Confederation of Indian Industry

Energy Circle CII National Energy Efficiency Circle Competition 2024

JSW STEEL COATED PRODUCTS LIMITED KALMESHWAR

BETTER EVERYDAY

10th-12th Sept'24

Presenter:-

1) Mr. Anish Karahe- DGM

2) Prashant Itankar - Manager

JSW – overview

JSW Steel*

DCM Issuer

- India's leading integrated steel producer
- Installed crude steel capacity of 27 mtpa, growing to **37 mtpa**
- Market capitalisation of **$16.8bn**[a]

JSW Energy*

DCM Issuer

- Power producer with installed capacity of 4.6 GW (Hydro, Renewable and Thermal)
- Growing to 20 GW by 2030 with **85% renewable portfolio**
- Market capitalisation of **$6.0bn**[a]

JSW PAINTS

- Commenced operations in March 2019
- Annual operating capacity of **130,000 KL**
- Fully automated coil coating capacity
- Only fully-automated, water-based plant in India

JSW
Better Everyday

Presence across the core sectors of India

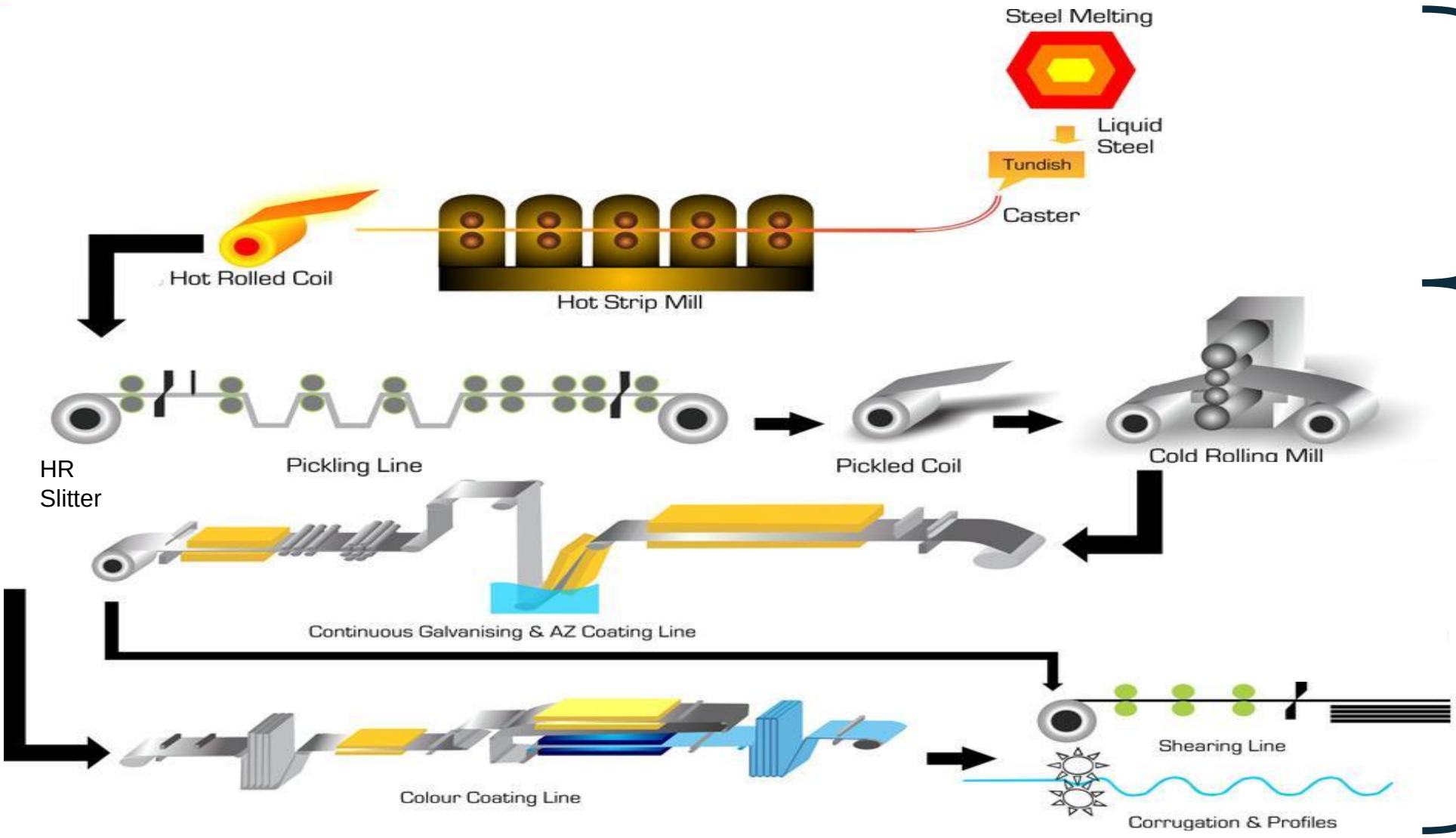
JSW Infrastructure

- Engaged in development and operations of ports
- Operational capacity **110 mtpa**
- Operations across East, West & Southern coasts of India

JSW Cement

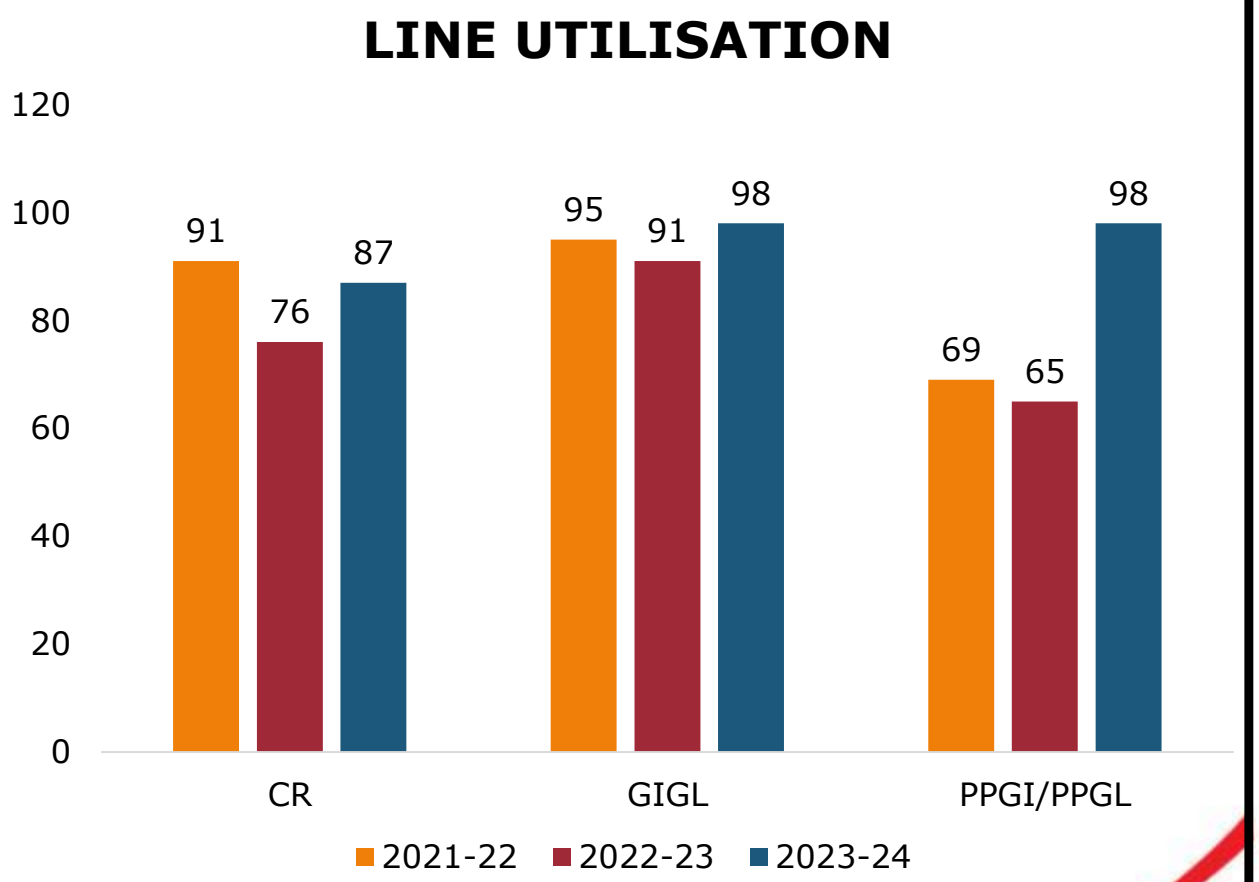
- Manufacturer of Portland Slag Cement (PSC), Ordinary Portland Cement (OPC) and Ground Granulated Blast Furnace Slag (GGBS)
- Operational capacity of 14 mtpa, growing to **25 mtpa**

JSW Steel Process Overview

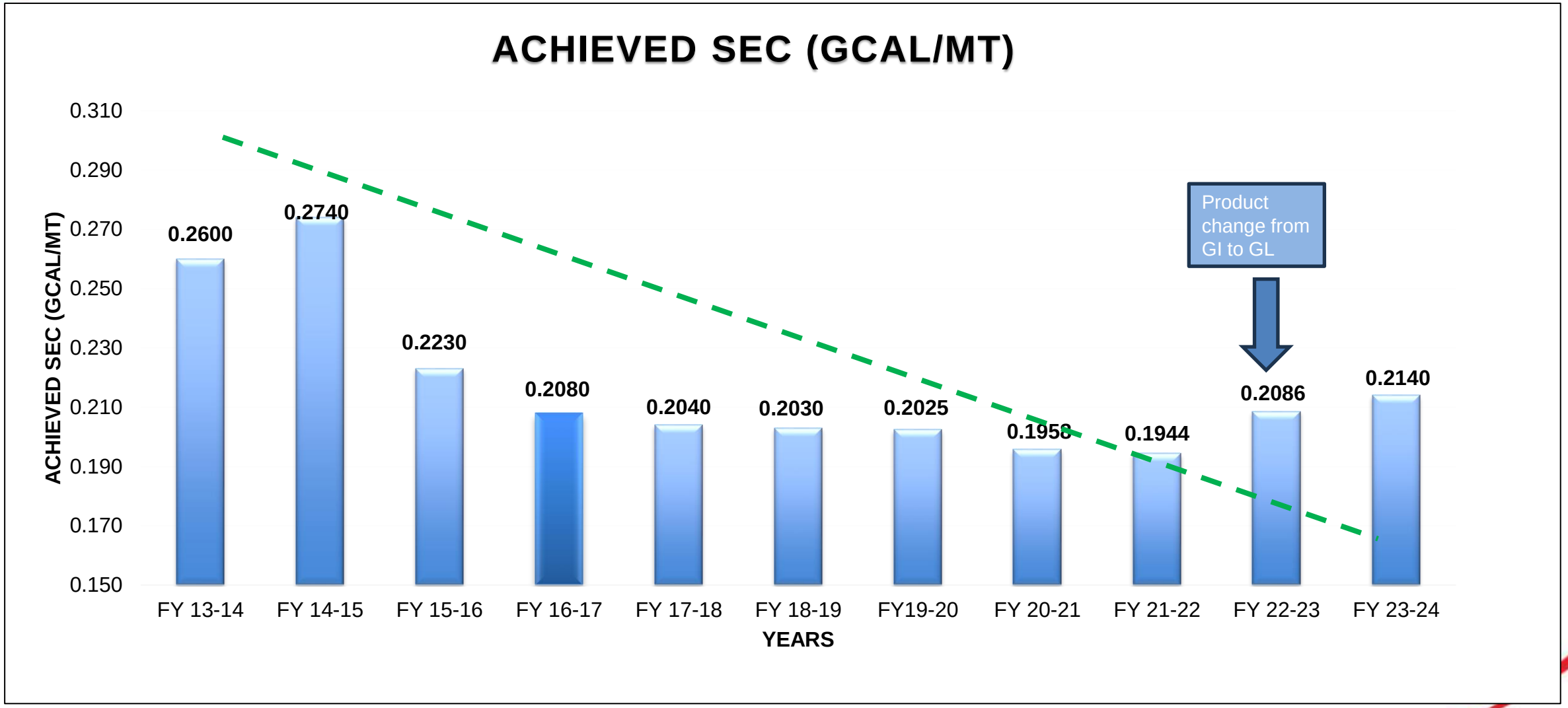


SPECIFIC ENERGY CONSUMPTION-PRODUCTION AND ENERGY

Parameter	FY		
	2021-22	2022-23	2023-24
Cold Rolled Coil			
Installed Capacity MT	840000	840000	840000
Actual Production MT	760966	634240	731910
Utilization	91	76	87
GI/GL (Galvanizing & Galvalume Plane)			
Installed Capacity MT	876000	876000	876000
Actual Production MT	771765	730432	810191
Utilization	95	91	98
CCL(Color Coated Products)			
Installed Capacity MT	600000	600000	600000
Actual Production MT	415499	387829	437558
Utilization	69	65	73
Thermal Energy(Million kCal)	242056	249684	274852
Electrical Energy(Million kWh)	141.22	137.11	149.05

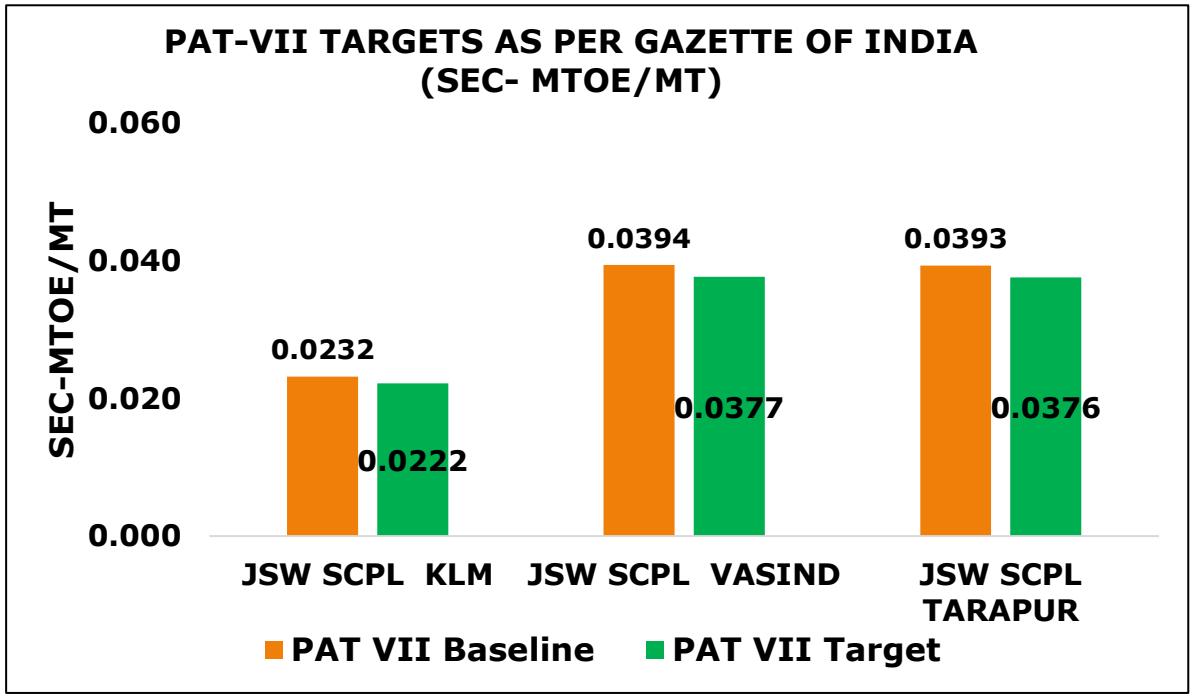


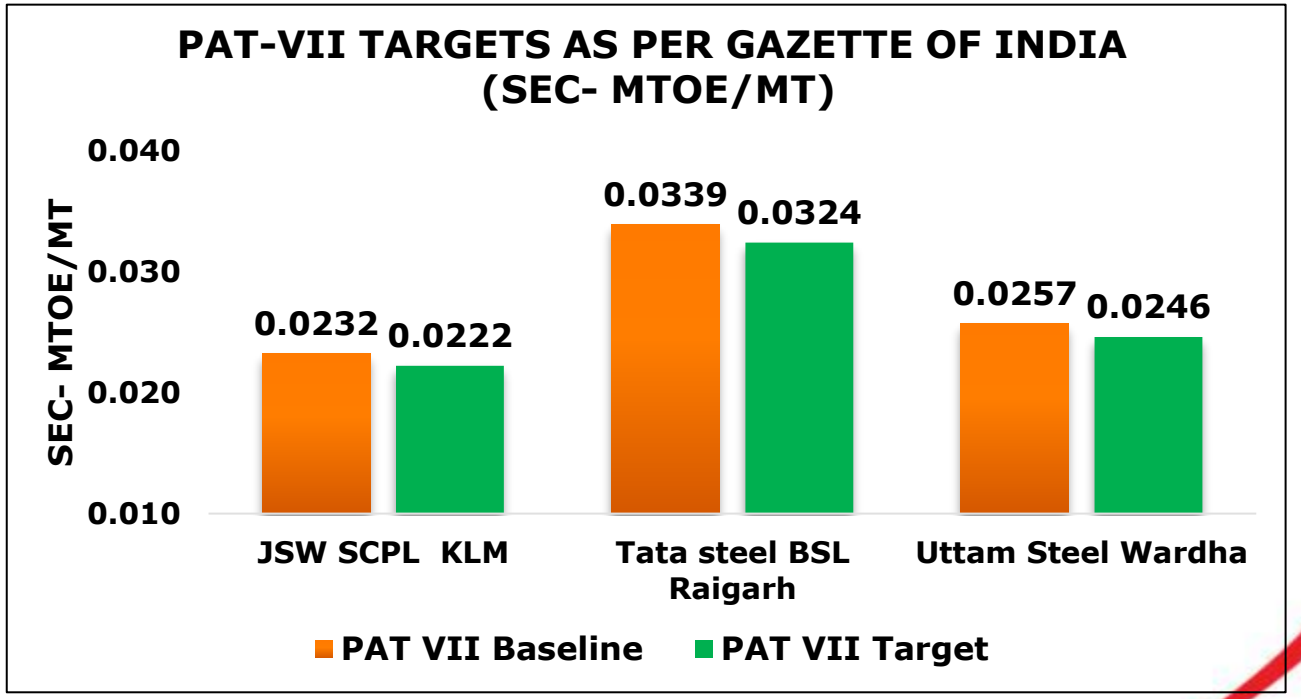
Reduction In Specific Energy Consumption (GCal/MT)



WITHIN GROUP AND NATIONAL BENCH MARKING

1	Following the best historical data as Target
2	By this we Identify Best Available Technology.
3	Identify Key Controlling Parameters
4	Identify the gap between existing and benchmark for key controlling parameter
5	Setting Targets Keeping in view of constraints
6	Cross Location Energy Audits & best practices horizontal deployment
7	Rolling, Galvanizing & Colour Coating meets for sharing best practices for respective process





4779-ESCerts issued.

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	11	135.3	1.13	3600	26.47	61.32
FY 2022-23	7	36.88	5.84	21984	115	3.82
FY 2023-24	5	29.4	0.58	3973.36	44.01	8

Energy Saving projects implemented in last three years

Energy Saving projects implemented in FY 2021-22

S No	Name of Energy saving projects	Investment(INRMillion)	Electrical Saving (Million kWh)	ThermalSaving (Million Kcal)	Total Saving (INRMillion)	Payback period (in months)
1	Reconfiguration of Compressed Air Distribution System in entire complex and provision of new energy efficient Screw Compressor/Header modification and stopping Area-2 compressors.	5	0.48	0	3.6	16.6
2	Replacement of furnace body and recuperator of CGL-1 furnace.	90	0	3600	18	60
3	Installation of IFC and ICC Controller for Centrifugal compressor & Screw Compressors.	2.8	0.18	0	1.35	24.89
4	To change old inefficient pump with new energy efficient pump (5 Nos.)	7.5	0.1	0	0.75	120
5	Boiler fuel substitution. Connected load reduced from 220kW to 65kW (ID fan , coal handling, ash handling not required).	30	0.37	0	2.775	129.73

Energy Saving projects implemented in last three years

Energy Saving projects implemented in FY 2022-23

S. NO	Name of Energy saving projects	Investments (INR Million)	Electrical Savings(Million kWh)	Thermal Savings (Million Kcal)	Total Savings (INR Million)	Payback period (in months)
1	To arrest compressed air leakage in compressed air line	2.5	1.44	0	10.8	2.77
2	To install Intelligent Flow Controller (IFC) for Centrifugal compressor of capacity 4000 CFM	2.5	0.18	0	1.34	22.28
3	CAG Blower Temperature control system based on ambient temp. And sheet temp. in closed loop	4.5	0.67	0	5.04	10.71
4	To replace selected standard efficiency motors with IE-3 motors	16.384	2.26	0	16.95	11.60
5	Capacity optimization of CCL#2 line by increasing the process speed from 120MPM to 150MPM	1	1.29	0	9.675	1.24
6	Waste heat recovery from #CGL-2 furnace flue gas (between furnace and Recuperator)	10	0	0.018	72	1.67

Energy Saving projects implemented in last three years

Energy Saving projects implemented in FY 2023-24

S.NO	Name of Energy saving projects	Investments (INR Million)	Electrical Savings (Million kWh)	Thermal Savings (Million Kcal)	Total Savings (INR Million)	Payback period (in months)
1	Gal2 PLC logic modification done to CAG Blower Run in Auto Control Mode wrt Temp and Thickness	0.8	0.32	0	2.24	4
2	CCL3 Oven temperature controlled by strip temperature	0.8	0	528	2.64	3.6
3	Installation of energy efficient Grundfoss 132kW pump 4HI Mill-3	1.6	0.262	0	1.83	10.4
4	Installation of pyrometer in CCl-2 Line for strip temperature control	1.2	0	2176.99	10.88	1.32
5	Installation of Additional RTO in CCL-2	25	0.72	1088.45	26.5	11.3

Projects - Energy Savings & GHG Reduction (Planed 24-25)

Sr. No.	Name of project	Timeline and Agency	Saving Achieved Per Annum	tCO2 Savings
1	To change old inefficient Roll Coolant pump of Mill-1 and 2 with new energy efficient pumps.	Capex-25	99705 kWh	82
2	Existing steam condensate and pumping traps at CPL to be replaced with effective evacuation system to transfer heat in APT.	Detailed Audit conducted M/s Forbes Marshall offer received.	614 MT of coal	1012.3155
3	Reduction in Idle Power	Under Progress 100 Units /Day	36,500 kWh	30
4	2 Canister RTO for CCL-1 @ Solvent load 300kg/hr.	By June 2024 Thermovision (0.8kg/Ton).	48 MT of propane	123.28
5	To replace graphite heat exchanger with energy efficient heat exchanger at CPL.	Detailed Audit conducted M/s Forbes Marshall offer received.	327 MT of coal	527.877

Projects - Energy Savings & GHG Reduction (Planed 24-25)

Sr. No.	Name of project	Timeline and Agency	Saving Achieved Per Annum	tCO2 Savings
6	To replace standard efficiency motor with IE3 motors	External audit by M/s TUV	3,00,000 kWh	252
7	500 conventional lights replaced with LED lights/ LUX level lights	Syska and Halonix	12000 kWh	10
8	To install Green Hydrogen for H2 generation with Electrolyser and Battery Bank @240 NM3/hr to meet furnace requirement.	Green Hydrogen. (5500 Unit/Day)	18,06,750 kWh	1201.602
9	Provision of W Type Recuperator at Gal-1 (Saving 0.5 kg/t propane saving)	Capex	120 MT	240
10	Installation of 1+3 MWp Solar Rooftop Plant.	M/s Radiance Renewables (Approx.- 4144 Unit/Day)	15,00,000 kWh	756
11	Capacity optimization of CCL-1 line by line modification to increase speed from 55 to 90 MPM from 12TPH to 20TPH.(Propane saving 2 kg/ ton & power saving 3 units/ton)	RTO ordered.(M/s Thermovision)	324000 kWh Power 21.6 MT Gas	307.2
12	Installation of Polycarbonate Sheets to Improve Daytime Illuminaion.	200 Units/Day	73000 kWh	59

Projects - Energy Savings & GHG Reduction (Planed 24-25)

Sr. No	Name of project	Proposed encon projects and Agency	Saving Achieved Per Annum	tCO2 Savings
13	Waste Heat Recovery System for CGL-2 furnace flue gas (Between furnace and recuperator). (Saving 0.5 Kg/t Propane)	During Furnace Capacity Enhancement (40T to 60T)	168 MT	336
14	Provision of 1700 CFM x2 CFM Compressors	New Energy efficient air compressors	1152000 kWh	933.12
15	To Stop the 4000CFM Compressor and to Optimise the Power Consumption with Demand side Compressors.	125 Units/Day	36,000 kWh	30

Innovative Projects Implemented

Innovation Project and Case Study- Installation of Additional RTO in Colour Coating Line

Before

VOC to RTO

FINISH Oven Zone

PRIME Oven Zone

Combustion Blower

Fresh Air

To Process

Steam

Chimney

RTO

Primary Heat Exchanger

Secondary Heat Exchanger

Waste Heat Recovery Boiler

Innovative Projects Implemented

Major Challenges

In CCL all zones of prime and finish ovens the VOC were treated with centralised RTO (Regenerative Thermal Oxidizer) of capacity 380kg/hr. After increasing the line speed from 120 mpm to 150 mpm, the existing RTO was insufficient to handle VOC generated at 150MPM.

Non availability of space to install large size of RTO

Budget Constraint

Solution Proposed

Installation of new additional RTO for prime oven of capacity 200kg/hr.

Old RTO used for finishing oven

Saved the budget

Can be adjusted in available space

Potential Saving

The required capacity after increasing the speed was 580kg/hr which would require Rs 9Cr.
But due to using the Old RTO with the additional one, saved Rs 5 crores capex.

Innovative Projects Implemented

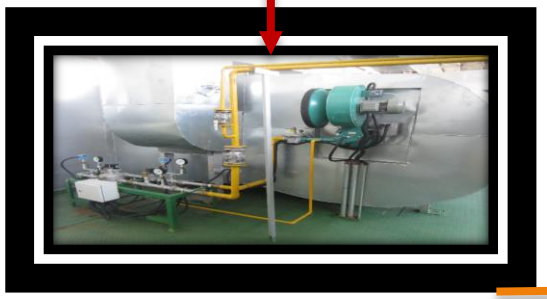
Innovation Project and Case Study- Installation of Additional RTO in Colour Coating Line

After

VOC to RTO

FINISH Oven Zone

PRIME Oven Zone



ADDITIONAL RTO

OLD RTO

Primary Heat Exchanger

Secondary Heat Exchanger

Combustion Blower

Fresh Air

Steam

To Process

Waste Heat Recovery Boiler

Chimney

Innovative Projects Implemented

Innovation Project and Case Study- Installation of Additional RTO in Colour Coating Line

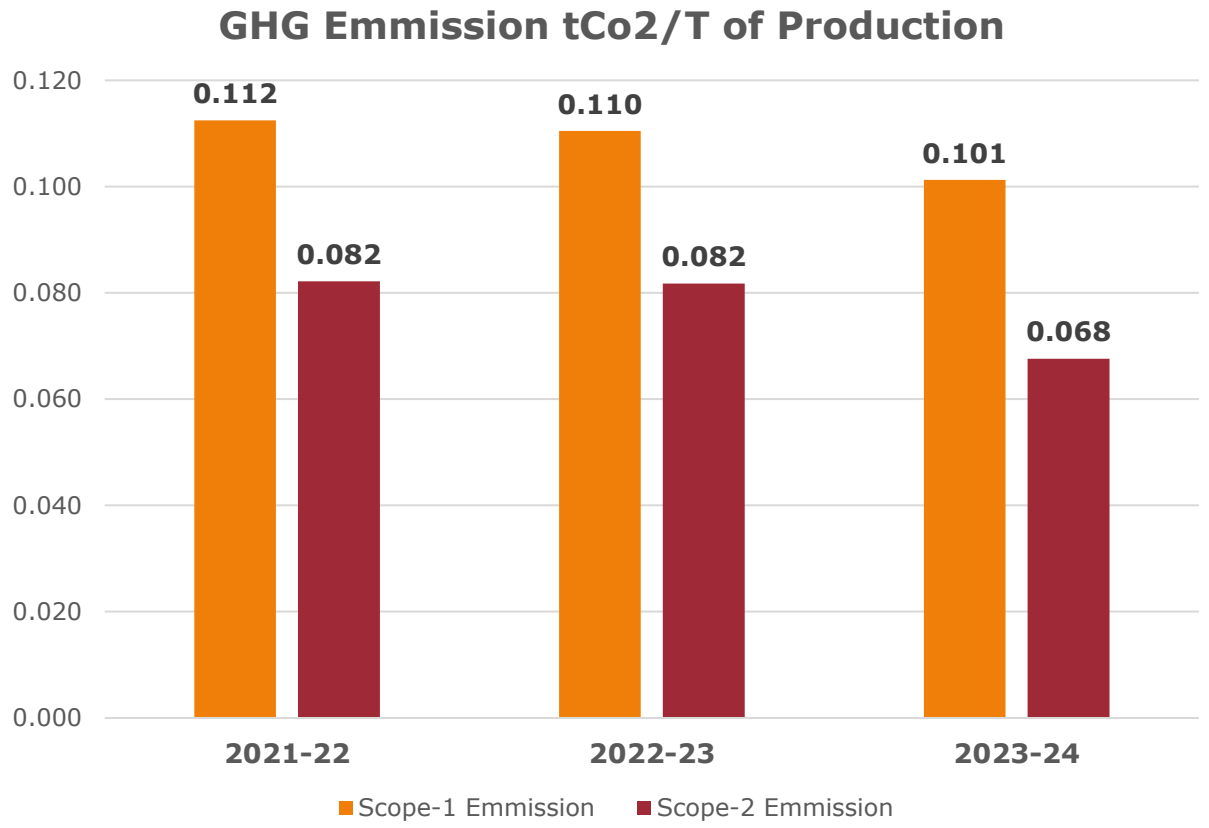
	Before	After	Saving (Rs Lac/A)
Propane Consumption (Kg/T)	14	12	216
Power Consumption (KWh/T)	47	43	49
Saving in Energy			265
Avg Production Per Month	12000	15000	2520
Productivity (Ton/Hr)	20	25	
Saving due to Productivity			2520
Total Saving			**2785**

Utilisation of Renewable Energy Sources (Onsite)

Year	Source	Installed Cacapcity (Million KW)	Generation (in Million kWh)	Share in the overall consumption (%)	Unit generated/ kWp Installation (kWh/kWp)
FY 2021-22	Solar	0.049	0.429	0.1333	97
FY 2022-23	Solar	0.049	0.425	0.1333	96
FY 2023-24	Solar	0.049	0.425	0.1333	96

Reduction in GHG Emission

Emission due to various sources	2021-22	2022-23	2023-24
Emission due to Electricity Consumed (tCO2)	96300	90209	111568
Emission due to Propane Consumed (tCO2)	42100	39326	54766
Emission due to Coal Consumed (tCo2)	28300	27420	19717
Scope-1 Emmission	0.112	0.110	0.101
Scope-2 Emmission	0.082	0.082	0.068
Total CO2 Emission (kTCo2)	167	157.59	186.21
tCO2/unit production	**0.195**	**0.193**	**0.169**

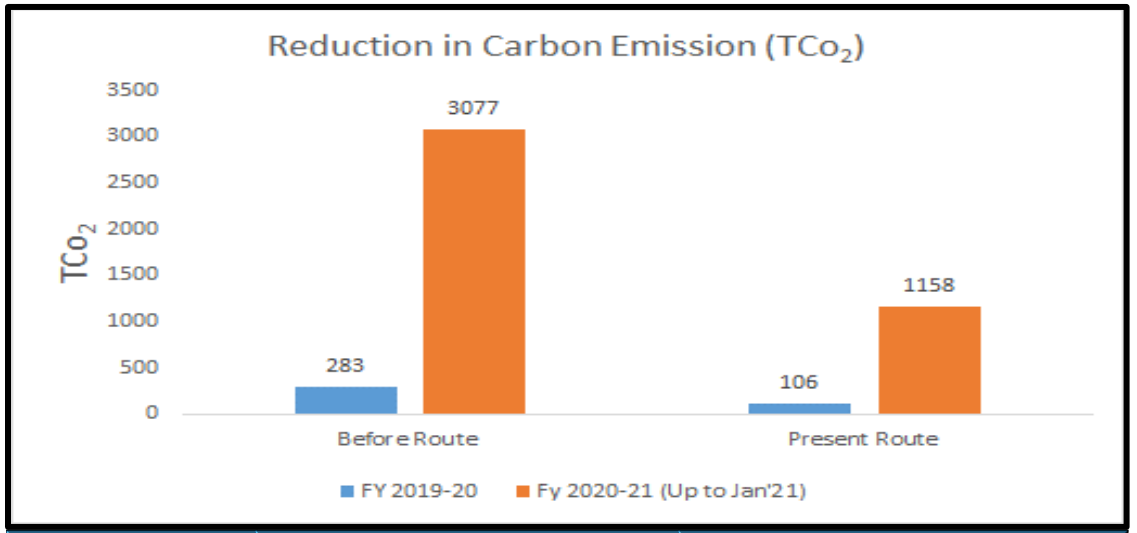


GHG INVENTORISATION

SCOPE- 3 :-Initiatives For Reduce Carbon Emission

Strategic decisions to reduce carbon emission:- Mutually agreement done between TATA Steel & JSW to provide HR Coils as per nearest Plant Location.

BEFORE		AFTER	
Angul to Khopoli	1654 KM	Angul to Kalmeshwar	868 KM
Dolvi to Kalmeshwar	887 KM	Dolvi to Khopoli	88 KM
Total Distance	2541 KM	Total Distance	956 KM
Transportation distance reduced by 1585 KM			



Year	Carbon Emission (tCo_2) Before Route	Carbon Emission (tCo_2) Present Route
FY 2022-23	283	106
Fy 2023-24	3077	1158

GHG INVENTORISATION

Paint Transportation Via Bulker And Storages In Cylindrical Tank

	Reduction in Paint Drum handling System	UoM	Qty.
	Average Monthly Production	Ton	22000
Back Coat	Back coat Consumption	Ltr	**79200**
	No of barrel	No's	396
Primer Coat	Primer Consumption	Ltr	**52800**
	No of barrel	No's	264
Top Coat	Primer Consumption	Ltr	200000
	No of barrel	No's	1000
	Total No of barrel	No's	1660
	Total No barrel Unloading ,Shifting to coater room and empty barrel shifting to secondary sale will be eliminated/month	No's	660
	Reduction in paint Drum handling System	%	39.76

INITIATIVES TO REDUCE CARBON EMISSION

Bay-to-Bay Coil Transfer Cars in place of internal trucks for shifting Material

Use of Battery-Operated Fork-Lifts for Shifting, towards safer & maintenance-free functionality

CONVENTIONAL INTERNAL TRUCK SYSTEM

NEW INTER-BAY COIL TRANSFER CAR

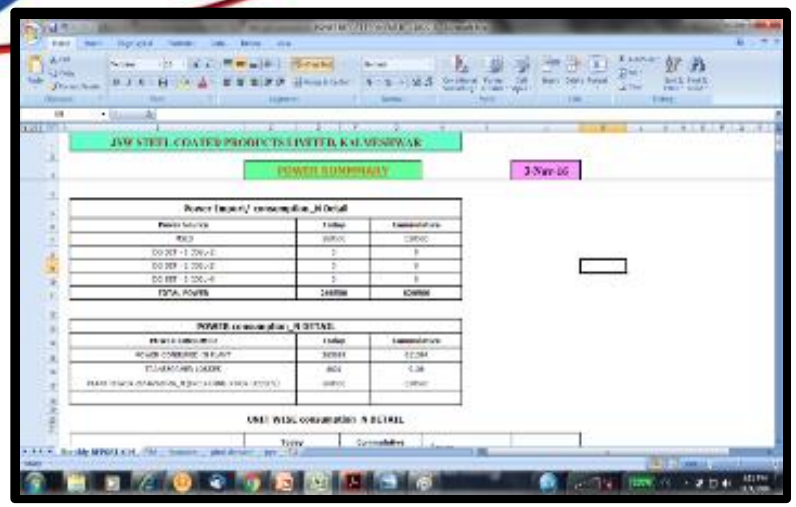
OLD HANDLING SYSTEM

NEW HANDLING SYSTEM

One of the group company JSW Energy has tie up Australian company for Green Hydrogen Technology.

For Galvalume Line AlZn Ingots were imported from Australia, Now Vendor Developed in India.

EMS SYSTEM AND OTHER REQUIREMENTS



Daily Power Report Via Mail

Implemented ISO 50001

Display of Energy Policy

Learning & implementation from award programs

- Participations in energy efficiency award programs encourages us to benchmark against the best in the industry, fostering a culture of excellence.
- Align energy efficiency initiatives with broader sustainability goals, aiming for carbon neutrality by 2030.
- Inspiring from many award programs, we have also initiated for zero waste management by installing Acid Regeneration Plant, Zero Liquid Discharge, Briquette plant, Regenerative Thermal Oxidizers

Future Plans- Net Zero Way Forward

Digitalization	a) Virtual data acquisition to analyze energy conservation. b) Smart tools like AIE and digital twins for performance tracking and improvement. c) Technology deployment in manufacturing like IOT, Deep learning and automation.
Renewable	a) Variable renewable energy integration into the open access grid. b) Reliable transition to renewables for sustainable growth. c) Green energy policy.
Electrification	a) Energy storage. b) Hydrogen as fuel. c) Alternative battery technology.
Circular Economy	a) Optimization of product life cycle. b) Waste to wealth. c) Carbon capture and storage. d) Water neutrality
Policy	a) Implementation of Energy policy and ISO 50001. b) Industry/ Academics/ Starts up/ Research collaboration. c) Achieving PAT-VII target. d) Carbon neutral by 2030. e) Green belt development

ROADMAP TO ACHIEVE NET ZERO

Proposed CFMP – with Timelines and % Reduction of FY 30 baseline

Mandatory Compliance – 10.9%

FY 2024

- Reductions from regulatory compliance requirements
  - Perform Achieve and Trade (PAT) Mechanism – 1.5%
  - Renewable Purchase Obligation (RPO) – **6.9%**
  - Carbon sequestration through existing plantation – **2.5%**

Energy Conservation Measures -0.9%

FY 2025

- Emission reductions from already planned energy efficiency improvement measures over and above PAT compliance – **0.9%**

Energy switch – 57.9%

FY 2026

- Switch from propane to RLNG in Kalmeshwar **-0.6%**
- Reductions from 100% switch of current fossil fuel based power to reliable round the clock mix of renewable power – **57.3%**

Switch from fossil fuel based steam to biomass based steam generation – 4.8%

FY 2027-28

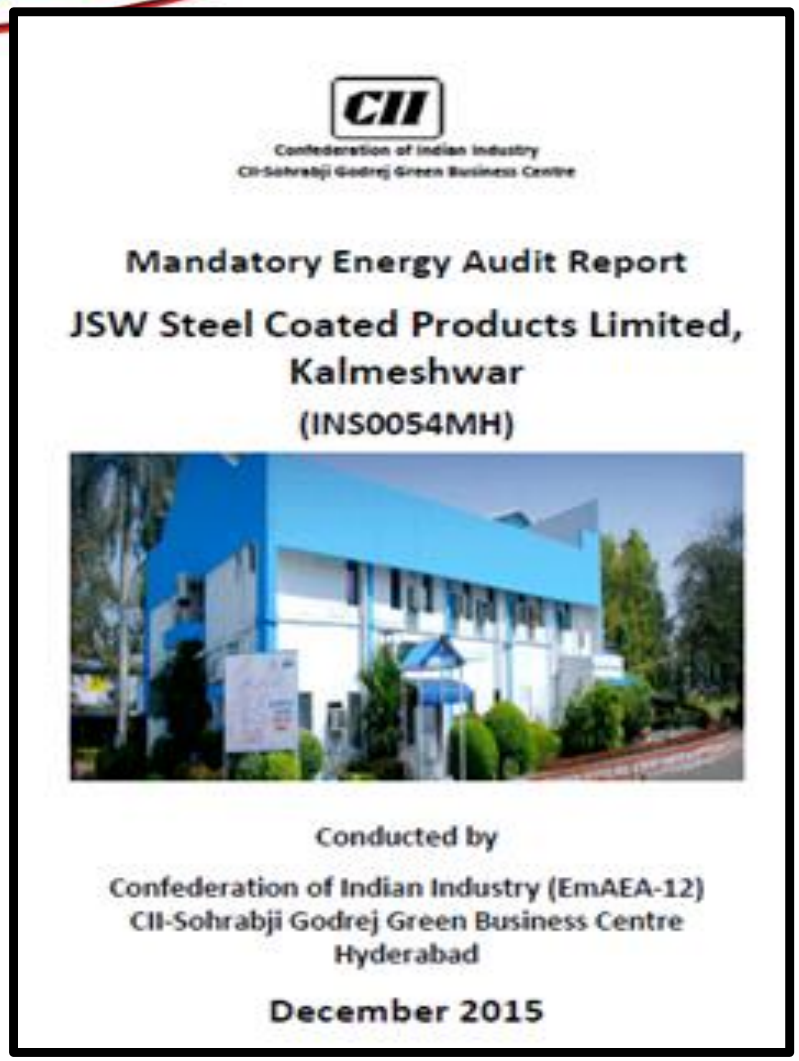
- Reductions from 100% avoidance of fossil fuel based steam generation – RLNG to biomass briquette in Vasind and Tarapur and propane to biomass briquette in Kalmeshwar – **4.8%**

Offsets – 25.6%

2029-30 onwards

- Carbon sequestration through additional plantation
- Emission offsets through purchase of voluntary emission reductions (VERs) or through emission reducing programme of activities like project of distribution of multifuel fired cookstoves to rural/ tribal households undertaken by JSW Foundation

Energy Audits


Confederation of Indian Industry
CII-Sohrabji Godrej Green Business Centre

Mandatory Energy Audit Report

JSW Steel Coated Products Limited, Kalmeshwar

(INS0054MH)

Conducted by

Confederation of Indian Industry (EmAEA-12)
CII-Sohrabji Godrej Green Business Centre
Hyderabad

December 2015

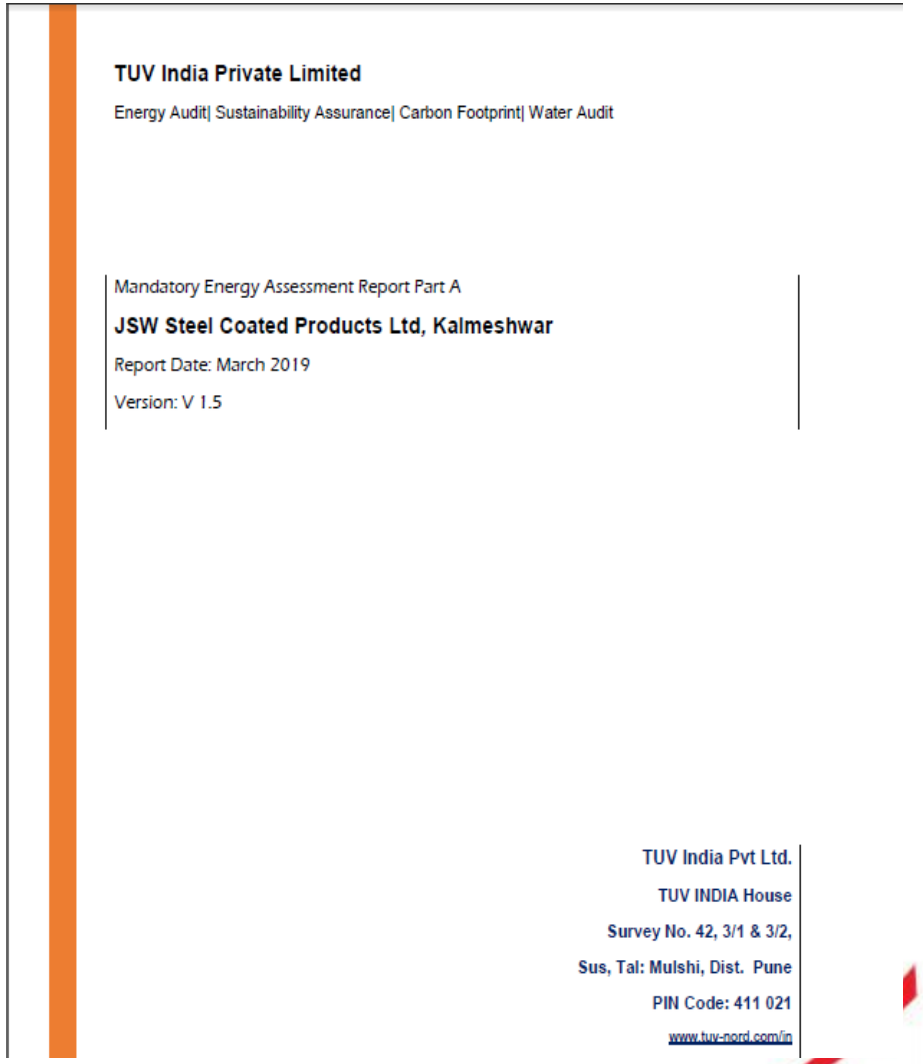
Energy Audit by CII

GRUNDFOS Pump Audit

Air Audit by M/s IR

Steam Audit by M/s Forbes Marshall

Boiler Audit By M/s Thermax


TUV India Private Limited

Energy Audit| Sustainability Assurance| Carbon Footprint| Water Audit

Mandatory Energy Assessment Report Part A

JSW Steel Coated Products Ltd, Kalmeshwar

Report Date: March 2019

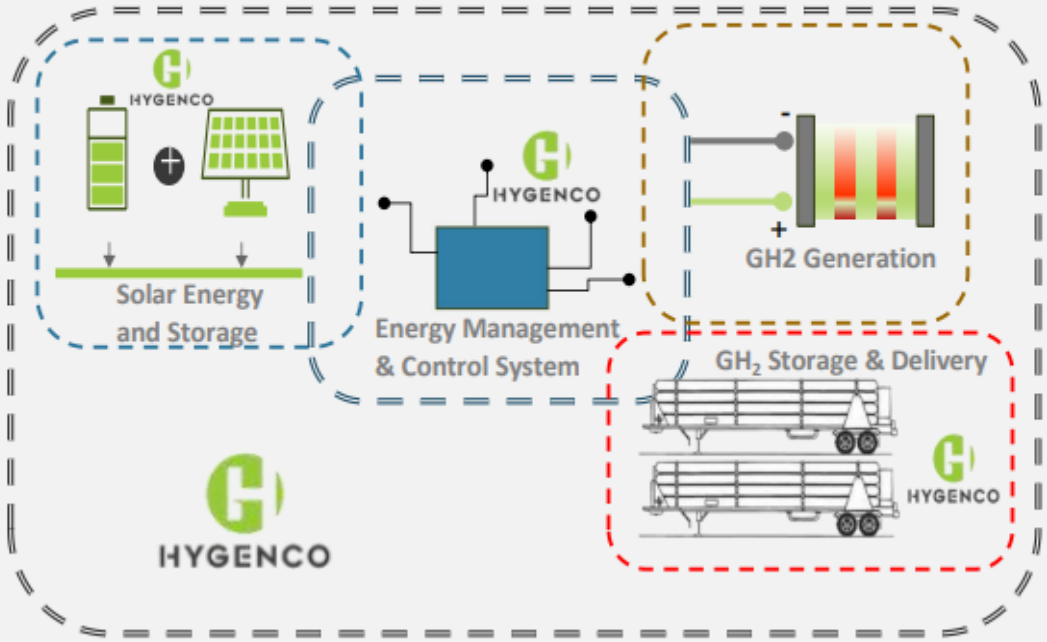
Version: V 1.5

TUV India Pvt Ltd.
TUV INDIA House
Survey No. 42, 3/1 & 3/2,
Sus, Tal: Mulshi, Dist. Pune
PIN Code: 411 021
www.tuv-nord.com/in

Energy Audit by TUV India

UPCOMING PROJECTS (GREEN HYDROGEN)

Our solution for Kalmeshwar



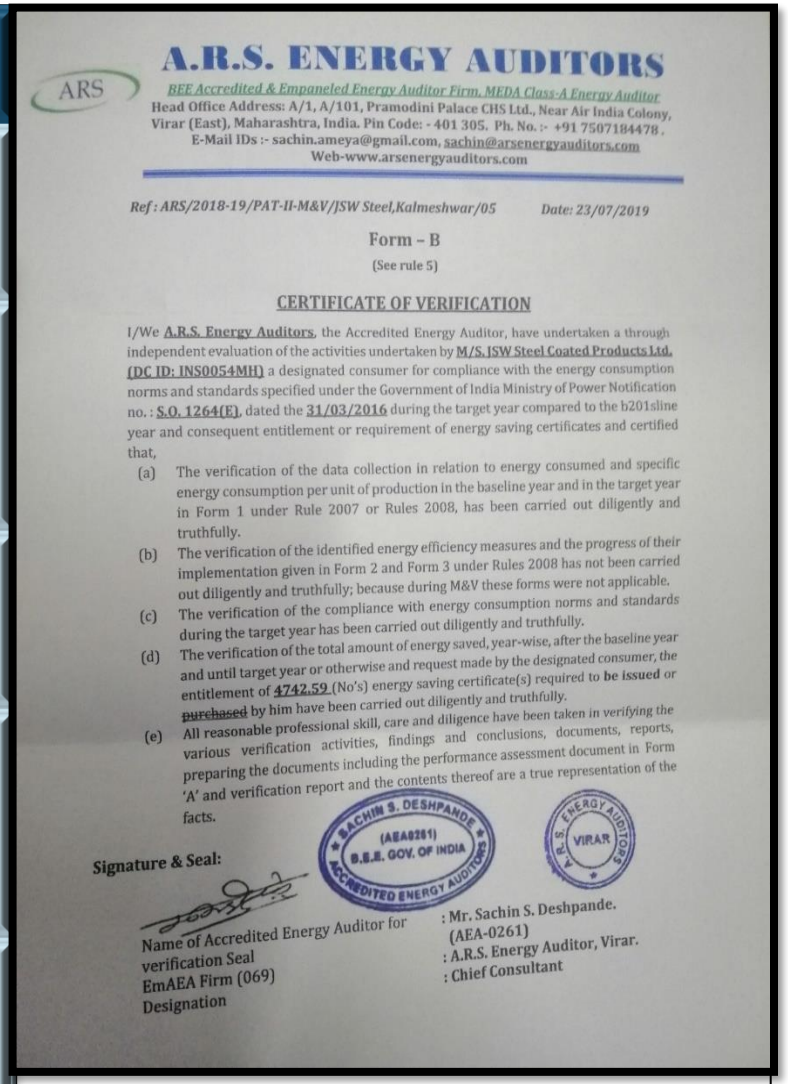
With clear benefits

- Up to 100% decarbonization
- Preserve capital (Hygenco Inves.)
- Eliminate over-heads (Hygenco O&M)
- No PnL volatility from H2 supply prices (fixed upfront)
- 100% availability
- Zero maintenance
- Merchant Capacity (Scalable Solution)

With respect to National Mission for Enhanced Energy Efficiency mission we have collaborated with startup hygenco for using green hydrogen as fuel in our furnaces.

MAJOR ACHIEVEMENTS FOR JSWSCPL KALMESHWAR FOR ENERGY EXCELLENCE

Sr. No	Achievement	Year
1	1st Position in State Level Award for Excellence in Energy Conservation and Management	2020
2	CII Excellent energy consumption22nd National Award for Excellence in Energy Management 2021	2021
3	1st Position in State Level Award for Excellence in Energy Conservation and Management	2021
4	CII Excellent energy consumption22nd National Award for Excellence in Energy Management 2021	2022
5	4779 ESCerts Recommended during M&V audit against PAT-II	2021



A.R.S. ENERGY AUDITORS

BEE Accredited & Empaneled Energy Auditor Firm, MEDA Class-A Energy Auditor
Head Office Address: A/1, A/101, Pramodini Palace CHS Ltd., Near Air India Colony, Virar (East), Maharashtra, India. Pin Code: - 401 305. Ph. No. :- +91 7507184478 .
E-Mail IDs :- sachin.ameya@gmail.com, sachin@arsenergyauditors.com
Web-www.arsenergyauditors.com

Ref : ARS/2018-19/PAT-II-M&V/JSW Steel,Kalmeshwar/05 Date: 23/07/2019

Form – B
(See rule 5)

CERTIFICATE OF VERIFICATION

I/We A.R.S. Energy Auditors, the Accredited Energy Auditor, have undertaken a through independent evaluation of the activities undertaken by M/S. JSW Steel Coated Products Ltd. (DC ID: INS0054MH) a designated consumer for compliance with the energy consumption norms and standards specified under the Government of India Ministry of Power Notification no. : S.O. 1264(E), dated the 31/03/2016 during the target year compared to the b201sline year and consequent entitlement or requirement of energy saving certificates and certified that,

(a) The verification of the data collection in relation to energy consumed and specific energy consumption per unit of production in the baseline year and in the target year in Form 1 under Rule 2007 or Rules 2008, has been carried out diligently and truthfully.

(b) The verification of the identified energy efficiency measures and the progress of their implementation given in Form 2 and Form 3 under Rules 2008 has not been carried out diligently and truthfully; because during M&V these forms were not applicable.

(c) The verification of the compliance with energy consumption norms and standards during the target year has been carried out diligently and truthfully.

(d) The verification of the total amount of energy saved, year-wise, after the baseline year and until target year or otherwise and request made by the designated consumer, the entitlement of 4742.59 (No's) energy saving certificate(s) required to be issued or ~~purchased~~ by him have been carried out diligently and truthfully.

(e) All reasonable professional skill, care and diligence have been taken in verifying the various verification activities, findings and conclusions, documents, reports, preparing the documents including the performance assessment document in Form 'A' and verification report and the contents thereof are a true representation of the facts.

Signature & Seal:

SACHIN S. DESHPANDE (AEA0261) B.E.E. GOV. OF INDIA ACCREDITED ENERGY AUDITOR

A.R.S. ENERGY AUDITORS VIRAR

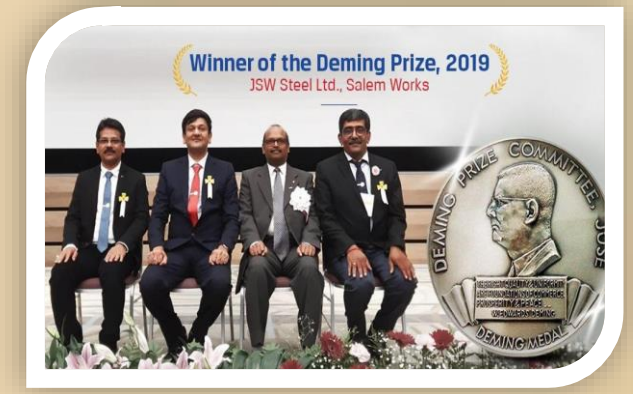
Name of Accredited Energy Auditor for verification Seal : Mr. Sachin S. Deshpande.
EmAEA Firm (069) (AEA-0261)
Designation : A.R.S. Energy Auditor, Virar.
: Chief Consultant

PAT CYCLE II FORM B

CII Excellent energy consumption23nd National Award for Excellence in Energy Management 2022

ATMA NIRBHAR JSW

Vijayanagar Plant won the most prestigious **Prime Minister's Trophy** 2012-13.



JSW Steel's Salem unit was awarded The Deming Prize in 2019.

JSW Steel's Vijayanagar unit was awarded The Deming Prize in 2018.

JSW Steel recognized as Steel Sustainability Champion by WorldSteel

Steel Minister's Trophy for the year 2013-14.

Toasting the spirit of **Success**...

Business Standard CEO of the Year award from Defence Minister Nirmala Sitharaman,2018.

THANK YOU

Better Everyday