NAVA LIMITED

(Formerly Nava Bharat Ventures Ltd)

POWER DIVISION, DHENKANAL, ODISHA-759121

B Laxmi Prasad
DGM-PP

B J Rao – DGM (Mech)
Certified Energy Manager

N SK S Kameswara Rao
Certified EnMS Lead Auditor

NAVA LIMITED
Global Presence & Company Profile

Kharagprasad (Odisha): Chromium Alloy Plant and Power Plant

Hyderabad (Telangana): Corporate Office

Paloncha (Telangana): Manganese Alloy Plant and Power Plant

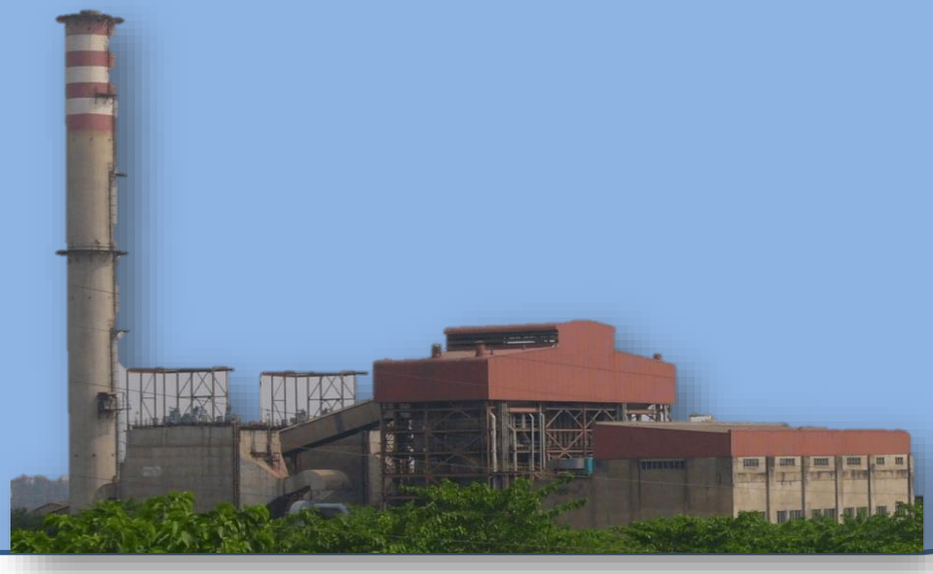
Dharmavaram (Andhra Pradesh): Power Plant

Samalkota (Andhra Pradesh): Power Plant

Captive Power Division, Odisha

30 MW Coal Based CPP

Boilers	2 X 65 TPH AFBC
Turbine	Condensing Extraction
Cooling Tower	Counter flow Induced Draft
Ash Handling	Pneumatic dry ash conveying
Compressors	Reciprocating type
Fuel	Domestic Coal from MCL

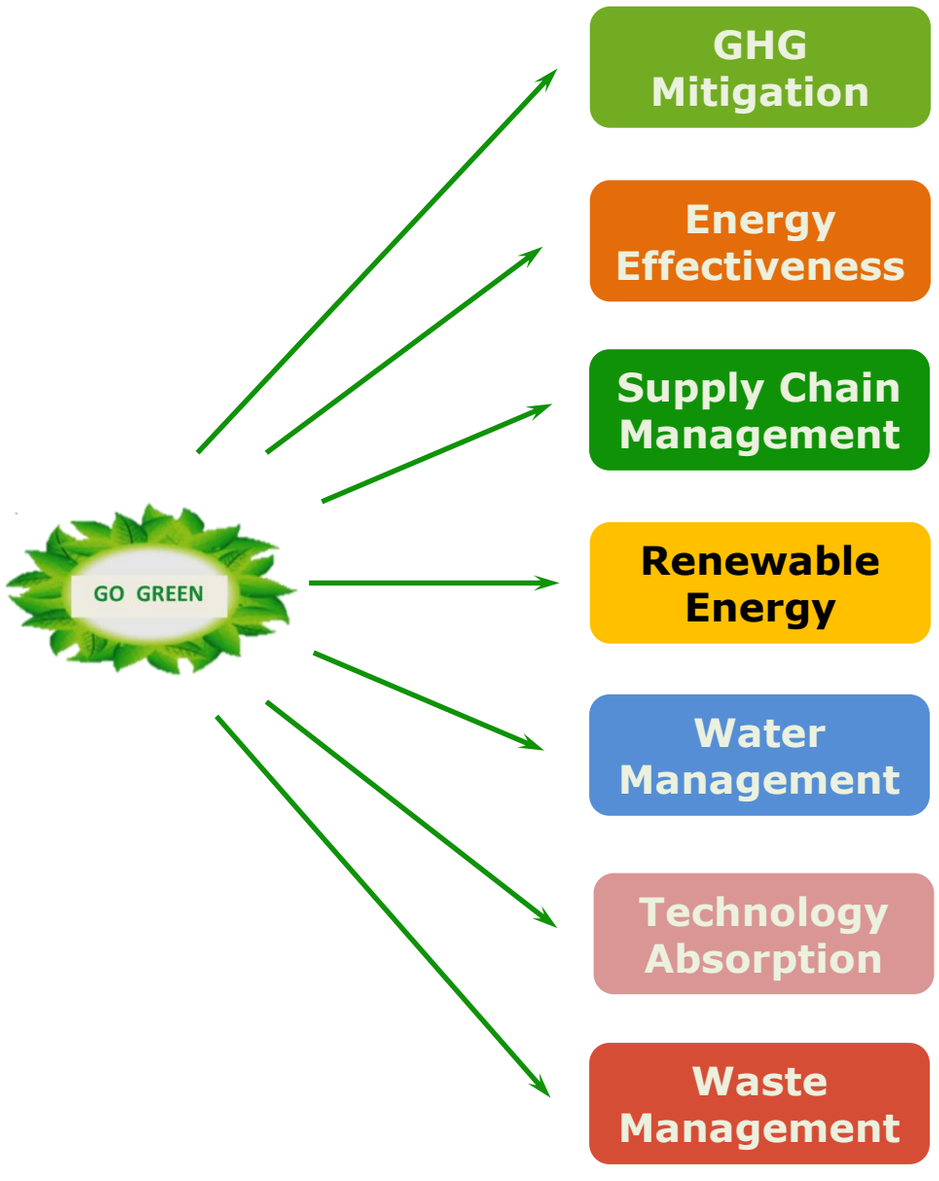


60 MW Coal Based CPP

Boilers	2 X 125 TPH AFBC
Turbine	Condensing Extraction
Cooling Tower	Counter flow Induced Draft
Ash Handling	Pneumatic dry ash conveying
Compressors	Reciprocating type
Fuel	Domestic Coal from MCL

ISO 9001 | ISO 14001 | ISO 18001 | ISO 50001

Mission – Go Green



Green house Gas Management and Mitigation

Optimizing Gate to Gate Energy performance

Green Supply Chain Management & Awareness

Renewable energy and day lighting Utilization

Excellent Water Management system and ZLD

Enhancing efficiency by technology Absorption

Net Zero waste (Effective waste management)

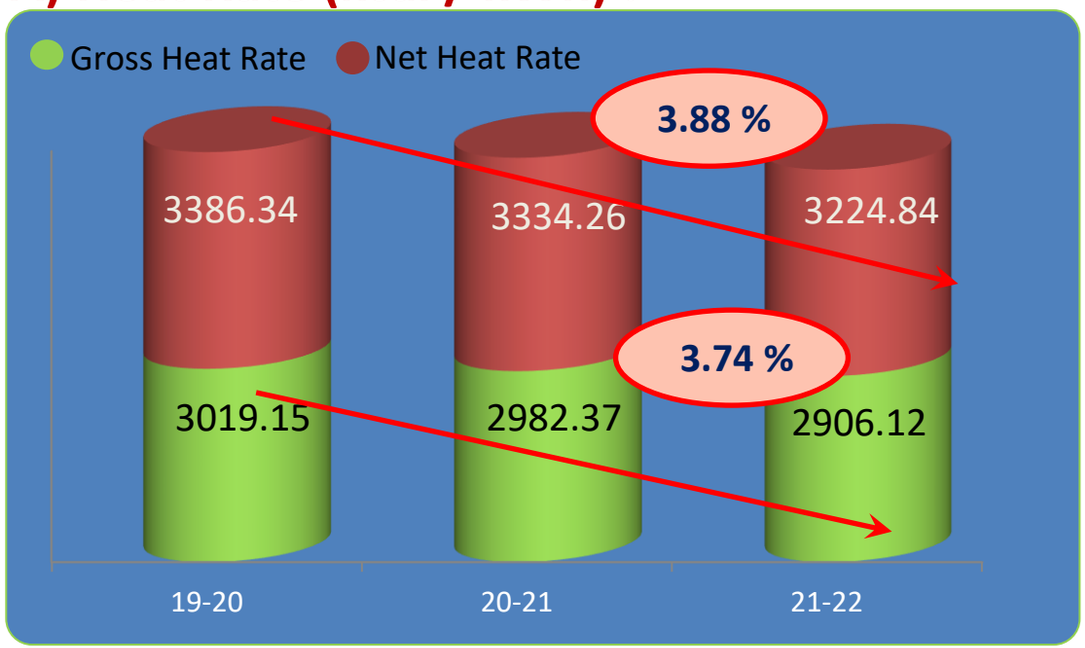
Key Performance Indicators

Energy Performance (2021-22) :

S.no	Parameter	UOM	CPP-1	CPP-2	Total
1	Generation	MWH	49660	446277	495937
2	Plant Load Factor (PLF)	%	18.90	84.91	62.90
3	Availability	%	100.00	99.77	99.88
4	Gross Heat Rate	kCal/kWh	3008.24	2894.52	2906.12
5	% Auxiliary Power	%	8.46	10.04	9.88
6	Boiler Efficiency	%	84.73	84.23	84.48
7	Turbine Heat Rate	kCal/kWh	2479.27	2329.30	2344.32
8	DM Water Consumption	m^3/MW	0.07	0.033	0.038
9	Raw Water Consumption	m^3/MW	--	--	3.11

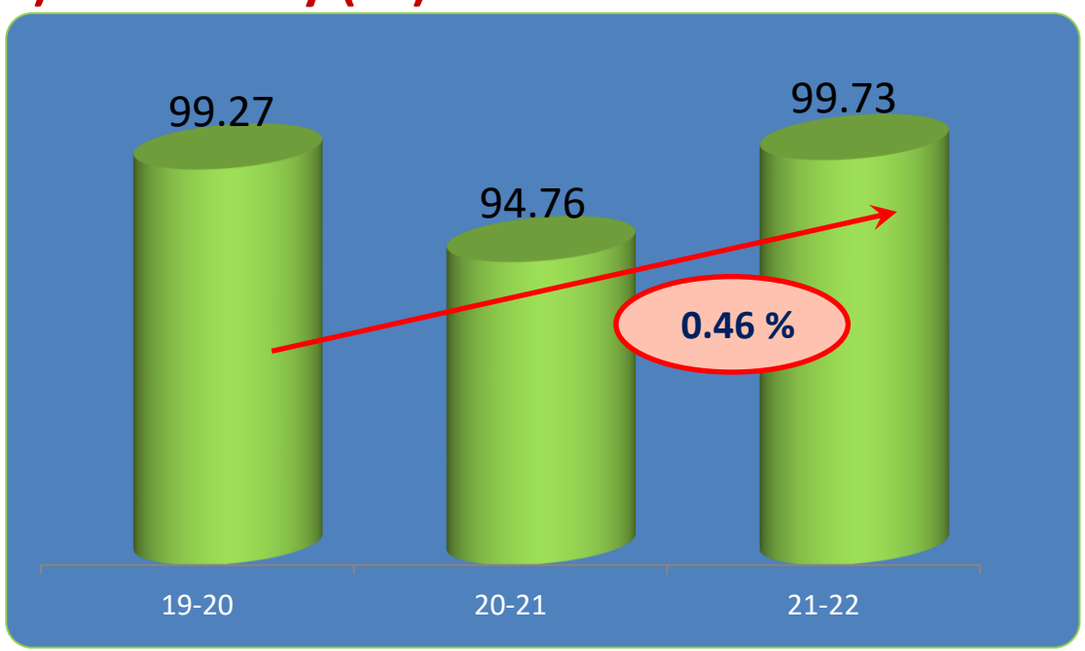
Specific Energy Consumption

A) Heat Rate (kcal / kWh) :

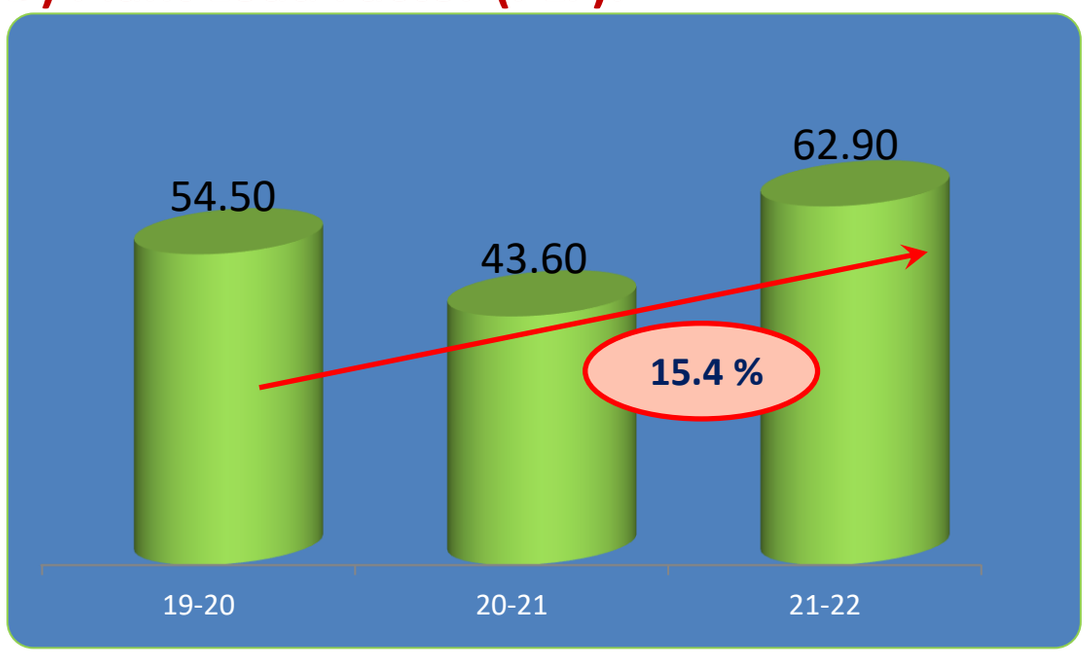


B) Auxiliary Consumption (%) :

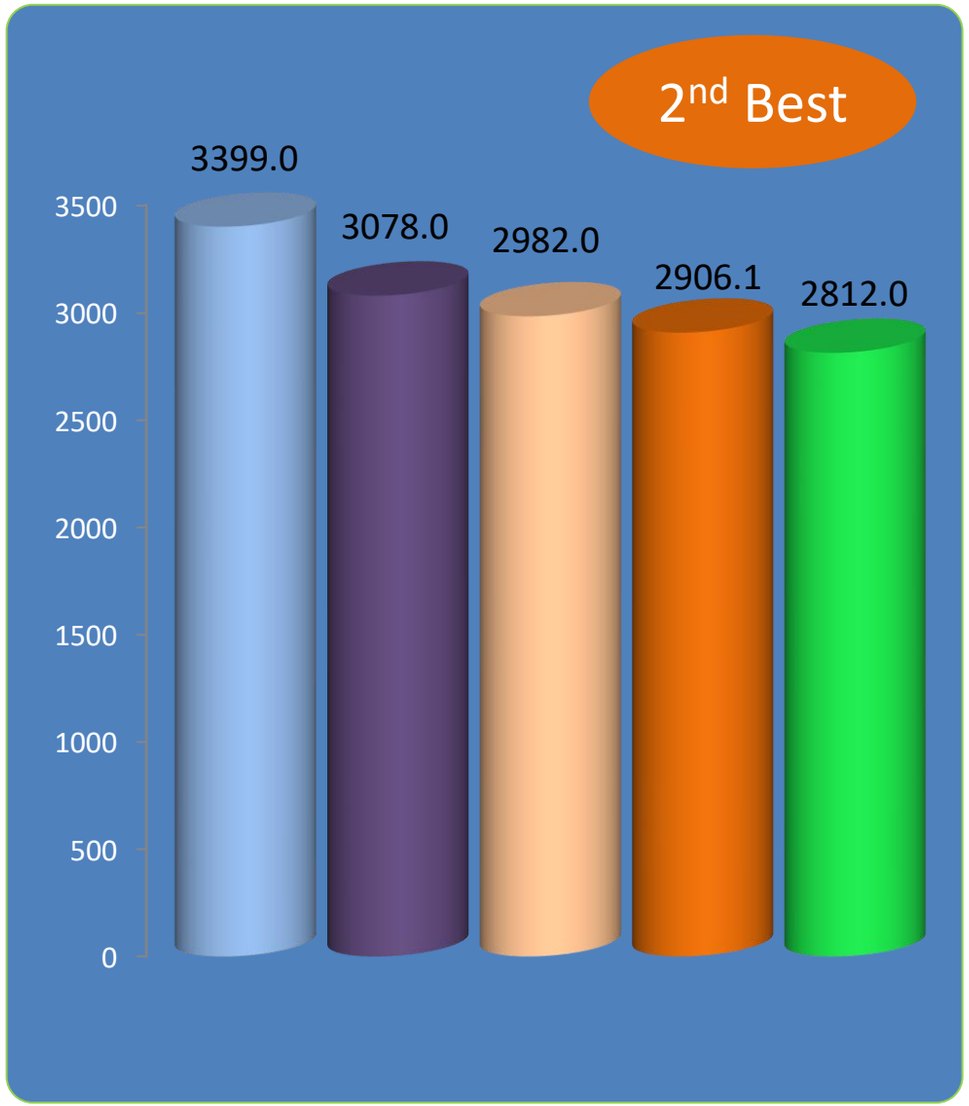
C) Availability (%) :



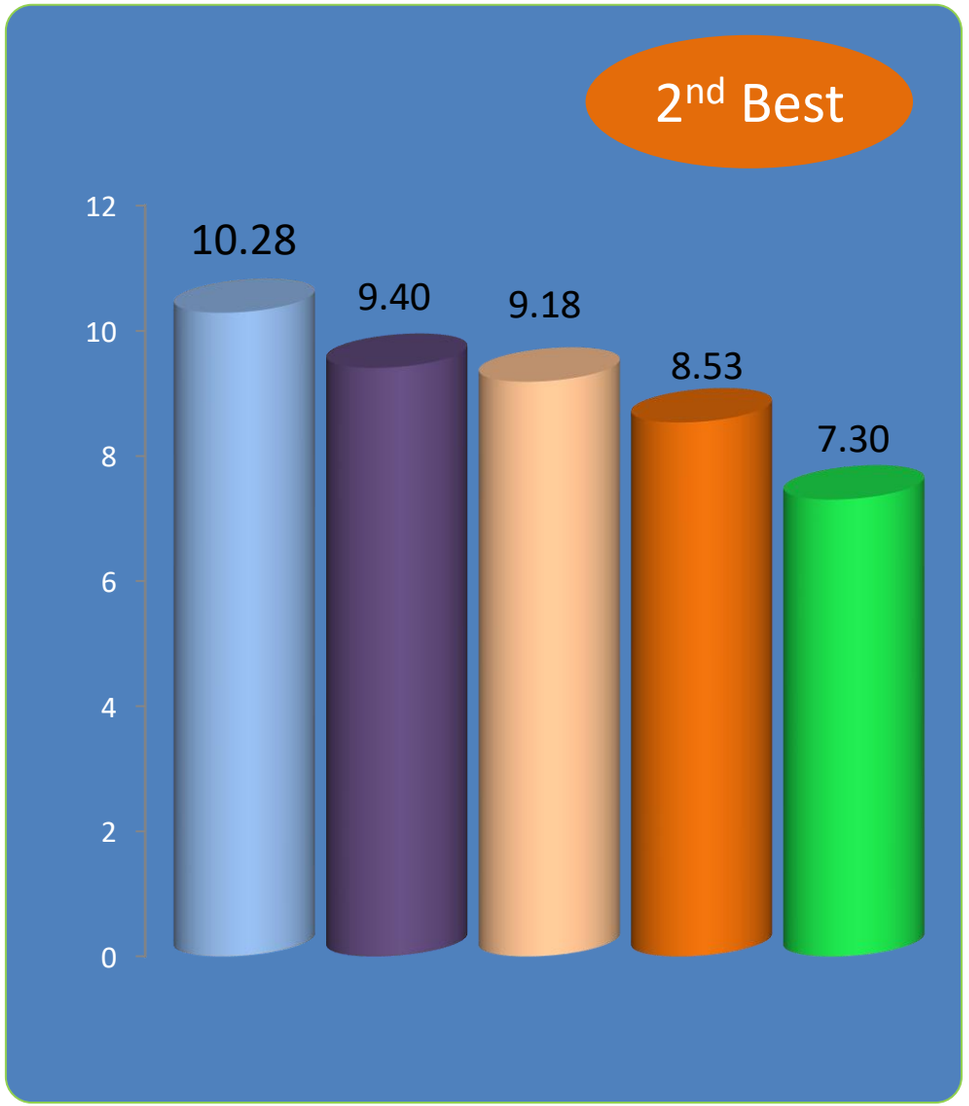
D) Plant Load Factor (PLF):



Comparison with National Best figures



Gross Heat Rate



% Auxiliary Consumption

PAT Target

Player-1

Player-2

National Best Figures

NAVA – DKL Best Achieved

Roadmap to achieve National Best figures

- Providing VFD for Clarifier Pump
- Up gradation of FD fan VFD of both the boilers in CPP-1
- Migration of conventional 70 W HPSV lamps to 42 W LED
- Providing VFD for AHU motor in ESP control room
- Utilizing passive day lighting by providing Noorikool double glazed transparent sheet in CHP
- Replacing the cooling tower fills in CPP-2
- Replacing the APH tubes MOC in CPP-1

Anticipated Electrical Savings 0.485 MU

Anticipated Coal Savings 610 MT

Thermal Energy Conservation Measures implemented

Replacement of APH tubes in module-1 of both Boilers in CPP-1		Implemented in : 2021-22 Coal Savings : 245 MT Cost Savings : 0.69 Rs. Million
Replacing the damaged LP & HP Heaters in CPP-2		Implemented in : 2020-21 Coal Savings : 6060 MT Cost Savings : 15.75 Rs. Million
Replacement of damaged APH tubes in Boiler-2 of CPP-2		Implemented in : 2019-20 Coal Savings : 4156 MT Cost Savings : 4.16 Rs. Million
Improving the cooling tower effectiveness by replacing the fills in one cell of cooling tower in CPP-1		Implemented in : 2019-20 Coal Savings : 500 MT Cost Savings : 0.51 Rs. Million
Conducting Insulation study and rectifying the damaged insulation in CPP-2		Implemented in : 2019-20 Coal Savings : 50 MT Cost Savings : 0.05 Rs. Million

Total Coal Savings: 11011 MT

Benefits attained by execution of above projects

GHG Reduction : 13700 MT Co_2e

Energy Conservation Measures implemented

Improving the pumping efficiency of RWPH by Installation & commissioning of 75kW, 450 m3 Energy efficient pump (IE3)		Implemented in : 2021-22 Energy Savings : 0.177 MU Cost Savings : 0.58 Rs. Million
Replacing the Motor pulley of AHU in ESP control room in CPP-2		Implemented in : 2021-22 Energy Savings : 0.0023 MU Cost Savings : 0.007 Rs. Million
Replacing of existing 7.5 kW, 20 m3 Neutralization pit pump-2 with 11 kW, 40 m3 energy efficient pump (IE2) in CPP-1		Implemented in : 2021-22 Energy Savings : 0.0005 MU Cost Savings : 0.0017 Rs. Million
Replacing the old inefficient sieving machine with new energy efficient sieving machine		Implemented in : 2021-22 Energy Savings : 0.0018 MU Cost Savings : 0.006 Rs. Million
Replacing conventional HPSV lights & CFL with LED lights		Implemented in : 2019-22 Energy Savings : 0.098 MU Cost Savings : 0.208 Rs. Million

Total Energy Savings: 0.28 MU

Benefits attained by execution of above projects

GHG Reduction : 434 MT Co_2e

Energy Conservation Measures implemented

Reducing idle running of Boiler blow down pit, Filter back wash pit & clarifier sludge pit pumps through Auto operation		Implemented in : 2020-21 Energy Savings : 0.004 MU Cost Savings : 0.013 Rs. Million
Reducing the idle running of conveyors by optimizing the operation of CHP in CPP-2		Implemented in : 2020-21 Energy Savings : 0.007 MU Cost Savings : 0.023 Rs. Million
Replacing of existing 7.5 kW, 20 m3 Neutralization pit pump-1 with 11 kW, 40 m3 energy efficient pump (IE2) in CPP-1		Implemented in : 2019-20 Energy Savings : 0.0005 MU Cost Savings : 0.0017 Rs. Million
Conducting CA audit & arresting identified air leak points. Re-routing the CA main header from underground to over ground		Implemented in : 2019-20 Energy Savings : 0.00012 MU Cost Savings : 0.0004 Rs. Million
Replacing of existing service water pump with efficient pump.		Implemented in : 2019-20 Energy Savings : 0.035 MU Cost Savings : 0.103 Rs. Million

Total Coal Savings: 0.05 MU

Benefits attained by execution of above projects

GHG Reduction : 77.5 MT Co_2e

Innovative Project

Description :

CPP-2, 60 MW OEM of TG & Auxiliaries has provided one common flash tank for HP & LP drains, in which all LP & HP drains are connected to condensate the steam. After condensation the condensate goes to condenser through flash tank drain.

As all HP & LP drains are connected in one drain flash tank, during opening of HP drains, due to high pressure the LP drains flow was restricted & we are unable to maintain the LP Heater level. Resulting Poor effectiveness of LP heaters.

Action Taken:

We have conducted a case study and decided to separate the HP & LP drains by installing one extra drain flash tank & the same is implemented.

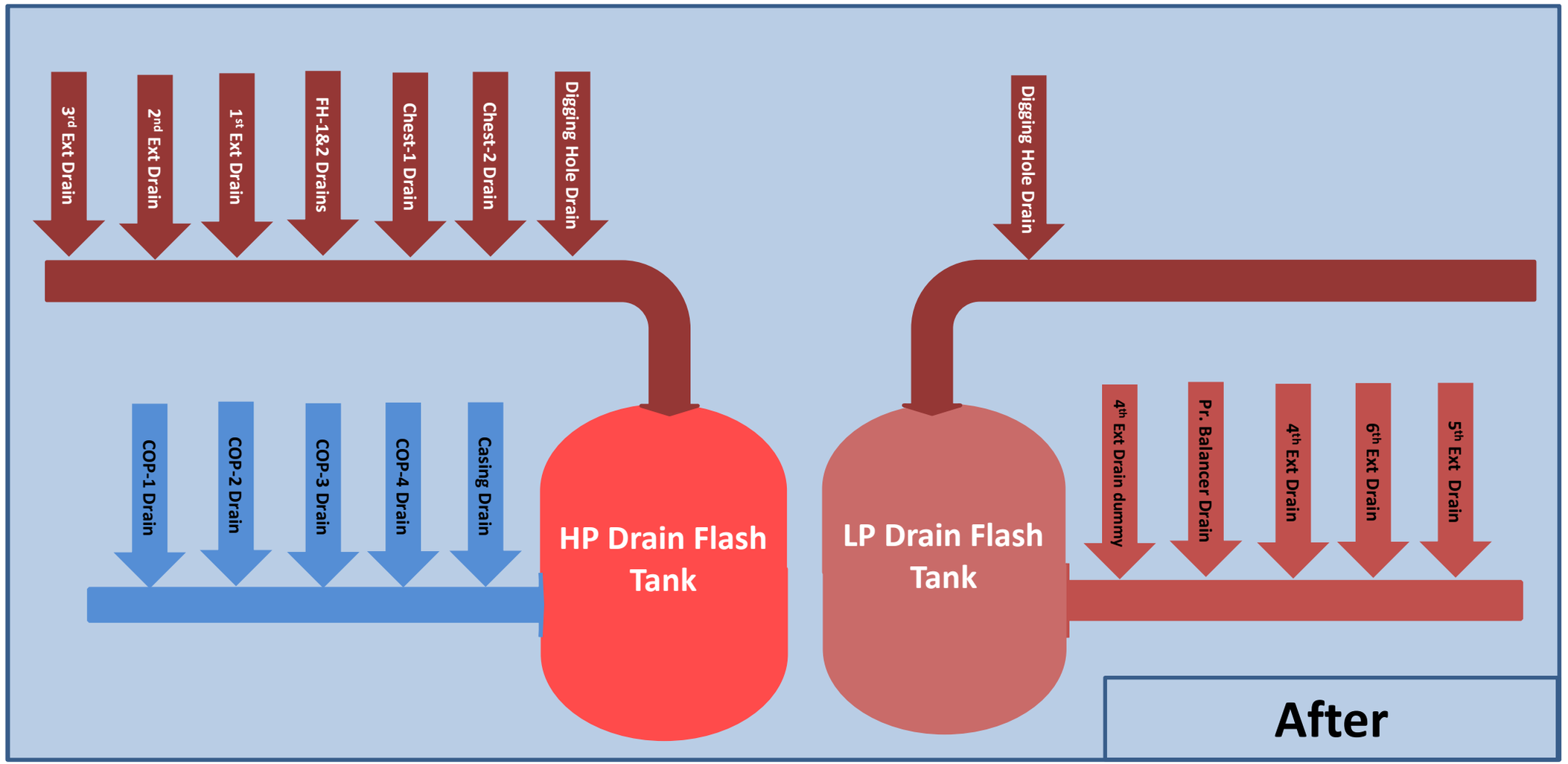
Further replaced the existing Glass wool insulation with ceramic fibre insulation to minimise the heat loss

Dedicated LP & HP Flash tanks

Result / Benefit Achieved:

- Increased Effectiveness of LP Heaters
- Increased flexibility of heaters charging
- Increased heat gain & reduced insulation loss

Initiative Beyond OEM



Implemented In 2020-21

₹ Investment (Rs.) 1.039 Million

Solar Power Harnessing

The sun provides a tremendous resource for generating clean and sustainable electricity without toxic pollution or global warming emissions

Recognizing the importance of solar energy, NAVA harnessing solar energy in following ways:

- Installing solar water heaters at guest house and Bachelor hostel
- Utilising passive sun lighting at applicable areas in the plant
- Installation of NoriKool double glazed transparent sheet
- Construction of office / club building with Eco Friendly lighting
- Installation of Solar Street Lights
- Installation of Turbo ventilators

Solar & Renewable Installations of NAVA Group

High Efficiency roof top solar power plant at Silicon House of Nava Limited.

40 kW Solar Power Unit installed at Nava Bharat Schools, Paloncha

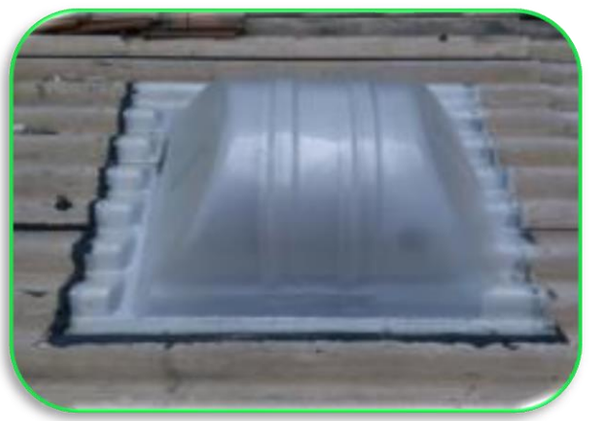
Solar water heaters at guest house and Bachelor hostel at Dhenkanal & Paloncha

Installation of Solar Street Lights at Dhenkanal and – Paloncha

Installation of Turbo Ventilators at Dhenkanal and Samalkot, Andhra Pradesh.

Installation of CSTR Bio-Digester to recover biogas and to use the same as fuel to distillery boiler.

Waste Heat recovery system from furnace flue gas at Paloncha



Utilizing of Passive day lighting at Dhenkanal and Paloncha.

Fly Ash Handling and Utilization

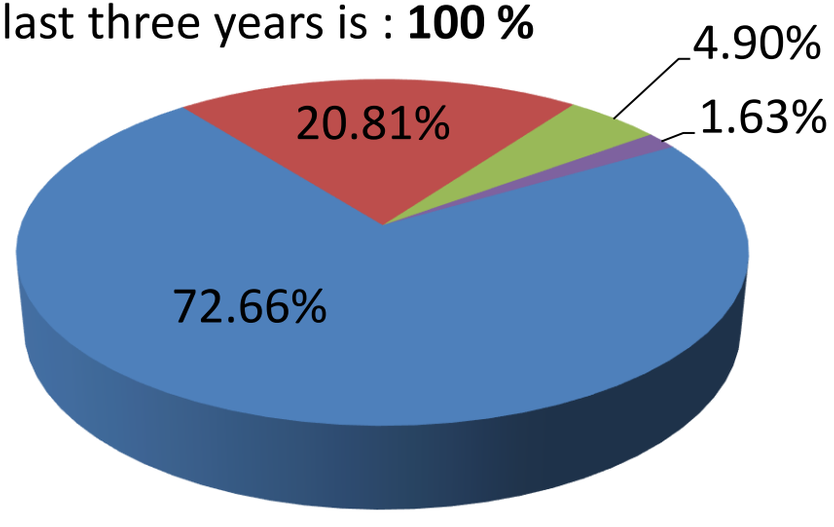
Ash Handling Process:

- Collection of Ash from Boilers in ash vessels / System
- Pneumatic conveying of Bed ash and Fly ash to respective silos
- Unloading of ash from silo by proper conditioning
- Transportation of ash in closed vehicles
- 100 % utilization of ash in Brick plants, Mine void filling and Stone quarry filling

Fly Ash Utilization %:

- Total Ash Generated in last three years : **6.04 Lakh MT**
- Ash Utilized in last three years is : **100 %**

Year	Ash Generated (MT)	Ash Utilization %	Ash Utilized in Fly Ash Bricks (%)	Ash Utilized in Mine void Filling (%)	Ash Utilized in Quarry Filling (%)	Ash used in Cement Plants (%)
2019-20	210403.10	100	28	2.16	69.84	0
2020-21	159061.40	100	15.46	2.4	80.26	1.88
2021-22	234887.45	100	18.99	10.13	67.87	3.01
Total	604351.95	100	20.81	4.9	72.66	1.63



Fly Ash Management at Mine void / Stone Quarry

Ash Dumping

Leveling

Compacting

Wetting

Top Soil Covering

Plantation

Green Belt at Ash pond

Green belt at Mine Void

Green Lawn

Live Garden Fencing

Rest Bench

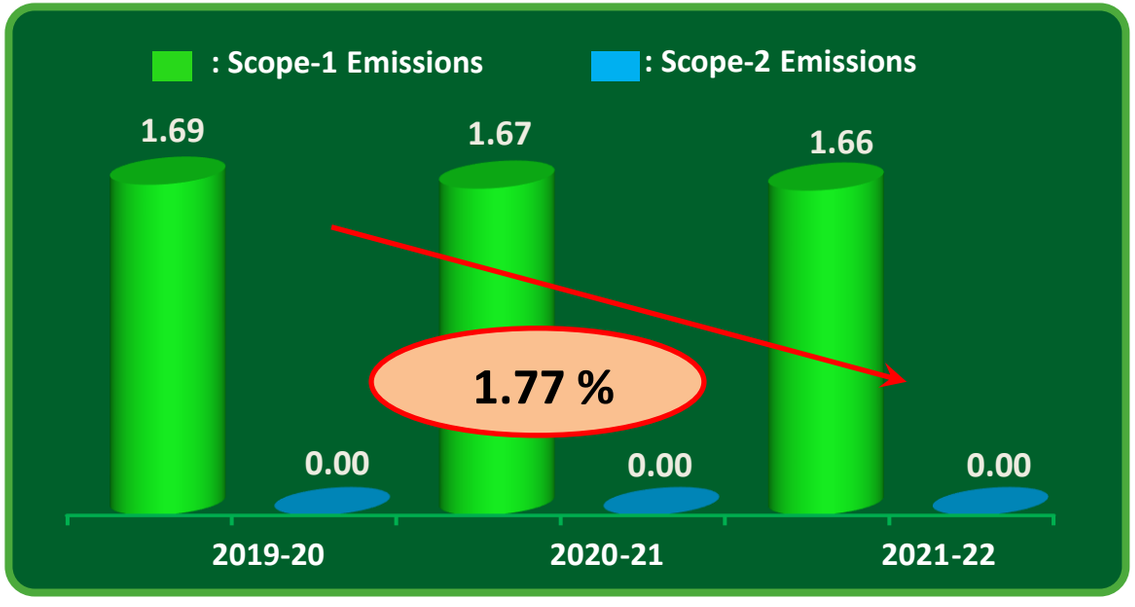
Children Playing Equipment's

GHG Management & Emissions

We have adopted Emission based calculation approach for calculating the Co_2e

Type of Scope	Scope Considered by NBVL
Scope-1 Emissions (Direct Emissions)	1) Fuel used in in power generation 2) Startup Oil consumption
Scope-2 Emissions (Indirect Emissions)	1) Import power from Grid

Scopes Considered



GHG Emissions Intensity (CO_2e / MWh)

Sox Emissions (mg / Nm3)

Nox Emissions (mg / Nm3)

Particulate Matter (mg / Nm3)

Environmental concern

Environmental management programs During last five years:

For controlling Emission:

- Installation of Ammonia dosing systems
- Installation of Microprocessor based MK-4 controller in place of existing controllers in one of the ESP fields
- Using Battery operated vehicle with in plant premises
- Installation of Lime dozing system
- Installation of Online Mercury Analyzer & HDIP camera for monitoring

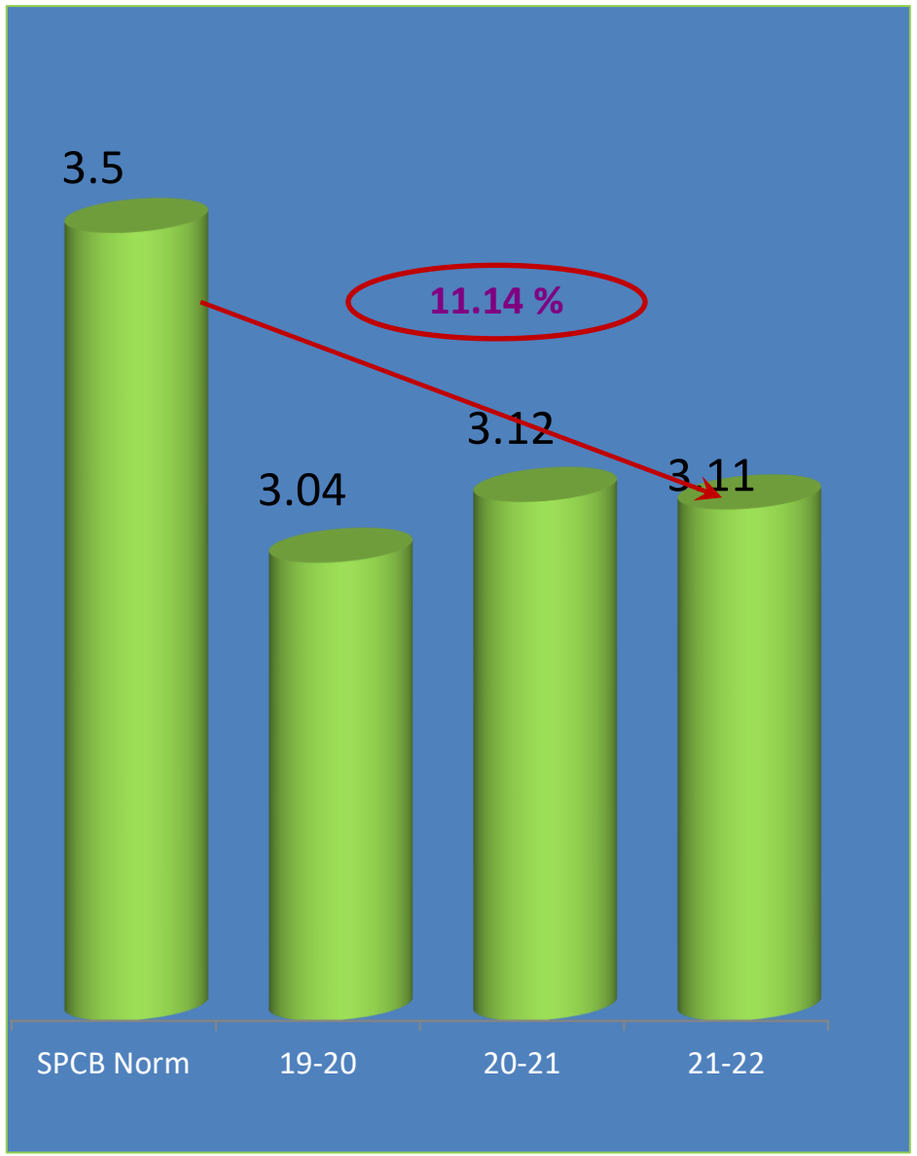
For controlling Fugitive Dust generation :

- Installation of dust extraction system
- Providing Water Spray Systems
- Providing Atomizing water spray nozzles
- Installation of Wheel Washing System

For Preventing Water pollution:

- Installation of Oil traps
- Construction of Silt catch Pits at applicable areas
- Installation of STP by Bio-digester & Phytorid Technology
- Providing Aerators in Water harvesting pond

Water Management



Sp. Raw water (m3/MWH) consumption

Water Conservation projects Implemented:

- Improving the Cooling Tower COC from 7 to 9 by using all organic treatment
- Installation of Sewage Treatment Plants using Bio-digester and Phytorid Technology
- Reducing the DM water make up to Boiler by optimizing the blow down quantity
- Recycling of Boiler Blow Down & Filter water back wash water
- Reusing of CT Blow Down & Clarifier Sludge Pit water
- Construction of Water Harvesting Reservoirs
- Effective storm water management
- Procuring Water Efficient Products

Good Practices in Other areas

Maintenance & Reliability

- Implementing 5s for workplace excellence
- Condition monitoring of critical equipment
- Reducing the MTTR by maintaining spare motors / equipment

Digitization

- Reducing environmental foot prints by paperless approvals through share point platform, ESS/MSS portal & Fiori app

Waste Utilization

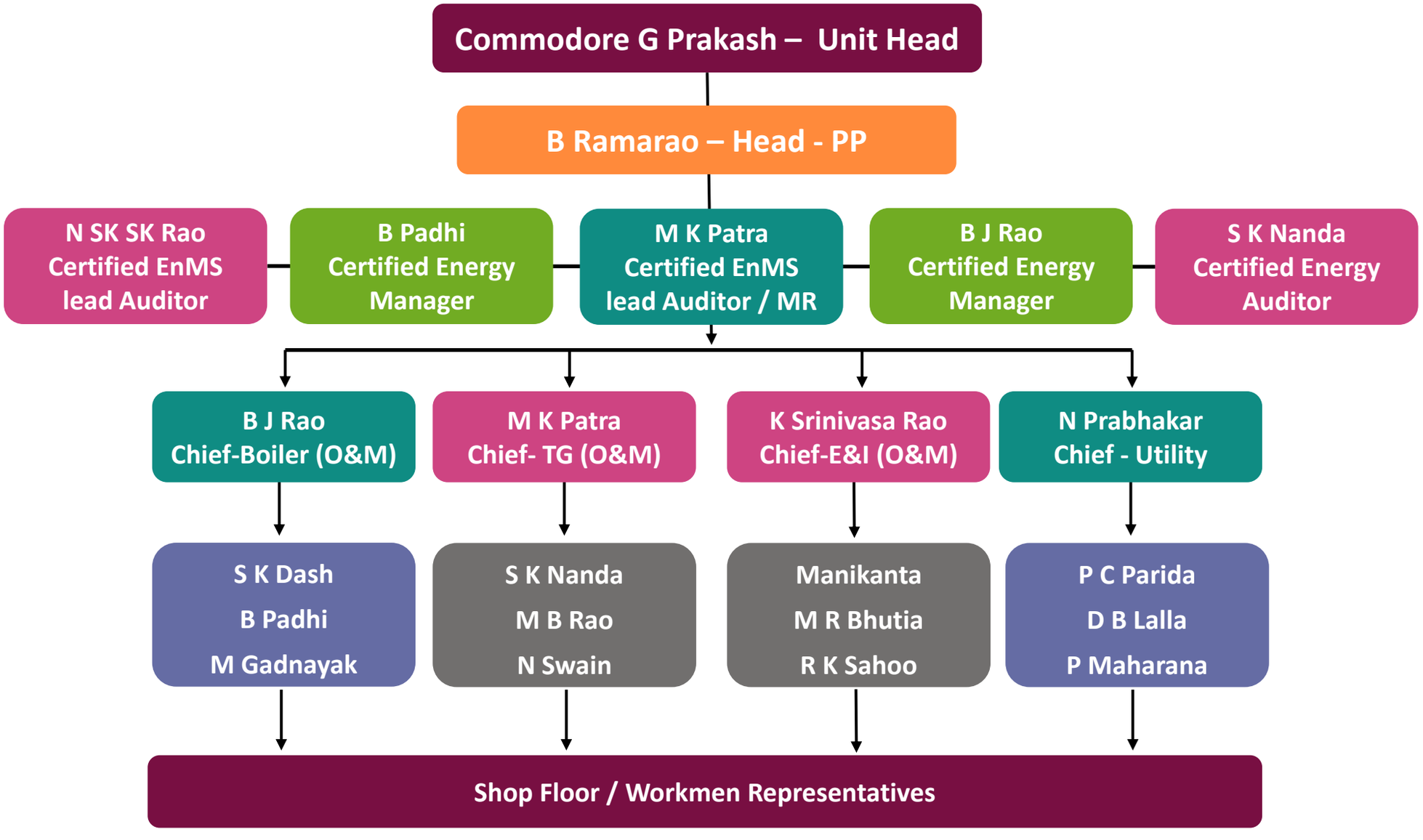
- Utilization of waste oil generated during maintenance in mud gun mass preparation in FAP
- Installation of Mechanically operated waste convertor to convert organic waste to compost
- Utilization of Fly ash in Brick manufacturing

Biodiversity & Afforestation

- Providing aerators in reservoir to keep pond & its inhabitants healthy
- In-house organic farming of vegetables by using compost
- Plantation & development of green belt & social forestry

Structure of Energy management team

NBVL-CPP has formed a team for implementation of EnMS, the team under the guidance of MR and Designated Energy manager will work for resource conservation, implementation of projects and action plans



Workers and Employee Involvement

Description of the Project	Suggested By	Year
Changing the MWPH lighting circuit from existing lighting MCB to Street lighting MCB	CCSY Shift Electrician	2019-20
Reducing Energy consumption of Clarifier pump-2 by Impeller Trimming / Changing	Mechanical Engineer	2019-20
Providing automatic timer switch for boundary lights in CPP-2	Electrical Engineer	2019-20
Reducing the running hours of Boiler blow down pit & Filter back wash pit pumps in CPP-1 by Float switches	DM Plant Chemist	2020-21
Reducing the running hours of clarifier sludge pit pumps in CPP-2 by providing Float switches	DM Plant Chemist	2020-21
Replacing the Motor pulley of AHU in ESP control room in CPP-2	Engineer	2021-22
Replacing the old inefficient sieving machine with new energy efficient sieving machine	Silo Operator	2021-22

Year	No of Suggestions		Annual Savings Achieved
	Received	Implemented	
2019-20	7	7	49.75 MW
2020-21	4	4	46.40 MW
2021-22	8	6	53.25 MW

Awareness on Resource conservation

- Improving awareness through internal training : Conducting Internal training classes to all employees and contract workers
- Showing the external presentations to core team: Showing the presentations down loaded from different forums to create the awareness among the core team members
- Providing Training on SEU and its Variables: Identification of significant energy uses and providing awareness training to the concerned on the variables & controls affecting the SEU
- Deputing the staff to External Seminars: Improving the knowledge by deputing the employees for external training classes /seminars conducted by BEE, CII,TERI, BSI etc…
- Display of awareness posters: Display of energy policy, resource conservation and GHG awareness posters with in the plant for immediate attention
- Utilizing the whatsApp for sharing the Tips: Sharing the energy conservation tips and best practices through “whatsApp”

Energy Conservation Day celebrations

Creating awareness among the Future generation & Employees by conducting Drawing, Quiz and Essay Competition

Creating awareness among the Employees and Contract workmen by Oath taking and Awareness Classes

Energy Management System (ISO 50001:2011)

Identifying the Legal and Other Requirements

Conducting energy Review / Audit (Internal / External)

Identifying & prioritizing the Opportunities for Improvement

Establishing the Baseline, Identifying the EnPI

Establishing the Objectives and Targets

Establishing the Action Plans

Ensuring the Competency of People & creating awareness

Establishing and Communicating the Operational Criteria for effective and efficient plant operation

Procurement of Energy Efficient Products

Maintaining The required Documents

Ongoing Energy Review by functional chiefs

EnMS Review by management representative

Taking decisions for Energy performance improvement

Continual Improvement

Monitoring the Key characteristics

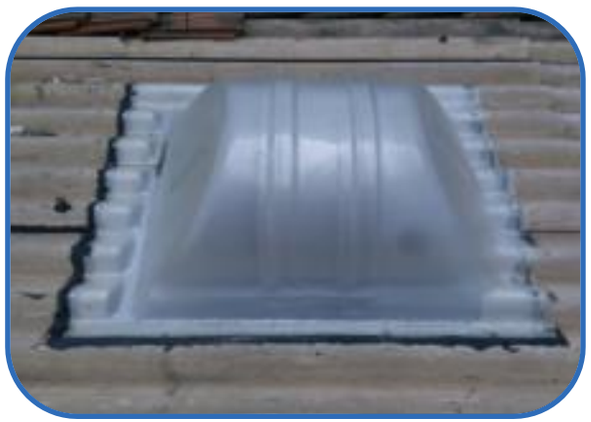
Evaluation Of Legal Compliances

Conducting regular Internal Audits

Identifying potential non conformities & taking C-CAPA

Learning from CII

- Installation of VFD for condensate extraction pump.
- Switching off the hopper heaters of ESP 1st field during normal operating condition in Both the Units
- Providing AIRTRON energy saving device to conserve Split AC Power consumption
- Installation of NoriKool double glazed transparent sheet



Excellence Endorsed

Resources Management:

- National Award for Excellence in Energy Management for the years 2013-14, 2015-16, 2016-17, 2017-18 & 2018-19 from CII.
- 4 Star Rating in Energy Management for the year 2017-18 & 2018-19 from Confederation of Indian Industries (Eastern Region).
- National Award for Excellence in Water Management for the years 2011-12, & 2012-13 from Confederation of Indian Industries.

Environmental Management:

- Pollution Control Excellence Award for the years 2007, 2013 & 2015 from State Pollution Control Board, Odisha.
- Prakruthi Mithra award for 2011 from Odisha Forest and Environment Department.

Safety:

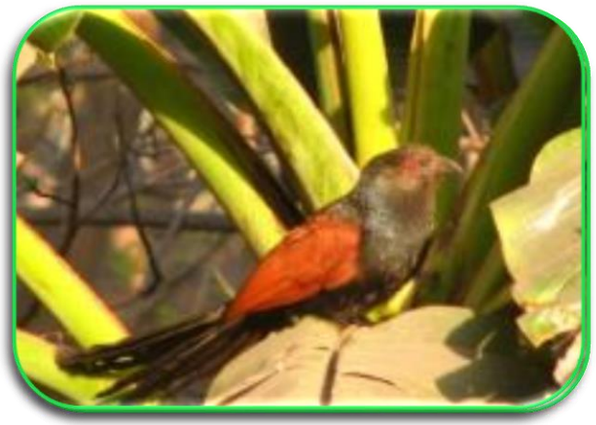
- Best Performance in Safety & Environment Management for the years 2011, 2012, 2013 & 2015 from Director of Factories & Boilers, Odisha.
- State Safety Awards in for the years 2007, 2008,2009, 2011 & 2012 from Director of Factories & Boilers, Odisha.
- State Safety Awards in different categories for the years 2012, 2013,2014,2016 & 2017 from Director of Factories & Boilers, Odisha.
- State Electrical Safety Award for the year 2021-22 from EIC, Department of Energy, Odisha.

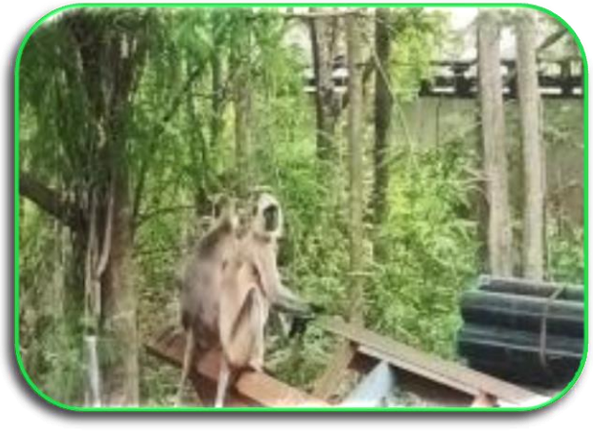
Biodiversity









Tree Plantation

NAVA Limited taken a initiative towards plantation & development of green belt in and around the Plant area , Peripheral villages and development of social forestry.

- No. of trees planted so far : 65339
- Survival percentage : 93 %




Thank You for your Attention

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