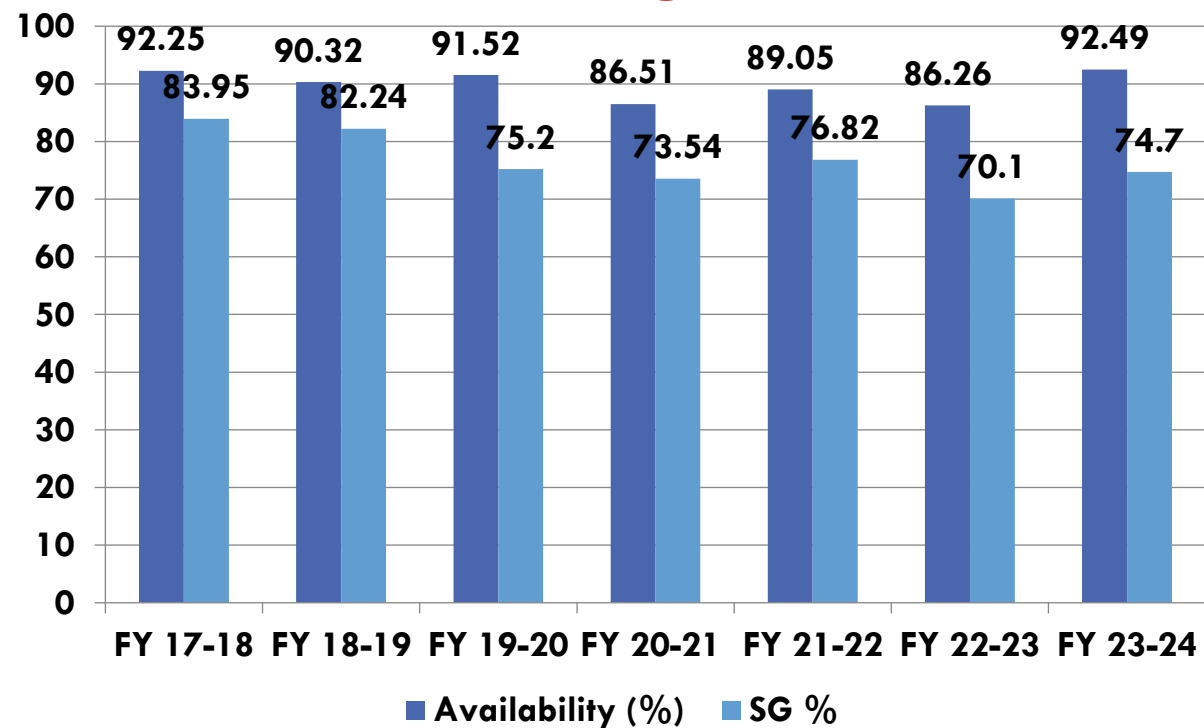


NTPC Ramagundam R&M in main plant area:Success in achieving results

Presentation outline	
✓	NTPC Ramagundam profile
✓	R&M Turbine & its benefit
✓	R&M of HPH and CPU & its benefit
✓	Station's visibility on globe

Demand Vs Availability @ NTPC Ramagundam



Presentation by:

Manoj Kumar Jha & Taraka Rama S V K Kishore





Profile: NTPC Ramagundam (An ISO 50001 Certified station)

Installed Capacity Configuration		
Capacity	No of units	Total Capacity
200 MW	3	600 MW
500 MW	4	2000 MW
10 MW Solar PV	1	10 MW
100 MW Floating Solar PV	1	100 MW
New: 800 MW (USC)	2	1600
Total Installed Capacity	4310 MW	

Stage	Unit	Date of Sync.	COD	Unit Capacity	Supplier
I	1	27.10.83	01.03.84	200 MW	Ansaldo
I	2	29.05.84	01.11.84	200 MW	Ansaldo
I	3	13.12.84	01.05.85	200 MW	Ansaldo
II	4	26.06.88	01.11.88	500 MW	BHEL
II	5	26.03.89	01.09.89	500 MW	BHEL
II	6	16.10.89	01.04.91	500 MW	BHEL
III	7	26.09.04	25.03.05	500 MW	BHEL



Plant Technologies				
Area of Plant	Technology adopted			
	Stage I	Stage II	Stage III	Stage IV Telangana
Power Generation	Sub critical	Sub critical	Sub critical	Ultra Super Critical
Boiler	Front fired Boiler (Ansaldo)	Corner fired Boiler (BHEL)	Corner fired Boiler (BHEL)	Corner fired Boiler (BHEL)
Turbine	GE Common HIP	BHEL Make	BHEL Make	GE
Control System	DDCMIS (Emerson)	DDCMIS (Honeywell)	DDCMIS (Max DNA)	DDCMIS

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**.

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



Renovation & Modernisation – A Perspective



- Our country has set a target for attaining 500 GW of non-fossil fuel capacity by 2030.
- There is a need of compliance of latest stringent environmental norms.
- Addition of large renewable plants leads to cyclic loading of thermal plants as well.
- Therefore, there is a greater need to operate the thermal plants at most efficient operational parameters during part load operation.
- As per CEA study, approx 63000 MW of potential for R&M



Renovation & Modernisation – A Perspective

- R&M of old thermal plants are cost effective solutions in comparison with addition of new thermal capacity for meeting the surging demand along with the challenges posed by integration of high level of non-fossil fuel capacity.
- As per CERC regulations, thermal units become eligible for R&M, after completion of 25 years of operation.
- As per CERC regulation 2024, a special allowance of Rs 10.75 Lakh/MW is envisaged for 2024-29 period.
- NTPC has adopted a policy of R&M of eligible stations using special allowance.



The R&M program is primarily aimed at generation sustenance and the following-

- i. Rectification of generic defects / design deficiencies
- ii. Replacement of obsolete equipment / component
- iii. Increasing plant availability and operating on new technical minimum
- iv. Heat Rate / Efficiency Improvement



- v. Major replacements of equipment on account of failures and / or generation sustenance not covered under regular O&M
- vi. Modernization / Up gradation of Plant Control system
- vii. Enhancing safety requirements and enabling cyber security
- viii. Improvement in cyclic operation.
- ix. Reduction in Auxiliary Power Consumption
- x. Reduction in water consumption



R&M Projects Implementation at NTPC Ramagundam



R&M Projects Implementation at NTPC Ramagundam		
Sr No	R&M projects implemented	Triggers for R&M Projects
1	Three units of 200 MW turbines R&M	<ul style="list-style-type: none"> ❖ Restriction on unit load ❖ Loss in heat rate and efficiency ❖ Reliability of units ❖ Spares availability Unit
2	HP heaters 5A & 5B replacement in unit#6 500 MW	<ul style="list-style-type: none"> ❖ Tube leakages and outages of heater ❖ Heat Rate Loss (Efficiency deterioration)
3	500 MW capacity three units LP bypass governing system	<ul style="list-style-type: none"> ❖ Obselence ❖ Tripping of boiler on reheater protection due to delayed opening of LPBP
4	CPUs with Regeneration system of three units of 200 MW and three units of 500 MW	<ul style="list-style-type: none"> ❖ Chemical parameters deviations in process



Turbine R&M – First of its kind in NTPC

Turbine R&M Objectives

- ❖ To extend the life of units by 20 years
- ❖ To enhance the design unit output from 200 MW to 210 MW
- ❖ To improve the turbine cycle heat rate- Guaranteed 1935 Kcal/Kwhr
- ❖ Modernization of STG Control
- ❖ Reduction in operational cost by efficiency improvement and reduction of CO₂ emissions



- ❖ HIP module, LP Inner casing and Rotor replacement
- ❖ Provision of Jacking oil System and Control fluid system
- ❖ Replacement of all Turbine Stop valves, Control valves and CRH NRVs
- ❖ Replacement of MS loop from stop valve to control valve
- ❖ Replacement Turning gear mechanism
- ❖ Replacement of Seal oil skids and Generator coolers
- ❖ Provision of Vibration monitoring system
- ❖ Provision of Generator Health Monitoring system



LP Turbine

- ❖ *LP Inner Casing – Lower Half fouling with Outer casing near the lifting lugs*
- ❖ *LP inner Casing fouling with outer casing – lower half radially on the periphery*
- ❖ *Old bearings were used and bearing's spherical surface scrapping carried out to achieve the required interference readings*



Major Modifications done at site during R&M as per site condition

LP Turbine

- ❖ LP outer casing gland area fouling with LP inner casing diffuser area



HPH Replacements at Ramagundam

Issues faced:

Frequent tube leakages after 40 years of Operation

Package of R&M:

- ❖ Awarded to BHEL
- ❖ Value INR 8.76 Cr

Issues while implementation

- ❖ Space Constraints
- ❖ Dragging of heater from the space between heaters
- ❖ Time constraints
- ❖ Quality plan envisaged RT for weld joints of around 55mm



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



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

HPH replacement- First in NTPC plants



Benefits of Turbine R&M



PARTICULARS	STAGE-1 R&M	
	BEFORE R & M	AFTER R & M
Capacity (MW)	200	210
Boiler Efficiency (%)	86%	86%
Turbine Heat Rate (kcal/kwh)	2165	1935
Unit Heat Rate (kcal/kwh)	2518	2250
Coal Factor (kg/kwh)	0.662	0.592
Coal Cons (MT/Hr.)	132.4	118.4
Per Year Coal Consumption at 70% PLF (MT)	811876	726028
Per year saving in Coal Consumption (MT) for all units	257544	
Landed Cost of Coal	Rs 4904/MT	
Saving in Fuel Cost PA per each Unit	25 Crores	
For All 3 Units	75 crores	
CO2 emission Reduction MT/Year	2 Lakhs MT/Year	
Payback period	6 years	



Innovative project: Faster Start up, Shutdowns and Low Load Operations

Problems Faced

1. Boiler Tripping on Reheater protection during Turbine Trip
2. Due to Delayed opening of LPBP due to Governing mechanism

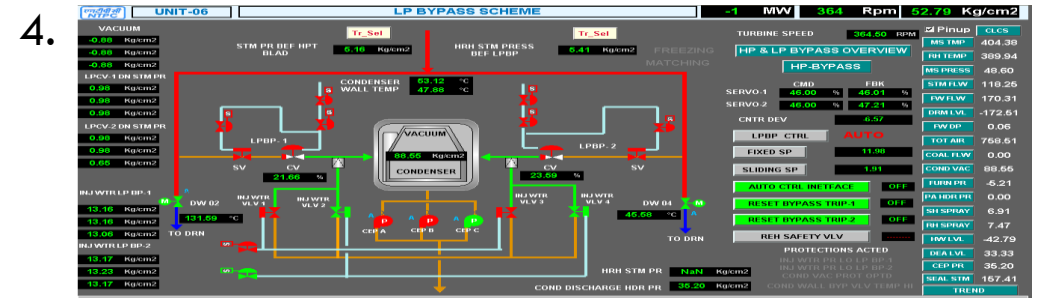


Results Achieved:

1. LPBP improved response avoided Boiler tripping on Reheater Protection
2. Saving of oil consumption around 40 KL for each trip. Monetary Gain of 32 Lakhs for unit outage on Case to Case basis

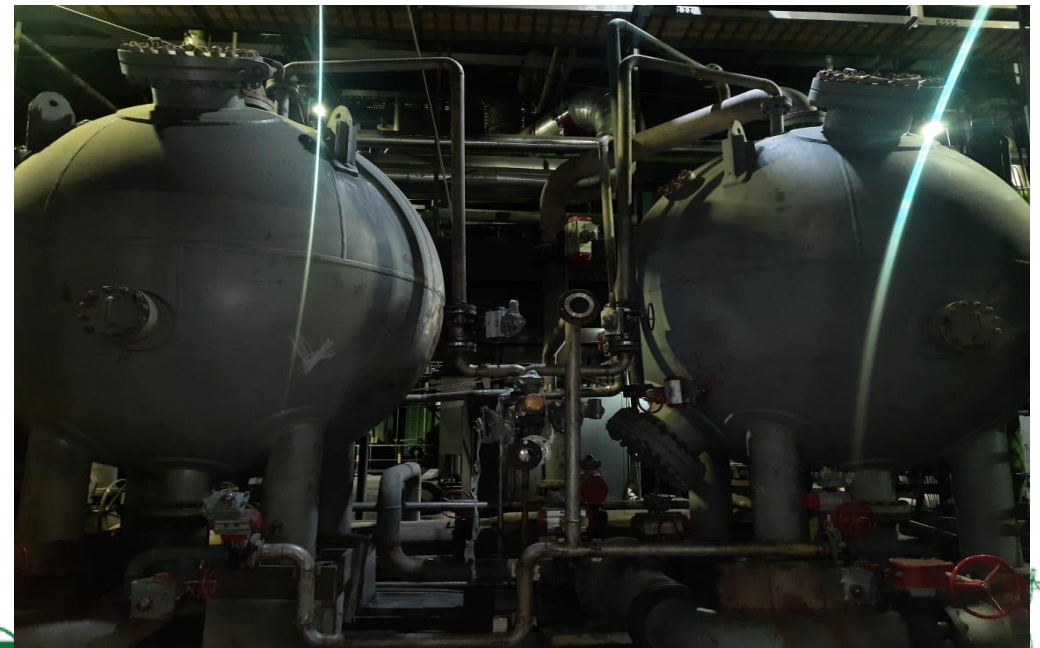
LPBP R&M

1. LPBP EHC governor replacement with proportional valve
2. Local mechanical protections: Low Vacuum, Spray Water injection pressure shifted to DDCMIS
3. Enhanced field monitoring for LPBP downstream pressure transmitters (6 No's), injection water pressure transmitters (6 no's), Vacuum transmitters (3 no's)



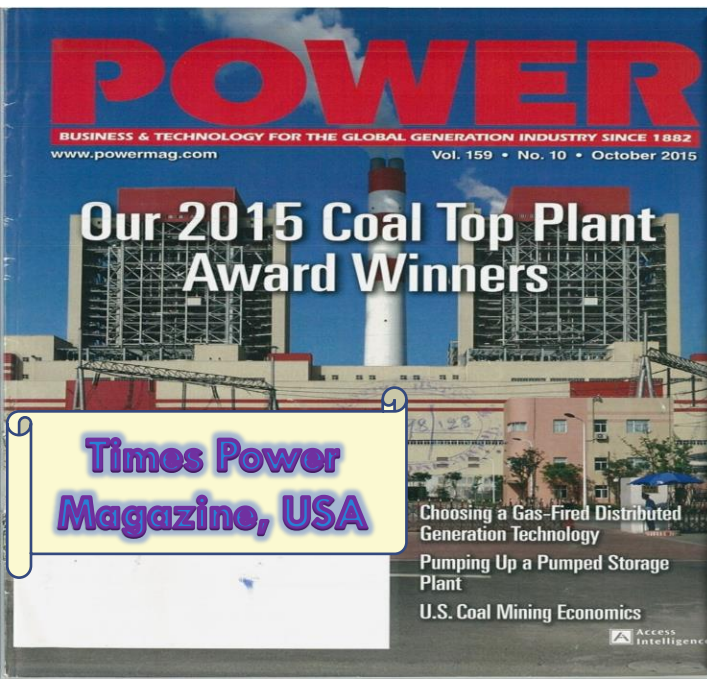
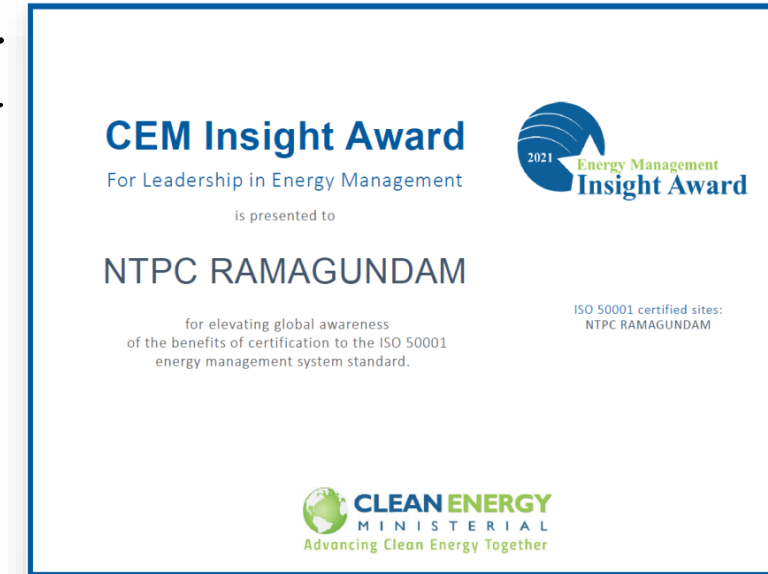
St#1 & 2 CPU R&M

- ❖ CPU vessels replacement in running units
- ❖ Routing of pipeline from regeneration area to CPU vessels
- ❖ Location for CPU regeneration system



NTPC Ramagundam received the Energy Management Insight Award for 2021 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



Confederation of Indian Industry

24th National Award for Excellence in Energy Management 2023

This is to certify that

NTPC Limited, Ramagundam

has been recognized as

"Excellent Energy Efficient Unit"

This acknowledgement is based on the evaluation by the panel of judges at the
"National Award for Excellence in Energy Management" held during 13 - 15 Sep 2023, Hyderabad

K S Venkatagiri
Executive Director
CII - Godrej GBC

Ravichandran Purushothaman
Chairman, Energy Efficiency Council
CII - Godrej GBC



State level National Energy Conservation
Award 2020 by TSREDCO, Govt of
Telangana



**BEE PUBLISHED THE VIDEO ON ENERGY
MANAGEMENT SYSTEM PRACTICES OF
NTPC RAMAGUNDAM AND SAME CAN
BE SEEN USING THE LINK**

[HTTPS://BEEINDIA.GOV.IN/SITES/DEFAULT/FILES/VIDEO_UPLOAD/THERMAL%20POWER.RMP4](https://beeindia.gov.in/sites/default/files/video_upload/thermal%20power.rmp4)



2021,2022 & 2023





*Thank
you*



NTPC Ramagundam

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