311	36.51	12.00	4
2	Improving HP Heater performance by refurbishment of tube bundle	3644	-	27.29	13.05	6
3	Improving Unit-1 cooling tower efficiency by redesigning cooling tower fan blades	2999	-	22.38	11.5	6

Defective APH baskets

High pressure water jet cleaning of basket

Installation of new basket



Installation of HPH-6 after refurbishment of tube bundle

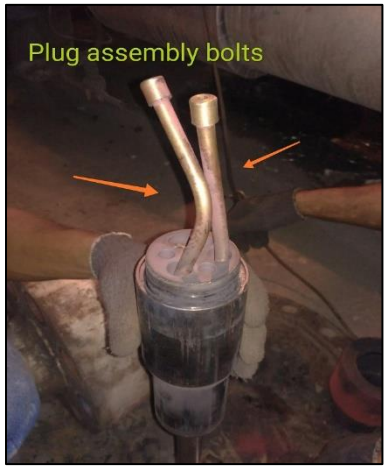
5. Energy Saving Projects Implemented for FY 18-19

Sr No	Title of Project	Annual Thermal Savings (MT of coal)	Annual Electrical Savings (kWh)	Total Annual Savings (INR million)	Investment (INR million)
1	Inspection & replacement of port plate flap in Vacuum Pump to attend air short circuit inside pump. (Carried out in two units)	3712	171593	28.27	Nil
2	Cleaning of CW suction screen by mixture of air & water to reduce fire water consumption	-	33250	0.11	Nil
3	Use of stored rain water and RO plant for plant purpose instead of river water so as to reduce MIDC pump power consumption	-	34366	0.24	Nil
4	Saving in aux power of Sea Water pump by optimizing its running hours	-	4886640	16.42	Nil
5	Reducing PA fan loading by optimizing its header pressure	-	4847040	16.29	Nil
6	Saving in cooling tower auxiliary power consumption by optimizing running hours	-	2867040	9.63	Nil
7	Optimization of ACW pump running hours	-	1853280	6.23	Nil
8	Coal mill LOP power optimization	-	300960	1.01	Nil
9	Coal feeder COC running hours optimization	-	237600	0.80	Nil
TOTAL		**3712**	**15231769**	**50.73**	**Nil**

5. Energy Saving Projects Implemented for FY 19-20

Sr No	Title of Project	Annual Thermal Savings (MT of coal)	Annual Electrical Savings (kWh)	Total Annual Savings (INR million)	Investment (INR million)	Payback Period (Month)
1	Replacement of Unit-2 cooling tower fans with redesigned fans	1509	0	9.81	11.5	14
2	Replacement of APH baskets for APH-B in Unit-1	1478	1116900	13.51	8.40	7
3	Installation of RC control valve with redesigned trim set in four BFPs to attend passing of RC control valve	0	5977824	20.92	2.40	1

Replacement of CT Fan blades with redesigned blades



Upgradation of BFP RC valve trim set from single stage to multistage

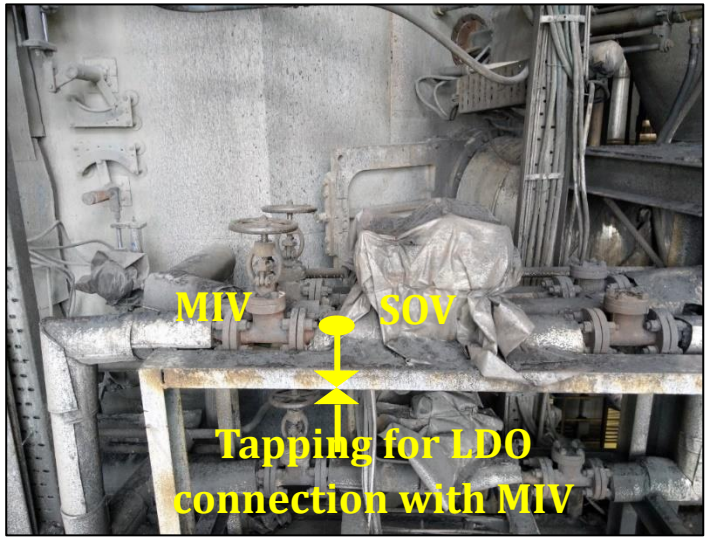
5. Energy Saving Projects Implemented for FY 19-20

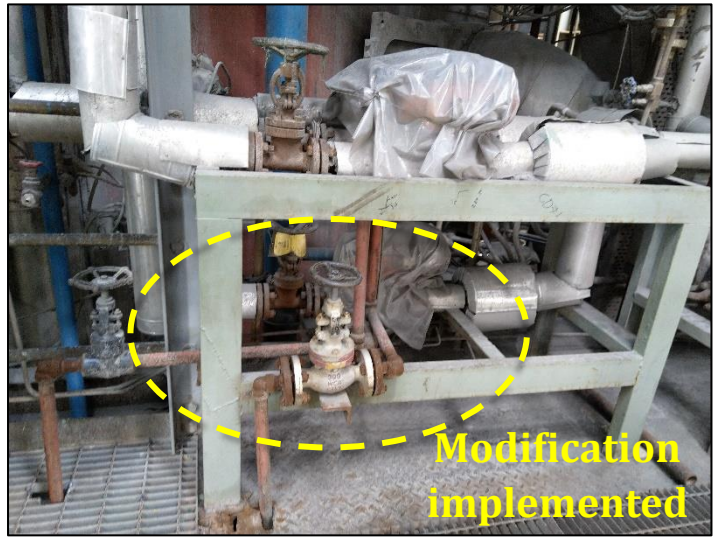
Sr No	Title of Project	Annual Thermal Savings (MT of coal)	Annual Electrical Savings (kWh)	Total Annual Savings (INR million)	Investment (INR million)
1	Improvement in Vacuum Pump-2B performance by replacing its valve plates	0	52240	0.18	Nil
2	Optimization of CW Pump power consumption by running common pump for two units at partial load	0	237600	0.83	Nil
3	Optimization of Coal Mill power consumption by optimizing number of running mills	0	3379287	11.83	Nil
4	Optimization of SWIP power consumption by optimizing running hours	0	484763	1.70	Nil
5	Optimization of CT Fan power consumption by optimizing running hours as per condenser vacuum	0	557348	1.95	Nil
6	Optimization of CEP power consumption by reducing discharge pressure	0	1675419	5.86	Nil
7	Optimization of ESP power consumption by changing charge ratio & hopper heater settings	0	5861210	20.51	Nil
8	Optimization of PA Fan power consumption by reducing discharge header pressure	0	3064010	10.72	Nil
TOTAL		**0**	**15311877**	**53.58**	**Nil**

5. Energy Saving Projects Implemented for FY 20-21

Sr No	Title of Project	Annual Thermal Savings (MT of coal)	Annual Electrical Savings (kWh)	Total Annual Savings (INR million)	Investment (INR million)	Payback Period (Month)
1	Internal inspection of HPH-6 & 7 in Unit-3 and rectification of passing parting plane	732	-	4.76	0.20	0.50
2	Internal inspection of HPH-6 in Unit-1 and rectification of passing parting plane	736	-	4.78	0.10	0.25
3	Improvement in performance of Vacuum Pump-1B by internal cleaning & servicing	2927	-	19.02	0.20	0.13
4	Elimination of HFO guns by replacement with LDO guns in Unit-1	1831	-	11.90	0.02	0.02

HPH parting plane rectification





5. Energy Saving Projects Implemented for FY 20-21

Sr No	Title of Project	Annual Thermal Savings (MT of coal)	Annual Electrical Savings (kWh)	Total Annual Savings (INR million)	Investment (INR million)
1	Modification in deaerator station CV control logic to optimize the discharge pressure of condensate extraction pump	-	490560	1.72	0.00
2	Stoppage of one ash handling plant compressor by optimizing cycle gap & conveying time	-	162000	0.57	0.00
3	Stoppage of one out of two Sea Water Intake pump at partial load for 24 hours by monitoring forebay COC, CW Inlet temperature & condensor vacuum	-	12420000	43.47	0.00
4	Optimization of draught fans load, so as to reduce its power consumption at partial load	-	4017600	14.06	0.00
5	Optimization in main plant compressor power by reducing the IFC set point as well as isolating instrument & service air for shutdown unit, thereby stopping one compressor	-	177120	0.62	0.00
6	Reduction in primary air fan power consumption by optimizing its header pressure from 8 kPa to 7.5 kPa	-	212760	0.74	0.00
TOTAL		**0**	**17480040**	**61.18**	**Nil**

6. Innovative Project Implemented

Reduction in power consumption of CEP by reduction in its discharge pressure

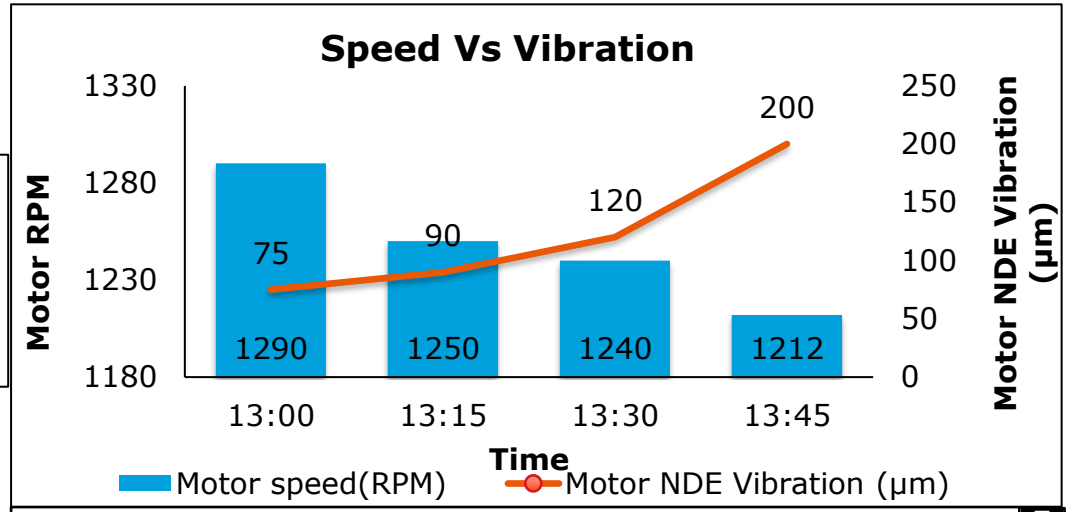
- At JSWEL, Ratnagiri, number of PDCA cycles were carried out to optimize the CEP discharge pressure & reduce it power consumption

PDCA-1

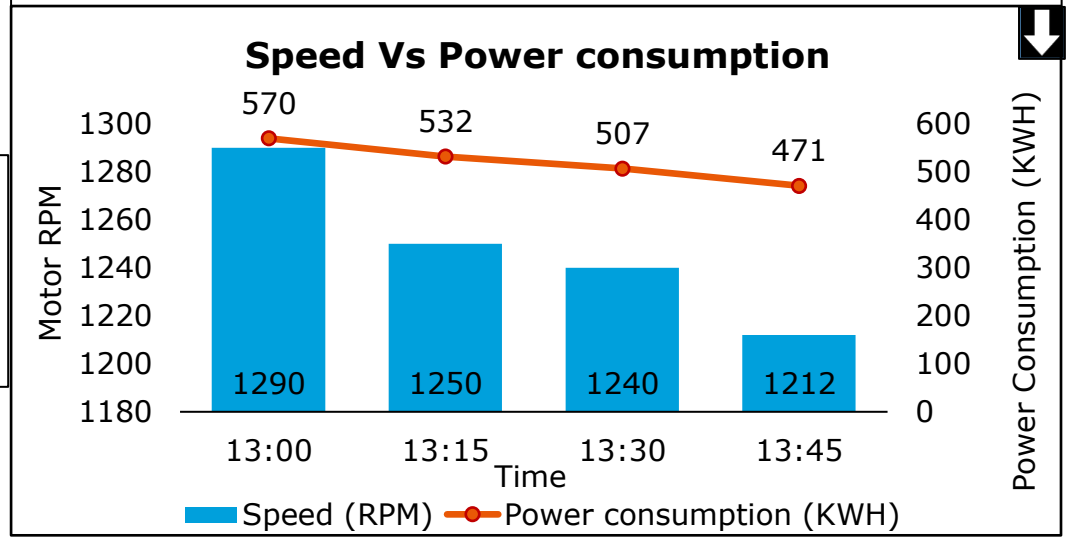
Replicability : Yes

- After VFD installation CEP power optimization done from from 932kWh to 636kWh by reducing motor speed. And also CEP discharge pressure reduced from 3.2Mpa to 2.2MPa.(The predicted APC reduction after VFD installation was 550 KWH).
- At full load (315 MW) below 2.2MPa discharge pressure vibration in motor NDE bearing observed higher than the alarm value (i.e. 80um).
- VFD Speed reduced up to 1290 rpm. Further speed reduction getting restricted as Motor NDE vibration going higher side as shown in Graph-1.
- However reduction of power consumption with respect to speed shown in Graph-2.

Graph-1



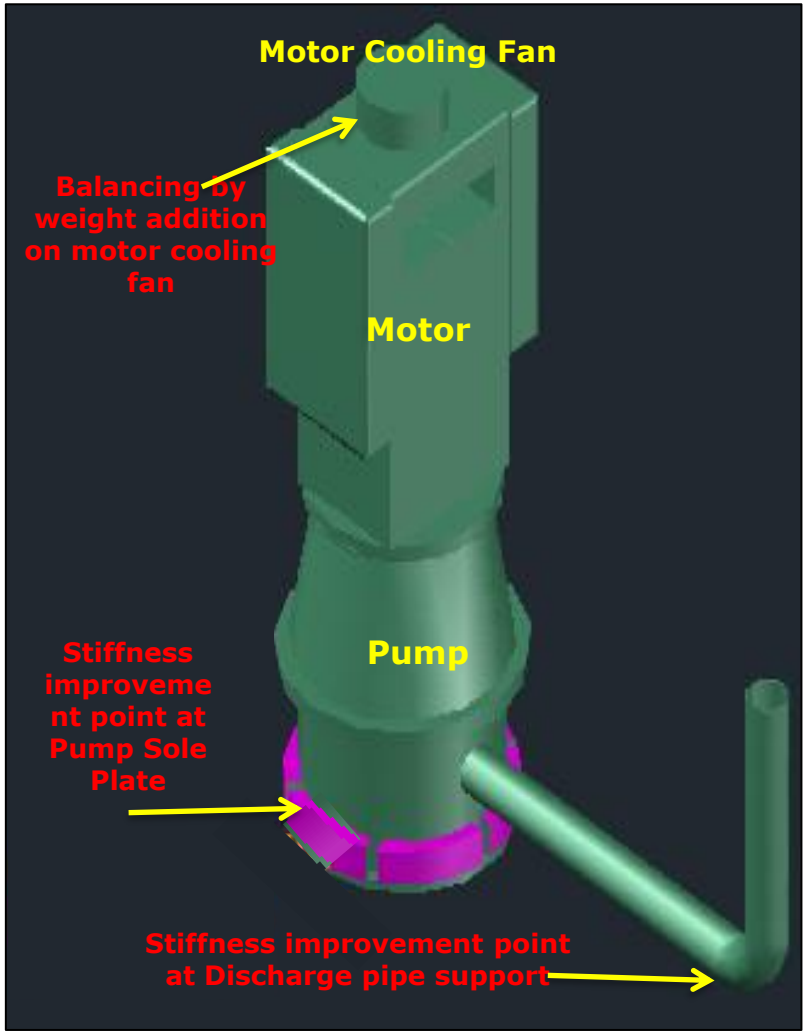
Graph-2

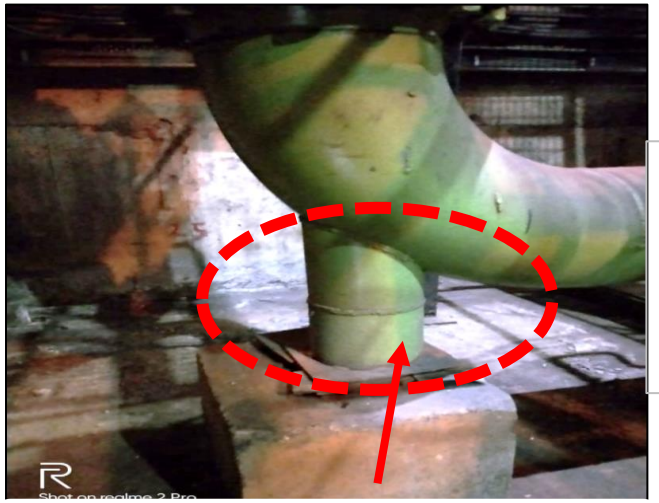


6. Innovative Project Implemented

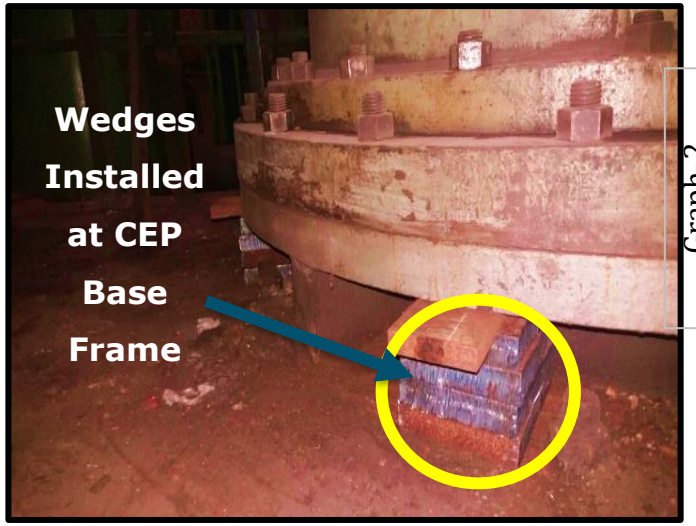
Reduction in power consumption of CEP by reduction in its discharge pressure

PDCA-1

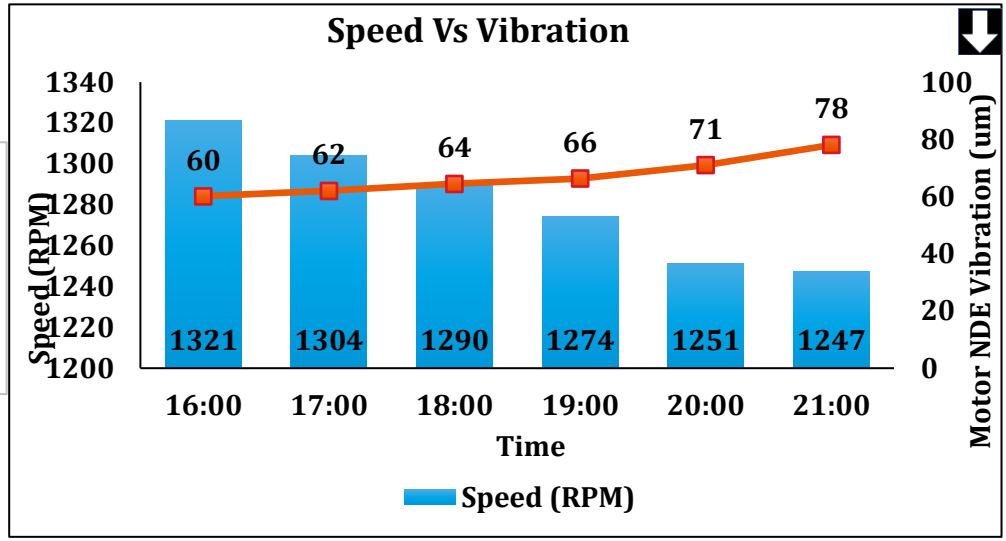




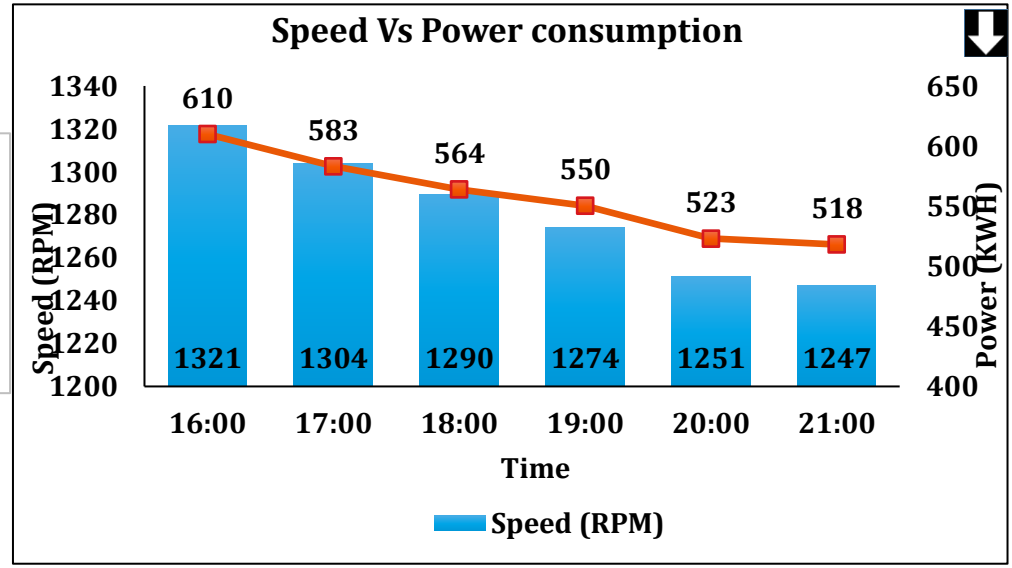
Shim plates provided at discharge pipe support.



Graph-1



Graph-2

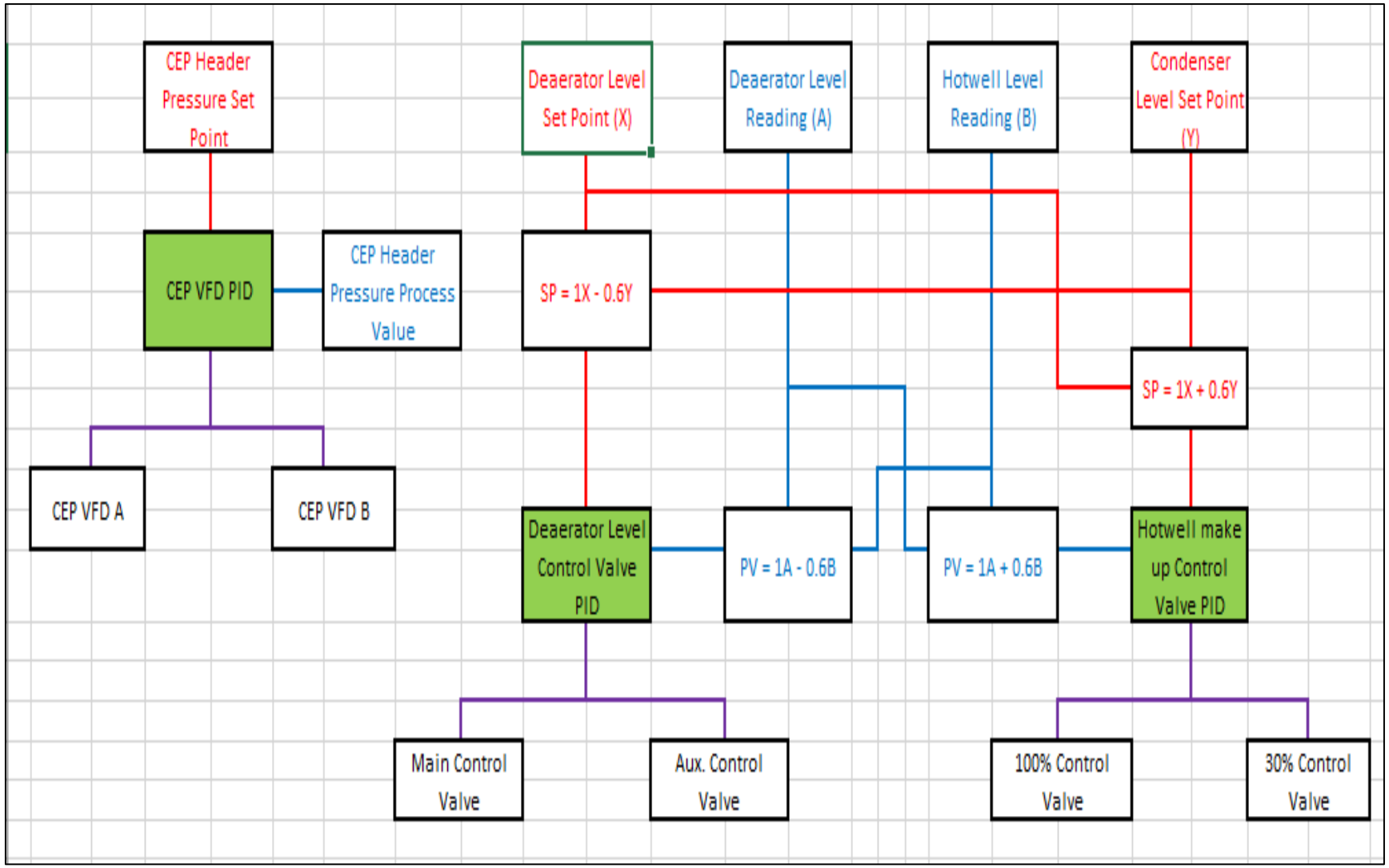


6. Innovative Project Implemented

Reduction in power consumption of CEP by reduction in its discharge pressure

PDCA-2

Replicability : Yes

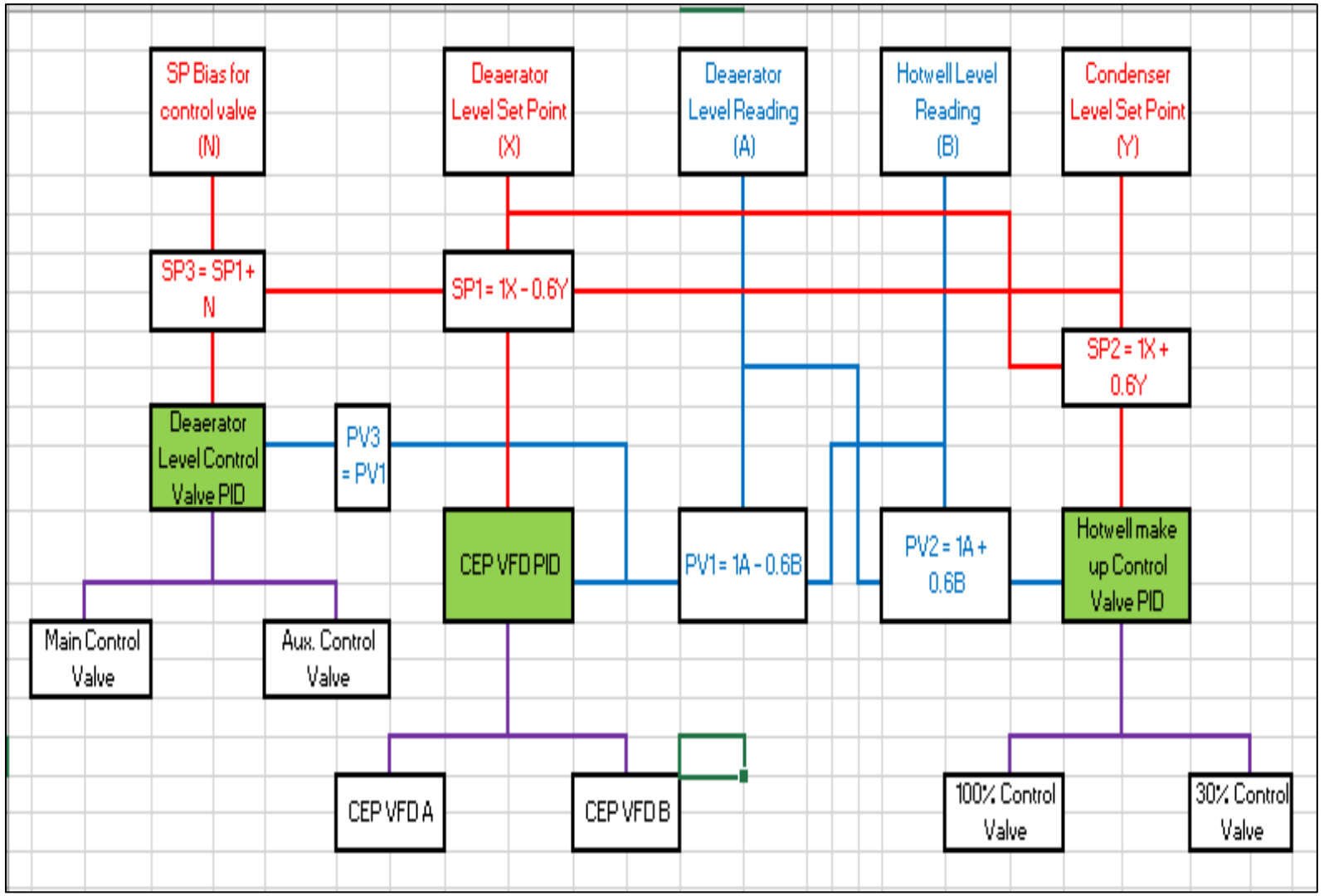


- In traditional setup, the CEP speed was controlled by discharge header set point
- The deaerator level was controlled by deaerator control station CVs for which the level set point was defined in the logic block (by operator)
- This logic was resulting in operation of CEP discharge header pressure and hence the speed of CEP independent of deaerator level

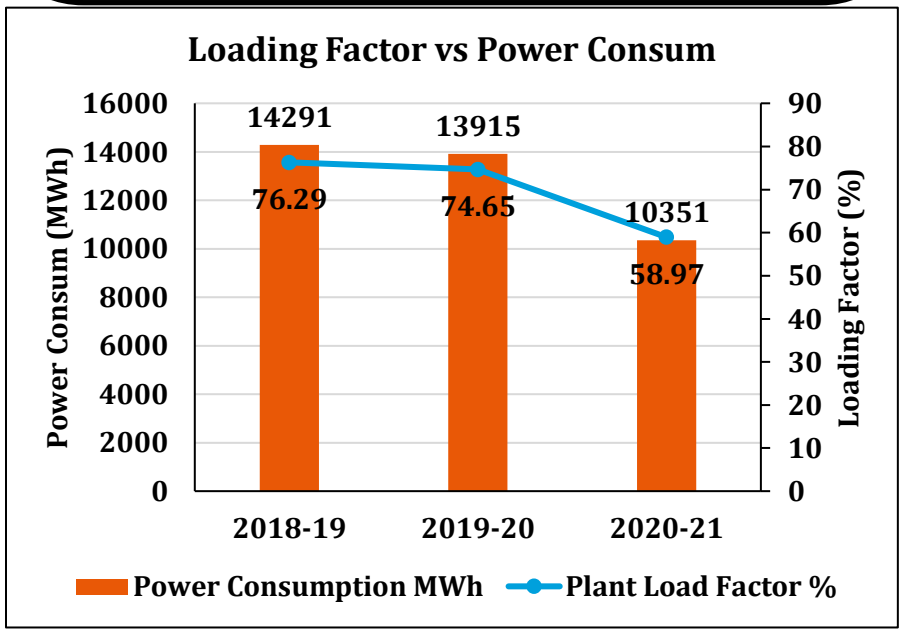
6. Innovative Project Implemented

Reduction in power consumption of CEP by reduction in its discharge pressure

PDCA-2



- The logic block have been developed so as to control the CEP speed by deaerator level
- This has enabled further optimization of CEP power consumption by bringing the discharge pressure set point as low as 1.0 MPa at partial loads



7. Utilization of Renewable Energy Resources

Installation of sky lights in Central Stores (Solar Energy)

Rating (Watt)	Electrical lights (No.)	Total annual saving (kWh)
400	12	21024
170	8	5957
Number of electrical units saved annually		**26981**

Recycle of biodegradable waste

Biodegradable wastes are utilized for producing bio-gas and being utilized at plant & associate canteen	
Bio gas production	> 14 m^3 / day
Equivalent to approx. 145 LPG cylinders per year	

8. Environment Management – Ash Utilization

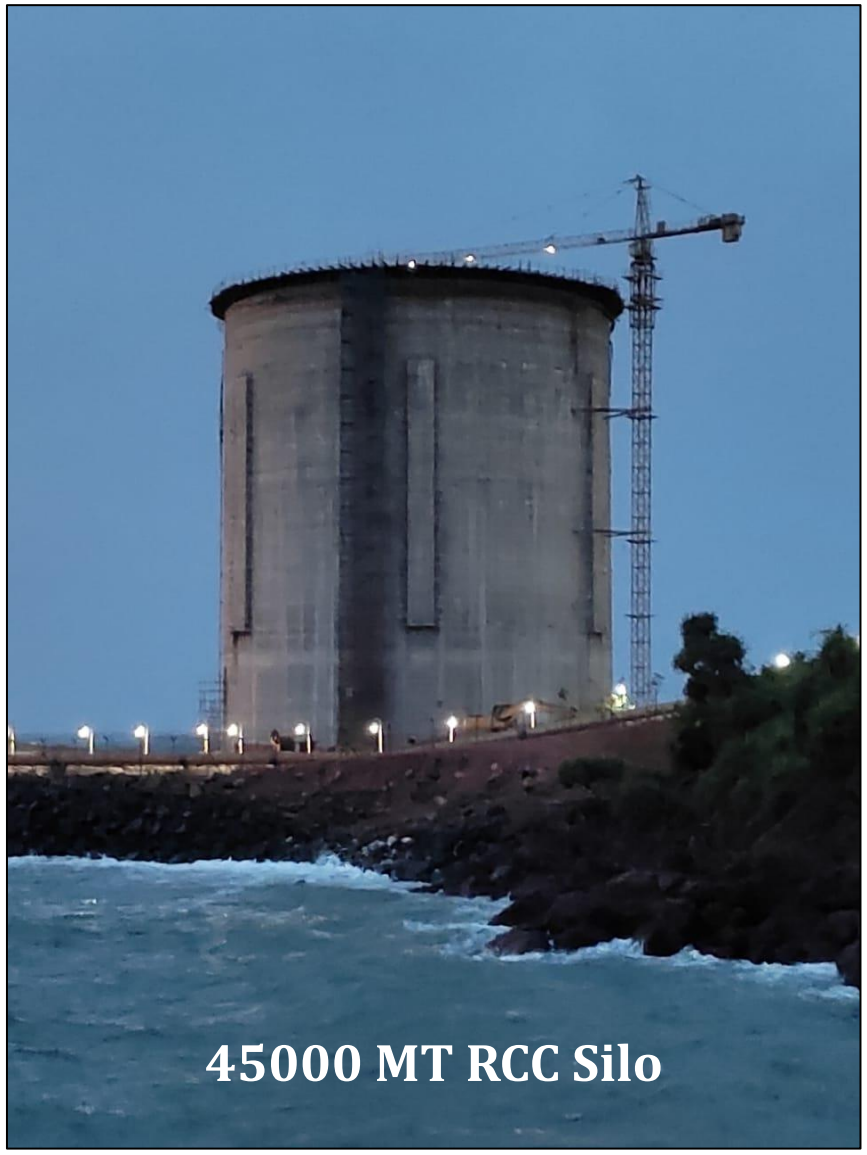
Particulars	UOM	2018-19	2019-20	2020-21
Ash Stock in Plant (yard+pond)	Tons	53612	55537	47853
Ash generated	Tons	425415	378352	264689
Ash Utilization	%	100	99.49	101.44
Ash utilized in manufacturing of cement	%	9.0	19.5	29.45
Ash utilized in fly ash bricks	%	13.5	23.29	33.35
Ash utilized in RMC	%	77	56.7	37.33

Ash handling done through various methods		
Ash handled (Wet method)	%	0.2
Ash handled (Dry method)	%	99.8
Ash handled (Semi method)	%	0

100 % Ash utilization by supplying ash on FOR basis

8. Environment Management – Ash Utilization

Upcoming Project (November-21) : Bulk Export of Fly Ash



45000 MT RCC Silo

About the Project :

- Fly ash from plant will be stored in a 45000 MT RC silo by means of pneumatic conveying pipe lines
- The ash stored in the silo shall be pneumatically conveyed to *Marine Vessels* and will be exported to various locations in *Gulf & European* countries

Salient Features of Project:

- 45000 MT capacity huge RCC Silo with 45 m ID & 60 m in height
- The ash from plant will travel a distance to 2.5 kms to reach the silo
- The ash from silo to marine vessel will travel a distance of 1 km
- Approx. 90% Ash export tied up with commitment from November-21

Total Investment ~ INR 100 Cr

8. Environment Management – Emission

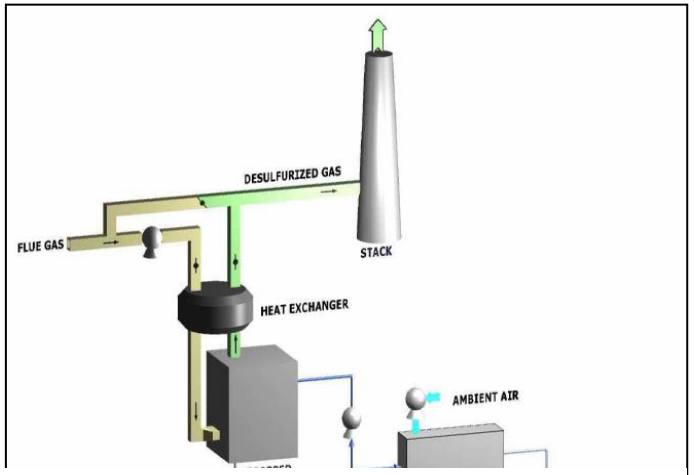
Particulars	UOM	Limit	2018-19	2019-20	2020-21
Total CO2 emissions per kW of generation	Ton/kW	-	889	895	965
current SOx emissions at full load	mg/Nm3	600	505.8	536.6	545.23
current NOx emissions at full load	mg/Nm3	450	312.2	308.5	310.77
Particulate Matter at full load	mg/Nm3	50	33.4	34.3	34.73
Mercury	mg/Nm3	-	<0.03	<0.3	<0.3

Public Disclosure :

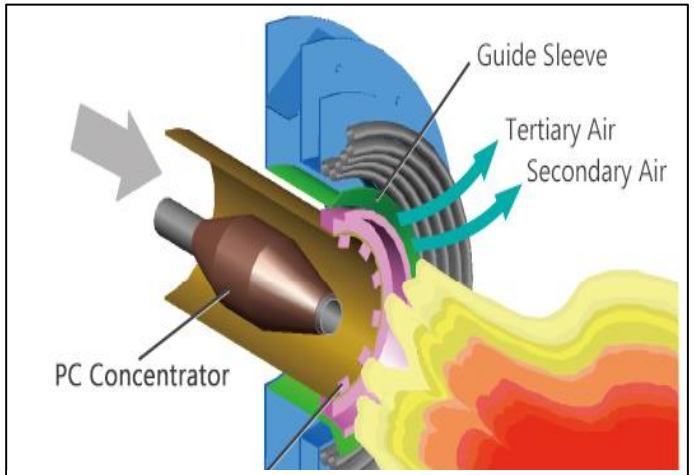
1. GHG data is submitted to Central Electrical Authority (CEA) **(Scope-1)**
2. The data is also included in BRR (Business Responsibility Report) and available on company website for public interest.
3. Refer link below:

https://www.jsw.in/investors/energy/jsw-energy-financial-information-business-responsibility-reports

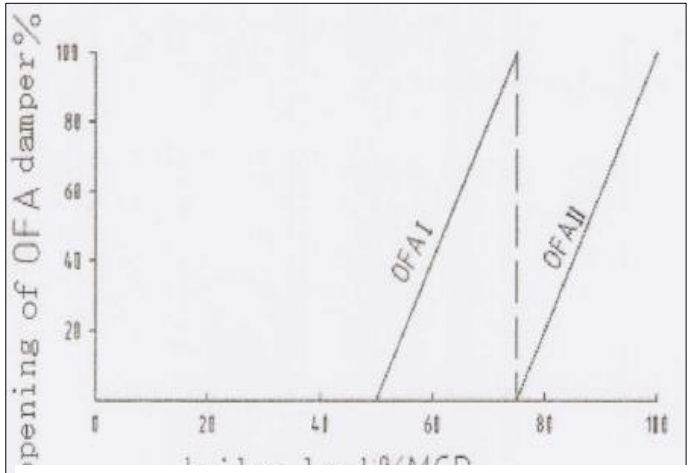
Practices adopted for emission control & monitoring



Installed Sea Water Based
Flue Gas De-Sulfurization System

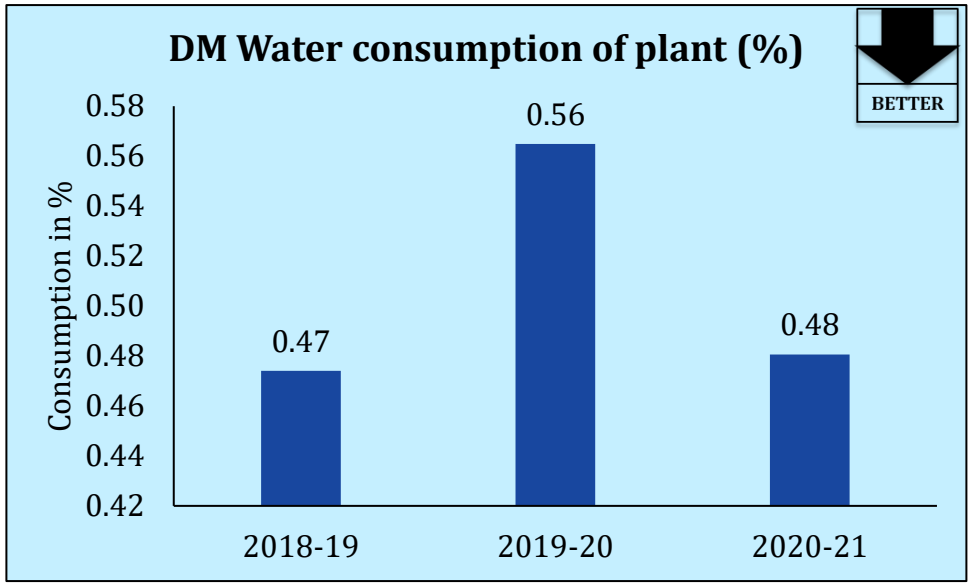


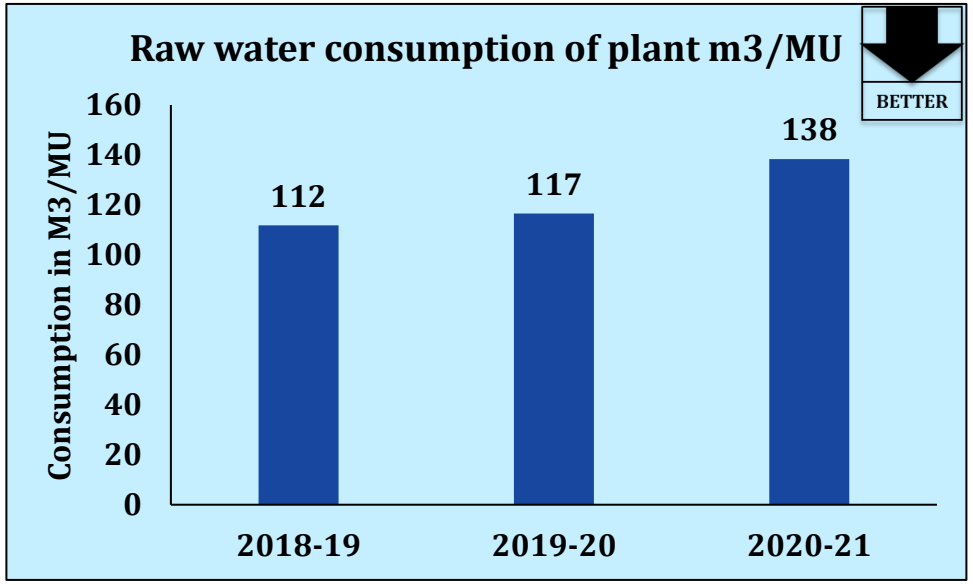
Installed
Low NOx Fuel Burners



Control by
SOFA Dampers

8. Environment Management – Water





Best practices in water management:

Sr. No	Description
1	**Rain water harvesting :** We've constructed number of check dams where rain water is collected and stored. The same is utilized as a fresh water for plant process as well as company township. In FY 2020-21, we consumed highest amount of fresh water from these dams **(This year : 2.81 Lakh Cum, Previous highest : 1.73 Lakh Cum)**
2	**All volatile Treatment:** - To Reduce boiler blow down water quantity, conventional Boiler water treatment was changed over to all volatile treatment.
3	**Use of treated effluent for Horticulture in plant:** - Sewage water is treated in Reed bed system and treated water is used for horticulture purpose. Fresh water requirement is reduced by use of this water.
4	**Cleaning of CW pump screen cleaning:** - Huge quantity of treated water was used to remove debris stuck on screens of Cooling water pumps. High pressure air was used along with water by fabricating in house cleaning device.
5	1. Automation of make up water to all the tanks in plant viz. service water tank, CCW make up tank, Potable water tank, etc so as to avoid overflowing of water 2. Installation of RTD in high pressure steam drain line so as to quickly identify passing of valve & attend the same 3. Drain temperature survey & thermography on regular intervals. Ensuring proper functioning of steam traps

8. Environment Management – Water

Water Contamination Control

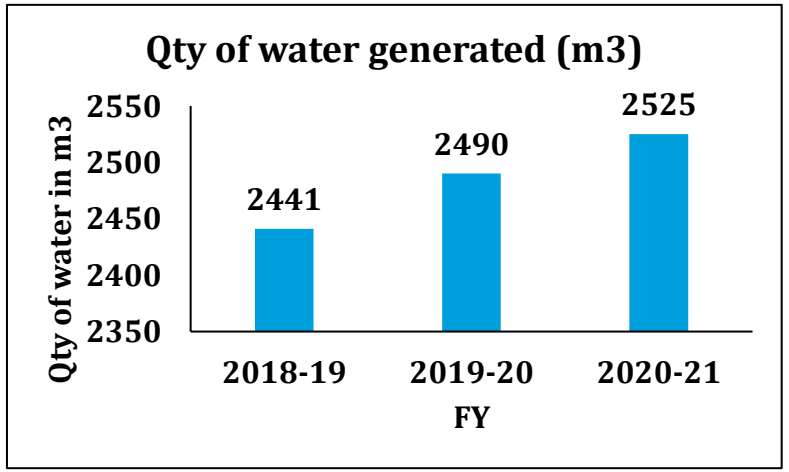
Oil-Water Separator Pit

CW ARV Pit

Check dams to store rain water

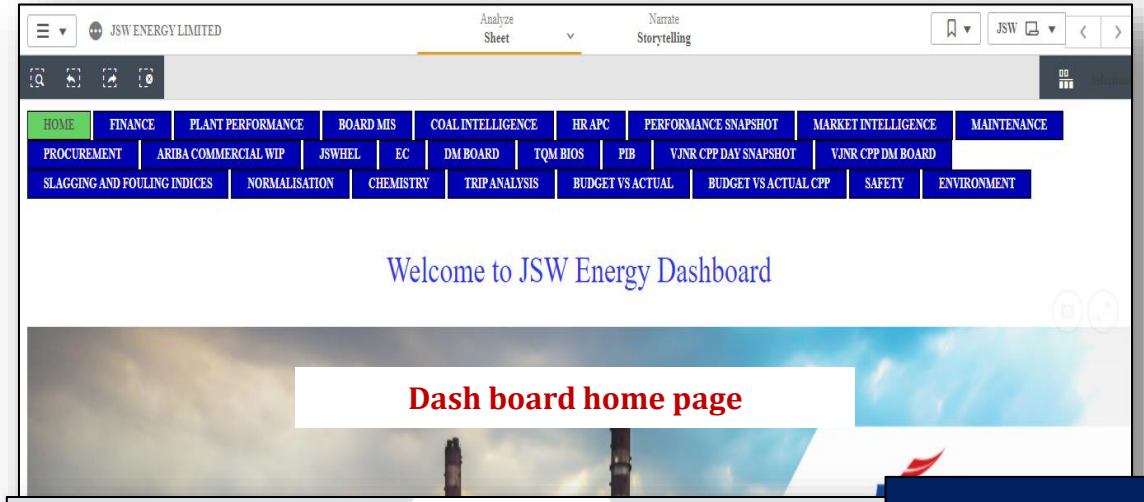
Sewage Treatment

*STP having NEERI patented **Phytorid** technology is installed in plant as well as in township for treatment of domestic effluent. **Treated water** is used for horticulture & gardening purpose.*

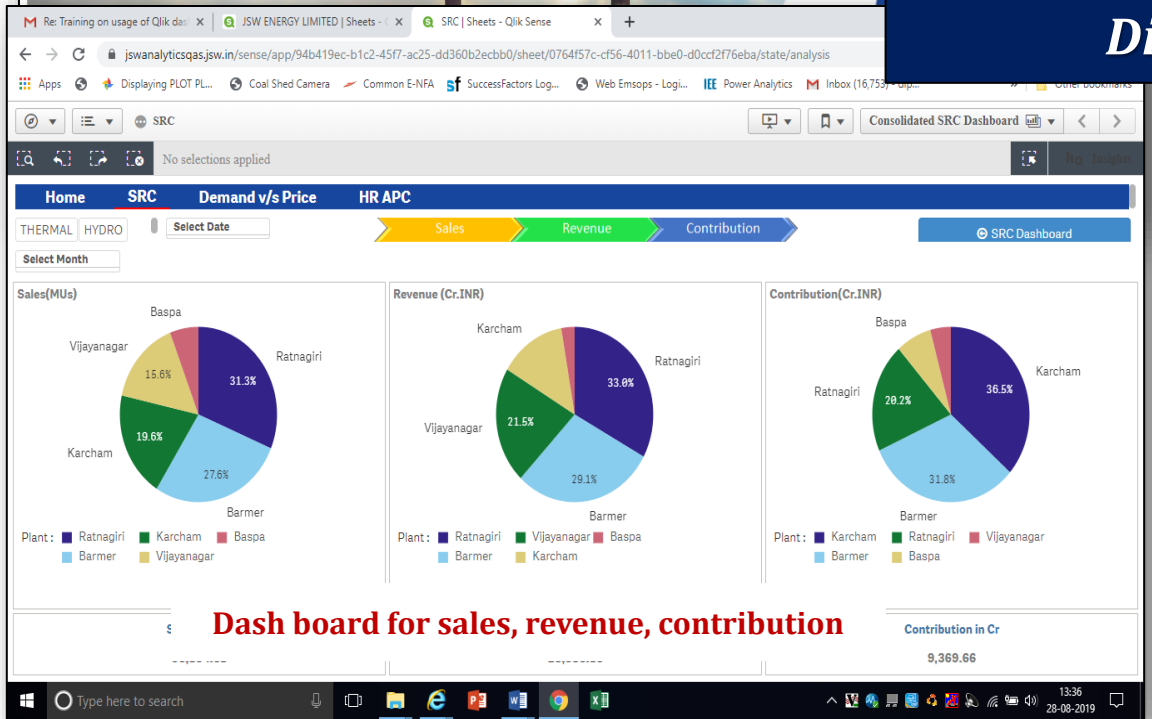


9. Best Practices in the Plant

Analytics Dash board in Qlick Sense for KPI monitoring

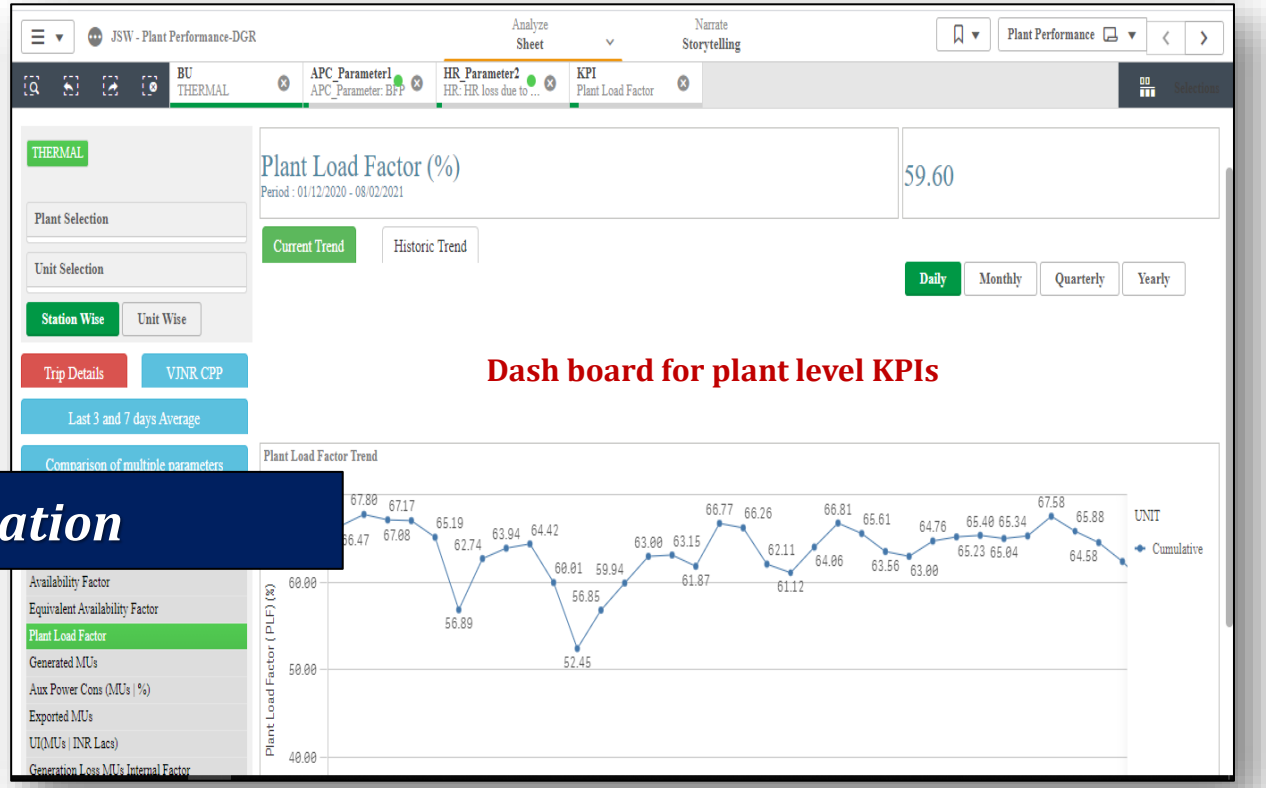


Dash board home page



Dash board for sales, revenue, contribution

Digitization



Dash board for plant level KPIs

Salient Features:

- All the management as well as plant level KPIs are tracked
- The data is SAP linked, hence no manual intervention required
- Analytics helps for projections and corrections of KPIs

9. Best Practices in the Plant

Centralization of following control stations :

1. **Coal handling system**
2. **Ash handling system**
3. **ESP**
4. **HCSD system**

Flexibilization

9. Best Practices in the Plant

Plantation data for last 10 years

Sr. No	Species	Planted Qty.	Survived Qty.	Survival %	Area (Acre)
1	Mango	9773	9753	99.80	52.9
2	Cashew	440	429	97.5	7.51
3	Forest	35200	35178	99.94	51.629
4	Coconut	465	459	98.70	1.936
5	Kokam	358	352	98.32	0.329
6	Betel Nut	433	432	99.77	0.138
7	Miscellaneous Plantation	59100	59085	99.97	10.056
	Total Qty.	**105769**	**105688**	**99.92**	**124.49**

Afforestation

Developed & Maintained green belt in & around the plant.

Converted more than 30 acres of barren rocky land into lush greeneries.

10. Team Work

JSW Energy

First MoM of Performance Optimization Group		Location :	VC with VJNGR / RTNG / HBPCL / RWPL
Date :	3-Aug-18	Time :	10:30 hrs to 13:30 hrs

Members Present: Mr.Gyan Bhadra Kumar, Mr.Aditya Agarwal, Mr.Shantharam Pai, Mr.Rajesh Vasudevan, Mr.Sudharshan Majji, Team VJNGR Leading by Mr.Kartikeya Misra, Team RTNG leading by Mr.Vijay Likhitkar, Team HBPCL leading by Mr.Ajay Nath, Team RWPL leading by Mr.C.V.Reddy

Sr. No.	Details of Discussion	Action by Location	Responsibility	Status
1	Monetary gain need to be verified for all the performance activities which are completed	All Stations	Station Finance HoD's	
2	Cooling Tower and Condenser performance need to be reviewed. All actions for reducing losses need to be shared with Corporate along with supporting documents	Ratnagiri/ Vijayanagar/ Barmer	PoG Heat Rate Team	
3	Issues related to measuring of Efficiency of CW Pumps / SWIP need to be discussed with professors from IIT Mumbai	Ratnagiri/ Vijayanagar/ Barmer	Team Corporate	
4	Trending of Hydro Turbine performance with parameters like water inlet flow, generation, guide vane opening etc. need to recorded on regular frequencies	HBPCL	PoG Team	
5	SBU-2, Unit-1 defects needs to be addressed before taking into service	Vijayanagar	Head O&M - VJNGR	
6	Protocol for sootblowing need to be shared among the locations	Ratnagiri/ Vijayanagar	PoG Heat Rate Team	
7	R2 Conveyor (Vessel discharge conveyor) Load cell instrument healthiness to be ensured and to be taken up with the port fro any deviation	Ratnagiri	RTNG PoG Coal Team	
8	Issues related to performance deterioration after COH need to be taken up with Seimens / Alstom	Ratnagiri/ Vijayanagar	PoG Heat Rate Team	
9	Plant wise categorization of performance issues need to listed out based on their monetary impact	All Stations	PoG Team	
1	Benchmarking of Hydro power stations need to be carried out			

QUALITY IMPROVEMENT PROGRAM-II

Topic	Description	Leader	Members					
Heat Rate	Improvement in O&M philosophy on load condenser tube cleaning system to improve heatrate.	Shivakumar Nargund	C. Thangakan	Gokul	Adhish Devshatali	Harshal Joshi	Vikram Jais	Shantanu Patkar

Quality Circle detail -Ratnagiri

Sl. No	Registration No	Month of Registration	Department	Name of QC	Role	Name
1	JSWEL/RATNAGIRI/QC-01	Oct-18	OPERATION	Better Everyday	Facilitator	Mr. ANSHUL AGRAWAL
					Leader	Mr. ANANT KUMAR
					Member	Mr. JAGDISH CHALAGERI
					Member	Mr. NILESH ADAV

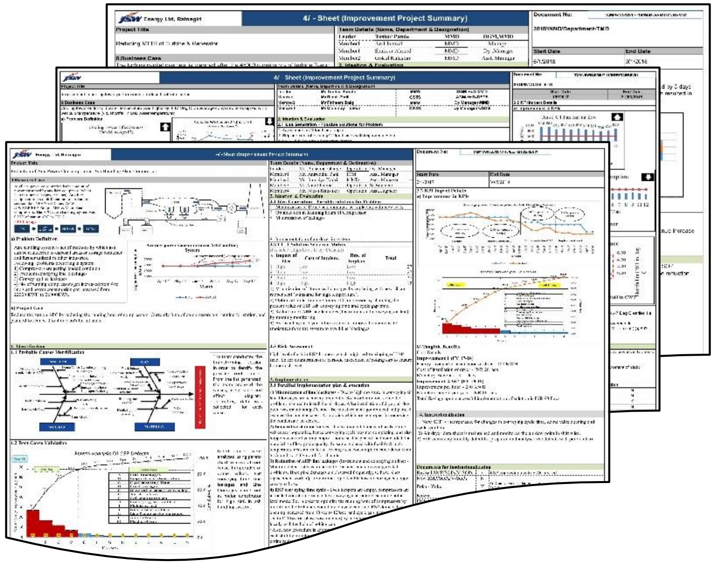
ENERGY MANAGEMENT CELL

CORE TEAM

Sr No	Name	Dept	E-mail
1	PEDDANA RAMAYANAM	Head-O&M	peddana.ramayanam@jsw.in
2	TUSHAR PANDE (PLANT EM)	MMD	tushar.pande@jsw.in
3	DIPAK PATIL	OS&TS	dipak.patil@jsw.in
4	SHIVAKUMAR NARGUND	MMD	shivakumar.nargund@jsw.in
5	SANJAY HARDIKAR	EMD	sanjay.hardikar@jsw.in
6	VIJAY LIKHITKAR	OPN	vijay.likhitkar@jsw.in
7	NAVEEN GUPTA	EMD	naveen.gupta@jsw.in
8	RANJAN SINGH	BOPMD	ranjan.singh@jsw.in
9	CHINMAY THAKUR	CO-ORDINATION	chinmay.thakur@jsw.in
10	ADHISH DEVASTHALI	CO-ORDINATION	adhish.devasthali@jsw.in

SUPPORT TEAM

Sr No	Name	Dept	E-mail
1	SANDESH GHATKAR	BMD	sandesh.ghatkar@jsw.in
2	SHAKEER AHMED SS	TMD	shakeer.ahmed@jsw.in
3	AJAY PATIL	EMD	ajay.patil@jsw.in
4	AVADHUT KELKAR	OPN	avadhut.kelkar@jsw.in
5	SATISH BISURE	ICM	satish.bisure@jsw.in
6	RAMESH NANDAWADE	EMD	ramesh.nandawade@jsw.in
7	SOURABH SHIRDHANKAR	OPN	sourabh.shirdhankar@jsw.in
8	VIKAS HULSURE	OPN	vikas.hulsure@jsw.in



POG teams

- **Cross functional teams** formed at plant level to work for improvement in performance parameters viz. GHR, APC, Coal Loss & UI.
- Review meetings chaired by HoP & HoT

EMC & QC Teams

- **Energy Management Cell** – Core team along with Support team formed with objective of improvement projects for *energy conservation*.
- **24 QC** teams for *continuous improvement projects under KAIZEN* (One *KAIZEN*/month)

4i-J2 & J3 Projects

- Identified & trained 27-J2 candidates & 8-J3 candidates to work for a cross functional project involving high end statistical tools & analysis
- The projects adopts our unique ***4i*** improvement methodology (Identify, Ideate, Implement, Institutionalize)

10. Team Work & Employee Involvement

Individual awards including **Employee of the Month**

Best ***KAIZEN*** awards for various categories to teams & individual

All these monthly celebrations are conducted virtually

10. Employee Involvement & Areas of Concern

Energy Efficiency Training & Awareness Programs

FY 2020-21		
Program	**No. of participants**	**Duration (Mandays)**
Internal	140	140
External	66	99

Regular knowledge sharing sessions within & between the departments

Projects implemented through KAIZEN

Level	Raised	Implemented	Under Progress
Supervisor	148	140	08
Workmen	102	90	12

Major areas of concern

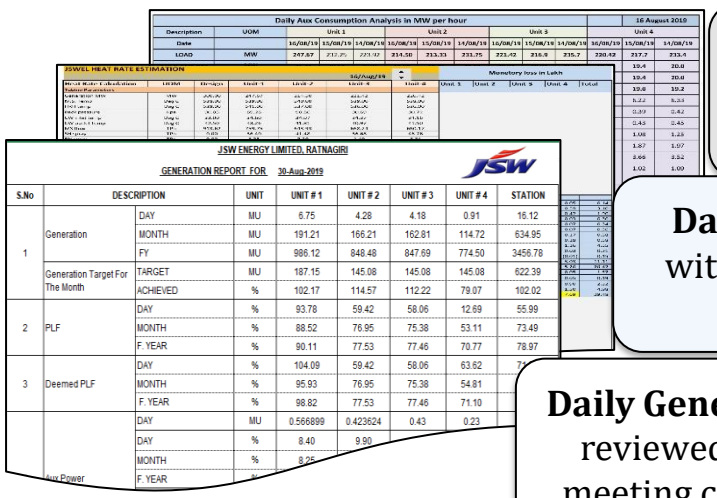
Sr. No	Description
1	Variation in quality of coal in different lots of same shipment (marine vessel)
2	Variety of imported coal based on the price & availability as the plant is designed for 100% imported coal
3	Controlling cost of generation to be competitive in market as the plant is 100% imported coal based
4	Lower utilization factor of plant due frequent back downs, unavailability of load schedule in open market & lower demand from captive customers
5	Spontaneous combustion of coal due to higher volatile matter

10. Employee Involvement & Monitoring

Employee Involvement

- **Energy Conservation Week** is celebrated every year in the form of various competitions and activities with involvement of company employees, associate employees.
- Active participation & involvement of Students from near by **schools and employee families at townships**

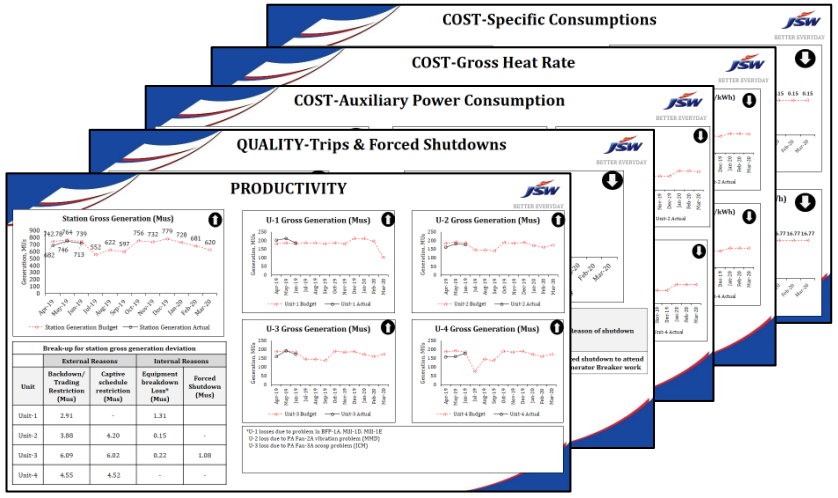
Monitoring Systems



Daily APC report with equipment wise break up & comparison

Daily heat rate report with break up of THR & Boiler Efficiency

Daily Generation Report reviewed by all HODs, meeting chaired by HOP



Monthly review is conducted by 10th of every month where plant performance is reviewed under various areas viz. **S**afety, **P**roductivity, **Q**uality, **C**ost, **M**orale & **E**nviron.

10. Monitoring

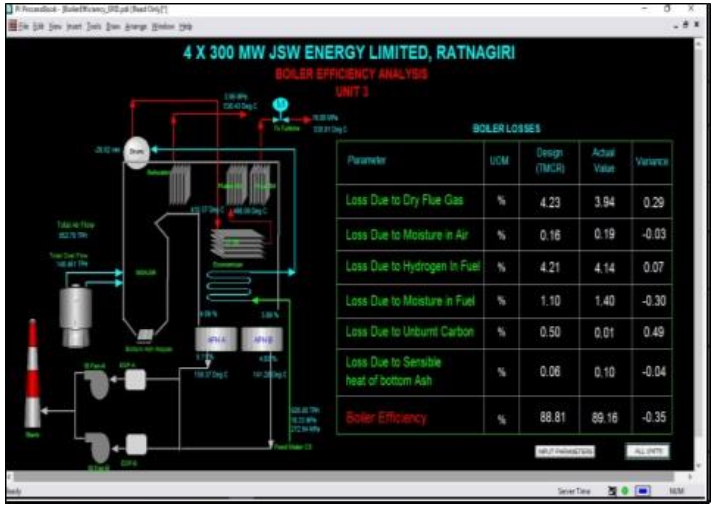
Real Time Monitoring System

ABT : To maintain load schedule

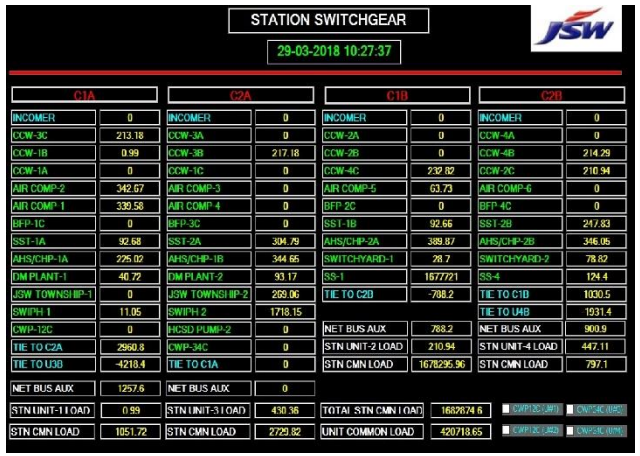
4 X 300 MW JSW ENERGY LIMITED, RATNAGIRI

GRID FREQUENCY 50.03 Hz — 09-Jun-2019 01:43:43 PM

Parameter	UNIT-1	UNIT-2	UNIT-3	UNIT-4
GROSS GENERATION, MW	225.55	246.13	220.01	205.46
NET GENERATION, MW	200.86	220.12	203.54	189.15
COAL FLOW, T/Hr	86.93	95.10	81.54	77.18
UNIT HEAT RATE, KCal/Kg	2304.55	2280.58	2291.20	2260.57
TG HEAT RATE, KCal/Kg	2066.10	1993.59	2010.47	2085.59
BOILER EFFICIENCY, %	88.83	87.13	88.27	89.82
Power Export, MW	201.24	613.15		



OSI PI : Real time plant performance monitoring system



EMS : Real time online monitoring of auxiliary power consumption of individual equipment

Other monitoring systems include :

- Daily Management Board
- Evening O&M Meeting
- Monthly Report
- Quarterly Report
- **Monthly EC Meeting** (Chaired by JMD of JSW Energy)
- Unit performance test on regular interval
- Monthly review of equipment & unit tripping and its RCFA & recommendation status

❖ All **performance related reports & documents** are kept in common folder with access to all the employees

11. Implementation of ISO 50001

TÜV NORD

CERTIFICATE

Management System as per
ISO 50001 : 2018

The Certification Body TÜV NORD CERT GmbH hereby confirms as a result of the audit, assessment and certification decision according to ISO/IEC 17021-1:2015, that the organization

JSW ENERGY LTD.
Village Nandivade, Post - Jaigad,
Taluka & District Ratnagiri - 415 614,
Maharashtra,
India

operates a management system in accordance with the requirements of ISO 50001 : 2018 and will be assessed for conformity within the 3 year term of validity of the certificate.

Scope -

Electric Power Generation by using Coal.

Certificate Registration No. **44 764 15390431**
Audit Report No. **2.5-6874/2015**

Valid from **16.07.2021**
Valid until **15.07.2024**
Initial certification **2015**

Certification Body
at TÜV NORD CERT GmbH

Mumbai, **11.07.2021**

TÜV NORD CERT GmbH Langemarckstrasse 20 45141 Essen www.tuev-nord-cert.com

TUV India Pvt. Ltd., 801, Raheja Plaza – 1, L.B.S. Marg, Ghatkopar (W), Mumbai - 400 086, India www.tuv-nord.com/in

Received ISO 50001 certification from July 2015

Upgraded to ISO 50001 : 2018

TÜV NORD

CERTIFICATE

Management system as per
ISO 9001 : 2015

In accordance with TÜV NORD CERT procedures, it is hereby certified that

JSW ENERGY LIMITED
Village Nandiwade, Post - Jaigad,
Taluka and District Ratnagiri - 415 614,
Maharashtra,
India

applies a management system in line with the above standard for the following scope

Electric Power Generation by using Coal

Certificate Registration No.**44 100 17391407**
Audit Report No.**2.5-6874/2015**

Valid from **03.08.2020**
Valid until **02.08.2023**
Initial certification **03.08.2017**

Certification Body
at TÜV NORD CERT GmbH

Mumbai, **31.07.2020**

This certification was conducted in accordance with the TÜV NORD CERT auditing and certification processes and is subject to regular surveillance audits

TÜV NORD CERT GmbH Langemarckstrasse 20 45141 Essen www.tuev-nord-cert.com

TUV India Pvt. Ltd., 801, Raheja Plaza – 1, L.B.S. Marg, Ghatkopar (W), Mumbai - 400 086, India www.tuv-nord.com/in

ISO 9001 (Quality)

TÜV NORD

CERTIFICATE

Management system as per
ISO 14001 : 2015

The Certification Body TUV NORD CERT GmbH hereby confirms as a result of the audit, assessment and certification decision according to ISO/IEC 17021-1:2015, that the organization

JSW ENERGY LTD.
Village Nandivade, Post - Jaigad,
Taluka & District Ratnagiri - 415 614,
Maharashtra,
India

operates a management system in accordance with the requirements of ISO 14001:2015 and will be assessed for conformity within the 3 year term of validity of the certificate.

Scope -

Electric Power Generation by using Coal.

Certificate Registration No. **44 104 15390607**
Audit Report No. **2.5-6874/2015**

Valid from **11.07.2021**
Valid until **10.05.2024**
Initial certification **20.05.2015**

Certification Body
at TÜV NORD CERT GmbH

Mumbai, **11.07.2021**

TÜV NORD CERT GmbH Langemarckstrasse 20 45141 Essen www.tuev-nord-cert.com

TUV India Pvt. Ltd., 801, Raheja Plaza – 1, L.B.S. Marg, Ghatkopar (W), Mumbai - 400 086, India www.tuv-nord.com/in

ISO 14001 (Environment)

TÜV NORD

CERTIFICATE

Management system as per
ISO 45001 : 2018

The Certification Body TÜV NORD CERT GmbH hereby confirms as a result of the audit, assessment and certification decision according to ISO/IEC 17021-1:2015, that the organization

JSW ENERGY LTD.
Village Nandivade, Post - Jaigad,
Taluka & District Ratnagiri - 415 614,
Maharashtra,
India

operates a management system in accordance with the requirements of ISO 45001:2018 and will be assessed for conformity within the 3 year term of validity of the certificate.

Scope -

Electric Power Generation by using Coal.

Certificate Registration No. **44 126 15390607**
Audit Report No. **2.5-6874/2015**

Valid from **11.07.2021**
Valid until **10.05.2024**
Initial certification **20.05.2015** (BS OHSAS 18001)

Certification Body
at TÜV NORD CERT GmbH

Mumbai, **11.07.2021**

TÜV NORD CERT GmbH Langemarckstrasse 20 45141 Essen www.tuev-nord-cert.com

TUV India Pvt. Ltd., 801, Raheja Plaza – 1, L.B.S. Marg, Ghatkopar (W), Mumbai - 400 086, India www.tuv-nord.com/in

ISO 45001 (OH & S)

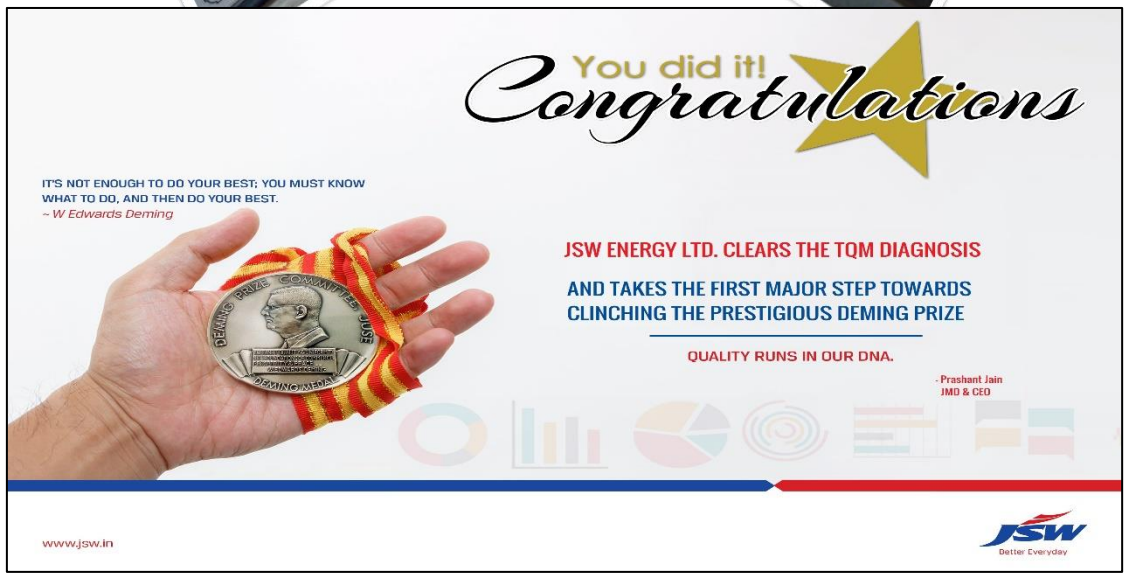
Chemistry lab is NABL accredited

12. Learning from CII Energy Award

Installation of sky lights (Solar Lighting)	*Status – Implemented*

De-staging of Boiler Feed Pump for reduction in power consumption	*Status – Under Implementation*
Application of 'HeatX' coating to heat exchanger tubes	*Status – Under Implementation*

13. Awards & Accolades



- **Energy Efficient Unit by CII (2020, 2019)**
- ***MEDA* awards for Excellence in Energy Conservation and Management (2020, 2019, 2017)**
- **The best operating thermal power plant by IPPAI (2020, 2019)**
- **National Energy Management Award by SEEM (2020) – Gold Category**
- ***Excellent Energy Efficient Unit by CII (2018)***

Successfully cleared *diagnosis* exam for challenging *Deming's Prize* in TQM

THANK YOU

Mr Dipak Patil (AGM & Head-OSTS)

Dipak.patil@jsw.in

9552577031