Confederation of Indian Industry

GreenCo: Powering the Path to Net Zero Carbon

Milestone 2030 and beyond

JUNE 2025

A report by CII GreenCo Council

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Message - Jamshyd N Godrej
Chairman, CII-Sohrabji Godrej Green Business Centre

The journey toward a green future demands bold vision, unwavering commitment, and collective action, both within India and across the globe. Countries and organizations are aligning with Net Zero pathways, and in this context, India holds a tremendous opportunity to lead, not just domestically but on the world stage.

CII-Godrej Green Business Centre (CII-GBC) has been at the forefront of this transition, supporting Indian industry with frameworks, capacity building, innovation platforms, and market-based solutions for sustainability. Ranging across green companies, green buildings, energy efficiency, resource efficiency, circular economy, and renewable energy, CII - Godrej GBC has worked across multiple fronts to foster a culture of environmental leadership within the Indian industrial ecosystem.

The publication, **"GreenCo: Powering the Path to Net Zero Carbon- Milestone 2030 and Beyond"**, reflects this commitment. It captures the essence of the journey ahead, providing a pragmatic and inspiring roadmap to help industries not only reduce their footprints but also innovate for resilience and long-term sustainability. It demonstrates how Indian industries are stepping up, translating environmental ambitions into measurable outcomes, and shaping climate-ready value chains.

We deeply appreciate the efforts of the industry leaders who have already committed to this path, and we encourage many more to join. Your work is not only critical to India's low-carbon transition but also to securing its position as a responsible and innovative global player in sustainability.

At CII – Godrej GBC, we remain fully committed to supporting industry, both large enterprises and SMEs, with the tools, knowledge, and partnerships needed to drive meaningful change. We invite all stakeholders: businesses, policymakers, institutions, and communities to unite in this shared mission.

Together, we can build an inclusive, low-carbon, and resilient economy that is future-ready and globally competitive. Let us act with urgency, collaboration, and optimism to truly power the path to Net Zero Carbon- with 2030 as a key milestone and a long-term vision beyond.

Message - Pradeep Bhargava, Chairman, CII-GreenCo Council

As we enter a pivotal phase in our climate journey, the next five years leading up to 2030 are decisive for India's journey towards Net Zero. While global efforts remain important, a cohesive and concerted strategy still remains elusive in the international dialogue. Hence, it is all the more critical that our national and industrial drive must intensify to meet the ambitious climate goals India has set. The progress we make before 2030 will shape the foundation of resilient, responsible, and regenerative industrial systems for the decades to come.

Over the past decade, GreenCo has played a pioneering role in India's Net Zero movement, supporting industries in embedding sustainability across business functions. With adoption by over 1500 industrial units, GreenCo's framework has served as a powerful catalyst for change. By helping companies embrace circularity, reimagine value chains, and institutionalize sustainability in decision-making, GreenCo has become a trusted enabler of climate action.

Building on this strong foundation, GreenCo has introduced three Net Zero certifications- Net Zero Operational Carbon, Water Neutrality, and Zero Waste to Landfill, that offer a robust, measurable pathway for organizations committed to science-based and outcome-driven climate goals. These certifications have already been adopted by many forward-looking companies and have been adding immense value to them. Looking ahead, our strategic focus is on accelerating the Net Zero transition across both large industries and SMEs simultaneously. We aim to promote value chain initiatives, strengthen ecosystem partnerships, and expand our efforts in capacity building and technical support. At the same time, recognition through the GreenCo platform continues to inspire excellence and encourage industry-wide replication of best practices.

Leading GreenCo-rated companies are already demonstrating what the future looks like. With clear 2030 goals, they are transforming their energy and water use, redesigning material flows, restoring biodiversity, and tackling decarbonization across entire supply chains. Their efforts represent a shift from compliance to true climate leadership, setting ambitious benchmarks and showing others what is possible. We now invite more industries to actively participate in this transition. Whether you're starting your sustainability journey or deepening your impact, GreenCo provides the tools, frameworks, and community to guide your way forward.

In this context, we are pleased to introduce our latest publication, developed through close collaboration with industry leaders and knowledge partners. It consolidates actionable insights, best practices, and future-ready strategies to help companies achieve Net Zero. This publication is designed to guide large enterprises and SMEs to act decisively today while preparing for tomorrow.

We extend our sincere thanks to Rialto Enterprises Pvt. Ltd. for their valuable contribution towards this publication, whose impressive journey from GreenCo Bronze to GreenCo Platinum+ is highlighted as a case study.

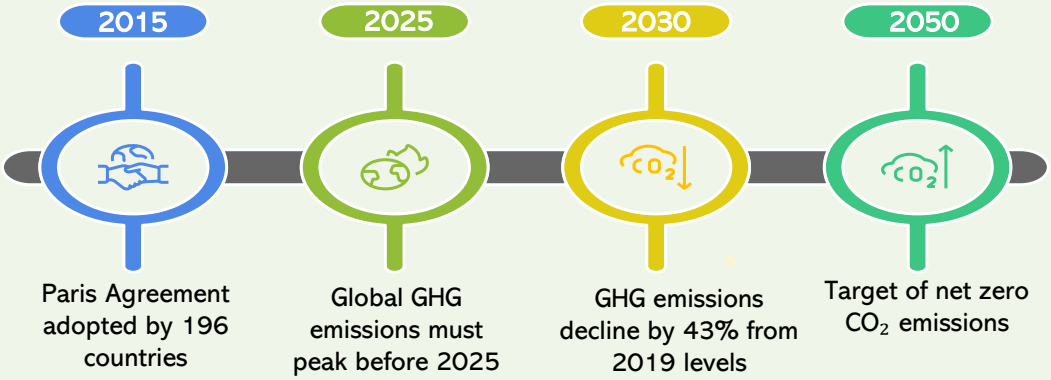
Together, through the GreenCo community, we can foster collaboration, continuity, and a shared commitment to a sustainable impact. The journey to 2030 demands urgency; the journey beyond calls for resilience, innovation, and unwavering leadership. GreenCo is proud to stand alongside Indian industry in shaping a Net Zero future for generations to come.

Preface

The world stands at a critical juncture in its response to the climate crisis. The Paris Agreement, adopted by 196 countries in 2015, marked a turning point anchoring global ambition to limit warming to well below 2°C, and preferably to 1.5°C above pre-industrial levels. Since then, climate science has only reinforced the urgency of this goal. As the Intergovernmental Panel on Climate Change (IPCC) highlights, staying within the 1.5°C threshold is vital to avoiding increasingly severe climate impacts such as heatwaves, floods, droughts, and widespread disruptions to ecosystems and economies.

To remain on this trajectory, a key global climate action timeline is set. While current emissions continue to rise, the window for action is still open. The concept of net zero- balancing emissions produced with those removed from the atmosphere, is more than a long-term goal; it is a transformation pathway for economies, industries, and livelihoods. Along this journey, carbon neutrality at the organizational level through systematic reductions and credible offsets, serves as a key milestone.

Global Climate Action Timeline: Key Milestones



As climate concerns move to the forefront of global priorities, the role of industry has become increasingly central. Historically, industrial sustainability efforts were primarily driven by legal and regulatory compliance. Today, they are propelled by voluntary commitments, investor expectations, supply chain accountability, and the growing business case for decarbonization and resource efficiency.

- ✓ The **global manufacturing sector** accounts for **20% of carbon emissions (***Source: World Economic Forum)*
- ✓ It also consumes **54% of the world's energy resources** *(Source: World Economic Forum)*
- ✓ In **India**, the **energy sector** is the **largest GHG emitter** at **75.66%**, followed by: **Agriculture:** 13.72% & **Industry:** 8.06% *(Source: 4th Biennial Update Report to the UNFCCC)*
- ✓ **Fossil fuels** currently meet **over 80%** of the industrial energy demand. *(Source: IEA)*
- ✓ With growing domestic manufacturing, **industrial CO_2 emissions in India** could rise to **32% by 2050** *(Source: IEA)*
- ✓ Achieving **net zero** will require industries to move **beyond NDCs** and adopt **proactive, non-mandated actions**

Preface (Cont.)

Against this backdrop, the GreenCo Rating System has emerged as a key enabler of India's Industrial sustainability transformation. Launched as a pilot in 2011, with its first two companies rated in 2012, GreenCo has since evolved through four major versions—most recently with Version 4 introduced in 2023, aligning the framework with evolving industrial needs and global best practices.

Today, GreenCo is a nationally recognized voluntary framework adopted by **over 1,500 industrial units** across sectors and scales, including public sector undertakings (PSUs), private companies, and MSMEs. It has been implemented in diverse sectors including manufacturing, automotive, cement, steel, chemicals, railways, pharmaceuticals, textiles, and FMCG.

GreenCo empowers organisations to systematically assess, benchmark, and improve their environmental performance across critical areas such as energy, water, waste, renewable energy, supply chain emissions, and product carbon footprint. The rating system has continually evolved to stay aligned with both national priorities and international standards. In its current form, the GreenCo system addresses net zero strategies across water, waste and carbon through the advanced certification pathways: Net Zero Operational Carbon (NZOC), Water Neutrality (WN), and Zero Waste to Landfill (ZWTL). These certifications help industries translate sustainability ambition into measurable, verifiable outcomes.

The **NZOC certification** has been adopted by one of the PSUs in a large scale, that helped them to **avoid around 6186 TCO_2 and sequester nearly 495 TCO_2**. This reflects how the certification can act as a key tool for industries in their net zero journey. As GreenCo continues to grow, it will play an increasingly proactive, on-the-ground role in supporting India's net zero aspirations.

This publication captures GreenCo's evolving journey and its growing relevance in India's climate transition. It features sector-specific insights, case studies, and scalable practices from industries that are leading the way in reducing emissions, conserving resources, and enhancing circularity. From clean energy deployment and green hydrogen pilots to Scope 3 initiatives and closed-loop systems, the publication reflects the depth and diversity of India's industrial sustainability movement.

We gratefully acknowledge the generous support of Rialto Enterprises Pvt. Ltd. in making this publication possible. Their journey from GreenCo Bronze to Platinum+ is highlighted within this edition, showcasing their steadfast commitment to sustainable industrial development. We also extend our sincere thanks to all our partner organizations for contributing their valuable case studies and insights.
Through GreenCo, collective leadership and a shared vision for a green economy, the Indian industry has the tools and the responsibility the transition towards net zero.

Executive Summary

With 2030 fast approaching, it is essential to convert Net Zero commitments into measurable, verifiable results- especially in industry, one of the largest sources of global emissions. Climate leadership today is no longer defined by pledges alone, but by the ability to demonstrate credible progress through transparent, scalable, and science-aligned action. This calls for a shift from fragmented voluntary efforts to coordinated, sector-wide transformation, supported by practical, performance-based frameworks.

This publication presents a consolidated view of how the GreenCo Rating System is enabling Indian industry to lead this transition. Grounded in climate science, aligned with national and global goals, and informed by real-world implementation, GreenCo provides a structured framework for industrial decarbonization. Drawing from 22 case studies across diverse sectors, the report highlights how companies are already delivering measurable outcomes: improving energy efficiency, adopting renewable energy, minimizing waste, decarbonizing supply chains, and piloting frontier technologies like green hydrogen and battery storage. Beyond technology and infrastructure, the report underscores the systemic enablers essential for scale: digital innovation, sustainable finance, robust certification, and transparent reporting.

More than a reference for existing adopters, this publication serves as a guide for industries across sectors seeking credible, scalable pathways to Net Zero. Through its growing network of adopters, GreenCo is cultivating a culture of transparency, competitiveness, and innovation, fostering continuous improvement and positioning Indian industry as a global leader in industrial sustainability. At its core, GreenCo offers a science-based, performance-driven model that not only helps industries set ambitious climate goals, but also verifies progress through rigorous assessment. As India accelerates toward its 2030 climate targets, GreenCo is evolving into a dynamic, digital, and globally recognized platform, supporting credible climate action from grassroots to the global stage.

This publication is both a showcase and a call to action. Industries must embed sustainability into their core operations by adopting credible, third-party frameworks like GreenCo. Policymakers must create enabling ecosystems through targeted incentives, supportive regulations, and integrated public-private initiatives. Investors and enablers must align capital with performance, rewarding transparency and impact.

The path to Net Zero must be practical, inclusive, and verifiable. With GreenCo, Indian industry has a credible platform to lead with integrity and deliver impact at scale.

Introduction

The year 2030 is widely recognized as a decisive milestone in the global climate response. To keep the goal of limiting warming to 1.5°C within reach, the Intergovernmental Panel on Climate Change (IPCC) calls for a nearly 50% reduction in global greenhouse gas emissions by 2030. Every fraction of a degree matters- lower emissions by 2030 will help avoid breaching critical planetary boundaries and life-supporting systems.

Encouragingly, recent years have seen increased momentum in global climate pledges and net-zero commitments from both governments and businesses. According to the United Nations' latest synthesis of Nationally Determined Contributions (NDCs), current pledges, if fully implemented **could reduce global emissions by 2.6% by 2030**. While this represents a positive step forward, continued enhancement of ambition and implementation is needed to reach the 43% reduction required for a 1.5°C-aligned trajectory. With strengthened policy action and accelerated deployment of low-carbon solutions, the potential remains to close this ambition gap and put the world on a more sustainable path.

India has articulated strong climate ambitions in its updated NDCs, which include:

- ✓ To reduce Emissions Intensity of its GDP by 45% by 2030, from 2005 level
- ✓ To achieve about 50 percent cumulative electric power installed capacity from non-fossil fuel-based energy resources by 2030
- ✓ To create an additional carbon sink of 2.5 to 3 billion tonnes of CO2 equivalent through additional forest and tree cover by 2030

These commitments are aligned with India's developmental priorities and the UN Sustainable Development Goals (SDGs). The country has already surpassed the earlier target of 40% non-fossil power capacity and has achieved a 28% reduction in emissions intensity. The Fourth Biennial Update Report submitted to the UNFCC highlights further progress: from 2005 and 2020, the emission intensity of GDP fell by 36%, **the share of non-fossil energy in installed electricity capacity reached 46.52% by October 2024, and forest and tree cover increased to 25.17% of the total geographical area.**

As India's industrial sector continues to grow, aligning this growth with national climate objectives presents a key opportunity. Supporting this alignment will require the creation of clear roadmaps, practical implementation tools, and enabling ecosystems that empower businesses to act decisively.

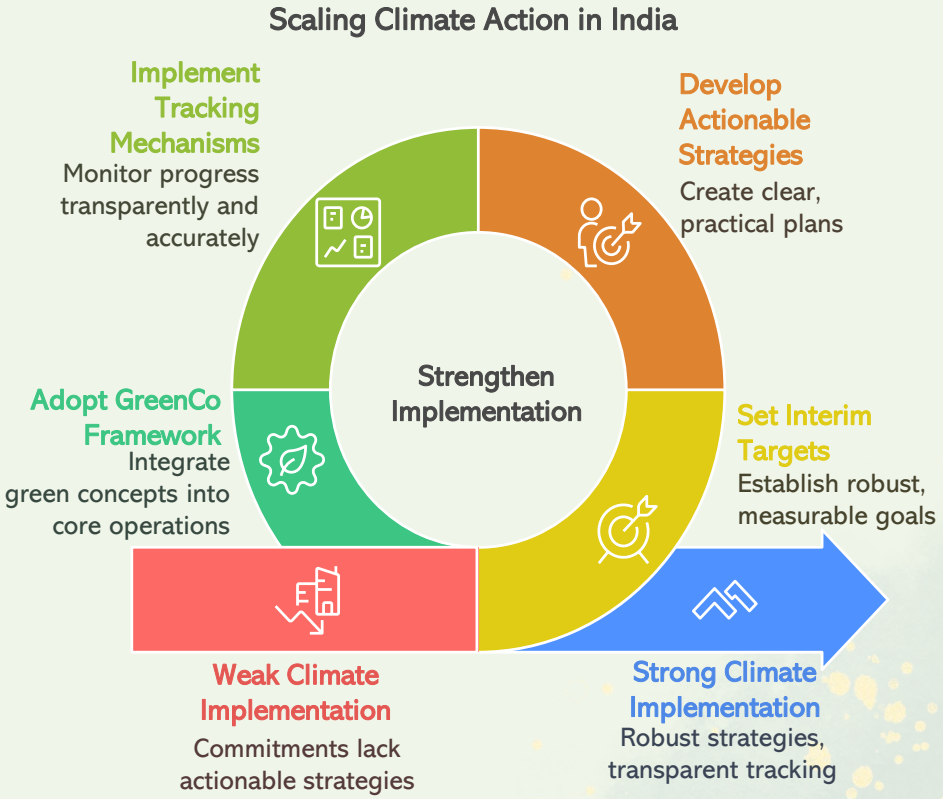
Introduction (Cont.)

Corporate climate leadership in India is growing in strength and scale. Over 127 Indian companies have set net-zero goals, many through platforms such as the Science Based Targets initiative (SBTi) and CDP, placing the country sixth globally in terms of corporate climate action. As companies across sectors embrace climate responsibility, the focus is now shifting toward ensuring that these commitments are backed by robust interim targets, actionable strategies, and transparent tracking mechanisms. Strengthening implementation will unlock long-term competitiveness and trust, helping companies play a catalytic role in India's low-carbon transition.

Voluntary frameworks such as the GreenCo Rating System, developed by the CII-Godrej Green Business Centre, are vital for operationalizing climate ambition. Rooted in scientific principles and industry best practices, GreenCo provides a structured methodology, sector-specific benchmarks, and third-party verification. It helps organisations integrate sustainability into their core business operations, improving resource efficiency, resilience, and long-term value.

More than just a rating system, GreenCo serves as a vital link between national climate ambitions and industrial performance on the ground. It supports businesses in aligning with India's NDCs while advancing sustainable growth and innovation.

As India moves towards a greener economy, the collaboration between policymakers, industry, and civil society becomes more important than ever. Voluntary frameworks like GreenCo offer a practical and powerful tool to enable this transition by scaling climate action, fostering innovation, and empowering organisations to lead by example.



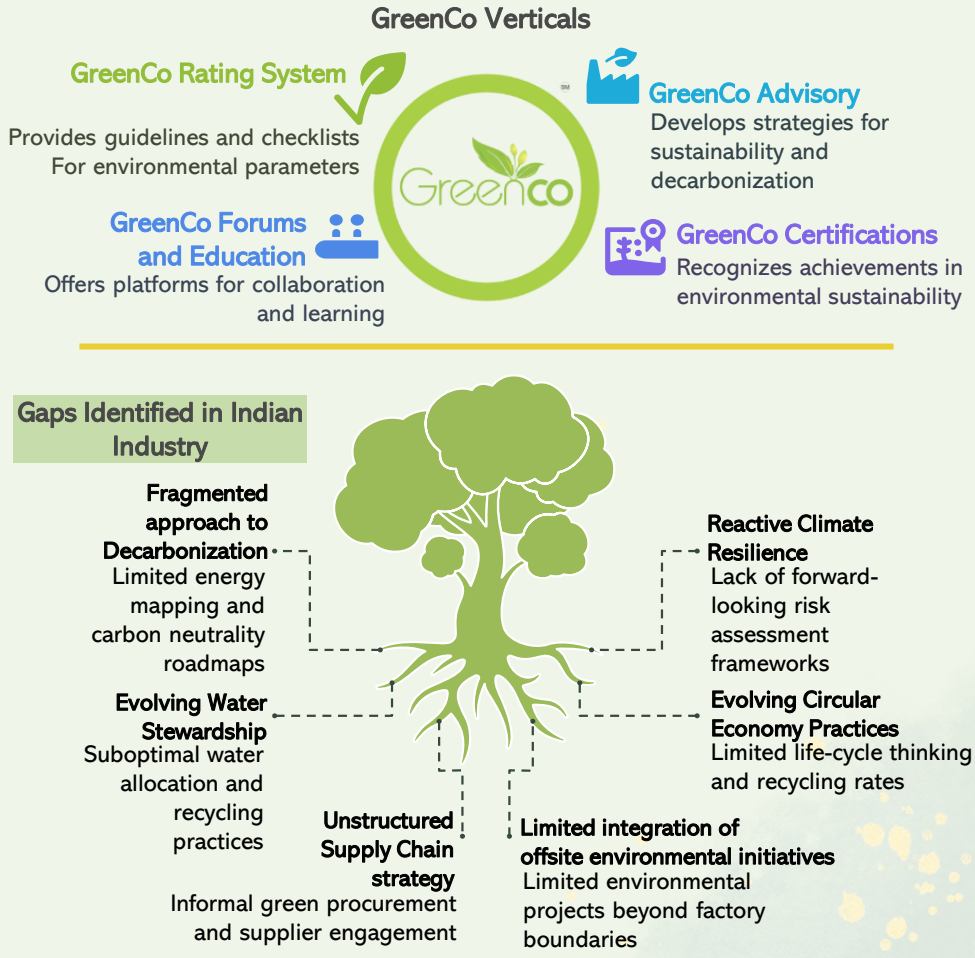
GREENCO BRIDGING THE GAP

GREENCO VISION STATEMENT - 15 million tons of GHG reduction by 2030

GreenCo Rating is a voluntary and comprehensive assessment framework that provides a holistic evaluation of a company's environmental performance. Built on a life cycle perspective, it examines multiple dimensions including resource efficiency, climate impact, sustainable supply chain management, and product responsibility. The system assesses how effectively companies utilize critical resources like energy and water, reduce waste generation, and integrate environmentally responsible practices throughout their operations. It also promotes sustainable product design, usage, and disposal, encouraging businesses to embed green principles across their entire value chain.

From a **carbon management perspective (reduction of GHG emissions within the boundary and supply chain)**, GreenCo plays a pivotal role in supporting organizations to transition towards low-carbon operations. It actively promotes the adoption of energy-efficient technologies, the shift to renewable energy sources, and the reduction of greenhouse gas (GHG) emissions. Through the framework, companies are encouraged to measure and monitor their carbon emissions, implement structured emission reduction plans, and engage in credible carbon offsetting measures.

Several challenges persist across industries in achieving Net Zero Carbon. However, GreenCo addresses these through its diverse verticals, each designed to drive progress toward decarbonization.



GREENCO BRIDGING THE GAP

Challenges	GreenCo Rating System	GreenCo Advisory	GreenCo Forums & Education	GreenCo Certifications
Fragmented Approach to Decarbonization	• Dedicated Carbon parameter in Version 4 • Sector-specific scoring for energy and carbon benchmarking • Management systems: targets, action plans • Supply chain Carbon targets and action plan	• Net zero / decarbonization strategy • Scope 1, 2, 3 GHG mapping • Renewable integration & abatement planning	• Peer exchange on integrated decarbonization success stories and innovations	• Net Zero Operational Carbon Certification provides validation of end-to-end decarbonization efforts at site level.
Reactive Climate Resilience	• Carbon evaluation includes climate risk readiness and mitigation pathways • Platinum+ level requires risk assessment	• Climate risk-integrated strategies • Internal carbon pricing and scenario analysis	• E-Learning on risk-informed carbon action • Forums on adaptation strategies linked to emissions	• Net Zero Operational Carbon Certification encourages forward-looking planning and site-level emission resilience.
Evolving Water Stewardship (carbon linkage via energy-water nexus)	• Carbon savings from efficient water use and treatment processes included in scoring.	• Water-energy nexus optimization projects • Reducing water and energy-related emissions • Water feasibility study which identifies improvement opportunities	• Content connects water stewardship with carbon • Forums on low-carbon water	• Water Neutrality Certification validates reduction, recycling, and recharge strategies supporting energy and carbon savings.

GREENCO BRIDGING THE GAP

Challenges	GreenCo Rating System	GreenCo Advisory	GreenCo Forums & Education	GreenCo Certifications
Evolving Circular Economy Practices	• Circularity scoring includes carbon intensity reduction via reuse, recycling, and material substitution	• Projects drive material efficiency, design changes, and closed-loop systems to lower embedded carbon	• Forums and training highlight the carbon impact of life-cycle strategies and zero-waste models.	• **Zero Waste to Landfill Certification** drives upstream carbon reduction via diversion and resource recovery
Unstructured Supply Chain Strategy	• Scope 3 carbon performance included • Promotes green procurement and low-emission sourcing	• Supply chain decarbonization through supplier engagement, emissions tracking, and sustainable logistics	• Forums foster cross-sector exchange on value chain decarbonization • Training on green logistics	• Certifications indirectly support sustainable procurement and operational zero emissions
Limited Integration of Offsite Environmental initiatives	• Points for carbon sequestration through nature-based/community projects	• Supports afforestation, carbon farming, and restoration for carbon-positive community initiatives	• Forums showcase beyond-the-fence-line carbon offset stories • Education for stakeholder involvement	• **Net Zero Operational Carbon Certification** supports offsets via verified community carbon projects

GREENCO BRIDGING THE GAP

Milestone 2030

GreenCo is enabling industries to achieve the Net Zero Carbon milestone by 2030 through a comprehensive, carbon-focused strategy. This includes capacity-building for carbon management, implementation of advanced energy management systems, and increased renewable energy adoption. GreenCo promotes Zero Liquid Discharge and 100% wastewater reuse to cut water-related emissions and supports rainwater harvesting. It facilitates the development of Scope 1 and 2 GHG inventories, Scope 3 mapping, and climate risk assessments. GreenCo drives Zero Waste to Landfill initiatives, green procurement, and product carbon footprint reduction using LCA and EPDs. It further enables digital, AI, and green hydrogen technologies to accelerate deep decarbonization. In addition, **GreenCo offers Net Zero Operational Carbon (NZOC) certification,** which has a feasibility-level assessment for performance improvement and a full certification that validates end-to-end decarbonization efforts at the site level, providing a robust framework for industries to transition toward operational net zero.

Beyond 2030

Beyond 2030, GreenCo is advancing deep decarbonization by extending carbon management across the entire value chain and setting ambitious targets beyond operations. It promotes full electrification, 100% renewable energy use, and deployment of low-carbon technologies. GreenCo supports water-positive sites with minimal carbon intensity and drives Scope 3 emission reductions through embedded carbon minimization. It fosters material circularity and decarbonized procurement, engaging Tier-2 suppliers for net-zero supply chains. GreenCo strengthens sustainable innovation, green infrastructure, and carbon-aware workplace practices. It enables economy-wide transformation via AI-driven carbon analytics, large-scale green hydrogen, ESS, and green finance to accelerate the transition to a carbon-neutral future.

GreenCo Impact

5.7 million tons of CO_2e saved in 2024-25

The **CII GreenCo Rating System** is more than just an assessment it's a **transformational journey** that turns sustainability challenges into competitive advantages. By adopting GreenCo, industries like **Rialto Enterprises Pvt Ltd** have bridged critical gaps in energy, carbon, water, and waste management, achieving measurable improvements. **On the following pages**, we showcase how Rialto evolved from compliance-driven operations to **sustainability leaders**.

The proof is in the progress—the success stories will inspire other companies to leap forward.

RIALTO's GREENCO Journey: The Path from Bronze to Platinum +

ABOUT THE COMPANY: Rialto Enterprises Pvt Ltd, a **GreenCo Platinum+** certified company, is a leading contract manufacturer of **Oral–B** brand toothbrushes for the global consumer goods leader **Procter & Gamble (P&G).** Since commencing operations in 2001, Rialto has evolved into a key player in the oral care manufacturing industry, producing over **2 million manual toothbrushes per day** and delivering more than **400 product variants to over 140 countries worldwide**, demonstrating its robust global footprint and manufacturing excellence. Rialto operates from a highly certified, environmentally conscious facility. The company holds a suite of internationally recognized certifications, including **ISO 9001:2015**, **ISO 14001:2015**, **ISO 45001:2018**, and **ISO 13485:2016**. Additionally, Rialto is **Ecovadis Silver-rated**, **SEDEX SMETA certified**, and recognized as both a **Water Positive Facility** and a **Zero Waste to Landfill certified** company. These achievements reflect Rialto's commitment to **sustainability**, **product quality**, and **ethical manufacturing,** positioning the company as a responsible leader in the global oral care supply chain.

NET ZERO VISION OF THE COMPANY: Net Zero Emission By 2040

GREENCO TIMELINE

Rialto's GreenCo journey began in 2017 with the adoption of **GreenCo Version 2**. Since then, the company has consistently embraced the evolving GreenCo guidelines, which have grown increasingly stringent with each revision, featuring 7–10% tougher criteria from **Version 2** to **Version 3**, and again from **Version 3** to **Version 4**. Despite these escalating challenges, Rialto has continually achieved higher ratings in every assessment cycle.

This journey highlights Rialto's proactive approach to **greening its operations**, with a particular emphasis on **decarbonization** both within its manufacturing facilities and throughout its supply chain. The company's sustained performance underscores its role as an industry leader in advancing sustainability through continuous improvement and innovative solutions.

RIALTO'S GREEN COMMITMENTS:

- ✓ Carbon Neutral by 2028 (on Scope 1 & 2)
- ✓ Net Zero facility by 2040
- ✓ Retain the Water Positive status (currently 1:3.25) and achieve 1:8 water positive by 2028
- ✓ Retain the "Zero Waste to Landfill" by maintaining more than 99.99% diversion rate
- ✓ More than 60% of the buy value from GreenCo-rated facility by 2028

RIALTO's GREENCO Journey: The Path from Bronze to Platinum +

THE DECARBONIZATION JOURNEY

Rialto Enterprises Pvt Ltd has adopted a comprehensive decarbonization strategy aligned with its long-term vision of achieving Net Zero emissions. This strategy is structured around two key components:

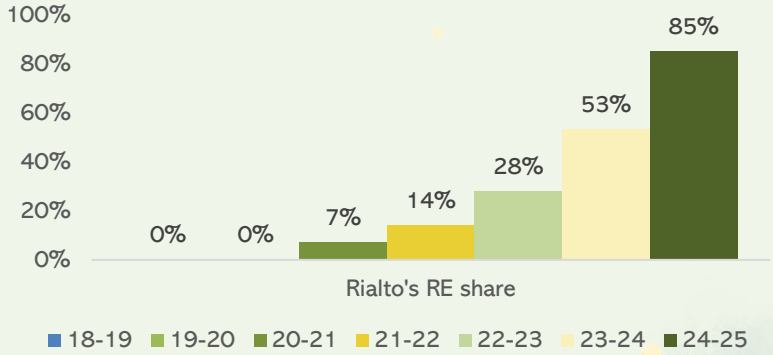
- **Scope 1 & 2 emissions** – Direct and energy-related emissions from operations
- **Scope 3 emissions** – Indirect emissions across the value chain

SCOPE 1 & 2

Milestone 2025: Rialto's decarbonization efforts began in FY 2017–18, the year it earned its first GreenCo Bronze Rating, with a baseline GHG emission footprint of 2,414 metric tonnes (MT), of which Scope 2 emissions accounted for approximately 82%. Subsequent years saw an increase in emissions (6.9% in FY 2018–19 and 18.8% in FY 2019–20), driven primarily by increased production volumes.

Recognizing the urgency for transformative change, Rialto embarked on a low-carbon transition journey, initiating several renewable energy (RE) projects and achieving a **zero RE usage to an 87% RE share** in its energy mix by FY 2024–25, having an installed capacity of nearly 97% of its yearly requirement.

PROJECT	REDUCTION IN GHG EMISSIONS
Installation of a 730 kWp rooftop solar	780 MT of CO_2
1 MWp off-site solar installation	1,163 MT of CO_2
Third-party Power Purchase - Wind energy from wind farms in Tiruppur 0.7 MWp	727 MT of CO_2
Third-party Power Purchase -0.85 MWp capacity	875 MT of CO_2



Through these initiatives, Rialto has successfully increased its renewable energy (RE) share from 0% to **87%**, a significant milestone that contributed to the company earning the prestigious **GreenCo Platinum+ rating**.

RIALTO's GREENCO Journey: The Path from Bronze to Platinum +

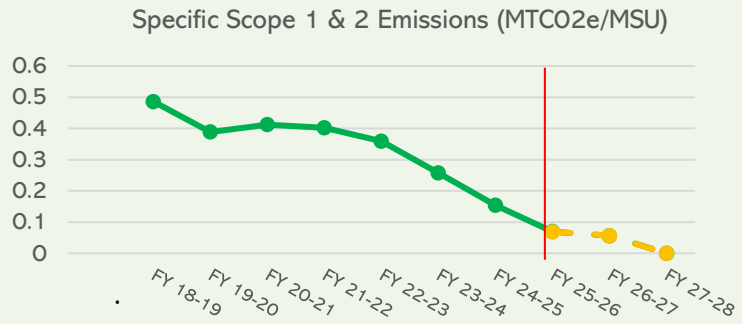
THE DECARBONIZATION JOURNEY

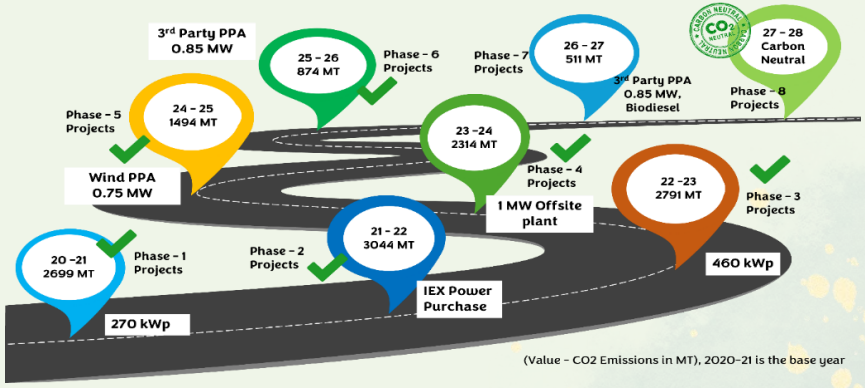
SCOPE 1 & 2

Milestone 2028: Rialto Enterprises is steadily advancing toward its goal of achieving **Net-zero greenhouse gas (GHG) emissions for Scope 1 and Scope 2 by the year 2028**. Benchmarking against its **FY 2018–19 baseline**, the company has already realized **87%** of its decarbonization **target as of FY 2024–25**. As part of its roadmap to 2028, Rialto has set aggressive interim goals to **further reduce GHG emission intensity** by **18% in FY 2025–26**, and **an additional 10% in FY 2026–27,** considering the production volume increase. To accelerate this transition, Rialto is implementing a series of forward-looking sustainability projects focused on renewable energy expansion, process efficiency, and sustainable resource management. These initiatives will play a critical role in fulfilling its 2028 carbon neutrality milestone while reinforcing its position as a leader in sustainable manufacturing.

Advanced energy-efficient VRF Air Conditioner systems	Technology Upgradation of its Process Equipments	Deployment of Super Premium Efficiency Motors	Increase RE– third party vendors & increasing its stake in group captive solar projects	Biodiesel blend fuel into its diesel generator

<u>The summary of GHG emissions and roadmap to achieve carbon neutral is given below:</u>





RIALTO's GREENCO Journey: The Path from Bronze to Platinum +

THE DECARBONIZATION JOURNEY

SCOPE 3 - Being a contract manufacturer, of the 15 Scope 3 categories defined under the GHG Protocol, 9 apply to Rialto. Initially, the company accounted for only 3 categories but has since expanded reporting to 7 categories by FY 2024–25.

Milestone 2025: Rialto began accounting for Scope 3 emissions at the start of its GreenCo journey. While initial coverage and data accuracy were limited, the company enhanced its focus on reducing supply chain emissions after achieving bronze certification, initiating targeted improvement measures as follows:

- Increasing the GHG accounting from 3 categories of scope 3 to 5 by FY 2021–22
- Localization of suppliers - 169.81 MT GHG saved in FY 21-22
- Bringing supply chain closer to Manufacturing site (Domestic Suppliers) – 145 MT GHG saved in FY 21-22
- Milk Run Model - 164.60 MT GHG saved in FY 21-22
- Refurbishment of plastic Molds instead of purchasing a New Mold - increasing the life of the existing mold
- Reduction in business travel through Virtual Audit/Meetings
- Leased asset Emission inventorisation
- CNG Vehicle Introduction to reduce the upstream Emissions
- Waste minimization across operations
- Housing facility for the employees to reduce travel commute emissions

Green Supplier Development Program (GSDP)

Along with the above sustained initiatives, the unit has received GreenCo Platinum rating. Building on the momentum of its **GreenCo Platinum rating**, Rialto Enterprises launched the **Green Supplier Development Program (GSDP)**—a strategic initiative aimed at accelerating **decarbonization across its value chain**. The program is guided by a **customized GSDP checklist**, developed in alignment with the **GreenCo Rating System**, and focuses on enhancing the environmental performance of Rialto's key suppliers. **Phase 1** of the program engaged **seven critical suppliers** whose operations significantly influence Rialto's overall environmental footprint. The **cumulative outcomes** of Phase 1 are outlined below, underscoring the tangible impact of the initiative.

Electrical energy savings	13,80,855	kWh
Thermal energy savings (Diesel & CNG)	35.5	kL of fuel
GHG emission mitigation	**3739.4**	**MT of CO2 eq.**
Renewable energy Addition	2411	kWp of RE
Water Conservation	19,914	kL of water
Resource conservation	241.5	MT of material
Waste Reduction	12,693	kgs of waste
Total investment made	340	Rs Lakhs
Monetary savings	175.6	Rs Lakhs
ROI	2	Years

RIALTO's GREENCO Journey: The Path from Bronze to Platinum +

THE DECARBONIZATION JOURNEY

SCOPE 3 - Out of 15 scope 3 categories, only 9 are applicable to the company

Green Supplier Development Program (GSDP) contd.

In recognition of their outstanding performance, the suppliers were honoured at the Supplier award ceremony detailed below:

Green Supplier Awards - 2023

Building on this success, Phase 2 of the GSDP was initiated in 2024, engaging six suppliers. Through tailored sustainability action plans and close collaboration, these suppliers achieved an average 60% improvement in their environmental performance, a clear indication of the program's growing impact and momentum.

Carbon Offset & Sequestration

Additionally, to offset and sequester residual carbon emissions, tree plantation drives have been implemented, contributing to emission reductions. The table below presents the total CO_2 sequestered by these trees over the years.

	21-22	22-23	23-24	24-25
Offset in TCO2	94.21	94.21	98.6	125

New green initiatives in 2024-2025 leading to Platinum +:

Expanded Scope 3 emissions accounting to 7 out of 9 applicable categories
Climate Risk Assessment
3.25 Water Positive Index
Zero waste to Landfill Certification - >99.9% Diversion rate from Landfill
Completed Life Cycle Assessment (LCA) for the major products (contributes 60% of sales): *0.11 kg CO_2e per brush*
100% recycled packaging material
85% of procurement using returnable package

RIALTO's GREENCO Journey: The Path from Bronze to Platinum +

THE DECARBONIZATION JOURNEY

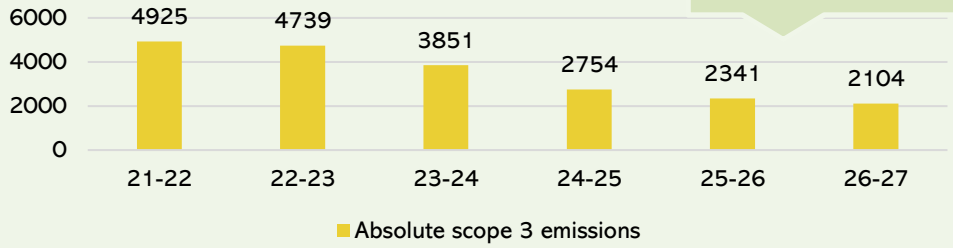
SCOPE 3

Milestone 2030 and beyond: Looking ahead, Rialto Enterprises is committed to expanding the breadth and depth of its Scope 3 emissions accounting. As of now, Categories 1 and 2—Purchased Goods and Capital Goods—remain the final major areas yet to be fully assessed. To close this gap, Rialto is actively collaborating with an external agency to conduct a comprehensive inventory and establish accurate baselines for these categories.

Planned SCOPE – 3 Emission Reduction Projects (2025–2027)

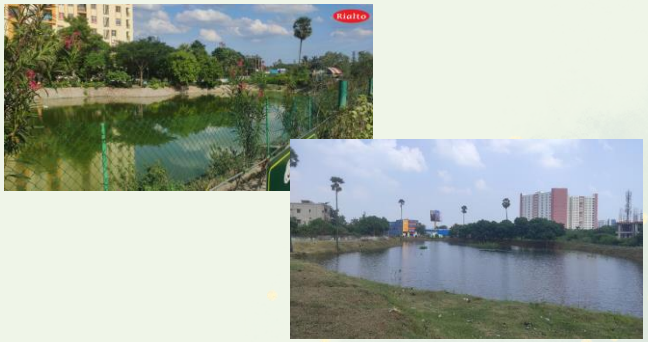
- ✓ Localization of molds and components
- ✓ Local sourcing of raw materials and filaments
- ✓ Optimization of logistics and shipment routes
- ✓ Sustainable packaging and material sourcing localization
- ✓ Third-party renewable energy procurement to reduce emissions under Category 3 (Fuel and Energy Related Activities)

25% reduction expected for the next 2 years based on the potential



OTHER GREEN INITIATIVES

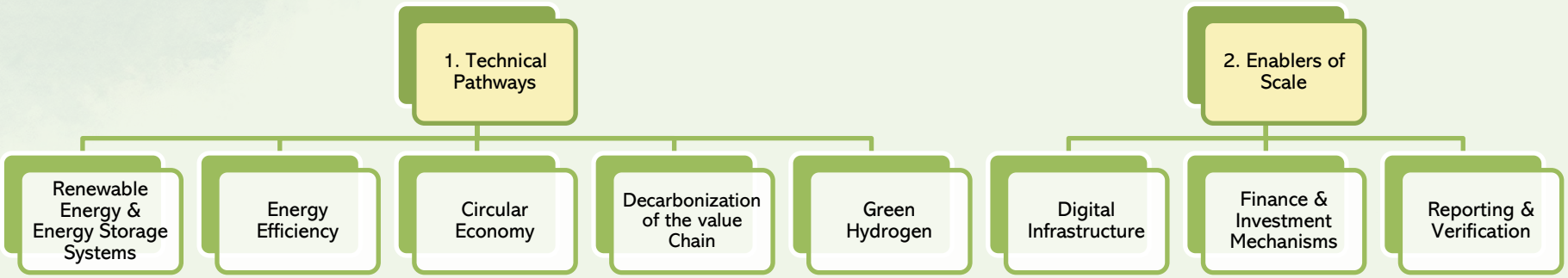
1. Water Consumption - less than 20 liters per person per day
2. Certified as a "Water Positive Facility" by the Confederation of Indian Industry (CII), replenishing 3.25 times the water consumption
3. Plant acquired Zero Liquid Discharge status
4. Reduced overall waste generation by 30.5% from FY21-22
5. Unit has an on-site vermicomposting yard
6. Rejuvenated two local ponds with a capacity of over **19,115 cubic meters**, supporting groundwater recharge and local ecosystem restoration



Setting the Context – Approach to Decarbonization

As industries across the globe intensify efforts to combat climate change, the journey towards Net Zero Carbon has emerged as both an environmental imperative and a strategic business priority. To achieve this transformation, particularly with 2030 as a key milestone, it is critical to adopt a comprehensive approach that addresses both **what** needs to change (technical solutions) and **how** it can be scaled (enabling systems and infrastructure).

Hence the approach to Net Zero have been categorized into two broad pillars:



Together, these enablers form the foundation for organizations to develop structured Net Zero Roadmaps, align with global & national frameworks, and deliver tangible progress by 2030 and beyond.

Following each section, real-world **GreenCo case studies** from pioneering companies are presented across each of the identified Net Zero pathways and enablers. These case studies highlight practical, scalable, and innovative actions taken to reduce emissions. By showcasing replicable strategies and measurable outcomes, they provide valuable guidance and inspiration for organizations at different stages of their Net Zero journey, encouraging industry-wide learning and adoption.

Renewable Energy & Energy Storage Systems (RE & ESS)

Milestone 2030

The global energy transition hinges on the integration of RE to meet the 1.5°C climate target. For the same, the below is recommended by International Renewable Energy Agency (IRENA):

IRENA's Recommendation → Renewables Must Account for 60% → Global Electricity Generation

Achieving this requires not only scaling up solar, wind, hydro, and biomass but also revolutionizing energy systems through enhanced grid flexibility, widespread deployment of battery energy storage systems (BESS).

India's scenario:

Commitment to achieve 500 GW of non-fossil fuel-based capacity by 2030, including 280 GW of solar and 140 GW of wind.

National initiatives which are strengthening the volumes of RE are:

- ✓ Green Energy Corridor
- ✓ Expansion of solar parks
- ✓ State-specific renewable energy policies
- ✓ Incentives under the Production Linked Incentive (PLI)

These efforts are crucial to not only meet India's Nationally Determined Contributions (NDCs) but also to provide reliable and affordable energy to a growing population and expanding economy.

Beyond 2030

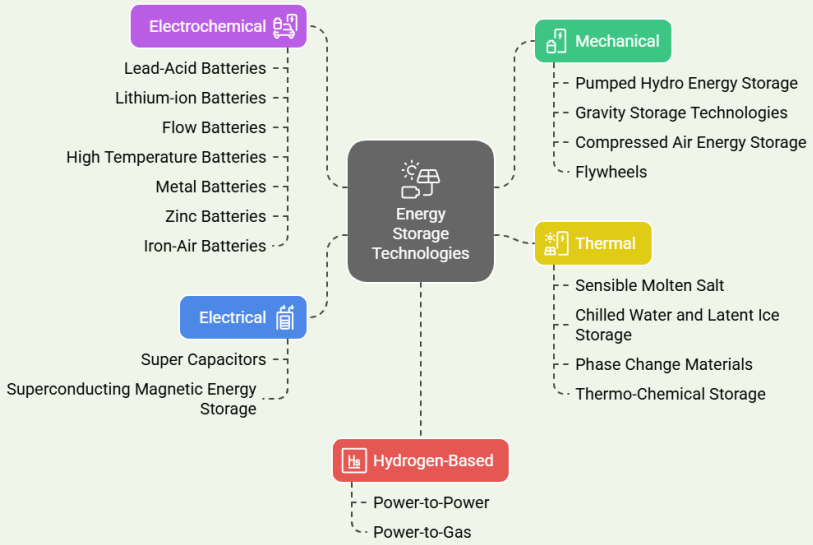
- ✓ AI-Optimized Grids: Artificial intelligence will drive smarter, real-time decision-making for grid management.
- ✓ Virtual Power Plants (VPPs): Distributed energy resources will be aggregated and controlled like a single power plant, improving efficiency.
- ✓ Sector Coupling: Electricity will be integrated with heating, cooling, and transport systems for seamless energy transitions.
- ✓ Cross-Border Green Energy Corridors: Regions like Europe and South Asia will exchange clean power across national borders, boosting energy security.
- ✓ Floating Solar & Offshore Wind: Deployment of floating solar in reservoirs and offshore wind turbines especially along India's coasts (e.g., Gujarat & Tamil Nadu) will scale up.
- ✓ Hybrid Renewable Systems: Combinations of solar, wind, and battery storage will become common to ensure reliability and grid stability.
- ✓ Advanced RPO Norms: Renewable Purchase Obligations will evolve into sector-specific mandates targeting >80% RE sourcing by 2050
- ✓ Decentralized Renewable Energy (DRE): Localized clean energy solutions will empower rural and peri-urban communities, improving access and equity.
- ✓ Green Jobs Creation: Growth in RE infrastructure and DRE solutions will generate employment opportunities across sectors.

Renewable Energy & Energy Storage Systems (RE & ESS)

Energy Storage Systems

Energy storage in the form of potential, kinetic, and chemical energy has been known to humankind for centuries. Whether in traditional water mills or modern-day industrial systems, managing intermittent, variable, or dynamic energy supply and demand has always been a challenge especially when fluctuations occur on a daily or even hourly basis. To ensure uninterrupted and reliable operations, energy systems are increasingly being integrated with suitable storage technologies. The different kind of Storage technologies are given below:

Energy Storage Technologies Overview



India's renewable energy boom **cannot succeed without large-scale energy storage**. The **Central Electricity Authority (CEA)** estimates a need for **27 GW of grid-scale battery storage (4-hour duration) by 2030** to balance intermittent solar and wind power. **Pumped Hydro:** ~4.7 GW operational (with ~37 GW under survey). **Battery Storage:** ~50 MWh deployed (mainly lithium-ion). **National Mission on Advanced Chemistry Cell (ACC) Storage** aims for **50 GWh of domestic battery manufacturing capacity**. **National Green Hydrogen Mission (2023)** targets **5 MMT annual green hydrogen production by 2030**, with storage in **ammonia (NH_3) for long-duration needs. Biomass & Bioenergy Storage:** India aims for **10 GW of biomass power by 2030**, with biogas storage for dispatchable power.

Among these, Battery Energy Storage Systems (BESS) have emerged as a scalable solution. BESS stores electrical energy in chemical form and releases it when required, allowing for peak shaving, load shifting, backup power, and renewable energy integration.

BESS is particularly vital in supporting the large-scale integration of renewable energy sources such as solar and wind, which are inherently intermittent and weather-dependent. By absorbing excess energy during periods of high generation and discharging it when generation is low or demand peaks, BESS helps maintain grid stability and energy reliability. As nations and industries transition toward clean energy and net zero goals, BESS plays a pivotal role in enabling the effective utilization and optimization of renewable energy.

Renewable Energy & Energy Storage Systems (RE & ESS)

Hindustan Petroleum Corporation Limited – Secunderabad Terminal

Achieving Net Zero Operational Carbon – 100% RE

Hindustan Petroleum Corporation Limited (HPCL) is a leading Oil and Gas company with a strong commitment to sustainability. In line with Government of India Net Zero target for 2070, a major step has been taken and HPCL Secunderabad terminal achieved India's first Net Zero Operational Facility as per CII guidelines on 15th Nov, 2024.

HPCL Secunderabad Terminal is a key storage and distribution facility in Telangana State, that handles Petroleum products. Recognizing the environmental impact of its operations, the Terminal has implemented several green initiatives to reduce its carbon footprint and achieve - **India's first Net Zero Operational Facility as per CII (Confederation of Indian Industries) guidelines.**

Primary Objectives

- Optimize Energy consumption
- Reduce Carbon emissions
- Enhance Operational efficiency
- Achieve Net Zero Operational Facility

Green Initiatives

Vapour Recovery System	Centralized Energy Monitoring	75% - Green Power Procurement	E-Vehicles & Green Belt
LEDs, Occupancy Sensors & Solar Lighting	25% power In-House Solar Plant	Biodiesel (B-100) for DG Sets	Green Gantry

Benefits Achieved

	CO_2 Reduction
252 KWp solar plant	203.35 T CO_2
8.1 Lakhs units of green power purchase	580.49 T CO_2
8.4 KL of biodiesel	22.15 T CO_2
27,000 trees onsite	356 T CO_2

Renewable Energy & Energy Storage Systems (RE & ESS)

JSW Steel Limited - Vijayanagar Works

Low operational carbon steel due to RE

The steel industry is traditionally known for its energy-intensive operations and high greenhouse gas (GHG) emissions. Unlike many other sectors where Scope 3 emissions dominate, steel manufacturers face the unique challenge of having significantly higher Scope 1 and Scope 2 emissions. As a foundational industry at the start of the supply chain, decarbonizing steel production is crucial.

Yet, JSW Steel Vijayanagar, one of India's leading steel plants, is setting an example by actively working toward its **Net Zero target of 2060** while managing these difficult emissions sources. The company has also developed granular climate action plan to reduce **carbon emission intensity by 42% in FY30 compared to 2005**. Hence, Initiatives taken for the same are given below.

Milestone 2024 - As of now, JSW meets 44% of its power demand through non-coal sources, equivalent to 443 MW. This includes:

- ✓ 225 MW Solar Power Plant
- ✓ Gas-based generation
- ✓ Waste Heat Recovery Systems (WHRS)
- ✓ Top Recovery Turbine (TRT)
- ✓ 600 MW Wind Power Plant

Renewable Energy Share

Power from Gas	•Power generation through byproduct gas
Power from WHR's & TRT's	•Power generation through WHR & use of pressure from the blast furnace top gas
Power from Solar Power Plant	•A JV project of JSW Steel & JSW Renewable Energy Limited

Milestone 2030

JSW Steel, Vijayanagar is planning to increase the share of its non-fossil renewable sources of power. Looking ahead to 2030, the company expects its power needs to rise to 2065 MW. To ensure sustainability, 72% of that energy will come from renewable sources.

Renewable Energy & Energy Storage Systems (RE & ESS)

JSW Steel Limited - Vijayanagar Works

Low operational carbon steel due to RE

New initiative by the plant: Agrivoltaics - Combining Solar Energy with Agriculture

Agrivoltaics, is an innovative approach where **solar panels are installed at elevated heights (typically 2–3 meters)**, allowing **simultaneous crop cultivation beneath or between the panel rows**. This dual-use model enables:

- **Efficient land utilization** by combining energy generation and food production on the same plot.
- **Sustainable development**, especially in land-constrained or high-energy demand areas.

GAIL (India) Limited

Identifying BEES as a key to reduce GHG Emissions

GAIL, a central public sector enterprise, embedding sustainability into its Business Strategy. Aligning with India's Net-Zero Vision, GAIL has undertaken a detailed study on science-based Net-Zero ambition and action plan. More than 10 units of GAIL are rated GreenCo out of which **3 are Platinum rated**. GAIL targets:

✓ 100% reduction in Scope 1 & 2 emissions by 2035
✓ 35% reduction in Scope 3 emissions by 2040

GAIL plans to achieve this ambitious goal through a strategic approach involving the Electrification of Natural Gas based equipment, Renewable Energy, BESS, Compressed Biogas (CBG), Energy Efficiency, Green Hydrogen, and Afforestation. **GAIL is targeting setting up 1000 MWh capacity of BESS and corresponding Renewable Energy (for BESS) capacity of 100 MW by 2035**.

Source: --: GAIL (India) Limited | Sustainability Reports:--

Energy Efficiency

Globally, energy efficiency has emerged as one of the most critical levers in the journey toward net-zero emissions.

Milestone 2030

- According to the International Energy Agency, doubling the annual rate of improvement in energy efficiency to 4% year-on-year from 2023 to 2030 is essential to keep the world on track for net-zero emissions by 2050.
- By 2030, each unit of energy should generate 40% more economic output than today.
- For emerging economies like India, energy efficiency is both a strategic and economic imperative.
- In India, the Energy Conservation (Amendment) Act of 2022 has laid the groundwork by introducing a national carbon credit trading scheme and enforcing stricter energy efficiency norms across sectors.
- India's Carbon Credit Trading Scheme (CCTS) scheme aims to reduce energy intensity in key industries by 30% by 2030.
- Energy-intensive sectors are transitioning towards high energy efficient technologies, adoption of green hydrogen, digitized operations, and recovery of waste heat, contributing significantly to India's climate commitments to achieve net-zero emissions by 2070.

Beyond 2030

- Looking beyond 2030, the global energy landscape will undergo a transformative shift toward ultra-efficiency.
- The evolution of net zero buildings, integrated with smart energy systems, on-site renewables, and energy storage will become mainstream.
- Net-zero-energy industrial processes will leverage next-generation technologies such as digital twins, quantum computing for energy modelling, and AI-optimized process control systems.
- Decentralized energy networks and peer-to-peer energy trading will further enhance energy utilization at the micro level.
- In India, the focus will pivot toward deep decarbonization of hard-to-abate sectors like cement, steel, and chemicals, aiming for at least 50% energy savings in these industries by 2050.
- With economic growth, urbanization, and digitalization continuing to rise, India's future energy ecosystem will rely heavily on frontier technologies integrated to maximize every unit of energy while minimizing emissions.

Energy Efficiency

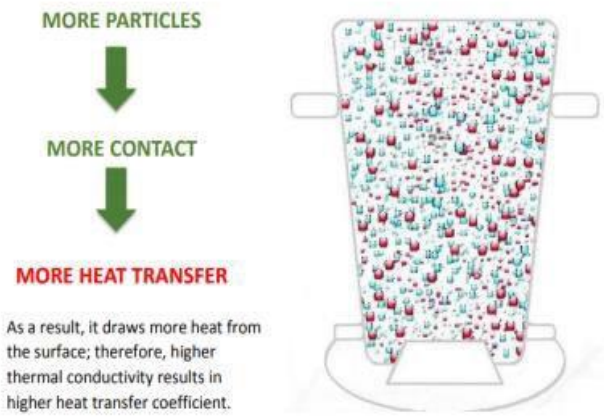
Hero MotoCorp Limited - Tirupati

Use of Hydromx Nano fluid in chiller unit

In alignment with the organization's Vision and Mission for "Sustainable Growth," a cross-functional team was formed to identify and implement energy-saving initiatives in Hero MotoCorp, Tirupati. During the evaluation phase, the Battery Pack Assembly (BPA) Chiller was identified as one of the top ten energy-intensive systems, primarily due to its 24/7 operational requirement. Following a comprehensive analysis, the implementation of "Hydromx" (nanofluid) was undertaken.

1. **Target Area** → High energy consumption in the BPA chiller due to continuous operation
2. **Objective** → Achieving a 30% reduction in energy consumption in the BPA chiller system
3. **Solution** → The potential use of Hydromx Nano fluid in the chiller unit of the BPA

Hydromx is a distinct red fluid that incorporates advanced nanoparticles. These nanoparticles enhance Hydromx heat transfer capabilities by 37.4% compared to water. Consequently, its application can yield energy savings of up to 35% in any equipment utilizing a closed-loop water circuit for heat exchange.



Benefits Achieved

	Before Implementation	After Implementation
Carbon Savings	1226 Tons of Co2 / year	1042 Tons of Co2 / year

- ✓ Achieved a reduction of 0.25 IKW/TR (Input Kilowatt per Ton of Refrigeration), resulting in annual energy savings of 1,05,000 kWh
- ✓ Lowered the chiller's water supply temperature from 8.63°C to 7.87°C, enhancing cooling performance
- ✓ The distinct red color of Hydromx enables easy detection of leaks in the chiller system, allowing for timely maintenance and reduced downtime

Energy Efficiency

TTK Prestige Limited - Hosur

Waste Heat Recovery from Air Compressors for Hot Water Generation

Key Challenge

TTK Prestige Ltd., a leading kitchen appliances manufacturer, is committed to improving energy efficiency and reducing its dependence on fossil fuels. At Hosur Unit 2, the company previously relied on diesel-fired thermic fluid heaters to produce hot water for cooker washing. This process required heating thermic fluid, which consumed significant quantities of diesel fuel. The existing method of using thermic fluid heaters was both energy-intensive and environmentally unsustainable. The system consumes 33.6 kiloliters (KL) of diesel annually, leading to high operating costs and increased greenhouse gas emissions.

Solution: Implementation of Compressor Heat Recovery System

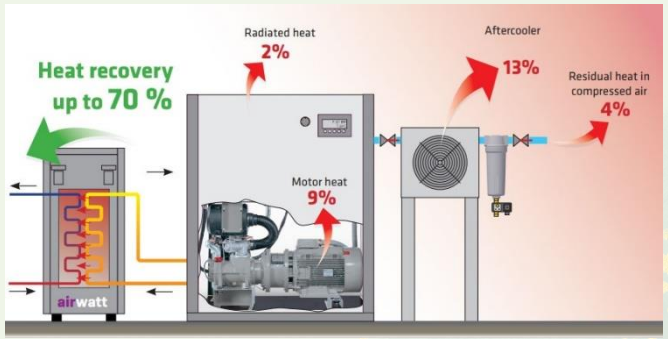
To address this, TTK Prestige Hosur Unit 2 implemented two numbers of Air Compressor Heat Recovery Systems. These systems capture and utilize the waste heat generated from 602 CFM Capacity Air compressor, which would otherwise be lost to the atmosphere.

- ✓ Investment: ₹16 Lakhs
- ✓ Technology: Heat recovery from Air compressor
- ✓ Air Compressor Oil Temperature: ~90° C
- ✓ Required Water Temperature for the Process : 45° C to 55° C

The recovered heat from the Air compressor oil is now effectively used to heat water to the required temperature range for cooker washing operations.

Benefits Realized

Parameter	Before Implementation	After Implementation
Diesel Consumption	33.6 KL / year	Eliminated
Investment	Diesel cost (~30 lakhs)	₹16 Lakhs (Expected payback - 1 year)
Environmental Impact	High CO_2 emissions from diesel (~90 tons)	Reduced carbon footprint due to fossil fuel saving

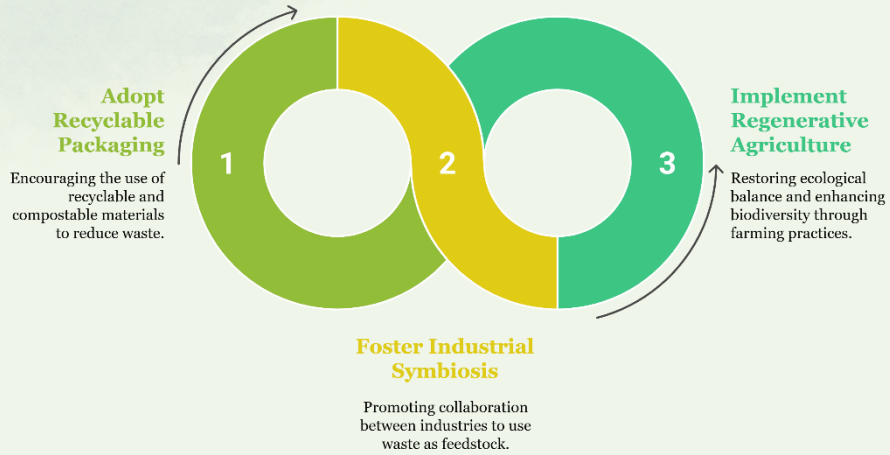


Circular Economy

Milestone 2030

The circular economy is emerging as a crucial lever in the global transition toward low-carbon, resource-efficient development. As per the Ellen MacArthur Foundation, **circular economy strategies have the potential to cut global CO_2 emissions by 39% by 2030** by rethinking the way products are designed, used, and disposed of. The key strategies' adopted globally and nationally are given below.

Global Circular Economy Strategies



Many advanced economies are embedding circularity into national legislation through waste reduction targets, eco-design standards, and incentives for reuse and repair. In India, the transition to a circular economy is gaining traction through policies like the Circular Economy Action Plan and targeted interventions in high-impact sectors such as construction, electronics, plastics, and automobiles.

Introduction of Vehicle Scrappage Policy initiative- to phase out old, polluting vehicles, and recover valuable materials like steel , aluminium, copper, and rare earth elements.

2021

2030

Goal of 30% recycled content in materials used in construction and automobiles.

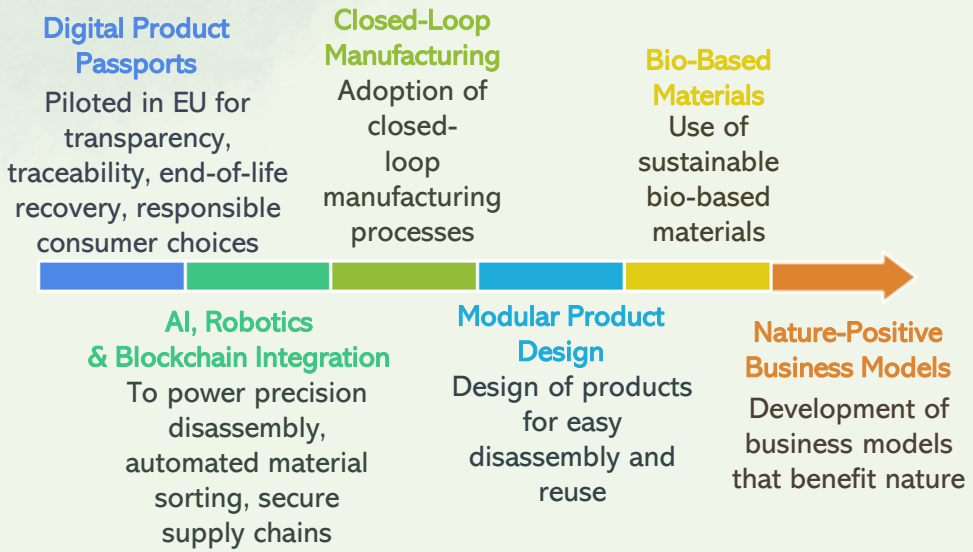
The Plastic Waste Management Rules, E-Waste Management Rules, and the Extended Producer Responsibility (EPR) framework are being actively enforced to ensure traceability and producer accountability. Importantly, India's Vehicle Scrappage Policy, introduced in 2021, is a key initiative to phase out old, polluting vehicles while recovering valuable materials like steel, aluminium, copper, and rare earth elements. This policy supports the twin goals of reducing vehicular emissions and creating a formalized vehicle recycling ecosystem, expected to generate jobs, attract investment, and reduce the dependency on imported raw materials.

Circular Economy

Beyond 2030

Beyond 2030, the circular economy will evolve into a fully digitized, regenerative system where waste is virtually eliminated, and material loops are tightly closed. AI, robotics, and blockchain will power precision disassembly, automated material sorting, and secure circular supply chains.

Future of Circular Economy



In India, the circular economy will be central to its sustainable development trajectory. By 2050, the country aims to achieve Near-Zero waste to landfill, supported by advanced EPR implementation, large-scale urban mining of legacy landfills, and the establishment of Circular Economy Zones in industrial clusters.

Manufacturing and automative sector:
The vehicle scrappage ecosystem will mature into a nationwide network of registered scrapping centers, with integration into the automotive design and manufacturing cycle to promote vehicle remanufacturing and recycled parts usage.

Construction sector:
The sector will increasingly rely on secondary raw materials like recycled concrete and fly ash-based composites.

Government-led mechanisms such as a National Circular Economy Index, digital waste registries, and carbon/resource efficiency credits could further institutionalize circular practices. Ultimately, circularity will redefine India's and the world's approach to growth- fostering economic resilience, lowering environmental footprint, and ensuring resource security for future generations.

Circular Economy

Rail Wheel Factory - Yelahanka

A Circular Economy Model in Indian Railways

Rail Wheel Factory (RWF), Yelahanka, is a premier manufacturing unit under **Indian Railways**, specializing in the production of **wheels, axles, and wheel sets** for rolling stock. Unlike conventional manufacturing plants, RWF Yelahanka operates as a **recycling hub**, utilizing **100% recycled materials** to produce high-quality wheels. By adopting a circular economy approach, the factory ensures sustainability by **repurposing end-of-life rails, wheels, and axles** into cast wheel manufacturing, minimizing waste and environmental impact.

CHALLENGES

- **Eliminating dependency on virgin steel** by using only recycled scrap
- **Reducing foundry waste** through sand reclamation
- **Minimizing carbon footprint** by cutting down transportation and mining needs of fresh sand

OBEJCTIVES

- **100% Utilization of Recycled Scrap** – Convert end-of-life rails, wheels, axles and Pandrol clips into new products
- **Sand Reclamation & Reuse** – Reduce dependency on fresh sand by reclaiming **90% of foundry sand**
- **Waste Minimization** – Avoid landfill dumping of used materials and foundry waste
- **Cost & Energy Efficiency** – Lower procurement and transportation costs while reducing carbon emissions

SOLUTIONS IMPLEMENTED:

Closed-Loop Recycling of Wheels & Axles

- Used Wheels, Axles, Wheelsets, Rails and Pandrol clips from across India are collected and brought back to RWF.
- They are cut, melted, and recast into new Wheels.

Sand Reclamation System

- **90% of foundry sand is recycled daily** (~25-28 MT/day).

Use of Process Scraps

- Axle end cuts, risers, turnings, and borings—by-products of the axle manufacturing process are reused in cast wheel production.
- Ensures **zero waste** in the manufacturing cycle.

Circular Economy

Rail Wheel Factory - Yelahanka

A Circular Economy Model in Indian Railways

Benefits Achieved:

1. **Environmental Benefits :**

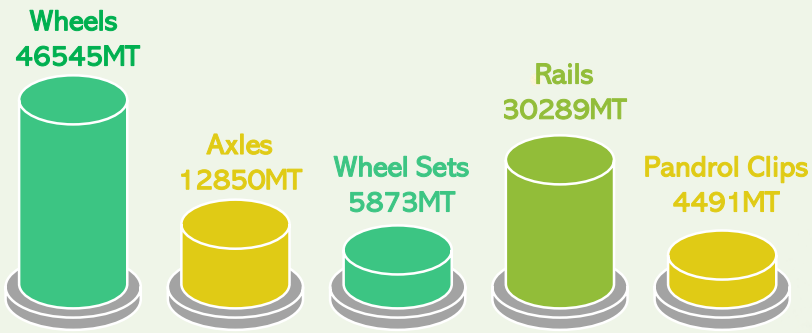
- ✓ **Reduced Mining Dependency** – No virgin steel used; only recycled scrap utilised.
- ✓ **Lower Carbon Footprint** – Less transportation and processing emissions.
- ✓ **Waste Minimization** – 90% sand reclamation prevents landfill pollution.
- ✓ **Avoided thousands of tons of mining waste** by using recycled steel.
- ✓ **Saved ~25-28 MT of sand daily** from being discarded.

	Wheels	Axles	Total
Quantity (MT)	46,545	12,850	59,395
Virgin Steel Emissions (tCO_2e)	97,744.5	26,985.0	124,729.5
Recycled Steel Emissions (tCO_2e)	41,890.5	11,565.0	53,455.5
Emissions Saved (tCO_2e)	55,854.0	15,420.0	71,274.0

Benefits Achieved:

2. **Social & Economic Benefits:** The initiative led to reduced expenditure on fresh sand and raw materials, along with less reliance on external suppliers. It sets a benchmark within Indian Railways and aligns with global ESG (Environmental, Social, and Governance) goals.

Materials Processed in Closed-Loop Recycling (2023-24):



RWF Yelahanka has successfully established itself as a **model recycling unit** within Indian Railways, demonstrating how **circular economy principles** can be integrated into heavy industry. By **repurposing 100% scrap metal** and **reclaiming 90% of foundry sand**, the factory has significantly reduced its environmental impact while maintaining high production efficiency.

Circular Economy

Sandvik Mining and Rock Technology India Pvt. Ltd. - Patancheruvu

Pioneering Circular Economy through Carbide Recycling

As a **GreenCo Gold Rated** company, Sandvik demonstrates industry leadership in sustainable manufacturing through its innovative **carbide recycling program**. Specializing in hard materials like tungsten carbide, Sandvik has implemented a **closed-loop recycling system** that transforms production waste and end-of-life drill bits into high-quality raw materials, significantly enhancing resource efficiency while reducing environmental impact.

Sandvik's **Carbide Recycling Program** focuses on:

✓ **Recovering scarce minerals** (tungsten, cobalt) from used drill bits & grinding waste
✓ **Eliminating landfill disposal** of hazardous metal powder
✓ **Reducing dependence on virgin mining** through industrial upcycling

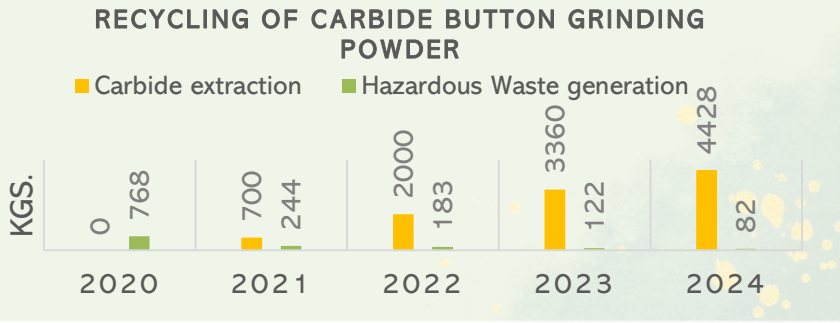
Key Initiatives

1. **Recycling Metal Powder from Button Grinding**
   - ✓ As on 2025, previously treated as hazardous waste, now **100% recycled**
   - ✓ Sent to Maharashtra plant for refining & reuse in new carbide products
2. **Drill Bit Take-Back Program**
   - ✓ Collects end-of-life tools from customers for material recovery
   - ✓ Processes scrap carbide into premium-grade raw material
3. **Sustainable Re-Manufacturing**
   - ✓ Recycled carbide used in new drill bits & cutting inserts

Ensures same quality as virgin materials

Benefits Achieved

Metric	Result
Energy Consumption	↓ 70% vs. virgin mining
GHG Emissions	↓ 40% carbon footprint
Recycling Rate (2024)	↑ 600% vs. 2021
Landfill Diversion	100% hazardous waste eliminated



Decarbonization of the value chain

Companies are substantially making progress in reducing Scope 1 and Scope 2 emissions, those that fall within their direct operational control. However, the more significant and complex challenge lies in addressing Scope 3 emissions. These indirect emissions, which span the entire value chain, are generally the most substantial component of a company's overall emissions profile. As such, they represent a critical determinant in the broader pursuit of net zero.

With 2030 identified as a critical milestone on the path to global decarbonization, companies must now shift their focus from strategy development to tangible implementation. This transition is especially urgent in addressing Scope 3 emissions, without a clear and actionable roadmap to reduce these indirect emissions, achieving net zero targets by 2050 or 2070 will remain out of reach. To meaningfully curb Scope 3 emissions, companies must concentrate their efforts across three key pillars: product design, collaboration with suppliers and customers, and transportation measures.

Milestone 2030

Beyond 2030

Product Design: Building for Low Carbon Impact

Companies must embed sustainability into the early stages of product development. This includes:

- Selecting low-carbon materials
- Designing for circularity (reuse, recycling, refurbishment)
- Decreasing virgin material
- Minimizing resource intensity throughout the lifecycle

Tools such as life cycle assessment (LCA) should be standard practice by 2030 to evaluate emissions at each stage of design decision point.

After 2030, companies must shift from pilot projects to full-scale adoption of zero-carbon and circular products. Design for remanufacturing should be the focus, enabling high-value reuse of components in new products.

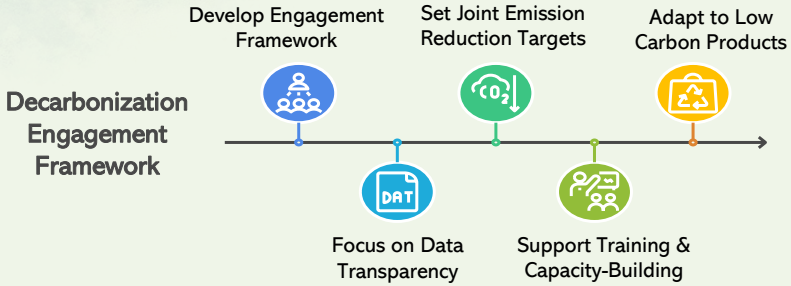
Establish closed-loop supply chains, where take-back systems are supported by reverse logistics and industrial recycling partnerships. Businesses will need to innovate continuously and maintain cradle-to-cradle accountability, where products return to the supply chain with minimal environmental impact.

Decarbonization of the value chain

Milestone 2030

Collaboration with Suppliers and Customers: Enabling Shared Accountability

Companies must develop strong engagement frameworks with suppliers, setting joint emission reduction targets, for decarbonization (e.g., renewable energy transitions, energy efficiency upgrades). For customers, this period is about education and adapting to only low carbon products.



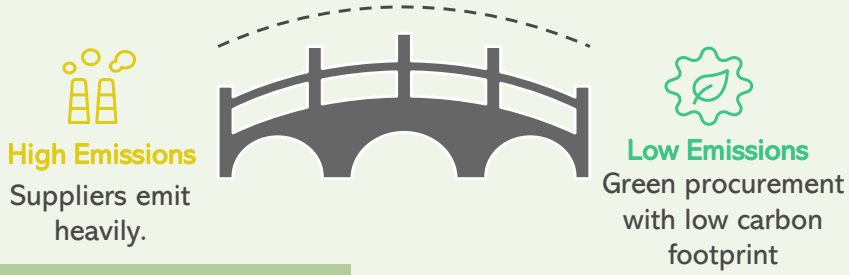
Transportation and Logistics: Greening the Flow of Goods

Optimizing logistics through route efficiency, modal shifts (e.g., from air to rail), and load optimization can lead to immediate reductions. Companies should invest in low-emission transportation fleets and work with logistics providers who commit to emission-reduction targets. Electrification of last-mile delivery and supply chain digitization are crucial

Beyond 2030

Collaboration with Suppliers and Customers: Enabling Shared Accountability

Collaboration must evolve into a fully integrated value chain ecosystem where decarbonization is a shared goal. Supplier performance on emissions will likely become a key criterion for procurement, and customer usage patterns may be influenced by smart product ecosystems that track and optimize carbon performance in real-time.



Transportation and Logistics: Greening the Flow of Goods

The large-scale adoption of zero-emission logistics technologies such as hydrogen-powered trucks and electric heavy-duty vehicles will be essential. To support this transition, robust charging and refueling infrastructure must also be fully developed and integrated across key transport routes. In parallel, companies should work toward establishing climate-neutral logistics networks and increasingly prioritize local sourcing strategies to minimize overall transportation needs.

Decarbonizing the value chain

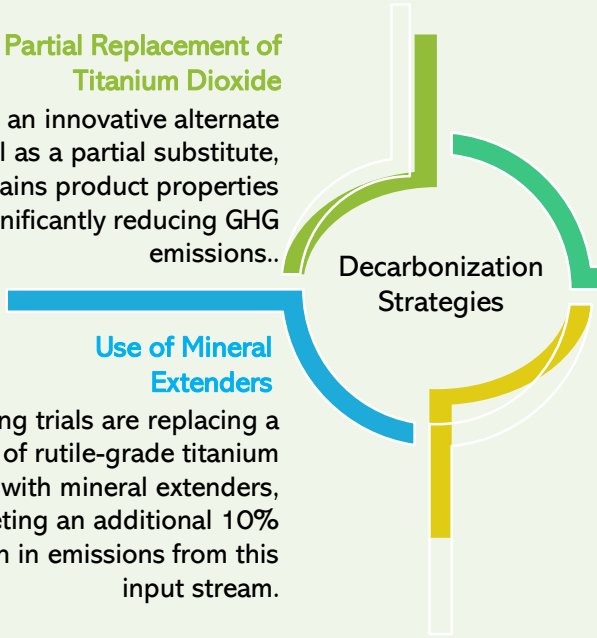
Nippon Paint - Sriperumbudur

Reducing Raw Material Impact through LCA

As part of its long-term sustainability vision of Net Zero 2050, Nippon Paint's Sriperumbudur unit has undertaken focused initiatives to reduce emissions embedded in the raw material supply chain. The company is proactively addressing upstream emissions, which are often the most significant and most difficult to mitigate category in the lifecycle of paint products. A detailed Life Cycle Assessment (LCA) conducted at the Sriperumbudur facility revealed that approximately **90%** of the total greenhouse gas (GHG) **emissions associated with major products arise from the raw material production stage.**

Two key raw materials were identified as primary contributors:

- ✓ **Titanium dioxide** – the largest single emitter, due to its highly energy-intensive calcination process, operating at temperatures up to 1600°C
- ✓ **Acrylic polymer mixtures** – another significant contributor due to their petrochemical base and associated carbon intensity



Partial Replacement of Titanium Dioxide

Introduced an innovative alternate raw material as a partial substitute, which maintains product properties while significantly reducing GHG emissions..

Use of Mineral Extenders

Ongoing trials are replacing a portion of rutile-grade titanium dioxide with mineral extenders, targeting an additional 10% reduction in emissions from this input stream.

Biomass-Based Acrylic Emulsions

Parallel efforts are underway to reformulate acrylic emulsions using biomass-based feedstocks:
These emulsions replace fossil-derived inputs (such as crude oil or natural gas) with renewable, bio-based materials.

Advanced coating solution for repainting projects

In collaboration with NIPSEA Technologies, 'Swift Unicoat', a single-coat interior emulsion has been launched. This innovative product eliminates the need for the traditional 1 coat of primer plus 2 coats of topcoat, delivering the same performance in just one coat. Additionally, it is packaged in tin containers instead of conventional plastic pails.

Decarbonizing the value chain

Tata Motors Limited

Product Design - Lightweight Eco-friendly Banana Fiber Composite Felt for Automotive Parts

Tata Motors Ltd., a leader in India's automotive sector, has embraced sustainability through innovative product design. Under the TATA Group level project Alingana through Circular Economies initiative, they have explored various approaches. By adopting the GreenCo rating system and implementing green manufacturing practices, the company is exploring various ways to increase use of Eco-Friendly materials in their product. 7 of its units are GreenCo Rated and its Pantnagar Plant has received the Platinum+ rating. Company also focuses on weight reduction, paint elimination, use of recycled materials etc. The current study is on company's initiative on exploring use of Banana Fiber composites in automotive components. The target was to make it: Eco-friendly, lightweight; less synthetics and cost-efficient.

Innovative Solution: Banana Fiber Composite Felt

Kalpataru (Tata Motors' initiative) developed a patented process to transform banana pseudostems, traditionally burned as farm waste into high-performance automotive materials.

Expected positive impact on -

Aspect	Achievement
Environmental	➢ Prevents pollution caused due to farm waste burning & converting waste into valuable materials. ➢ 35% weight reduction & equivalent performance

Key Breakthroughs	
Material Composition	➢ 65% Banana stem fibers + 35% Polypropylene fibers
Performance Validation	➢ Meets all **critical durability tests** for automotive applications ➢ **Expected Weight reduction** ~ 1.4 kg against 2.25 kg (e.g parcel shelves) ➢ **Thermal & acoustic resistance** comparable to conventional materials
Manufacturing Readiness	➢ Compatible with **existing tooling & production processes** ➢ Developed **automated fiber extraction** process to enable industrial-scale use
Future Readiness	➢ Targeted areas – Roof Liners & Parcel Sheves ➢ Scale up 100% Banana Fibre based composites ➢ Exploring blending with new agricultural waste-based fibres

Decarbonizing the value chain

Godrej Enterprises Group

Integrating 'GreenCo' for a Decarbonized Supply-chain

ABOUT THE GROUP: Godrej Enterprises Divisions have adopted the 'GreenCo Rating System', as a strategic tool to advance their environmental sustainability objectives in Manufacturing. Pertinent to mention, Godrej's Appliance plant at **Shirwal was the 1st Manufacturing facility in India to receive CII's GreenCo Platinum** Rating.

GreenCo Certification
15 manufacturing units certified overall

Platinum Rating
5 manufacturing units achieved platinum status

Platinum Plus
3 units elevated to highest certification

WHAT NEXT?
It is not enough to just make the impact within the confines of your own premises, more so when the **supply-chain constitutes the large part of the carbon footprint** of any organization. Recognizing this aspect, Godrej embarked on a very focused Strategy to Sensitize, Educate, Handhold and Onboard, all their key suppliers who constitute bulk of their buy value.

CHAIRMAN'S COMMITMENT
In alignment with the chairman's vision which manifest in their company's 'Good & Green' targets. For sourcing in particular, the endeavor is to ensure **80% of their buy value comes from a Green supply-chain, by 2032.**

CHALLENGES

- ✓ Lack of familiarity - sustainability frameworks
- ✓ Limited financial resources
- ✓ Constrained manpower

SOLUTION – SUPPLIER COLLABORATION

1. Sensitize & Educate
Godrej is building awareness and knowledge around sustainability frameworks

2. Handhold & Support by Godrej
Technical learning modules & knowledge - sharing sessions and dedicated resources

3. Cluster Methodology
Facilitating cross-learning among supplier groups with CII and Godrej mentors

4. GreenCo Certification
Guiding 145+ suppliers towards GreenCo certification

Decarbonizing the value chain

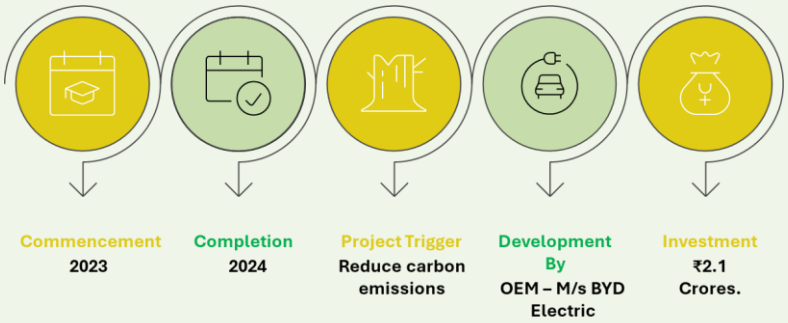
Sagar Cements Limited, Grinding Unit, Bayyavaram

EV Integration in Downstream Transportation

Sagar Cements Limited (SCL) has demonstrated excellent leadership in sustainable business practices by becoming the **first Indian cement company with approved Science Based Targets initiative (SBTi) targets** for achieving net-zero emissions. As part of its sustainability roadmap, SCL has pledged to reduce its gross Scope 1 and 2 greenhouse gas (GHG) emissions by 18.8% per ton of cementitious product by 2030, using FY 2023–24 as the base year. This target aligns with global climate goals and underscores SCL's commitment to responsible manufacturing and a greener future. SCL's Bayyavaram unit, a GreenCo Platinum-rated facility, is at the forefront of the company's climate action strategy. The unit's latest initiative involves the **deployment of two electric trucks into its transport fleet as pilot project,** a strategic move to reduce carbon emissions in logistics, which aligns with SCL's net-zero pathway.

These electric vehicles are dedicated to transporting slag and cement from the Bayyavaram plant to Visakhapatnam and nearby areas including Steel Plant, Madhurawada, Pendurthi, Auto Nagar, and Bhima's Yard - all within a 150 km radius. Over the project period, the two EVs completed 38527 kilometers of operation and made 351 and 348 trips, respectively.

Project Details



Impact Summary:

- Power Consumed: 74,830 kWh
- Total Trips Made: 699
- Carbon Emissions Avoided: 21.03 tons of CO_2
- Material Transported: Cement and slag (Net load: 38 tonnes per vehicle)

Decarbonizing the value chain

Rane (Madras) Limited - SLD, Mysuru

Reducing Supply Chain Emissions through Green Transportation Initiatives

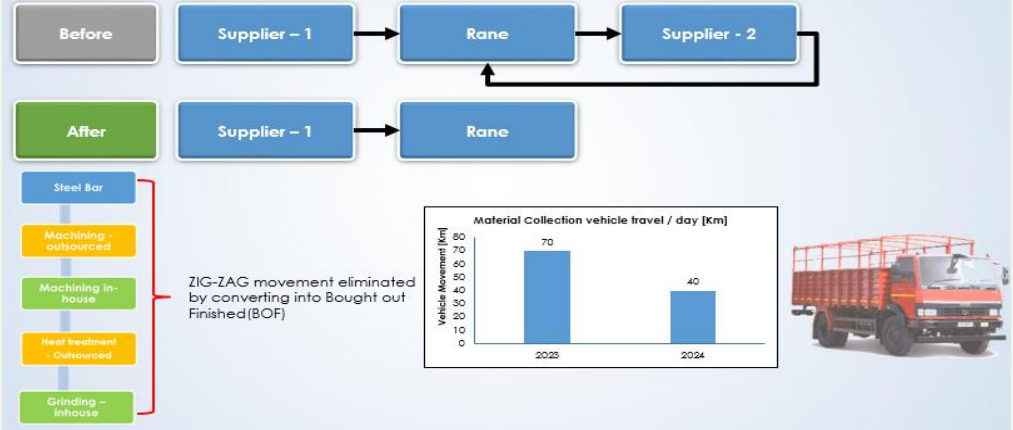
Rane (Madras) Limited (RML), a leading manufacturer of steering and suspension systems for the automotive industry, has implemented targeted initiatives at its plant facilities to reduce carbon emissions across its supply chain, with a particular focus on transportation.

1. Optimizing Vendor Transportation

In Lean Management, the Product Travelling Metric (in kilograms) within a value stream is used to quantify and evaluate the movement of physical products or materials through various stages of a process. This metric helps identify waste, especially transportation waste, which does not add value to the product.

Previously, manufacturing at the Mysuru plant involved machining of sockets and ball pins at different locations. The complete value stream was mapped using the Product Travelling Metric, which revealed a high value due to multiple vehicle trips required to transfer materials.

As part of lean manufacturing, the process flow was streamlined to eliminate unnecessary trips. This reduced reliance on external vendors and eliminated the repetitive back-and-forth movement of steel bars between processing sites.



Improvements			
Metric	**Before (2023)**	**After (2024)**	**% Reduction**
Product Travelling Metric	-	↓ 43%	43% ↓
Transport Trips / Month	62 trips	48 trips	22% ↓
Avg. Vehicle Distance / Day	90 km	40 km	56% ↓

Decarbonizing the value chain

Rane (Madras) Limited - SLD, Mysuru

Reducing Supply Chain Emissions through Green Transportation Initiatives

2. Trip optimization through GPS and Freight Management

A key challenge in logistics was the inefficient routing, leading to increased fuel consumption and emissions. RML implemented the following actions:

GPS devices

GPS devices are installed in vehicles.

Digital tracking system

Accessible via web and mobile, enabling real-time route optimization.

Freight Management System

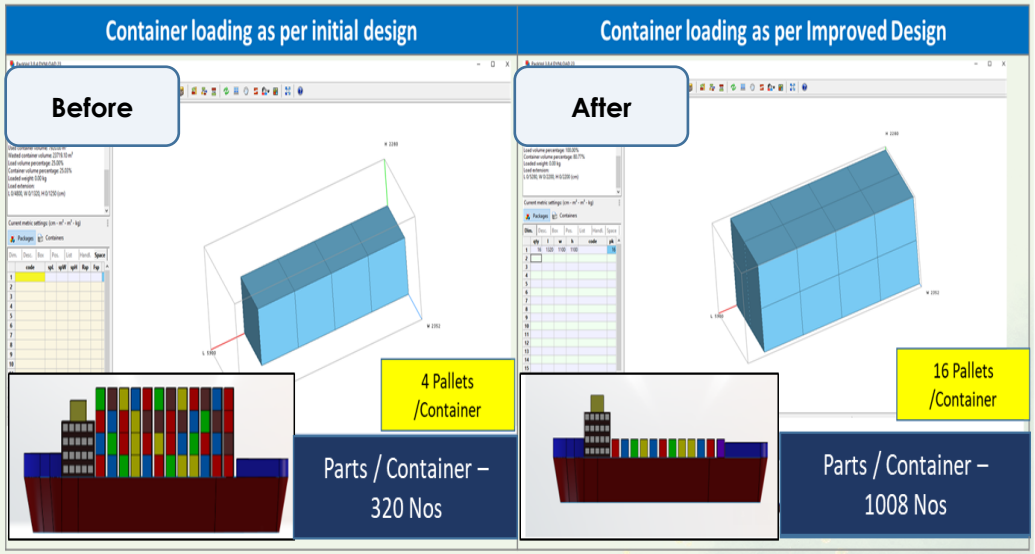
Improves vehicle routing and performance in-house.

These measures enhanced route efficiency, reducing travel distances and fuel consumption, minimized emissions, and lowered overall logistics costs.

3. Improving Container Volumetric Efficiency

Packaging strategy was redesigned using the 3C concept (Cube, Content, Curb) to maximize packaging density within containers. This optimization improved the volumetric efficiency from 25% to 84%, significantly lowering the number of containers required for transportation.

✓ **800 tonnes of CO_2 were reduced.**

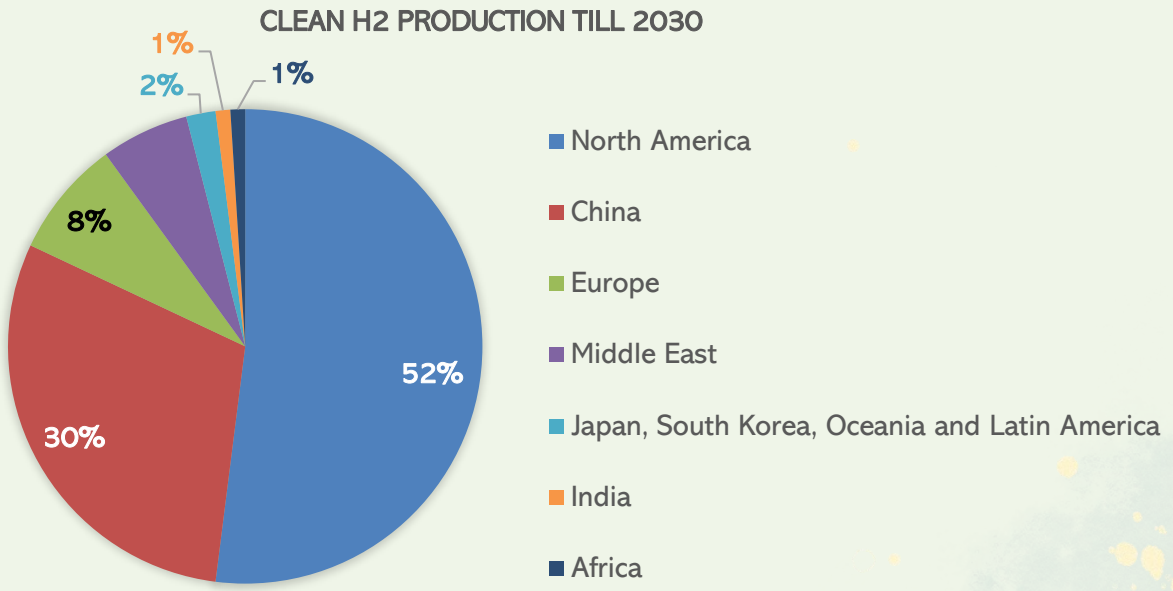


H_2 *Green Hydrogen*

Green hydrogen refers to hydrogen produced through zero or low-carbon processes using renewable energy sources, through processes like electrolysis, biomass gasification, solar thermal conversion, and steam reforming. It also includes hydrogen generated using stored renewable electricity. As per the Ministry of New and Renewable Energy (MNRE), green hydrogen must meet a "Well-to-Gate" emission limit of 2 kg CO_2e/kg H_2, including emissions from water treatment, electrolysis, purification, drying, and compression. Green Hydrogen is vital for decarbonizing hard-to-electrify sectors. It can replace fossil fuels in sectors like steel, cement, aluminium, and glass production. It can offer low-carbon alternative for heavy-duty vehicles, aviation, and shipping where battery solutions are less feasible. It can also substitute natural gas in power generation and support heating applications where electrification is not viable.

Milestone 2030

Global hydrogen production reached 97 million tonnes (Mt) in 2023, but less than 1% was low emission. However, based on announced projects, low-emission hydrogen could reach 49 Mt annually by 2030. Electrolyser capacity also grew to 1.4 GW in 2023, with manufacturing expected to scale from the current 2-4 GW per year to over 200 GW by 2030. Although green hydrogen remains 1.5 to 6 times more expensive than fossil-based alternatives, its impact on end-product pricing remains minimal, e.g., in electric vehicles made with green steel.



Source: Hydrogen Insights September 2023

H_2 Green Hydrogen

Green Hydrogen in India

In India, the National Green Hydrogen Mission (NGHM), launched in 2023 with an outlay of ₹19,744 crore from FY2023-24 to FY2029-30, aims to establish the country as a global hub for green hydrogen. The mission targets 5 Mt of annual green hydrogen production, 125 GW of supporting renewable energy capacity, and abatement of 50 Million tons CO_2 per year.

Several major public and private sector entities including NTPC, IOCL, BPCL, CIL, Adani, GAIL, and ReNew Power are investing in green hydrogen infrastructure, mobility applications, and clean fuel projects. Hydrogen-powered truck trials are underway, and dedicated R&D is being promoted through initiatives such as the IIPE's ₹150 crore hydrogen research park and MNRE's innovation guidelines. International partnerships, such as the ₹10,000 crore green hydrogen and ammonia facility being developed in Andhra Pradesh by Juno Joule and Germany's Select Energy, further highlight India's global engagement.

Policy support includes ₹600 crore allocated in the Union Budget 2024–25 and financial incentives under the SIGHT (Strategic Interventions for Green Hydrogen Transition) programme, which has earmarked ₹17,490 crore to support electrolyser manufacturing and hydrogen production. Recent awards include ₹2,220 crore for 1,500 MW of electrolyser capacity, ₹2,239 crore for 450,000 TPA hydrogen production, and ₹454 crore for pilot projects in the steel sector.

Despite this momentum, challenges including high production costs, water and infrastructure constraints, and the need for clearer regulations and greater private sector participation needs to be addressed to meet 2030 targets.

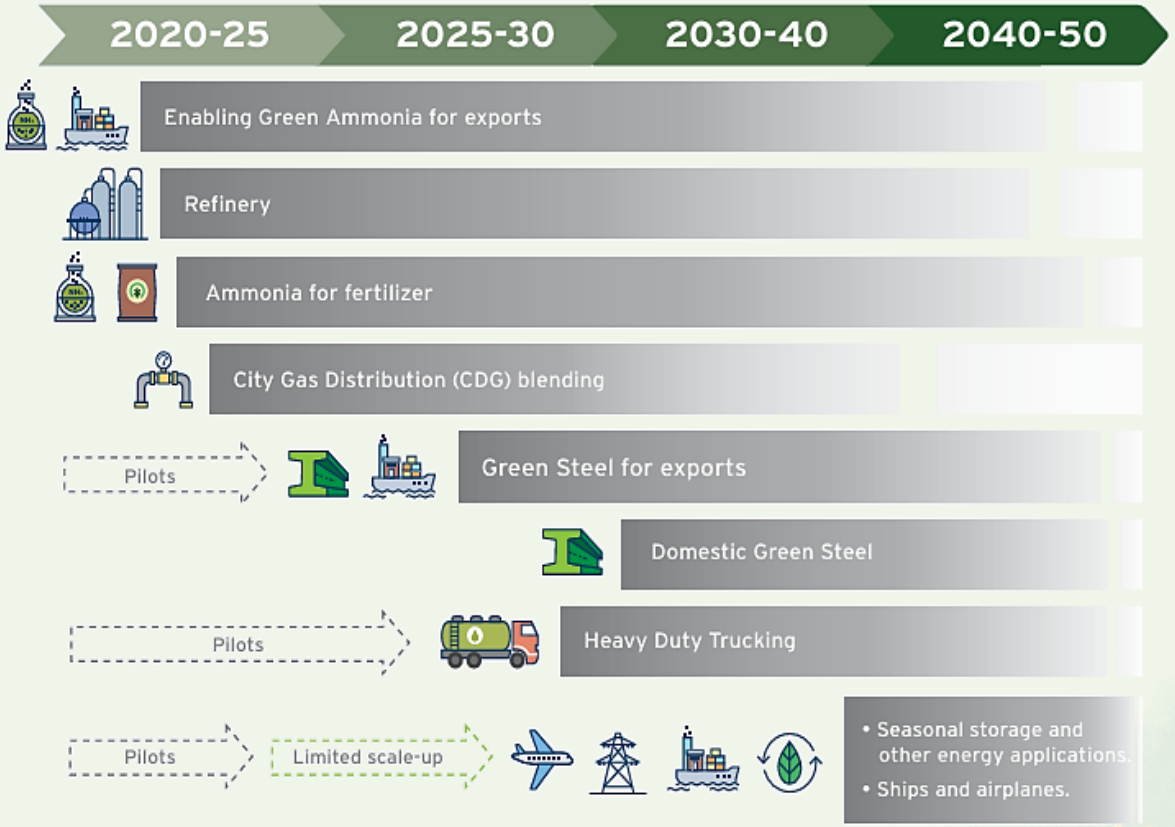
Source: https://mnre.gov.in/en/national-green-hydrogen-mission/

H_2 Green Hydrogen

Beyond 2030

Green hydrogen is expected to become increasingly cost-competitive beyond 2030, driven by technological maturity, supply chain scale-up, and global market integration. It will play a critical role in decarbonizing hard-to-abate sectors such as international shipping, aviation, long-duration energy storage, and green chemicals.

India's long-term strategy, guided by the National Green Hydrogen Mission and NITI Aayog's roadmap, envisions large-scale deployment across domestic and export-oriented applications. This includes scaling up pilots in green steel production, heavy-duty transport, seasonal storage, and hydrogen use in maritime and aviation sectors. Ongoing R&D, supported by international collaboration, will be essential to advancing production efficiency, storage solutions, and emerging hydrogen-based fuels, positioning India as a key player in the global green hydrogen economy.



National Green Hydrogen Roadmap – Source: NITI Ayog

H_2 *Green Hydrogen*

KNAUF INDIA PRIVATE LIMITED - SRICITY

In-house Green Hydrogen Production - SoHHyTec

Knauf, a leading provider of drywall and ceiling solutions, brings decades of expertise in delivering sustainable building systems. Their solutions are designed to offer fire resistance, boost energy efficiency, enhance acoustic performance, and contribute to visually appealing interior environments.

Knauf, with a global presence of over 300 manufacturing facilities, relies heavily on thermal energy, **accounting for more than 90% of the total energy** used in gypsum board production. The company is committed to sustainability, **aiming to reduce its CO_2 emissions by 50% by 2032 and reach net-zero carbon emissions by 2045.**

Green Hydrogen Initiative:

Knauf India's Sricity facility, is currently operating at the lowest specific energy consumption benchmark among its regional peers. In its early operational phase, the plant relied on Liquefied Natural Gas (LNG), a cleaner, low-carbon alternative to meet its thermal energy requirements. In line with Knauf's global ambition to achieve net-zero emissions by 2045, the Sricity unit has taken proactive steps to explore next-generation clean energy solutions. SoHHytec, is a Swiss-based company known for its revolutionary solar hydrogen production technology. SoHHytec's ARB system - a patented, photoelectrochemical technology uses concentrated solar irradiation to generate green hydrogen efficiently, mimicking the process of photosynthesis.

- **ARB Technology**: Solar Hydrogen Production system that generates hydrogen using solar energy
- Feasibility study by SoHHytec

Feasibility study has found that solar irradiation-based Technology can deliver at a Life cycle cost of hydrogen at <5 USD/Kg-H2

- ✓ **Scale**: Project with 50 ARBs to produce 500 kg/day of H2
- ✓ **Space Requirements:** 40m2 / ARB's

H_2 Green Hydrogen

Integral Coach Factory - Chennai

India's First Hydrogen-Powered Train

Indian Railways has actively adopted the GreenCo rating system to drive sustainability across its operations, with 113 units rated, including 6 Platinum and 37 Gold rated facilities. Among these, the Integral Coach Factory (ICF) in Chennai, a premier coach manufacturing unit established in 1955, stands out as a GreenCo Gold-rated unit and is now pursuing certification for the third consecutive time- a testament to its sustained environmental leadership. ICF has achieved carbon-negative status, becoming the first railway production unit to fully offset its industrial emissions. Reinforcing its sustainability leadership, ICF is developing **India's first hydrogen-powered train**, advancing the nation's **net-zero 2030** goals.

Retrofitting Innovation:

Prototype hydrogen train created by retrofitting existing Diesel Electric Multiple Units (DEMUs) with hydrogen fuel cells, onboard hydrogen storage, and distributed power systems, ensuring efficient energy use and balanced weight distribution.

Green Hydrogen Ecosystem:

Production: A 1 MW electrolyzer plant in Jhajjar, Haryana, generating ~420-430 kg of green hydrogen per day

Refueling: Dedicated refueling system in Jind, Haryana, with 3,000 kg hydrogen storage capacity

Performance Specifications:

Power: 1200 HP- almost twice the average power of similar global hydrogen trains

Speed: Designed for 110 km/h

Capacity: 8 passenger coaches (2500+ passengers) and 2 hydrogen storage coaches.

Key Benefits

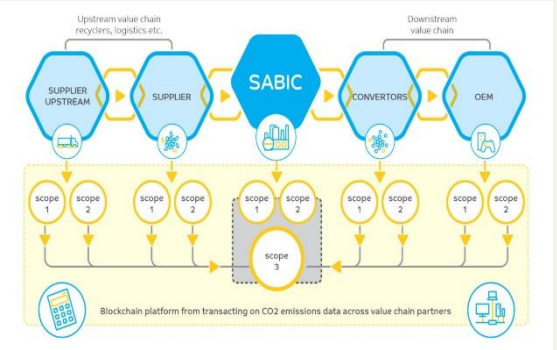
- ✓ Zero Tailpipe Emissions: Replaces diesel engines, eliminating GHG emissions
- ✓ Supports Indian railways' decarbonization journey
- ✓ ₹2,800 crore committed to rolling out 35 hydrogen-powered trains, strengthening green transport infrastructure.

Sources: Wikipedia, The Hindu, ETManufacturing.in, greenhydrogenindia.com, ETinfra.com, ETEnergyworld.com, DD news, dtnext, Timesbull, AdvanceH2,

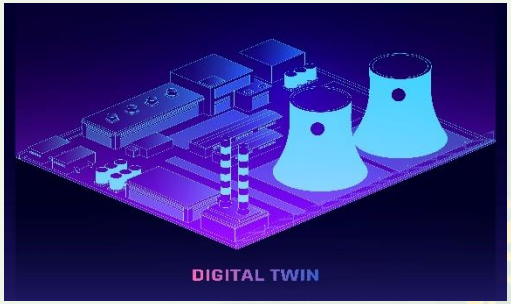
Digital Infrastructure

Digital infrastructure - including Industrial IoT, Online Monitoring Systems (OMS), Digital Twins, AI, and Blockchain, is a critical enabler of the global transition to net zero carbon. These technologies provide the intelligence, transparency, and automation needed to decarbonize operations, industries, and entire systems. The key pillars include - Industrial IoT and OMS (Online Monitoring System), Artificial Intelligence (AI), Digital Twins and Blockchain.

	Description	Examples
Industrial IoT and OMS	Industrial IoT refers to the use of internet-connected sensors, devices, and systems in industrial settings to monitor, collect, and analyze real-time data. Online Monitoring Systems (OMS) are platforms that track parameters like energy use, emissions, and equipment performance continuously.	A cement plant uses industrial IoT-based OMS to monitor CO_2 emissions from kilns in real time and optimize fuel mix.
Artificial Intelligence	AI involves machines and algorithms that can learn from data, recognize patterns, and make intelligent decisions. In climate contexts, AI helps in optimizing systems, predicting outcomes, and managing complex energy or environmental data.	AI is used to forecast solar and wind energy availability, improving renewable energy grid integration.
Digital Twins	Digital twins are real-time virtual models of physical assets, systems, or environments that use IoT data, AI, and analytics to simulate, monitor, and optimize performance.	A manufacturing plant uses a digital twin to test low-carbon production scenarios before implementation.
Blockchain	Blockchain is a decentralized digital ledger technology that securely records transactions in a tamper-proof way. It ensures transparency, traceability, and trust in carbon tracking and sustainability practices.	Example - A company tracks and verifies Scope 1, 2, and 3 emissions using blockchain for transparent ESG reporting.



Blockchain to trace carbon across supply chain.
Source: SABIC Uses Blockchain to Trace Carbon Footprint of Products



Digital Infrastructure

Milestone 2030 - Enabling Real-Time Efficiency and Compliance

- ✓ Industrial IoT and OMS deliver real-time data on energy use and emissions, enabling rapid interventions and accurate carbon accounting
- ✓ AI supports smart energy management, predictive maintenance, and early adoption of renewables
- ✓ Digital Twins simulate scenarios for energy savings and operational optimization without disruption
- ✓ Blockchain ensures transparency and trust in carbon tracking and supply chain sustainability
- ✓ Together, these tools drive measurable emission reductions, ensure ESG compliance, and turn sustainability into a competitive advantage

Beyond 2030 - Scaling Autonomous, Predictive, and Systemic Decarbonization

- ✓ AI-powered Digital Twins will self-optimize systems at scale—across buildings, cities, and industries, enabling autonomous emission control
- ✓ Global OMS integration with digital governance will provide planetary-scale monitoring and harmonized carbon reporting
- ✓ Blockchain platforms will support decentralized energy trading, full traceability of green fuels, and circular economy practices
- ✓ Low-carbon digital infrastructure will ensure these technologies themselves remain sustainable, maximizing net climate benefits

Tech Evolution			
Tech	**Now–2027**	**2028–2030**	**2031+**
IoT/OMS	Real-time sensing	IoT + analytics & ESG dashboards	AI-driven ops + smart grids
AI	Optimization, alerts	Scenario modeling	Autonomous net zero systems
Digital Twins	Asset-level models	Full-plant simulations	Lifecycle & Industry-scale twins
Blockchain	Pilots, tracking	Verified disclosures	Supply chain integration & carbon trading platform

Digital Infrastructure

ITC Limited PSPD, Bhadrachalam

Leading Digital Transformation with Industry 4.0

ITC PSPD began its Industry 4.0 journey in FY 18 to gain a competitive edge and achieve long-term sustainable growth. While ITC has always prioritized digital innovation, PSPD has led the way in adopting Industry 4.0, showing how a traditional, asset-heavy business can transform by becoming digital-first.

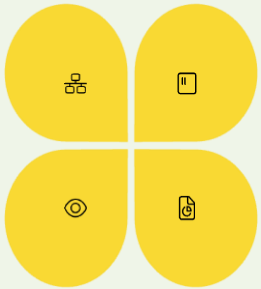
The digital transformation, formalized in FY18, was driven by a desire to improve efficiency for both people and processes. Business Excellence and Total Productive Maintenance (TPM) have always been central, with a focus on quality and productivity through data-driven initiatives. With digital and AI technologies, PSPD aims to turn data into actionable insights. Tools like image analytics and IoT have helped create and connect data sources. Applying AI to this data has improved quality and productivity.

Enterprise Data Infrastructure

Integrated Historian system connecting all manufacturing units

Industrial IoT

Smart operations and equipment monitoring systems



Deep Learning Analytics

Automated safety and quality inspections

AI/ML Algorithms

Process optimization and 'Golden Batch' creation

PSPD continues to expand its digital capabilities, including:

- Industrial IoT for smart operations and equipment monitoring
- Integrated data platforms
- AI/ML algorithms for process optimization and creating ‘Golden Batches’
- Deep learning image analytics for automated safety and quality inspections
- Robotic process automation for repetitive tasks
- AR/VR for training
- IoT-based crop monitoring and smart irrigation
- Mobile/web apps for digitizing plantation transactions
- Integrated systems for renewable energy (solar, wind, and cogeneration)
- Power BI dashboards for near real-time data involving saplings sales & distribution, Integrated systems for solar, wind and Cogen power, Power BI for near real-time dashboards, etc.

Digital Infrastructure

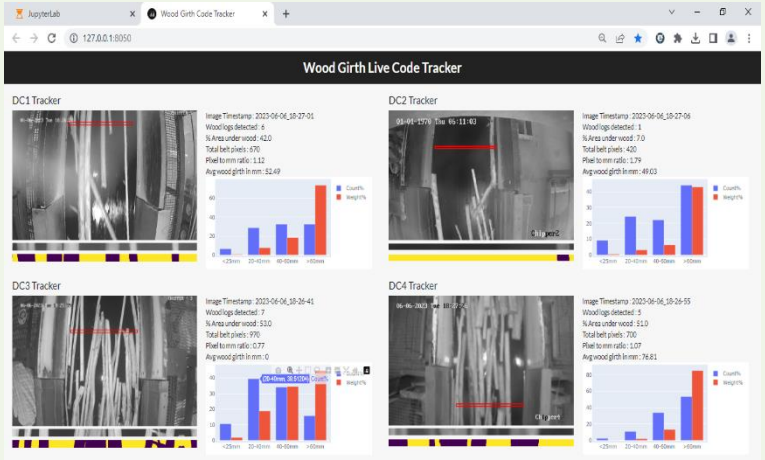
ITC Limited PSPD, Bhadrachalam

Leading Digital Transformation with Industry 4.0

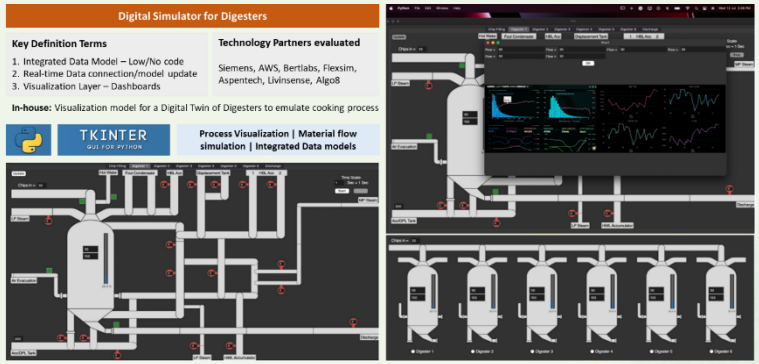
Industry 4.0 for Sustainability: Reducing Carbon Emissions

ITC PSPD is using Industry 4.0 to support sustainability and reduce carbon emissions through projects focused on:

- Advanced video and image analytics for raw material inspection, saving energy and resources
- Digital Twins for real-time simulation and process optimization, reducing waste
- Auto-ML for chemical control and improved water quality
- Machine learning for optimizing steam generation and consumption
- Power reduction projects using VFDs and motor counters
- Efficiency improvements in heat exchangers and cooling towers with real-time monitoring
- Boiler and kiln efficiency improvements via oxygen control
- Water savings through condensate reuse and recovery
- Turbine efficiency improvements through steam and power network optimization



ITC's Live Wood Girth Monitoring System

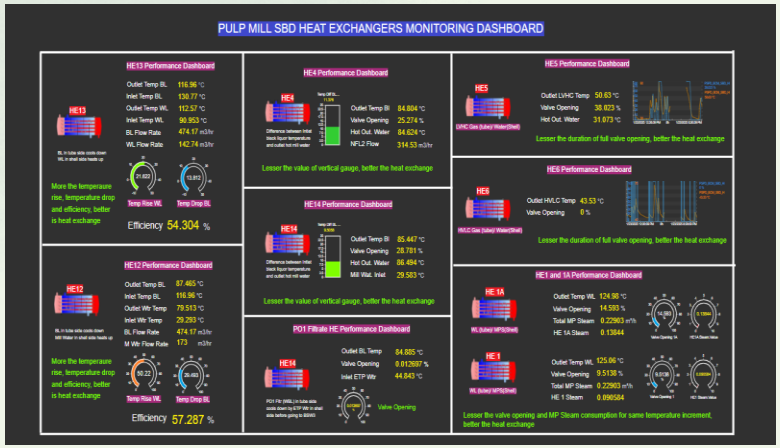


Process Digital Twin for Digesters in Pulp Mill

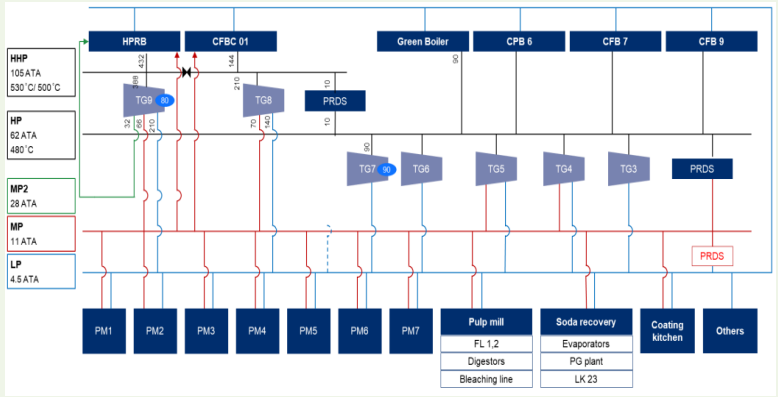
Digital Infrastructure

ITC Limited PSPD, Bhadrachalam

Leading Digital Transformation with Industry 4.0



Heat Exchanger Monitoring Dashboard for the mill



Steam and Power Distribution Network Optimization

Future Vision: End-to-End Traceability and Beyond

Farm to Factory

Mobile applications like MyTree and MyWood track raw materials from source, while satellite imagery verifies sustainable forestry practices. ITC's Live Wood Girth Monitoring System ensures optimal harvesting.

Smart Manufacturing

AI-powered process optimization creates 'Golden Batches' while minimizing waste. Digital twins simulate operations to identify efficiency opportunities across the production chain.

Supply Chain Integration

End-to-end traceability follows each product from wood harvest to final delivery, creating transparency for customers and stakeholders.

Digital Infrastructure

Vulkan Technologies Pvt Ltd - Pirangut

Enhancing Global Inspection Efficiency through Smart Glasses & Digital Tools

VULKAN Technologies Pvt. Ltd. (VULKAN INDIA), a subsidiary of the global VULKAN Group headquartered in Herne, Germany, has been a leading manufacturer in India since 2001. Headquartered in Pune, it operates state-of-the-art facilities producing advanced couplings, solder-free tube connections, and high-precision castings in steel, aluminium, and rubber for marine, energy, refrigeration, and industrial applications. With over 500 skilled employees and a strong R&D base, the company is ISO and GreenCo certified, known for its innovation, sustainability, and impactful CSR initiatives, making it a trusted partner to global industry leaders.

Target Area

Overseas inspections were time-consuming, travel heavy, and delayed project timelines.

Objective

- Enable remote, real-time inspections & approvals
- Reduce travel, inventory overhead, and move towards an Industry 4.0 facility

Solution

Vulkan Technologies adopted Smart Glasses (SMART GLASSES – Rear Wear) integrated with voice control and real-time digital access tools for conducting virtual inspections with the Vulkan Brazil team for the new Disc Coupling sub-parts and assemblies.

- ✓ The glasses allow hands-free, mistake-proof inspections supported by evidence-based documentation
- ✓ Operators can safely access systems, communicate in real-time, and respond to issues without physical paperwork
- ✓ The entire process is automated, logged, and monitored digitally reducing the need for physical presence both locally and globally

Benefits Realized

Parameter	Before	After
Overseas Travel for Inspections (Brazil)	6–8 trips/year	0 trips
CO_2 Emissions (per year)	~10.2 tCO_2e	0.3 tCO_2e
Air Travel & Logistics Costs	₹20–25 Lakhs	Negligible

- ✓ Saving 60–70% inspection time.
- ✓ Energy Efficiency: Reduced workspace utilization and HVAC load due to less on-site crowding.

Finance & Investment (F&I) Mechanisms

Finance and investment tools such as Sustainability-Linked Bonds (SLBs), Transition Bonds, and Internal Carbon Pricing (ICP) are emerging as essential levers to accelerate the transition to net zero carbon emissions by 2030 and sustain climate action beyond.

F&I Mechanisms	Definition	Example
Sustainability-Linked Bonds (SLBs)	SLBs are financial instruments where the interest rate is tied to a company's sustainability performance, based on predefined Key Performance Indicators (KPIs) such as GHG reduction or energy efficiency. If the company fails to meet its targets, it pays a higher interest rate.	A company issues an SLB linked to reducing carbon emissions by 20% by 2027. If it fails to meet the target, the coupon rate increases, raising its cost of capital. The proceeds are not tied to specific green projects but must result in measurable sustainability outcomes.
Transition Bonds	Transition Bonds raise capital for projects that help high-emission industries shift toward lower-carbon operations, even if they're not fully green yet. These bonds support realistic, science-based pathways toward long-term decarbonization.	A steel company issues a transition bond to finance the replacement of coal-fired furnaces with gas-based systems and invest in carbon capture and storage (CCS) technology. This supports a stepwise transition without requiring full net-zero alignment immediately.
Internal Carbon Pricing (ICP)	ICP is a voluntary internal mechanism where a company assigns a monetary value to its carbon emissions (e.g., ₹1,500/ton CO_2), helping to integrate climate costs into investment and operational decisions.	A company uses a shadow price of ₹1,000 per ton of CO_2 for new manufacturing facilities. This helps prioritize energy-efficient projects and avoid investments that would increase long-term carbon liabilities.
Carbon Funds (Monetary Fund for Carbon)	A **Carbon Fund** is an internal or pooled monetary reserve created by collecting fees from business units based on their emissions (through ICP) or by allocating external finance. It is used to **fund low-carbon projects** such as energy efficiency, renewable energy, or carbon offsetting.	A company charges its units ₹500 per ton of CO_2 emitted and pools this into a corporate carbon fund. The fund is then used to finance solar panels, green packaging innovation, or Scope 3 emissions reduction in the supply chain.

Finance & Investment Mechanisms

Net Zero Finance Roadmap: Strategic Tools for 2030 and Beyond

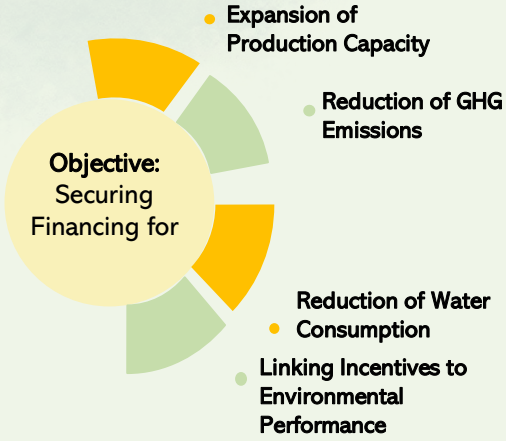
Mechanism	Pre-2030 (Laying the Foundation & Mobilizing Capital)	2030 Milestone (Integration & Maturity)	Post-2030 (Scaling & Strategic Alignment)
Sustainability-Linked Bonds (SLBs)	- Pilot SLBs with sustainability KPIs (e.g., GHG reduction, RE use).	- Link financial performance with verified sustainability outcomes.	- Fund Scope 3 decarbonization and supply chain resilience.
	- Mobilize ESG capital.	- Strengthen third-party validation to reduce greenwashing.	- Expand KPIs to include social/environmental co-benefits.
	- Build governance and KPI systems.		
Transition Bonds	- Target high-emission sectors (steel, cement, power).	- Build investor trust through credible decarbonization pathways.	- Scale for full sector transformation.
	- Fund retrofits, fuel switching, and CCUS.	- Develop sector-specific transition frameworks.	- Enable Just Transition financing and blended capital (public-private).
Internal Carbon Pricing (ICP)	- Pilot shadow pricing or internal carbon fees.	- Integrate ICP into financial models and risk assessments.	- Align with market-based carbon prices dynamically.
	- Identify carbon-intensive operations.	- Reflect policy signals (e.g., ETS, CBAM).	- Encourage innovation and climate-linked executive accountability.
	- Support low-carbon investment.		
Monetary Carbon Fund	- Establish internal fund from ICP revenue or carbon levies.	- Create fund governance structure aligned with ESG goals.	- Institutionalize climate finance.
	- Invest in RE, energy efficiency, circular pilots.	- Monitor return on sustainability investments (ROSI).	- Scale toward R&D, nature-based solutions, offsets, and innovation for net-zero outcomes.

Finance & Investment Mechanisms

JK Tyre & Industries Ltd.

Sustainability-Linked Finance

JK Tyre & Industries Ltd., a leader in India's tyre manufacturing sector, has embraced the GreenCo rating system as part of its sustainability journey. With 4 GreenCo-rated units- including 3 Platinum and 1 Gold-rated unit, JK Tyre demonstrates strong environmental leadership across its operations. To accelerate its green transition and scale operations sustainably, the company became the first in India's tyre industry to secure a $100 million Sustainability-Linked Loan (SLL) from the International Finance Corporation (IFC).



Project & Loan Structure

- $30 million to JK Tyre & Industries
- Up to $70 million to its subsidiary, Cavendish Industries Ltd (CIL)
- Linked to Sustainability Performance Targets (SPTs) with clear KPIs: 50% reduction in GHG emissions and water consumption by 2030 (from 2018 baseline)
- Manufacturing expansion projects in Banmore plant and Laksar plant

Parameter Comparison

Parameter	Before Implementation	After Implementation
GHG Emissions (Scope 1 & 2)	Baseline (2018 levels)	50% reduction
Raw Water Consumption	Baseline (2018 levels)	50% reduction
Cost of Capital	Higher (traditional loans)	Lowered via SLL performance
Debt Mix for CIL	Traditional debt	Mix of SLL with performance triggers
Tyre Production Capacity	Constrained by infra & finance	Expanded PCR and TBR

Benefits Achieved

✓ Attracted concessional capital from a development finance institution (IFC)
✓ Created a performance incentive: lower interest rates upon meeting ESG targets
✓ Enhanced brand value and investor confidence in JK Tyre's green transition

Sources:
- JK Tyre gets USD 100 mn sustainability-linked loan from IFC - The Economic Times
- JK Tyre targets 50% reduction in emissions and water use by 2030 with $100 million ESG loan, says CFO Sanjeev Aggarwal, ETCFO

Finance & Investment Mechanisms

Tata Steel Limited

Internal Carbon Pricing

Tata Steel, a leading global steel producer has long embedded sustainability into its operations. Its Jamshedpur received the GreenCo Platinum Rating. To further this commitment, the company implemented Internal Carbon Pricing (ICP) in 2015, becoming one of the first Indian industrial players to assign a financial value to carbon emissions.

Objectives

- ✓ Implement ICP to assign monetary value to carbon emissions
- ✓ Integrate carbon cost into capital decisions
- ✓ Promote low-emission technologies
- ✓ Future-proof business against carbon regulations

Benefits Achieved

- ✓ Energy Efficiency: Adoption of Top Recovery Turbines and Waste Heat Recovery Systems
- ✓ Cleaner Power: Transition from coal-fired power to by-product gas firing systems
- ✓ Reforestation in mining areas to create carbon sinks and boost biodiversity
- ✓ Trained 1,000+ personnel (executives and climate champions)

Key features of the ICP Strategy:

- ✓ Carbon Price: $15 per ton of CO_2e (implemented in 2015), modified to $40 per ton of CO_2e in 2022
- ✓ Application: CapEx decisions, supplier and customer engagement, and sustainability integration across operations
- ✓ Goal: Shift investment towards low-emission, energy-efficient technologies.

Parameter	Before ICP	After ICP
Carbon Pricing	None	$15/ton CO_2e (2015), $40/ton CO_2e (2022)
CapEx Evaluation	Financial returns only	Financial + carbon impact
CO2 Intensity-Jamshedpur	Baseline	25% reduction over 10 years
CO2 Intensity-Kalinganagar	Baseline	14% reduction since 2017
Stakeholder Engagement	Limited	Extensive climate leadership training

Sources: www.tatasteel.com, Carbon pricing leadership coalitiona

Reporting & Verification

Transparent, credible, and science-based reporting is the backbone of global climate action and a critical enabler of the Net Zero transition.

Milestone 2030

IFRS S2 Climate Disclosures for publicly listed companies

Blockchain and AI in Environmental Audits for transparency

Integration of TCFD and CDP into national policy frameworks

Third-party Net Zero Certifications

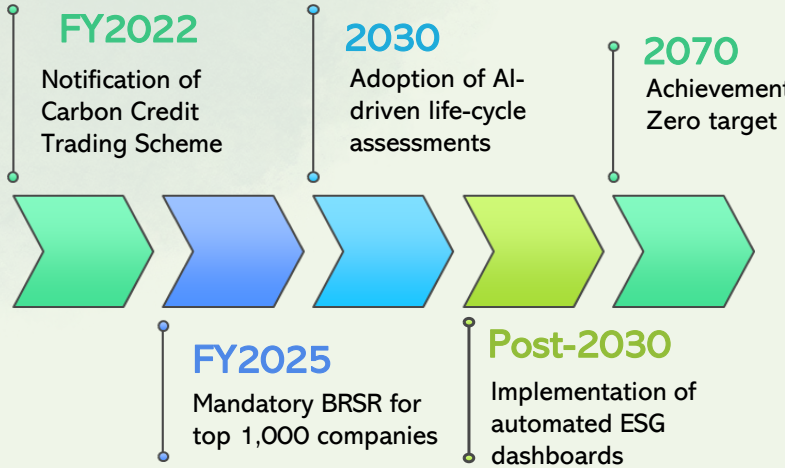
- The International Sustainability Standards Board (ISSB) introduced the IFRS S2 Climate-Related Disclosures in 2024, which mandates climate-related risk and opportunity disclosures, including Scope 1, 2, and 3 emissions, for publicly listed companies. These standards are fast becoming the global benchmark, with adoption expected in over 140 jurisdictions by 2030.
- The Task Force on Climate-related Financial Disclosures (TCFD) and CDP (formerly Carbon Disclosure Project) are being integrated into national policy frameworks, ensuring that ESG disclosures are not only voluntary but regulatory.
- To combat greenwashing, companies are increasingly adopting blockchain-enabled carbon tracking and AI-powered environmental audits, which offer real-time verification of emissions reductions, energy savings, and resource conservation.
- Certifications like Net Zero Operational Carbon, Water Neutrality, and Zero Waste to Landfill are gaining international recognition as tangible, independently verified milestones that support authentic net-zero claims. These certifications ensure companies are not merely offsetting emissions but reducing them through concrete operational changes.

Beyond 2030

Beyond 2030, the world is expected to shift toward real-time global carbon accounting systems, supported by digital MRV (Monitoring, Reporting, and Verification) platforms and satellite-based remote sensing, which will bring uniformity, comparability, and accountability to all net-zero commitments globally.

Reporting & Verification

India's Scenario



The country is rapidly advancing corporate certifications in areas like Zero Liquid Discharge (ZLD), Water Neutrality, and Zero Waste to Landfill, which are increasingly being mandated or incentivized through policy and industry coalitions such as CII-Godrej GBC. These certifications are not only being used as proof of environmental leadership but are also embedded into procurement, finance, and regulatory frameworks.

In India, robust reporting and verification systems are becoming institutionalized to support its "Net Zero by 2070" commitment.

- The Business Responsibility and Sustainability Reporting (BRSR) framework, mandatory for the top 1,000 listed companies by 2025, represents a major step in aligning India's corporate disclosures with global ESG expectations
- The Carbon Credit Trading Scheme (CCTS) has introduced a framework for carbon markets, where third-party verification ensures the authenticity of emission reductions
- By 2030, India is expected to adopt AI-driven life-cycle assessments (LCA) to provide deep environmental insights across value chains and sectors
- Post-2030, India's compliance ecosystem is likely to include automated ESG dashboards, digital twin technology for environmental modelling, and sector-specific disclosure taxonomies
- As sustainability-linked finance gains traction, verified environmental performance will become essential for access to green capital

Ultimately, robust, transparent, and third-party verified reporting mechanisms will empower Indian industries to transition credibly towards Net Zero, while meeting investor expectations, global trade norms, and national development goals.

Reporting & Verification

Hindustan Petroleum Corporation Limited

Leading the Transition to Net Zero Carbon Operations in India's Oil & Gas Sector

Hindustan Petroleum Corporation Limited (HPCL) is a Maharatna oil and gas company and a key player in India's energy sector. As part of its climate action commitments, HPCL has successfully transformed nine of its facilities into Net Zero Operational Certified (NZOC) units, as per CII (Confederation of Indian Industry) guidelines. These facilities have significantly reduced their carbon footprint through renewable energy adoption, biodiesel usage, and carbon sequestration. This third-party certification has helped the organization to track the emissions and mitigate them for a Net -zero future.

Solutions Implemented	
Scope 1 Emissions	• B100 Biodiesel in DG Sets • Solar-DG Synchronization – Integrated solar with DG
Scope 2 Emissions	• 100% Green Power Procurement • On-Site Solar Plants
Carbon Sequestration	• In-House Afforestation • External Carbon Offsetting

HPCL's Net Zero Facilities

Ghatkesar Terminal	Haldia Terminal	Kolkata Terminal
Ramagundam Depot	Sholapur IRD	Durgapur IRD
Manmad IRD	Miraj IRD	Visakh New WO Terminal

Environmental Benefits

- Avoided 5,186.57 T CO_2 through Scope 1 & 2 reduction initiatives.
- Sequestered 356+ T CO_2 via afforestation and renewable energy integration.
- **Reduced reliance on fossil fuels** by transitioning to biodiesel and solar power.

Economic Benefits

- **Lower operational costs** due to reduced diesel and electricity consumption.
- **Enhanced compliance with ESG norms**, improving sustainability ratings.

Industry Leadership

- **First Indian oil & gas company** to achieve NZOC certification for multiple facilities.
- **Demonstrated scalable decarbonization strategies** for energy-intensive industries.

Reporting & Verification

TVS Motor Company Limited

Certification as a Catalyst for Green Transformation

TVS Motor Company is a reputed two-wheeler and three-wheeler manufacturer globally, championing progress through Sustainable Mobility with state-of-the-art manufacturing facilities in India and Indonesia. By embedding sustainability into its core strategy through decarbonization, water conservation, waste elimination, and a bold shift toward electric mobility. TVS has emerged as a global leader in sustainability. All three Indian units have initiated their GreenCo Certification journey and are now progressing towards GreenCo Rating, with the Mysore unit already achieving a GreenCo Gold rating.

A key enabler of this transformation has been the company's adoption of **credible sustainability certifications**, which provide a transparent and standardized framework for measuring, verifying, and reporting its environmental performance.

Role of Certifications in Driving Sustainability

TVS Motor Company has strategically adopted several **CII GreenCo** frameworks and **international standards** to benchmark and validate its environmental actions:

✅ **CII GreenCo Net Zero Certification** for **water and waste management**, ensuring the company tracks and verifies its progress toward zero environmental impact.

✅ **GreenCo-rated manufacturing plants** integrate sustainability into operations, across parameters such as energy efficiency, water use, and material conservation.

✅ **ISO IWA 42:2022-aligned Net Zero strategy**, placing the company on a **1.5°C-aligned decarbonization pathway**.

✅ **GHG Protocol-compliant emissions accounting** covering **Scope 1, 2, and 3**, which brings global consistency to how emissions are measured and reported.

These certifications ensure **data integrity**, enhance **stakeholder trust**, and establish robust **internal monitoring systems**, making sustainability efforts both **accountable and scalable**.

Reporting & Verification

TVS Motor Company Limited

Certification as a Catalyst for Green Transformation

Sustainability Framework in Action

TVS has turned these certifications into actionable strategies across its operations:

1,69,155 KL - water recycled/reused, equivalent to access to water for ~1,000	95.32% of its total energy mix is renewable	The company is committed to transitioning to 100% renewable energy across all its operations by 2030, a crucial step towards its Net Zero Journey	All TVS Motor Indian sites are Water Positive	**Water Ratio** •Hosur Site: 1.21 •Mysuru Site: 1.24 •Nalagarh Site: 1.49	All TVS Motor Indian sites are Zero Waste to Landfill
Diversion Rate •Hosur Site: 99.76% •Mysuru Site: 99.92% •Nalagarh Site: 99.83%	Achieved 38% reduction in Scope 1 and 2 emissions (baseline: 2018)	Reduced Scope 3 emissions across 12 of 15 categories, including supply chain and product lifecycle	Introduced electric vehicle (EV) manufacturing with closed-loop battery recycling systems	The Hosur plant recharges 4,901 m^3 of groundwater annually	The Hosur plant in Tamil Nadu, a Zero Liquid Discharge (ZLD) facility
	At dealerships, implemented dry wash technology, reducing water usage by up to 90%	GreenCo certification ensures periodic water audits, enabling verified water positivity	Achieved 100% waste segregation and advanced recycling practices across facilities	Utilized co-processing techniques to recover energy from non-recyclable waste	

Through a combination of industry-aligned certifications, TVS Motor Company has established a repeatable model for sustainable manufacturing. These frameworks have not only validated TVS's environmental performance but also created a clear roadmap for continuous improvement.

Reporting & Verification

Maxim Tubes Company Pvt. Ltd.

Driving Decarbonization Through GreenCo Adoption and CBAM Compliance

Established in 2006, **Maxim Tubes Company Pvt. Ltd.** is a leading manufacturer of high-precision stainless steel pipes and tubes, serving global markets including the European Union, USA, and Middle East. With a fully vertically integrated manufacturing setup, the company produces mother hollows through advanced hot piercing and cold finishing processes, catering to critical sectors such as:

- Petrochemicals & Power Plants
- Heat Exchangers & Automotive
- Oil & Gas (Onshore/Offshore)

Challenge

With the enforcement of the **Carbon Border Adjustment Mechanism (CBAM)** in the EU, Maxim Tubes faced several operational and strategic challenges:

- Increasing **CBAM liability per ton of CO_2 emissions (CO_2EPTP)** affecting price competitiveness in exports.
- Mounting pressure to **decarbonize manufacturing processes** to remain globally relevant.
- The urgent need for **credible, verified carbon reporting** for international compliance.

Strategic Response: GreenCo Rating as a Catalyst

In order to reduce its impacts, Maxim Tubes adopted the **GreenCo Rating framework**. This holistic approach enabled the company to implement structured decarbonization initiatives, including:

1. Renewable Energy Integration - Installed a **2.3 MW wind turbine and 1 MW solar plant** to meet a significant portion of energy demand.

2. Supply Chain Optimization - Shifted to **locally sourced raw materials**

3. Energy Efficiency Measures - Launched an internal **"Save Energy"** campaign to drive behavioural and operational change. Replaced inefficient machinery with **low-power, high-efficiency alternatives**.

4. Carbon Monitoring & Tracking

- Deployed **carbon tracking and management systems** to calculate and report emissions accurately.
- Achieved **alignment with EU CBAM documentation standards**, easing regulatory compliance.

Reporting & Verification

Maxim Tubes Company Pvt. Ltd.

Driving Decarbonization Through GreenCo Adoption and CBAM Compliance

Benefits Realized

Parameter	Before GreenCo Adoption	After GreenCo Implementation
CO_2 Emissions (per ton)	Higher CBAM Liability	30% Reduction in Emissions
Energy Source	Grid-Dependent	Majority Powered by Renewables
Export Compliance	Risk of CBAM Penalties	Certified Low-Carbon Export Status

Conclusion

Through the strategic adoption of the **GreenCo Rating system**, Maxim Tubes effectively reduced its CBAM exposure by 30%, while enhancing its operational sustainability. The company's commitment to renewable energy, energy efficiency, and transparent carbon reporting has enabled it to:

- Strengthen export competitiveness in carbon-regulated markets
- Build resilience against tightening global climate regulations
- Position itself as a **sustainability frontrunner** in the stainless steel industry

This case exemplifies how **GreenCo-guided decarbonization**, combined with proactive compliance, can yield both environmental and economic dividends in the era of climate accountability.

Looking Ahead

As we navigate the decisive decade leading up to 2030, the GreenCo movement stands at the forefront of India's transition toward a low-carbon, resource-efficient, and climate-resilient economy. Through the implementation of GreenCo Ratings, industries are no longer just passive participants in environmental compliance, but active drivers of innovation, circularity, and green value creation.

The journey so far has demonstrated that voluntary, performance-based frameworks can spark measurable impact, reducing greenhouse gas emissions, optimizing energy, and embedding life cycle thinking into core business strategies. However, the path to net zero is neither linear nor uniform. It requires sector-specific roadmaps, collaborative innovation, supportive policy mechanisms, and robust financing models.

Looking ahead, Milestone 2030 marks not just a checkpoint, but a launchpad. It calls for deep decarbonization efforts aligned with science-based targets, scaled adoption of frontier technologies such as green hydrogen, CCUS (Carbon Capture, Utilization & Storage), AI-powered energy optimization, and nature-based solutions. Companies will need to integrate climate risk into financial decision-making, embrace circular economy principles, and actively engage in ecosystem restoration and carbon sequestration. GreenCo will be a catalyst for all of this, enabling industry transformation by providing a structured, performance-driven framework that supports innovation, collaboration, and measurable progress toward a net-zero future.

The next frontier for GreenCo lies in expanding its reach across MSMEs, enabling just transitions, and driving cross-sector synergies to decouple growth from emissions. As national and global frameworks evolve through instruments like the Indian Carbon Market, ESG disclosures, and taxonomy alignment - GreenCo must remain agile, data-driven, and outcome-oriented.

In essence, achieving net zero by 2070 and key milestones by 2030 will demand more than compliance. It calls for leadership, collective ambition, and a shared commitment to redefine competitiveness in climate terms. GreenCo's role, as both a catalyst and a compass, will be vital in shaping a regenerative industrial future, where sustainability is not just a choice, but the foundation of long-term value.

About CII

The Confederation of Indian Industry (CII) works to create and sustain an environment conducive to the development of India, partnering Industry, Government and civil society through advisory and consultative processes.

CII is a non-government, not-for-profit, industry-led and industry-managed organization, with around 9,700 members from the private as well as public sectors, including SMEs and MNCs, and an indirect membership of over 365,000 enterprises from 318 national and regional sectoral industry bodies.

For more than 125 years, CII has been engaged in shaping India's development journey and works proactively on transforming Indian Industry's engagement in national development. CII charts change by working closely with the Government on policy issues, interfacing with thought leaders, and enhancing efficiency, competitiveness, and business opportunities for industry through a range of specialized services and strategic global linkages. It also provides a platform for consensus-building and networking on key issues.

Through its dedicated Centres of Excellence and Industry competitiveness initiatives, promotion of innovation and technology adoption, and partnerships for sustainability, CII plays a transformative part in shaping the future of the nation. Extending its agenda beyond business, CII assists industry to identify and execute corporate citizenship programs across diverse domains, including affirmative action, livelihoods, diversity management, skill development, empowerment of women, and sustainable development, to name a few.

For 2025-26, CII has identified "Accelerating Competitiveness: Globalization, Inclusivity, Sustainability, Trust" as its theme, prioritizing five key pillars. During the year, CII will align its initiatives to drive strategic action aimed at enhancing India's competitiveness by promoting global engagement, inclusive growth, sustainable practices, and a foundation of trust.

With 70 offices, including 12 Centres of Excellence, in India, and 9 overseas offices in Australia, Egypt, Germany, Indonesia, Singapore, UAE, UK, and USA, as well as institutional partnerships with about 300 counterpart organizations in almost 100 countries, CII serves as a reference point for Indian industry and the international business community.

About CII Sohrabji Godrej Green Business Centre

CII – Sohrabji Godrej Green Business Centre (CII – GBC) was established in the year 2004, as CII's Developmental Institute on Green Practices & Businesses. It is aimed at offering world class advisory services on conservation of natural resources. The Green Business Centre was inaugurated by His Excellency Late Dr. A. P. J. Abdul Kalam, the then President of India, on 14 July 2004. Located in Hyderabad, the Green Business Centre is housed in one of the world's greenest buildings (as rated in 2003) and has been operating as a Platinum-rated, Net Zero Energy building since 2019.

CII – GBC works closely with all stakeholders in facilitating India emerge as one of the global leaders in Green Business. Under the aegis of the Green Business Centre, eight specialized councils operate, each focusing on a distinct facet of environmental sustainability. These councils are: Energy Efficiency Council, GreenCo Rating Council, Indian Green Building Council, GreenPro Council, Renewable Energy Council, Green Entrepreneurship Council, Green Mobility Council & Green Cooling Council.

About GreenCo Rating System

The CII GreenCo Rating System stands as a pioneering and a first-of-its-kind framework that recognizes and facilitates the growth of top-notch green companies in India. The pilot rating was launched in 2011 and developed as a voluntary standard through extensive stakeholder consultation. The rating system reflects the collective wisdom and expertise of industry leaders, policymakers, and environmental experts. This collaborative effort ensures that the framework encompasses diverse perspectives and addresses the evolving needs of industries in achieving sustainability.

Confederation of Indian Industry

Confederation of Indian Industry

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Publication Supporter:

GreenCo: Powering the Path to Net Zero Carbon - Milestone 2030 and beyond

Rialto