



Development of Environment Friendly Fossil Free Linkages



Steering and Linkages Division

#	Name	Details	Department
1	Lakshamanan KM	Facilitator	VP – Corp. MED/PLE/HSE & Sustainability
2	Arun Raja M	Member	Corp. MED
3	Sanjay M	Member	Corp. HSE & Sustainability



Rane (Madras) Limited – SLD – Executive Summary

Overview

- Deming Prize (2007) and Deming Grand Prize (2012) winner
- Serves all industry segments: Passenger Vehicles, Commercial Vehicles, Farm Tractors and ATVs with 26% sales from International markets
- Supplying Steering and Suspension products since **1960**

Key Customers

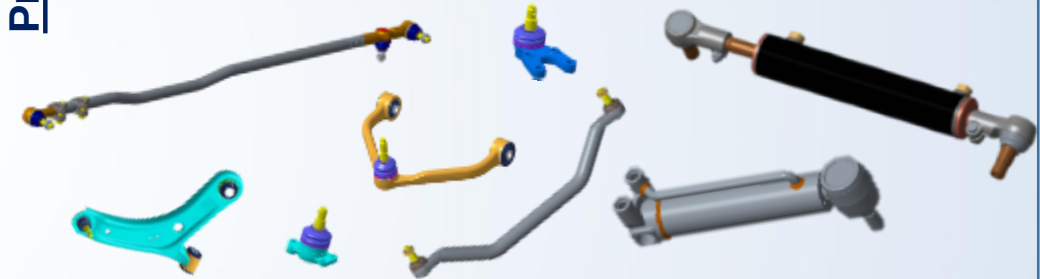


Products

Steering Products



Suspension & Linkage Products



Plant Locations

Mysore Plant



Puducherry Plant



Chennai Plant



Pantnagar Plant



Mexico Plant



Background:

GM, Ford, Polaris, BRP, Kubato,
Kawasaki, John Deere

Rack & Pinon Gear, Ball Joint

VOLVO, Daimler , Piaggio,
Stellantis, Polaris, Suzuki

Linkages, Cylinder,
Rack & Pinon Gear, Ball Joint

UD Trucks, ISUZU, Ford, Renault,
Nissan, Daihatsu, Kubato

Cylinder,
Rack & Pinon Gear, Ball Joint

Europe

Europe has a significant potential for the Linkage business, with Volvo identified as a key OEM partner.

Carbon Border Adjustment Mechanism (CBAM) poses one of the most critical environmental challenges for Indian exports to the EU

The aim of CBAM



Export to EU need to align with the environment regulations and Customer Specific requirements

Inline with the CBAM requirement Customers in EU will not change the suppliers due to safety critical parts

Customer Sustainability Goals: Volvo Group Sustainability Ambitions

100% FOSSIL FREE VEHICLES BY 2040	35 % OF VEHICLE SALES FULLY ELECTRIC BY 2030	HYDROGEN POWERED HEAVY DUTY OFFER AVAILABLE SECOND HALF OF 2020'S	40 % CO2 REDUCTION PER TRUCK & BUS KM BY 2030	PHASE-OUT SUBSTANCES OF CONCERN
NET-ZERO GHG EMISSIONS FROM OPERATIONS BY 2040	ENERGY SAVING MEASURES SAVING 150 GWH BY 2025	ZERO WASTE TO LANDFILL BY 2030	INCREASE REMANUFACTURING BUSINESS BY 60% BY 2025	ALL OUR SUPPLIERS TO FULFIL REQUIREMENTS OF THE VOLVO GROUP SUSTAINABLE MINERALS PROGRAM BY 2025
NET-ZERO GHG VALUE CHAIN BY 2040	INDUSTRY LEADING APPROACH FOR MORE SUSTAINABLE SUPPLY CHAINS	TRANSFORM OUR INTERNAL TRANSPORTATION SYSTEM TO WORLD CLASS BY 2025	REDUCE CO2 EMISSIONS FROM FREIGHT TRANSPORTS PER PRODUCED UNIT BY 30% BY 2025	CONTRIBUTE TO 100% PRODUCTIVITY IMPROVEMENTS OF OUR CUSTOMERS' LOGISTICS OPERATIONS BY 2030



Inline with the CBAM requirement Volvo group created a long term ambitious goal is 100% Fossil Free Vehicles by 2040

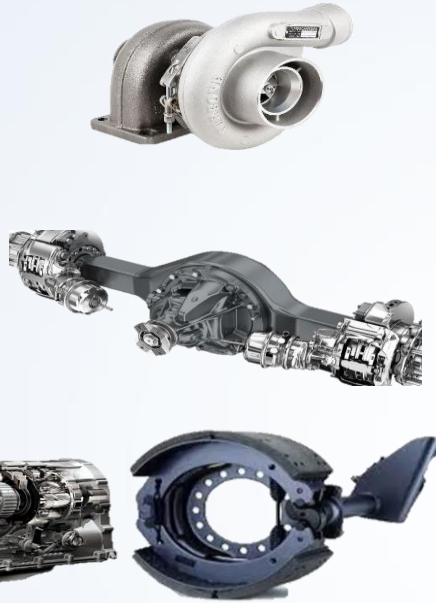
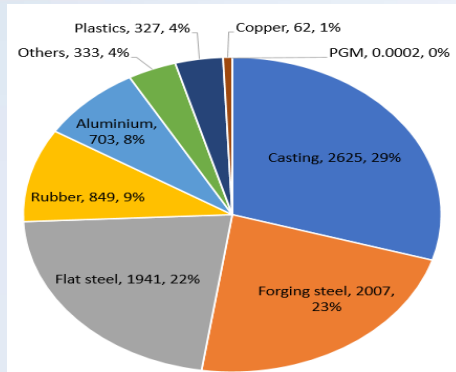
In this key strategy, we found that OEM is working towards fossil-free products and aims to launch a fossil-free vehicle by 2040

- Fossil free means **that a product or service has been created without using fossil fuels or fossil raw materials**
- As Fossil free raw materials are being developed and are in research stage, Products which are manufactured with least carbon emission throughout the manufacturing process is termed as “Fossil Free Products” by Volvo.



We understood that challenges in developing fossil-free products, particularly for products with multiple child parts, where no technologies are available.

Material of the Truck



Fossil Free Products



Steel



Casting



Truck with 3000+ child parts assembled as vehicle

Set target & Boundary

S M A R T



Theme:
Fossil Free Linkages for the export customer

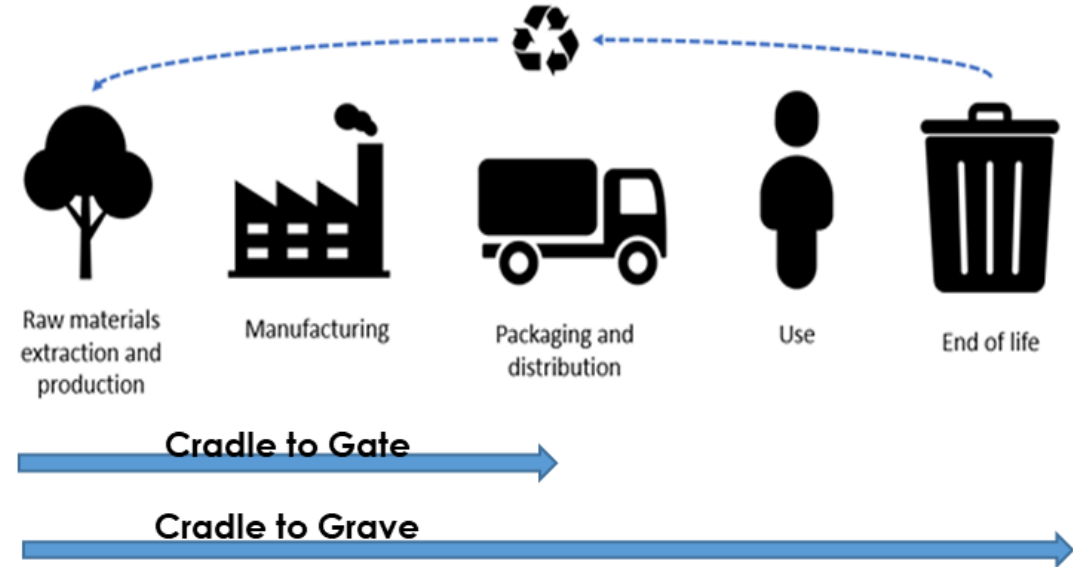


Task:
Reduce the Product Carbon Footprint(PCF) by 60%

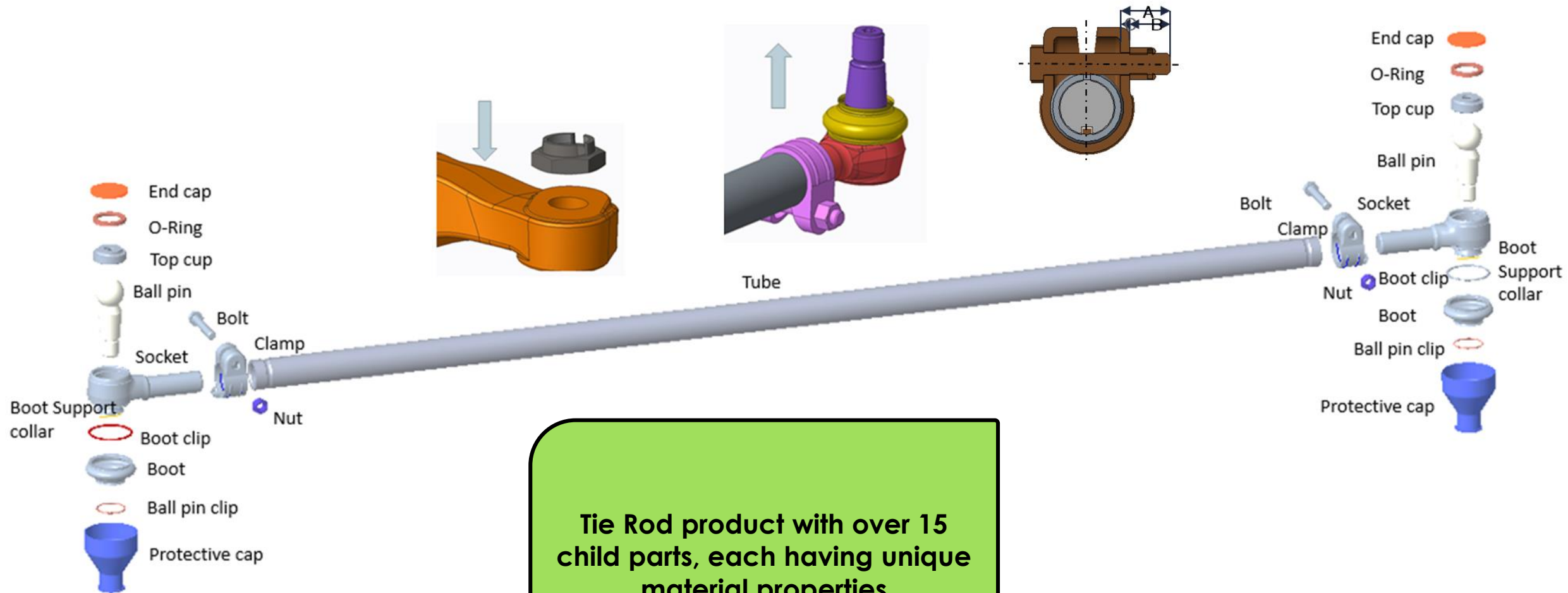


Target:
Fossil free linkages(Development & Launch) –
Aug'2024

Boundary



- All emissions are equated in terms of Equivalent Co2 (Eq. Co2)
- GHG protocol categorize these emission as scope 1, scope 2 & scope 3
- Fossil Free/Green Product means lowest Eq.Co2 throughout supply chain (Cradle to Grave)
- For our products, Boundary condition is 'Cradle to Gate' which is under our control



Affinity diagram: Challenges for Fossil-Free Product Development

Team brainstormed the challenges and grouped them to make it easier to identify patterns and insights

Lack of Established Alternatives

No one's done this before multiple child part

Lack of proven case studies

Technical Feasibility

We don't have the technology for zero-emission manufacturing

Difficult to lower emissions in production

Market Adoption Barriers

Higher production cost for fossil-free options

Financial barriers to adoption

Regulatory and Certification Barriers

Long certification and verification timelines

Inconsistent standards across regions

Supply Chain

Incomplete or unverifiable fossil-free claims

Suppliers not equipped with fossil-free materials

Mindset & Culture

Resistance to change from traditional approach

Fear of failure in uncharted approach

Emission Reduction Approach

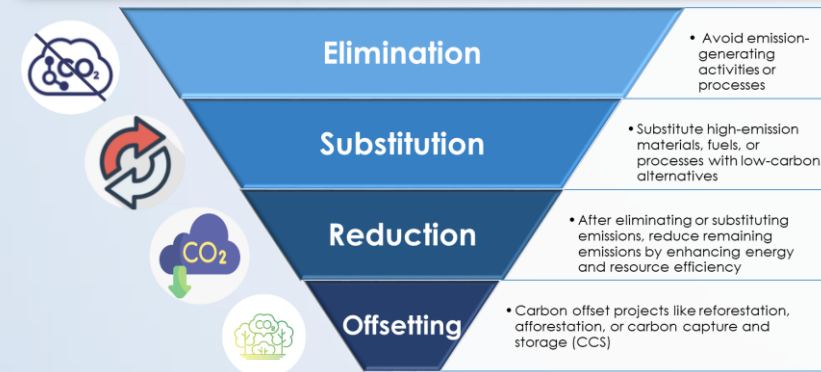
Emission Reduction Approach

GHG Emission Standard/Circularity

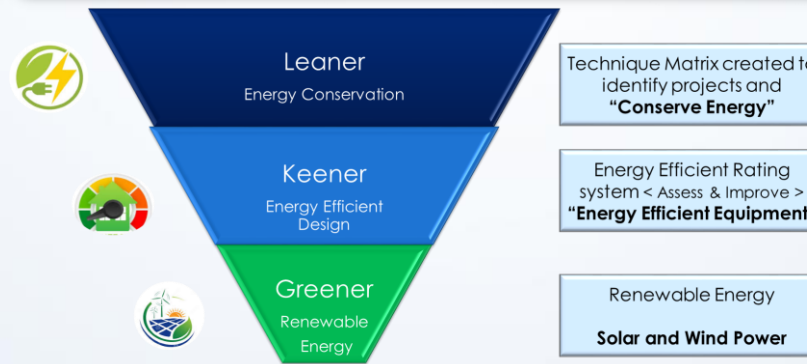


Since no International standard available for the Fossil Free Product with multiple child Parts developed our own approach with referencing all the global standards

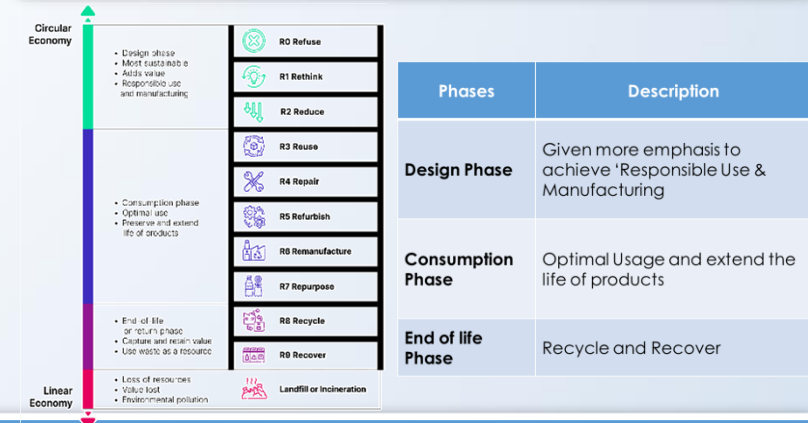
Scope 1 Emission Reduction Process



Scope 2 Emission Reduction process



Circularity – Embodied Carbon Emission reduction



Developed our own approach with referencing all the global standards

Scope 1 Emission Reduction

Scope 1 Emission reduction



Challenges

- Higher Initial investment cost of electric forklifts.
- Charging downtime

Solution

- Investment outsourced on rental basis
- Parallel charging provided for 3 forklifts

Electric Forklift introduced which eliminates requirement of Fossil Fuel 'Diesel'

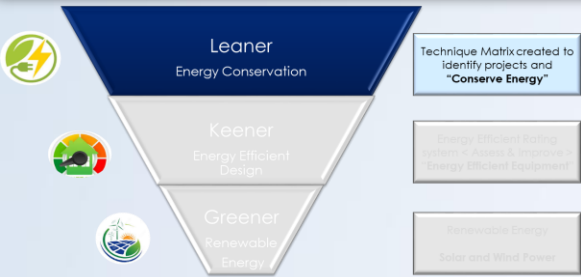
Before : Diesel Forklift	After : Electric Forklift
	 

Elimination of 3600 Lts/Annum of Fossil Fuel 'Diesel' used in forklifts

9.7 Tons of CO2 / Annum reduced

Scope 2 Emission Reduction

Scope 2 Emission reduction



Energy-saving technique matrix developed, which helps the teams to maximise energy efficiency and reduce the environmental impact,



Utility Equipment's

Energy Efficient Process Template - Utility Equipments								
#	Utility Equipments	VFD	Inverter	Process optimisation - On/Off control - Efficient Devices	Motor class conversion IE4 standard	Efficiency Improvement	LED	0.9 PF Loading by APFC
1	DG set	☑	☑	☑	☑	✓	☑	✓
2	Air Compressor	✓	☑	✓	✓	☑	☑	☑
2.1	Compressor / Drier Interlink	☑	☑	✓	☑	☑	☑	☑
3	Cooling tower & Blowers	✓	☑	✓	✓	☑	☑	✓
4	STP & ETP	✓	☑	✓	✓	☑	☑	✓
6	Air conditioners	☑	✓	✓	☑	☑	☑	✓
7	Lighting	☑	☑	✓	☑	☑	✓	✓
8	Pumps / Borewell motor	✓	☑	✓	✓	☑	☑	✓

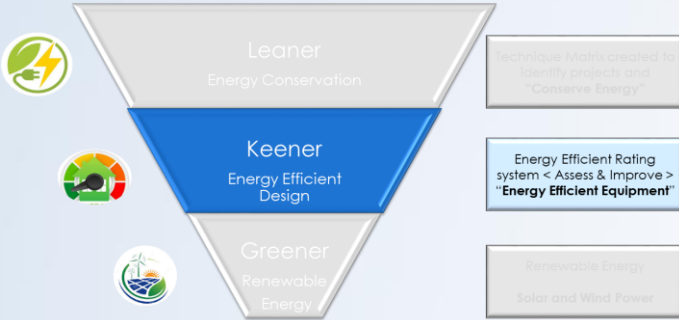
Production Equipment's

#	Group of Machines	Induction Motors connected Load in KW	Idle Time Trip	Delta to star conversion	Motor Size Optimisation	VFD	Process based On / Off	PID Control / Thyristor controller & Ceramic Isolation	Motor class conversion IE3 / IE4 standard	Heat Pump	Thyristor to Inverter Control
1	CNC Turning, Milling, Cylindrical & Cress Grinding Machines	Up to 2 Kw	✓	☑	☑	✓	✓	☑	☑	☑	☑
2		2 Kw to 5 Kw	✓	☑	☑	✓	✓	☑	☑	☑	☑
3		5 Kw to 10 Kw	✓	☑	☑	✓	✓	☑	✓	☑	☑
4		10 Kw to 25 Kw	✓	✓	✓	✓	✓	☑	✓	☑	☑
5	Hydraulic, Mechanical Presses	>25 Kw	✓	✓	✓	✓	✓	☑	✓	☑	☑
6		Up to 2 Kw	✓	☑	☑	✓	✓	☑	☑	☑	☑
7		2 Kw to 5 Kw	✓	☑	☑	✓	✓	☑	☑	☑	☑
8		5 Kw to 10 Kw	✓	☑	☑	✓	✓	☑	✓	☑	☑
9	HT Furnace Heaters	10 Kw to 25 Kw	✓	✓	✓	✓	✓	☑	✓	☑	☑
10		>25 Kw	✓	✓	✓	✓	✓	☑	✓	☑	☑
11	HT Furnace Fan	-	☑	☑	☑	☑	☑	✓	☑	☑	☑
12	HT Furnace circulating pumps	-	☑	✓	☑	✓	☑	☑	✓	☑	☑
13	Phosphating Plant / parts Washing (Water Heating)	-	✓	☑	☑	☑	☑	✓	☑	✓	☑
14	Welding MIG	-	☑	☑	☑	☑	☑	☑	☑	☑	✓
15	Paint Shop (Blower / conveyor interlock)	-	✓	☑	✓	✓	✓	☑	☑	☑	☑

VFD, Ideal time trip, PD controller are installed all the applicable machining process involved in Linkages

Scope 1 Emission Reduction

Scope 2 Emission reduction



Equipment is assessed with a rating system



Improvements are carried out to upgrade machinery



Energy Efficient Machine is created

Hydraulic Press



Servo Press



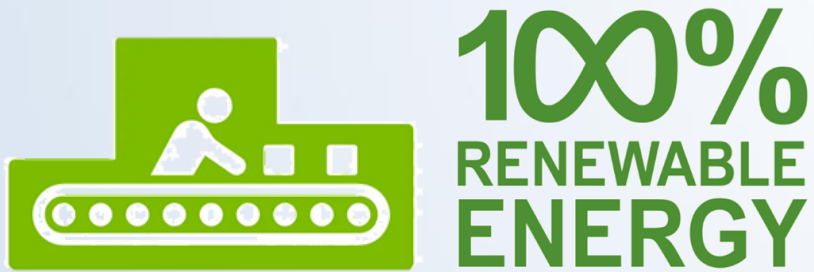
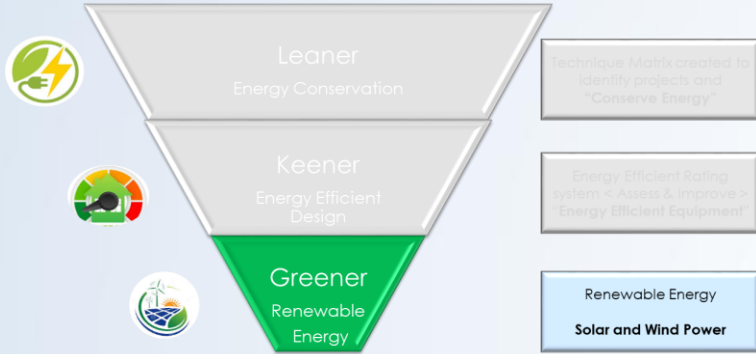
fossil-free

1 Machine : Total power consumption - 18240 (kWh) reduced to 260 (kWh) per year
Fossil Oil consumption reduced 100 liters/year

All the Linkage product machines are converted in Energy Efficient machines

Scope 1 Emission Reduction

Scope 2 Emission reduction



Offsite Solar & Wind Power Plants



Location: Aruppukottai
Total Capacity – 2 MW



Location: Virudhunagar & Thoothukudi
Total Capacity – 2 MW

100% of the production demand meet throu' Renewable Energy

Scope 3 - Emission Reduction

Scope 3 Upstream Emission reduction

Challenges

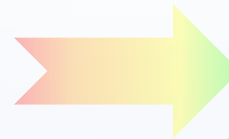
- Higher Initial investment
- EVs can't go as far and take longer to "refuel"
– coverage feasibility is less than 100 KM
- Downtime during the charging

Solution

- Investment vehicle outsourced on rental basis
- Local based supplier within 100 KM range
- Charging points are provided our facility and at the supplier end to eliminate the downtime

All the vehicles which are operated within 100 km range, has been converted into **“Electric Vehicle”**

Diesel Vehicle



6,248 Litres of
Diesel saved
per year

Electric Vehicle



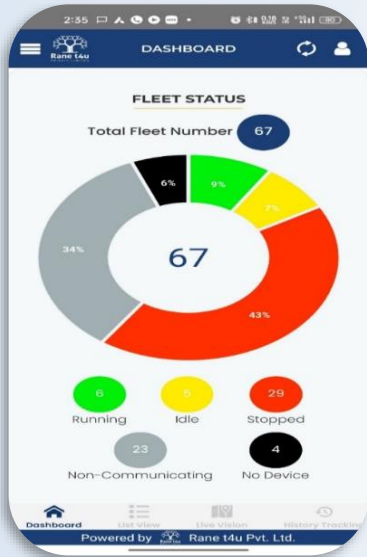
Scope 3 - Emission Reduction

Scope 3 Upstream Emission reduction

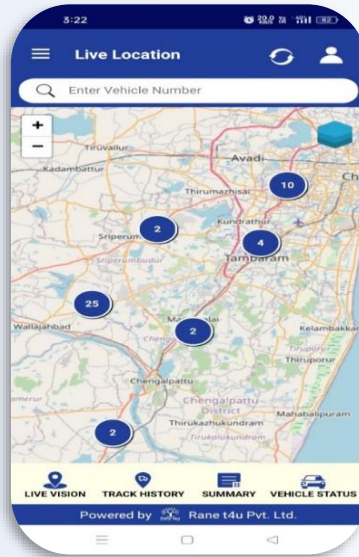
Challenges

Vehicles often take longer, less efficient routes, leading to higher fuel consumption and CO₂ emissions.

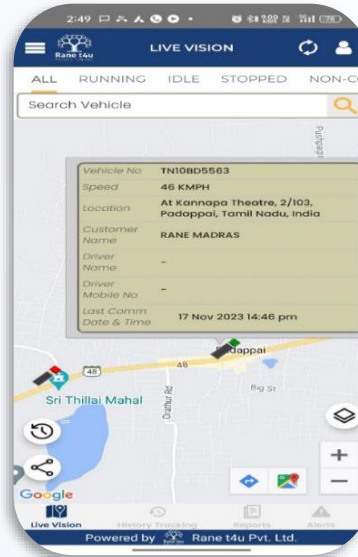
FMS - Mobile Application



- ✓ Vehicle Status
- ✓ Running Status
- ✓ Stop Status
- ✓ GPS Fault

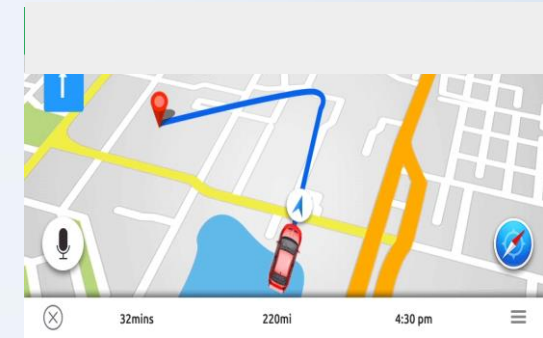


Vehicle Geo Locations



Tracks vehicle location with playback history

Vehicle GPS Tracking



All our Vehicles are connected with GPS

S.NO	Vehicle No	Last Communication	Image	Location	Ignition	Speed(km/hr)	Stoppage Time(H:MM)	Customer Name	Status	Driver Name
1	TN1481081	14-02-2023 12:39:25		At Vipassana Meditation Centre Dharma Setu, Vipassana Meditation	On	5	0:00	RANE MADRAS	Vehicle Available	
2	PY55X0817	14-02-2023 12:39:24		2 kms from Pillayar Kovil, Kandaswalam Road, Pakkiasalam, Tam.	On	24	0:00	RANE MADRAS	On Trip	AUR - Driver 1 / NA
3	TN10W9309	14-02-2023 12:39:22		2 kms from P.L. VEDYAR AUTO MOTIVE PRIVATE LTD CHENNAI, TA.	On	53	0:00	RANE MADRAS	Vehicle Available	
4	TN182024	14-02-2023 12:39:18		Inside RAIL_P4 PLANT VARANANASI, TAMIL NADU, INDIA	On	0	0:00	RANE MADRAS	Vehicle Available	
5	TN18K2235	14-02-2023 12:39:04		At RAIL_P4 PLANT VARANANASI, TAMIL NADU, INDIA	Off	0	0:00	RANE MADRAS	Vehicle Available	
6	TN19K2475	14-02-2023 12:38:55		1 kms from Special Service Road, Spout Ph 1 Ind. Complex, Spout Ph	On	10	0:00	RANE MADRAS	Vehicle Available	
7	TN14M2479	14-02-2023 12:38:21		Near to P.L. SYSTURN AUTO ENGINEERING PVT LTD, HOSUR, TAMIL	Off	0	0:00	RANE MADRAS	Vehicle Available	
8	TN18M1570	14-02-2023 12:38:15		Inside RAIL_P4 PLANT VARANANASI, TAMIL NADU, INDIA	On	0	0:00	RANE MADRAS	Vehicle Available	
9	TN25A25702	14-02-2023 12:38:10		Inside RAIL_P4 PLANT VARANANASI, TAMIL NADU, INDIA	Off	0	0:00	RANE MADRAS	Vehicle Available	
10	TN2021855	14-02-2023 12:38:05		Inside RAIL_P3 PLANT THIRUJANURAI, PUDUCHERRY, INDIA	Off	0	2:05	RANE MADRAS	Vehicle Available	

- Developed in-house FMS application to optimize and improve the Vehicle Performance
- Online GPS Tracking helps to optimize the routes in real time
- Vehicle planning improved, thereby helps in reducing emissions

- Weight reduction by alternate material
- Reduced wastage by near net shape forging

VA/VE

Free from 3TG

- CMRT (Conflict material report template)
- IMDS Submission

3TG - Tin, Tantalum, Tungsten, Gold

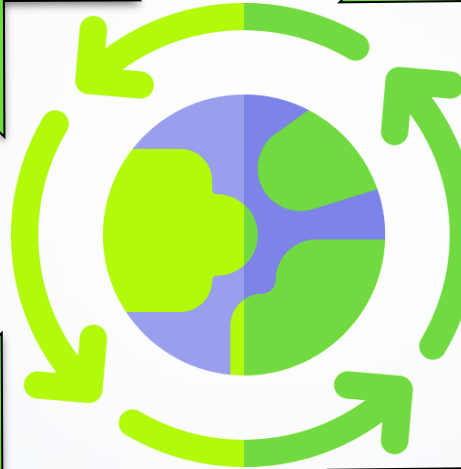
End of Life

Extend life of product

Enhanced durability of product

- Increased durability life with reduced weight and size
- Increased durability life by suitable alternate process

- Recycle and Reuse
- Eco-friendly



Circularity

100 % Renewable energy + Electric arc furnace +
70% Recycled materials



Green steel for Ball pin and Socket Forgings



Page 1 of 3 INDEPENDENT GREENHOUSE GAS VERIFICATION STATEMENT

On the basis of verification and scope of work agreed upon, nothing has come to our attention to believe that Scope 1 and Scope 2 Greenhouse Gas (GHG) emissions of

Sarloha Advanced Materials Private Limited
Mundwa, Pune, Maharashtra - 411036, India

from its operations in Steel plant with Electric Arc Furnace (as mentioned in the table below) which will form the Scope 3 GHG emissions (purchased goods and services) for Sarloha's customers, are not materially correct and are not a fair representation of the GHG assertions calculated by the Company.

Sarloha has calculated the GHG footprint for the Green Steel produced using recycled scrap and renewable energy (RE) in its facility at Mundwa and branded as 'KALYANI FORRESTA™' based on the following standards and guidelines:

- Greenhouse Gas Protocol - A Corporate Accounting and Reporting Standard (Revised Edition) published by World Business Council for Sustainable Development (WBCSD) and World Resources Institute (WRI)
- ISO 14040-2 'Calculation method of carbon dioxide emission intensity from iron and steel production - Part 2: Steel plant with electric arc furnace (EAF)'
- ISO 14064-1 (2018) 'Greenhouse Gases - Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals'
- ISO 14067:2018 'Greenhouse gases Carbon footprint of products Requirements and guidelines for quantification'
- Sarloha's GHG Emissions Manual used for GHG inventory and traceability system, (Document No. GS-01 (Rev. no. 002) dated 22nd February 2024).
- Definition of Green Steel 'KALYANI FORRESTA™' by Sarloha and related Doc No. GS-02 dated 18th July 2022.

Particulars	Unit	Total
Total Quantity of Green Steel ('KALYANI FORRESTA™') with heat no. GS176168 produced and sold during period 1st July 2024 to 31st July 2024 and sold on 2nd August 2024 to Punch Ratna Fasteners Private Limited, Kanchipuram (Customer Code: 101386) as: Rolled Steel	MT	27.17
Heat Numbers, Invoice Numbers and corresponding quantities are attached as annexure to this statement		
Total Electricity consumption corresponding to the above quantity of Green Steel	MWh	26.223
Total Electricity consumption from renewable energy sources corresponding to the above quantity of Green Steel	MWh	26.223
Average GHG Emission Intensity for above quantity of Green Steel (scope 1, scope 2)	CO2e/MT	0.249

Sarloha confirms that total Green Steel sold does not exceed the production/total accumulated Green Steel stock verified by DNV.

Note 1: AISI, PCC based GHG values are used for emission calculations. Emissions factors for Steel Mills are derived from 2004 IPCC Guidelines for National Greenhouse Gas Inventories.
Note 2: Emission Factors from Cross Sector Tools of Greenhouse Gas Protocol, World Steel Association, DRI 2024 and Internal lab test report are used for calculating GHG emissions.
Note 3: Emission factors for purchased electricity - Grid Emission factor based on weighted average factor of 0.716 tCO2/MWh from the CO2 Baseline Database for the Indian Power Sector User Guide Version 1.0 December 2023.
Note 4: All emissions are allocated to finished products and there is no allocation of emissions to waste generated in production.
Note 5: The methodology adopted towards defining 'Green Steel' is as per Sarloha's Green Steel definition (Document No. GS-02 dated 18th July 2022)

Joint Attestation:

For DNV Business Assurance India Private Limited	For Sarloha Advanced Materials Private Limited
 Anjana Sharma Lead Verifier, Sustainability Services DNV Business Assurance India Private Limited, India. Roshni Sengupta (Lead Verifier - Trainee) Sudhanshu K (Verifier) 13th August 2024, Pune, India.	 Anand Parasramia Chief Financial Officer Sarloha Advanced Materials Private Limited, Pune.

DNV Business Assurance India Private Limited is part of DNV - Business Assurance, a global provider of certification, verification, assessment and training services, helping customers to build sustainable business performance; the Verification Protocol is available on request from www.dnv.com

Certificate No. DNV-2023-ASR-CA83530-0

RSN-437541

Green steel certification for Ball pin and Socket Forgings



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Heat Numbers, Invoice Numbers and corresponding quantities are attached as annexure to this statement		
Total Electricity consumption corresponding to the above quantity of Green Steel	MWh	20.291
Total Electricity consumption from renewable energy sources corresponding to the above quantity of Green Steel	MWh	20.291
Average GHG Emission Intensity for above quantity of Green Steel (scope 1, scope 2)	CO2e/MT	0.275

Sarloha confirms that total Green Steel sold does not exceed the production/total accumulated Green Steel stock verified by DNV.

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Note 2: Emission Factors from Cross Sector Tools of Greenhouse Gas Protocol, World Steel Association, DRI 2024 and Internal lab test report are used for calculating GHG emissions.
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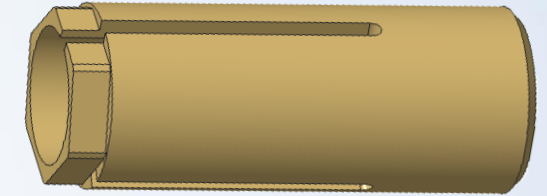
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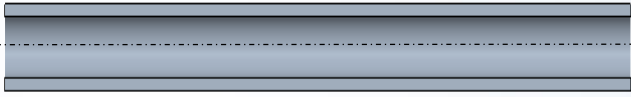
DNV Business Assurance India Private Limited is part of DNV - Business Assurance, a global provider of certification, verification, assessment and training services, helping customers to build sustainable business performance; the Verification Protocol is available on request from www.dnv.com

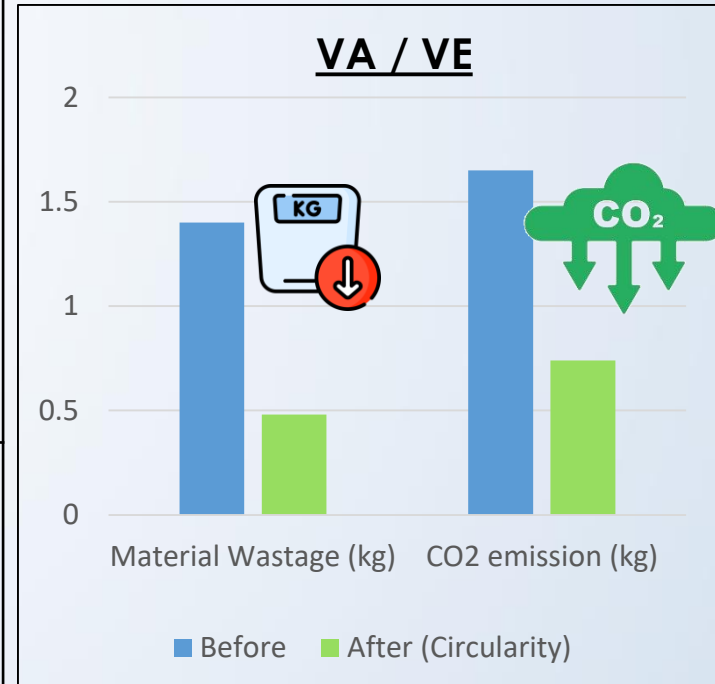
Certificate No. DNV-2023-ASR-CA83530-1

RSN-437541

Sleeve

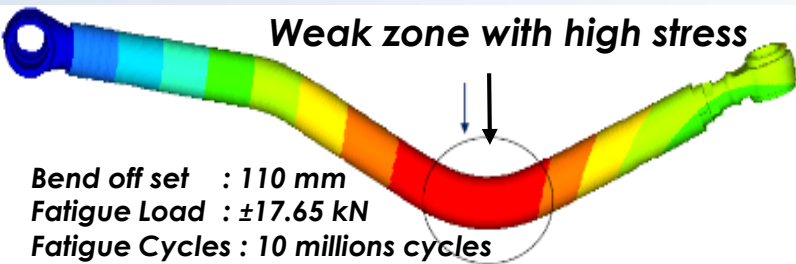


Before	After (Circularity)
Conversion of sleeve from machined bar	Conversion of sleeve from tube
Step 1:  Bar procurement length ↓ Step 2:  Bar cut to desired length ↓ Step 3:  Finished part	Step 1:  Near nut tube size procurement length ↓ Step 2:  Tube cut to desired length ↓ Step 3:  Finished part
Material Wastage : 1.4 kg Co2 Emission : 1.65 kg	Material wastage : 0.48 kg (66% reduction) Co2 Emission : 0.56 kg (66% reduction)



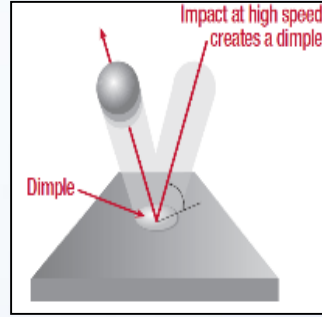
Result : By Sustainable design proposal, the material waste is reduced by 66% which reduced the Co2 emission by 66%

Link rod with high bend offset



Other improvements to increase the product life

1. Alternate boot material
2. Improved corrosion resistance

Before	After (Circularity)
<u>Tube dimension</u> - Outer diameter : 60 mm - Wall thickness of tube : 6 mm	<u>Tube dimension</u> - Outer diameter : 52 mm - Wall thickness of tube : 8 mm
<u>Stress relieving process :</u> Thermal stress relieving process	<u>Stress relieving process :</u> Mechanical stress relieving process
 1 Million Cycles	 10 Million Cycles
Increase in weight 	15% Reduction in Weight 

Result : By Sustainable design proposal the increase in product life was achieved with no harm to environment

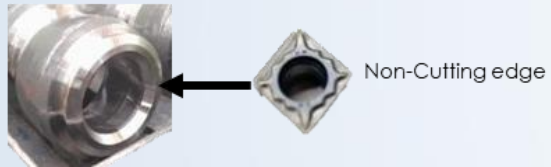
Circularity

Rethink

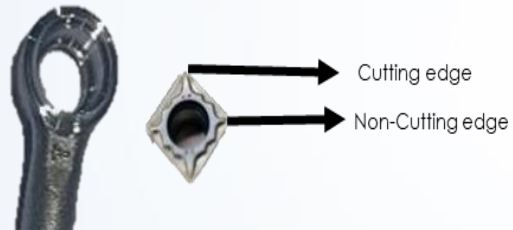
Increasing cutting tool life:

Non-cutting edges of the CCMT inserts were utilized for the socket back opening operation

Before



After



- Life of the insert increased from 300 nos. to 600 nos.
- Eliminating the 125 Nos. per month consumption

Recover

Grinding sludge briquetting - Oil extraction can help to reduce the amount of waste generated from the grinding Sludge processes



- Oil extraction helps to reduce the amount of waste generated from the grinding Sludge processes and reduced in the process
- Final Output used for Co- Processing in cement industry

Circularity

Challenges

- LDPE Protective Cap - Recyclable through a specialized process
- Must have similar properties to LDPE
- End-of-life: Must allow eco-friendly disposal

Solution

- Explored localized supplier with the different model and material
- Recycled materials are the option finalized for the approach



Trial - 1



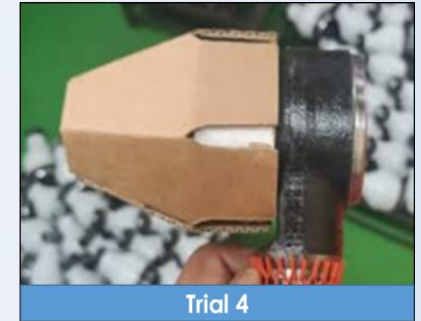
Trial - 2



Trial - 3



Trial 4



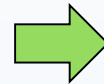
Trial 4

Before



Weight : 0.018 kg
Co2 emission : 0.055 kg
Pull out strength : 32 N
(Spec : 25 N)

After

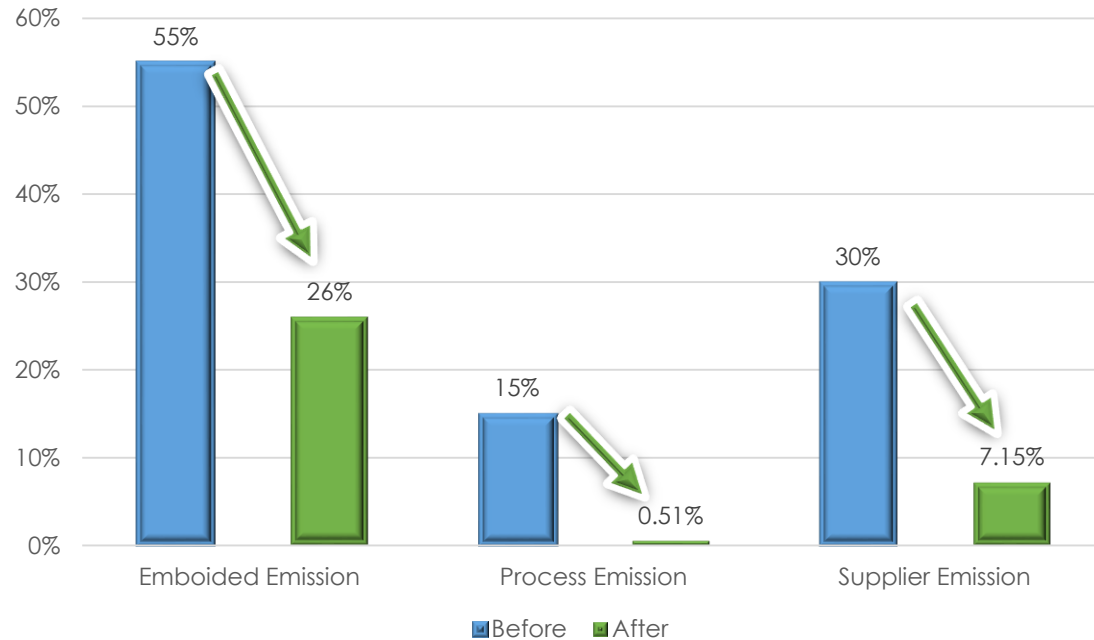


Weight : **0.020 kg**
Co2 emission : **0.03 kg**
Pull out strength : **28 N**
(Spec : 25 N)



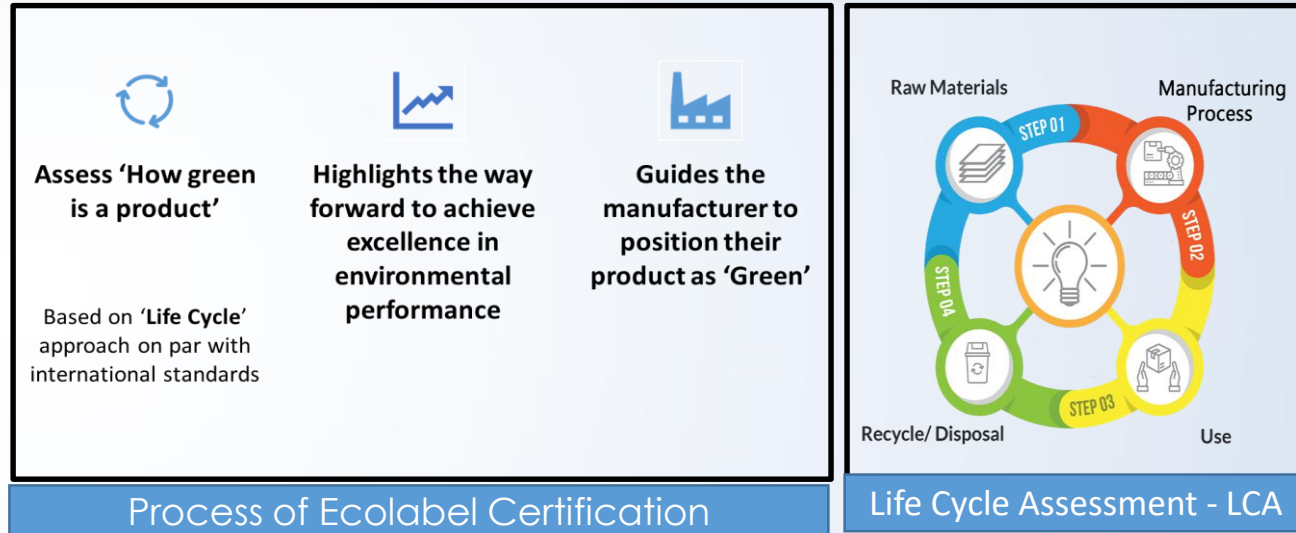
Emission level

Product Emission Level



66% reduction achieved in the Product Carbon Footprint (PCF)

To check the result we followed LCA approach for Product EcoLabel Certification



GreenPro is part of CII IGBC they'll validated the approach the process and Certify the product Ecolabel

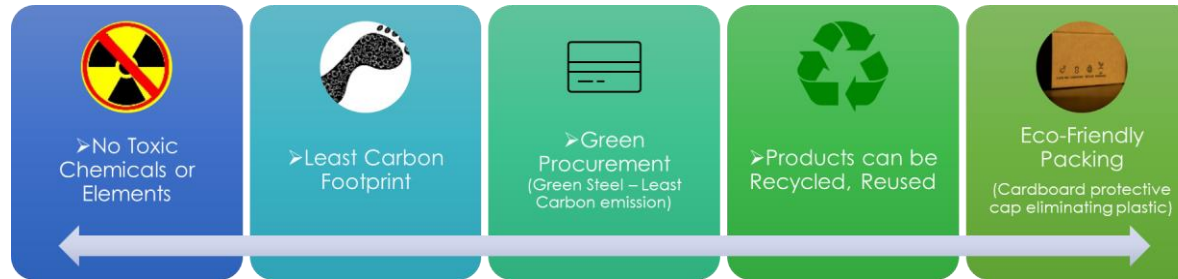
GreenPro Ecolabel Certification



Fossil Free products



Zero waste to landfill



**Fossil Free Linkages were developed,
First of its kind for a product with multiple child parts**



**GreenPro Ecolabel Product
(Linkages)**



VOLVO Press
release

Volvo Group has collaborated with two key supply partners from Chennai, India – Rane (Madras) Ltd and Madras Engineering Industries Private Limited (MEI) in this endeavor.

In collaboration with Rane (Madras) Ltd, Volvo Group has developed fossil-free tie rods and linkages, essential components that steer the wheels of Volvo trucks. These products are manufactured using 100% renewable energy across the supply chain, eliminating the use of fossil fuels, and hazardous materials. The innovative approach also includes the use of fossil-free steel and electric vehicles for material movement, ensuring a truly sustainable production process.



Results & lesson Learnt

OEM's Volume in Nos.



Increase in Sales from 7 Crs. to 14 Crs.

Lesson Learnt

Aligning with customer-specific needs and engaging in joint sustainability efforts positions us for meaningful market impact and long-term competitive advantage.



Product Carbon Footprint(PCF) Standard

Carbon Neutral Standard

Rane
Expanding Horizons

(4 major products)

Carbon Neutrality



Water Neutrality



Circularity



Biodiversity



Eco Friendly Protective Cap - Patent Status

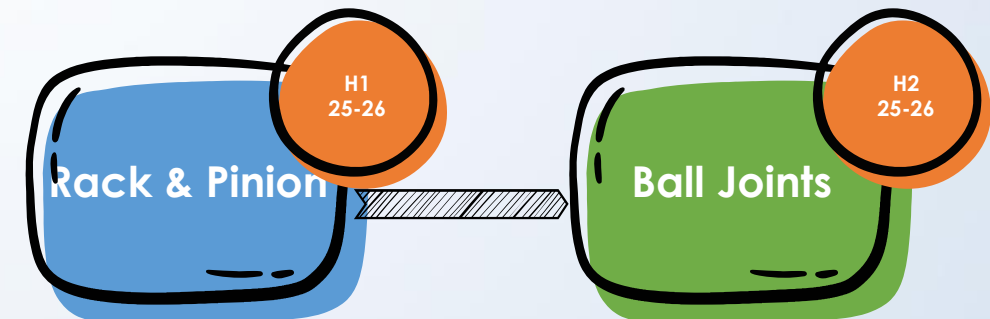
Utility Equipment's

Energy Efficient Process Template - Utility Equipments

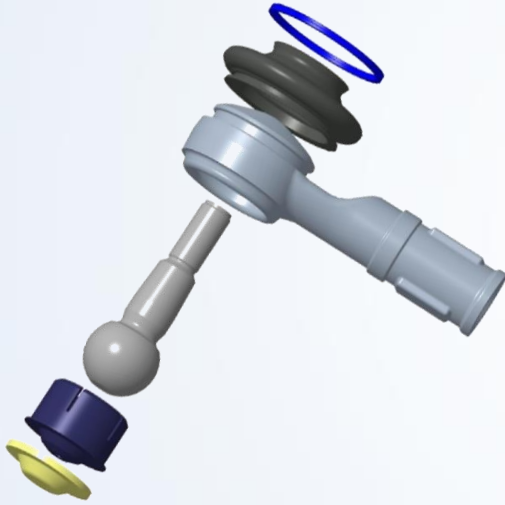
#	Utility Equipments	VFD	Insulation	Process optimization - On/Off control - Efficient Drives	Motor data conversion IIS standard	Efficiency improvement	LED	SDP Loading by JARC	Solar panel
1	DG set	✓	✓	✓	✓	✓	✓	✓	✓
2	Air Compressor	✓	✓	✓	✓	✓	✓	✓	✓
2.1	Compressor / Drive Interlink	✓	✓	✓	✓	✓	✓	✓	✓
3	Cooling tower & Blowers	✓	✓	✓	✓	✓	✓	✓	✓
4	STP & ETP	✓	✓	✓	✓	✓	✓	✓	✓
5	Air conditioners	✓	✓	✓	✓	✓	✓	✓	✓
6	Lighting	✓	✓	✓	✓	✓	✓	✓	✓
8	Pumps / Borewell motor	✓	✓	✓	✓	✓	✓	✓	✓

Production Equipment's

#	Group of Machines	Production Motors (Maximum Load) KW	Min Drive Top	Min Drive Intermediate	Min Drive Intermediate	VFD	Process based On / Off	HE Guard / Motor controls (Efficient Drives)	Automatic Motor Start / Stop (Efficient)	Heat Temp.	Temperature Sensor / Cool down
1		Up to 25 Kw	✓	✓	✓	✓	✓	✓	✓	✓	✓
2	CMC Turning, Milling, Cylindrical & Chorus Grinding Machine	2 Kw to 5 Kw	✓	✓	✓	✓	✓	✓	✓	✓	✓
3		3 Kw to 10 Kw	✓	✓	✓	✓	✓	✓	✓	✓	✓
4		10 Kw to 20 Kw	✓	✓	✓	✓	✓	✓	✓	✓	✓
5		20 Kw	✓	✓	✓	✓	✓	✓	✓	✓	✓
6		Up to 25 Kw	✓	✓	✓	✓	✓	✓	✓	✓	✓
7		2 Kw to 5 Kw	✓	✓	✓	✓	✓	✓	✓	✓	✓
8	Hydraulic, Mechanical Presses	3 Kw to 10 Kw	✓	✓	✓	✓	✓	✓	✓	✓	✓
9		10 Kw to 20 Kw	✓	✓	✓	✓	✓	✓	✓	✓	✓
10		20 Kw	✓	✓	✓	✓	✓	✓	✓	✓	✓
11	HE Rubber Machine		✓	✓	✓	✓	✓	✓	✓	✓	✓
12	HE Rubber Fan		✓	✓	✓	✓	✓	✓	✓	✓	✓
13	HE Rubber extruding Machine		✓	✓	✓	✓	✓	✓	✓	✓	✓
14	Plasticating Machine / parts extruder, extruder (injection)		✓	✓	✓	✓	✓	✓	✓	✓	✓
15	Extruder		✓	✓	✓	✓	✓	✓	✓	✓	✓
16	Paint Shop (blower / Sub-processes)		✓	✓	✓	✓	✓	✓	✓	✓	✓



Ball Joints



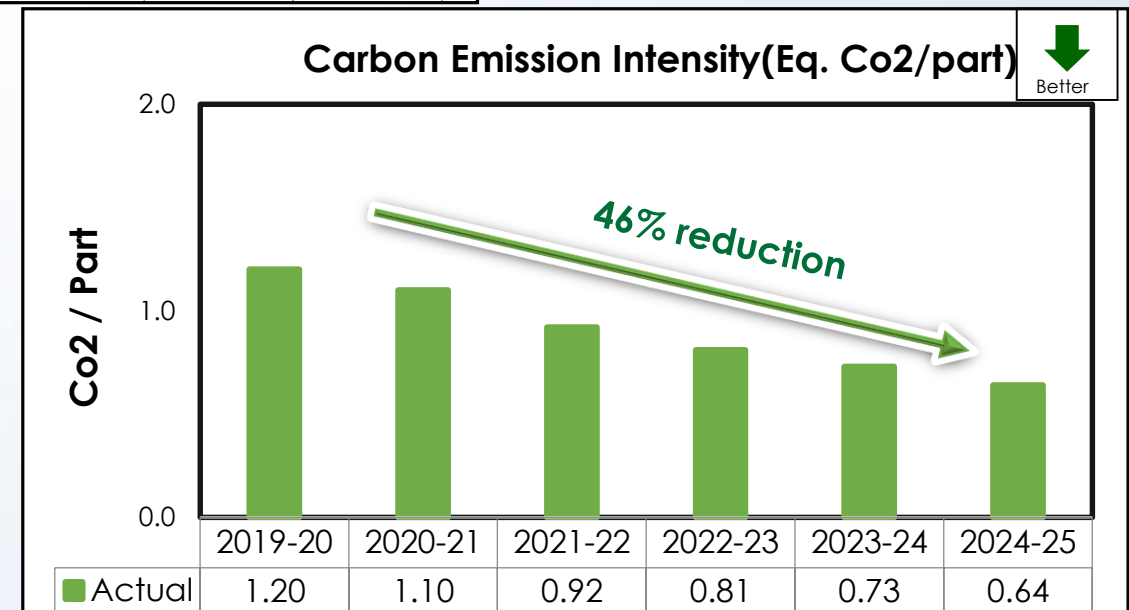
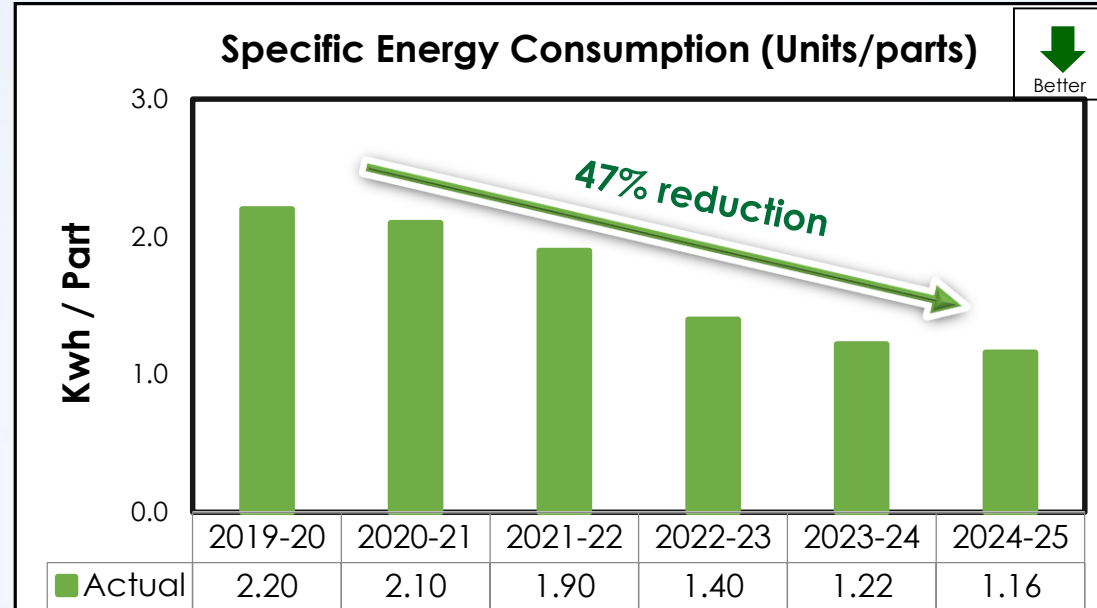
Ball Joints as a product designed and developed with the lowest carbon emissions.

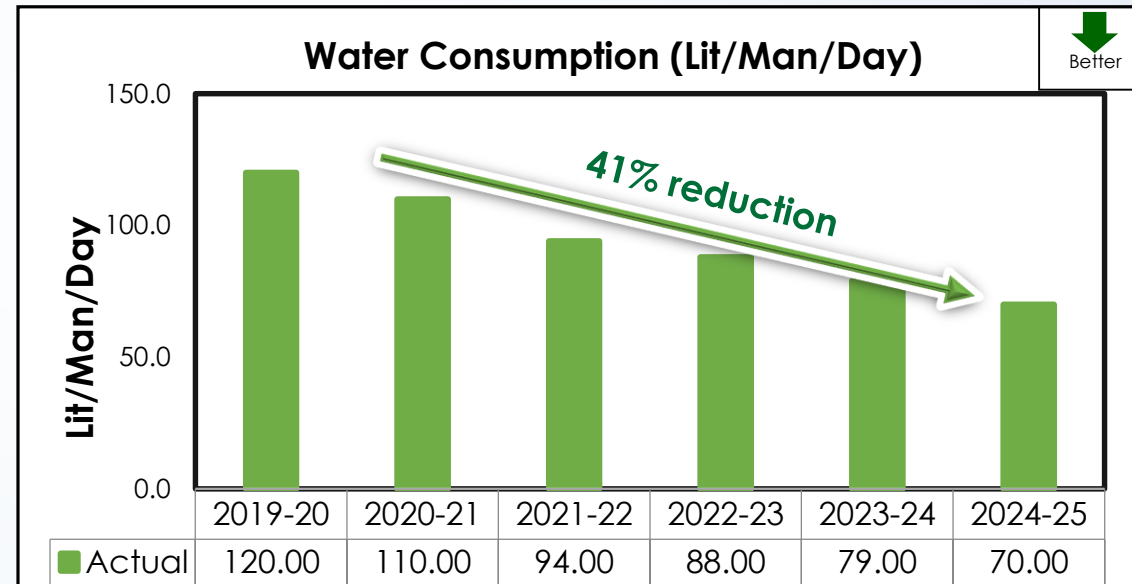
(78% reduction in carbon emission between cradle to gate)



Life Cycle assessment carried out for this Ball Joints and certified for GreenPro

Results





Awards & accolades

GreenCo

Facility : In India – **GreenCo** rating system is developed by CII to evaluate a company on 9 broad parameters.

GreenCo helps to drive excellence in resource conservation, green corporate image and goes beyond compliance



Mysuru Plant



Varanavasi Plant



GreenPro

Product : In India - **Greenpro** is Type 1 Ecolabel certification based on life cycle assessment.

'GreenPro' is accredited by Global Ecolabelling Network (GEN) through GENICES – GEN's Internationally coordinated Ecolabelling system.

What is GENICES?

Global Ecolabelling Network's Internationally Coordinated Ecolabelling System shortened to GENICES, launched in 2003.

GENICES ensures and enhances alignment to the ISO 14024 international standard in order to drive credibility in ecolabelling.



Ball Joints



Linkages – Tie Rods



Awards & accolades



Sustainability Excellence Award from TATA Motors



Ecovadis Commitment Badge in recognition of our sustainability achievement



Green Champion in Supply Chain award from CII



RML SLD won five awards across different categories at the CII-SR Water Management Competition

S. No.	Criteria	Summary
1	Uniqueness of the Project	• First fossil-free, low-emission product globally • Included multiple child parts • Delivered to OEM
2	Replication Potential	• Adopted as internal emission reduction strategy • Roadmap created and followed. • Next product (ball joints) completed on time
3	Benefits Achieved	• Tangible: 66% emission reduction/part, volume increase • 50% sales growth to OEM • New business awarded • Intangible: Reduced carbon, water, and energy use
4	Challenges & Solutions	• Developed in-house emission reduction method • Partnered with Indian supplier for certified low-carbon material
5	Employee Involvement	• Ongoing team involvement- Training on emission reduction across supply chain and in-house
6	Standards	• Certified by GreenPro & GreenCo • Emission approach and LCA verified

End of the Presentation