

**PRESENTATION**  
**For**  
**CII GBC NATIONAL ENERGY AWARD**  
**FOR**  
**EXCELLENCE IN ENERGY MANAGEMENT**

**Rashtriya Ispat Nigam Limited**  
**VISAKHAPATNAM STEEL PLANT**



## TEAM MEMBERS

**K V Bangar Raju, Sr. Mgr(EMD)**

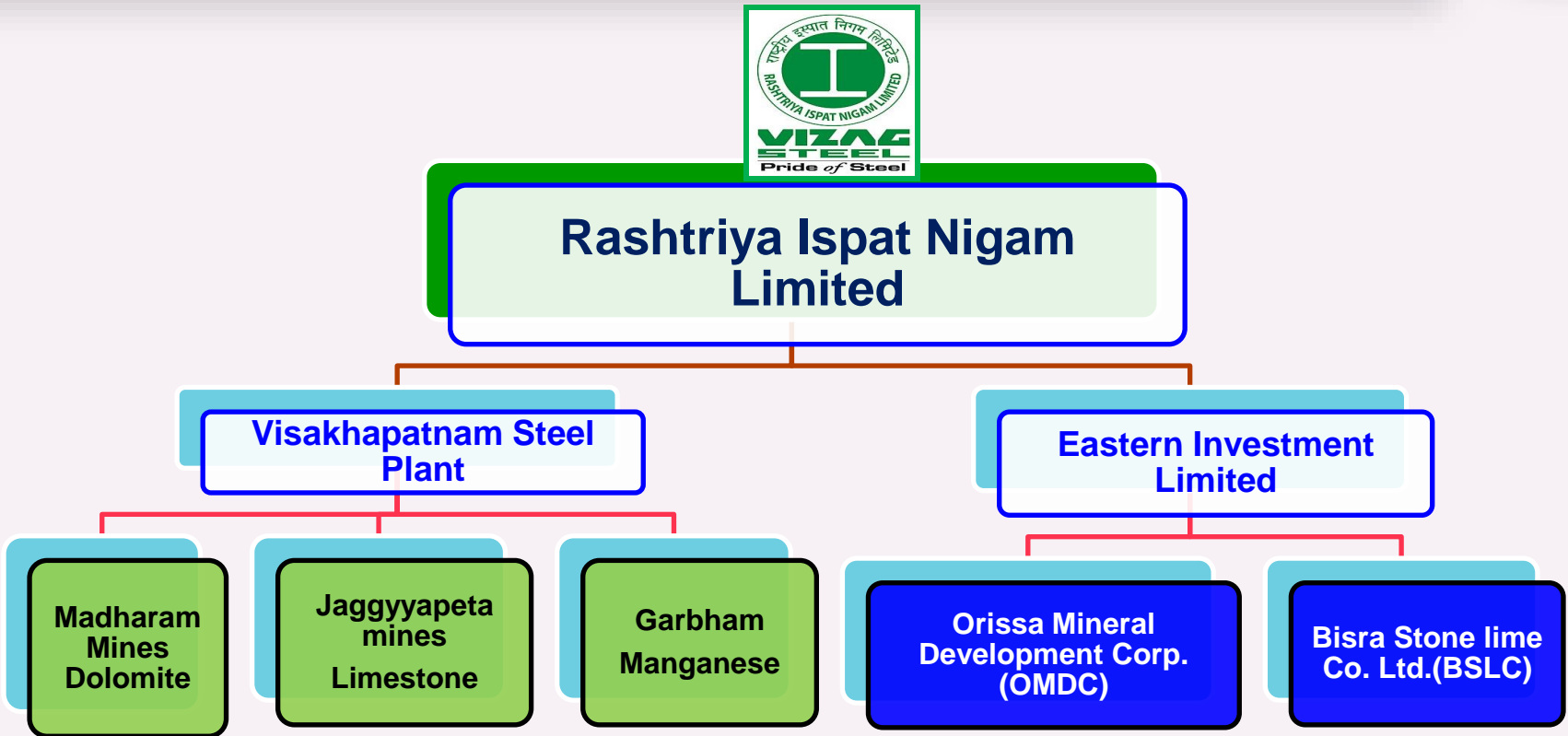
**N K Rastogi, Mgr (EMD)**

**K SUDHAKAR, GM(EMD)I/c**  
**Designated Energy Manager**

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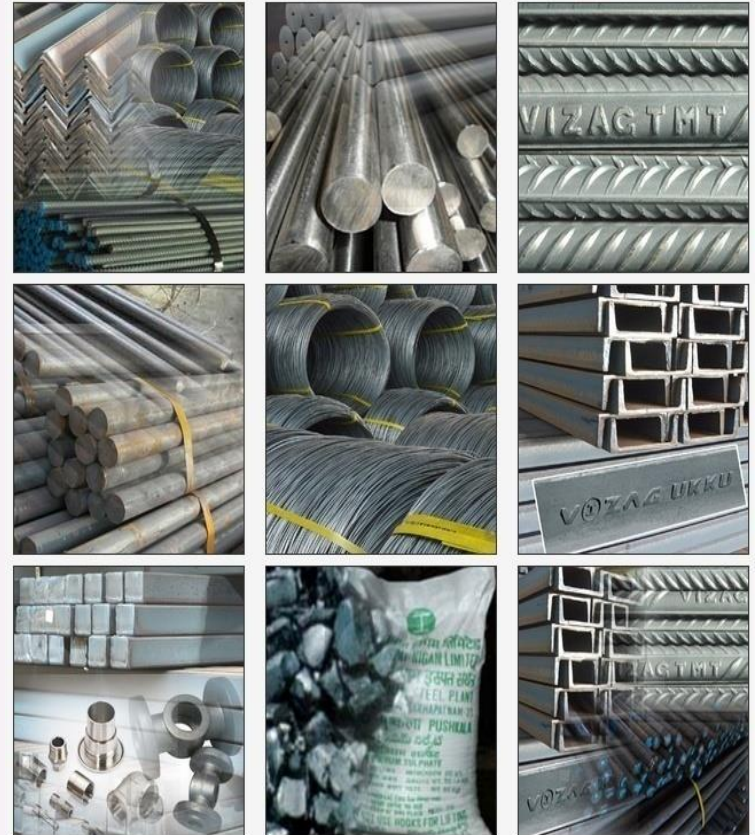
# RINL Corporate Structure



# RINL – Growth Plan

- RINL's completed Upgradation & Modernization for 7.3 MTPA of Crude Steel.
- Products includes bars, rods, wire rod and structural's and Value Added Products
- Vision envisages growth to 20 Mtpa by 2032-33 in phases

Turnover (2023-24)- **23,224** INR Cr





# Major Accreditations

The 1<sup>st</sup> ISP to be certified for Quality, Health & Safety and Environment

1<sup>st</sup> Steel Plant to get ISO 50001 certification for Energy Management

1<sup>st</sup> Steel PSE to sign Integrity Pact of Transparency International

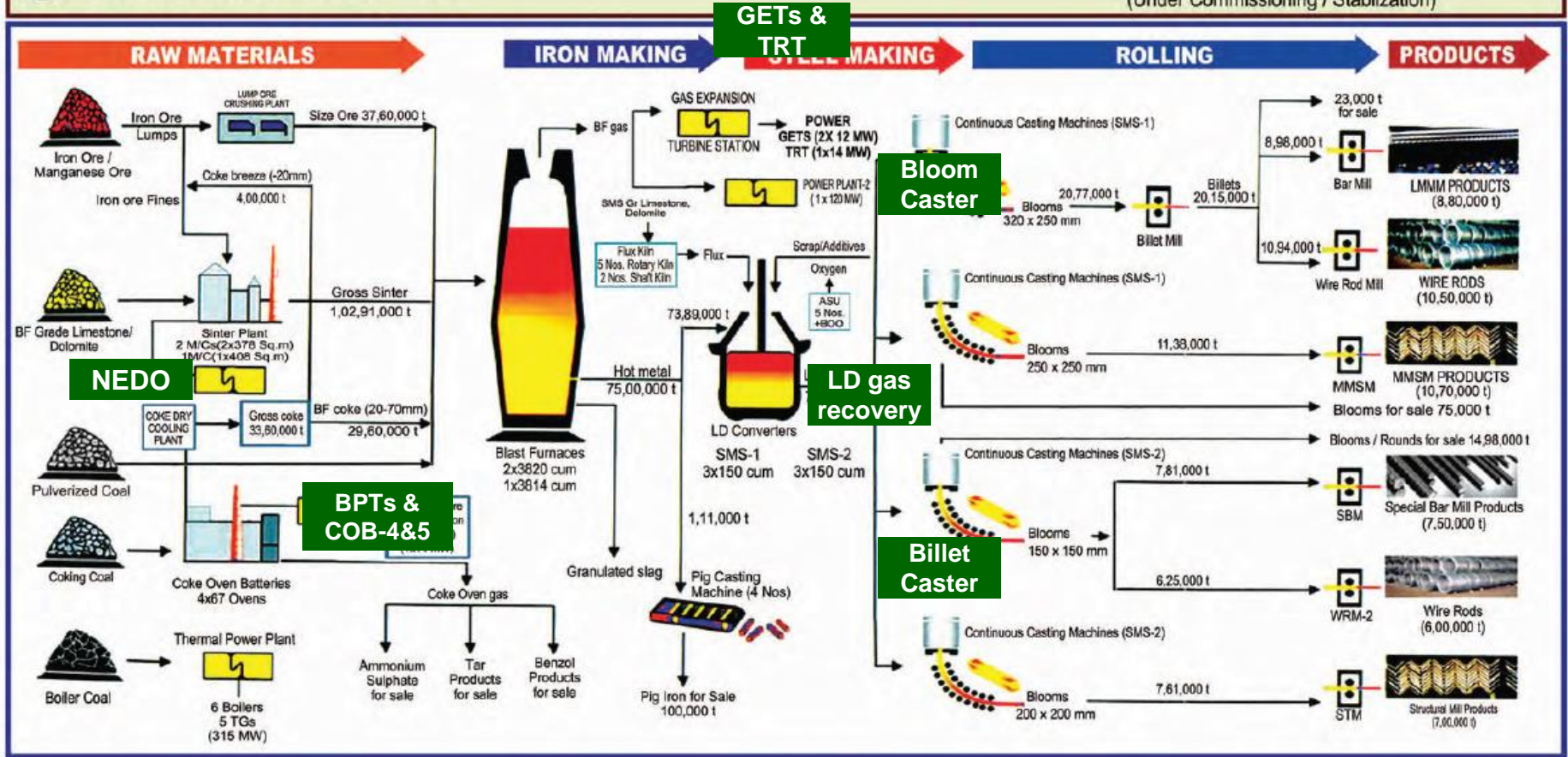
CMMI Level 3 certification for IT Systems and ISO 27001 for ISMS

1<sup>st</sup> ISP to be 5S Certified for the whole plant



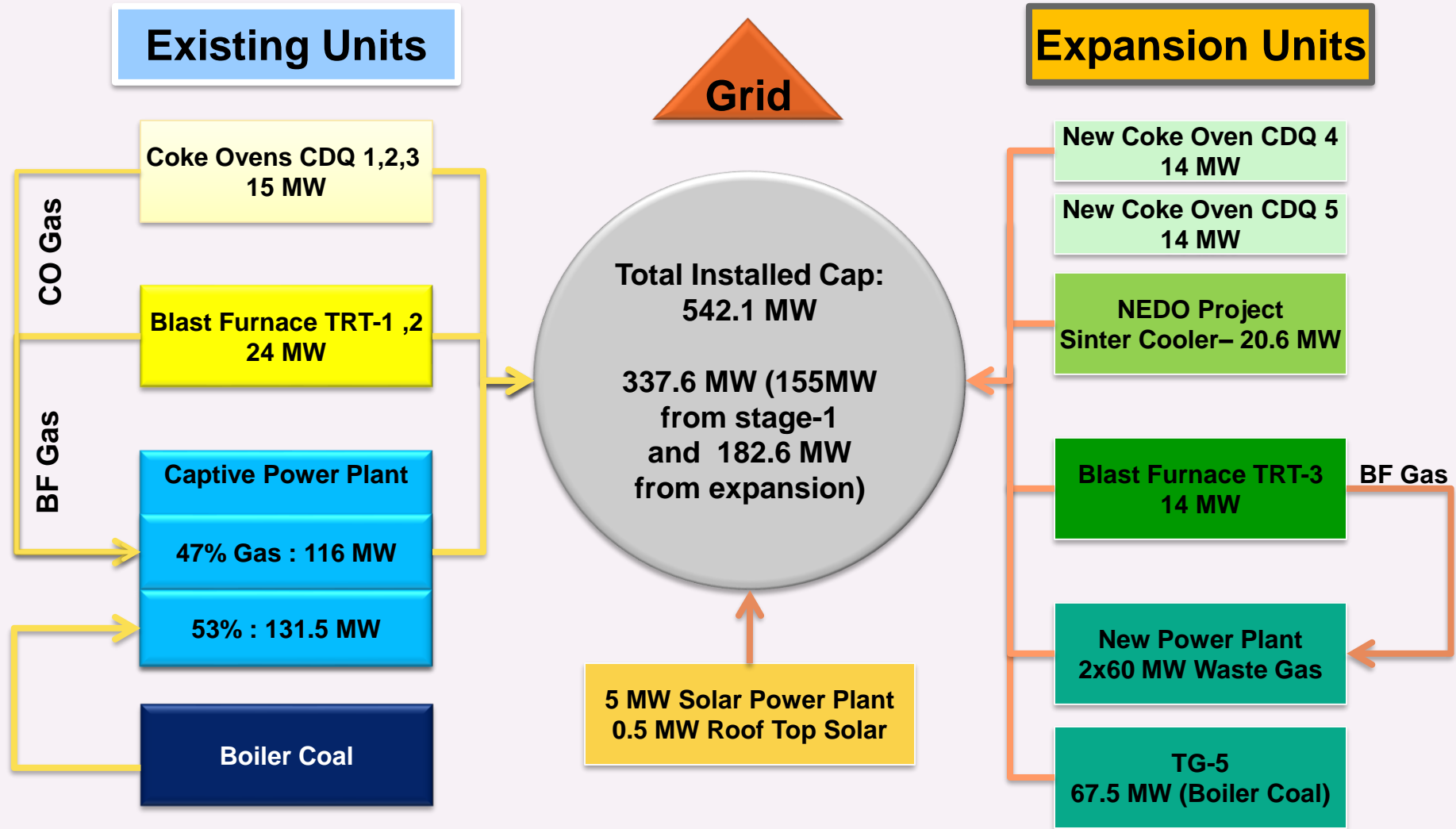
**VISAKHAPATNAM STEEL PLANT**

**FLOW CHART (7.3 MT STAGE)**  
 (Under Commissioning / Stabilization)



- Sinter Plant with NEDO
- CO Battery with Coke Dry Quenching and Back Pressure Turbine Station.
- BFs with Gas Expansion Turbine & Top Recovery Turbine station.
- SMS-1 & 2 with LD gas recovery plant.
- Continuous Bloom & Billet caster.

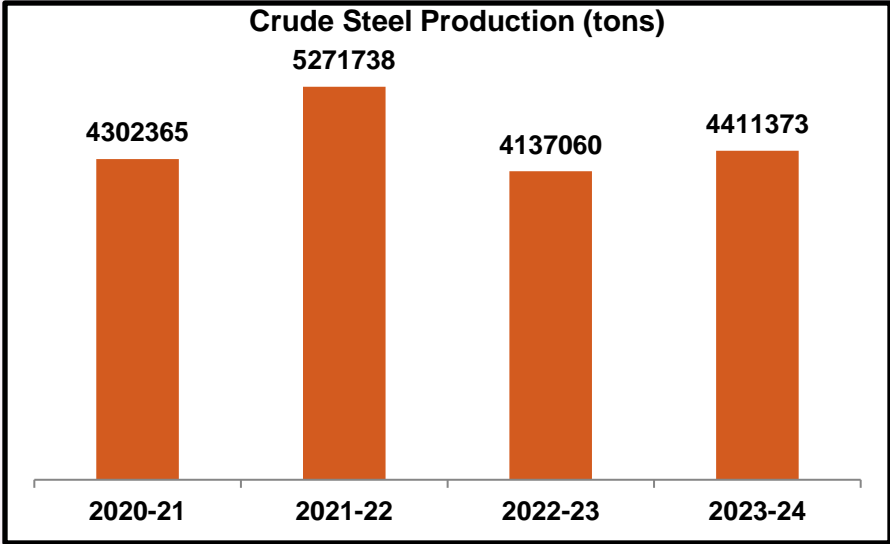
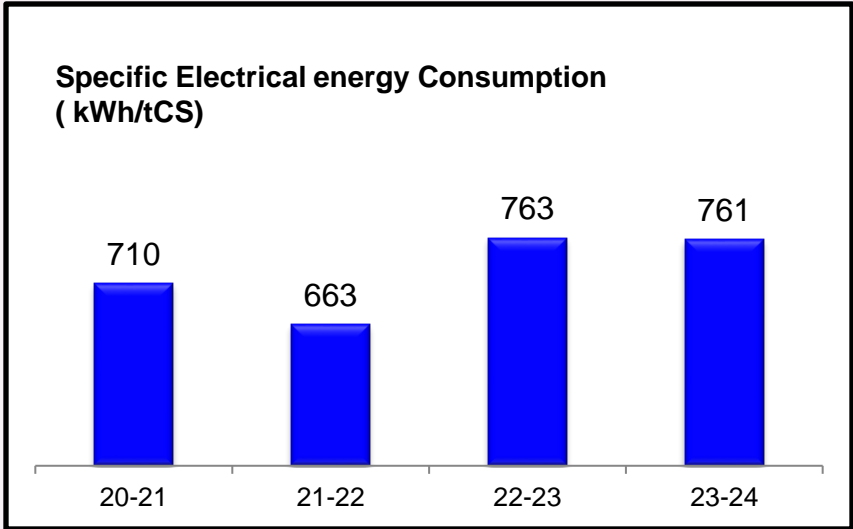
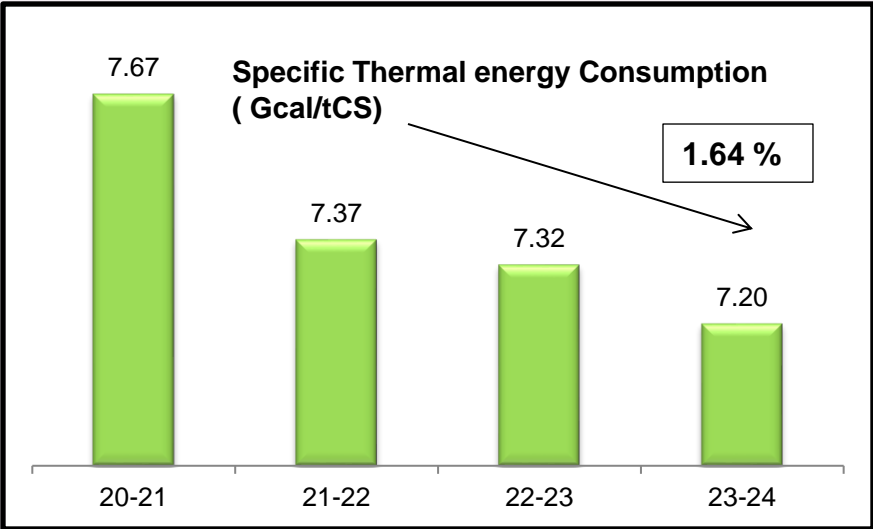
# Power Generation capacity from Waste Energy (MW)



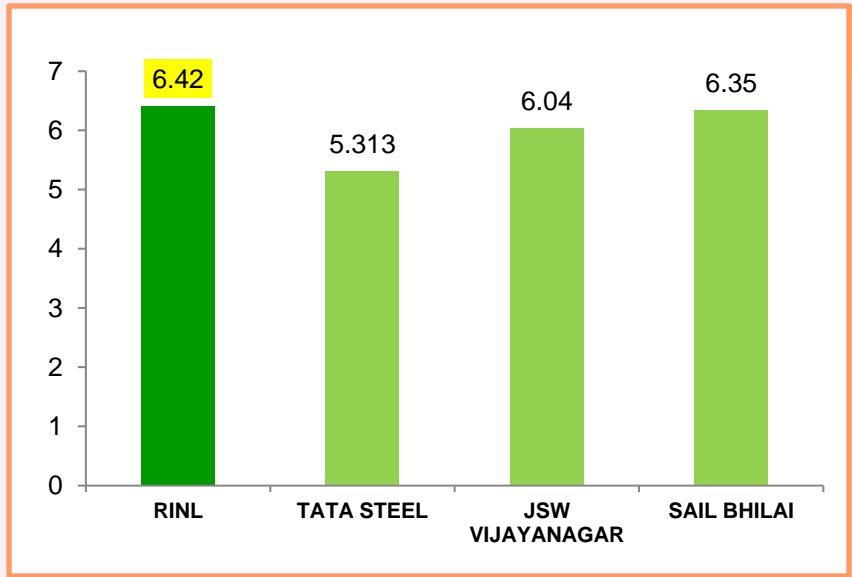
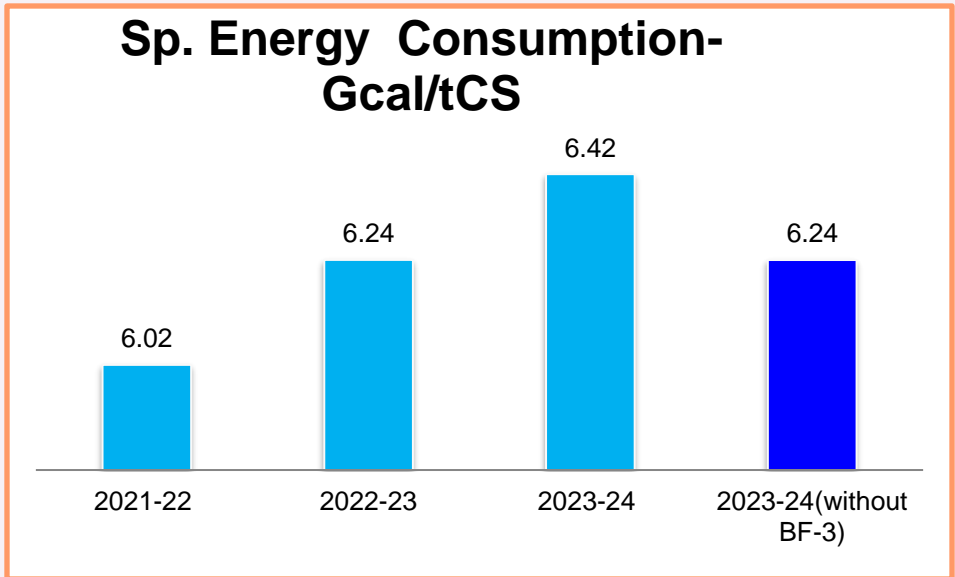
<b>Total Installed capacity:</b>	<b>542.1 MW</b>
<b>Total Power generation from Waste Energy:</b>	<b>337.6 MW</b>
<b>% of Power Generation through Waste Energy:</b>	<b>63.3%</b>



# Energy Consumption Overview



# Internal Bench Marking of SEC(Gcal/tCS)

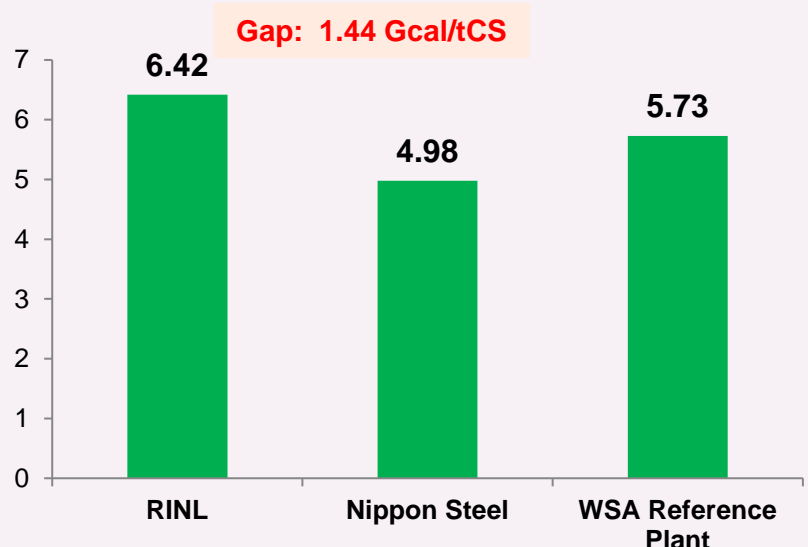


Energy(2023-24)		GHG Emission		Gap : 1.1 Gcal/tCS
RINL	Tata Steel	RINL	Tata Steel	
6.42	5.313	2.76	2.43	<ol style="list-style-type: none"> <li>1) Coal injection &gt; 182kg/tHM(0.20 Gcal/tCS) vs 82 kg/tHM</li> <li>2) Fuel rate 526 kg/tHM vs 569 kg/tHM (0.29 Gcal/tCS).</li> <li>3) Plant Production: 10.6 Mt Crude Steel.</li> <li>4) Gross coke yield: 74.5% vs 72.3%</li> <li>5) CO gas yield: 319 vs 330 Nm3/TDC</li> <li>6) LD gas yield: 87 vs 108 Nm3</li> </ol>

# External Bench Marking of SEC(Gcal/tCS)

Energy(2023-24)		GHG Emission		<b>Gap :1.44 Gcal/tCS</b>  <b>1) Scrap usage : 200 kg/thm( As per Japanese Industry)-RINL: 83 kg/tCS</b> <b>2) All Energy Conservation technologies</b> <b>Coke Dry Quenching,</b> <b>Top Pressure Recovery Turbine,</b> <b>BOF Gas Recovery,</b> <b>Sinter Cooler waste heat recovery</b> <b>Pulverized Coal Injection,</b> <b>BF stoves Heat Recovery,</b> <b>Billet Caster,</b> <b>Hot Charging,</b> <b>Regenerative Burners,</b> <b>Coal Moisture Control</b> <b>Hydrogen injection in BF</b> <b>Sensible Heat recovery from BOF gas</b> <b>3) Waste Plastics Injection and tires(0.2 million tons- 6 kg/tCS)</b> <b>4) Petro fuel 16 lts/Tcs</b>
RINL	NSC	RINL	NSC	
6.42	4.98	2.75	1.96	



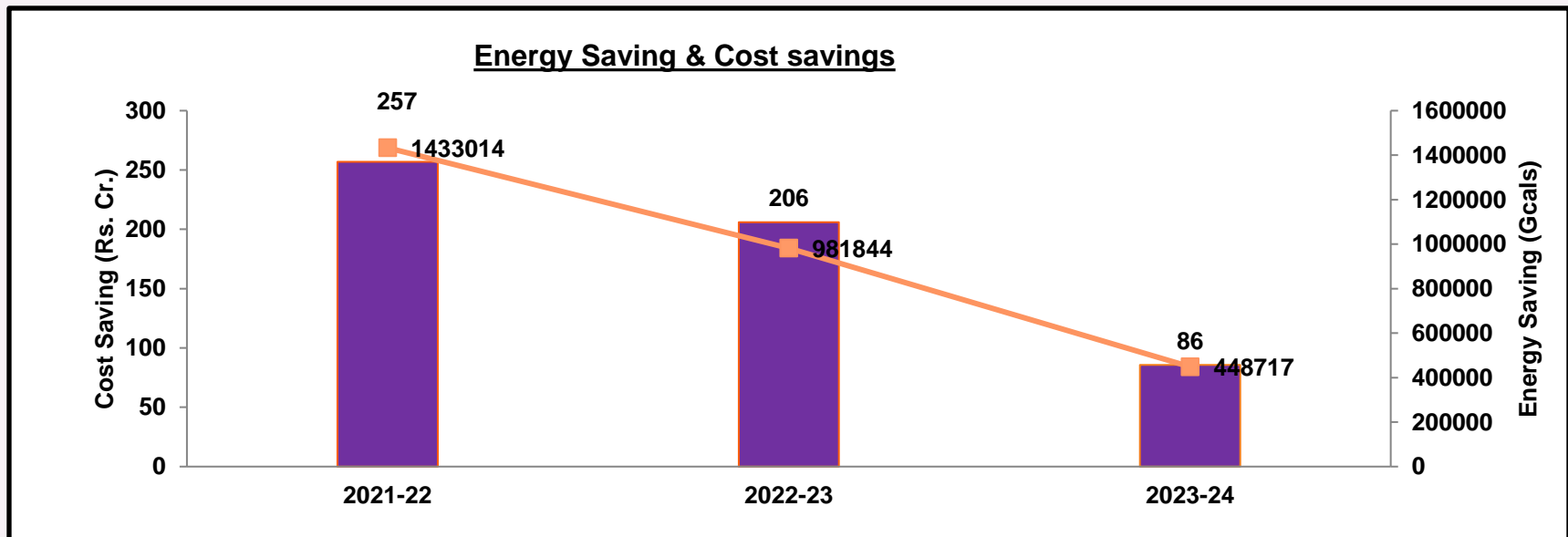
Entity	Energy Consumption (Gcal/tCS)
RINL	6.42
Nippon Steel	4.98
WSA Reference Plant	5.73

## Energy Conservation Projects planned in 2024-25

Sl No	Name of Energy Conservation Activity	Expected Energy Savings	
		Gcal /MkWh	Rs. Million
1	Increasing the PCI consumption in BF 2 from 83.4 kg/thm to 114 kg/thm	97082	14.35
2	Increasing the PCI consumption in BF3 from 40.8 kg/thm to 110 kg/thm	219544	32.46
3	Increasing the power generation from TRT of BF-3 from 1.11 MW to 10MW.	78	68.3
4	Improving power generation from waste heat recovery of COB 4 from 4.34MW to 9MW	41	35.8
5	Re commissioning of SHRPP to generate power to 5MW	44	38.4
6	Re commissioning of 5MW solar power plant to generate 0.9 MW.	8	6.9
	<b>Total Savings</b>		<b>196.2</b>

# Summary of the Projects identified & Implemented

YEAR	No of Projects	Investment In Rs Cr	Thermal Savings (Gcals)	Electrical Savings (Million KWH)	Savings in Rs.Cr	Savings (GcaltC S)	Payback period
2021-22	26	0.123	1073878	149.64	257.3	0.272	< 1 year
2022-23	21	22	835756	60.87	206	0.237	< 1 year
2023-24	15	10	359221	37.29	85.7	0.101	< 1 year





## ENCON Projects with Investment (2021-22)



S.No.	Title of Project	Energy Savings in	
		Gcal/ MKwh	Rs Millions
1	Reduction in Power Consumption during Deriming at Air Separation Unit-5	0.78	0.13
2	Hydraulic Modification in MMSM reheating furnace	15785	1.0
3	Reduction in power Consumption by reducing idle running of Stelmor Blowers at Wire Rod Mill	1.06	0.10

## ENCON Projects with no Investment (2021-22)

S.No.	Title of Project	Energy Savings in	
		Gcal/ MKwh	Rs Millions
1	Improvement in tar yield at coke oven from 3.07% to 3.09%	3884	5
2	Reduction in coke breeze consumption at Sinter Plant from 71.6 Kg/t charged sinter to 64.2 Kg/t charged Sinter.	403953	541
3	Reduction in Sp. Heat Consumption of Sinter Plant-2 from 12 Mcal/tGS to 11 Mcal/tGS.	3285	4
4	Reduction in Sp. Power Consumption of Sinter Plant-1 from 63.03 Kwh/tGS to 62.13 Kwh/tGS.	4.25	32
5	Increasing in Pulverized Coal Injection (PCI) in Blast Furnace-2 from 82.9 Kg/tHM to 100.3 Kg/tHM.	150692	202
6	Reduction in Sp. Power Consumption of Blast Furnace-3 from 50.41 Kwh/tHM to 42.27 Kwh/tHM.	10.5	80
7	Improvement in LD gas yield at SMS from 81 Ncum/tCS to 92 Ncum/tCS.	106526	143
8	Reduction in Sp. Heat Consumption of SMS-1 from 38 Mcal/tCS to 31 Mcal/tCS.	18760	25
9	Reduction in Sp. Heat Consumption of SMS-2 from 35 Mcal/tCS to 33 Mcal/tCS.	5184	7
10	Reduction in Sp. Power Consumption of SMS-2 from 113.06 Kwh /tCS to 109.70 Kwh /tCS.	8.71	66

## ENCON Projects with no Investment (2021-22)

S.No	Title of Project	Energy Savings in	
		Gcal/ MKwh	Rs Millions
11	Reduction in Sp. Power Consumption of Bar Mill from 72.91 Kwh /tIP to 67.81 Kwh /tIP.	4.33	33
12	Reduction in Sp. Heat Consumption of Special Bar Mill from 323 Mcal /tIP to 306 Mcal/tIP	7260	10
13	Reduction in Sp. Power Consumption of Special Bar Mill from 115.35 Kwh /tIP to 109.02 Kwh /tIP.	2.70	21
14	Reduction in Sp. Power Consumption of WRM-2 from 200.46 Kwh /tIP to 193.31 Kwh /tIP	3.62	28
15	Reduction in Sp. Power Consumption of MMSM from 91.67 Kwh /tIP to 76.08 Kwh /tIP.	11.19	85
16	Reduction in Sp. Heat Consumption of STM from 335 Mcal /tIP to 309 Mcal /tIP.	10730	14
17	Reduction in Sp. Power Consumption of STM from 106.79 Kwh /tIP to 96.38 Kwh /tIP.	0.01	0.08
18	Reduction in Sp. Power Consumption of CRMP from 41.82 Kwh /tGL to 35.28 Kwh /tGL.	4	32
19	Reduction in Sp. Heat Consumption of CRMP-1 from 1329 Mcal /tGL to 1220 Mcal /tGL.	23418	31
20	Reduction in Sp. Heat Consumption of CRMP-2 from 951 Mcal /tGL to 909 Mcal /tGL.	18020	24
21	Improvement in power generation in BPTS from 7.54 MW to 10.91 MW	29.52	224
22	Improvement in power generation in COB-4&5 from 7.95 MW to 15.79 MW.	68.68	521
23	Reduction in BF Gas bleeding from 10.28 % to 6.64 %.	306383	410

## ENCON Projects with Investment (2022-23)

S.No.	Title of Project	Investment	Energy Savings in		Payback
		(INR Million)	Gcal /MKwh	Rs Millions	Months
1	Re-Comissioing of LD Gas Holder-2	220	42212	74	35

## ENCON Projects with no Investment (2022-23)

S.No.	Title of Project	Energy Savings in	
		Gcal/ MKwh	Rs Millions
1	Reduction in Sp. Heat Consumption of Coke Oven from 678 Mcal/tDC to 636 Mcal/tDC.	147439	258
2	Improvement in Crude Tar yield from 3.09 % to 3.10 %.	2239	4
3	Reduction in Sp. Heat Consumption of Blast Furnace from 514 Mcal/tHM to 486 Mcal/tHM.	123400	216
4	Reduction in Sp. Power Consumption of Blast Furnace from 61.06 Kwh/tHM to 59.36 Kwh/tHM.	7.49	73
5	Improvement in LD gas yield at SMS-1 from 105 Ncum/tCS to 118 Ncum/tCS.	52530	92
6	Improvement in LD gas yield at SMS-2 from 80 Ncum/tCS to 92 Ncum/tCS.	42212	74
7	Reduction in Sp. Heat Consumption of MMSM from 462 Mcal/tIB to 401 Mcal/tIB.	38073	67
8	Reduction in Sp. Heat Consumption of WRM-2 from 258 Mcal/tIB to 244 Mcal/tIB.	8035	14

## ENCON Projects with no Investment (2022-23)

S.No.	Title of Project	Energy Savings in	
		Gcal/ MKwh	Rs Millions
9	Reduction in Sp. Power Consumption of WRM-2 from 193.3 KWH/tIB to 179.3 KWH/tIB.	8.03	78
10	Reduction in Sp. Power Consumption of SBM from 109 KWH/tIB to 94.7 KWH/tIB.	7.89	77
11	Reduction in Sp. Heat Consumption of STM from 309 Mcal/tIB to 295 Mcal/tIB.	8170	14
12	Reduction in Sp. Power Consumption of STM from 96.38 KWH/tIB to 80.14 KWH/tIB.	9.48	92
13	Reduction in Sp. Power Consumption of CRMP-1&2 from 35.28 KWH/tGL to 29.62 KWH/tGL.	0.31	3
14	Reduction in Sp. Heat Consumption of CRMP-1 from 1220 Mcal /tGL to 1200 Mcal /tGL.	5968	10
15	Improvement in Power Generation at GETs from 5.46 MW to 6.50 MW.	9.11	89
16	Improvement in Power Generation at COB-4 from 5.65 MW to 7.64 MW.	17.43	170
17	Reduction in BF Gas bleeding from 6.64% to 0.95%.	349694	612
18	Optimization of Energy Consumption in Laddle furnace of SMS-2	15785	28
19	Energy Conservation in Structural Mill	1.06	10
20	Energy Conservation by changing mode of operation by dropping arrester in BSY of SMS-1	0.06	0.6

## ENCON Projects with Investment (2023-24)

S.No.	Title of Project	Investment	Energy Savings in		Payback
		(INR Million)	Gcal/MKwh	Rs Millions	Months
1	Rolling of 8mm TMT Rebar without RSM in WRM 2	0.05	0.023	1.9	1
2	Power saving by Reducing the idle speed of GCP ID fans at SMS 1	0.05	1.92	13	1
3	Modification of pass design for MC 200 rolling at MMSM	0.1	576	0.8	2
4	Reduction of power consumption during brush maintenance of GETG	0.25	720	6.3	1

## ENCON Projects with no Investment (2023-24)

S.No.	Title of Project	Energy Savings in	
		Gcal/MKwh	Rs Millions
1	Reduction in Sp. Heat Consumption of Coke Oven from 636 Mcal/tDC to 626 Mcal/tDC.	36844	54.47
2	Improvement in Crude Tar yield from 3.10 % to 3.14 %.	9398	13.98
3	Reduction in Sp. Heat Consumption of Sinter Machine 3 from 14 Mcal/t to 13 Mcal/t	2782	4.11
4	Reduction in Sp. Heat Consumption of SMS-2 from 42 Mcal/t to 41 Mcal/t	2160	3.19
5	Improvement in LD gas yield at SMS-2 from 92Ncum/tCS to 100 Ncum/tCS.	31818	47.04
6	Reduction in Sp. Heat Consumption of SBM from 320Mcal/tIB to 318 Mcal/tIB.	1088	1.61



# ENCON Projects with no Investment (2023-24)



S.No.	Title of Project	Energy Savings in	
		Gcal/ MKwh	Rs Millions
7	Reduction in Sp. Heat Consumption of WRM 1 from 275Mcal/tIB to 259Mcal/tIB.	12978	19.19
8	Reduction in Sp. Heat Consumption of CRMP 1 from 1200Mcal/tgf to 1192Mcal/tgf	2320	3.43
9	Reduction in Sp. Power Consumption of SMS 2 from 124.30 KWH/tcs to 122.75KWH/tcs.		29.28
10	Reduction in Sp. Heat Consumption of STM from 295Mcal/tIB to 293 Mcal/tIB.	1160	1.72
11	Reduction in sp steam consumption of CPP 1 from 3.88 t/MWh to 3.59 t/mwh	258672	382.45
12	Reduction in Sp. power Consumption of Cpp 2 from 33.20 Kwh/ t of steam to 27.09 kwh/ t o steam		40.85
13	Reduction in Sp. power Consumption of CRMP 1&2 from 29.62 Kwh/ t of gf to 20.21 kwh/ t o gf		50.87
14	Reduction in Sp. power Consumption of ASP from 171.45 Kwh/TNCM of air to 169.22 Kwh/TNCM		79.11
15	Improvement in power generation from BF TRT from 6.5 MW to 8.14 MW		125.95
16	Improvement in performance of turbo blower -1 of TPP	4.56	40

# INNOVATIVE PROJECTS IMPLEMENTED

Name of the Project	Replicability	Impact on SEC (Mcal/tCS)	Annual Savings	Investment
			( Rs. In lakhs)	( Rs. In lakhs)
Rolling of 8mm TMT Rebar without RSM in WRM 2	Yes	0.0442	19.83	0.5
Modification of pass design for MC 200 rolling at MMSM	Yes	0.1305	8	1.0
Improvement in performance of Turbo Blower -1 of TPP	Yes	0.0000	-	-
Power saving by Reducing the idle speed of GCP ID fans at SMS 1	Yes	0.375	136	0.5
Reduction of power consumption during brush maintenance of GETG	Yes	0.040	630	2.5

## INNOVATIVE PROJECT-1

### Rolling of 8mm TMT Rebar without RSM in WRM 2

- ❖ WRM 2 is rolling re-bars of different sizes.
- ❖ To carry out rolling of 8mm TMT rebar, 6 stands out of 8 stands in NTM and 2 stands out of 4 stands in RSM are in the rolling process

#### Before Modification

- RSM has a gear box with 9 Clutches with highest shaft speed of 10000 RPM which accounts for a significant power consumption
- It also consumes significant power due to high inertia during no load operation also

#### After Modification

- Last two stands in RSM have been incorporated in NTM last Two Stands
- RSM was dummied
- Pass Changes & Mill Configuration Setup changes
- Bypassing RSM Ready Rolling Interlocks in PLC .

**These activities resulted in reduction of Power consumption by 226780 KWH and resulted in Energy saving of 0.23Mkwh accounting for annual savings of Rs 19.83 lacks**

Stand	Operator	Actual	Target	Actual	Target
FRM01		285.3	282.1	10.788	10.78
FRM02		285.3	282.1	12.348	12.34
FRM03		287.3	285.3	2.000	2.00
FRM04		287.3	285.3	2.000	2.00
FRM05		287.3	285.3	2.000	2.00
FRM06		287.3	285.3	2.000	2.00
FRM07		287.3	285.3	2.000	2.00
FRM08		287.3	285.3	2.000	2.00

Stand	Operator	Actual	Target	Actual	Target
FRM01		1.176	1.148	0.288	0.288
FRM02		1.176	1.148	0.288	0.288
FRM03		1.200	1.200	0.000	0.000
FRM04		1.200	1.200	0.000	0.000
FRM05		1.200	1.200	0.000	0.000
FRM06		1.200	1.200	0.000	0.000
FRM07		1.200	1.200	0.000	0.000
FRM08		1.200	1.200	0.000	0.000

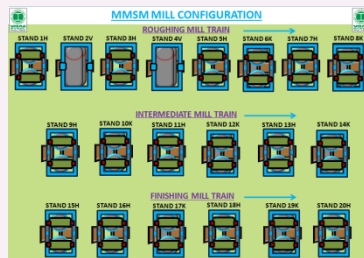
# INNOVATIVE PROJECT-2

## Modification of pass design for MC 200 rolling at MMSM

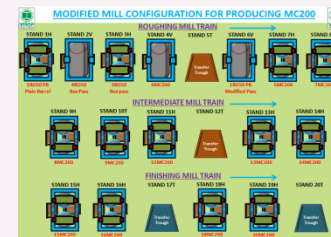
- MMSM produces Angles, beams, channels, rounds, flats and squares
- Annual capacity is 8,50,000 tons

Sl. No.	Before Modification	After Modification
1	Main drive motor of Stand 5 got breakdown in Roughing Mill Train (RMT) during MC200 rolling.	1. Modification of Mill setup and roll pass design at stand 6 to take care of sized reduction at Stand 5 and subsequent reduction from Stand 7 <sup>th</sup> to 11 <sup>th</sup> .
2	Estimated time taken to replace the motor is 3 days.	2. Modification of the mill configuration has reduced production loss.
3	Rolling can't be continued till the motor gets replaced resulting in production loss	3. Resulted in thermal savings by eliminating the idle heating of reheating furnaces
4	Results in idle heating of reheating furnaces	

This modification resulted in Energy saving of 576000 Mcal.



OVERVIEW – MMSM MILL TRAIN



MODIFIED MILL TRAIN

# INNOVATIVE PROJECT-3

## IMPROVEMENT IN PERFORMANCE OF TURBO BLOWER-1 OF TPP

- The turbo blowers are installed to supply the cold blast to Blast furnaces for its process requirement
- These turbo blowers are of axial flow compressors and prime mover is 29.7 MW Turbine – Condensing Type
- The capacity of TB 1 is 5200 nm<sup>3</sup>/min

### Before Modification

1. Cold blast flow from TB 1 is not able to meet the demand of BF 1 due to :
  - a. Low vacuum in the condenser
  - b. Higher clearance between stator and rotor
  - c. Drop in speed of turbine at higher load
  - d. Higher air temperature after inter cooler

### After Modification

1. Condenser tubes are cleaned
2. Adjusted the gaps between stator and rotor
3. Modification of the stroke of the HP control valve.
4. Intercooler bundles cleaned

This modification has resulted in increasing the production of Blast furnace 1 with the same turbo blower. The blower was able to supply 5800 nm<sup>3</sup>/min



OVERVIEW – Turbo blower station



LP guide adjustment



Inter cooler bundle



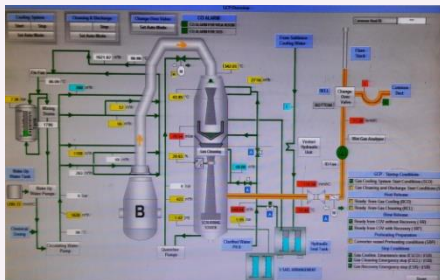
## INNOVATIVE PROJECT-4

### Power saving by Reducing the idle speed of GCP ID fans at SMS 1

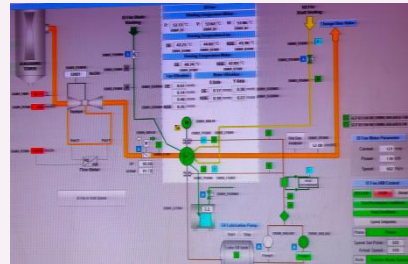
- The GCP I.D. fans are installed in each LD converter to extract the LD gas through the gas cooling and cleaning system
- To create suction as required in order to overcome the pressure drop in the system.
- Able to operate with variable flow rates & pressures as well as gas conditions.

Sl. No.	Before Modification	After Modification
1	The GCP I.D. fans of SMS 1 are installed for operation at a speed of 600 RPM during non blowing periods.	Reducing the idle running of ID fan from 600 to 300 rpm has reduced the power consumption during non blowing time of the ID fans in SMS 1
2	Additional energy consumption during idle running of Id fans designed to run at 600 rpms	

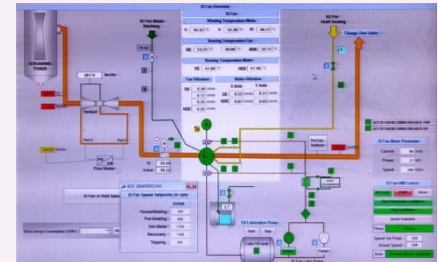
This modification resulted in Energy saving of **1921725 KWH**.  
Accounting for annual financial savings of **Rs1.36Cr**



OVERVIEW – SMS PROCESS



Power consumption Of ID fan running at 600 rpm



Power consumption Of ID fan running at 300 rpm

## INNOVATIVE PROJECT-5

### Reduction of power consumption during brush maintenance of GETG

1. The generated BF gas during iron making is cleaned and is passed through Turbine Stations (GETS/TRT) to convert the pressure energy into electrical energy.
2. Gas Expansion turbine station consists of two turbo generators (12MW each) respectively connected to BF-1 and BF-2 top pressure gasses. Top Recovery Turbine (14MW) is connected to BF-3.
3. BF gas at a Pressure of 2.2 Kscg and 360000Nm<sup>3</sup>/hr is used in each GETS for generating 12MW

#### Before Modification

1. The static excitation system used to generate magnetic field in the turbine station contains Slip rings and brushes for Excitation supply feeding to generator rotor
2. Brushes and holders are open conductive type, so its maintenance is a non-live activity which takes 3 hrs for replacing brushes.
3. The power generation is to be stopped

#### After Modification

1. By adapting online brush replacement using insulated brush holders, the brushes were replaced one after the other with out stopping the rolling of the turbine
2. It helped in eliminating the import of extra power to compensate power requirement during stopping the rolling of turbine during brush maintenance

This modification has resulted in saving the electrical energy by 720 MW



OVERVIEW – GETG



BEFORE MODIFICATION



AFTER MODIFICATION

# Utilization of renewable energy sources-**Solar** **Energy Utilization**

- ❑ RINL has been exempted from complying RPPO.
- ❑ RINL commissioned 5 MW Solar Power Plant  
Investment: Rs 36 cr
- ❑ RINL commissioned 0.5 MW Roof Top Solar Power Plant at three Building  
Investment: RESCO Model



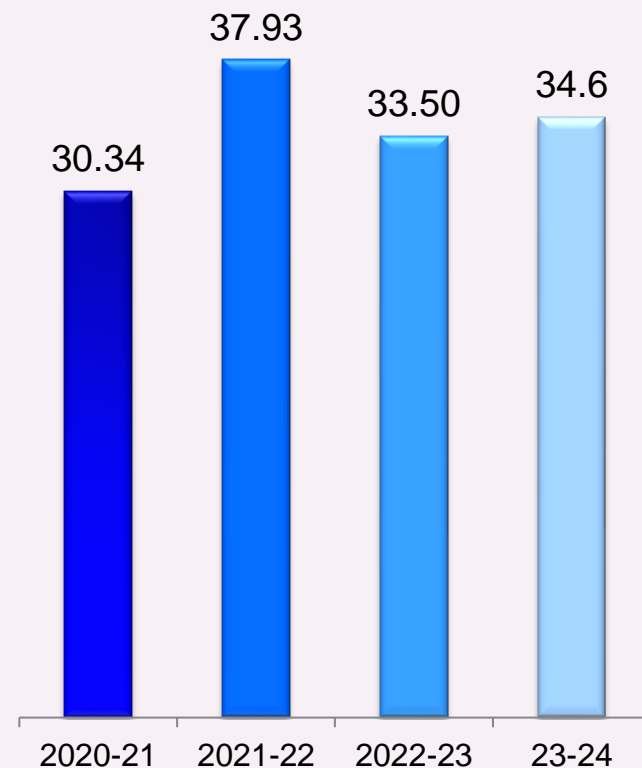
# Utilization of renewable energy sources-**Solar** Energy Utilization

Year	Technology (Solar, Wind, Biomass etc.)	Installed capacity (MW)	Capacity addition (MW) after FY 2021	Total Generation (MWh)	Consum ption (Mkwh)	Share % w.r.t to overall energy cons.
2021- 22	Solar	5 MW		3406 MWh	0.047	0.1
2022- 23	Solar	5.0 MW	0.5MW	684 MWh	0	0
2023- 24	Solar	5.5 MW		686 MWh	0	0

# Utilization of Waste Material as fuel

Name of the Fuel	Quantity of waste Fuel used (MT/ year)	GCV of fuel (kcal/kg)	Heat Value (million kcal/year)	Waste Fuel as % of total energy used
Coke Dust	2783	6708	18668	0.06
LD Slag	173690	1000	173690	0.55
Met Waste	467377	500	233689	0.74
Tar sludge	4895	7100	34755	0.11
Benzol muck	1991	7100	14136	0.04
ASP sludge	6584	7100	46746	0.15
BF gas	8085000	861	6961185	21.93
LD gas	476800	1841	877789	2.77
Coke dust(sold)	42681	775	33078	0.10
Granulated Slag	2367937	1070	2533693	7.98
Limefines	50304	1075.012	54077.401	0.17
<b>Total</b>				<b>34.6</b>

Waste Fuel utilisation as % of total energy

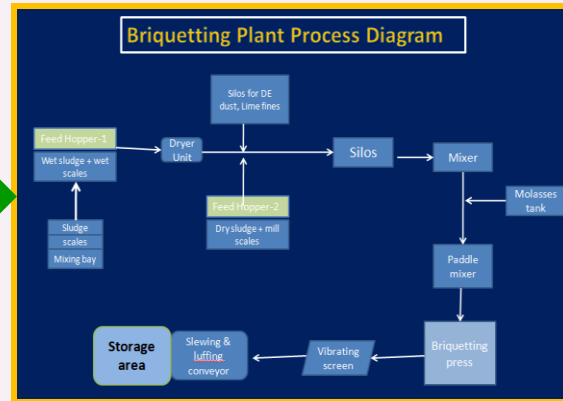




# Waste Recycling

RINL is recycling waste by making Briquettes (0.15 MTPA) and Micro pellets (0.4 MTPA) on BOO basis through M/S Harsco.

Mill Scale
CCM Scale
SMS-1&2 GCP Sludge
SECS SMS-1&2
BF Cast House Dust
Lime Fines Binder

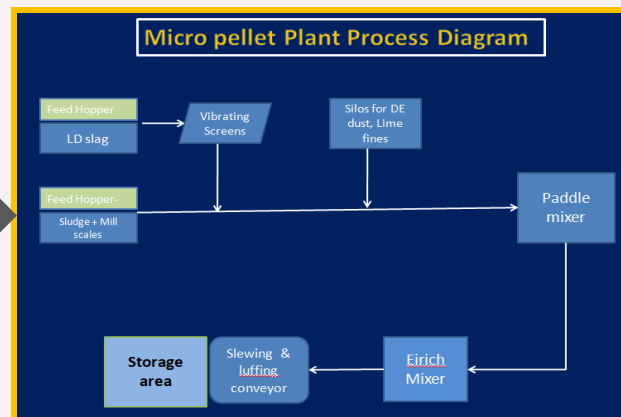


→ SMS (32016 tons)

### Benefits

- Substitute for steel scrap of 64000 tons, required at LD converter.

BF Stock House Dust
Met. Pond sludge
SMS-1 & 2 GCP Sludge
BF Sludge
SMS CCM Scale
Lime fines
Water



→ Sinter Plant (2,62,127)

### Benefits

- Reduced Coke Breeze consumption by 13000 Tons i.e. 88400 Gcal

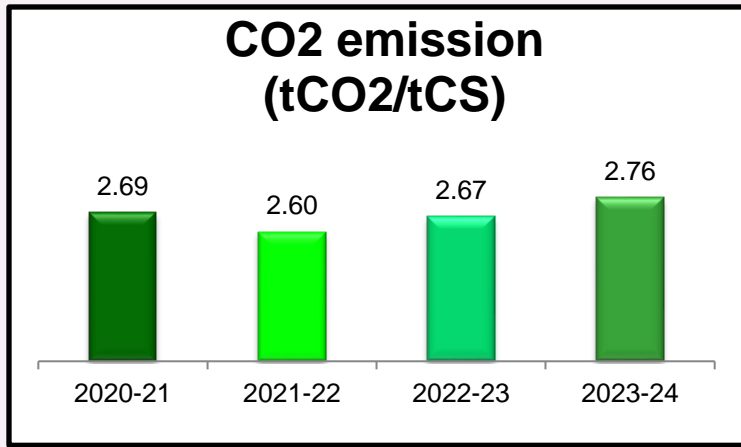
Other steel plants are visiting to adopt this model

# GHG Inventorisation

## As per ISO:14064:-

Emission	Details
Scope 1&1.1	Direct emissions from site chimneys determined from straight carbon balance
Scope 2	Upstream emissions of electricity and steam from site.
Scope 3	Other upstream emissions by-products from site

Scope 1 & 1.1	Scope2	Scope 3	Total CO2(t CO2/TCS)
<b>1.926</b>	<b>0.385</b>	<b>0.454</b>	<b>2.766</b>



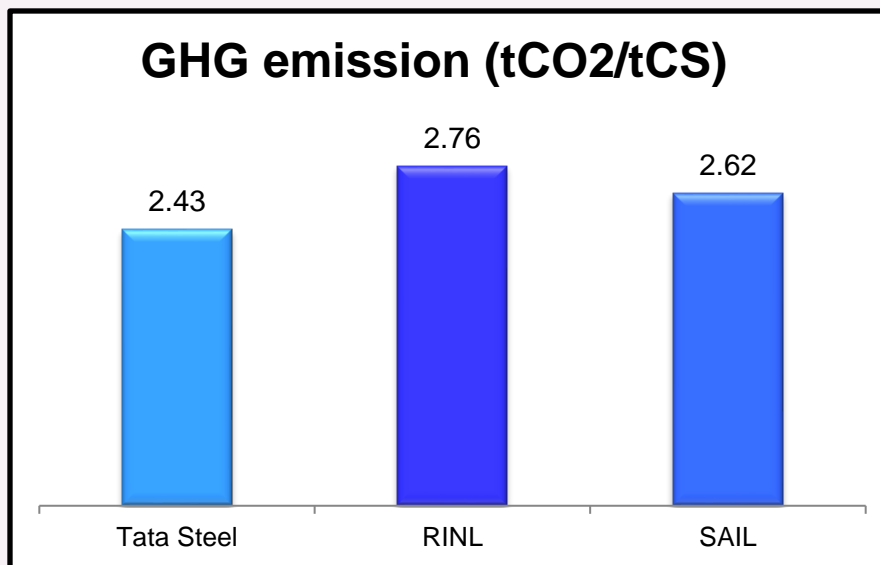
# Target & Action plan for GHG reduction

Parameters	2023-24	Short Term (2030)	Long term (2047)
<b>GHG Emissions</b>	<b>2.76</b>	<b>2.40</b>	<b>2.30</b>

## Action plan

- Increasing PCI >150 Kg/tHM.
- Usage of more scrap based on availability of quality Steel Scrap
- Installation of floating Solar Power Plant at reservoirs (KBR)
- Gas Holder for BF gas & CO gas

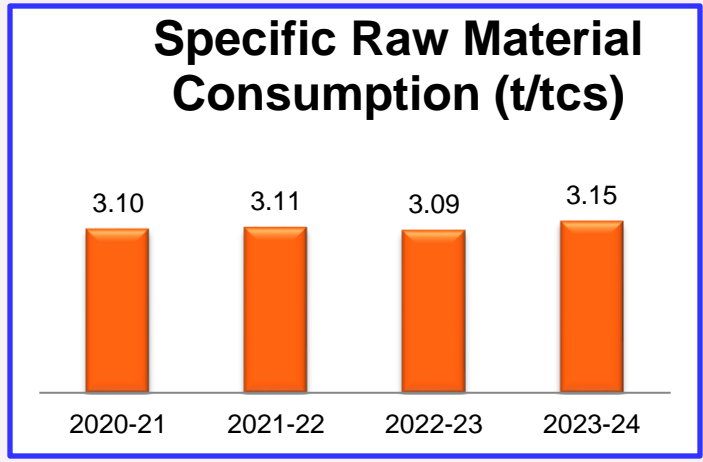
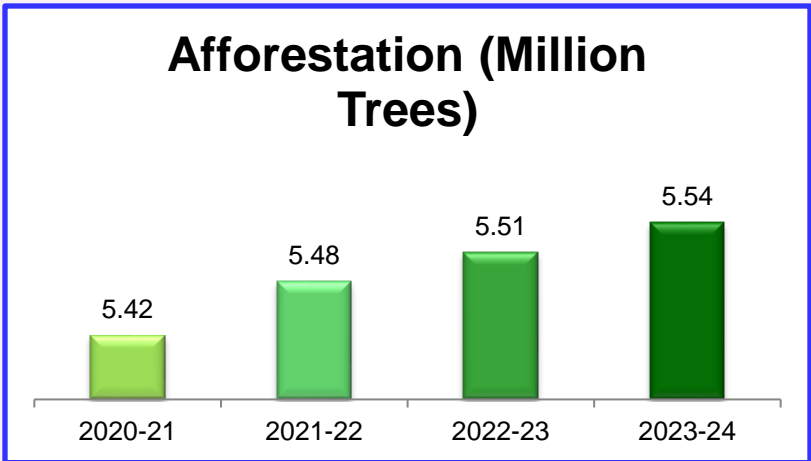
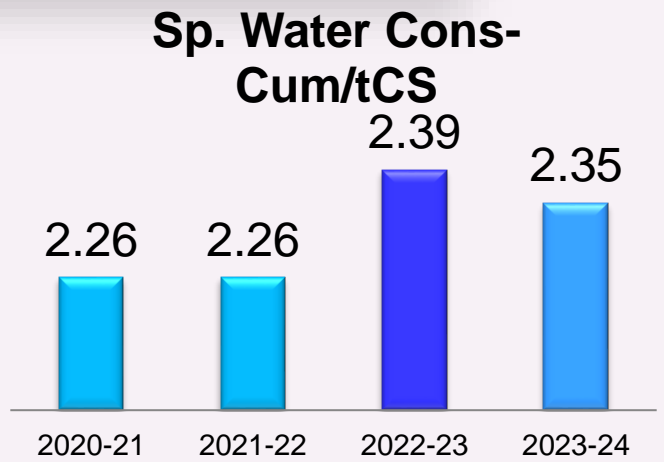
# GHG Benchmarking



GHG Emission		Gap :0.33 tCO <sub>2</sub> /tCS
RINL	Tata Steel	1) Coal injection > 182kg/tHM(0.20 Gcal/tCS) vs 82 kg/tHM 2) Deemed purchased coke of 0.1 tons CO <sub>2</sub> /tCS(130 kg/tCS) 3) Fuel rate 526 kg/tHM vs 569 kg/tHM (0.29 Gcal/tCS). 4) Plant Production: 10.6 Mt Crude Steel. 5) Scrap Consumption 8.5%
2.76	2.43	

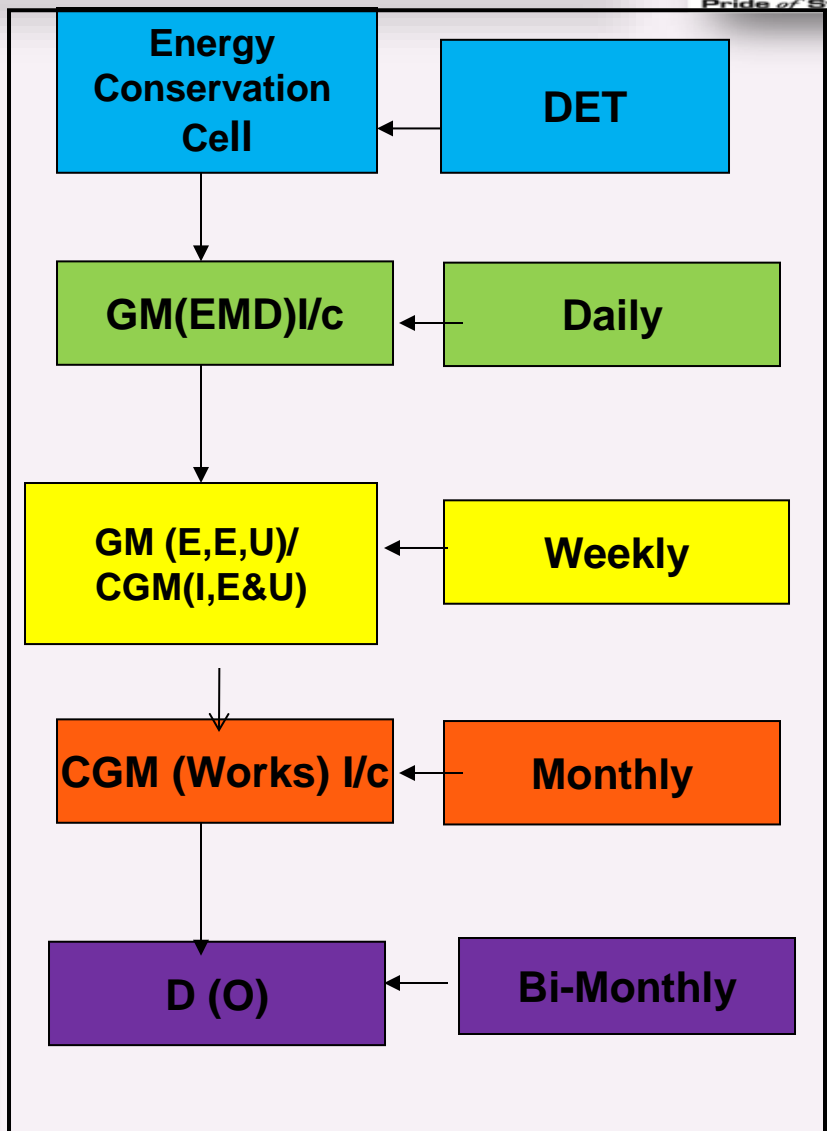
# Environmental Projects

Projects	Benefits
Up gradation of Electro Static Precipitators (ESP) in TPP	SPM 100 Vs 50 PPM
Up gradation of Bag Filters at CRMP	SPM <50 PPM
Internal Repairs of Central Ventilation System (CVS) of SMS-1	SPM 140 Vs <50 PPM



# EMS & Other requirements

DAILY ENERGY REPORT									
Production			SHOP	PARAMETER	UNIT	NORM	ON DATE	15-Aug-24	
Monthly	ACTUAL On date	For the Month						ACTUAL	CUM
Plan	255	298	COCOP	Gross Coke Yield :	T	71.3	72.2	72.2	
Plan/day	51	795	Bat-1	Mel.Coke Yld :	%	64.3	64.6	64.6	
	56	930	Bat-2	C.O.GAS YIELD :	NCUM/TDC	335	338	330	
	49	791	Bat-3	SP.HEAT.CONS :	MCAL/TDC	632	634	616	
	32	853	Bat-4	C.O.GAS .C.V. :	KCAL/Noem	4150	4317	4314	
	67	1106	Bat-5						
744000	19430	287730	SP	SP.HEAT.CONS :	MCAL/TSP	20	26	26	
	6810	96360	SP-1(M/c-1)	SP.HEAT.CONS :	MCAL/TSP	27	29	29	
	3250	70120	SP-1(M/c-2)	SP.HEAT.CONS :	MCAL/TSP	27	51	45	
	9370	121250	SP-2(M/c-3)	SP.HEAT.CONS :	MCAL/TSP	9	14	13	
	0	0	BF-1	SP.HEAT.CONS-1:	MCAL/THM	560	0	0	
	5500	87850	BF-2	SP.HEAT.CONS-2:	MCAL/THM	560	446	460	
	5500	87200	BF-3	SP.HEAT.CONS-3:	MCAL/THM	420	446	461	
434000	11000	175050	BF[All]	SP.HEAT.CONS [AB]:	MCAL/THM	531	458	474	
	0	53	Pulver/NM(BF)	Norm/TCID:		3125	3132	3088	
	0	0	Pulver/NM(BF-1)	COKE RATE BF-1 :	KG/THM	430.3	0	0	
	0	106	Pulver/NM(BF-2)	COKE RATE BF-2 :	KG/THM	430.3	508	503	
	0	0	Pulver/NM(BF-3)	COKE RATE BF-3 :	KG/THM	442.9	553	505	
	1374	1332	Sinter/NM(BF)	COKE RATE [AB]:	KG/THM	433	531	504	
	0	0	Sinter/NM(BF-1)	Pul.Coke BF-1:	KG/THM	120.6	0	0	
	1413	1311	Sinter/NM(BF-2)	Pul.Coke BF-2:	KG/THM	120.6	74	80	
	1335	1354	Sinter/NM(BF-3)	Pul.Coke BF-3:	KG/THM	117.7	55	77	
	0.0	0.0	OD-BF-1	Pul.Coke [AB]:	KG/THM	120	64	78	
	2.8	3.0	OD-BF-2	B.L.GAS.C.V. :	KCAL/NCUM	850	824	857	
	2.5	2.5	OD-BF-3	COAL RATE :	KG/THM	834	935	906	
159000	5151	77527	SMS-1	HOT METAL BATERD:	KG/TLS	1000	1035	1035	
242000	4867	73468	LS	SP.HEAT.CONS :	MCAL/CLS	47	51	51	
1268.709677	36	35.7	CS	CONV.GAS YIELD :	NCUM/TLS	90	106	112	
			Heats	SP.OXYGEN CONS :	NCUM/TLS	59	69	49	
				SP.ARGON CONS :	NCUM/Heat	226	218.4	148.8	
				SP.LPG CONS:	KG/TCS	0.139	0.30	0.32	
242000	5928	93176	SMS-2	HOT METAL BATERD:	KG/TLS	1000	1000	1000	
234000	5750	90380	LS	SP.HEAT.CONS(TotAB):	MCAL/TLS	47	35	33	
1560	39	40.9	CS	L.D.GAS YIELD :	NCUM/TLS	87	97	101	
			Heats	Total Heats	Heat	131	75	76.6	
				L.D Gas CV	KCAL/Noem	1825	1851	1836	
431000				Liquid Steel	Tons	19256	11079	170703	
476000				Crude Steel	Tons	18402	10617	163848	
	955	14163		Sp.Heat(CRMP-2)	MCAL/TCL	950	770	768	
120000	3287	43912	BILLETS	SP.HEAT.CONS :	MCAL/TTP	460	458	468	
52000	0	10285	BAR5	SP.HEAT.CONS :	MCAL/TTP	20	0	56	
0	2422	30476	WRM-1	SP.HEAT.CONS :	MCAL/TTP	251	284	302	
39000	2746	34729	WRM-2	SP.HEAT.CONS :	MCAL/TTP	260	263	274	
62000	0	10566	MMSM	SP.HEAT.CONS :	MCAL/TTP	400	0	#DIV/0!	
60000	2746	34729	SBM	SP.HEAT.CONS :	MCAL/TTP	320	277	278	
15000	2483	27344	STM	SP.HEAT.CONS :	MCAL/TTP	325	280	295	
TPP	165	152	TPP	SP.HEAT.CONS :	MCAL/TP	755	857	913	
PP-2	81	91	PP-2	SP.HEAT.CONS :	MCAL/TP	720	795	774	
GETS	2.4	3.1		HEAT RATE (PP-2):	MWh/MWH	2456	3080	3114	
TRT	6.6	7.5		STEAM RATE (PP-2):	TWh/MWH	3.4	3.71	3.75	
WVHR	29.8	32.4		POWER GEN.(BPT):	MW	36.0	20.8	22.4	
Imp Plant Load	108.5	104.0		POWER GEN.(TRT + GETS):	MW	13.0	9.0	10.7	
Steam (PP-1)	384.0	380.1		POWER GEN.(MEDO):	MW	5.0	0.0	0.0	
B Coal (PP-1)	25223	372675	LOSSES	C.O.GAS Bleeding:	%	0.2	0.00	0.00	
Steam (PP-2)	7195	123089		B.L.GAS Bleeding:	%	2.0	0.12	0.22	
				OXYGEN Bleeding:	%	2.0	14.4	15.7	
				NITROGEN Bleeding:	%	2.0	13.9	11.3	
VM(C.Coal)	25.38	25.71	PLANT	SP.POWER CONS :	KWh/TCs	414	582	541	
ASH(C.Coal)	11.15	11.34	A.P.P	SP.ENERGY CONS:	GCAU/TCs	6.00	6.91	6.72	
VM(Coke)	0.61	0.59	TPP	OIL CONSUMPTION:	KL	83	0	0.0	
ASH(Coke)	15.07	14.83		CO2 EMISSIONS:	KOD/GCS	2.58	2.98	2.94	



- Energy Savings are quantified with respect to displacement of Boiler Coal
- Electrical Savings are quantified by pegging with Electricity imported.
- Savings are certified by Energy Auditors

# Energy Management System ISO:50001

## Features:

- Significant Energy Use
- Developing Energy Management programmes.
- Operational control of identified energy aspects
- Monitoring and Measurement
- Risk & Opportunities
- Internal Audit
- Management Review
- Re-certification completed for ISO: 50001, Ver 2018 in Dec'22.**

Bureau Veritas Certification



**RASHTRIYA ISPAT NIGAM LIMITED**  
**VISAKHAPATNAM STEEL PLANT**



VISAKHAPATNAM – 530 031, ANDHRA PRADESH, INDIA.

*Bureau Veritas Certification Holding SAS – UK Branch certifies that the Management System of the above organization has been audited and found to be in accordance with the requirements of the Management System Standard detailed below.*

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Standard  
**ISO 50001:2018**

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Scope of certification

**PRODUCTION OF IRON AND STEEL, COKE AND COAL CHEMICALS,  
UTILITY GASES AND GENERATION OF POWER**

Original cycle start date: **28 December 2010**

Recertification cycle start date: **27 December 2022**

Subject to the continued satisfactory operation of the organization's Management System, this certificate expires on: **27 December 2025**

Certificate No. **IND.22.15132/EN/U**    Version: **1**    Issue date: **27 December 2022**



Signed on behalf of BVCH SAS UK Branch  
**Jagdish N. MANIAN**  
Director – CERTIFICATION, South Asia  
Commodities, Industry & Facilities Division



Certification body address: 5th Floor, 86 Prescott Street, London, E1 8HQ, United Kingdom.

Local office: Bureau Veritas (India) Private Limited (Certification Business)  
72 Business Park, Marol Industrial Area, MIDC Cross Road 'C',  
Andheri (East), Mumbai – 400 093, India.

Further clarifications regarding the scope of this certificate and the applicability of the management system requirements may be obtained by consulting the organization.  
To check this certificate validity please call + 91 22 6274 2000.



# Learning from CII & other award programs

Organization	Learnings
Tata Steel	Use of super absorbent polymer to reduce moisture in coke
Tata Steel	Thermal Hawk : Microbolometer
Tata Steel	Predictive modeling project for CO Gas Generation
Bhilai Steel plant	DECONTAMINATION FACILITY OF PURE POLYCHLORINATED BIPHENYLS (PCBs) IN TRANSFORMERS
JSL(Hisar)	O2 enrichment in Reheating furnace

# Frequency of DEA and Status

Following the Energy Conservation Act-2001, RINL is conducting Detailed Energy Audit once in three years.

DETAILS OF ENERGY SAVING MEASURES RECOMMENDED IN THE ENERGY AUDIT REPORT (2023-24)

Sl. No	Department	Energy Conservation Measure No.	Energy efficiency improvement measures	Investment Lakhs of Rupees (Million)	Annual Energy Savings		
					Coal/ Coke (T/ Year)	Electricity (kWh/ Year)	Others (TOE/year)
1	CO & CCP	ECM-1	ENERGY CONSERVATION BY REDUCING EXCESS FLUE GAS VOLUME IN COB - 5	-	3088.69		926.61
2	Blast Furnace (BF)	ECM-2	ENERGY CONSERVATION BY REDUCTION IN FUEL RATE OF BLAST FURNACE BY INCREASING HOT BLAST TEMPERATURE FROM 1050 °C TO 1200 °C	-	109760.17		32928.05
3	Blast Furnace (BF)	ECM-3	ENERGY CONSERVATION BY IMPROVING SINTER PERCENTAGE IN BLAST FURNACE BURDEN FROM 65% TO 80% TO REDUCE FUEL RATE	-	205800.30		61740.09
4	Blast Furnace (BF)	ECM-4	ENERGY CONSERVATION BY INCREASING PULVERIZED COAL INJECTION (PCI) IN BLAST FURNACES TO BY ENERGY COST SAVINGS	-	31202.53		9360.76
5	LMMM	ECM-5	ENERGY CONSERVATION BY PLUGGING AIR LEAKAGE IN RECUPERATOR	-	4239.45	490568.13	1271.83
6	MMSM	ECM-6	ENERGY CONSERVATION BY PLUGGING AIR LEAKAGE IN RECUPERATOR	-	1710.09	189171.8	513.03
7	WRM-1	ECM-7	ENERGY CONSERVATION BY PLUGGING AIR LEAKAGE IN RECUPERATOR	-	1135.40	206401	340.62
8	SBM	ECM-8	ENERGY CONSERVATION BY PLUGGING AIR LEAKAGE IN RECUPERATOR	-	1640.46	235554	492.14
9	STM	ECM-9	ENERGY CONSERVATION BY PLUGGING AIR LEAKAGE IN RECUPERATOR	-	1204.24	245598.6	361.27
10	CPP-1/TPP	ECM-10	ENERGY CONSERVATION BY REDUCING AIR INFILTRATION IN FLUE GAS PATH (BOILER-5)	-		4615103.20	1107.62
11	CPP-1/TPP	ECM-11	ENERGY CONSERVATION BY REDUCING EXCESS AIR SUPPLIED TO BOILER-6	-	9106.14		2731.84
12	CPP-1/TPP	ECM-12	ENERGY CONSERVATION BY REDUCING AIR INFILTRATION IN FLUE GAS PATH (BOILER-6)	-		3138838.00	753.32

# Frequency of DEA and Status

Following the Energy Conservation Act-2001, RINL is conducting Detailed Energy Audit once in three years.

Sl. No	Department	Energy Conservation Measure No.	Energy efficiency improvement measures	Investment Lakhs of Rupees (Million)	Annual Energy Savings		
					Coal/ Coke (T/ Year)	Electricity (kWh/ Year)	Others (TOE/year)
13	TPP-CPP1	ECM-13	ENERGY CONSERVATION BY INSTALLATION OF NEW REGENERATIVE AIR HEATER (RAH) FOR BOILER-1	112.10	9600.00	58469202.58	16912.61
14	CPP-1/TPP	ECM-14	ENERGY CONSERVATION BY IMPROVING THR OF TG-5	-		8524978.97	2045.99
15	CPP-1/TPP	ECM-15	ENERGY CONSERVATION BY IMPROVING CONDENSER VACUUM IN TG-2 OF TPP-1	120.00		17042043.50	4090.09
16	CPP-1/TPP	ECM-16	ENERGY CONSERVATION BY REDUCING EXCESS AIR SUPPLIED (BOILER-1 OF CPP-2)	-	7660.68		2298.20
17	CPP-1/TPP	ECM-17	ENERGY CONSERVATION BY REDUCING EXCESS AIR SUPPLIED (BOILER-2 OF CPP-2)	-	14387.35		4316.20
18	TPP-CPP2	ECM-18	ENERGY CONSERVATION BY INSTALLING NEW VAMS	100.00		5823492.06	1397.64
19	TPP-CPP2	ECM-19	ENERGY CONSERVATION BY INSTALLING NEW 3RD GETS TO UTILIZE ADDITIONAL BF GAS	300.00		40525714.29	9726.17
20	CRMP	ECM-20	ENERGY CONSERVATION BY REDUCING FLUE GAS LOSSES BY CONTROLLING EXCESS AIR IN ROTARY KILNS OF CRMP-1	5.00	7602.75		2280.83
21	CRMP	ECM-21	ENERGY CONSERVATION BY REDUCING FLUE GAS LOSSES BY CONTROLLING EXCESS AIR IN SHAFT KILNS OF CRMP-2	2.00	4054.62		1216.39
22	Utilities	ECM-22	ENERGY CONSERVATION BY REPLACEMENT OF EXISTING AHU FANS WITH ELECTRONICALLY COMMUTATED FANS (EC FANS)	1.00		144480.00	34.68
23	ACVS	ECM-23	ENERGY CONSERVATION BY REPLACEMENT OF EXISTING AHU FANS WITH ELECTRONICALLY COMMUTATED FANS (EC FANS)	4.65		941488.00	225.96
24	Utilities	ECM-24	ENERGY CONSERVATION BY INSTALLING ENERGY EFFICIENT PUMPS IN PRIMARY PUMPING SYSTEM OF CHILLED WATER PLANT-5	3.60		723879.77	173.73
<b>Total</b>				<b>644.75</b>	<b>4,12,192.88</b>	<b>14,13,16,513.66</b>	<b>1,57,245.68</b>

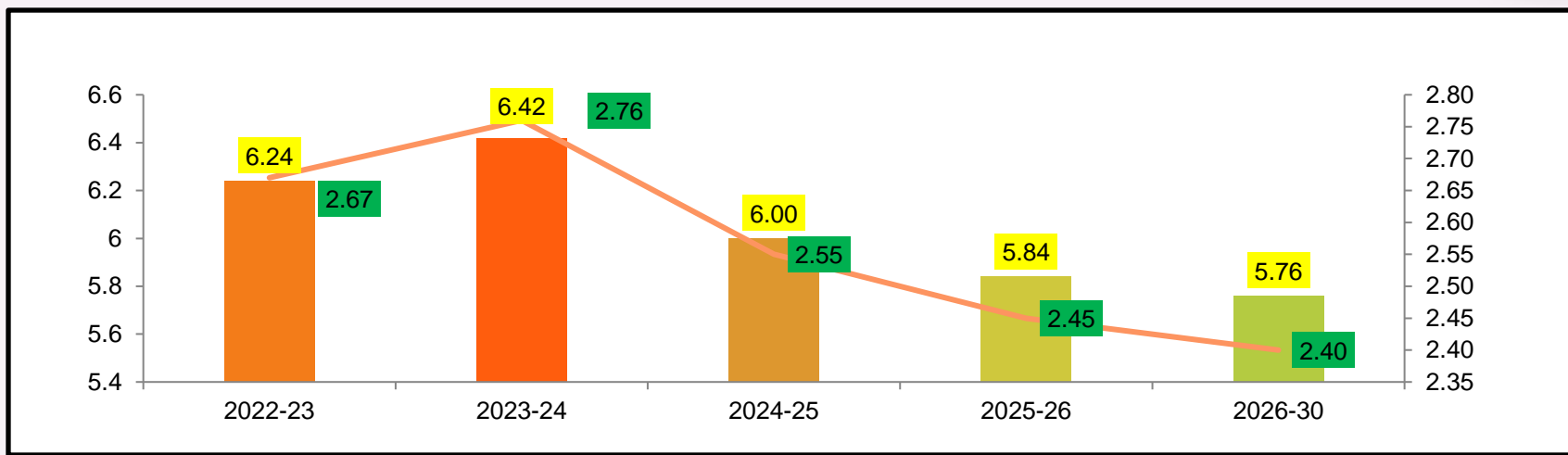
# Net Zero Commitment

Parameters	2030	2047	2047 (with policy intervention)
<b>GHG Emissions</b>	<b>2.40</b>	<b>2.30</b>	<b>2.00</b>

## Action plan (With policy intervention)

- Usage of Natural Gas based on availability and cost
- Usage of more scrap based on availability of quality Steel Scrap
- Installation of floating Solar Power Plant
- Installation of WHR systems like regenerative burners in reheating furnaces and Coal Moisture Control with financial assistance from National Clean Energy (NCEF)
- Usage of hydrogen in Blast furnace based on availability and cost

# Roadmap for reduction of Energy Consumption & GHG emissions.



## Action plan to achieve 2.40 tCO2e/tCS by 2030,

- Increasing Pulverized Coal Injection in Blast Furnace >150 Kg/tHM
- Optimizing power generation from Waste Heat Recovery system like CDQ, SHRPP & TRT
- Process optimization (combustion improvement, installation of VFD drives, optimizing fuel rate in BF )
- Exploring pellet usage in Blast Furnaces.

- Usage of Hydrogen in place of PCI coal
- Injection of CO Gas in BF, Syngas injection into BF
- Carbon Capture usage and Storage (CCU&S) technology



# National Energy Conservation Week Celebration

National Energy Conservation Day Celebration



Energy Quiz competition



Energy Awareness Program at Various Departments



Essay competition



Road Show



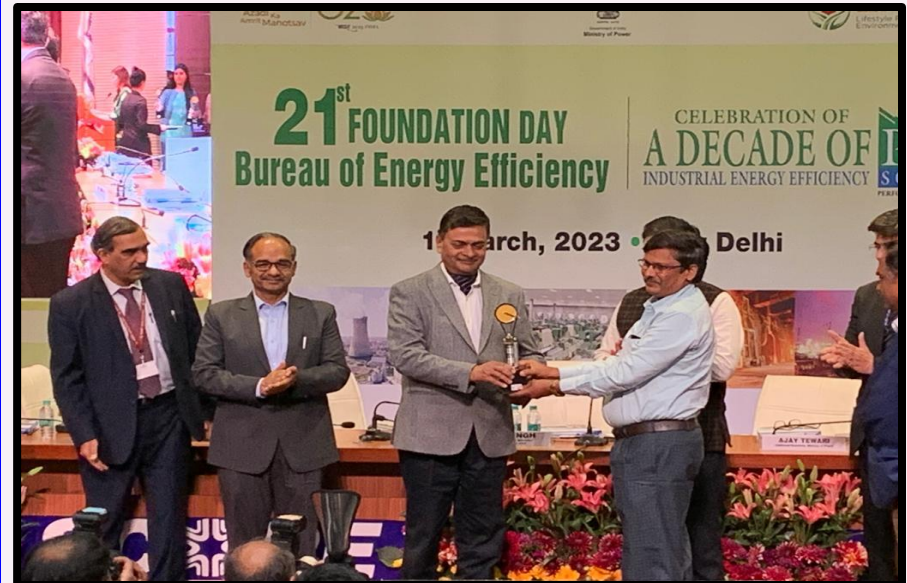
Energy Awareness Program at various schools





# Awards

- ❑ CII National Award for Excellence in Energy Management consecutively for seven years 2023, 2022, 2021, 2020, 2019, 2018 & 2017.
- ❑ CII National Energy Leader” award five times (2023,2022, 2021, 2020 & 2019).
- ❑ National Energy Conservation Award-1st Prize from Ministry of Power-2019
- ❑ RINL received TOP PERFORMER Award from Shri R RK singh, Minister for Power & Renewable Energy for obtaining highest Energy savings (1,29,907 Escerts) among all industries for PAT 2nd Cycle.



# Escerts Sales

<b>Total No. Of Escerts Sold</b>	<b>38,737</b>
<b>Revenue generated</b>	<b><u>8.41 Cr</u></b>

# Thank you

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राष्ट्रीय इस्पात निगम लिमिटेड  
RASHTRIYA ISPAT NIGAM LIMITED

