JINDAL POWER LIMITED, TAMNAR

Auxiliary Power Reduction

JINDAL POWER OVERVIEW

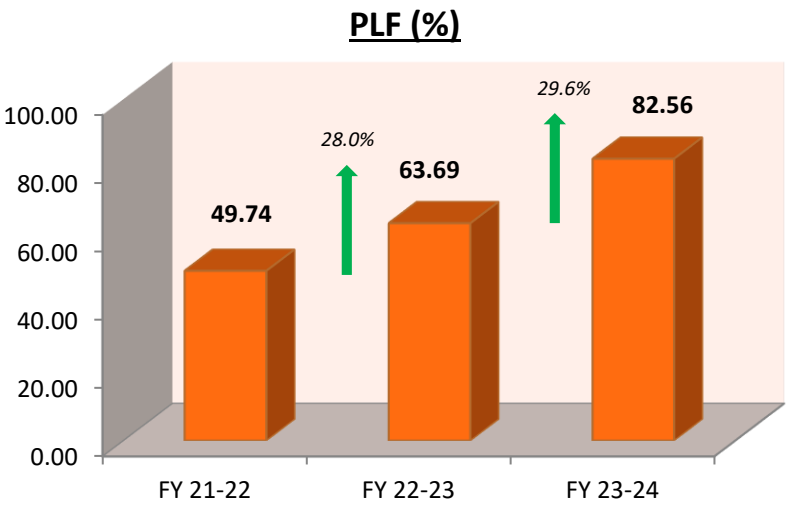
Jindal Power Limited (JPL) is a leading power company in India across the energy spectrum: thermal, hydro and renewable. JPL has been contributing significantly to the growing needs of power in the country and its installed capacity is 4300 MW.

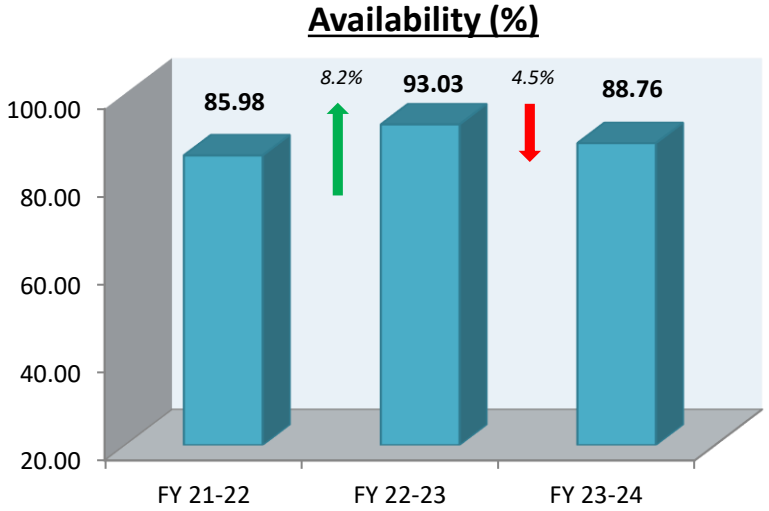
4X250MW It is India's 1st Merchant power Plant along with 4X600MW making it 3400MW which is 5th largest power station in country. Located at Tamnar, Raigarh in the state of Chhattisgarh. All the 8 units are installed with BHEL PF fired boilers.

Plant Performance FY 23-24

Parameters	UOM	Stage-I (4X250 MW)	Stage-II (4X600 MW)	Station (3400 MW)
Generation	MU	7517.44	17140.56	***24658.00***
PLF	%	85.58	81.31	***82.56***
Availability	%	93.21	86.91	***88.76***
Gross Heat Rate	kcal/kwh	2299	2295	***2296***
Auxiliary Power	%	9.61	5.25	***6.58***
Boiler Efficiency	%	86.47	86.52	***86.50***
Turbine Heat Rate	kcal/kwh	1988	1986	***1987***
DM Water Consumption	%	0.76	0.76	***0.76***
Raw Water Consumption	m3/MW	-		***2.44***
Specific Oil Consumption	ml/kwh	0.090	0.181	***0.153***
Specific Coal Consumption	kg/kwh	0.748	0.748	***0.748***

PLF & Availability Trend (Station 3400 MW)

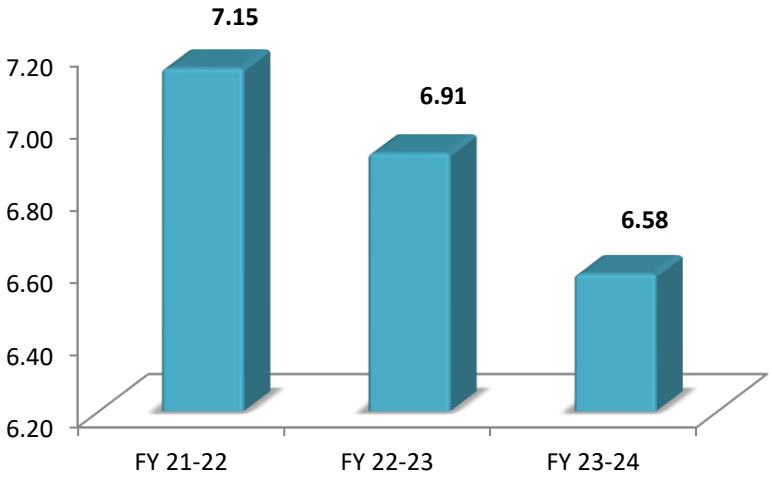




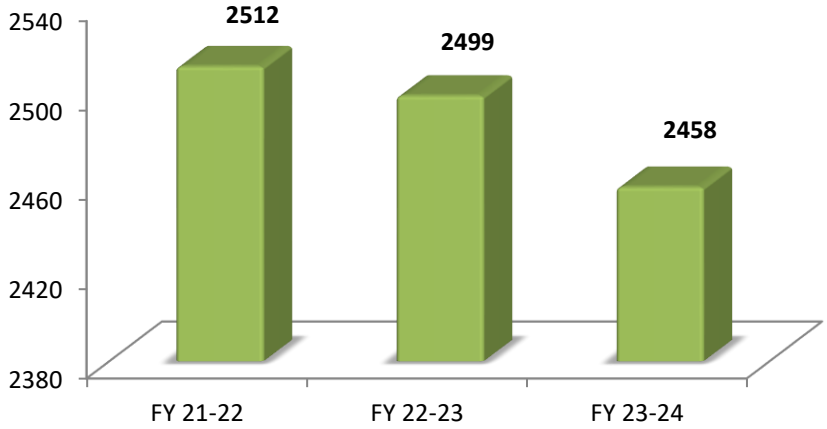
- ❑ Increasing PLF Trend
  - ✓ Coal Availability & Mines Allocation
  - ✓ Fuel Security and Efficient Fuel Management
- ❑ Availability
  - ✓ Lower Availability in FY'24 due to 5 Units OH

APC & NHR Trend : Station (3400 MW)

APC (%) : Station (3400 MW)



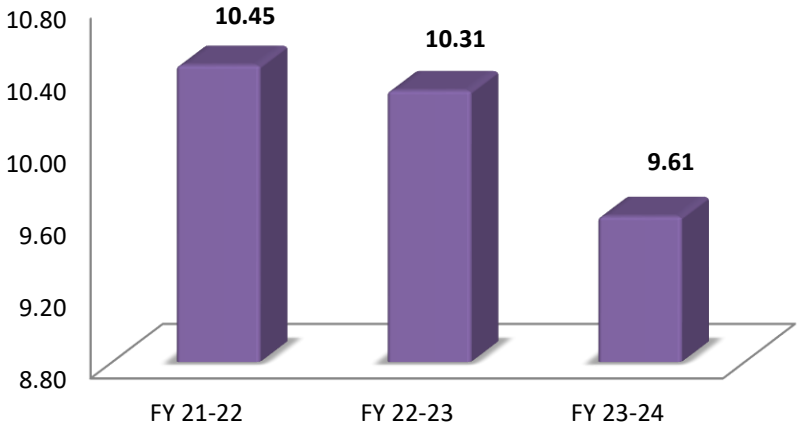
NHR (kcal/kWh) : Station (3400 MW)



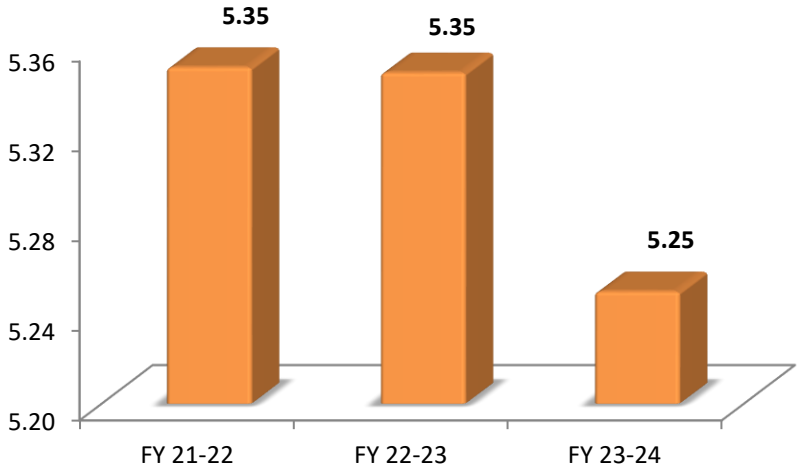
✓ Improvement in APC & NHR due to Increase in PLF, Loading Factor, Improved coal quality and continuous implementation of Energy Saving measures.

APC Trend : Stage-I & II

APC (%) : Stage-I (4 X 250 MW)



APC (%) : Stage-II (4 X 600 MW)



For Stage-I (4 X 250 MW), the Non-Plant APC is approximately 1.0% (CHP-O, Mines, Washery, Residential)

Energy Management Activities of the Plant

- ***Jindal Power Limited, Tamnar is certified with EN 50001 (Energy Management System)***
- The inherent energy efficiencies in our plants enable us to achieve higher level of performance.
- Power consumption is correlated with process or equipment output and energy consumption is used for calculating individual equipment specific power consumption.
- Better decision making to operator to merit order running of the redundant auxiliaries.

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

JINDAL POWER LIMITED
Tamnar, District: Raigarh - 496 107, Chhattisgarh, 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 -

Generation of Electricity by Operating Coal Based Thermal Power Plant (3400 MW) and Transmission of Power to Grid.

Certificate Registration No. **44 764 19392542**
Audit Report No. **2.5-6121/2013**

Valid from **27.07.2022**
Valid until **28.07.2025**
Initial certification **2013**

Certification Body
at TÜV NORD CERT GmbH

Mumbai, **23.07.2022**

TÜV NORD CERT GmbH Am TÜV 1 45307 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

Gain in APC & NHR after Overhaul of Units

Stage	Unit	APC Improvement (%)	NHR Gain(kcal/kWh)
Stage-I (4 X 250 MW)	2	0.29	87
	3	0.41	83
Stage-II (4 X 600 MW)	2	0.69	96
	3	0.71	75
	4	0.21	34

ID Fan Power Consumption Reduction after OH Activity by attending duct leakages

- ✓ St-I : U#2 – 712 KW, U#3 – 270 KW
- ✓ St-II : U#2 – 2319 KW, U#3 – 1557 KW, U#4 – 482 KW

Comparison of EnPI

Stage	Equipment	Reference Period Aug'22 to Jul'23 (kWh/ton)	FY 23-24 (kWh/ton)	FY 24-25 (kWh/ton)
Stage-I (4 X 250 MW)	ID Fan	3.69	3.48	3.45
	FD Fan	1.08	1.00	0.968
	PA Fan	5.78	5.53	5.53
	BFP	7.89	7.48	7.66
	Compressor	800.5	772.3	773.25
	CW Pump	0.078	0.075	0.076
	Mills	9.06	8.67	8.58
Stage-II (4 X 600 MW)	ID Fan	3.28	3.12	3.11
	FD Fan	1.014	0.917	0.918
	PA Fan	5.35	4.69	4.67
	BFP	8.26	8.21	8.19
	Compressor	324.5	314	315
	CW Pump	0.0886	0.0879	0.0875
	Mills	7.66	7.38	7.35

Auxiliary Power Reduction Initiatives & Practices

O&M Based Practices: Stage-I (4 X 250 MW)

- 3 Mill Operation at Part Load – 292 kW/Hr. Savings
- Opportunity Based 3 Mill Operation at Higher Loads – 320 kW/Hr. Savings
- 1.5 CW Pumps in Operation instead of 2 for a Unit during Winters – 11.39 MU Annual Savings
- Switching Off CT Fan during Winters as per requirement.
- Hydrant Pump running hour Optimisation – 0.35 MU Annual Savings
- Stopping of one IA compressor – 2.20 MU Annual Savings
- Air Washers running hour Optimisation – 0.49 MU Annual Savings
- PA Header pressure optimization – 48 kW/Hrs. Savings
- Saving Auxiliary Power during Unit Shut down by stopping drive as per requirement such as LOP of Mills & Fans, DMCW BP
- Saving Auxiliary Power during Unit Start up by taking single set of air cycle, single Vacuum pump in operation and optimizing drive as per requirement

Auxiliary Power Reduction Initiatives & Practices

O&M Based Practices: Stage-II (4 X 600 MW)

- 4 Mill Operation at Part Load – 393 kW/Hr. Savings
- Opportunity Based 5 Mill Operation at Higher Loads – 524 kW/Hr. Savings
- 2 CW Pumps in Operation instead of 3 for a Unit during Winters – 29.3 MU Annual Savings
- 2.5 CW Pumps in Operation instead of 3 for a Unit during Summers at Mid Load – 4.9 MU Annual Savings
- 1.5 CW Pumps in Operation instead of 3 for a Unit during Winters at Part Load – 5.3 MU Annual Savings
- Switching Off Air Washers during Winters – 0.86 MU Annual Savings
- Unit Start Up through TDBFP (MDBFP Stopped) – 0.02 MU Savings per Startup.
- Both TDBFP Stopped in S/D Unit Once Casing Temp reached below 100 Deg. C.
- Mill to Seal Air Valve Closed in Stand-By Mills (Avg. 3 Mills)

Auxiliary Power Reduction Initiatives & Practices

Modification in Existing Systems: Stage-I (4 X 250 MW)

- CEP One Stage Removal - 0.69 MU Annual Savings
- Optimizing Running Hours of DM Make Up Pump by giving Auto Start Logic - 0.17 MU Annual Savings
- Modification in Guard Pond Pump by Impeller trimming - 0.09 MU Annual Savings
- Cora coating in CW and ACW Pumps – 1.53 MU Annual Savings
- Ash handling vacuum pump seal water supply line modification with stopping of 2 seal water pumps for both phases – 0.17 MU Annual Savings
- Modification done in Ash water system by re-routing water from the ash dyke directly to ash handling plant – 0.43 MU Annual Savings
- O2 Grid Arrangement at APH Inlet – 250 kW/Hr. Savings in Draught Power
- LDO Line Modification – 0.11 MU Annual Savings
- HFO Line Modification – 0.29 MU Annual Savings

Modification in Existing Systems: Stage-II (4 X 600 MW)

- LDO Line Modification - 0.29 MU Annual Savings

Auxiliary Power Reduction Initiatives & Practices

Technology Driven Initiatives

- VFD Installation in CEP (250 MW U#1) - 20 kW/Hr. Savings
- VFD Installation in ID Fan (250 MW U#1) – 285 kW/Hr. Savings
- AI Implementation for Performance & Process Parameters monitoring and corrective action. (250 MW U#2, 600 MW U#2)
- CO based combustion optimization
- CT Fan Blade Modification from GRP to FRP in Stage-I – 3.29 MU Annual Savings
- Solar Project of 9.79 MWp (0.15 + 1.0 + 2.14 + 6.5 MWp) – 0.06% APC Reduction & 1.4 kcal/kWh NHR Reduction
- Lighting Replacement by LEDs
- VFD installation in DM Plant : Portable Water Pump, Degassifier Pump, DM Feed Pump, Ultrafiltration Feed Pump – 0.31 MU Annual Savings

Future Auxiliary Power Reduction Initiatives

- VFD Installation in CEP (250 MW U#2, 3 & 4) - Expected 20 kW/Hr Savings / Unit
- VFD Installation in ID Fan (250 MW U#2, 3 & 4) – Expected 285 kW/Hr Savings / Unit
- AI Implementation for Performance & Process Parameters monitoring and corrective action. (250 MW U#1, 3 & 4, 600 MW U#1, 3 & 4)
- Stoppage of HFO Pump (Stage-I) after switching from HFO to LDO. – Expected 60 kW/Hrs Savings
- Optimisation of CT Fans running through Auto Cut in/Out on Condenser vacuum.
- Capacity Improvement of Stage-1 Unit from 250 MW to 270 MW on continuous running basis.- Technical discussion with M/s Siemens, M/S BHEL is under process.

THANK YOU
For Your Attention….

Energy Consumption matters both to our environment and our economy.

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