25th National Award for Excellence in Energy Management 2024

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Profile: NTPC Ramagundam (An ISO 50001 Certified station)

Installed Capacity Configuration				Date of	COD		Suppli	Plant Technologies				
		guration	Stg	Unit	Sync.	COD	Capacity	er	Area of	Тес	hnology adopte	d
Capacity	No of units	Total Capcity							Plant	Stage I	Stage II	Stage III
200 MW	3	600 MW		1	27.10.83	01.03.84	200 MW	Ansaldo	Power	Sub critical	Sub critical	Sub critical
500 MW	4	2000 MW	I	2	29.05.84	01.11.84	200 MW	Ansaldo	Generati on			
10 MW Solar PV	1	10 MW	1	3	13.12.84	01.05.85	200 MW	Ansaldo		Front fired	corner fired	corner fired
100 MW Floating Solar		100 M/M	Ш	4	26.06.88	01.11.88	500 MW	BHEL	Boiler	Boiler (Apsaldo)	Boiler (BHEL)	Boiler
PV	1	100 MW		5	26.03.89	01.09.89	500 MW	BHEL		(Ansaldo)	(DREL)	(BHEL)
New: 800 MW (USC)	2	1600		3	20.03.09	01.09.09	300 101 00	BHEL	Turbine	GE Common	BHEL Make	BHEL Make
Tatal Installed			11	6	16.10.89	01.04.91	500 MW	BHEL		HIP		
Total Installed Capacity	431	0 MW	Ш	7	26.09.04	25.03.05	500 MW	BHEL	Control System	DDCMIS (Emerson)	DDCMIS (Honeywell)	DDCMIS (Max DNA)

Presentation Team: Manoj Kumar Jha & M Vamsi Krishna

Our Mission:



'To Provide Reliable Power & related solutions in an Economical, Efficient & Environment friendly manners driven by Innovations & Agility"

EnMS Objectives:

Providing the solutions for generating Efficient, Economical and Environment friendly Power with Operational Excellence through Systematic practices of Monitoring, Analysis and employing innovation Techniques

Station is firmly guided by its philosophy of:

- Core business of power generation which is intricately intertwined with social and environmental growth
- Generating reliable energy at competitive prices in a sustained manner
- Employing a mix of energy sources using innovative & eco-friendly technologies.

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S No	PARAMETER	UNIT –	FY 2023-24			
3 NO	PARAMEIER		TARGET	ACHIEVED		
1	Generation	MU	16649	16950		
2	PLF	%	72.90	74.21		
3	Declared Capacity	%	85.00	90.02		
4	APC	%	6.88	7.77		
5	Sp. Oil Cons.	ml/kwhr	0.50	0.469		
6	Heat Rate	KCal/kWh	2399	2330		
7	Boiler Efficiencies	%	86.6	86.85		
8	Turbine Heat Rate	KCal/kWh	2077	2030		
9	Net Heat Rate	KCal/kWh	2576	2526		
9	Raw Water Consumption	Ltr/kWh	3.5	3.24		
10	DM Water Consumption	Ltr/kWh	0.08	0.079		

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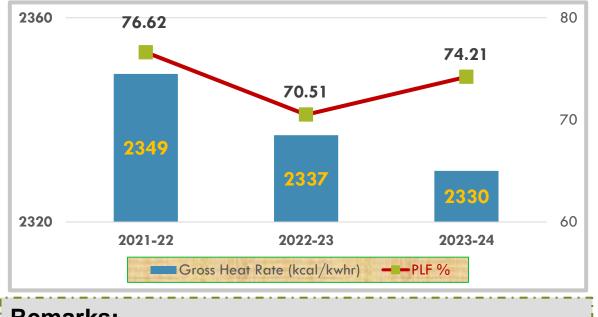
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Specific Energy Consumption – Last 3 years



Gross Heat rate (GHR): CERC Norms for RSTPS: 2399 kCal/Kwhr



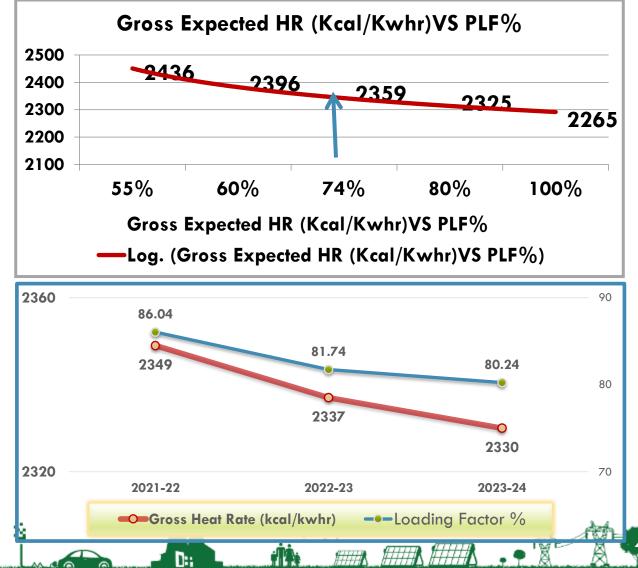
Remarks:

•Unit-2 Turbine Replacement in Feb'2023.Station Heat rate improvement of 15 kcal/kwhr achieved

•Replacement of HPHs in one 500MW unit . HR improvement of 3kcal/ kwhr

•The gross HR at the given PLF is in line of Manufacturer curve

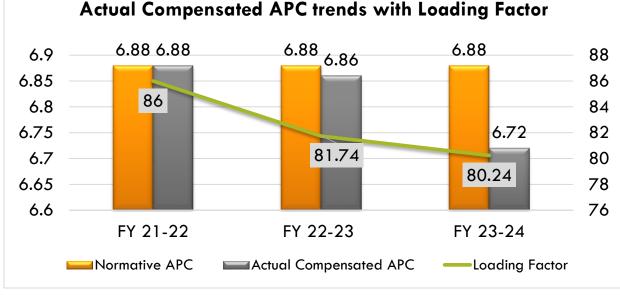
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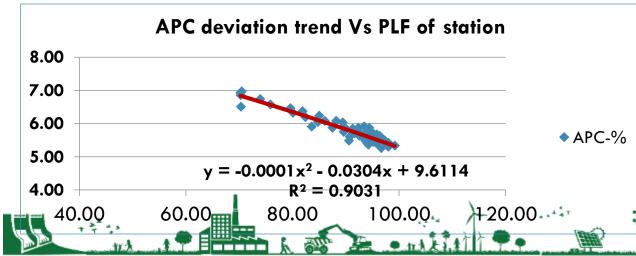


Specific Energy Consumption – Last 3 years



Auxiliary Power Consumption (APC) CERC Norms for RSTPS: APC of 6.88%





Compensated AF	PC Bre	ak up	
		APC (%)	
Compensation Head	2021- 22	2022-23	2023-24
Loading factor compensation	0	0.35	0.47
ESP R&M (25% of ESP isolated)	0	0.3	0.36
Additional ESP Pass addition in 3 units	0	0.01	0.2
FGD construction & other Environment considerations			0.01
RSD Start up APC	0	0	0.01
Total Compensation	0	0.66	1.05
Actual Total APC	6.88	7.52	7.77
Major Improvement works taken	up in F	Y 2024-25	till Aug
2024:			
 Unit-5 Duct and APH basket rep 	acemen	t: APC red	uction by

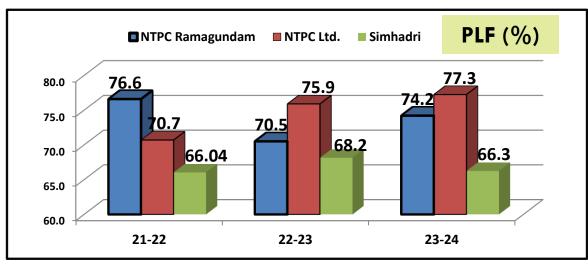
1.2 MW

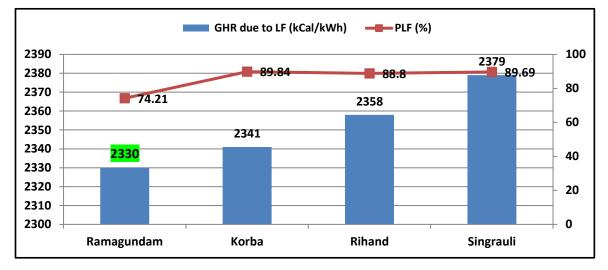
• Unit-7 duct works and APH Complete basket replacement: Expected APC reduction : 1.5 MW

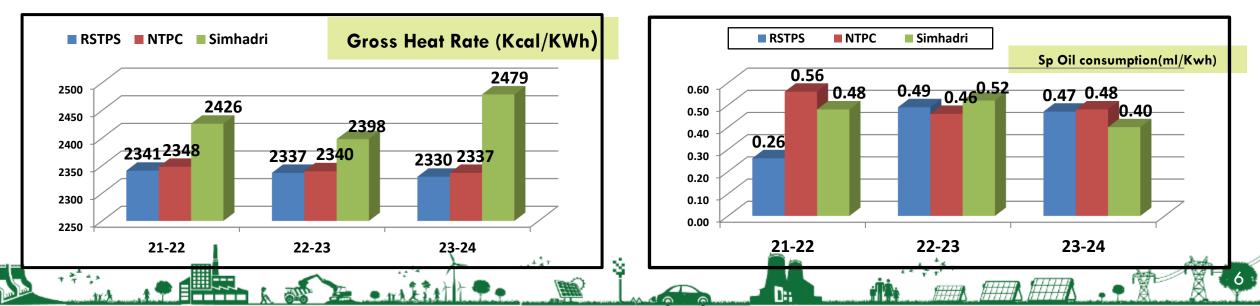
Information on Competitors, National benchmark

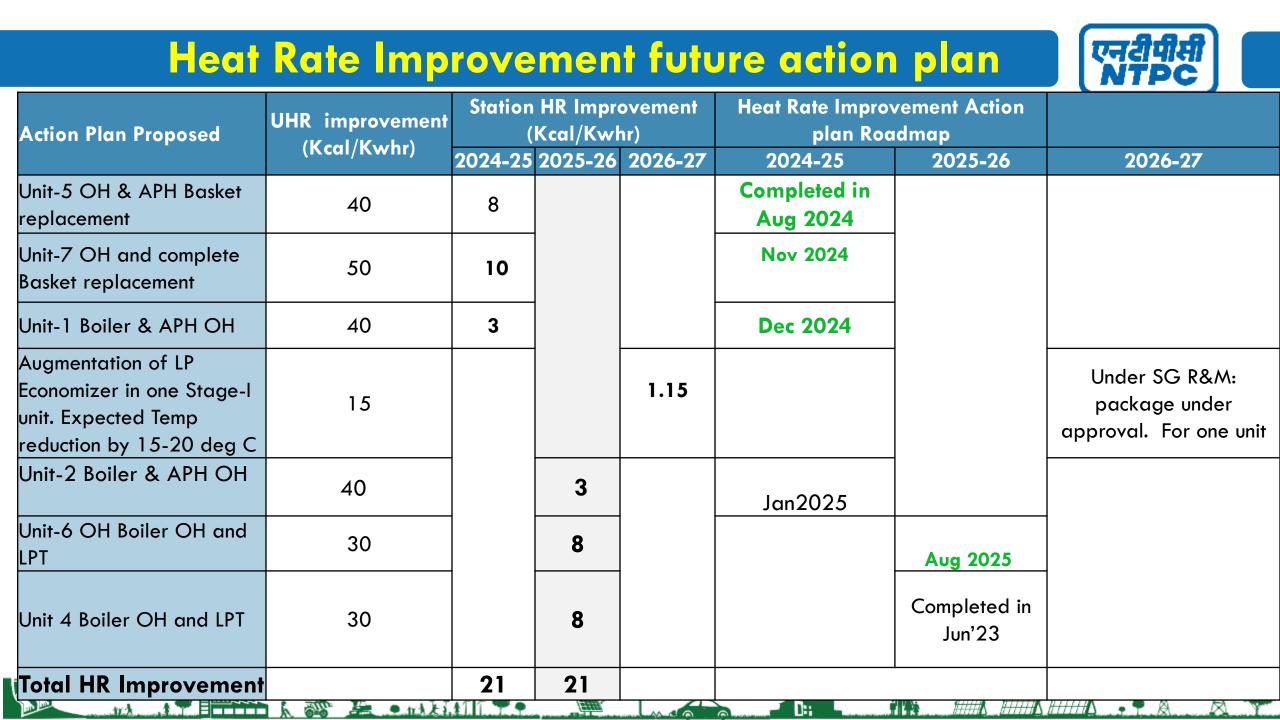


NTPC Ramagundam (RSTPS) has been the best performing station amongst its internal peers over the years









MAJOR ENCON PROJECT completed IN 23-24



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S.N	Particulars	Investment (Rs in Million)	Annual Electrical Savings (Million kWh)	Payback Prd (Yrs)	Target Date
1	Reduction in draft power consumption after overhauling of Unit-6,4 & Unit-3	ОН	30.32		Unit-6 Completed (June-23) Unit-4 in Oct'23 & Unit-3 (Feb'24)
2	Replacement of Township conventional electrical fittings with energy efficient equipment	15.2	3.97	1.5	Feb-24
3	Installation of Soft starters for CT Fans in Stage II Units	3	1.3	0.7	Completed . May-23
4	Installation of Soft Starters for Stage-2 Bottom ash series pumps (8 PUMPS)	3.26	0.73	1.3	Sep-23
5	Installation of VFD in ID Fan motors of 1 units of 500 MW	30	3.8	2.5	Completed . June-23

Total Energy Saving achieved due to ENCON PROJECT in 2023-24 : 40.12 Mus

Major EC project planned in 2024-25 & beyond



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Action Plan Proposed	Expected APC Reduction	Station Thermal	Target co	mpletion	
Action Fight Floposed	(KW)	Savings(kcal)	2024-25	2025-26	2026-27
Unit-5 Flue gas Ducts works & Boiler& LPT OH	1200	3.85	Completed in Aug 2024		
Unit-7 Flue gas ducts OH , APH basket replacement ,Boiler & LPT OH	1500	7.69	Nov 2024		
Unit-1 Flue gas ducts OH, Boiler and APH basket replacement & condenser Acid cleaning	500	3.07	Dec 2024		
Unit-2 Flue gas ducts OH, Boiler and APH basket replacement & condenser Acid cleaning	500	3.07	Jan 2025		
CEP VFD Augmentation in on 500 MW units	100	-			
CEP VFD Augmentation in on 500 MW units	100	-		Aug 2025	Dec 2026
UNIT-3 APH Replacement under R&M		3.07			

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Energy Saving projects implemented in last three years

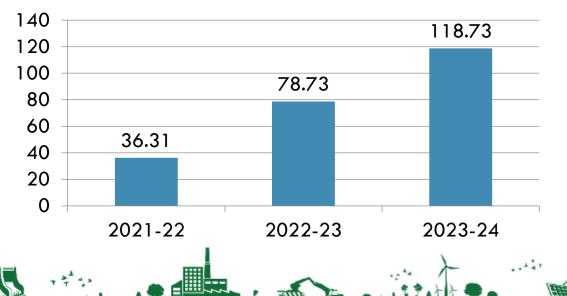


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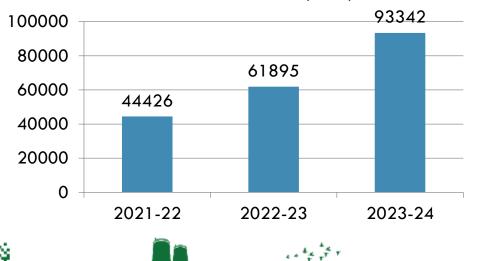
No of Energy saving projects implemented in last three years

FY	No. of Proposal	Investment (In Rs. Millions)	Electrical Savings (in MUs)	Savings (In Rs. Millions)	Payback Year
2021-22	8	36.05	18.8	52.65	0.68
2022-23	9	44.13	22.22	74.43	0.6
2023-24	4	35.5	9.8	40	1.28

Commulative Energy Saving (Mus)



Cummulative CO2 Emission reduction due to EC activities (MTs)



Innovative Project-1: Mill scheduler for Flexibilization

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- Mill change over plays critical role to meet flexibilization
- From Flexible operation study experience, Mill scheduler Implemented in All Four 500 MW units
- Achieved 94% of 1% Ramps in FY 2024-25

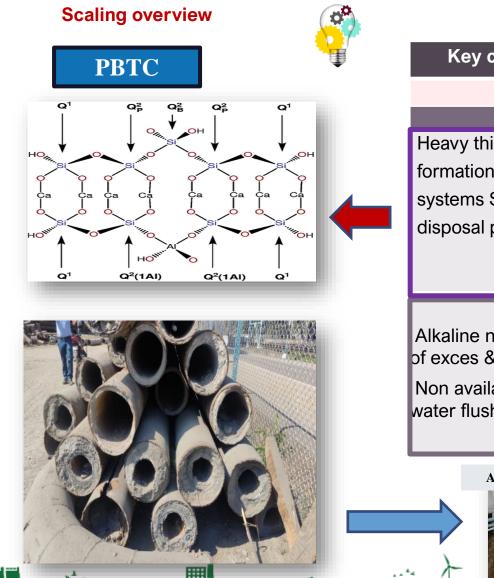
Benefits :

- Eliminates the manual intervention
- Helps to achieve Ramps & flexibilization with better stability of the unit
- supports to manage Standard Deviation of Temperatures within +/- 3.5 deg c
- Monetary gains : 12 crores/Annum (No ROE reduction due to non achieving of ramp rate)

RAMAGUNDAM U#	7 MILL SCHEDULER	A	В	С	D	E	F	G	H	J	К	
SCHEDULER MASTER ON	MASTER RESET RESET	$\overline{\mathbb{O}}$	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	: ELEV SELT FOR LEAD ST	TART
SCHEDULER MASTER FORCE OFF		Ŏ	$\overline{\odot}$	$\overline{\bigcirc}$	$\overline{\bigcirc}$	$\overline{\bigcirc}$	$\overline{\bigcirc}$	$\overline{\bigcirc}$	$\overline{\bigcirc}$	$\overline{\bigcirc}$: ELEV SELT FOR LAG-1 S	
CMC OFF MILLS IN AUTO	ON_OFF	Ŏ	$\overline{\odot}$	$\overline{\bigcirc}$	$\overline{\bigcirc}$	$\overline{\bigcirc}$	Ŏ	$\overline{\bigcirc}$	Ŏ	ŏ	: ELEV SELT FOR LAG-2 S	TART
KUNDACK INCL	: LD RAMP UP IN PROGRESS	$\overline{0}$		•		$\overline{0}$	$\overline{0}$			0		
BOILER MASTER IN MANUAL	• : MILL AUTO STRT COND TRUE			÷.			÷.	÷.	÷.	ě.	: ELEV START INITIATE CN	
37.5TPH # F: 0.2TPH	: MILL AUTO START REQUIRED			Ă	Ă			Ă	×.		ELEV START INTIATE CM ELEV START COMPLETE	
41.8TPH A G: 39.0TPH A	• : LEAD ELEV START COMPLETE					1	Ξ.			Ξ.		U
44.5TPH A H: _0.4TPH M	• LAG-1 ELEV START COMPLETE			2	2				2	<u>.</u>	• ELEV START FAILED	
43.2TPH A J: -1.1TPH M	• : LEAD ELEV AUTO START FAILED			•	•			•	•	•	• ELEV STRT SGC TIMEOU	T/ERR
35.6 TPH & K 44.2 TPH A	• : LAG-1 ELEV AUTO START FAILED	8	8	8			8				💼 : ELEV A/M STATUS	
	💽 : LEAD ELEV START TIME LAPSED	5	5	5	5	5	5	5	1	5	5 : ELEV SEQ ACTIVE CHAIN	N
	💽 : LAG-1 ELEV START TIME LAPSED	501	501	501	501	501					501 : ELEV SEQ ACTIVE STEP	
Fdr Feedrate : 44.50 TPH	💽 : ELEV START SELTN RESET CMD		501	001	501	001	001	001	101	501	SUT . ELEV SEQ ACTIVE STEP	
(Auto) Fdrate 41.37 TPH	• NO ELEV SELTD FOR LEAD START											
Fdr Feedrate : 35.63 TPH	• NO ELEV SELTD FOR LAG START	╘		-	-		<u>–</u>			믣		
ent MW DMD: 490.0 MW	• AVG FEEDRATE IS LOW	Α	В	С	D	E	F	G	H	J	K	
224.0		\odot	\odot	\odot	\odot	\odot	\odot	\odot	\odot	\odot	💽 : ELEV SELT FOR LEAD S	TOP
	LD RAMP DOWN IN PROGRESS	$\overline{\bigcirc}$	$\overline{\bigcirc}$	$\overline{\bigcirc}$	$\overline{\bigcirc}$	$\overline{\bigcirc}$	$\overline{\bigcirc}$	$\overline{\mathbb{O}}$	$\overline{\bigcirc}$	$\overline{\bigcirc}$: ELEV SELT FOR LAG-1 S	
	MILL AUTO STOP COND TRUE											
th Mill Cut-in : 516.6 MW	• : MILL AUTO STOP REQUIRED	\Box	\cup	\odot	\bigcirc	\odot	\bigcirc	\odot	\bigcirc	\odot	: ELEV SELT FOR PTW ST	OP
th Mill Cutout : 423.1 MW	ILEAD ELEV STOP COMPLETE										💿 : ELEV STOP SGC REL AV	LBL
th Mill Cutout : 364.1 MW	💽 : LEAD ELEV STOP FAILED		۰		٠	۰	٠				: ELEV STOP INITIATE CM	D
th Mill Cutout : 295.2 MW	: LEAD ELEV STOP TIME LAPSED	0	0	٠	٠	•		٠)
O Threshold: 42.0 TPH	💿 : ELEV STOP SELTN RESET CMD	0	•	•	•	•	0	٠	٠		• ELEV STOP FAILED	
II Threshold: 50.0 TPH	• : NO ELEV SELTD FOR LEAD STOP	0	0	0	0	•	0		0	•	💿 : ELEV STOP SGC TIMEOL	JT/ER

Innovative Project-2: Descaling of Ash slurry Discharge lines



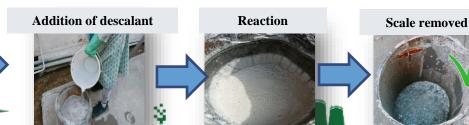


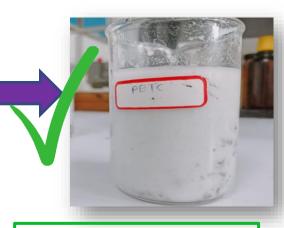
Key challenge : Preparedness to changing environment

Action plan: In-house Scientific support

issue Heavy thick stone like scale formation in ash disposal systems Such as sump and disposal pipes solutionScale is removed. However, invertical position, reaction getssaturated. Needed solutionreplacement frequently. Longreaction time (more than 48 hrs)

Alkaline nature of fly ash because
of exces & MgOs, CaO.PBTC is working on scales . To
reduce reaction time, circulationNon availability of intermittent
water flushing systemwas proposed





Benefits:

- 1. Ash slurry series running hours reduction
- 2. 800 KW pumping power reduction
- 3. APC reduction in Mus 5.95 Mus
- 4. Monetary benefits achieved : 24 Lakhs/Annum
- 5. Improved safety

Innovative Project-3: NOGS TYPE ASH LEVEL MEASUREMENT



New Technology Adoption for ESP hoppers level monitoring :

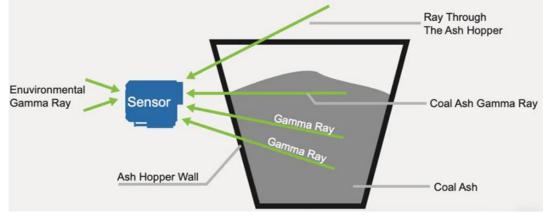
Issues faced: Non reliable conventional ash level switch in ESP hoppers causing frequent field outages

Solutions

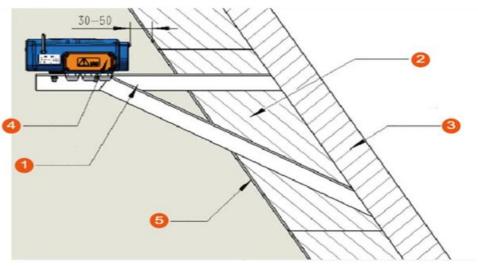
- Installation of NOGS sensor for all 16 hoppers of 1st Field of ESP Unit#7 completed
- * Field tripping provided from these sensors which is user configurable.
- Continuous Level provided in UCB DCS system

Benefits :

- Increased availability of ESP fields & less Emissions
- Improved safety of ESP structures and personal
- Reduced Maintenance cost on ESP pass outage
- No partial loss on account of ESP pass isolation due to level monitoring



Principle of operation



Installation

Innovative Project-4: HPH 5A&5B Replacement



HPH Replacements at Ramagundam

Issues faced: Frequent tube leakages after 40 years of Operation

a. HPH replacement- First in NTPC plants

Benefits :

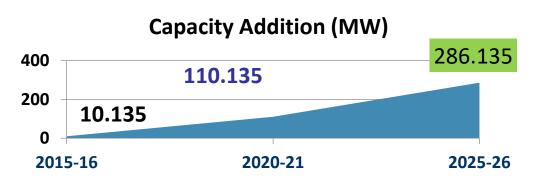
- Improved Reliability of Units
- Heat rate improvement of 15 kcal/kwh
- > Annual Monetary gain : 4.5 crores/unit
- Pay back Period: less than one year

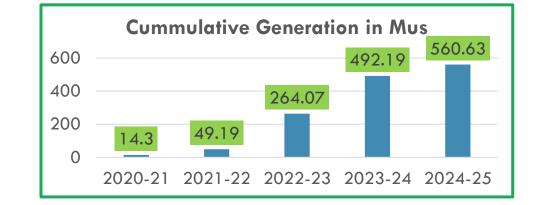




Existing RE Capacity & Future projects

Present RE capacity : 110.135 MW



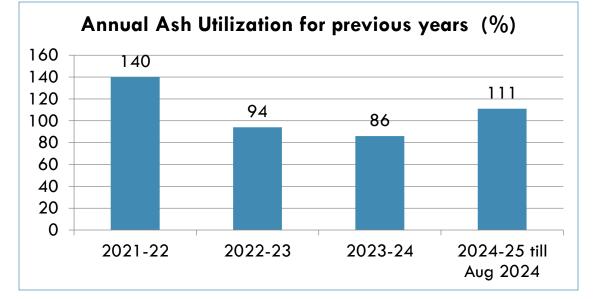


Up	coming Renew	vable Energy Proje	cts				
Name of Project &	Project	Investment made	Expected Power				
Location	Capacity	(Rs Million)	generation year	SP			
Additional 56 MW Floating Solar PV plant on water reservoir &120 MW Land	176 MW	9090 Rs.Million/ Awarded to L&T	2025				
	400MWh/10M		2025	100 mw Floating	10 MW Land solar		
Battery energy	W capacity Li-	Under plan	2025	Share % w.r.t to overall energy			
Storage System	ion BESS			 consumption is 14%			
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Environmental Management- Ash Utilization

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Reason for variation in Ash utilizations

- ✓ Completion of NHAI projects & delay in fresh agreement with new road projects
- ✓ Auctioning process for pond ash

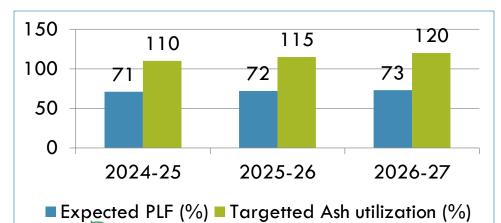
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- ✓ Heavy monsoon in July to Sep 2024 reduces pond ash lifting
- $\checkmark~$ Less lifting in first quarter from pond ash

Mode of Ash conveying at station

~	Stage I 200 MW unit	✓	Partial Dry with Transport air	✓	Wet evacuation
~	Stage II 500 MW unit	~	Partial Dry with Transport air	~	Wet evacuation
~	Stage III 500 MW unit	~	Dry with vacuum conveying	✓	Wet evacuation

Future Ash Utilization Action Plan



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Distribution of Areas of Ash Utilization

Particulars	UOM	21-22	22-22	23-24
Ash Generated	Tons	3938331	4325326	4549218
Ash Utilization	Tons	5550065	4063238	3924027
Ash Utilization	%	141	94	86
Ash utilized in manuf. Of cement/RMC	%	15	20	25
Ash utilized in FA bricks	%	16	7	30
Ash utilized in Mine filling	%	8	10	9
AU for road works	%	38	62	22
TeSTPP Ash dyke construction	%	2	0	13
Land Development	%	0	1	1

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Environmental Management- Ash Utilization



Best Practices:

Ash Pond Management





Sprinkler system



Water sprinkling on haul roads

N2 LAGOON S2 LAGOON 300 acres hillocks Lagoons



Lagoon Clean water

Earth Cover

Firm actions for : For sustainable generation

- Ash Dyke Life available for next 12 months \checkmark
- Buttressing in N2S2 Dyke is in progress
- 100% ash utilization in last 5 years \checkmark
- Target of 120-130% Ash utilization in coming years
- Future use of Ash dyke for Solar PV project, capacity around 200 MW \checkmark



Fog Cannon Dust suppression system in Ash Dyke

Other Best Practices:

- Ash sale through Auction
- Re-use of Dyke length by Buttressing
- Installation New Brick Batching Plant



Dry Ash supply Rake Loading System

Environmental Management-Emission



Absolute Emissions and Emission Intensities									
Particulars	UOM	21-22	22-23	23-24					
Total CO2 Emissions Per kW of Generation	Ton/kW	0.000813	0.000792	0.000771					
Current SOx Emissions at Full Load*	mg/Nm3	1350	1341	1412					
Current NOx Emissions at Full Load*	mg/Nm3	409	401	388					
Particulate Matter *	mg/Nm3	71	74	76					
Mercury*	Mg/Nm3	0	0	0					

Current Emission Details									
Parameters	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 7		
SOX (mg/Nm3)	746	537	1176	677	573	1292	935		
NOX (mg/Nm3)	476	422	438	418	322	252	240		
Opacity (mg/Nm3)	45	90	82	92	88	85	74		

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FGD under implementation .Completion by March'25 NOX modification of Stage-3 is completed.

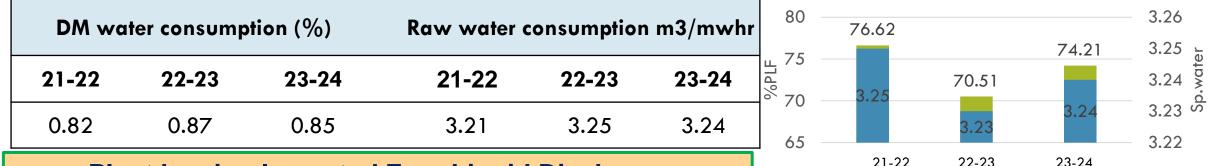
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ESP R&M of stage-1 units is completed and Stage-2 ESP R&M : 25% completed. Target completion : Dec'2025

Environmental Management- Water

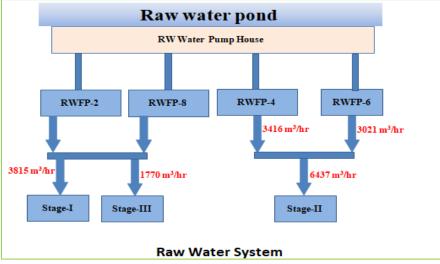


Sp.water Consumption



Plant has implemented Zero Liquid Discharge

■ %PLF ■ Sp.water



Station is ZLD Complied

Best Practices in Water Management

- i. Third Party Water Balance Audit completed in FY 22-23
- ii. Target Sp water consumption for FY 2024-25 is 3.0 lit/Kwhr against Regulatory norms of 3.5 lit/kwhr.
- iii. Total 52 meters installed in Plant & Township
- iv. Use of Municipal sewage water through STP. 3.5LPD STP in place
- v. Township rain water harvesting (In use).
- vi. Bottom ash timing optimization based on monitoring leading to ash water ratio improvement.
- vii. Ash Water Recirculation system recovers 1500 m3/Hr water from Ash Pond.
- viii. Fire water line replacement & lying over ground for No Leakage



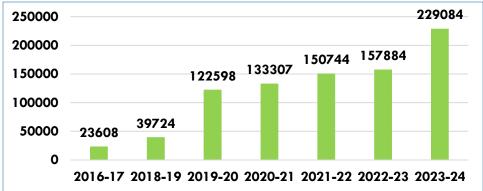
Best practices in the plant:





YEAR	LOCATION	PLANTED NO OF SAPPLINGS	SURVIVED SAMPLINGS	RATE OF SURVIVAL	AMOUNT SPENT (Rs Lah)
2021-22	Plantation by Miyawaki method at RMC parks Ganganagar and Gouthamnagar park	17848	17437	98 %	144
2022-23	Head works area Miyawaki plantation	7140	7140	100%	65
2023-24	Telangana phase-1 ashdyke area Miyawaki plantation	71200	71200	100%	862
	TOTAL	2,81,110	2,46,240		1,071

Cumulative no of plantation in last years



Benefits

Self sustaining and low maintenance

Occupies less space and called mini oxygen factories

Reach biodiversity of n no of species

Very high survival rate

Thick vegetations and denser plantation

Flexibilisation Initiatives: 40% Load Pilot study & Ramp Rate Improvements



Major Steps taken for flexibilization

- Units are being operated with Flexibilization with 1% Ramp Rate and study is going on for achieving 3% Ramp rate.
- Already achieving ramps up to 1.2%
- Mills Automatic scheduler for Mill Changeovers during Ramps
- Al based State variable control is incorporated in place of conventional PID. For preventing Metal Temperature excursion
- TDBFP R/C valve modification for smooth Drum level control
- SCAPH Auto Control
- Boiler Health monitoring App
- Soft starters in CT fans to maintain vacuum at low loads(40%)
- 400MWh/10MW BESS and 100 MW floating solar power will be used for bundling of thermal power.

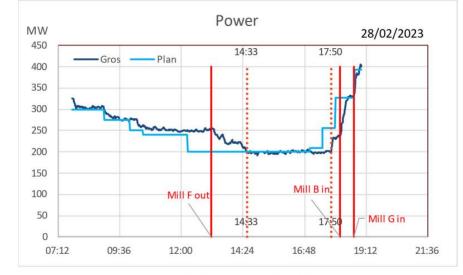
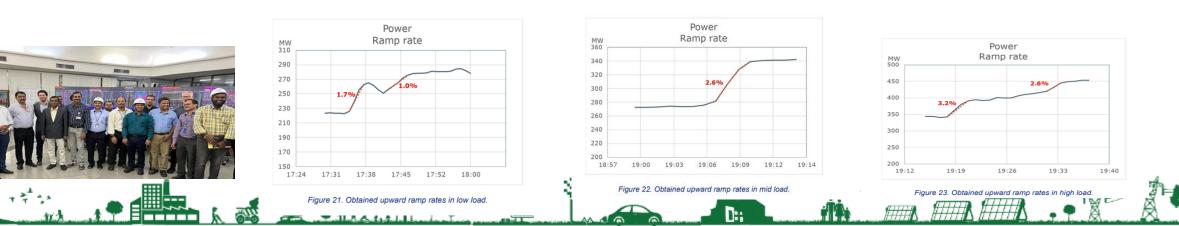


Figure 1. Load progress 1st test day.



In House Innovation in CHP- Conveyor belt joint patch open detection system using Internet of Things (IoT)



Problem : In CHP, Conveyor belt joint opening is a very common problem. 90% time this problem is detected by local workers in initial level and get attended. But sometimes this problem go unnoticed and belt patch stuck up in nip points and joint opened beyond repair and this lead to high restoring time of system and may lead to generation loss.

By using problem solving methodologies <u>we have developed</u> <u>a belt joint patch open detection system by using Internet</u> <u>of Things.</u>

- ✓ This system will detect belt patch open in its initial level and will give alarm to local worker and control room.
- ✓ <u>TANGIBLE BENEFITS: 1) Prevention of Belt</u> <u>through cut due to early detection of opening of</u> <u>belt patch</u>

Way Forward:

- 1) Water proof and dust proof enclosure for circuit.
- 2) Interfacing of alarm with CHP PLC at control room.



UNIQUE first time in NTPC -ASLD system Interfaced with DDCMIS

Challenge: Improvement in Reliability, Availability of ASLD system

Solution:

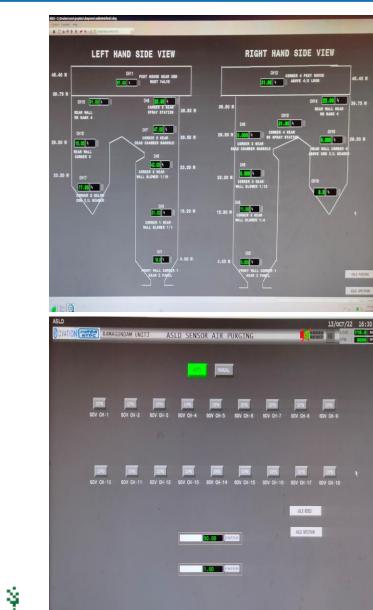
ASLD system interfaced with DDCMIS for effective monitoring & early detection of BTL to avoid Secondary Damage

Future planning

Data captured in DDCMIS data can be effectively utilized for predictive detection of primary steam leakages using advanced Artificial intelligence/Machine Learning algorithms and thus avoiding the boiler tube leakages

Tangible benefits:

Secondary damage of BTL
 Reduction of outage hours by 15-20 hrs
 Monetary gains: 20 Lakhs/BTL



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Best practices in the plant: Maintenance & Reliability

Risk plots and risk grids to decide maintenance priorities

Risk Plot & Risk Grid

Risk plot which is a quantitative assessment of risk is a plot of probability Vs loss

It is plotted on actual partial loss & FO event of equipment/unit etc

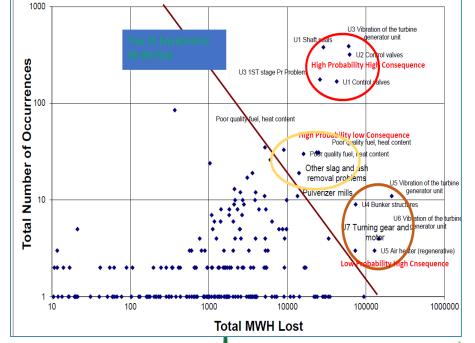
Top critical components/equipments are segregated using risk plot of 5 years of notifications data from SAP historian

Risk Grid is a qualitative tool to capture likelihood of failure of an equipment and potential loss

Maintenance & Reliability

- 1. Advanced tools like PM, PdM, REAP, regular vibration measurement of critical equipment & RCM
- 2. Condition monitoring tools & Techniques, WDA of identified critical equipment, Infra-red thermograph and dissolved gas analysis periodically
- 100% Overhauling Performance Index Score before start of OH





Digital Initiatives: In house Developed Performance Monitoring APP



•Automated Alerts to the concerned Maintenance Team in case of Excess Power consumption & Suggested corrective Action Message

•It will Guide the Operator to operate efficient Drive during Normal operation especially during Start up & Shutdowns

- Real time monitoring of Condenser losses enables us to take timely decisions which results in optimising the unit heat rate.
- Based on this we have carried out chemical cleaning of condenser tubes which results in better vacuum and hence the heat rate.
- Benefits in Unit-4,5,6



Digitalization: APC OPTIMIZATION TOOLS



Subject **EEMG ALERTS** Unit-6 Mills optimisation alert: 4 Mill operation may be considered in Unit-6. The each additional running mill consumes additional 400 KW of Draft power and incurs monitory loss of Rs. 2000 per hour. Unit-7 MS-LEFT set point alert: Temperature set point may be reviewed. Every 1 DegC drop in MS Temperature Auto refresh Body ases the Unit Heatrate by 0.7Kcal/kwh In Stage-2, 2 Units are Running and 6 CW pumps are in service. Consider stopping one CW Pump. Stop Refresh ALERTS PRESENT TRUE LAST SENT ALER Unit-6 Mills optimisation alert: 4 Mill operation may be considered in 6. The each additional running mill consumes additional 400 KW of Dra power and incurs monitory loss of Rs. 2000 per hou Unit-7 MS-LEFT set point alert: Temperature set point may be revie Every 1 DegC drop in MS Temperature Increases the Unit Heatrate b 0.7Kcal/kw/ In Stage-2, 2 Units are Running and 6 CW pumps are in service. Conside Unit-4 HRH-RIGHT set point alert: Temperature set point may be reviewed. Every 1 Dea Unit-5 MS-I FET set point alert: Temperature set point may be reviewed. Every 1 Dept. stopping one CW Pump AUTO REFRESHING... Subject EEMG ALERTS Body Auto refresh Revision No : 176 Stop Refresh ALERTS PRESENT TRUE 46 LAST SENT ALERT 06-02-2024 11:15 Stage-1&2 Schedule is less than Technimal minimum in the Tir Block: 46 Inform SRLDC Immediately for necessary correction in the schedule SG Given is: 1766.1 Inform SRLDC Immediately for necessary correction in the schedule.

Implemented Projects:

- a. CT Fans running optimization
- b. ID FD Fans starting and stopping during unit start ups and shutdowns.
- c. Modelling of Specific power consumption of Mills and
- Mill performance alerting system.
- d. HP Heaters DCA monitoring and Alerting system

Tangible Benefits:

- 1. Timely alerts to operator & concerned engineers for optimizing running hours of Auxiliaries
- 2. APC saving of around 1.2 MUs for timely optimization of Auxiliaries
- 3. Monetary benefits achieved 48 Lakhs
- 4. Saving potential is very huge

Timely Revision of DC in case of unit outage

If DC revision delays by 2 time blocks (30 mins)

The Monitory loss in DSM would be 3.5 lakhs.

(Assuming frequency in the range of 49.95-50.03 Hz)

Best practices in the plant:



100/12

60/6.5

Asset Management: In house integrated dashboard for asset monitoring and management:

.

PA FAN - 1A

Features of dashboard

Equipment History with Design Data Availability

Availability of Spares at station

Live trending of parameter

Total Measurement classification

Standard Operating Procedures and LMI

Link of dashboard:

https://lookerstudio.google.com/reporting/050c4a80abcc-4516-ac35-2ddd70ca2b63/page/p_23h6aeia1c

Benefits of dashboard

DATA AVAILABLE AT SINGLE PLATFORM : SAVE DATA CAPTURING TIME

DATA MAINTAINED LIVE Support FOR PREDECTIVE MAINTENANCE

EASY ACCES FROM ALL DIGITAL DEVICES GIVES IMPROVEMENT MONITORING

ALL SPARES MONITORING IS LIVE HELPS TO IMPROVE OPI.

LIVE TRENDING SHOWS HEALTHINESS OF EQUIPMENTS.

FAN O/B BEARING					~	_	-
50.0	LATEST FAN C/P-(H-V) 6.0	60.0	LATEST RAN GIR (MV) 6.0	TO.0	6.0		εÊ.
FAN I/B BEARING					~	FAN O/	
LATEST FAN LIE-(H-D) 50.0	6.0	20.0	LATEST RAN US-(/m/) 6.0	LATEST M-NOD-(A-0) 5.5	6.7	PERFOR	MANCE
MOTOR-DE					~	мото	
45.0	1.7	43.0	2.3	43.0	4.3	PERFORM	MANCE
MOTOR-NDE					~	0	2
T0.0	LATEST MINDE(HIV) 5.6	45.0	43.0	5.5	6.7		Η.
Diagnostics	of Measurem	ent				TOTAL MEAS	UREMEN
_	NORMAL A	INORMAL				111	114
SCHEDULE				9	3	<u> </u>	1
ON CALL	3		4				100
0	2	4	6	8 10	12	19	
LATEST DATE 🝷			LATEST CMG REM	IARKS		200 201 201	
6 Jan 2023		Vibratio	n reading taken. Al	I are within limit		1 <u>~</u>	\sim
BMRM DATE 👻		BMRM OBSERV	ATION	BMRM	ACTIVITY	(<u>8</u> =)	
7 Dec 2022	O/B BE	ARING CLERANO	CE FOUND 0.35	I/B & O/B	BRG REPLACE		ይ–ረግ
EMD DATE 🔹		EMD OBSERVA	TION	EMD	ACTIVITY		
23 Jan 2023		DGFS		CF	HJVG		
Spares at S	station						
MATERIAL COD	DE SUB STORE -		IAL DESCRIPTION	QUANITY	GODOWN/STORE	PLANT CODE	MITYP
1. M4656010060	9500		IMPELLER R/HAND MO2SMA2R0481	0	BMD Sub Store	1033	ZCSF
2. M4656010291	9500	WHITE META	L SLEEVE BERGLOCK SUPPORT 7	ED 0	BMD Sub Store	1033	ZSPF
3. M4656010060	1000	SAON	IMPELLER R/HAND MO2SMA2R0481	0	Permanent Stores	1033	ZCSF
4. M4656010291	1 1000	WHITE META	L SLEEVE BERGLOCK SUPPORT 7	ED 0	Permanent Stores	1033	ZSPF
						Parag Buradkar-Engg	

D-um/V-mm/s

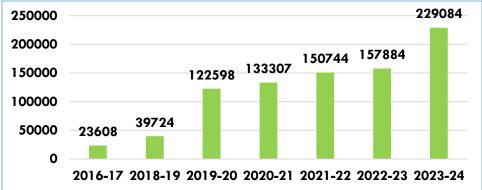
Best practices in the plant:





YEAR	LOCATION	PLANTED NO OF SAPPLINGS	SURVIVED SAMPLINGS	RATE OF SURVIVAL	AMOUNT SPENT (Rs Lah)
2021-22	Plantation by Miyawaki method RMC parks Ganganagar and Gouthamnagar park	at 17848	17437	98 %	144
2022-23	Head works area Miyawaki plant	ation 7140	7140	100%	65
2023-24	Telangana phase-1 ashdyke area Miyawaki plantation	71200	71200	100%	862
	TOTAL	2,81,110	2,46,240		1,071

Cumulative no of plantation in last years



Benefits

Self sustaining and low maintenance

Occupies less space and called mini oxygen factories

Reach biodiversity of n no of species

Very high survival rate

Thick vegetations and denser plantation







In house, Boiler Health monitoring app was developed to assess the life of Boiler and Tube leakage prediction.

All tags are taken from PI

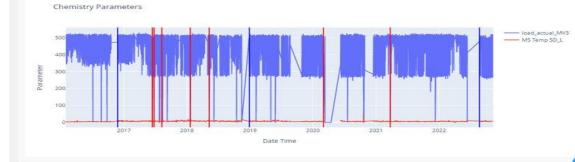
The App deploys unit operating, chemical parameters and Al model to assess the Life consumption of Boiler.

Major monitoring Parameters are Current per day health consumption & desired per day health consumption

MS temperature standard deviation LHS and RHS

RED line indicates – Actual BTL & Blue line indicates – Overhauling & Dash Green line indicated – Predicted BTL 🗆 PH Boiler Water 🗆 Chloride Boiler Water 🗆 Cation Conductivity Condensate 🗆 Sodium Condensate 🗆 DO Condensate

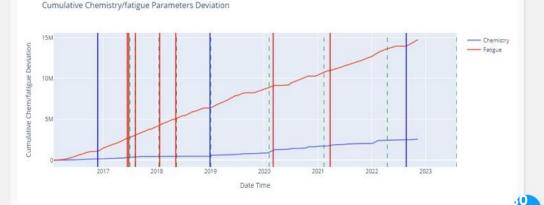
CATION CONDUCTIVITY MAIN STEAM Sodium Main Steam Cat ion conductivity BOILER LOAD INDEX Drum pressure MS TEMP AT ESV (L) CATCONMS DIFFIC Coal Fatigue DP Fatigue Temp Fatigue SH spray PH Lower Diff% PH Upper Diff% DO Diff% CATCONMS Diff% CATCONMS DIFF% CATION Diff% CATCON DIFF% SD L Fatigue MS Temp SD L MS Temp SD R Fatigue MS Temp SD R



Mode:

O Basic

Detailed
Next Predicted Chemistry BTL date: 31/07/2023
Current per day health consumption:0.1863
Desired per day health consumption:0.0671
MS TEMP SD L: 5.49 MS TEMP SD R:4.38



BTL-Red, Overhauling-Blue, Predicted BTL- Dash green lines

New Initiatives:



- AI/ML: In house developed Boiler Health Monitoring App to assess the life of Boiler and Tube leakage prediction
- Real time Plant performance monitoring using Mobile Apps
- Optimization of Bottom De-ashing time using PI based Tools. Saving in Water & APC
- 400 MWH BESS & 25 MWH PSP
- People's Participation in Energy & Environment Awareness competitions/Programmes



EMS System and other requirements



1. Existing Monitoring system:



Ramagundam 06-09-2024 18:09:45								Stage - II & III			
Unit Load , MW		U#4 278	U#5 276	U#6 288	U#7 272						
Main Plant		Energ	y Consu	mption I	ndex		FW	Air	Coat		
System	Unit	U#4	U#5	U#6	U#7	UP4		1200	232		
Days Since O/H	Nos.	3443	2975	3370	3749	U#5	932	1267	206		
Post O/H Draft ECI	Kw/MW	18.5	17.7	17.7	15.9	U#6	932	1251	237		
Draft	Kw/MW	- 26.1	19.0	23.5	19.3		alak.	140	-		
Milling	Kw/MW	6.4	. 5.6	. 6.5	. 5.6		a alle		-		
CW Pumps	Kw/MW	17.5	17.4	8.6	17.0	A	in the second	Sec. 1	1000		
Cooling Tower	Kw/MW	4.9	Calc Faile	4.3	Calc Faile			and serve			
Condensate	Kw/MW	5.2	5.0	5.5	4.5	and the	1	of line	k de		
ESP	Kw/MW	2.5	3.5	2.4	Calc Faile	-	P. Sales	180	100		
Unit APC	Kw/MW	Calc Faile	Calc Faile	dCale Faile	1 2.9			marin	1		
Off Site		Energy	Consur	nption I	ndex						
System		Sta	ge-ll	Stag	e-111						
Ash Handling	Kw/MW	1.0		2.1			-	11	10		
Compressed Air Kw/MW		Cale	Calc Failed		2.1		1	-	12		
		Specific	Energy	Consum	ption						
System	Unit	U#4	U#5	U#6	U#7	1					
Milling	Kw/Ton	7.7	7.5	8.0	7.2	-	and a second	-	-		
PA & SA	Kw/Ton	2.9	2.1	2.6	2.0	-	100	1940	10		

Real time Energy efficiency Performance parameters Monitoring through PI vision SEED Tool :System Energy Efficiency display:Real time systemwise APC analysis

- 2. ISO 50001 Certification: NTPC Ramagundam is certified ISO 50001:EnMS station
- 3. Details of RLA conducted in the station

RLA of steam piping of 500 MW units

RLA of Turbine casings and rotors of Unit 4 and Unit 6. No major deviation found

RLA of Steam piping and hangers of all units boiler side defects of hangers attended

	PROMO KON O	e zanacimonia
\odot	GENERATION 6582.5 MU	16650 FY 2024-25
	SPECIFIC OL 638	0.62 % FO Prov Year 1.9 %
PLANT	APC 100MW CUF 22.04 %	25 OCTRI Dute STACE-142 Peak Nour Off-Peak Hour Off-Pe Normative 83 83 85 85
NAPSHOT	Generation: 31.32 MU PLF: 50.2 % Gen Till Date: 6682.5 MU Gen Loading Factor: 62.1 % Loading Factor: 62.1 % Loading Factor: 100 MW Generation: 0.444 MU 100 MW MAX Gen: 89.6 MW CUE: 18.5 % 100 MW Generation: 100 MW Generation: 100 MW Generation: 0.444 MU 100 MW MAX Gen: 89.6 MW CUE: 18.5 % 100 MW Generation: 100 MW Generation:	04-09-2024 EXAMON DETAILS: Instructort: 34.48 MU PLF : 55.2 % Gen 7/II Date: 6651.2 MU ding Factor: 68.4 % MW Generation: 0.541 MU 100 MW MAX Gen: 99.9 MW CUP 22.5 % MK DETMAS:
		TRI Date: 2.96 % FO Prevyear: 1.9 % BTLs TRI Date: 8 CHAS: AMP Details:
DC A N		STAGE-162 STAGE-3 STAGE-162 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 STAGE-3 S

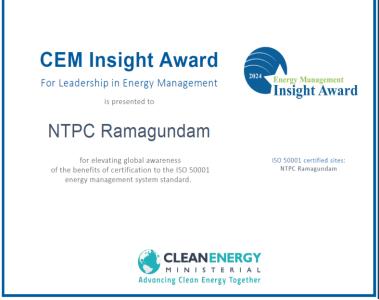
Plant Generation and performance monitoring through power Mobile App

State of the local division of the	4		2 1 1 1 1		UNIT-1 (KN	· · · ·	1	NIT-6 (KW)	STAGE WISE (KW)	STAGE T	STAGE-283
10			1		12,92			2,774	MILLING SYSTEM	2,963	10,143
						_		3,482	DRAFT SYSTEM	15,425	42,147
			-		11,85			STN SWEE (KM)	ESP SYSTEM	1,717	3,477
					12,53	6	5	,381	CONDENSATE SYSTEM	1,938	7,164
		Illight Contraction of the	A State of the second	Conservation of the	UNIT-4 0XV			STN SWOR (KW)	CW SYSTEM	6.251	16.835
CALCOLOGIC IN		ante		61 19	25,66			,143			
and the second	- All Street	Sand Provide			UNIT-5 (KV)	_	and the second second	STN SWOR (KW)	CT-LT-TRANSFORMER		1,631
			Yest _ see	and the second	19,55	6		833 AGE 2 APC OV) (%)	AW-FF-TRANSFORMER		641
	6. A. 10	ALS AND	1		49,042	82		724 5.2	B.F.PUMP SYSTEM (STAGE-	1)	11,580
		CONTRACTOR OF			STAGE 3 AF	C		ATION APC	ASH SLURRY (STAGE-1)		0
			and the second second	0.000	15,660	3.1	142	427 5.5	ASH SLURRY (STAGE-2)		1,432
UNIT WISE	UNIT-1	0001-2	UNIT-3	UNIT-4	UNIT-5	UNIT	-0	LINET-7	ASH SLURRY (STAGE-3)		557
VILLING SYS.	992	911	1,059	2,836	1,953	2,70	03	2,650	CHP (CRUSHER)		866
RAFT STAGE	5,314	4,920	552	12,350	7,990	11,4	29	10,379	CHP (CONVEYOR)		1,118
ISP SYSTEM	674	491	552	662	997	63	6	1,182	RAW WATER PUMPS		477
CONDENSATE SYS	662	637	639	1,756	1,568	2,30		1,538	CLARIFIED WATER PUMPS		572
IF PUMP SYSTEM	2,298	4,626	4,656	0	0	0		0	PLANT AIR COMP. (STAGE 1.2 & 3)		1,315
ICW SYSTEM	NA	NA	NA	871	849	83		293			
ACW SYSTEM	NA	NA	NA	345	256		287 NA		INSTRUMENT SIR COMP. (STAGE 1, 2 & 3)		1,158
IGW SYSTEM	NA	NA	NA	410	411	45		465	DAETP (EXHAUST AIR COMP.)		0
LUID PUMP SYS.	NA	NA	NA	187	0	0		NA	DAETP (TAC.)		0
ACCUM PUMP	NA	NA	NA	-0	0	12	1	NA	DAETP (VACCUM PUMP)		0

NTPC Ramagundam – Global footprint

NTPC Ramagundam received the Energy Management Insight Award for 2024 from the international Clean Energy Ministerial (CEM) forum under Department of Energy, United Nation Industrial Development Organization.

"This award recognizes organizations that have implemented energy management systems to achieve energy, economic, and sustainability benefits"





NTPC Ramagundam **received POWER MAGAZINE Award, USA**. This award recognizes diverse state-of-the-art technologies to address both unique and global challenges towards climates and economic environments

"For nearly four decades this plant has been essential power provider as it had added capacity over the years. Even as the plant ages, it has been setting new performance records thanks to technological & environmental upgrades"

Awards & Accolades

tr A







Website: www.ntpc.co.in | Email: hopramagundam@ntpc.co.in







