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

Rashtriya Ispat Nigam Limited

VISAKHAPATNAM STEEL PLANT

TEAM MEMBERS

KV Bangar Raju, Sr. Mgr.-EMD

Priyanka Rajpoot, Dy. Mgr(O)-EMD

K SUDHAKAR, GM(EMD)I/c

Designated Energy Manager

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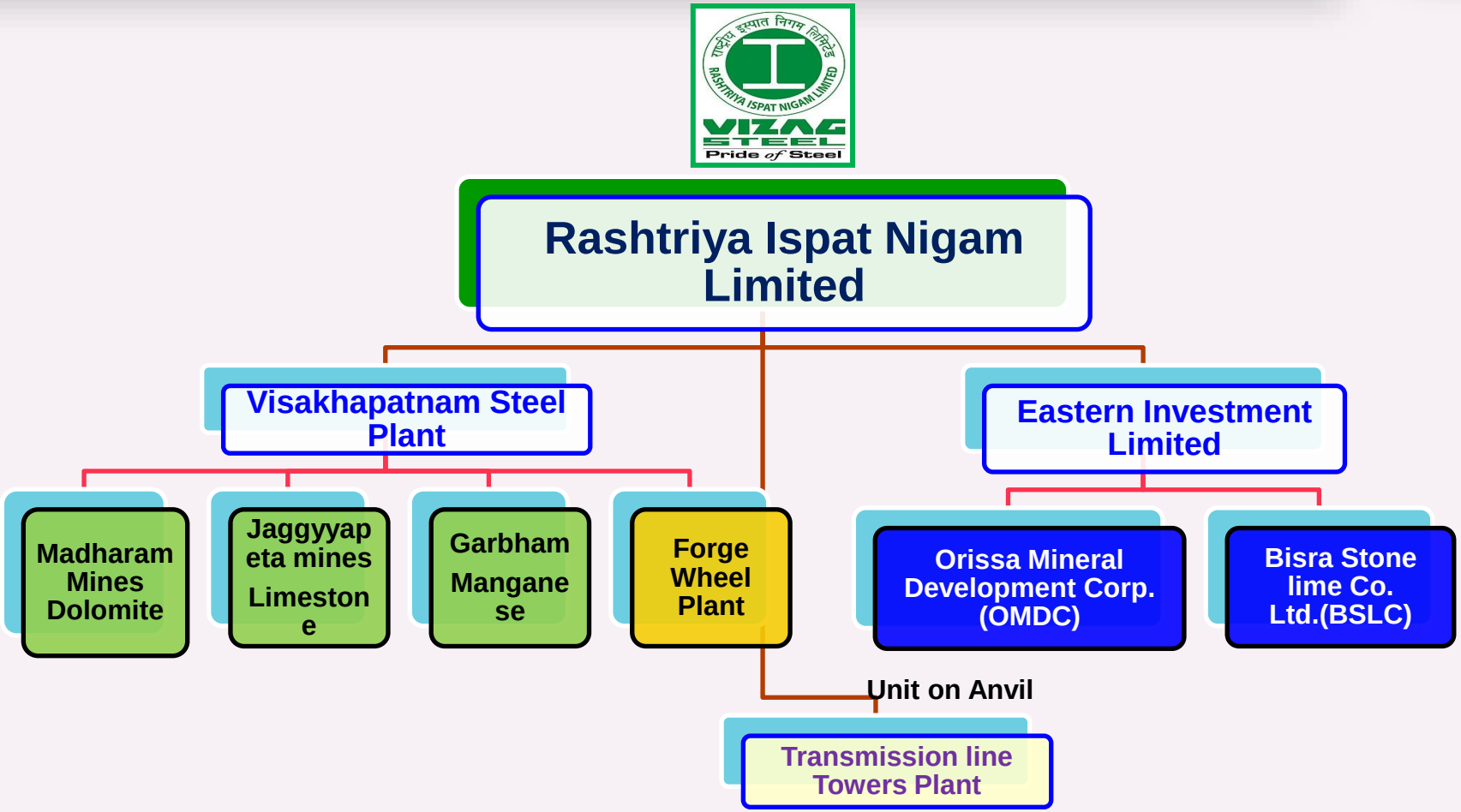
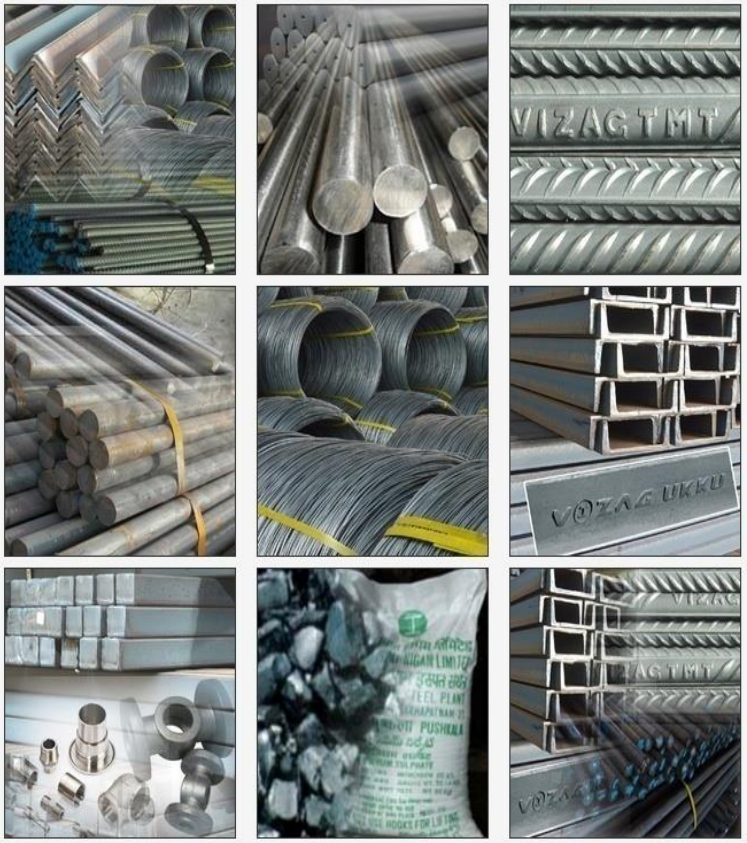
RINL Corporate Structure



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 (2022-23)- 22760 INR Cr

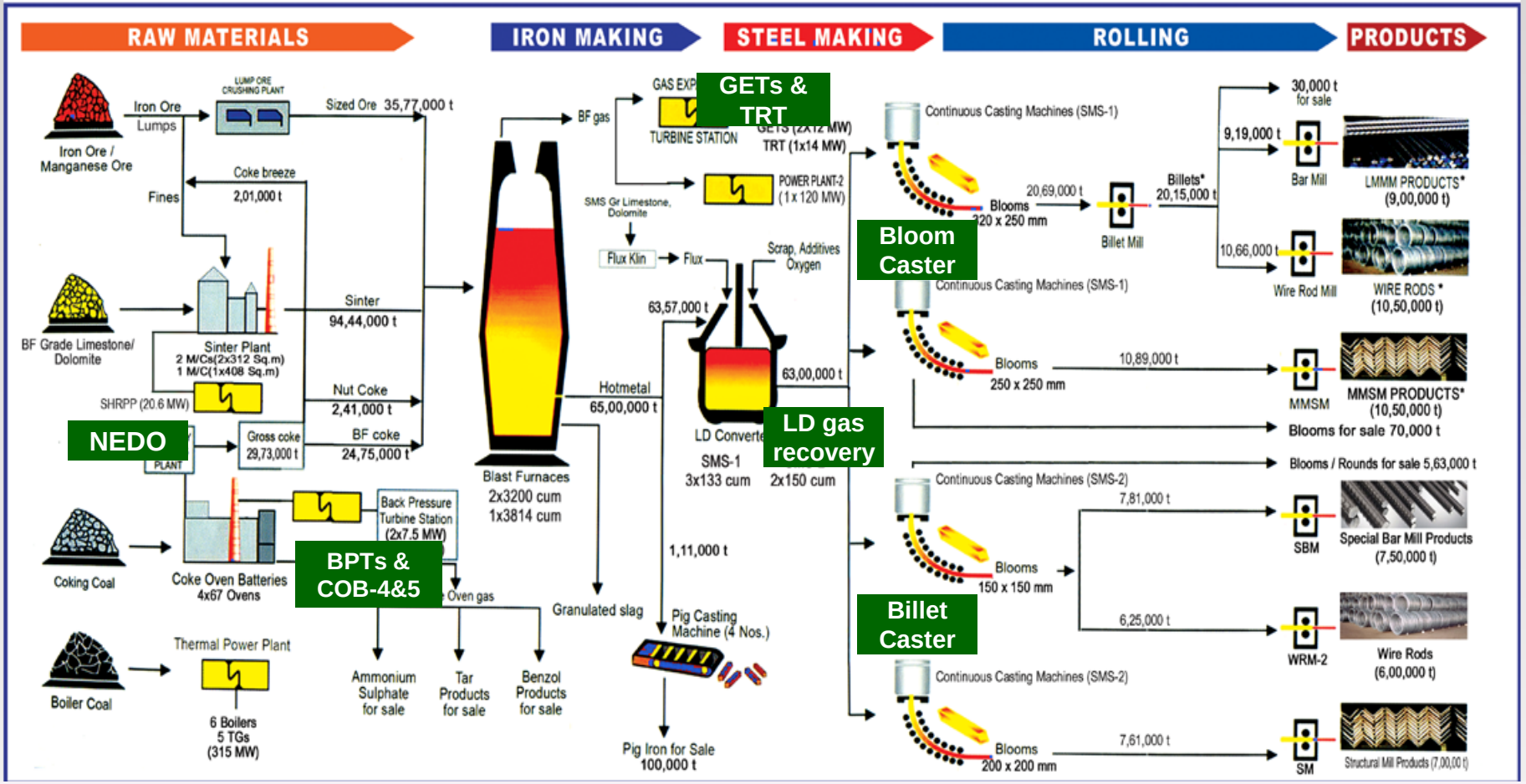


Major Accreditations

- The 1st ISP to be certified for Quality, Health & Safety and Environment
- 1st Steel Plant to get ISO 50001 certification for Energy Management
- 1st Steel PSE to sign Integrity Pact of Transparency International
- CMMI Level 3 certification for IT Systems and ISO 27001 for ISMS
- 1st ISP to be 5S Certified for the whole plant

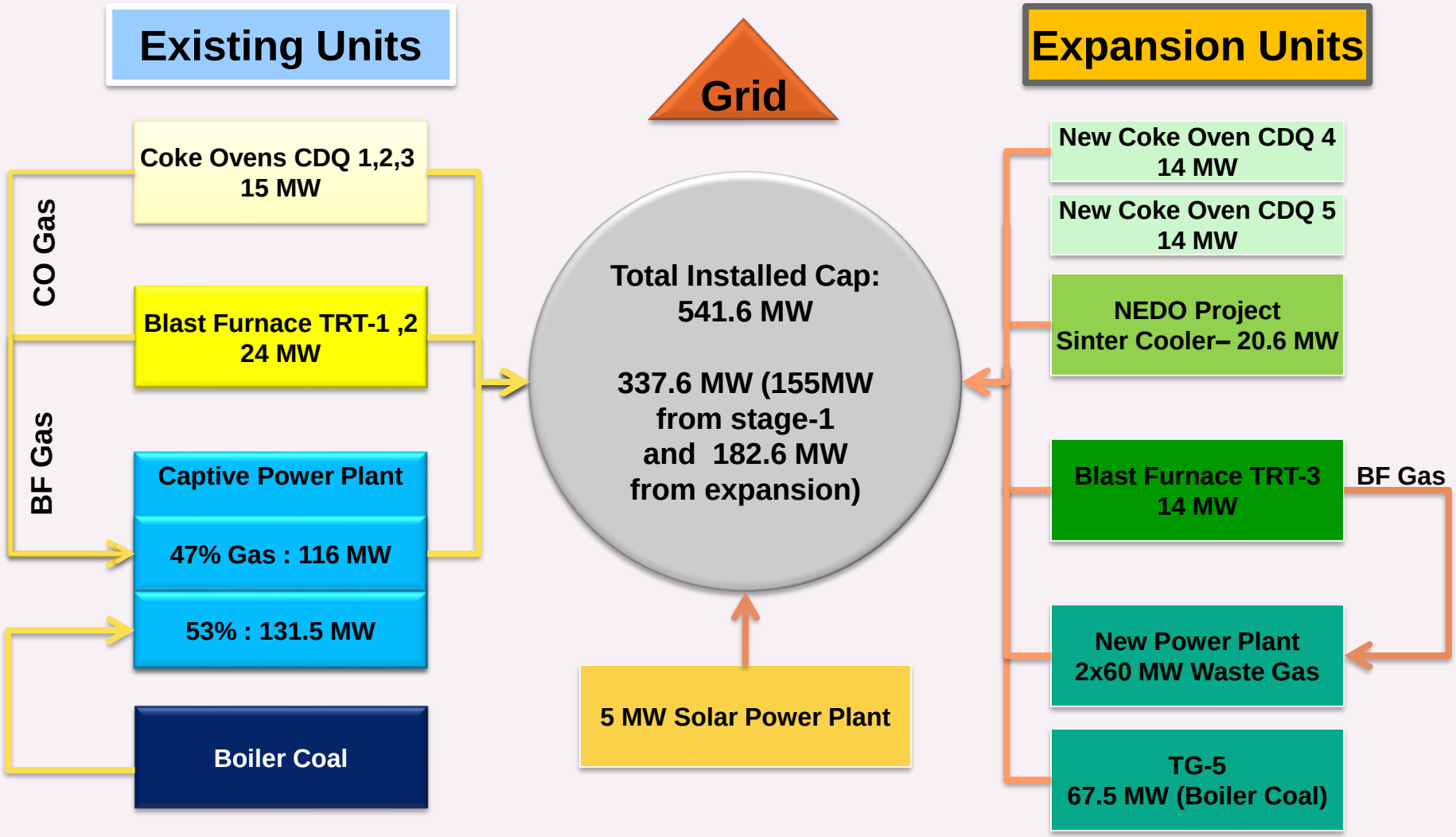
VISAKHAPATNAM STEEL PLANT

FLOW CHART (6.3 MT STAGE)
(Under Commissioning / Stablization)



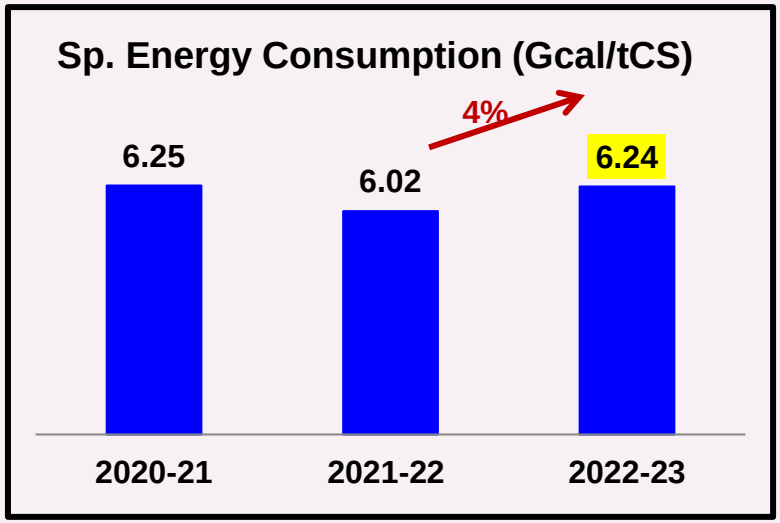
- Sinter Plant with NEDO
- CO Battery with Coke Dry Quenching and Back Pressure Turbine Station.
- BFs with Gas Expansion Turbine &Top Recovery Turbine station.
- SMS-1 & 2 with LD gas recovery plant.
- Continuous Bloom & Billet caster.

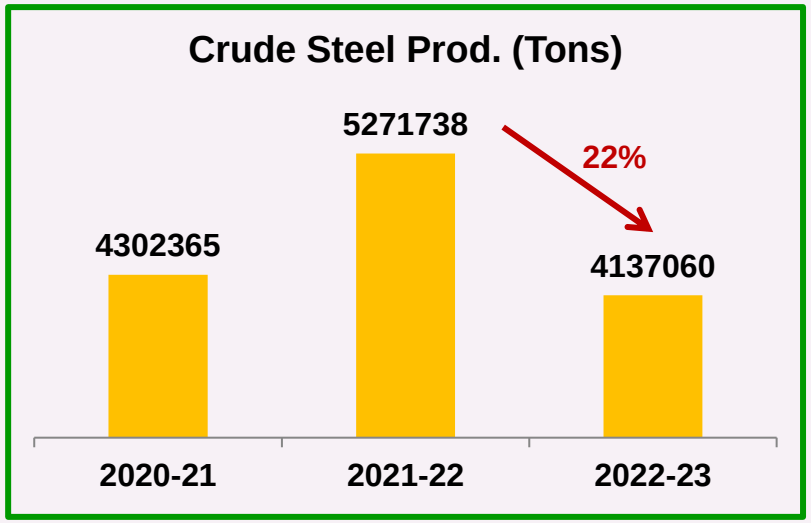
Power Generation capacity from Waste Energy (MW)

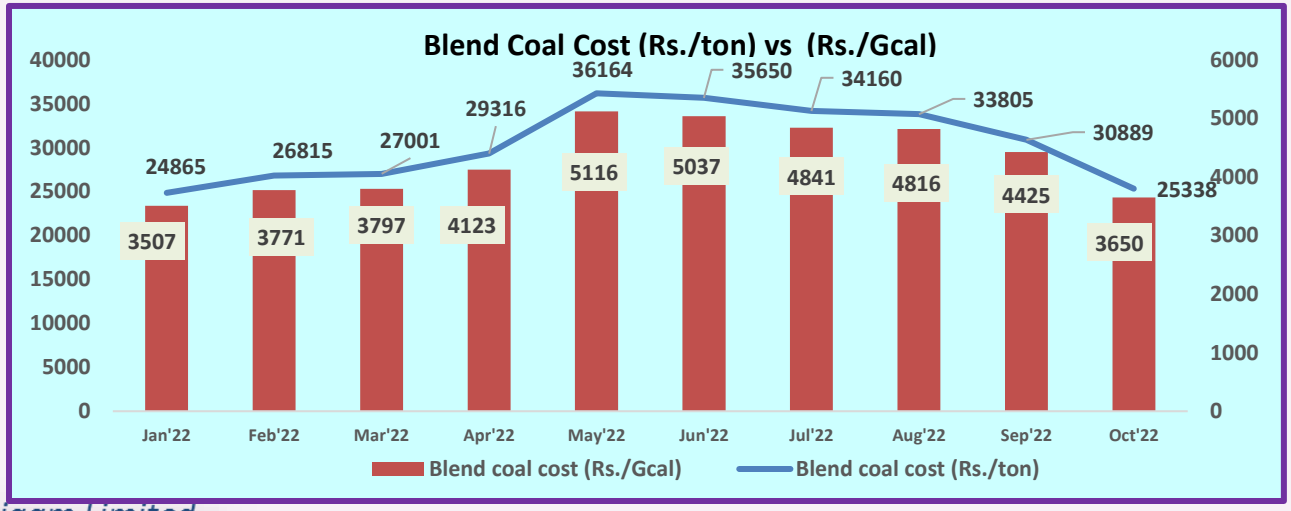


Total Installed capacity:	541.6 MW
Total Power generation from Waste Energy:	337.6 MW
% of Power Generation through Waste Energy:	63.3%

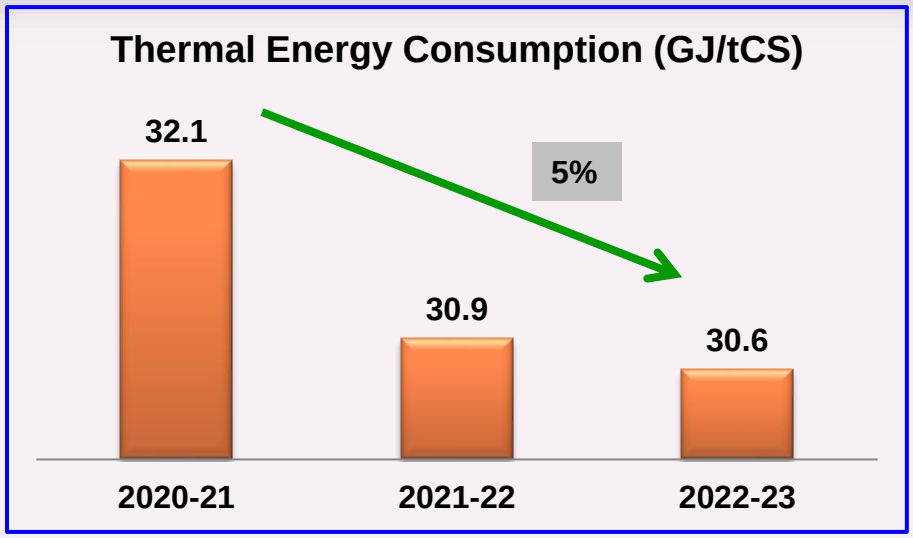
Energy Consumption Overview

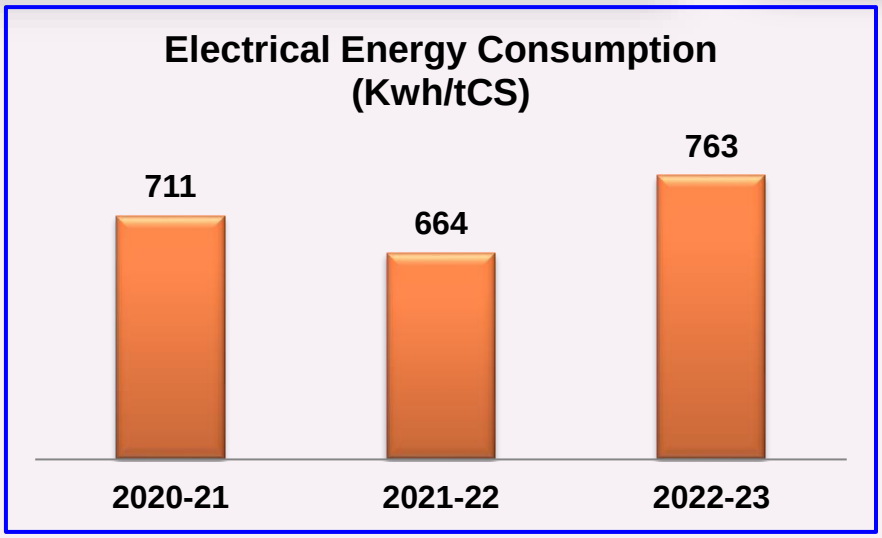


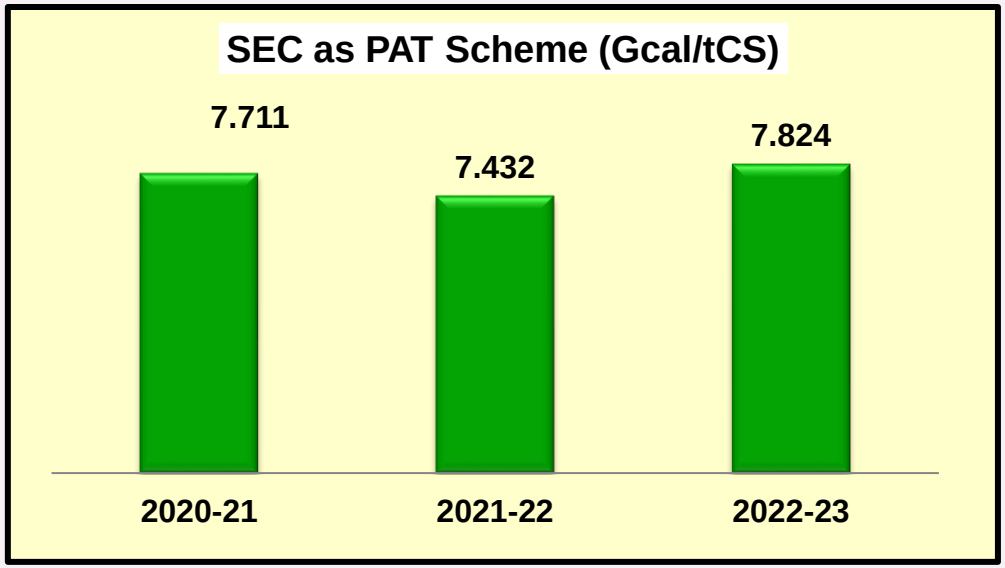




Energy Consumption Overview

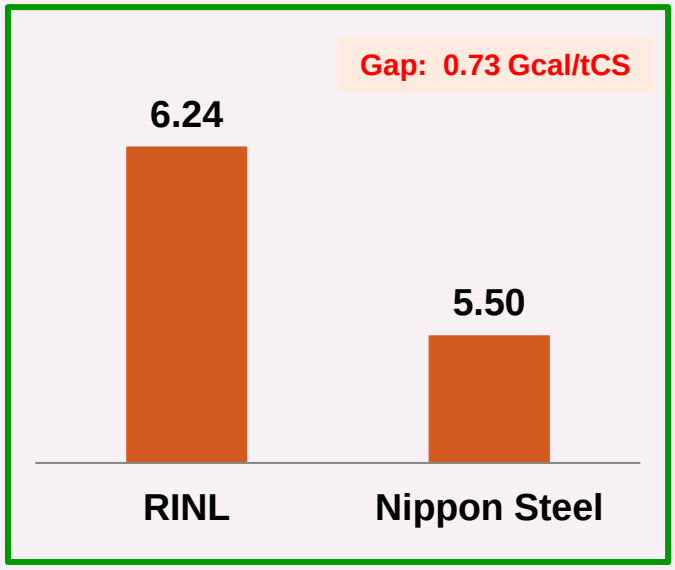






External Bench Marking of SEC(Gcal/tCS)

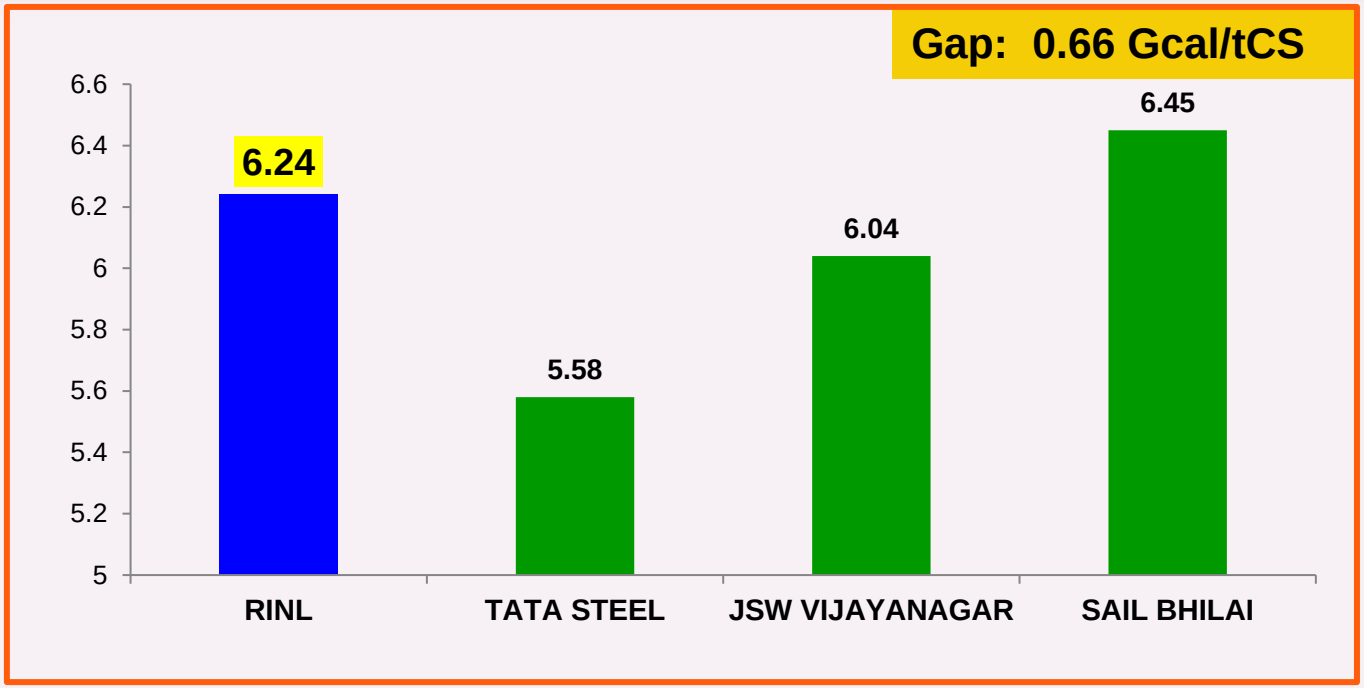
Energy(2022-23)		GHG Emission	
RINL	NSC	RINL	NSC
6.24	5.50	2.67	1.96



Gap :0.73 Gcal/tCS

1) Scrap usage : 200 kg/thm(As per Japanese Industry)-RINL: 80 kg/tCS
2) All Energy Conservation technologies
Coke Dry Quenching,
Top Pressure Recovery Turbine,
BOF Gas Recovery,
Sinter Cooler waste heat recovery
Pulverized Coal Injection,
BF stoves Heat Recovery,
Billet Caster,
Hot Charging,
Regenerative Burners,
Coal Moisture Control
Hydrogen injection in BF
Sensible Heat recovery from BOF gas
3) Waste Plastics Injection and tires(0.2 million tons- 6 kg/tCS)
4) Petro fuel 16 lts/Tcs

Internal Bench Marking of SEC(Gcal/tCS)



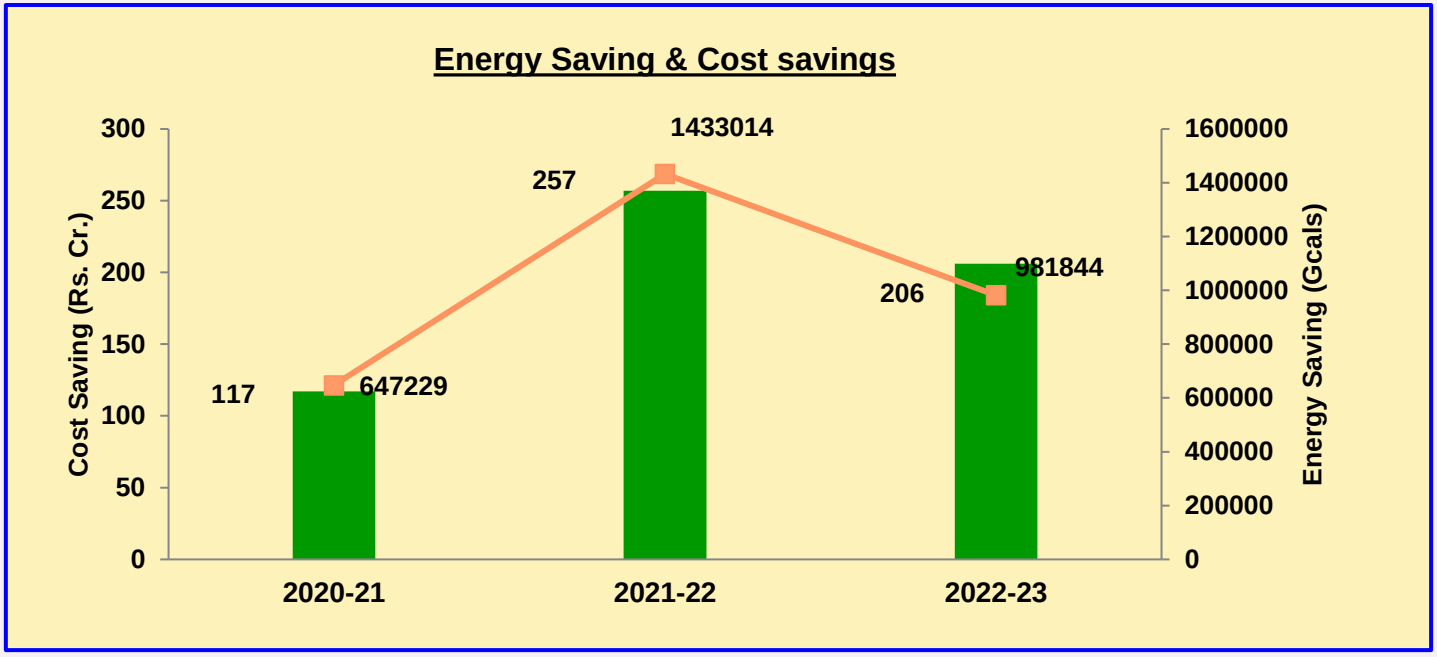
Energy(2022-23)		GHG Emission		Gap :0.66Gcal/tCS
RINL	Tata Steel	RINL	Tata Steel	1) Coal injection > 180kg/tHM(0.25 Gcal/tCS) vs 100 kg/tHM 2) Fuel rate 526 kg/tHM vs 556 kg/tHM (0.25 Gcal/tCS). 3) Plant Production: 10.6 Mt Crude Steel. 4) Scrap Consumption 8.5%
6.24	5.58	2.67	2.38	

Energy Conservation Projects planned in 2023-24

Sl No	Name of Energy Conservation Activity	Expected Energy Savings	
		Gcal/Mkwh	Rs. Million
1	To improve Pulverized coal injection at BF-1 from 97.6 Kg/tHM to 120.6 kg/tHM at Blast Furnace	82722	145
2	To improve Pulverized coal injection at BF-2 from 93.8 Kg/tHM to 120.6 Kg/tHM at Blast Furnace	96389	169
3	To improve power generation at SHRPP upto 5 MW.	43.8	427
	Total Savings		**741**

Summary of the Projects identified & Implemented

YEAR	No of Projects	Thermal Savings (Gcals)	Electrical Savings (Million KWH)	Savings in Rs.Cr	Investment In Rs Cr	Savings (GcaltCS)
2020-21	16	446733	83.4	117	2.3	0.104
2021-22	26	1073878	149.64	257.3	0.123	0.272
2022-23	21	835756	60.87	206	22	0.237



ENCON Projects with Investment (2020-21)

S.No.	Title of Project	Energy Savings in		Investment (Rs Million)
		Gcal/MKwh	Rs Millions	
1	Interconnection of LD Gas holder -1&2	99150	128	8
2	Improvement in Power Generation at GETS from 3.37 MW to 6.16 MW	24.4	174	5
3	Improvement in Power Generation at SHRPP from 0.15 MW to 2.49 MW	20.5	146	10

ENCON Projects with no Investment (2020-21)

S.No.	Title of Project	Energy Savings in	
		Gcal/MKwh	Rs Millions
1	Reduction in Sp. Power Consumption at SP-2 from 64.07 to 62.85 Kwh/tGS	2.8	20
2	Reduction in Sp. Heat Consumption at SP-1 from 27 to 26 Mcal/tGS	4080	5
3	Reduction in Sp. Power Consumption at SP-1 from 64.95 to 63.03 Kwh/tGS	7.8	56
4	Improvement in Pulverized coal injection at Blast Furnace-1 from 33.36 to 104 Kg/tHM	256953	331
5	Reduction in fuel rate at Blast Furnace-3 from 530.6 to 526.5 Kg/tHM	29537	38

ENCON Projects with no Investment (2020-21)

S.No.	Title of Project	Energy Savings in	
		Gcal/MKwh	Rs Millions
6	Reduction in Sp. Heat Consumption at SMS-2 from 45 to 35 Mcal/tCS	23544	30
7	Reduction in Sp. Power Consumption at SMS-2 from 119.26 to 113.06 Kwh/tCS	14.6	104
8	Reduction in Sp. Heat Consumption at CRMP-1 from 1380 to 1329 Mcal/tGL	13668	18
9	Reduction in Sp. Power Consumption at CRMP from 55.17 to 41.82 Kwh/tGL	7.27	52
10	Reduction in Sp.Power Consumption at WRM from 120.07 to 118.59 Kwh/tBl	1.12	8
11	Reduction in Sp. Heat Consumption at WRM-2 from 260 to 247 Mcal/tBl	5756	7
12	Reduction in Sp.Power Consumption at WRM-2 from 211.30 to 200.46 Kwh/tBl	4.8	34
13	Reduction in Sp. Heat consumption at BF from 494 Mcal/tHM to 491 Mcal/tHM	14045	18

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 Seperation Unit-5	0.78	0.13
2	Hydraulic Modfication 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-Commissioing 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

INNOVATIVE PROJECTS IMPLEMENTED

Name of the Project	Replicability	Impact on SEC (Gcal/tCS)	Annual Savings (Rs. In lakhs)	Investment (Rs. In lakhs)
Optimization of Energy Consumption In Ladle Furnace (LF) Of SMS-2	Yes	0.0020	719.8	20
Energy conservation in structural mill an innovative way	Yes	0.0054	747	10.00
Energy Conservation by changing mode of operation by dropping arrester in BSY of SMS-1	Yes	0.0000	5.98	3.55

INNOVATIVE PROJECT-1

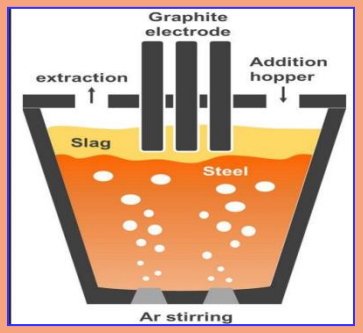
Optimization of Energy Consumption In Ladle Furnace (LF) Of SMS-2

❖Ladle Furnace ensure heat homogenisation and to control super heat.
❖Ladle Furnace capacity is 15-17 MW and energy consumed during arcing. It is basically process modification

Current Concern

- High Power consumption at LF.
- Low opening temperature due to low heating rate during arcing.
- High viscous slag due to low heating rate which increases arcing time.
- High Ferro alloy addition
- Grade of steel

All these factors are contributing to higher energy consumption at LF (37 kwh/tS)



Modification done

- Controlling temp raise to <= 30 deg C.
- Maintaining Ferro Alloy addition <= 1300 kg.
- Maintaining arcing time <= 25 min and starting LF treatment at tap no. 4-5.
- Addition of lime in batches and online carbon correction in medium/high carbon steel.

These activities resulted in reduction of Power consumption from 37 kwh/tls to 35 kwh/tls and resulted in Energy saving of 8 Mkwh.

INNOVATIVE PROJECT-2

Energy conservation in structural mill

Structural mill produces Angles, Rounds and other products.

Rated capacity: 7,00,000 tons/annum

- **Power consumed in Main rolling drives, Auxiliary drives (6.1 MW) and water circuit pumps (3.7 MW).**
- **Major energy is consumed in main drives & Auxiliary drives.**

Sl. No.	Before Modification	After Modification
1	Energy consumption during switching off 16 converters of 1400 kw (commutation current)	Reducing DC current (180 AMP/105 AMP)by presetting up of Main drive.
2	Low capacity loading of pumps of Billet yard (55 kw) i.e 37%	Switching off Hydraulic pumps and optimising pumping operation (23 vs. 18 Nos.)
3	Low capacity loading of Direct cooling water and scale pitpumps.	Optimisation of pumps (8 vs 4)
4	Energy conservation in lighting circuit at unmanned location	Switching off lighting and reduction of voltage by 5%.
5	Energy consumption in AHU	Optimisation of AHU during no rolling (8 vs. 21)

This modification resulted in Energy saving of 9337 KWH.

OVERVIEW - MAINDRIVE PANEL

OVERVIEW -MAIN STAND MOTORS

INNOVATIVE PROJECT-3

Energy Conservation by changing mode of operation by dropping arrester in BSY of SMS-1

The main function of the dropping arrestor is to align the blooms linearly for handling by magnetic crane and driven by a 7KW motor.

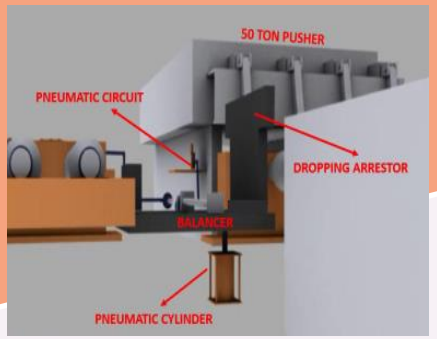
Problem

Non functioning of Dropping arrestor due to loosening of plummer block bolts and misalignment of the eccentric shaft on account of high vibrations. It results in iimproper Alignment of Blooms, Roller & Shaft damage leads to delay in stacking of blooms, reduced handling of blooms (5 vs 4), more no. of crane movements (high power consumption)

Blooms Stacked in Zig-Zag Pattern due Non-Functioning of Dropping arrestors

Solution

Existing system is replaced with new pneumatic cylinder for auto operation of dropping arrestor.



Benefits

- Reduced stacking time for blooms.
- Reduction in crane movement.
- Reduction in power consumption of crane.

This modification resulted in energy saving of 61320 KWH and monetary savings of 5.98 lakhs per year.

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

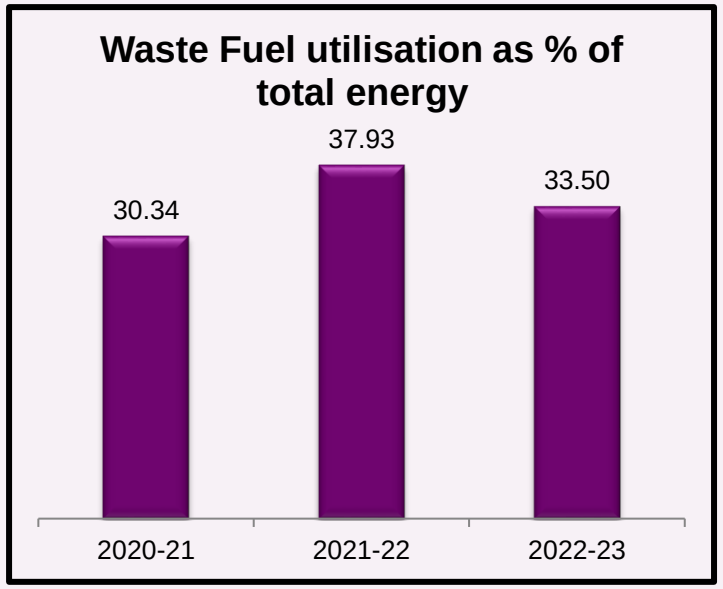
Exploring 150-200 MW Floating Solar Power Plant at Water Reservoirs.

Utilization of renewable energy sources-Solar Energy Utilization

Year	Technology (Solar, Wind, Biomass etc.)	Installed capacity	Consumption (Mkwh)	% of overall electrical energy consumption
2020-21	Solar	5 MW	0.056	0.24
2021-22	Solar	5 MW	0.047	0.1
2022-23	Solar	5 MW	0	0

Utilization of Waste Material as fuel

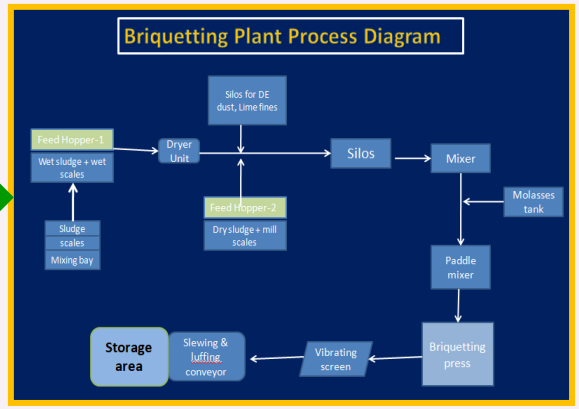
Name of the Fuel	Quantity of waste Fuel used (MT/ year)	GCV of fuel (kcal/kg)	Heat Value (million kcal/year)	Waste Fuel as % of total energy used
Coke Dust	3361	6674	22431	0.1
LD Slag	145816	1000	145816	0.5
Met Waste	377942	500	188971	0.6
Tar sludge	3232	7100	22947	0.1
Benzol muck	242	7100	1718	0.0
ASP sludge	288	7100	2045	0.0
BF gas	7299000	842	6145758	20.3
LD gas	437000	1827	798399	2.6
Coke dust(sold)	52429	775	40632	0.1
Granulated Slag	2593767	1070	2775331	9.2
Total				**33.5**



Waste Recycling

RINL is recycling waste by making Briquettes (0.15 MTPA) and Micro pellets (0.4 MTPA) on BOO basis.

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

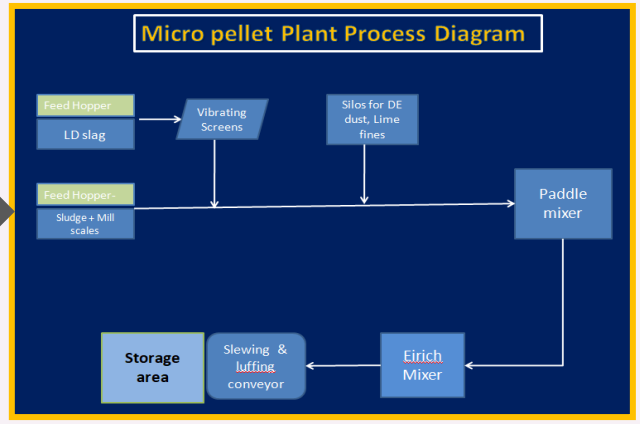


SMS (1,50,000 tons)

Benefits

- Substitute for steel scrap required at LD converter.
- Increased yield ,reduced Oxygen consumption, reduced lime addition & higher LD recovery

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



Sinter Plant (4,00,000 tons)

Benefits

- Reduced Coke Breeze consumption.
- Increase in waste utilization 75 Vs 110 kgs/tchs
- Elimination of micro fines handling
- Increase in yield

Investment: 110 Cr

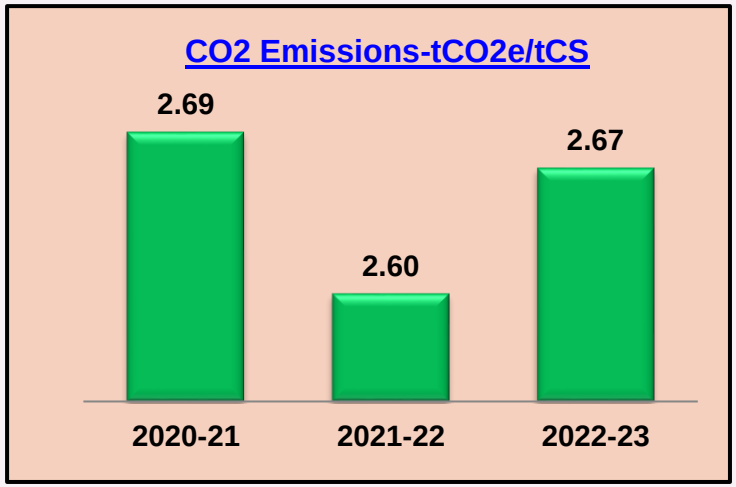
GHG Inventorisation

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

CLIMATE ACTION Member worldsteel ASSOCIATION

Scope 1	Scope 1.1	Scope2	Scope 3	Total CO2(t CO2/TCS)
1.89	**0.84**	**0.14**	**-0.19**	**2.67**



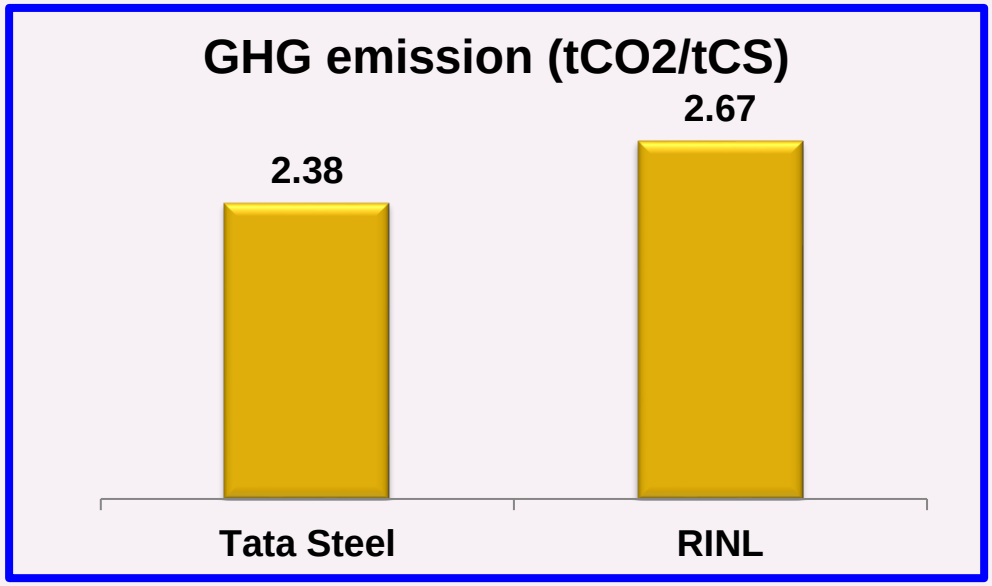
Target & Action plan for GHG reduction

Parameters	2022-23	Short Term (2030)	Long term (2047)
GHG Emissions	2.67	2.40	2.30

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

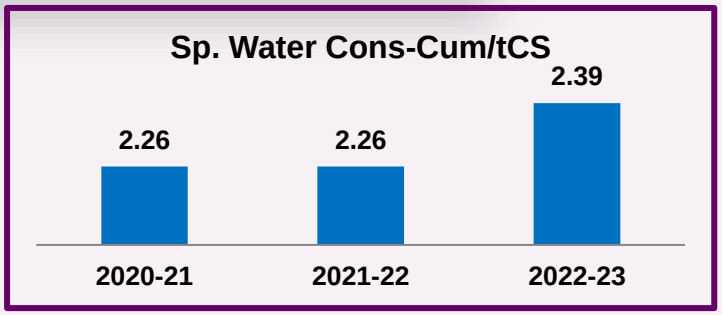
GHG Benchmarking

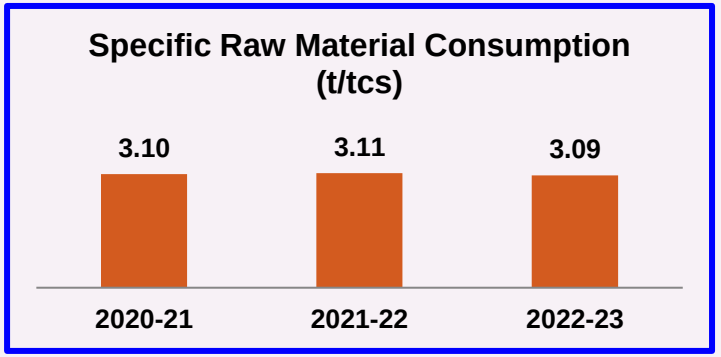


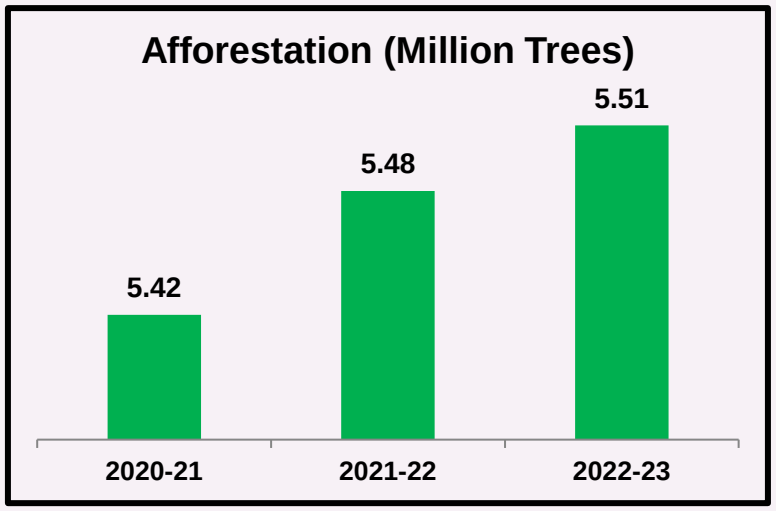
GHG Emission		Gap :0.29 tCO2/tCS
RINL	Tata Steel	1) Coal injection > 180kg/tHM(0.12 tco2/tCS) vs 100 kg/tHM 2) Fuel rate 526 kg/tHM vs 556 kg/tHM (0.12 tco2/tCS). 3) Plant Production: 10.6 Mt Crude Steel. 4) Scrap Consumption 8.5% (0.1 tco2/tCS)
2.67	2.38	

Environmental Projects

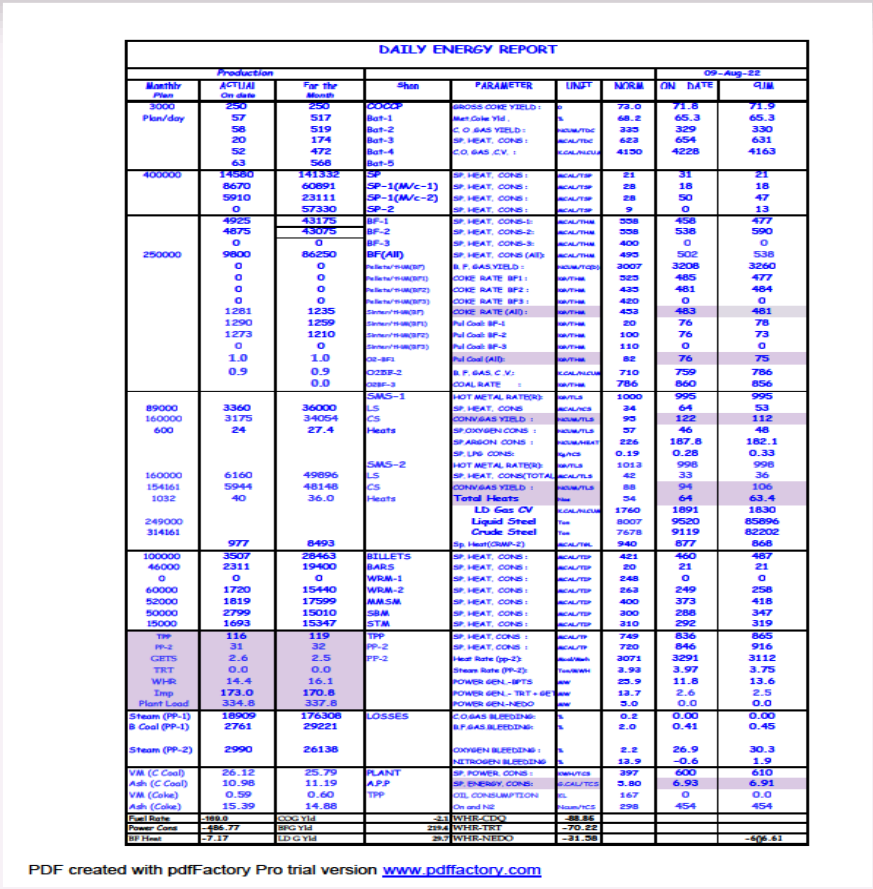
Projects	Benefits
Up gradation of Electro Static Precipitators (ESP) in TPP	SPM 100 Vs 50 PPM
Up gradation of Bag Filters at CRMP	SPM <50 PPM
Internal Repairs of Central Ventilation System (CVS) of SMS-1	SPM 140 Vs <50 PPM







EMS & Other requirements



DAILY ENERGY REPORT

Production							09-Aug-22	
Monthly Plan	ACTUAL On date	For the Month	Plan	PARAMETER	UNIT	NORM	ON DATE	CUM
3000	250	250	COCOP	GROSS COKE YIELD :	%	73.0	71.8	71.9
Plan/day	57	517	Bat-1	Met.Coke Yld :	%	68.2	65.3	65.3
	58	519	Bat-2	C.O.GAS YIELD :	NCUM/TDC	335	329	330
	20	174	Bat-3	SP. HEAT. CONS :	KCAL/TDC	623	654	631
	52	472	Bat-4	C.O. GAS .C.V. :	K.CAL/NCUM	4150	4228	4163
	63	568	Bat-5					
400000	14580	141332	SP	SP. HEAT. CONS :	KCAL/TSP	21	31	21
	8670	60891	SP-1(M/c-1)	SP. HEAT. CONS :	KCAL/TSP	28	18	18
	5910	23111	SP-1(M/c-2)	SP. HEAT. CONS :	KCAL/TSP	28	50	47
	0	57330	SP-2	SP. HEAT. CONS :	KCAL/TSP	9	0	13
	4925	43175	BF-1	SP. HEAT. CONS-1:	KCAL/THM	538	458	477
	4875	43075	BF-2	SP. HEAT. CONS-2:	KCAL/THM	538	538	590
	0	0	BF-3	SP. HEAT. CONS-3:	KCAL/THM	400	0	0
250000	9800	86250	BF(All)	SP. HEAT. CONS (All)	KCAL/THM	495	502	538
	0	0	Pellets/THM(BF)	B. F. GAS YIELD :	NCUM/TODS	3007	3208	3260
	0	0	Pellets/THM(BF1)	COKE RATE BF1 :	KG/THM	325	485	477
	0	0	Pellets/THM(BF2)	COKE RATE BF2 :	KG/THM	435	481	484
	0	0	Pellets/THM(BF3)	COKE RATE BF3 :	KG/THM	420	0	0
	1281	1235	Sinter/THM(BF)	COKE RATE (All) :	KG/THM	453	483	481
	1290	1259	Sinter/THM(BF1)	Pul Coal: BF-1	KG/THM	20	76	78
	1273	1210	Sinter/THM(BF2)	Pul Coal: BF-2	KG/THM	100	76	73
	0	0	Sinter/THM(BF3)	Pul Coal: BF-3	KG/THM	110	0	0
	1.0	1.0	O2-BF1	Pul Coal (All):	KG/THM	82	76	75
	0.9	0.9	O2SP-2	B. F. GAS .C .V.:	K.CAL/NCUM	710	759	786
		0.0	O2SP-3	COAL RATE	KG/THM	786	860	856
			SMS-1	HOT METAL RATE(R):	KG/TLS	1000	995	995
89000	3360	36000	LS	SP. HEAT. CONS	KCAL/KGS	34	64	53
160000	3175	34054	CS	CONV.GAS YIELD :	NCUM/TLS	95	122	112
600	24	27.4	Heats	SP.OXYGEN CONS :	NCUM/TLS	57	46	48
				SP.ARGON CONS :	NCUM/HEAT	226	187.8	182.1
				SP. LPG CONS:	Kg/KGS	0.19	0.28	0.33
			SMS-2	HOT METAL RATE(R):	KG/TLS	1013	998	998
160000	6160	49896	LS	SP. HEAT. CONS(TOTAL	KCAL/TLS	42	33	36
154161	5944	48148	CS	CONV.GAS YIELD :	NCUM/TLS	88	94	106
1032	40	36.0	Heats	Total Heats	Nos	54	64	63.4
				LD Gas CV	K.CAL/NCUM	1760	1891	1830
249000				Liquid Steel	Tns	8007	9520	85896
314161				Crude Steel	Tns	7678	9119	82202
	977	8493		Sp. Heat(CRMP-2)	KCAL/TRL	940	877	868
100000	3507	28463	BILLETS	SP. HEAT. CONS :	KCAL/TSP	421	460	487
46000	2311	19400	BARS	SP. HEAT. CONS :	KCAL/TSP	20	21	21
0	0	0	WRM-1	SP. HEAT. CONS :	KCAL/TSP	248	0	0
60000	1720	15440	WRM-2	SP. HEAT. CONS :	KCAL/TSP	263	249	258
52000	1819	17599	MMSM	SP. HEAT. CONS :	KCAL/TSP	400	373	418
50000	2799	15010	SBM	SP. HEAT. CONS :	KCAL/TSP	300	288	347
15000	1693	15347	STM	SP. HEAT. CONS :	KCAL/TSP	310	292	319
TPP	116	119	TPP	SP. HEAT. CONS :	KCAL/TP	749	836	865
PP-2	31	32	PP-2	SP. HEAT. CONS :	KCAL/TP	720	846	916
GETS	2.6	2.5	PP-2	Heat Rate (pp-2):	Kcal/Kwh	3071	3291	3112
TRT	0.0	0.0		Steam Rate (PP-2):	Tns/MWH	3.93	3.97	3.75
WHR	14.4	16.1		POWER GEN.-BPTS	MW	23.9	11.8	13.6
Imp	173.0	170.8		POWER GEN.- TRT + GET	MW	13.7	2.6	2.5
Plant Load	334.8	337.8		POWER GEN.-NEDO	MW	3.0	0.0	0.0
Steam (PP-1)	18909	176306	LOSSES	C.O.GAS BLEEDING:	%	0.2	0.00	0.00
B Coal (PP-1)	2761	29221		B.F.GAS BLEEDING:	%	2.0	0.41	0.45
Steam (PP-2)	2990	26138		OXYGEN BLEEDING :	%	2.2	26.9	30.3
				NITROGEN BLEEDING	%	13.9	-0.6	1.9
VM (C Coal)	26.12	25.79	PLANT	SP. POWER CONS :	Kwh/TCS	397	600	610
Ash (C Coal)	10.98	11.19	A.P.P	SP. ENERGY CONS:	K.CAL/TCS	5.80	6.93	6.91
VM (Coke)	0.59	0.60	TPP	OIL CONSUMPTION	KL	167	0	0.0
Ash (Coke)	15.39	14.88		Dr and N2	Ncum/TCS	298	454	454
Fuel Rate	-988.0	COG Yld		-2.1	WHR-CDQ	-88.86		
Power Cons	-486.77	BFG Yld		219.4	WHR-TRT	-70.22		
BF Heat	-7.17	LD G Yld		29.7	WHR-NEDO	-31.58		-406.61

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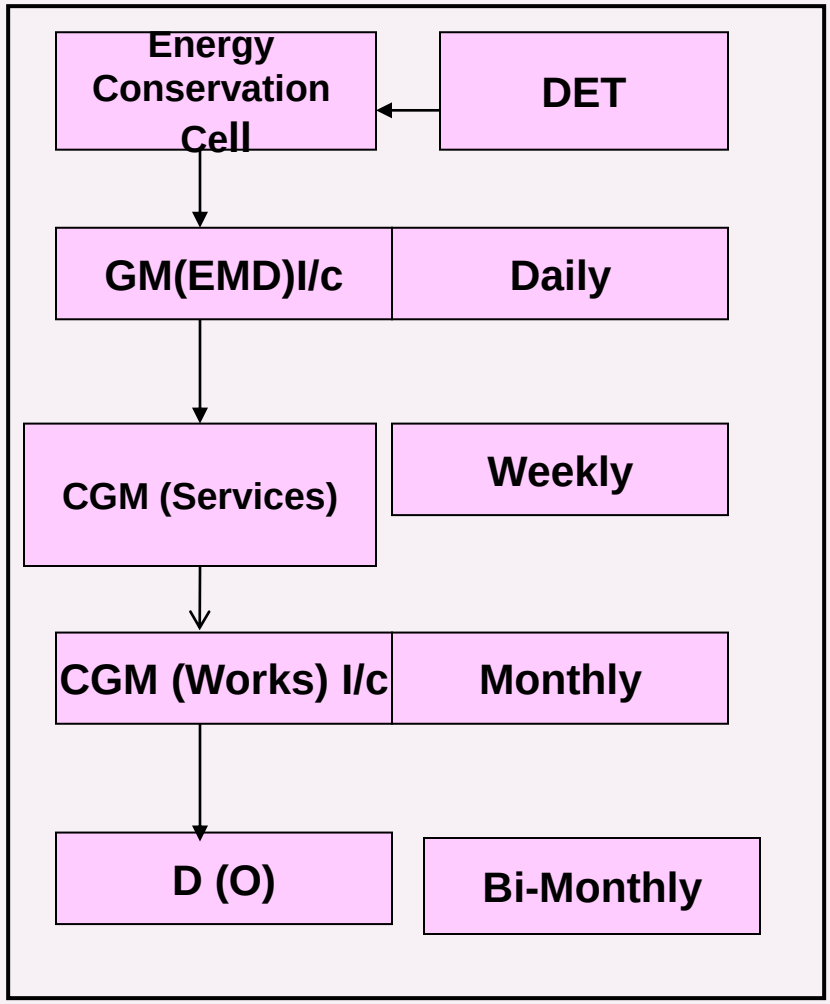


-Energy Savings are quantified with respect to displacement of Boiler Coal
-Electrical Savings are quantified by pegging with Electricity imported.
-Savings are certified by Energy Auditors

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.

Standard

ISO 50001:2018

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
Jagdheesh N. MANIAN
Director – CERTIFICATION, South Asia
Commodities, Industry & Facilities Division

UKAS MANAGEMENT SYSTEMS 0008

Certification body address: 5th Floor, 66 Prescot Street, London, E1 8HG, 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	Carbon Capture from BF gas
Tata Steel	Energy recovery at PRDS
Tata Steel	Optimising cooling Tower Performance
Bhilai Steel plant	Floating Solar Power Plant at Water Reservoirs
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.

A. Implemented:(Accredited Energy Audit Recommendations)

Sr. No.	Energy efficiency improvement measures	Investment Rupees (lakhs)	Verified savings (lakhs)	Verified Energy saving	Unit
1	Efficiency improvement of exhausters in CCP	240	620	6357	MWH
2	Efficiency improvement of Mechanical, biological and chemical (MBC) blower in CCP	25	45	464	MWH
3	Replacement of rubber seal with labyrinth seal in sinter cooler of sinter machine-1	350	448	4592	MWH
4	BOF B ID fans speed reduction during non-blowing time	-	62	640	MWH
5	Effciency Improvement of ID fan of Basic Oxygen Furnace-B	25	115	1183	MWH
6	Optimize the gap between furnace and hood in ladle furnace-1 (SMS-2) to reduce the arcing time by 10%	10	143	1464	MWH
7	Optimize the gap between furnace and hood in ladle furnace-2 (SMS-2) to reduce the arcing time by 10%	10	127	1300	MWH
8	Efficiency improvement of ID fan of Basic oxygen furnace-E	25	259	2653	MWH
9	Heat loss reduction from outer surface of furnace wall in LMMM furnace by providing optimum refractories and insulation	11	9	150	Tons
10	Excess air control in LMMM furnace-1 by fine tuning of auto controller	40	384	6279	Tons
11	Heat loss reduction from outer surface of furnace wall in MMSM furnace	11	11	180	Tons
12	Heat loss reduction from outer surface of furnace wall in WRM-1 furnace	11	11	175	Tons
13	Excess air reduction in WRM-2 furnace by fine tuning of auto controller	40	46	747	Tons
14	Heat loss reduction from outer surface of SBM furnace	11	3	42	Tons
15	Stoppage of steam flow to chilled water plant-2	-	73	1194	Tons
16	Vacuum improvement in TG-4 and TG-5 of TPP	200	6319	64787	MWH
17	Vacuum improvement of TB-4 in TPP	100	202	3297	Tons
18	Reconditioning of GET-2 in Blast Furnace-2	400	294	3010	MWH
19	Overhauling of inefficient pump of pump house-2 of SMS-2	11	32	325	MWH
20	Reconditioning and servicing of inefficient pumps of pump house-18 & 18B	12	117	1202	MWH

B. Under Implementation: ((Accredited Energy Audit Recommendations)

Sr. No.	Energy efficiency improvement measures	Investment Rupees (lakhs)	Verified savings (Rs lakhs) Estimated	Verified Energy saving(Estimated)	Unit
1	Efficiency improvement of Dedusting ID fan-2 in sinter plant-2	80	219	3,584	Tons
2	Increase of PCI injection in Blast Furnaces	-	12,525	2,04,898	Tons
3	Installation of VFD along with VFD compatible motor in combustion air fans of MMSM furnace	200	46	469	MWH
4	Installation of VFD along with VFD compatible motor in control ventilation fan of MMSM furnace	19	11	109	MWH
5	Replacement of air preheater tube with new one in WRM-1	60	336	3444	MWH
6	Optimization of CEP pressure of TG-1 in TPP	20	44	450	MWH
7	Replacement of APH in boiler 1 of TPP	1300	1756	18002	MWH
8	Reconditioning and servicing of existing pumps in pump house-4	11	121	1236	MWH

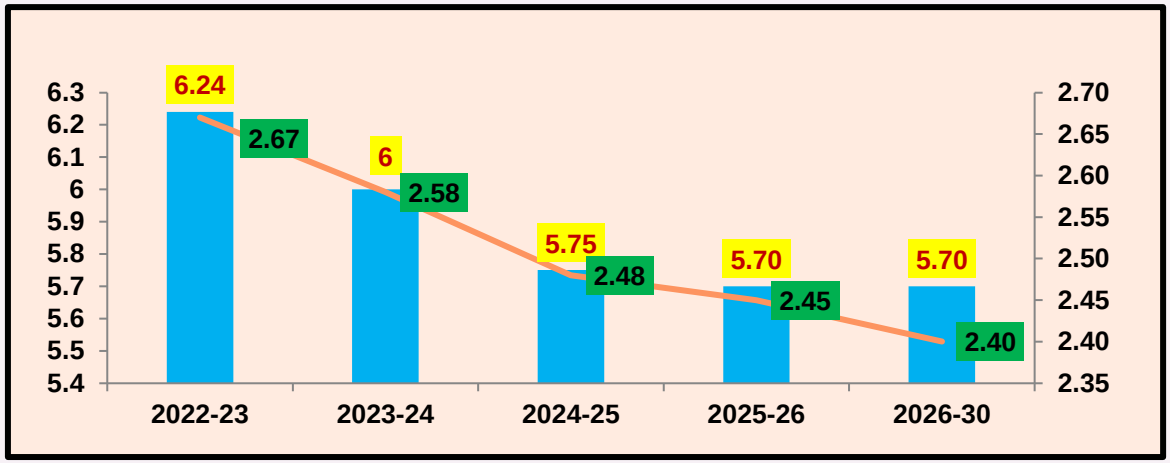
Net Zero Commitment

Parameters	2030	2047	2047 (with policy intervention)
GHG Emissions	2.40	2.30	2.00

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,

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

Net Zero Ideas For Steel Industry

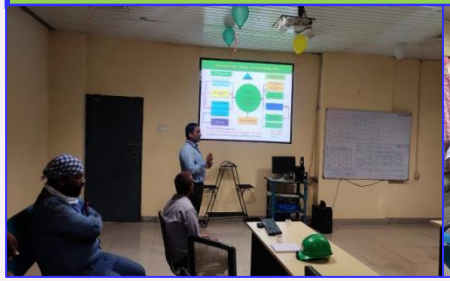
- Usage of Hydrogen in place of PCI coal
- Injection CO Gas in BF, Syngas injection into BF
- Carbon Capture usage and Storage (CCU&S) technology

National Energy Conservation Week Celebration

National Energy Conservation Day Celebration

Energy Quiz competition

Energy Awareness Program at Various Departments



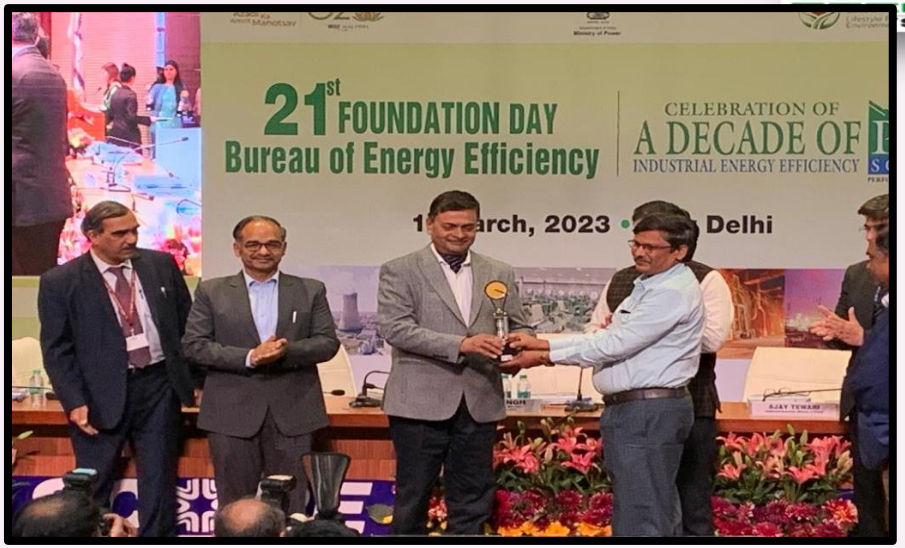
Essay competition

Road Show

Energy Awareness Program at various schools

Awards

- 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.
- CII National Energy Leader" award four times (2022, 2021, 2020 & 2019).
- CII National Award for Excellence in Energy Management consecutively for six years 2022, 2021, 2020, 2019, 2018 & 2017
- National Energy Conservation Award-1st Prize from Ministry of Power-2019



Escerts Sales

Total No. Of Escerts Sold	**34, 763**
Revenue generated	**7.54 Cr**

Thank you

राष्ट्रीय इस्पात निगम लिमिटेड

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