JSL
JINDAL STAINLESS

INDIA'S LARGEST STAINLESS STEEL PRODUCER

Workshop on "Best Practices in Energy Efficiency in Iron and Steel Sector and Steel Sector- A path for Decarbonization"

By
Mr Jyoti Ranjan Tripathy,
Senior Manager, Energy Excellence Cell
& Team

OUR ORGANIZATION

Founded by Shri O.P Jindal in 1970, Jindal Stainless is one of the largest stainless steel conglomerates in India and ranks amongst the top 10 stainless steel conglomerates in the world. It's not only the magnitude of our operations that determines our credibility and name, but we remain inspired by our vision for innovation and enriching lives. Jindal Stainless Group has an annual crude steel capacity of 1.1 MTPA and the group has an annual turnover of Rs 20,311 crores.

Our Founder –
Late Shri O.P.Jindal Ji

Our Chairman
Shri.Ratan Jindal

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

MISSON: 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.

CORE VALUES:

Integrity

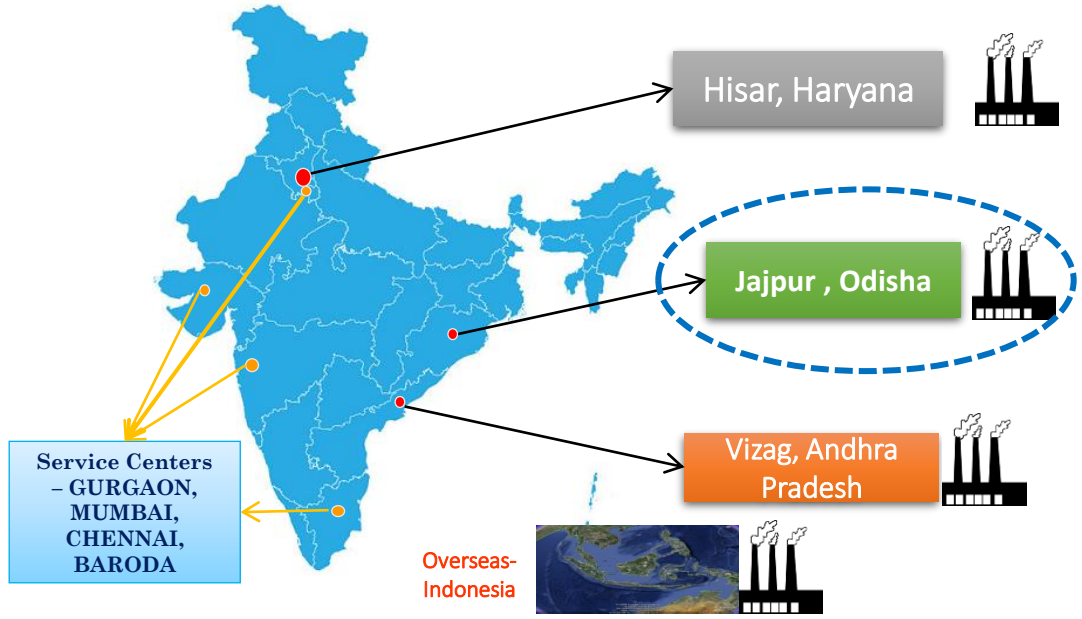
Dynamic Thinking

Respect for Individual

Meritocracy

Social Responsibility

Creativity & Innovation



Our MD –
Shri Abhyuday Jindal

LEADING PRODUCER OF STAINLESS STEEL IN INDIA

Aims to achieve
Net Zero
emissions by 2050

Carbon footprint
2.08 t CO2/tcs

Scrap Utilization
85%
in Steel Making

- We contribute to the following United Nations Sustainable Development Goals (SDGs)
- We are Largest Stainless Steel Producer in India
- We are world's largest producer of razor blade grade of stainless steel and among the largest producers of coin blanks in the world

Stainless steel is a superb material for sustainable solutions as it is 100% recyclable, efficient and Durable.

Towards a more circular model

Recycled, long-lasting and resource-efficient stainless steel

- reduces the need to extract virgin minerals and ores from Earth
- minimizes the environmental impact

We recycle about
55% of input materials used

MULTIPILE FACILITIES & PRODUCT

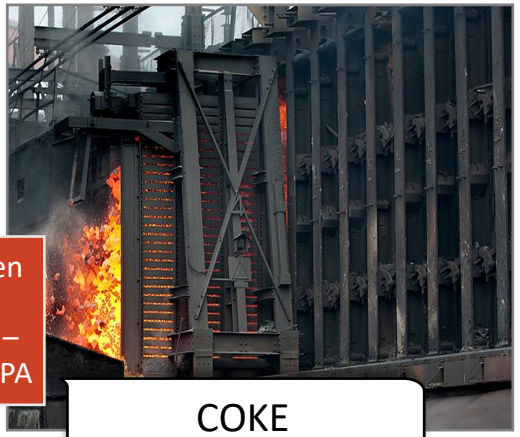
Facilities at Jajpur , Odisha locations & its Products :

263 MW Captive Power Plant

POWER

Ferro Alloys – 250000 TPA

FERRO CHROME



Coke oven & By-Product – 425000 TPA

COKE

Steel Melting Shop – 1100000 TPA

SS SLAB

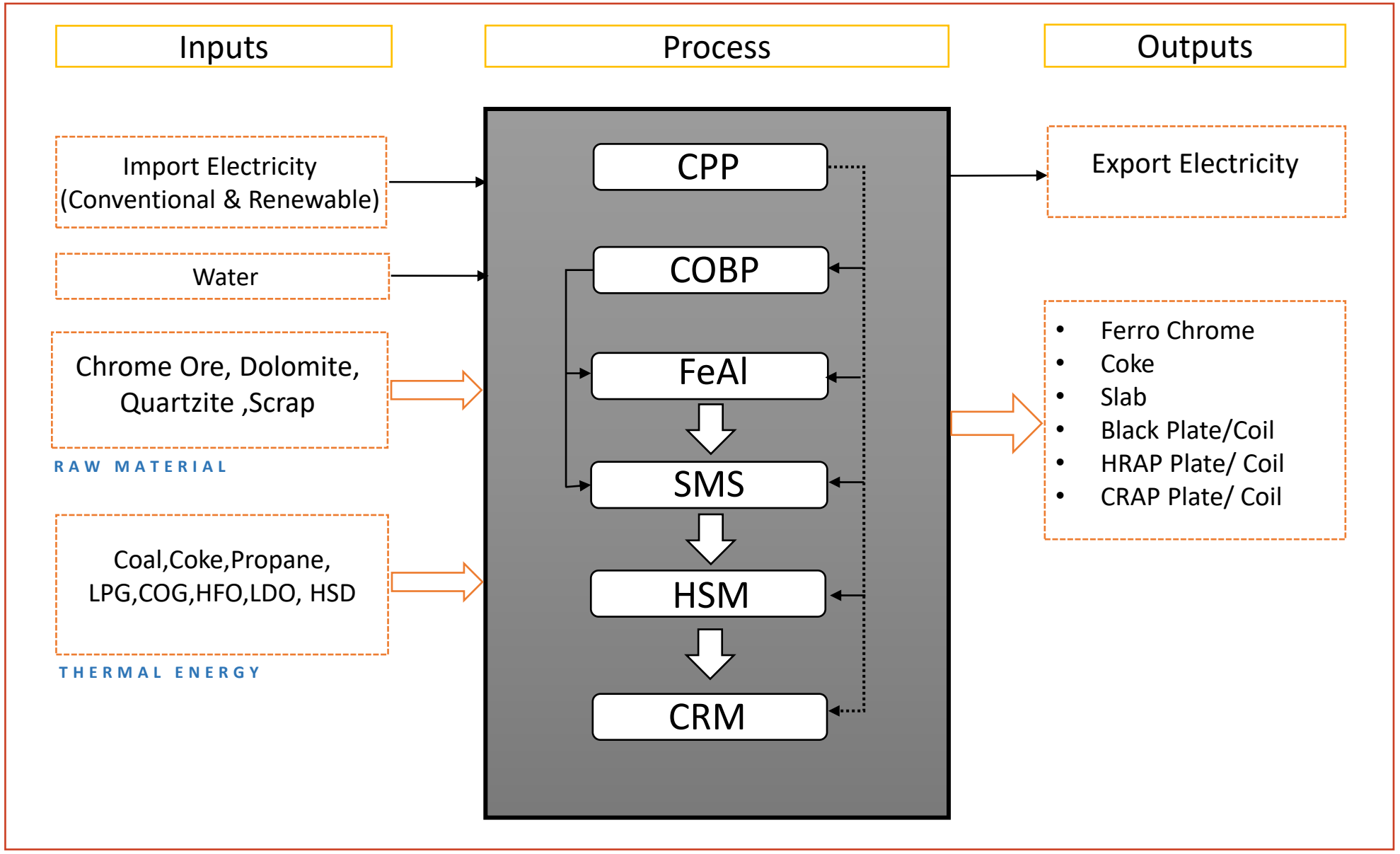
Hot Strip Mill – 1696000 TPA

HOT ROLLED COIL

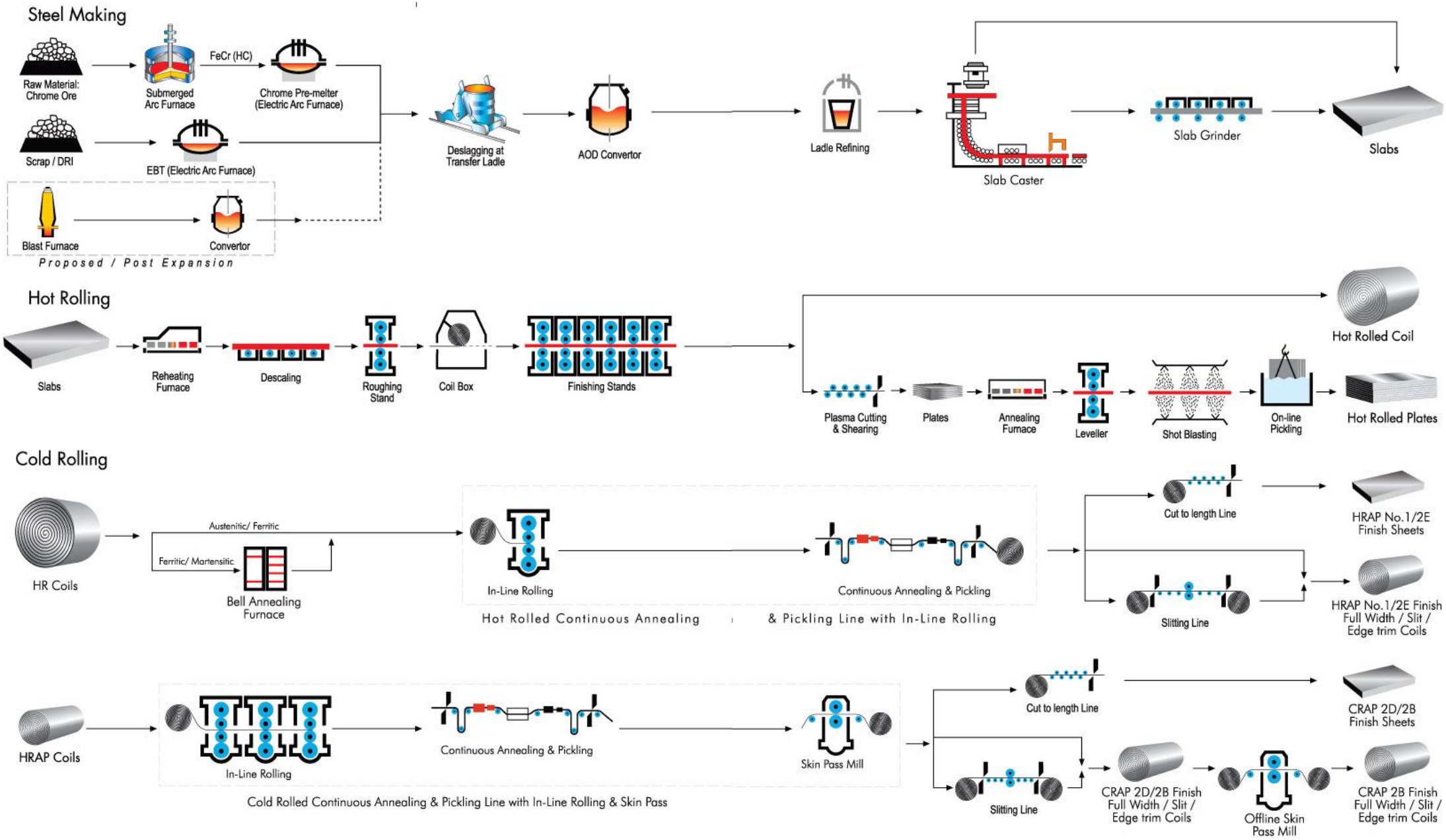
Cold Rolling Mill – 1250000 TPA

HRAP/CRAP COIL & PLATE

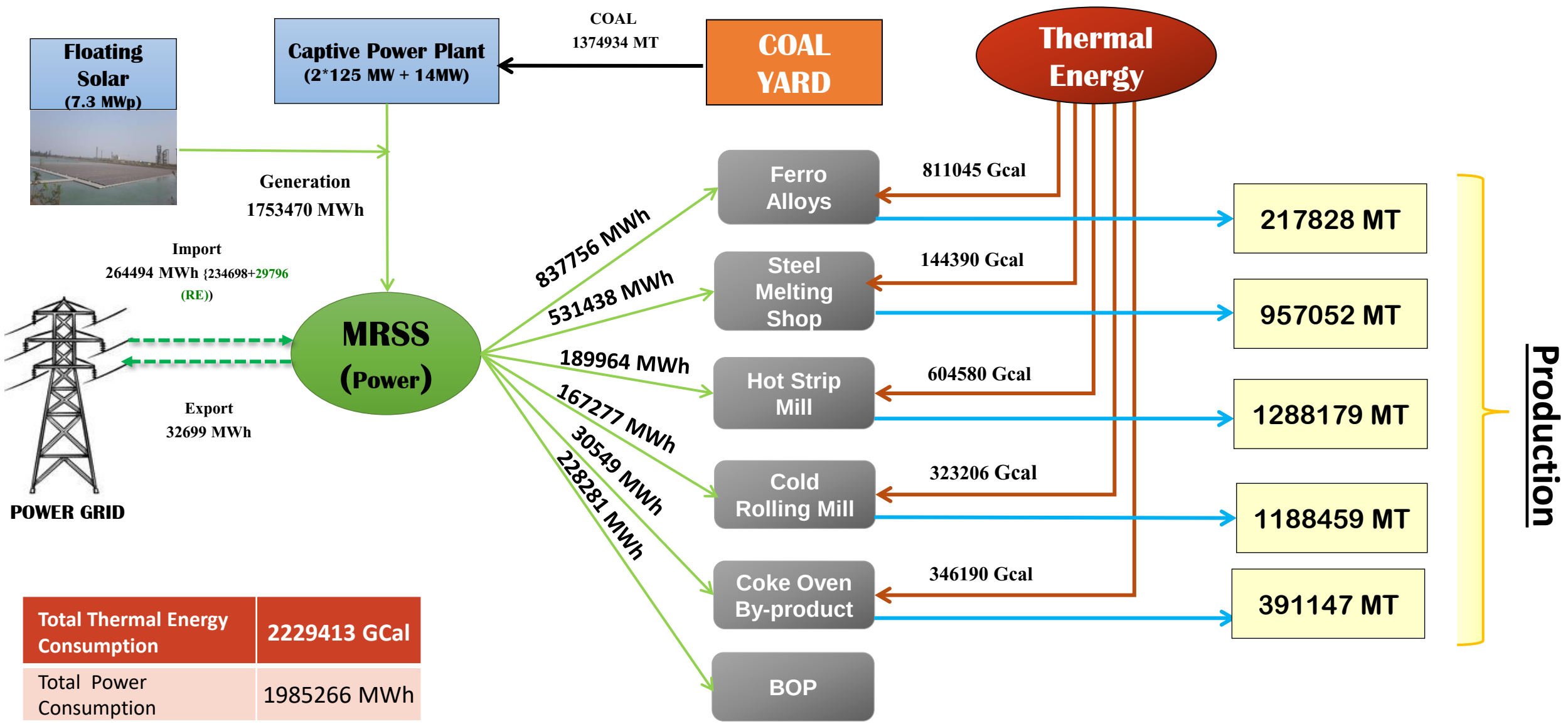
GATE TO GATE DIAGRAM



PROCESS FLOW DIAGRAM



ENERGY MAPPING 2022-23

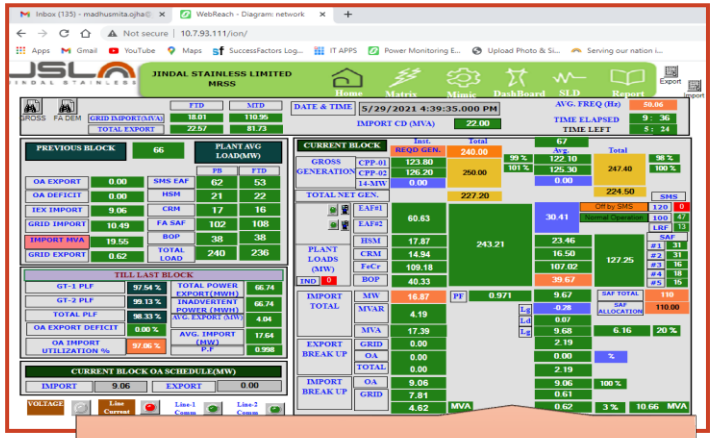


Total Thermal Energy Consumption	2229413 GCal
Total Power Consumption	1985266 MWh

CERTIFICATION

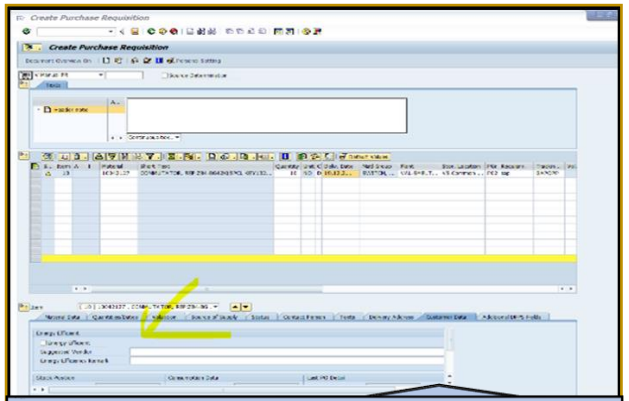
- ✓ ISO 50001:2018
  Energy Management System
- ✓ ISO 14001:2015
  Environment Management System
- ✓ ISO 9001:2015
  Quality Management System
- ✓ ISO 45001:2018
  Occupational Health & Safety Management System
- ✓ ISO 17025:2017
  Laboratory Management System
- ✓ ISO 16949:2016
  Quality Management System

ENERGY REPORTING & IT ENABLEMENT

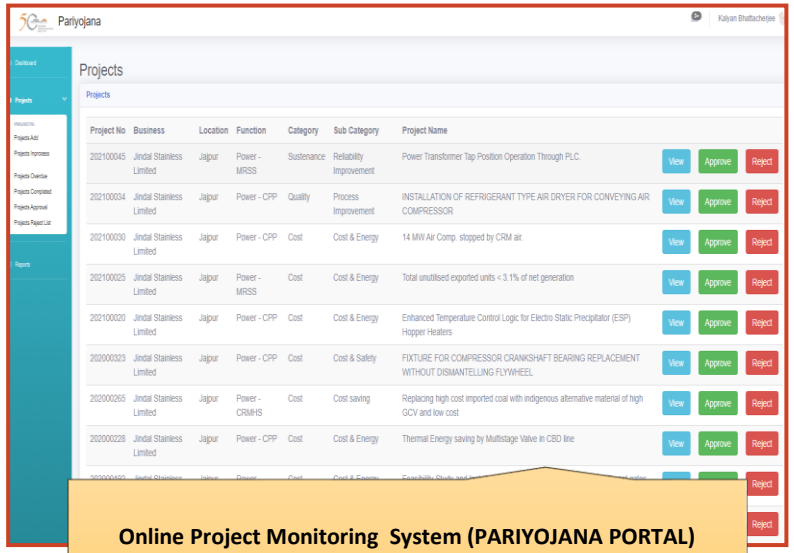


Online EnMS Scada System

Online loading monitoring major Equipment's

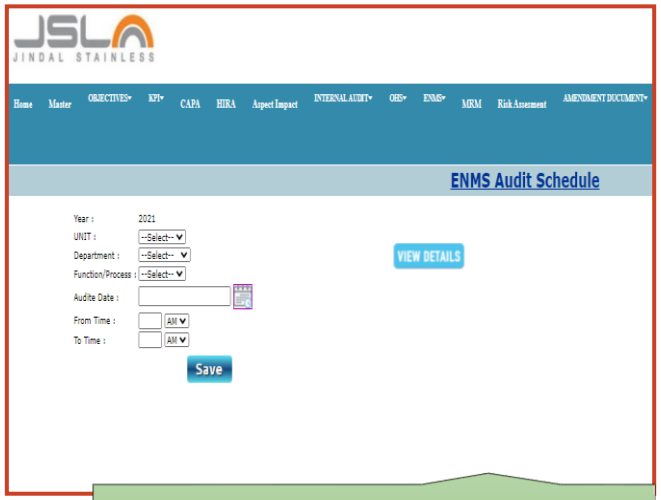


Energy Efficient Procurement



Online Project Monitoring System (PARIYOJANA PORTAL)

Energy EnPIs Portal

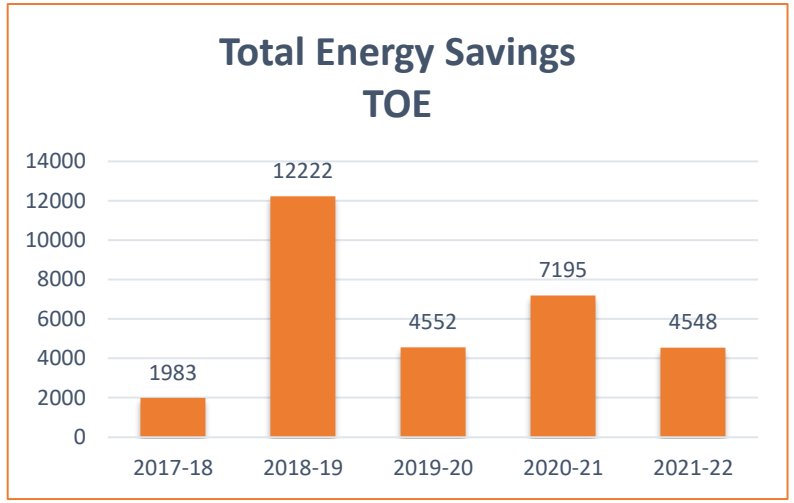


ISO 50001 EnMS portal

Energy Conservation Projects Implemented

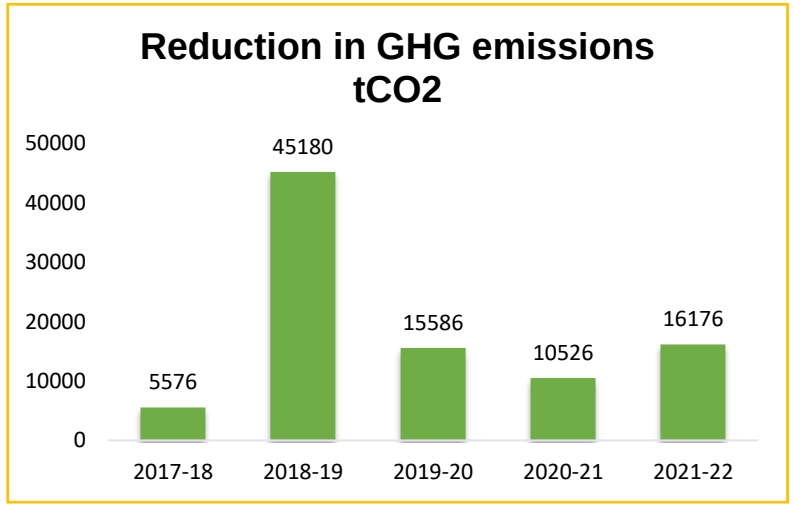
118 nos. Energy Conservation projects in last 5 Years resulting in Energy Saving and CO2 abatement

Summary of EE Projects Implemented during 2017-18 to 2021-22							
Year	**Number of Projects**	**Electrical Energy Saving (MWh)**	**Thermal Energy Saving (Gcal)**	**Total Energy Savings TOE**	**GHG Reduction t CO2**	**Cost Savings Rs. Lakhs**	**Investment Rs Lakhs**
2017-18	21	4,238	6,611	1,983	5,576	463	158
2018-19	33	48,082	2,522	12,222	45,180	2,954	1,528
2019-20	21	12,928	12,850	4,552	15,586	1,049	494
2020-21	23	13,608	36,295	7,195	10,526	994	136
2021-22	20	16,562	1,493	4,548	16,176	1,126	52
Total	**118**	**95,418**	**59,772**	**30,500**	**93,043**	**6,585**	**2,369**



The significant savings achieved by the following projects

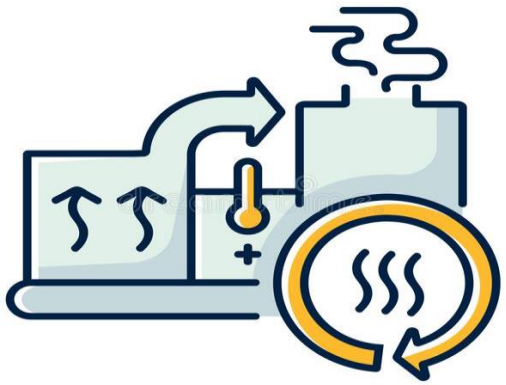
- Direct addition of Liquid FeCr to the EAF at SMS
- Waste Heat Recovery from Submerged Arc Furnaces and Annealing Furnace
- Installation of VFDs for Fume Extraction system ID Fans in SMS
- Modification of Electrode regulation system in order to reduce specific power consumption at EAF in SMS
- Decrease in LRF Power consumption by Minimal purging in lead heats of longer sequences in SMS
- Increase the capacity of transformer used in DRI furnace to 120MVA in SMS
- Coal Mills Optimization in CPP
- Black coil pickling in HPL in place of HAPL
- Energy saving through compressed air networking in CRM
- Running of 2 pumps instead of 3 in Plate rolling and Ferritic rolling in HSM
- Interlocking of the belt running and De system ID fan in RMHS
- Mass replacement of Conventional Lights with LED lights
- Replacement of Old Inefficient motors with Energy Efficient IE3 motors



Energy Efficiency / Decarbonization Projects Implemented

1. Waste Heat Recovery from Submerged Arc Furnaces (SAF)

- JSL is the India's 1st plant installed Waste Heat Recovery from SAF
- The waste heat from off-gas of SAF is being recovered through WHR Boilers to produce steam
- The steam is internally used in the process at 12 Bar, 190 °C



Particular	UoM	SAF-1_WHRB-1	SAF-2_WHRB-2
Capacity of Submerged Arc Furnace	MVA	60	60
Off-gas temperature	°C	450 – 500	450 – 500
Off-gas quantity	Nm^3/hr	214000	214000
Steam Generation Capacity	TPH	28.5	28.5
Annual Steam Generation (FY2021-22)	Tonne	133,474	
Avoided coal consumption (FY2021-22)	Tonne	32,771	
Avoided GHG emissions (FY2021-22)	t CO2	37,031	
Cost Savings to Avoided Coal consumption	INR Cr	15	

Other Benefit : (Intangible)

➢Reducing the energy requirements by effectively utilizing the heat of waste gases

➢Conservation of fossil fuels and natural resources

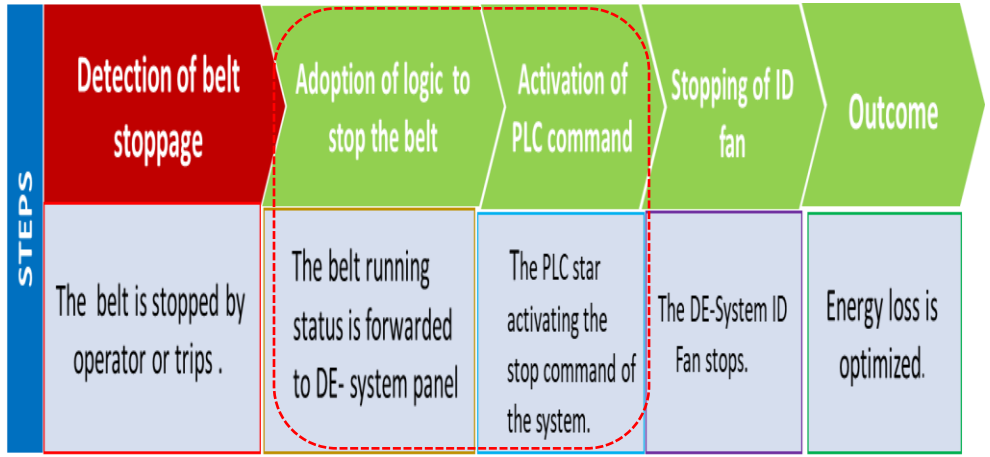
Energy Efficiency / Decarbonization Projects Implemented

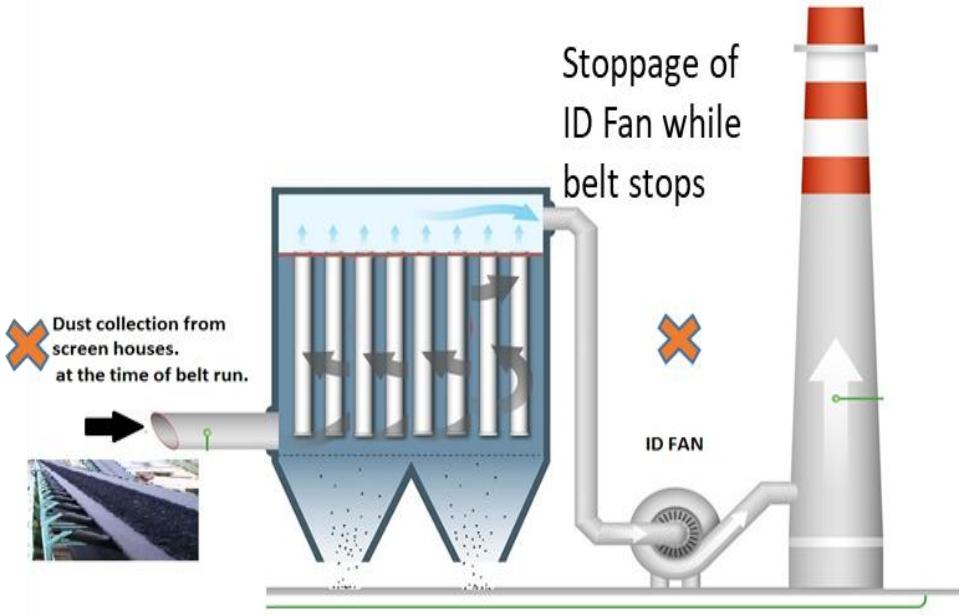
2. Interlocking of Belt Conveyors and Key Equipment's with Pollution Control Equipment

- Energy loss due to continuous running of Dust Extraction (DE) System ID fans in RMHS

- Avoided the idle running of ID Fans by Interlocking the Central DE system ID fans with key equipment's of the Raw Material feeding and Briquetting circuits

Particulars	UoM	DE-1	DE-2	SH-1	Plant-2
Rating of ID Fans	kW	160	132	90	200
Avoided Idle running hours	Hr/month	80	90	180	120
Avoided Energy Consumption	kWh/month	8960	8190	11340	16800
Annual Energy Savings	kWh/year	543480			
Avoided GHG emissions	t CO2	530			
Monitory Savings	INR Lakh	34			
Investment	INR Lakh	1.2			

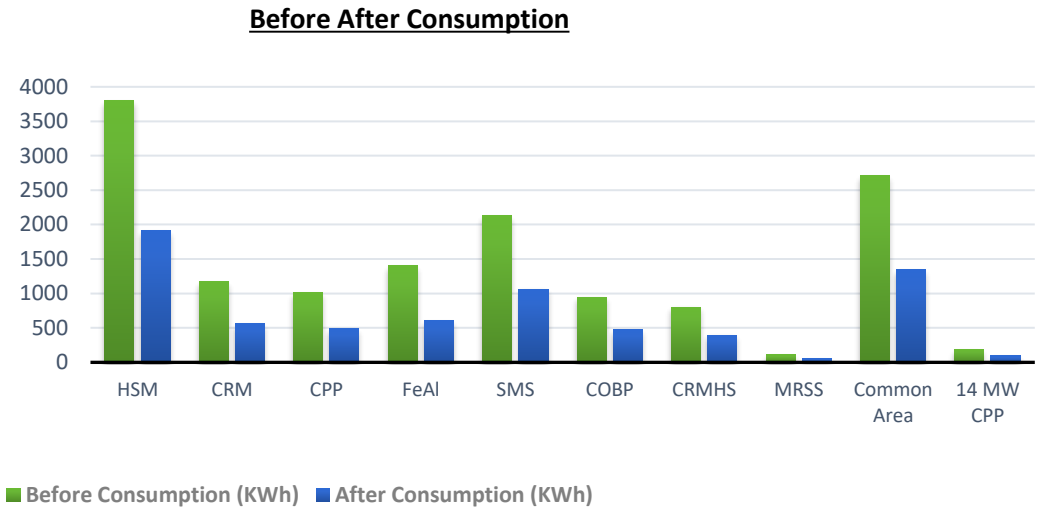




Energy Efficiency / Decarbonization Projects Implemented

3. Installation of LED Lights

Sl. No.	Plant	Quantity	Before Consumption (MWh)	After Consumption (MWh)	Difference (MWh)
1	HSM	2610	3797.095	1912.892	1884.2
2	CRM	1415	1172.745	561.297	6114.48
3	CPP	1386	1009.809	488.107	5217.02
4	FeAl	1744	1405.717	601.155	8045.62
5	SMS	2558	2133.848	1063.727	1070.12
6	COBP	1486	949.54	472.449	477.09
7	CRMHS	1647	804.124	396.062	408.06
8	MRSS	70	109.5	54.312	55.18
9	Common Area	2115	2706.84	1341.506	1365.33
10	14 MW CPP	461	187.683	90.491	97.19
Total		**13531**	**14276.9**	**6981.998**	**7294.903**



ESCO Mode

SAVINGS (ROI)			
1	Energy Saving	KWh	7294903
2	PU Energy Cost	Rs/Unit	6
3	Reduction of cost	Rs	43769418
4	Project Cost including Financing	Rs in Lakhs	750.64
5	ROI	Yrs	1.71
6	**Monthly saving**	**Rs in Lakhs**	**36.47**
7	**Annual Saving**	**Rs in Lakhs**	**437.69**
8	**Additional Energy Saving with Timer**	**MW**	**69.35**

4. Installation of Floating Solar plant

Installed Capacity
7.3 MWp

225,364 MWh
Energy Generation
during the Lifetime

PV Modules **540 Wp**
Mono-crystalline type Silicon
solar cells **13563 Nos**

Reduction in Evaporation
Loss during lifetime
285.8 Lakh m^3
(Water saving)

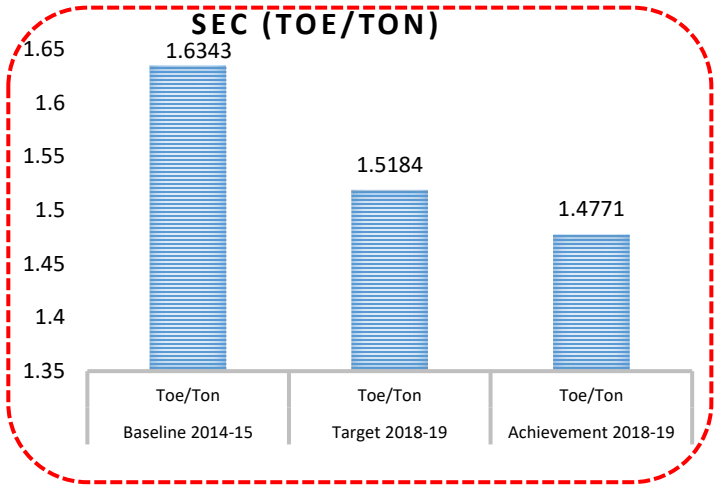
Project Lifetime
25 years

Carbon Abatement potential
2.2 Lakh Tonne CO_2e

Investment
33 Cr

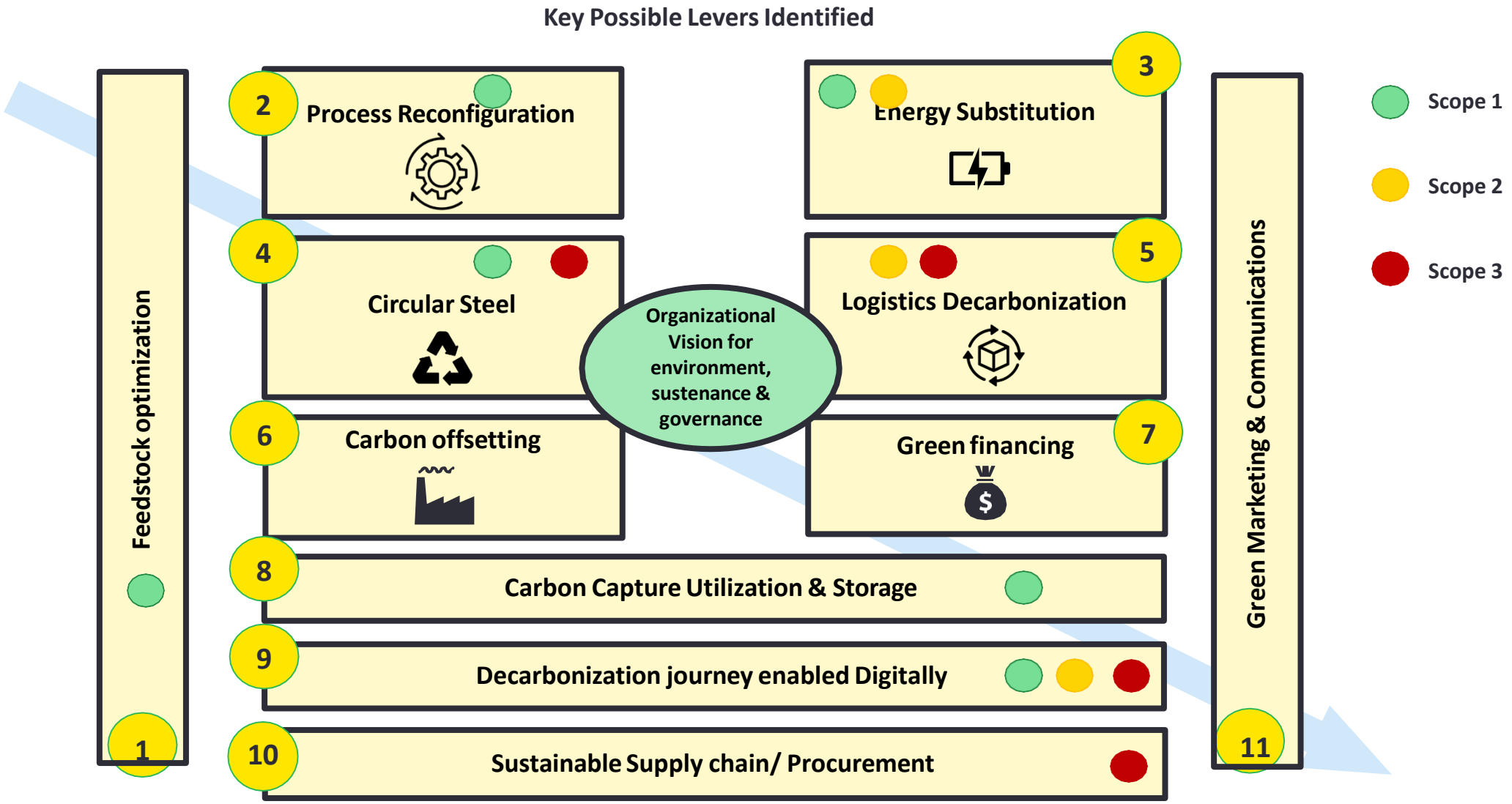
PAT TARGET & ACHIEVEMENT

Particular	UoM	PAT-II AY 2018-19
Total Net Energy Consumed (Thermal+Electrical)	Million kcal	6531707
	TOE	653171
Total Equivalent Major Product	Tonne	442186
GtG Specific Energy Consumption	TOE/Tonne	1.4771
GtG Specific Energy Consumption after Normalisation	TOE/Tonne	1.3405
Number of EsCerts		20887



JSL Decarbonization Framework to achieve net zero by 2050 target

JSL has an Intermediate target of about 55% reduction in CO2 emission compared to Baseline year of FY 2021-22 by FY 2035



GHG MANAGEMENT SYSTEMS

➢ Summary of GHG Emissions for FY 2021-22

Parameter	UoM	FY 2021-22
Scope-1	t CO_2	21,14,754
Scope-2	t CO_2	74,376
Total	t CO_2	21,89,130
Crude Steel Production	Tonne	10,52,956
Emission Intensity	t CO_2/tcs	2.08

**This is the scope 1 and 2 emission intensity of steel value chain, excluding the emissions of by-products sold.

➢ GHG emission reduction / avoided through various projects in FY 2021-22

SL No	Projects	Units	Value
1	Imported RE Power	t CO_2	86,580
2	Waste Heat Recovery	t CO_2	38,582
3	EnCon Projects	t CO_2	16,176
4	Logistics	t CO_2	1,026
	Total	t CO_2	142,365

➢ Internal Reduction Target: 55% by 2035 and Net Zero by 2050

Short & Medium-term (by 2035)

- Increase share of renewable energy (RE-RTC)
- Enhance scrap in steel making
- Maximize waste heat recovery and use of by-product gases
- Green H2 in Bright Annealing
- Fuel Substitution
- Warehouse fleet electrification
- Process Reconfiguration

Long-term (by 2050)

Deployment of decarbonization technologies

- CCUS
- H2 use across value chain
- Fuel Substitition
- Carbon Off-setting

Renewable Energy

JSL imports RE power through Open Access to Comply the RPO by SERC.
The RE projects of JSL are as below:

Rooftop Solar project

- Available roof of sheds for stand alone solar PV panels for RE power generation to increase the Renewable Energy Portfolio into the Energy mix
- **21 MWp** rooftop solar project is underway

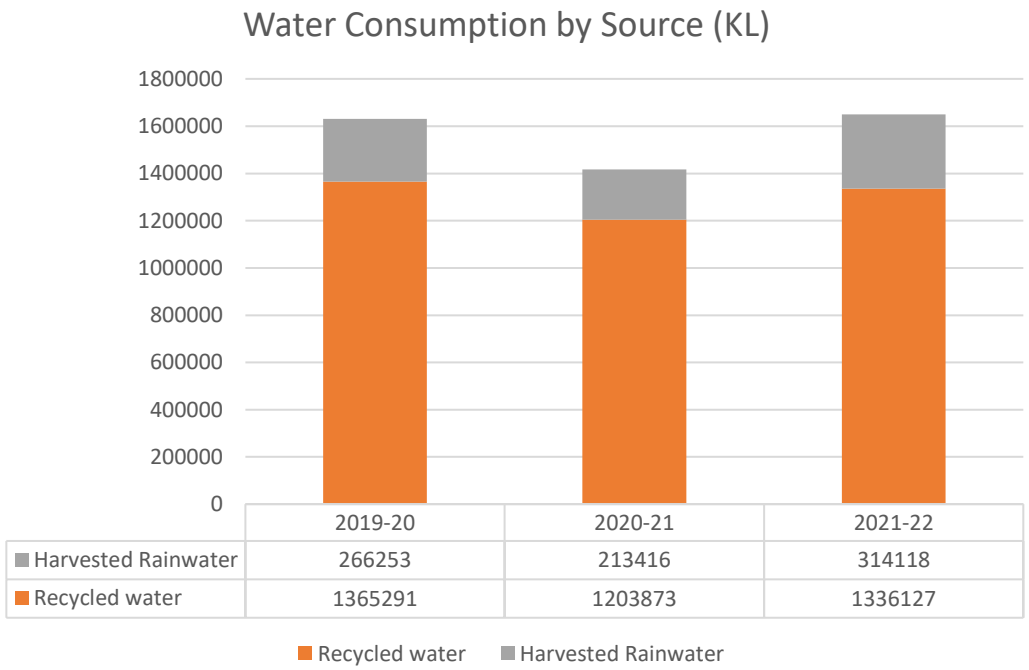
RE RTC

- Signed MoU with M/s Renew Power for setting up **~300 MW** Wind-Solar Hybrid Renewable project which will ensure 100 MW Round the clock power for upcoming capacity expansion
- Project planned to be commissioned by FY 2023-24
- Discussions started for the 2nd phase of 100 MW RE RTC project

WATER MANAGEMENT

❑ Water Consumption

- Water requirement is met through withdrawal from rivers
- 14% of the water consumption is met by recycled water and harvested rainwater
- The plant is designed on “Zero Discharge” concept by leveraging state-of-the-art technologies for water conservation and reuse



❑ Few Water Conservation Initiatives

- CT Blowdown water of CPP is treated through RO and reused
- Use of STP treated water instead of canal water for horticulture use.
- Avoided evaporation loss from reservoir by installing Floating Solar plant
- Blowdown from CTs and Filter Backwash water is being used for Direct cooling applications
- Canal water is reduced by removing non-essential freshwater taps.
- Housekeeping is done with ETP-treated water instead of makeup water

✓ water savings achieved through various initiatives is 500 m^3/day

WASTE MANAGEMENT PRACTICES

Direct Utilization in side the Plant

- Process Gases (COG) from Coke Oven is used as fuel in Re-heating & Annealing Furnaces
- **Emulsions from mills and used oil** is reused for Chrome Ore drying
- Mill scales & Bag filter dust being reused in Briquette Plant for further reuse in Ferro-Alloy Plant
- Metal Recovery from **EAF and SAF slag** is reused

Recycled outside the Plant

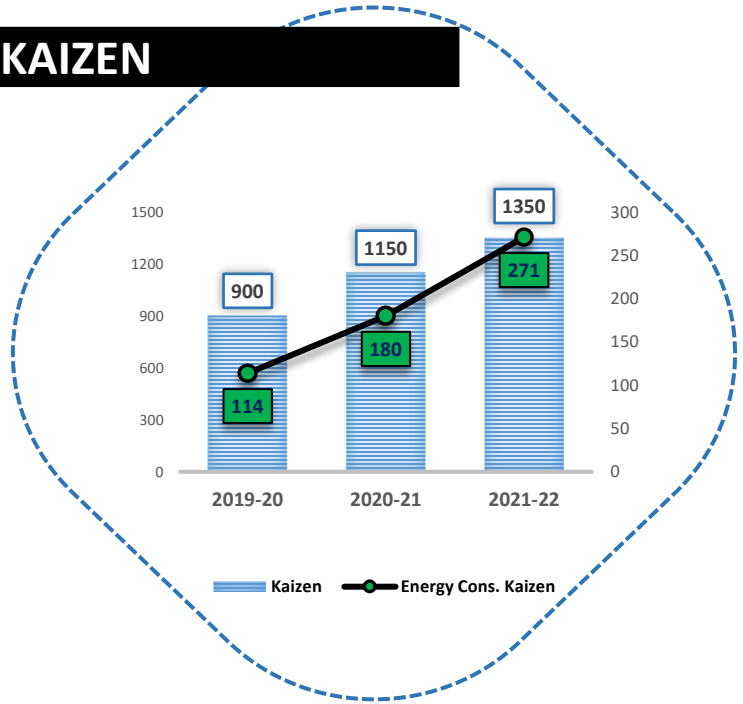
- EAF and SAF slag will be sent for landfilling and cement plant
- Fly Ash from CPP is being utilized in Cement, Bricks, Tiles and corrugated Sheet manufacturing industries
- Bottom Ash for exhausted mine filling at SPCB approved locations and road construction projects
- Wood Waste is recycled and reused for Finished Product Transportation
- E-Waste generated from the plant is being sold to authorize re-processors

Circular Economy

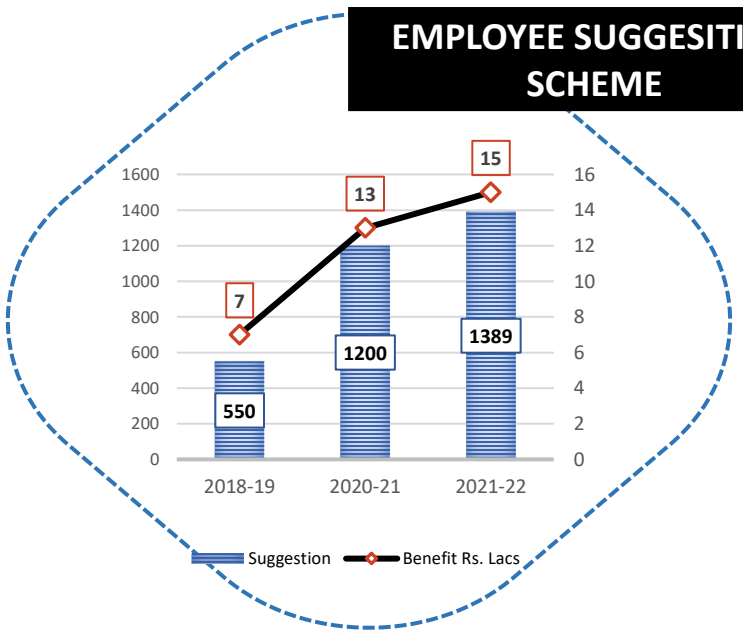
- JSL uses about 85% scrap in steal making
- **Waste heat from SAF** is utilized for steam generation for process use and power generation
- **Waste heat from Annealing furnaces** is utilized for steam generation for process use
- **STP treated water** is re-used for green area development
- **BOD treated** water for coke quenching
- **Cooling tower Blowdown water** is recycled through RO and also used for Bottom De-ashing
- **ETP treated water** reused for Dust suppression in RMHS, Slag granulation, Metal recovery

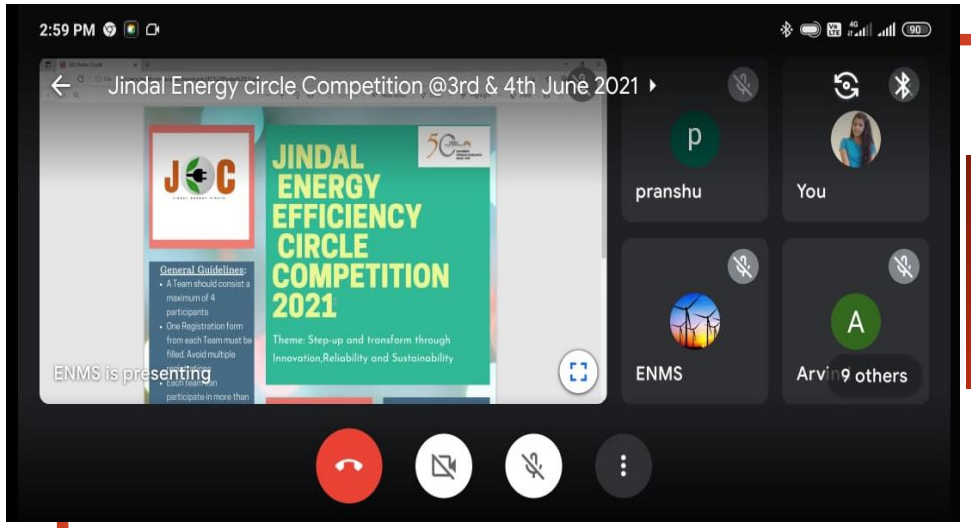
EMPLOYEE INVOLVEMENT & TEAM WORK

KAIZEN



EMPLOYEE SUGGESTION SCHEME



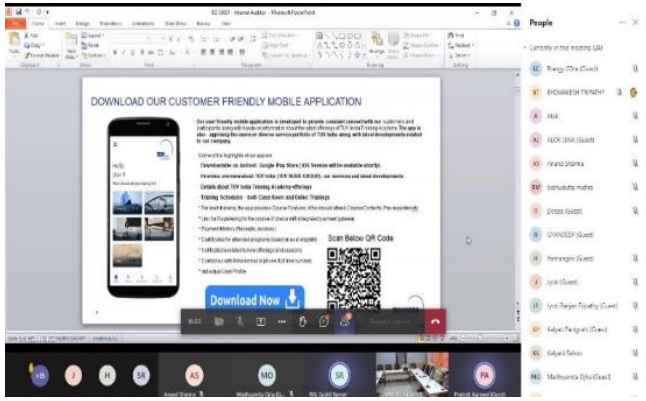


JINDAL ENERGY CIRCLE COMPETETION

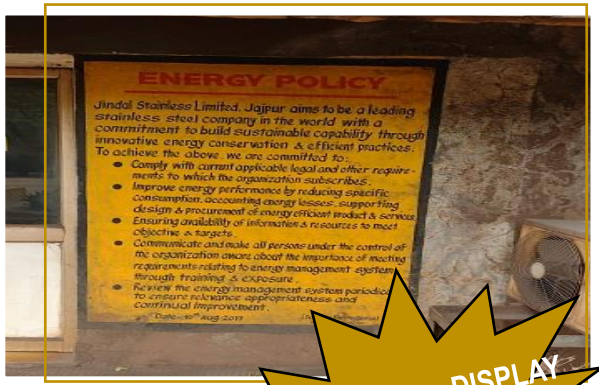
JINDAL QUALITY CIRCLE COMPETETION

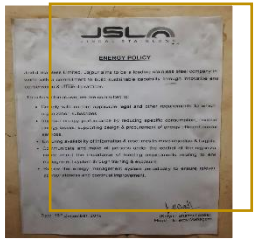
EMPLOYEE INVOLVEMENT & TEAM WORK

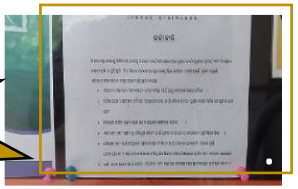
Electric Vehcles Launch



Internal Auditor Training





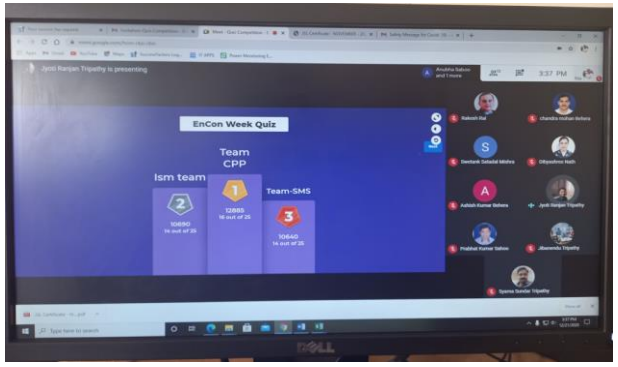


Energy Policy DISPLAY on various location

Energy Conservation PLEDGE Taking

Daily Awareness Training

National Energy Conservation Week Celebrations



EnCon Quiz competition

Training Regarding Efficient Procurement

CSR & ENVIRONMENT ACTIVITIES TOWARDS ENERGY CONSERVATION

CSR SOLAR PROJECT

Solar Photovoltaic Irrigation Projects

Solar Drinking Water Project

ENVIRONMENT PROJECT

- Towards surface runoff management, RCC drain of 2.3 KM has been made along with provision of settling pit having 18,000 m^3 capacity followed by 250 m^3/hr capacity Effluent Treatment plant for treatment of Hexa-valent Chromium.

- Towards Air Pollution at Ferro Alloy Plant, A dedicated new bag house of capacity 280000 m^3/hr has been installed & commissioned at SAF 4 & 5 to control process emission/fugitive emission and secondary emission during tapping.
- Pneumatic dust handling system has been installed & commissioned and connected to hoppers of the bag houses in 27.6 MVA Ferro Alloy complexes with provision of MS silo of capacity 80 MT for storage of Bag filter dust.

Secondary fume extraction system at SAF # 4 & 5

Pneumatic Dust Handling System at SAF # 3, 4 & 5

- Online Mercury Analyzer for continuous monitoring of Mercury have been installed and connected to the stack of CPP-1 and online data is being transmitted to SPCB/CPCB server on uninterrupted basis.

AWARDS & ACCLOADES

Energy Conservation Awards

1st Runner up in large Industry category & 5 Star rating for its commendable performance
14th Edition of CII ENCON Awards 2020-21

1

2

2nd Runner-up Under Best Energy Efficient Organization Category:
5th edition of CII National Energy Efficiency Circle Competition

Winner Under Best Energy Efficient Organization Category:
4th edition of CII National Energy Efficiency Circle Competition

3

4

Winner in DCs under PAT Sector Specific Circle Competition Category:
4th edition of CII National Energy Efficiency Circle Competition

Best Poster by Jindal stainless Limited, Jajpur:
CII- EnCon 2020 Poster Competition

5

6

Runner-up Under Best Energy Efficient Organization Category:
3th edition of CII National Energy Efficiency Circle Competition

7

Best Performing Unit' in the 'CPP COAL between 50 - 135 MW' category at the National Power Plant Awards 2023 hosted by the Council of Enviro Excellence **(CEE)**

Operational Excellence award, for the Best Energy Efficient Unit in the category of 50-135 MW coal-fired power plants by
Council of Enviro Excellence (CEE)

8

9

Odisha State Energy Conservation Awards 2022

Thank you