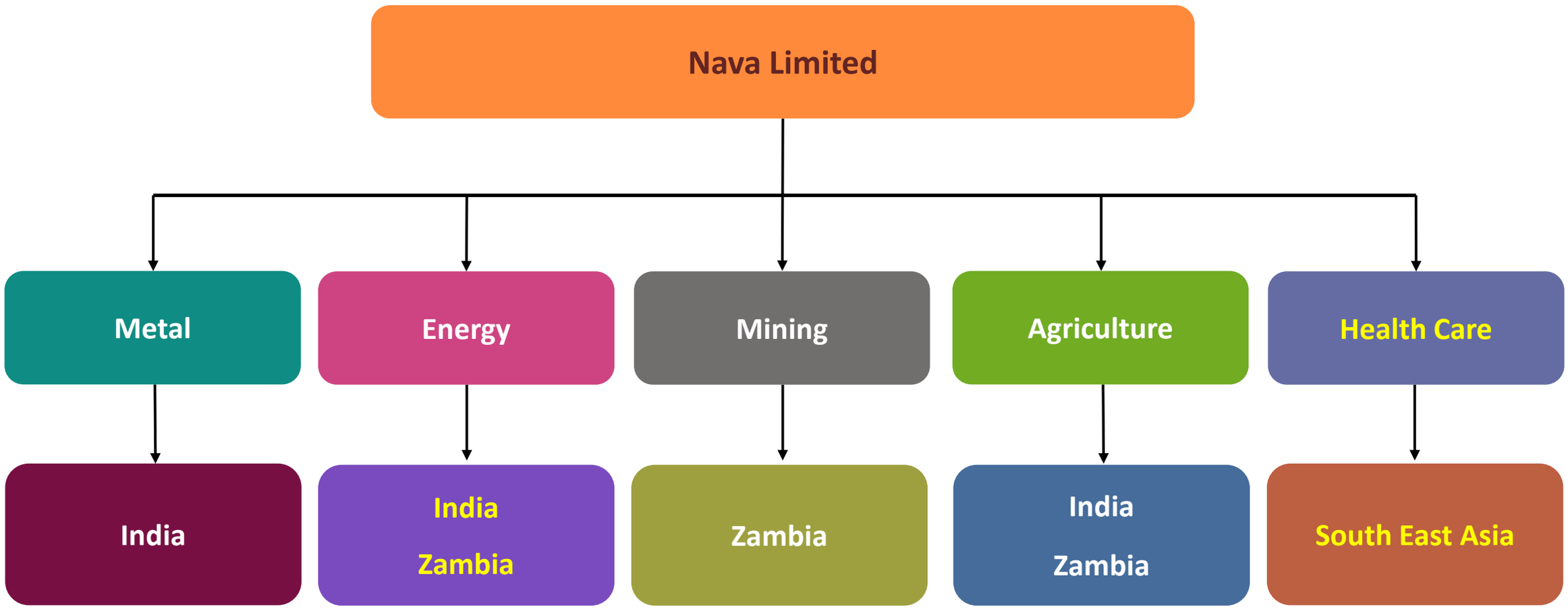
NAVA LIMITED

DHENKANAL, ODISHA-759121

N SK S Kameswara Rao
EnMS Lead Auditor

Rajat Sahoo
Manager (Electrical -FAP)

Company Profile



India: Andhra Pradesh, Telangana & Odisha

Nava Limited, Odisha

Ferro Alloy Plant

Product	HcFeCr & SiMn
Furnace	2 X 22.5 MVA SAC
Cooling Tower	Counter flow Induced Draft
Dryer	Double Drum Rotary (LPG)
Compressors	Reciprocating type
Power	From CPP

90 MW Coal Based CPP

Boilers	AFBC (2 X 65 & 2 X 125 TPH)
Turbine	Condensing Extraction
Cooling Tower	Counter flow Induced Draft
Ash Handling	Pneumatic dry ash conveying
Compressors	Reciprocating type
Fuel	Domestic Coal from MCL

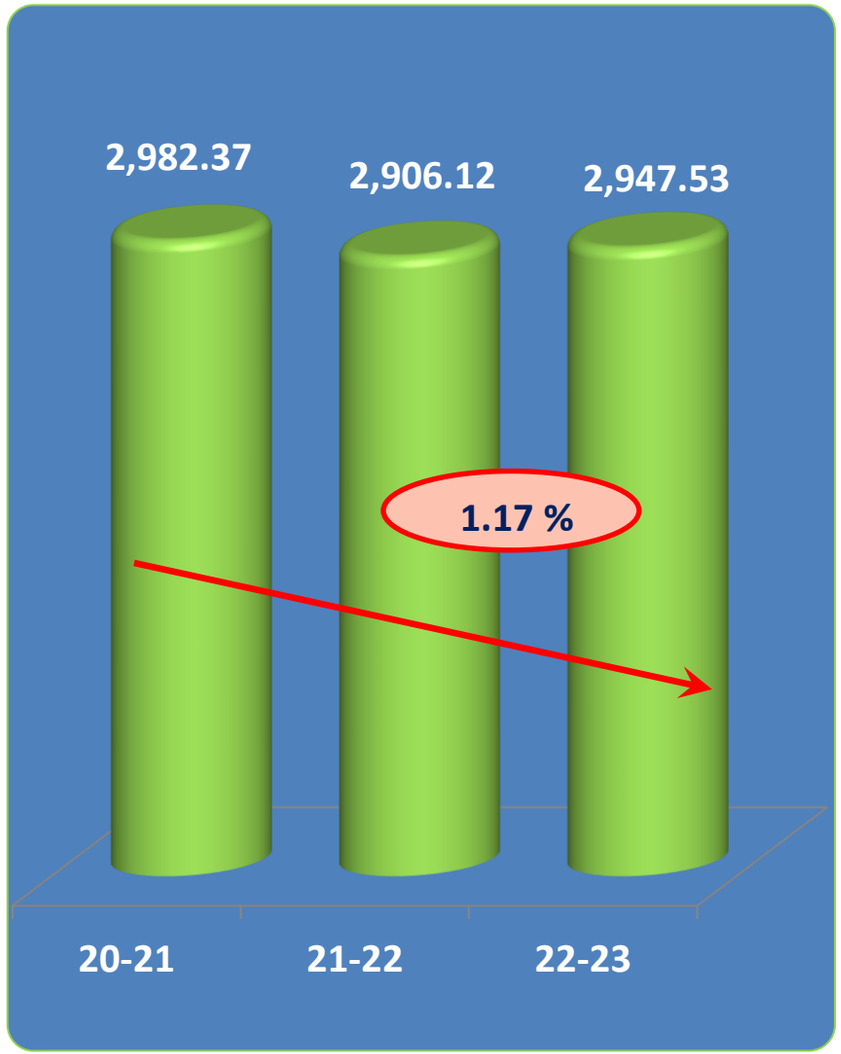
ISO 9001 | ISO 14001 | ISO 18001 | ISO 50001

Plant Performance

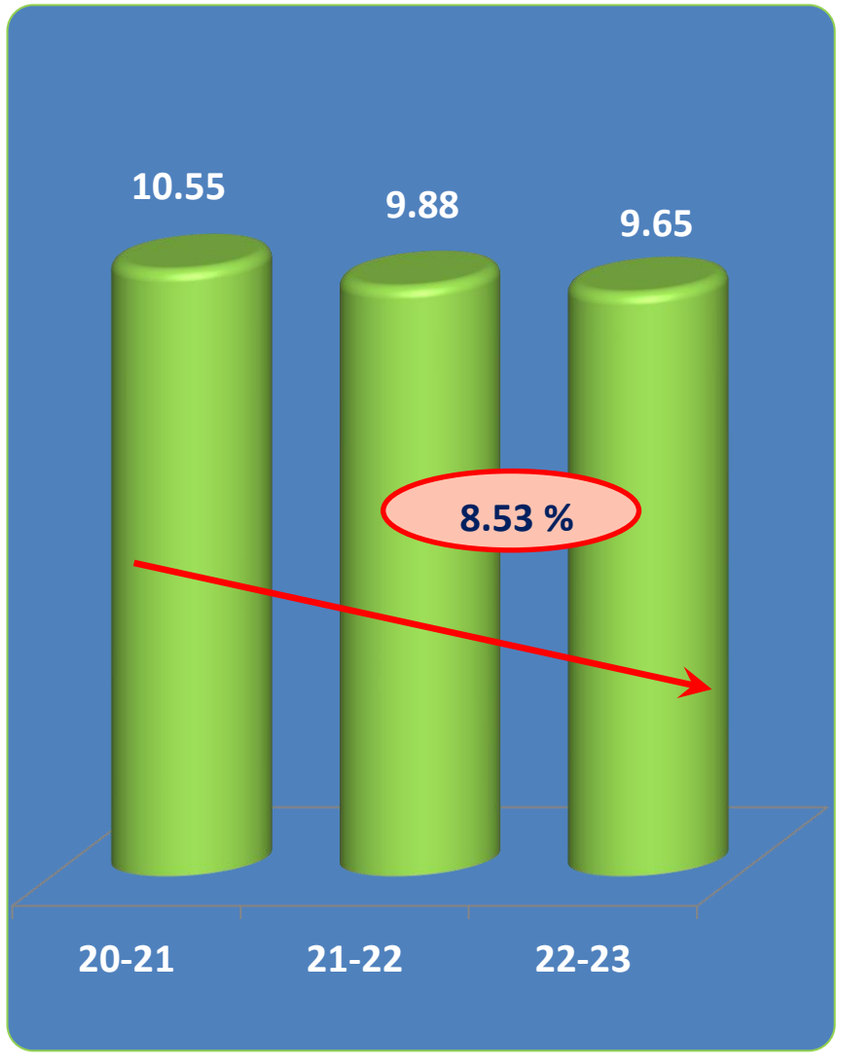
Production Details :

S.no	Parameter	UOM	2020-21	2021-22	2022-23
1	FeCr Production	MT	57512.80	67592.68	35909.60
2	SiMn Production	MT	0.00	0.00	11826.48
3	Normalized Final Product	MT	57512.8	67592.68	51254.49
4	CPP Generation	MWH	343771	495937	433976
5	CPP Plant Load Factor (PLF)	%	43.60	62.90	55.05
6	Average GCV of Coal	Kcal/Kg	3351.70	3275.37	3234.80

Specific Energy Consumption-CPP



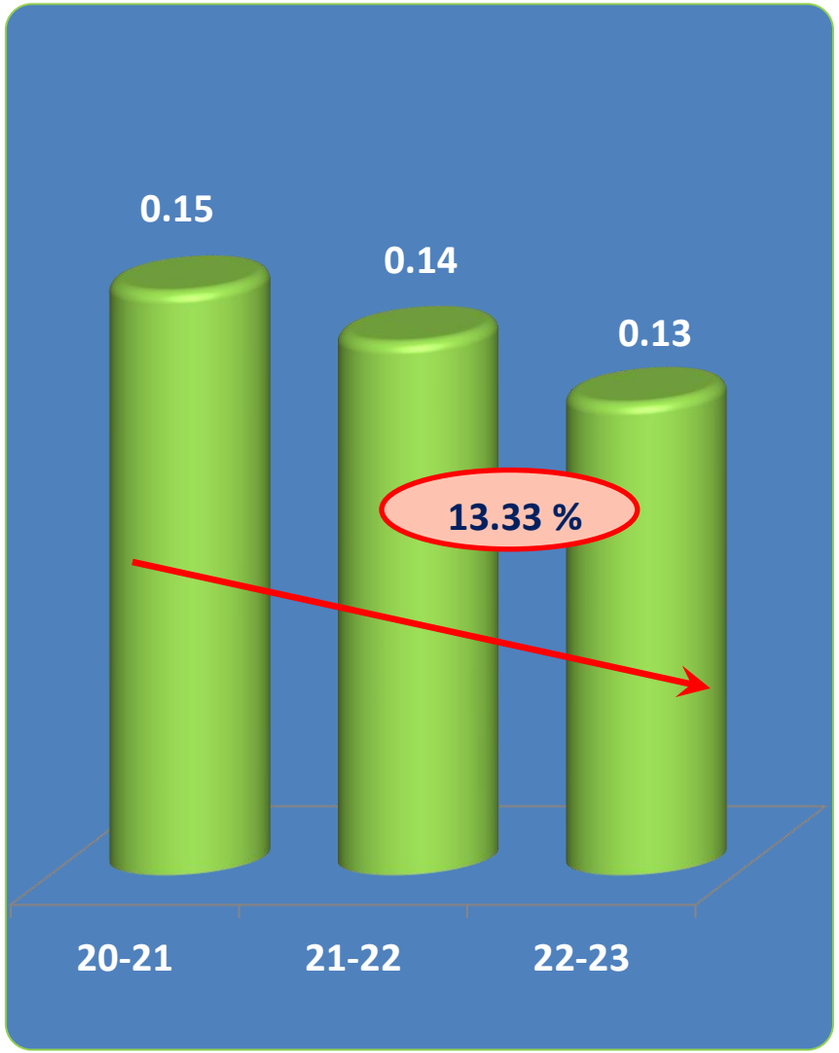
Plant Heat Rate (kcal / kWh)



Auxiliary Consumption (%)

Specific Energy Consumption-FAP

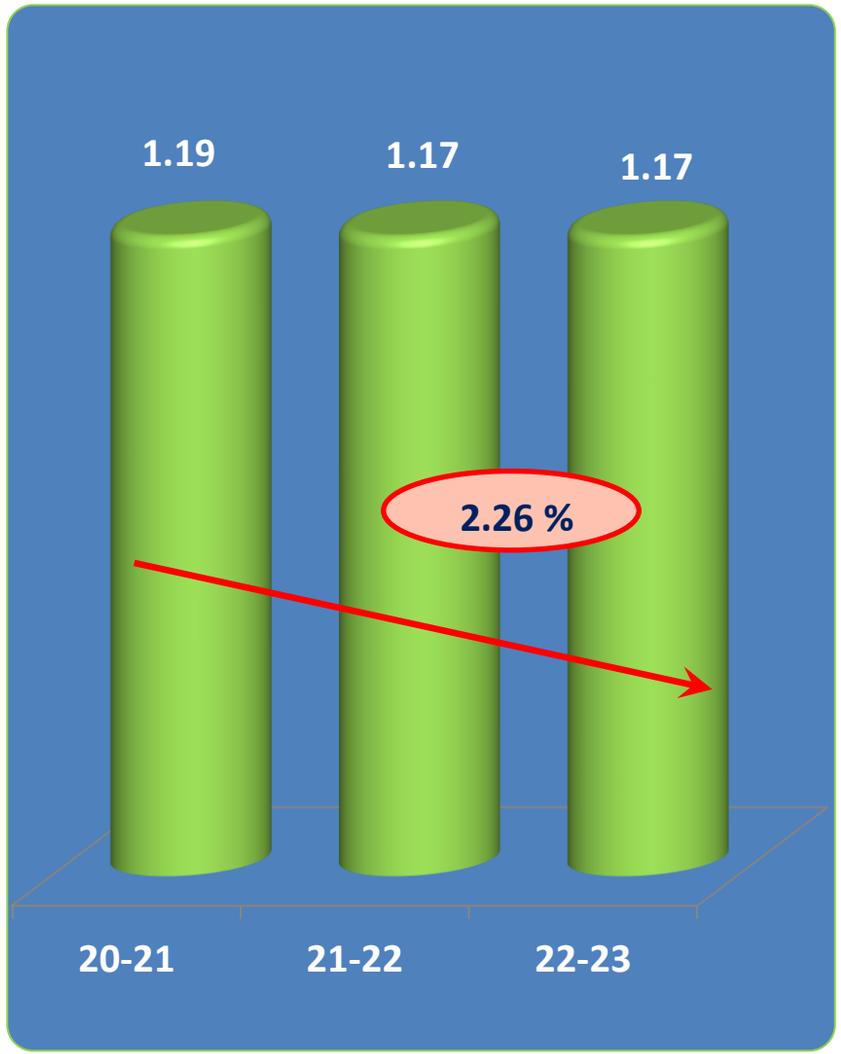
Sp. Electrical Energy Cons. (kWh/ MT)



Sp. Thermal Energy Cons. (Million Kcal/MT)

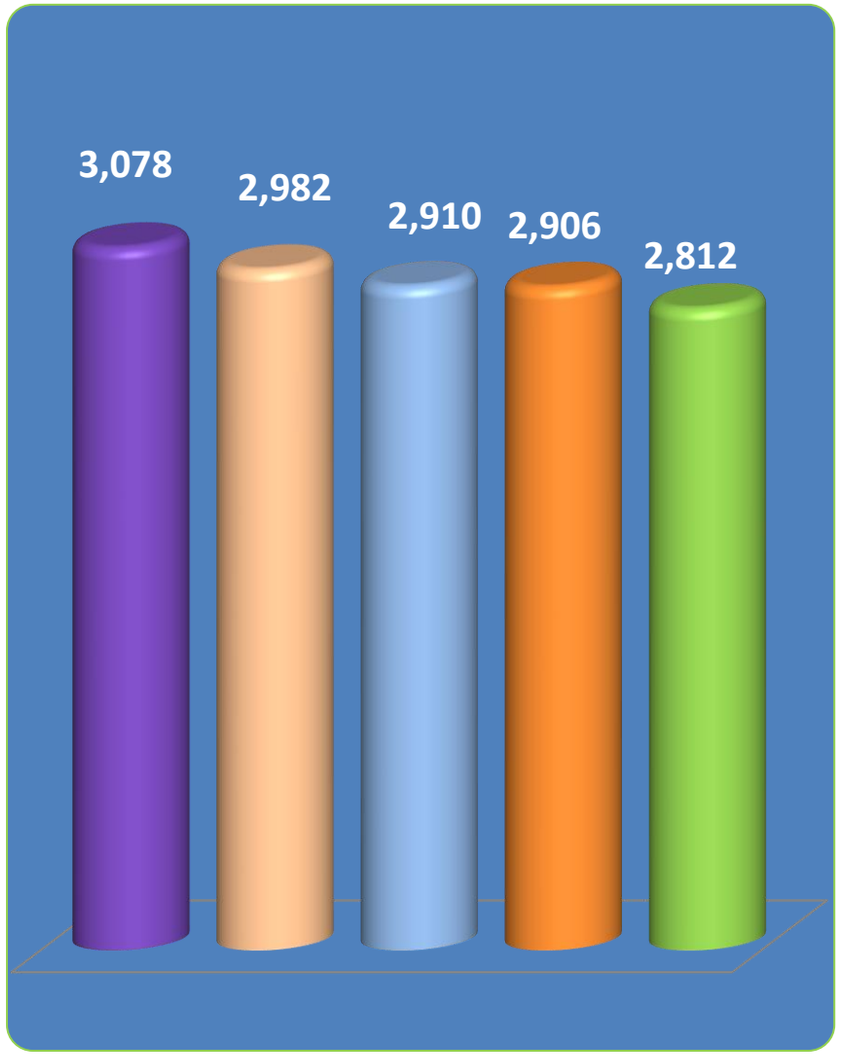
Note: The Sp. Electrical Energy Consumption of FAP, slightly increased due to number of furnace start/stops & Product change

Specific Energy Consumption-GtG



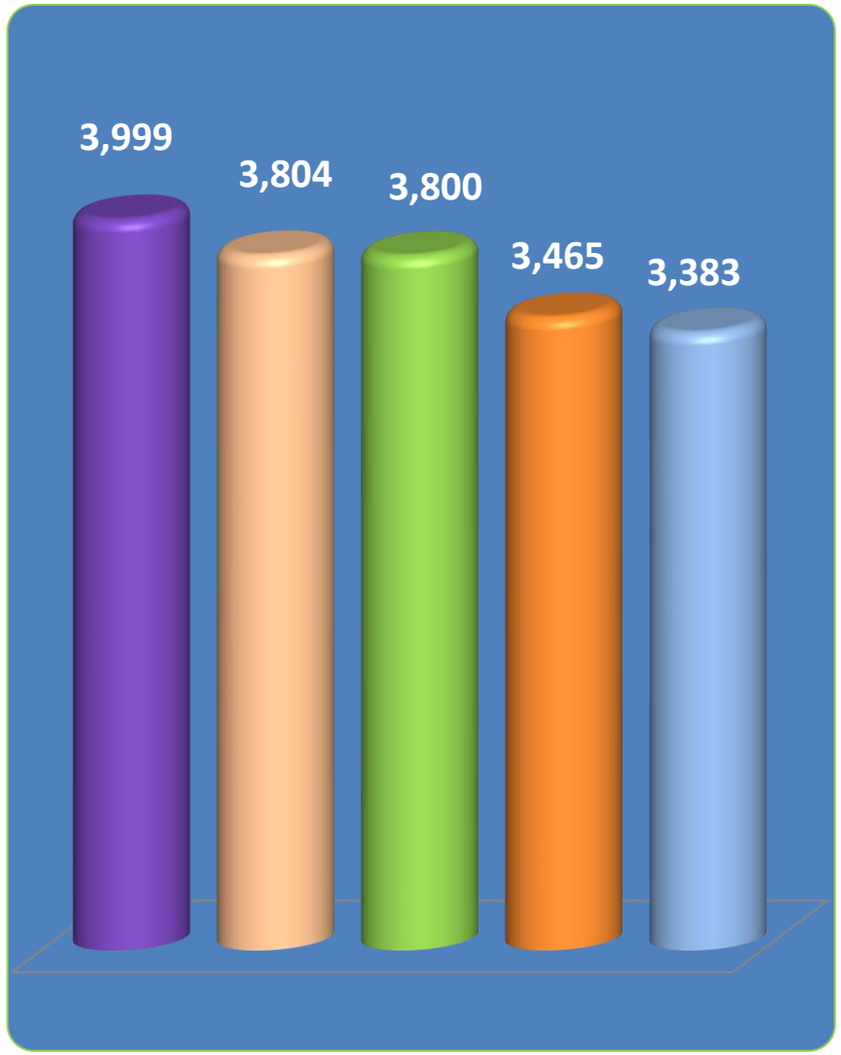
PAT - GtG Energy Consumption (Mtoe / MT)

Benchmarking



CPP - Gross Heat Rate

One of the Top EE Industry



FAP Sp. Electrical Energy Consumption

PAT Target

Player-1

Player-2

National Best

NAVA – DKL Best

Way Forward

- **Providing Variable Frequency Drives**

  - for Clarifier Pump

  - for FD Fan-1 & 2 in CPP-1

  - for AHU motor in ESP control room

- **Migration of conventional lamps to LED**

- **Major Overhauling of TG-2**

- **Installation of Aerodynamic Energy Efficient FRP Blades**

Anticipated Electrical Savings
0.811 MU

Anticipated Thermal Savings
9 Million Kcal

Summary of Measures

EnCon Projects:

Year	No of Measures	Investment (Rs. Million)	Electrical Savings (Million kWh)	Thermal Savings (Million Kcal)	Total Savings (Rs. Million)	Pay back period (Months)
2020-21	10	25.54	0.12	20926	19.23	16
2021-22	11	4.13	0.42	735	1.54	33
2022-23	10	6.14	0.21	345692	5.21	14

Resource Suggestion Scheme:

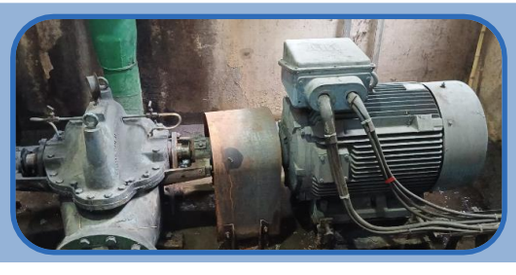
Year	No of Suggestions		Total Savings (Million kWh)	Total Savings (Rs. Million)
	Received	Executed		
2020-21	7	7	0.11	0.55
2021-22	9	9	0.24	0.27
2022-23	8	7	0.21	1.61

EnCon Measures (Thermal)

Replaced eroded APH tubes in module-1 of Boiler-1 & provided diversion plate in CPP-2		Implemented in : 2022-23 Coal Savings : 460 MT Cost Savings : 1.29 Rs. Million
Optimizing moisture content of ore by storing more quantity in chrome ore shed & covering the ore with tarpaulin		Implemented in : 2021-23 LPG Savings : 28.65 MT Cost Savings : 1.12 Rs. Million
Replaced eroded APH tubes of both Boilers in CPP-1		Implemented in : 2021-23 Coal Savings : 605 MT Cost Savings : 1.69 Rs. Million
Separated HPH & LPH drains by providing dedicated flash tanks		Implemented in : 2020-21 Coal Savings : 540 MT Cost Savings : 1.40 Rs. Million
Replaced damaged LP & HP Heaters in CPP-2		Implemented in : 2020-21 Coal Savings : 6060 MT Cost Savings : 15.76 Rs. Million

Energy Savings: 24149 Million Kcal | **Benefits** | **Cost Savings : 21.26 Rs. Million**

EnCon Measures (Pumps & Fans)

Replaced the blades of 1 CT Fan in CPP-2 with energy efficient aerodynamic FRP MOC blades (Make-Encon)		Implemented in : 2022-23 Energy Savings : 0.076 MU Cost Savings : 0.25 Rs. Million
Replaced Motor pulley of AHU at ESP control room in CPP-2		Implemented in : 2021-22 Energy Savings : 0.0023 MU Cost Savings : 0.007 Rs. Million
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
Installed MOV at slurry pump suction & provided interlock with Zig operation at MRP in FAP		Implemented in : 2021-22 Energy Savings : 0.0005 MU Cost Savings : 0.003 Rs. Million
Replaced Furnace-1 direct granulation pump with new pump by changing the design & MOC of impeller		Implemented in : 2020-21 Energy Savings : 0.0055 MU Cost Savings : 0.03 Rs. Million

Energy Savings: 0.26 Million kWh | **Benefits** | **Cost Savings : 0.87 Rs. Million**

EnCon Measures (Lighting & Others)

Replaced Cooling Tower drift eliminators & Optimized the blade angle in CPP-2		Implemented in : 2022-23 Energy Savings : 0.0067 MU Cost Savings : 0.022 Rs. Million
Installed Variable Frequency Drive for green Briquette screen in FAP		Implemented in : 2022-23 Energy Savings : 0.0123 MU Cost Savings : 0.04 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 conventional HPSV lights & CFL with LED in FAP		Implemented in : 2021-23 Energy Savings : 0.2512 MU Cost Savings : 0.46 Rs. Million
Replacing conventional HPSV lights & CFL with LED in CPP		Implemented in : 2021-23 Energy Savings : 0.158 MU Cost Savings : 0.521 Rs. Million

Benefits

Energy Savings: 0.17 Million kWh

Cost Savings : 1.07 Rs. Million

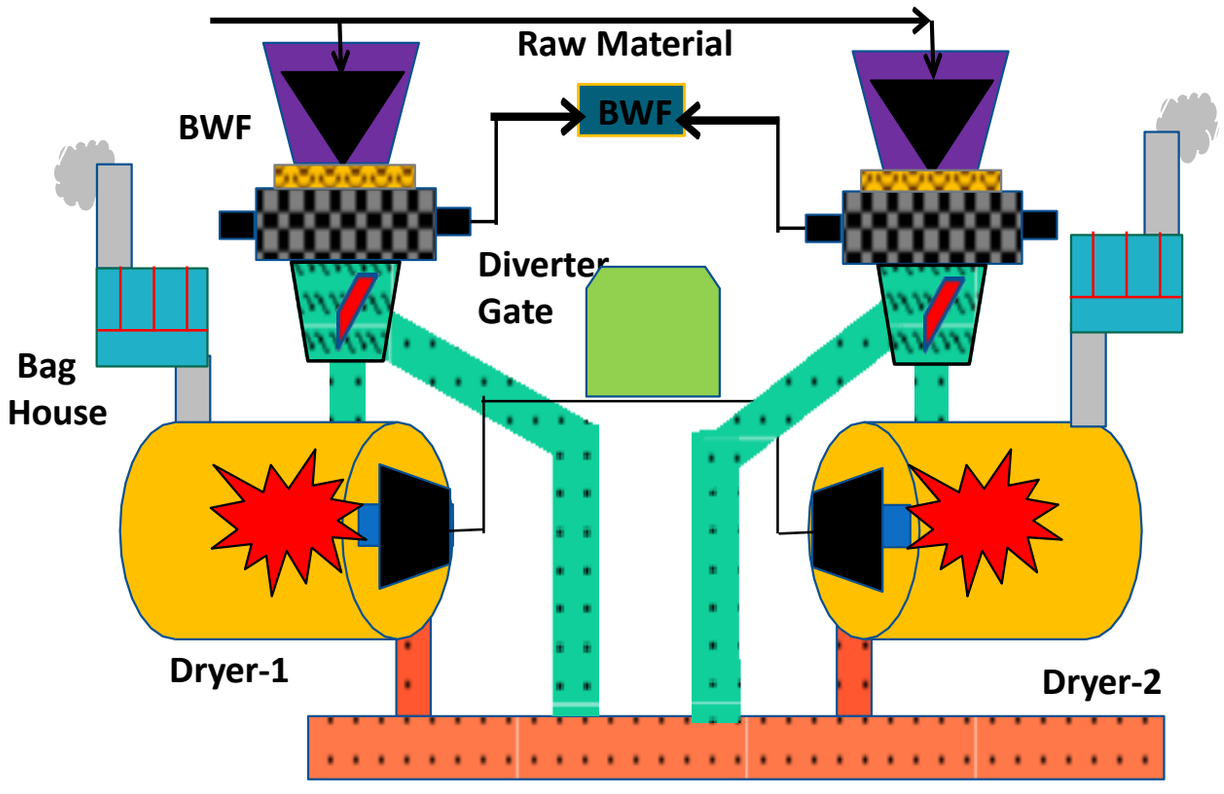
Dryer Efficiency Enhancement

Before

2 no of LPG fired Double Drum Rotary Dryers of capacity of 20 TPH are used to dry the ore from moisture of 8 % to 2 %. But at optimum valves closing condition the O/P moisture was found 1.5 %. As a result dryer consuming more LPG

After

Arranged a bypass chute from inlet to outlet conveyor for partial blending of high moisture ore, over dried output & there by desired output moisture of 2% is obtained



Result / Benefit Achieved:

- **Improved Efficiency**
- **Reduced Molasses consumption**
- **Reduced LPG consumption (75 Kg / day)**
- **Reduced Electrical consumption (261 kWh/ day)**

Incremental Innovation in CCSY

Deviation

Significant power consumption of CCSY & High diesel consumption of unloading equipment

Root cause

Idle running of Crushed Coal Stacking System equipment & Improper location of BF-2 (design (OEM) constraints)

Action Taken

- **Dismantling of concrete wall at back side of the Truck tippler ground hoppers**
- **Enlarging GH-1 & 2 grizzly openings from 200 x 200 mm to 400x400 mm**
- **Enlarging all transfer point chutes to accommodate the lump coals size up to 400 mm**
- **Relocation of BF-2 (From Transfer house-2 to CPP-2 Ground hoppers)**

Result / Benefit Achieved

- **Reduced Power Consumption (0.162 kWh /MT of coal feed)**
- **Reduced Running hrs of Dozer & Unloading equipment**

Incremental Innovation in CCSY contd...

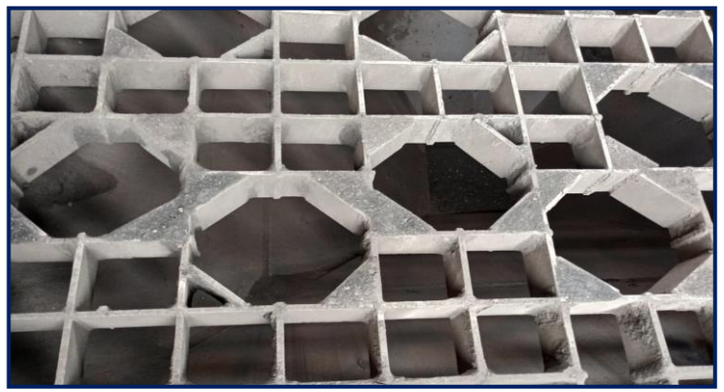
Before

Concrete Wall

After

Before

GH Grizzly Opening



After

Before

Belt Feeder-2

After

Solar Power Harnessing

- Installed **solar water heaters** at guest house & Bachelor hostel
- Utilizing **passive sun lighting** at applicable areas in the plant
- Installed **NoriKool double glazed** transparent sheet
- Construction of office & club building with **Eco Friendly lighting**
- Installed **Solar Street Lights & Turbo ventilators**

RPO Compliance:

Solar - 1210 & Non Solar – 6773 for the FY 22-23

Solar & Renewable Installations of NAVA

High Efficiency roof top solar power plant at Silicon House

40 kW Solar Power Unit at Nava Bharat Schools, Paloncha

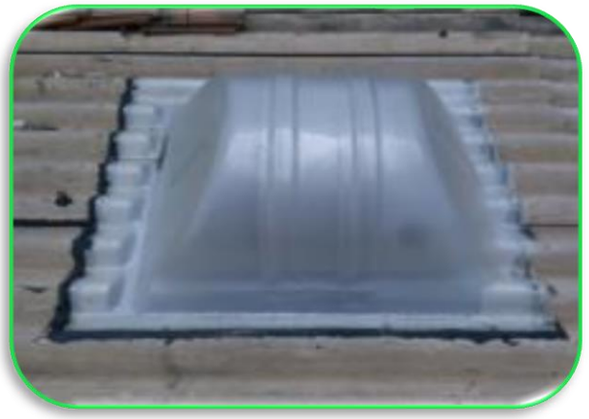
Solar water heaters at Dhenkanal & Paloncha

Solar Street Lights at Dhenkanal & Paloncha

Turbo Ventilators at Dhenkanal & Samalkot

CSTR Bio-Digester to recover biogas & to use as fuel to distillery boiler

Waste Heat recovery system from furnace flue gas at Paloncha



Using Passive day lighting at Dhenkanal & Paloncha

GHG Management

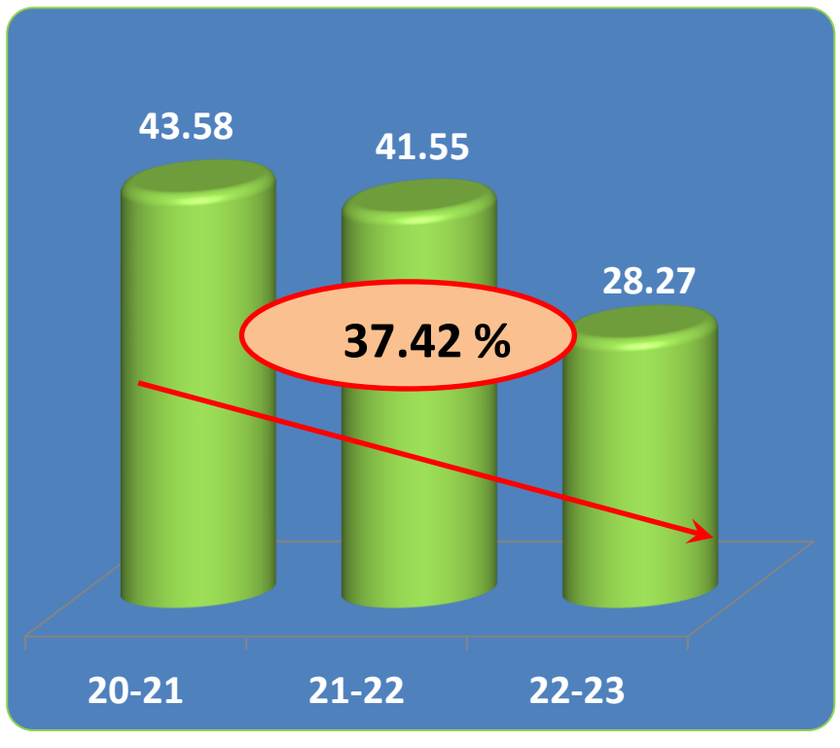
Adopted Emission based calculation approach for calculating the Co_2e

Scope-1

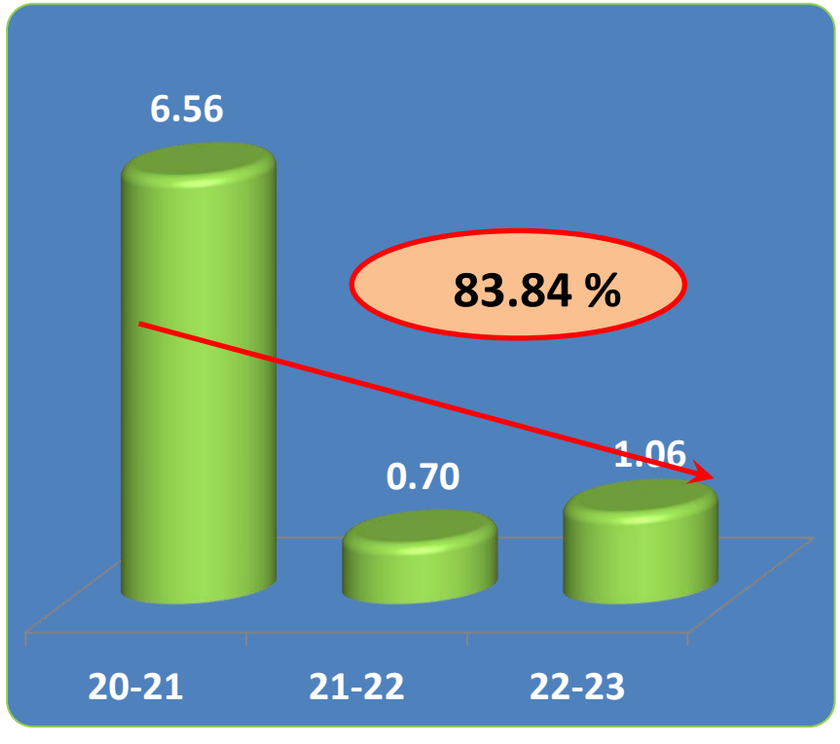
- **Fuel used in Power Generation**
- **Start-up oil consumption**
- **Fuel used in Dryer**

Scope-2

- **Import power from Grid**



Scope-1 Emissions Intensity (CO_2e / MT)



Scope-2 Emissions Intensity (CO_2e / MT)

Environmental Concern

Environmental management programs During last five years:

- Installed **MK-IV controller**, **Ammonia & Lime dozing system**
- Installed **Online Mercury Analyzer**, **HDIP camera & Ammonia** monitoring systems
- Installed **dust extraction system, Wheel Washing System**
- Provided **Water Spray** & **Atomizing water spray nozzles**
- Installed **Oil traps, Aerators & Neutralization Pit**
- Construction of **Silt catch Pits** at applicable areas

Net Zero Initiatives

- Utilizing **Vapor Absorption Machine**
- Using **Battery operated vehicles** with in plant premises
- Reusing of waste oil generated during maintenance in **mud gun mass preparation** in FAP
- **Mechanical waste convertor** to convert organic waste to compost
- Installed **Ash product plant**
- 100 % **Fly ash utilization**
- **Zero Liquid discharge through**
  - STP (Bio-digester & Phytorid Technology)
  - Reusing CT Blow Down & Clarifier sludge Water
  - Recycling Boiler Blow down & Filter back wash water

Energy Management System (ISO 50001:2011)

Identifying the Legal & Other Requirements

Conducting energy Review / Audit (Internal / External)

Identifying & prioritizing the Opportunities for Improvement

Establishing the Baseline, Identifying the EnPI

Establishing the Objectives & Targets

Establishing the Action Plans

Ensuring the Competency of People & creating awareness

Establishing & Communicating the Operational Criteria for effective & 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

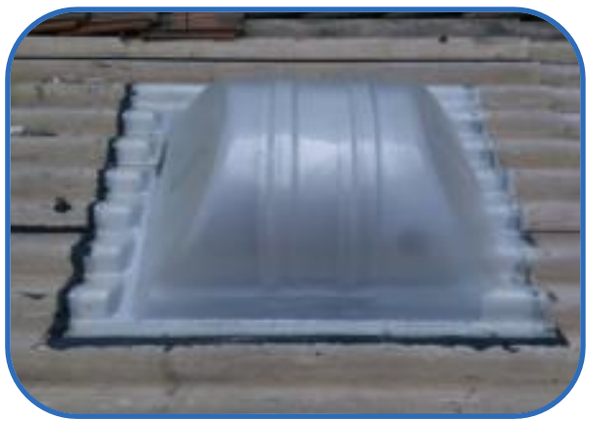
Identifying potential non conformities & taking C-CAPA

Learnings from EnMS

- Installed Energy Meters for Significant Energy Uses
- Periodical Ongoing Energy Review
- Record of Energy Deviations & Management Action Plan (REDMAP)
- Monitoring Variables & Controls
- Conditioning Monitoring & performance evaluation of Critical equipment

Learning from CII

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



Workers and Employee Involvement

Description of the Project	Suggested By	Year
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 pump in CPP-2 by providing Float switch	DM Plant Chemist	2020-21
Reducing the running hours of slurry pump at MRP in FAP by providing Float switch	FAP Electrician	2021-22
Replacing the old inefficient sieving machine with new energy efficient sieving machine	Silo Operator	2021-22
Replacing 7.5 kW, 20 m3 Neutralization pit pump-2 with 11 kW, 40 m3 energy efficient pump (IE2) in Unit-1	Supervisor	2021-22
Replacing 8 No's of conventional 400 W HPSV lights with 120 W LED lights at boundary & CCSY area	PP Electrician	2022-23
Replacement of 112 numbers of Conventional lights with Energy Efficient LED lights in plant	FAP Electrician	2022-23

Awareness on Resource conservation

- Observing **Energy Conservation week**
- Improving awareness through **internal training**
- Showing the **external presentations** to core team
- Providing Training on **SEU & its Variables**
- Deputing the staff to **External Seminars**
- Display of **awareness posters**
- Utilizing the **whatsApp** for sharing the Tips
- Resource Suggestion Scheme

Energy Conservation Week

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

Excellence Endorsed

Resources Management

- CII - National Award for Excellence in Energy Management (8 Times)
- CII(ER) - 4 Star Rating in Energy Management (2 Times)
- CII - National Award for Excellence in Water Management (2 Times)
- EIC-SDA (O) – State Energy Conservation Award (1 Time)

Environmental Management

- SPCB (O) - Pollution Control Excellence Award (3 Times)
- MOEF (O) - Prakruthi Mithra award (1 Time)

Safety

- DFB (O) - Best Performance in Safety & Environment (4 Times)
- DFB (O) - State Safety Awards (5 Times)
- DFB (O) - State Safety Awards in different categories (5 Times)
- EIC – DOE (O) - State Electrical Safety Award (1 Time)

Tree Plantation

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

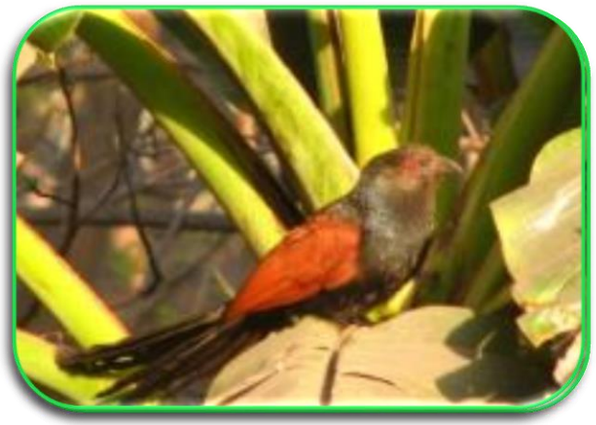
- **No. of trees planted so far : 69089**
- **Survival percentage : 89 %**

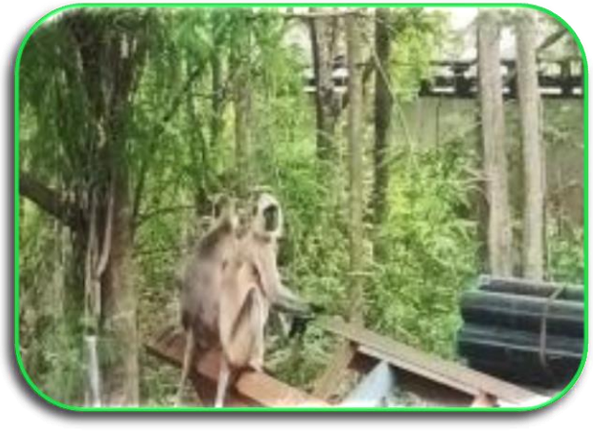
Biodiversity










Thank You for your Attention

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