

Presented By: Jindal Stainless, Jajpur



Jyoti Ranjan Tripathy _{АGM-ESG}

Bhabani Sankar Pradhan Manager-ESG

Alluri Arpith Prasanna Kumar Associate Manager-CRM CII National Award for Excellence in Energy Management 2024

10th-12th September 2024

About Jindal Stainless Limited-Jajpur



- Founded by (Late) Shri O.P Jindal in 1970, Jindal Stainless Group is the Largest Stainless Steel conglomerate in India and ranks amongst the top 5 Stainless Steel Producers globally (Ex China).
- Jindal Stainless Group has an annual crude steel capacity of 2.9
 MTPA and the group has an annual turnover of Rs 35,030 crores.

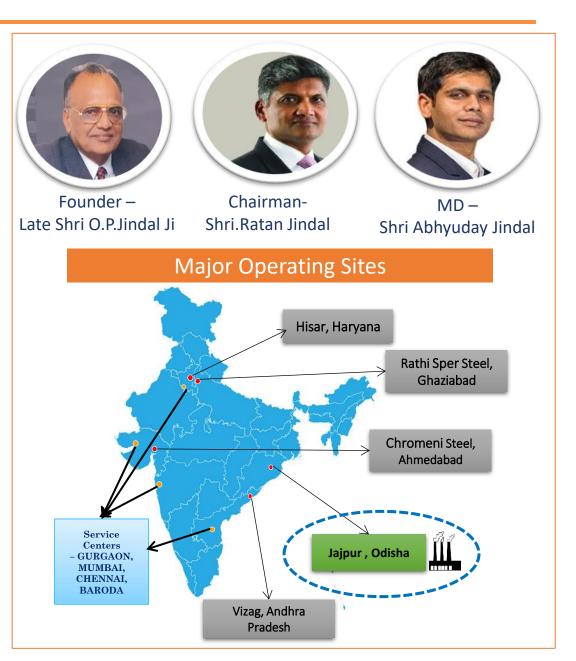
Our Vision:

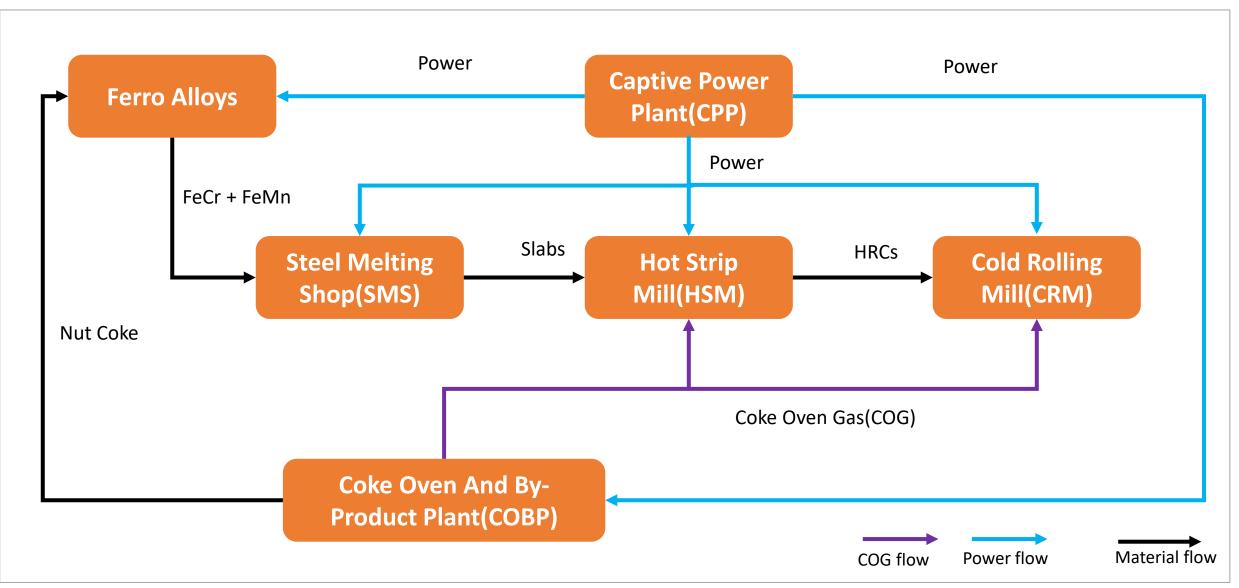
Improving lives through trust-worthy and innovative stain-less solutions.

Our Mission

To be a leading Stainless steel company in the world forging Reliable relationships with the Customers, Suppliers, employees and all other Stake Holders. Building Strong Capabilities driving innovative practices, high quality and competitive solutions.

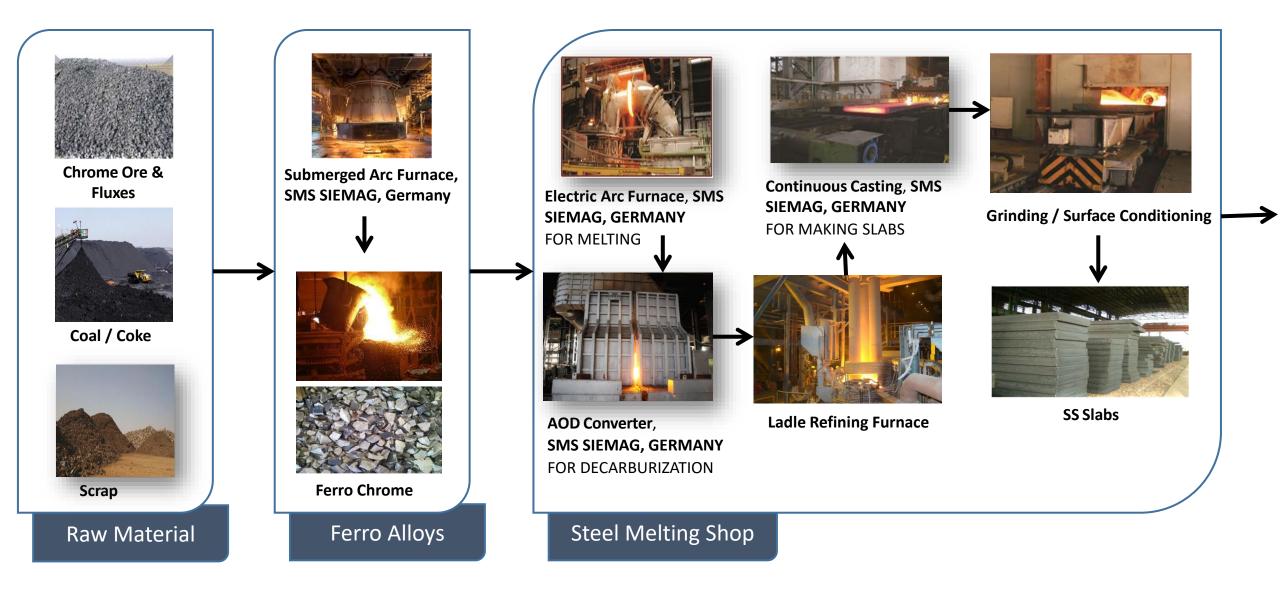




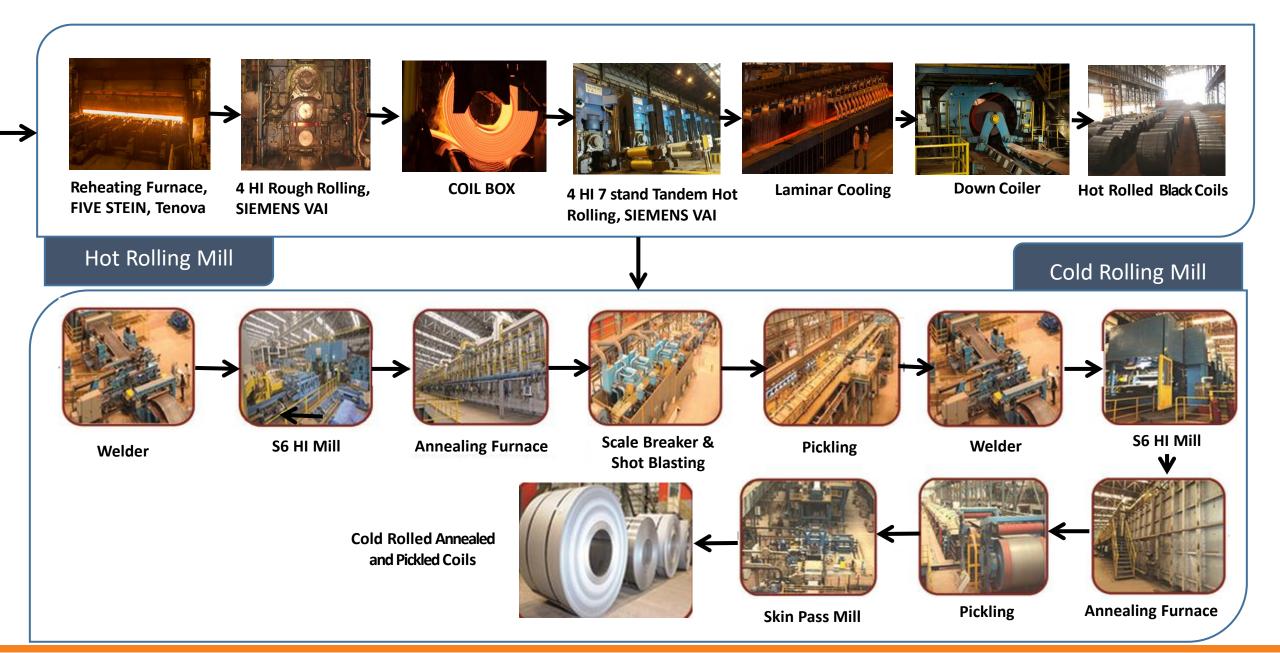


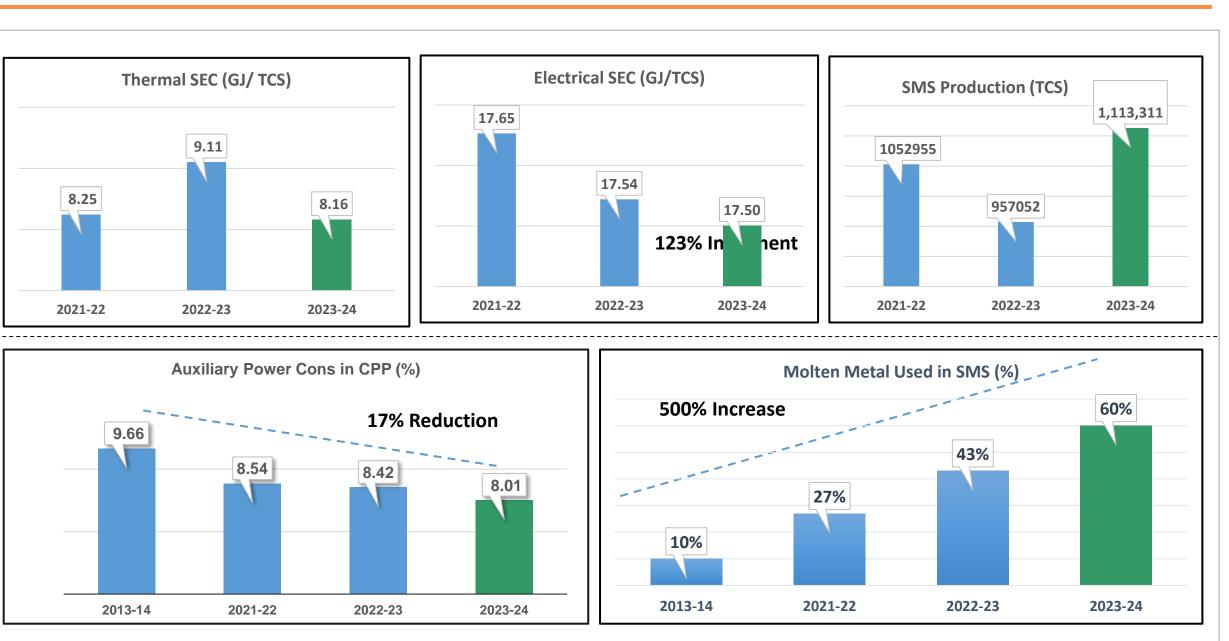


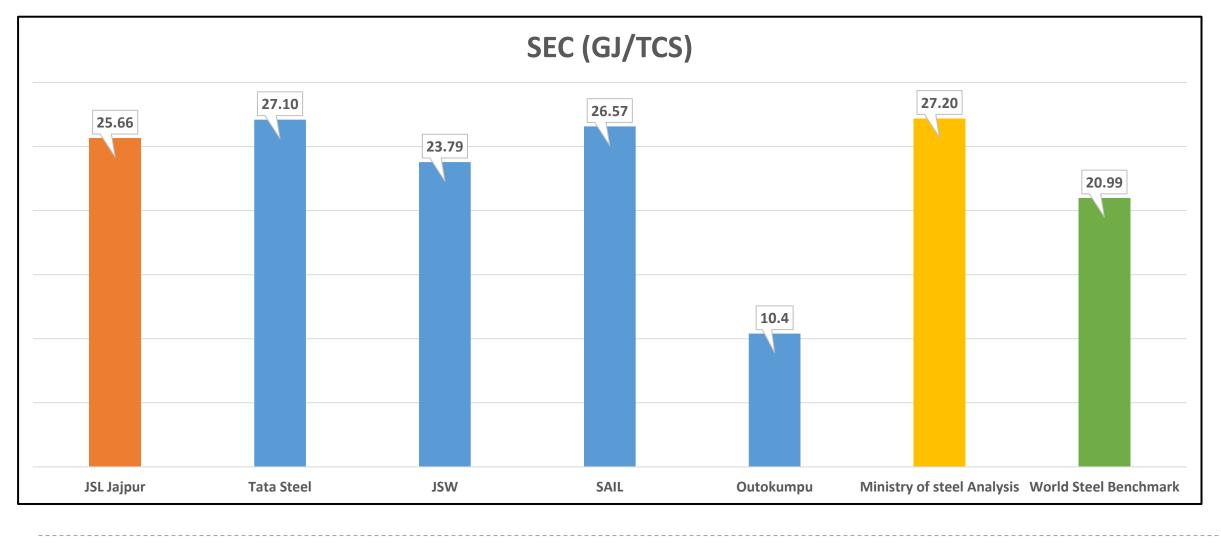












Legend Note

Peers

National Benchmark

International Benchmark

Note:

• Intensity figures has been complied from latest available public reports of peers.

• For National benchmarking data has been taken from ministry of steel website.

• For International benchmark <u>world steel 2023 sustainability indicators</u> has been considered.





The Mandatory Energy Audit was conducted by TUV SUD in January 2024 – engaging 80 Man-days that lead to the exploration of the following projects.

S.No	Details of energy efficiency improvement measure	Expected Investment in Rs. In Lakh	Expected Savings in Rs in Lakh	Expected Savings - Energy	TOE	mkcal/mkwh	Units	Fuel Saving Type
Departr	nent: CPP							
1	Scope of Insulation of CEP Discharge line till LPH Inlet in all the TG's	0.30	2.90	806.03	260.27	2,602.67	Tonne	Coal
2	Improving the Mill Outlet Temperature	0.00	7.52	2,089.97	674.85	6,748.51	Tonne	Coal
3	Improving Coal Mill Air to Coal Ratio	0.00	17.67	26,56,691.00	629.75	2.66	kWh	
4	Improving the Economizer Inlet temperature of Unit 2 to improve Unit heat rate	2.00	48.49	13,468.42	4,348.95	43,489.53	Tonne	Coal
5	Scope of Sonic soot blower in APH of the Boiler in place of Steam Soot blower	3.00	4.76	1,321.94	426.85	4,268.54	Tonne	Coal
6	Stop 1 Ejector in Normal operation	2.00	10.07	2,799.00	903.80	9,037.97	Tonne	Coal
7	Improving the Heat rate of the Steam Turbine of TG 1, and TG 2	20.00	213.04	2,36,710.00	76,433.66	7,64,336.59	Tonne	Coal
8	Scope of Auto Control of Cooling tower fan Speed	0.00	0.43	65,088.00	15.43	0.07	kWh	
9	Insulation Improvement in the CPP Area	1.00	0.25	70.59	22.79	227.94	Tonne	Coal
10	Improve ID Fan power consumption by arresting the duct leakages between APH outlet and ID Fan inlet	2.00	10.64	15,99,600.00	379.17	1.60	kWh	
11	Arrest Passing of Recirculation Valve of Condenser Extraction Pump	0.00	1.86	2,80,000.00	66.37	0.28	kWh	
12	Replacement of Existing Reciprocating Compressor with Screw Compressor	6.00	5.95	8,94,736.84	212.09	0.89	kWh	
13	Scope of Trimming/VFD in Seal Air Fan of Coal Mill	0.36	0.29	43,800.00	10.38	0.04	kWh	

List of Major Encon Project Planned for FY 2024-25 [2/3]

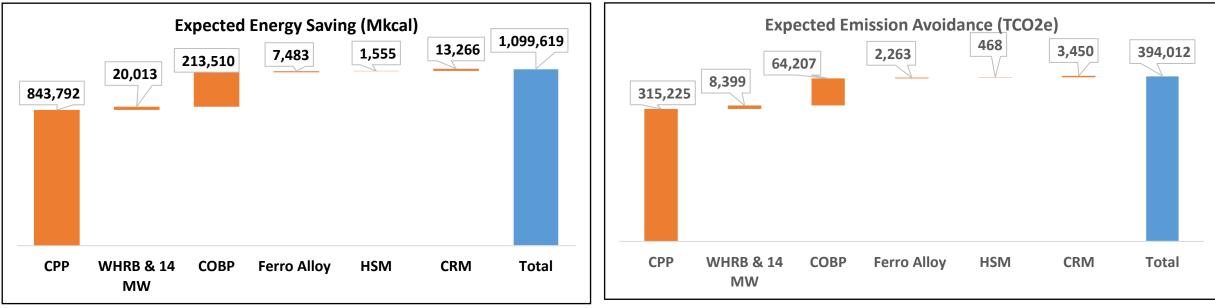


S.No	Details of energy efficiency improvement measure	Expected Investment in Rs. In Lakh	Expected Savings in Rs in Lakh	Expected Savings - Energy	TOE	mkcal/mkwh	Units	Fuel Saving Type
Departn	nent: WHRB & 13 MW CPP							
1	Scope of Improvement of WHRB 1 Flue Gas Temperature	0.00	20.75	5,763.71	1,861.10	18,611.02	МТ	Coal
2	Scope of Insulation of CEP Discharge line till DEA Inlet in 13 MW Plant	0.10	0.77	214.00	69.10	691.01	Tonne	Coal
3	Stop 1 Ejector in Normal operation in 13 MW Plant	0.00	0.66	183.00	59.09	590.91	Tonne	Coal
4	Improving the Heat rate of the Steam Turbine of TG in 13 MW Plant	0.10	2.81	781.00	252.18	2,521.85	Tonne	Coal
Departn	nent: COKE OVEN PLANT (COBP)							
1	Scope of CDQ (Coke Dry Quenching) System in place of Wet quenching System	1,000.00	598.50	9,00,00,000.00	21,333.87	90.00	kWh	
2	Scope of VFD in 1 Cooling tower fan	0.66	0.17	58,176.00	13.79	0.06	kWh	
3	Scope of replacement of Old Compressors	6.00	2.49	3,73,714.30	88.59	0.37	kWh	
Departn	nent: Ferro alloy			· · · · · · · · · · · · · · · · · · ·				
1	Scope of Utilization of Waste Heat of Submerged arc furnace 3, 4, and 5	10.00	13.97	21,00,000.00	497.79	2.10	kWh	
2	Increase capacity utilization of Jigging plant conveyors	0.04	0.06	8,400.00	1.99	0.01	kWh	
3	Low Efficiency of Briquette Plant Dryer	2.00	8.21	164.11	164.93	1,649.31	MT	FO
4	Stop idling operation of Briquette Conveyor BC 2.	0.19	0.15	22,200.00	5.26	0.02	kWh	
5	Scope of VFD in Primary Water Pump	4.00	1.26	136.30	0.03	0.00	kWh	
6	Scope of VFD in Secondary Water Pump	4.00	2.00	3,00,326.70	71.19	0.30	kWh	
7	Stop Cooling water flow in standby compressor	0.02	0.27	40,000.00	9.48	0.04	kWh	

List of Major Encon Project Planned for FY 2024-25 [3/3]



S.No	Details of energy efficiency improvement measure	Expected Investment in Rs. In Lakh	Expected Savings in Rs in Lakh	Expected Savings - Energy	TOE	mkcal/mkwh	Units	Fuel Saving Type
Departr	nent: HSM							
1	Scope of VFD in RH Furnace Combustion air fan	4.50	2.85	4,28,800.00	101.64	0.43	kWh	
2	Revamping of Chiller Plant	0.10	1.53	2,30,009.60	54.52	0.23	kWh	
Departr	nent: CRM							
1	Scope of Optimisation and improvement of operating efficiency in IDCW Pumps	0.00	6.33	9,52,000.00	225.66	0.95	kWh	
2	Scope of utilization of Flue gas for preheating in Annealing furnace 1 and 2	10.00	12.00	1,80,000.00	214.00	2142.00	kg	LPG
3	Optimization of Propane Boiler	0.00	73.00	8,76,00,00,000.00	876.00	8,760.00	kcal	propane
4	Scope of VFD in 1 Cooling tower fan	0.55	0.33	49,247.01	11.67	0.05	kWh	



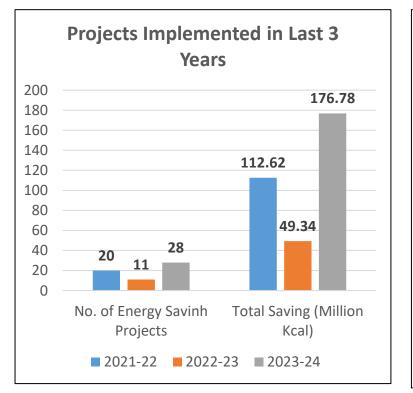
Energy Saving Projects Implemented in Last Three Years

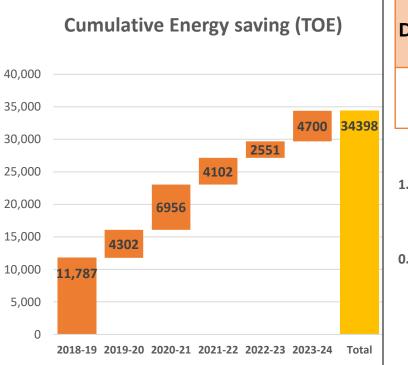


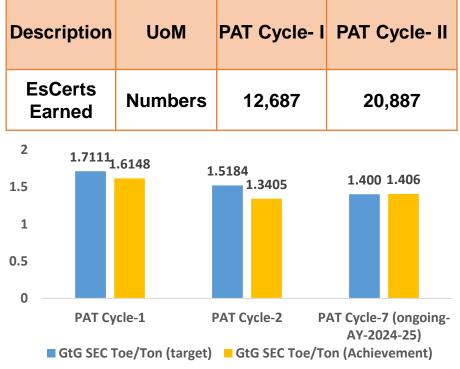
Year	No of Energy saving projects	Investment (INR Million)	Electrical savings (Million kWh)	Thermal savings (Million Kcal)	Total Savings (INR Million)	Payback period (in months)
FY 2021-22	20	5.22	16.56	573671.31	112.62	0.56
FY 2022-23	11	14.94	3.36	17540.00	49.34	3.6
FY 2023-24	28	45.53	6.10	5875.83	176.78	3.1

Perform Achieve & Trade (PAT) Performance

JSL has successfully met the energy consumption reduction target established by the Bureau of Energy Efficiency (BEE) during PAT Cycle-I & II in excess & entitled with positive ESCerts.







List of Major Projects Implemented in Last Three Years [1/2]



Year	Name of Energy saving projects	Investments (INR Million)	Electrical savings (Million kWh)	Thermal savings (Million Kcal)	Total Savings (INR Million)	Payback period (in months)
21-22	Reduction of specific time consumption at EAF	0	5.28	0	33.02	0
21-22	Reduction of specific power consumption at LRF	0	3.52	0	22.01	0
21-22	Reduction of auxiliary power consumption at ID Fan	0	2.64	0	16.51	0
21-22	Reduction in power consumption of ID Fan	2.5	2.42	0	15.14	2
22-23	Heat Rate improvement through improvement in condenser Vacuum Unit-2 of CPP	2.2	0	12186	18.6	1.4
22-23	Up-gradation of the Electrode regulation system at LRF to decrease the specific power consumption of SMS	7.04	1.62	0	10.13	8.3
22-23	High Pressure Heaters internal inspection and rectification Unit-2 of CPP	0.8	0	4298	6.99	1.4



Year	Name of Energy saving projects	Investments (INR Million)	Electrical savings (Million kWh)	Thermal savings (Million Kcal)	Total Savings (INR Million)	Payback period (in months)
23-24	Installation of waste heat recovery boiler with COMBO process	26.26	0	3735.0	72	4.4
23-24	Reduction of Energy Consumption by Annealing Bypass of Specific Grades	0	0.36	11362.50	57	0
23-24	Reduction of power consumption by reducing of U-1 ID fan overload	8	3.14	0	20.78	4.6
23-24	Hot Charging of Slabs in RHF for fuel saving in different grades	0	0	2463.63	12.41	0
23-24	Energy saving in Pump house by leveraging potential of primary and cold well pumps in SAF 3,4&5	0.45	0.72	0	4.78	1.1



Reduction of Energy Consumption by Annealing Bypass

Problem Definition

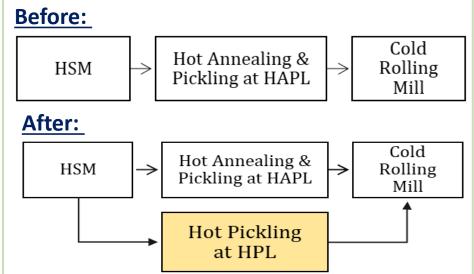
The Process required all grades of slabs to be processed in HAPL division before further processing though some grade does not need to go annealing

Steps Taken

- Annealing bypass trials conducted for specific grades and found slabs still meet quality requirement
- Bypassing annealing process leads to propane reduction (~20kg/ton) along energy savings

Data collection and Results Achieved

Particulars	UoM	QTY
Total Quantity bypassed in FY'23-24	MT	44457
Propane saved (@20.7Kg/MT)	MT	920
Total CO2 abated through Propane reduction (A)	TCO2e	2752
Power Saved (HPL-37 Kwh/MT, HAPL -45 KwH/MT)	KWh/T	8
Total CO2 abated through Power reduction (B)	TCO2e	336
Total CO2 abated (tCO2) (A+B)	TCO2e	3088
Tangible Benefits	Lakhs	720
* Calculation is based on FY 23-24 data		



Other Benefits (Intangible)

Reduction of energy requirements by effective process optimization

Conservation of fuels and natural resources

Return on Investment

- ➢Return on investment in
- = 2.8 Years





Hot Charging of Slabs from Melt Shop to Reheating Furnace (RHF) of Hot Roll

Problem Definition

The Process required all grades of slabs to be processed in reheating furnace before further processing which causes huge amount of thermal energy consumption

Steps Taken

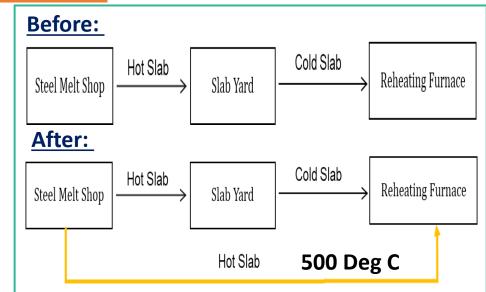
- Identified and prioritized list of grades to be populated basis complexities/ quality constraints to optimize energy savings
- Hot charging of slabs in reheating furnace leads to significant energy savings (~15%) along with productivity improvement

Data collection and Results Achieved

Grades	Total Production (MT)	Total Hot Charged (MT)	Fuel Savings (MT)	TCO2 Abated
Grade – 1	283111	91728 (32%)	775 (8.45 kg/MT)	2318
Grade - 2	138789	82748 (60%)	201 (2.43 kg/MT)	601
Total	421900	174476 (41%)	976	2919

Tangible Benefits due to Avoided LPG consumption = 585 Lakhs

* Calculation is based on FY 23-24 data



Other Benefits (Intangible)

- Reduction of energy requirements by effective process optimization
- Conservation of fuels and natural resources

Uniqueness

Process Improvement and energy conservation without investment





Waste Heat Recovery from Annealing Furnaces in Cold Roll Mill

Problem Definition

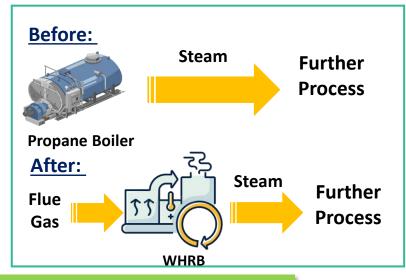
The Process required to use propane fired boiler to generate steam which is used in further process. Which causes huge amount of thermal energy consumption

Steps Taken

- Waste heat recovery boiler is installed to recover heat from waste heat from off-gas of annealing to produce steam
- The steam is internally used in the process at 12 bar, 190 °C

Data collection and Results Achieved

Particular	UoM	HAPL_WHRB	CAPL_WHRB	COMBO_WHRB
Capacity	MVA	0.95 MTPA	0.45 MTPA	0.95 MPTA
Steam Gen. Capacity	ТРН	5.4	3.3	8.8
Steam Generation	Tonne	12998	3986	6358
Avoided LPG consumption	Tonne	749	230	366
GHG emissions Reduction	TCO2e	4022 TCO2e (EF of LPG 2.99 TCO2e/T)		
Tangible Benefits due to Avoided LPG consumption	INR Cr	6.2 Cr (Average LPG Cost is 60k/Ton)		



Other Benefits (Intangible)

 Reducing the energy requirements by effectively utilizing the heat of waste gases
 Conservation of fuels and natural resources

Return on Investment

Return on investment in = 0.75 years

* Calculation is based on FY 23-24 data

Investment 470 Lakhs

Utilization of Renewable Energy Sources(Onsite)



	Onsite									
Year	Source (Solar, wind, etc.,)	Installed capacity (in MW)	Capacity addition (MW) after FY 2021	Total Generation (MWh)	Share % w.r.t to overall energy consumption					
FY 2021-22	-	-	-	-	-					
FY 2022-23	Floating Solar	7.3	7.3	751.93	0.04%					
FY 2023-24	Floating Solar	7.3	-	6155.85	0.29%					
FY 2023-24	Rooftop Solar (23 MW)	13	13 (Commissioned during FY 23-24)	17082	0.79%					

Installation of Floating and Rooftop Solar Plant

- Odisha's first floating Solar Plant Installed on water reservoir
- Rooftop Solar over 10 shades on shop floor

Levers	Floating Solar Plant	Rooftop Solar Plant
Module (Mono crystalline Silicon cells)	540 Wp, 13500 modules	620/625 Mp, 38000+ modules
Lifetime	25 Years	25 Years
Water Savings	285.3 lakh m3	NA
Carbon Abatement	5676 TCO2e	17028 TCO2e



Floating Solar Installed Capacity: 7.3 MW

Rooftop Solar Capacity: 23 MW Installed Capacity: 13 MW



Other Benefit : (Intangible)

➤Use of more green power in process

Low maintenance and manpower cost

Our Renewable Energy Portfolio



Year	Onsite-RE Generation (MWH)	RE Imported From Grid (Offsite)(MWH)	Total RE Consumption (MWH)	Share % w.r.t to overall energy consumption
FY 2021-22	0	70714	70714	3.50%
FY 2022-23	752	74475	75227	4.04%
FY 2023-24	19296	73121	92417	4.35%

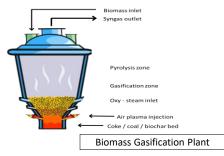
RPO Obligation

 JSL is subjected to Renewable Purchase Obligation of 0.5% Solar and 2.5% Non-Solar

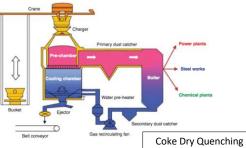
Way Forward Projects

- Onsite 10 MW Solar Roof Top Project by Aug'24.
- 100 MW RE RTC Project by Jan'25
- 27.5 MW RE RTC Project by March 25
- Second Trench of RE-RTC Project by Dec'25
- Green Hydrogen Plant by May 25
- Biomass Gasification Plant by June 25
- Coke Dry Quenching (CDQ) by Dec'24

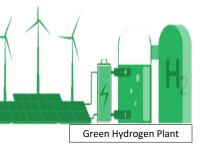


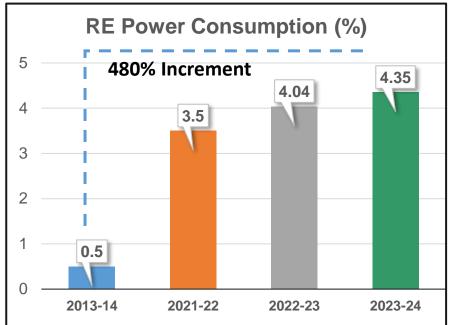












Way Forward in Renewables– 100 MW RE RTC Project



SOLAR (100 MW)
Geotech survey completed Vendor finalized for boundary wall & Site office set-up at solar site. Site set-up completed & boundary wall work is in progress. IDT erection work completed & 12/12 Nos HT panel foundation work completed. 6 nos. HT panels & ACSB erected. 100% piling completed.
2)/140 MW MMS erection 2)/140 MW modules installed. 64 inverters installed. ork in progress 80%(75%) civil works 50% (20%) structure erection

Uniqueness

- It's a hybrid project combination of wind and solar
- Minimum of **70%** CUF is guaranteed
- RE power will be available during night time also

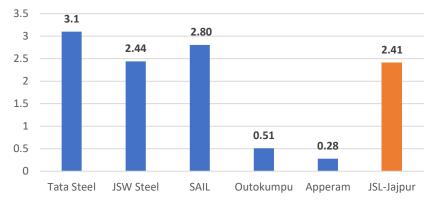
* Status as per the 30th July, 2024 Review meeting



FY 2021-22 FY 2022-23 FY 2023-24 Unit **Parameters** 2.29 2.26 2.40 Scope 1 Emission TCO2e/TCS¹ 0.08 0.15 0.14 Scope 2 Emission TCO2e/TCS 1.81 1.75 1.65 Scope 3 Emission TCO2e/TCS Scope 1 & 2 Intensity (TCO2e/TCS) 3.21 **21% reduction** 2.47 2.44 2.41 FY 2013-14 FY 2021-22 FY 2022-23 FY 2023-24 ¹TCS- Tonnes of Crude Steel

GHG Profile of Peers

Scope 1+Scope 2 Inensity (Tco2e/TCS)



Note:

- Emission Intensity combining Scope 1 & 2.
- Intensity of JSL can be assessed from publicly available BRSR Report, Pg 33.
- Peer intensity has been considered based on latest available public reports.

Our Climate Goals

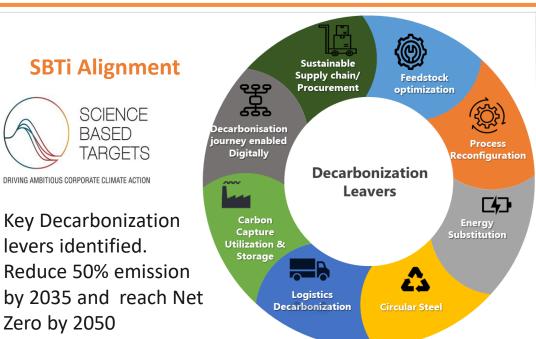
- Short-term: 50% Reduction in emission intensity by FY 2035 compared to FY 2021-22 levels.
- Long-term: Net Zero emission by 2050.



JSL has committed to Science Based Target Initiative (SBTi) for Near term and net zero targets

Our Action Plan for GHG Reduction





Green Hydrogen Plant

- To replace electrically operated ammonia crackers to generate a 75% H2 + 25% N2 mixture
- Use In –House RE power to generate green hydrogen

HZ HZ HURDED HURDED	Parameter	Quantity
	Average Hydrogen Flow (Nm3/hr)	1000
	Carbon abatement Potential (TCO2e)	19000

Electric Vehicle

- Four Electric Vehicles acquired.
- Electric Fleet for employee commute.
- Electric forklifts for material movement
- Use of In house RE power to for charging of EVs



Biomass Gasification Plant

Syngas generated using biomass gasification process to replace LPG and COG



- Plant Capacity : 1800 TPD
 Energy Output: 1,54,700 MCal
 - COG replaced: 1,69,79,268 kg
- CO2 abatement potential: 27800 MT CO2e

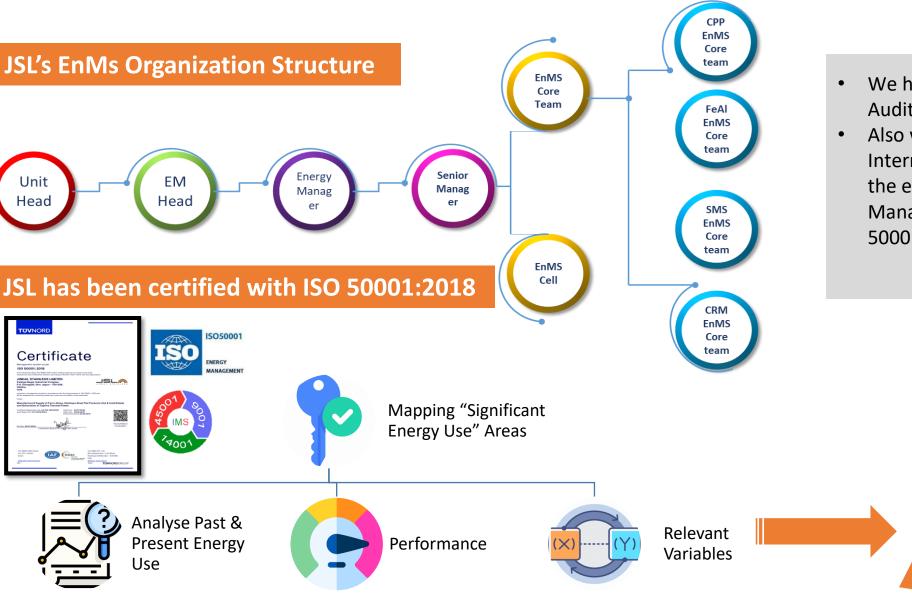
RE-RTC Project



- Procurement of 100 MW RE-RTC by Oct 2024.
- Addition of 27.5 MW off site ground mounted solar project by Jan 2025.
- Another 100 MW RE-RTC to be procured by Dec 2025.

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Energy Management System at JSL Jajpur [1/2]



- We have BEE Certified <u>7</u>Energy Auditor & <u>10</u>Energy Manager.
- Also we have trained <u>43</u> Certified Internal Energy Auditor to check the effectiveness of Energy Management System as per ISO 50001:2018.

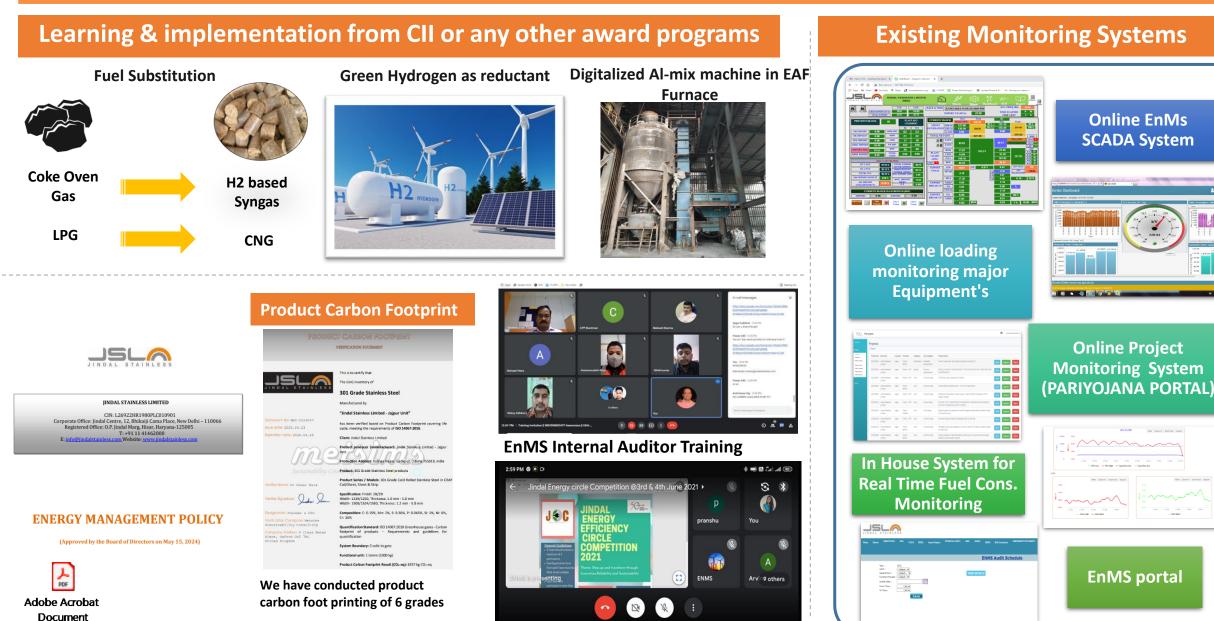






Energy Management System at JSL Jajpur [2/2]

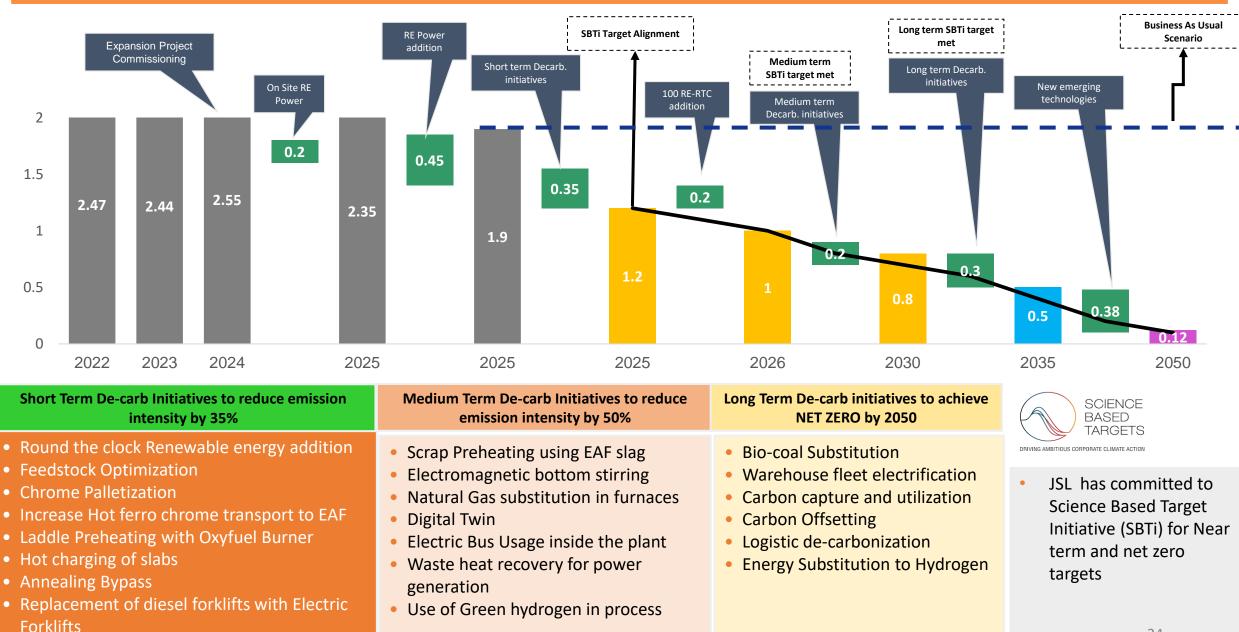




Energy Efficiency Circle Competition

Existing Monitoring Systems

Net Zero Action Plan for JSL Jajpur





Awards, Accolades & Initiatives



