ITC Enduring Value
PAPERBOARDS AND SPECIALTY PAPERS DIVISION

High Pressure Recovery Boiler

Project Background

- BCM Unit has three conventional SRB's – SRB # 3, 4 & 5.
  - Black liquor solids (BLS) firing capacity – 1975 TDS/Day (Ton of Dry solids per day).
  - Steam Generation capacity – 260 Tons per Hour at 62 Kg/cm2 and 465 Deg C.
  - Power produced - 32.5 MW power and energy generated is classified as "Renewable Energy".

- Major challenges faced with existing Boilers –
  - Serious corrosion of pressure parts.
  - Replacement of Boiler lower furnace and super heaters (part replacement) every 6-7 years.
  - Replacement of the pressure parts resulting plant stoppage for 45 to 50 Days.
  - Safety challenges associated with pressure parts failure and process systems.

In last 11years Boilers were shut for 200 Days to restore health.

Project Background

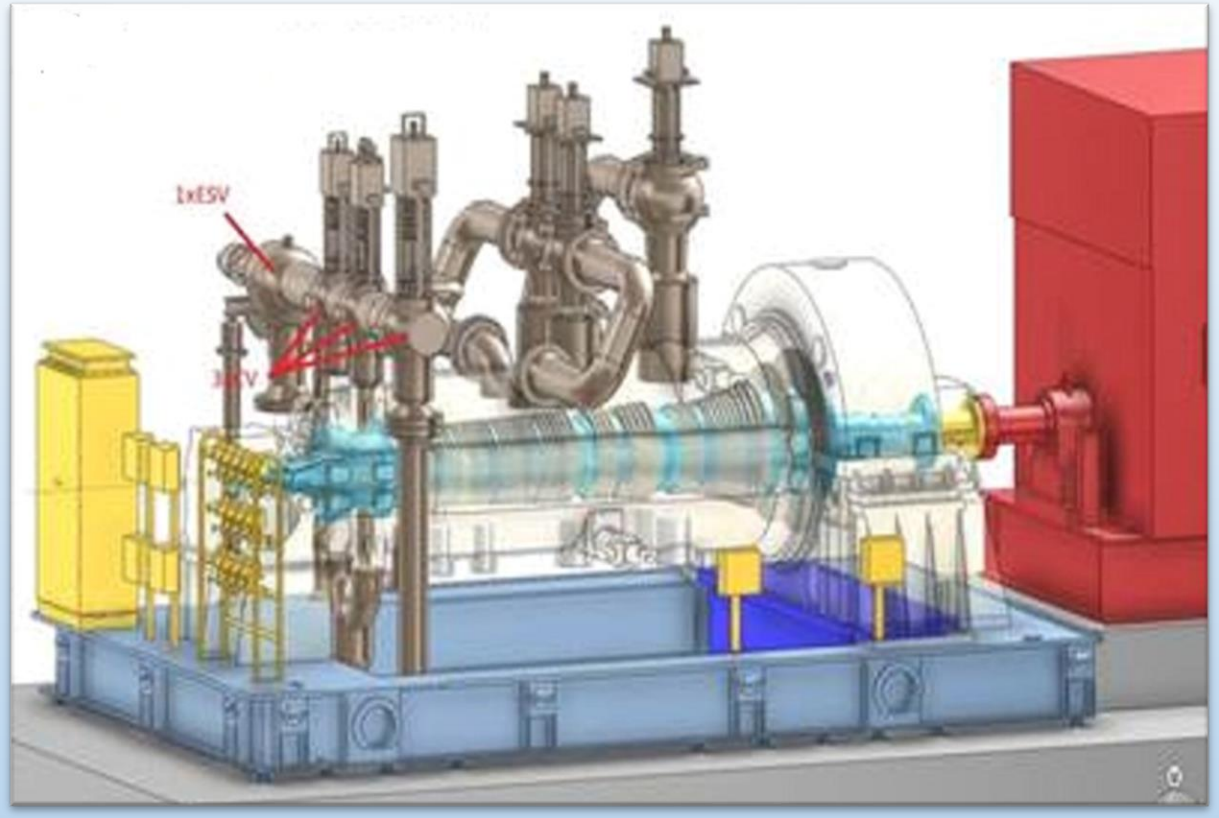
- Considered replacement of all the three existing SRB's with a High Pressure Recovery Boiler.
  - 404 TPH Capacity designed to generate steam at 110 Kg/ Sq-cm & 505 Deg C.
- Benefits Envisaged –
  - Pulp substitution – 77000 TPA
  - Reduction in coal consumption up to 1.57 Lakhs TPA
  - Reduction in solid waste (Fly ash) by 63000 MT/Annum

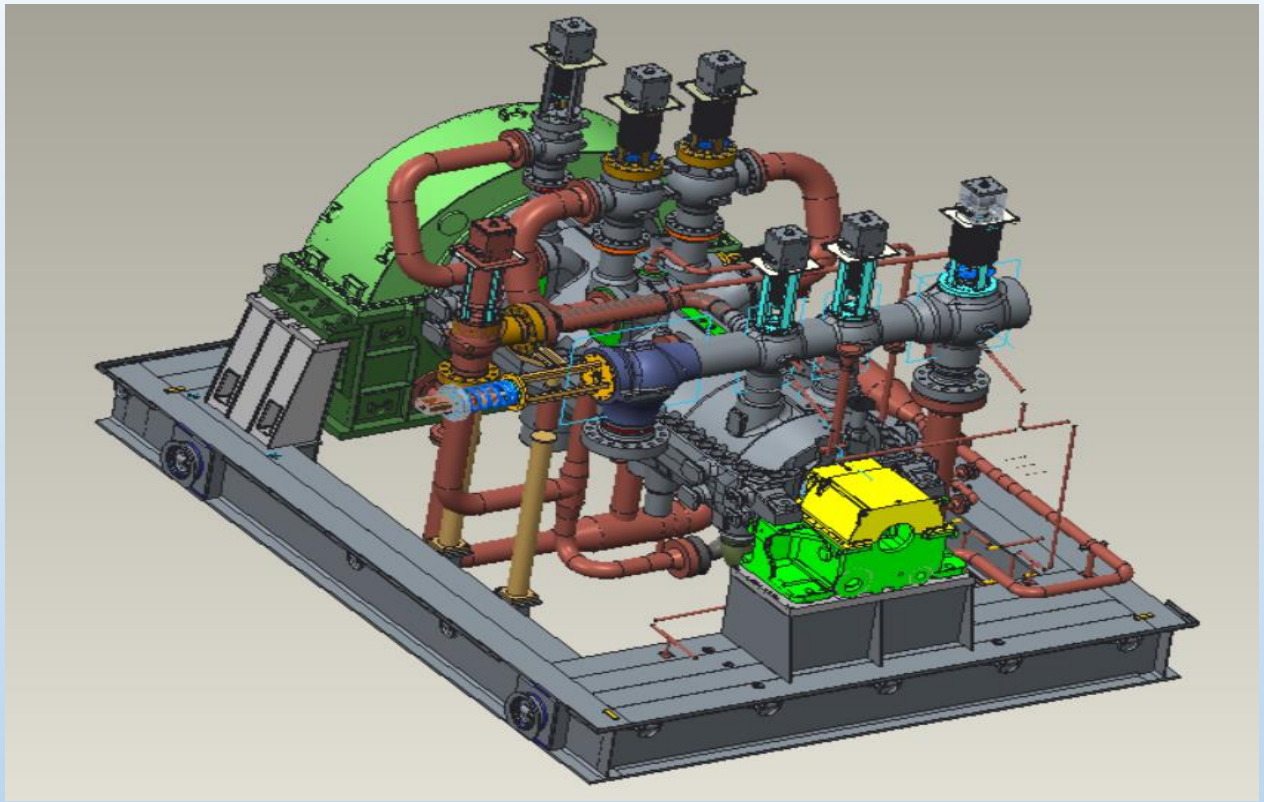
HPRB & PEP # 4 Project

❑Project Scope include following:

- 2700 TPD High Pressure Recovery Boiler
- 65 MW Turbine Generator
- 390 TPH Evaporator
- Other auxiliaries like cooling tower etc

Turbo Generator # 9 Specifications





Salient Features:-

- Triple Extraction Cum Condensing Turbine.
- Turbine & Generator is direct coupled without Gear Box.
- Turbine bypass dump arrangement to condenser.

Make	- M/s Siemens - Germany
Capacity	- 65 MW
Pressure	- 107 Kg/Sq.- Cm
Temperature	- 510 Deg. C
Inlet Flow	- 404 TPH.
Speed	- 3000 RPM (2 pole generator)

At full capacity generates 165 KWH /Ton of Steam

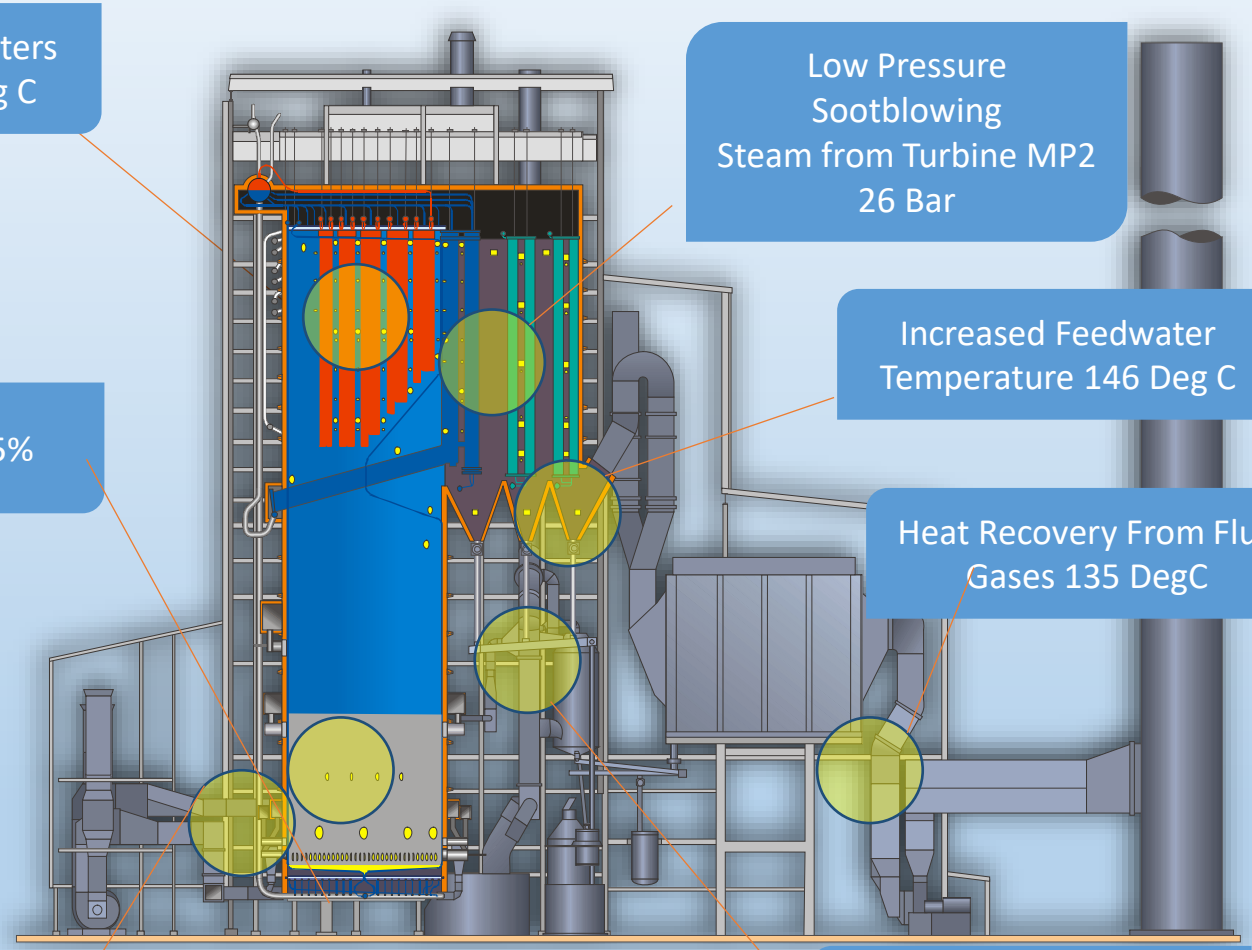
Largest High Pressure Recovery Boiler in India (2700 TPD)

Partnered with Valmet

	UOM	Existing SRB's	HPRB	Benefits
Boiler Capacity	↑ TPD	1975 (3 Boilers)	2700	Support more pulp production
Steam Generation	↑ TPH	270	404	More steam with increase in pulp production
Steam per Ton of Black liquor solids	↑ Tons per Ton of BLS	3.25	3.71	Additional 830 TPD steam at 1400 TPD Blown pulp production
Flues gas out let Temp	↓ °C	160	135 ± 10	More heat recovery and lower LP steam consumption in Deaerator
Steam temperature	↑ °C	460±10	505 ± 8	More power Generation
Steam pressure	↑ Bar	65	110	More power Generation
Dust content in Flue gas	↓ mg/Nm3	115	20	Lower emissions
Green liquor dregs	↓ Mg/l	1800	800	Lower dead load and lower lime consumption in Causticizing Plant

High Pressure Recovery Boiler Features

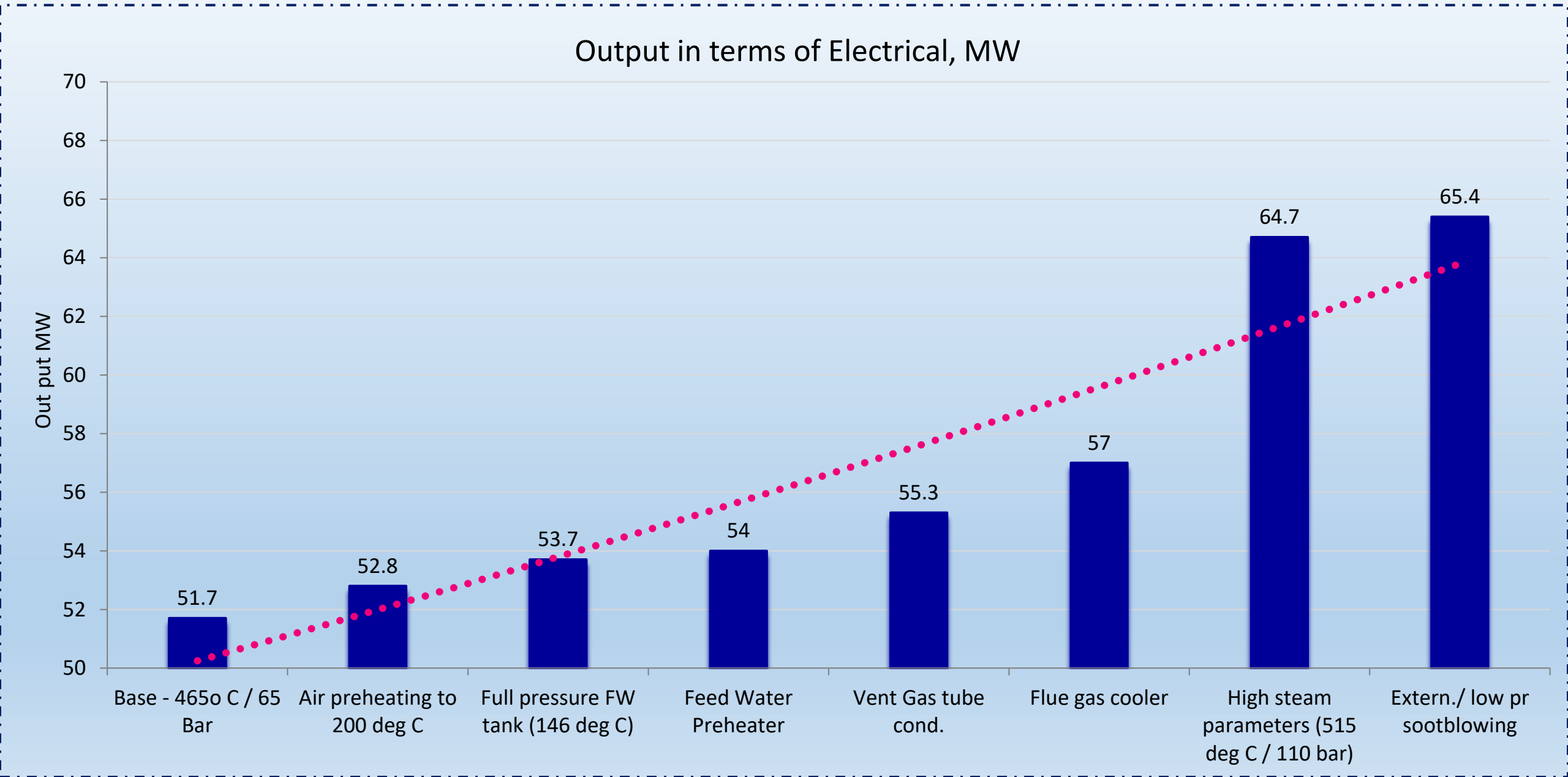
Largest Chemical recovery Boiler in India



The High Power features:

- ✓ High Steam parameters.
- ✓ High black liquor dry solids.
- ✓ Fully pressurized feedwater tank.
- ✓ Feedwater preheating and interheater.
- ✓ Heat recovery from dissolving. tank vent gases.
- ✓ Heat recovery from flue gases.
- ✓ 18 Months cleanability.
- ✓ High efficiency and availability.
- ✓ Low fouling and corrosion characteristics.
- ✓ Most advanced automation features for safe working of personnel.

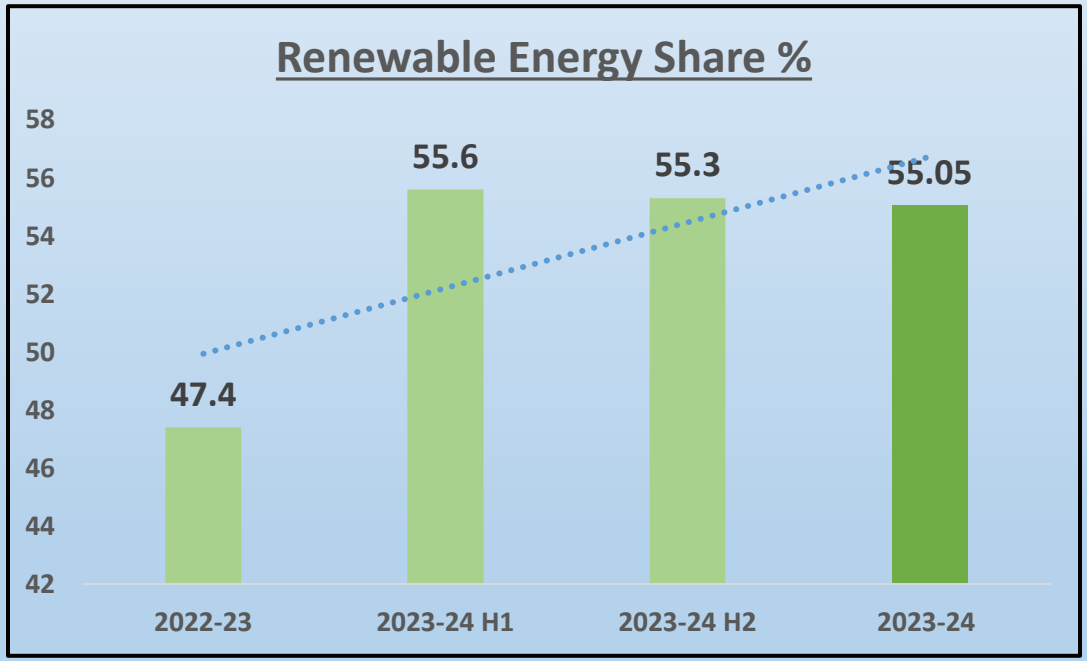
HPRB Features for Higher Thermal Energy



Savings/Benefits FY 2023-24:

- RE Share improved from 47.4% to 55.05%. (7.65%)
- Coal consumption reduced by 82446 dry basis Tons (13.6%).
- Specific Energy Consumption (SEC) improved by 2.5%.
- Fossil Emissions Reduction 1.5 Lac Co2/Annum

Rs. 41.22 Cr



7.65% Improvement

Safety & Environment Challenges

Challenges in Existing Boilers	Design in Existing Boilers	Design in HPRB	Advantages
Critical Safety Interlocks	❖ DCS based	❖ Hard wired safety PLC	❖ Boiler protection
Burner start up with Ignitor	❖ Furnace oil with manual intervention of ignitor for light up	❖ Burner startup with LPG light up all controls in PLC with flame scanner. ❖ All operations are in auto	❖ Safety of personnel and Boiler
Air ports cleaning	❖ Manual activity	❖ Automatic Pneumatic air ports rodders	❖ More stable operation and reduction in manual interventions
Bed condition	❖ No Bed camera	❖ 2 Bed cameras are installed	❖ Bed monitoring and Temperature measurement
Spill collection systems	❖ Not available	❖ 2800 M3 Holding capacity spill collection system	❖ Reduction of load on ETP. Spill will be processed through Evaporator

Major Mile stones

Steam Drum Erection

Dec 2020

First Column Erection

Jan 2020

Bhoomi Puja

Sep 2019

Dec 2018

Contract Signing

Hydro Test

Sep 2021

Oil Firing

Feb 2022

Liquor Firing

Mar 2022

New Initiatives in Projects

- Process Safety Management
  - PSI – Process Safety Information
  - PHA - Process Hazard Analysis
    - Hazop Study
    - QRA & Facility Siting Study (Traffic Study)
  - Operating Procedures
  - Asset Integrity
  - Training
  - PSSR - Pre Start Up Safety Review
  - Emergency Response & Planning

- Safety at Design Stage
  - Retainer wall construction
  - Hazop study of all plants
  - Traffic study by MS Chola
  - Storm water system for complete HPRB layout
  - Layout matrix

New Initiatives in Projects

- Construction safety
  - Training to workmen
  - Method statement and communication to team members
  - CCTV for monitoring
  - Engaged Cup lock scaffolding of professional agencies
  - Engaged scaffolding expert for training ,inspection and guidance
  - Engaged professional safety stewards and supervisors
  - Safety walk along with Vendors on weekly basis
  - Safety Campaigns and drills
  - Safety Celebrations

Simulator training to operation team

• Standard scenarios

- Standard scenarios
- Water filling of boiler
- Boiler purge
- Pressure increase
- Solid fuel firing / Liquor firing
- Full production
- Normal shutdown (hot)
- Normal shutdown (cold)
- Emergency shutdown

• Example of disturbances

- Example of disturbances
- Feed water pump trip
- Stop in solid fuel silo
- Main steam valve closes
- Change in fuel moisture content
- Mill blackout
- Dirty wall tubes
- Tube leakage

• Benefits with Simulator training

- Practice procedures, scenarios and safety measures
- Prepare to handle process disturbances and equipment failures .
- Reduce the amount of number of unplanned outages and thereby save money
- Possibility train the operators for the plant to in a secure setting.

Training to Operational crew on HPRB by Valmet

- Operational Engineers and operators are given on
  - Simulator training
  - Class room Training
  - On the Job training
  - Training on Boiler critical interlocks

- No. of training Days 20
- No. of Members covered 35

Simulator Training

Classroom Training

Boiler Critical Interlocks Training

2700 TDS/Day
High Power Recovery Boiler

AN OVER VIEW OF PROJECT HPRB


THANK YOU