



Commercial Vehicle Solutions

ZF Group - ZF Commercial Vehicle Control Systems India Limited, Chennai 600058

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Date March 18, 2025

The Manager
Listing Department
BSE Limited, Phiroze Jeejeebhoy Towers
Dalal Street, Mumbai 400 001

Scrip code: 533023

Listing Department
National Stock Exchange of India Ltd
Exchange Plaza, C-1, Block G
Bandra - Kuria Complex
Bandra (E), Mumbai 400 051

Trading Symbol: ZFCVINDIA

ISIN : INE342J01019

Dear Sirs,

Sub: Updated-Shareholders Plant Visit on 19th March 2025

Ref: Our stock exchange letter dated 7th March 2025

In continuation of our earlier letter dated 7th March 2025 intimating the Shareholders Plant visit (Company's Oragadam Plant) on Wednesday, 19th March 2025, please find attached the presentation to be made thereat.

No unpublished price-sensitive information (UPSI) is intended to be discussed during the interactions.

Thanking you,
Yours sincerely,
For ZF Commercial Vehicle Control Systems India Limited

Muthulakshmi M
Company Secretary

ZF Group

ZF CVCS India Overview

19th March, 2025 | Corporate Presentation

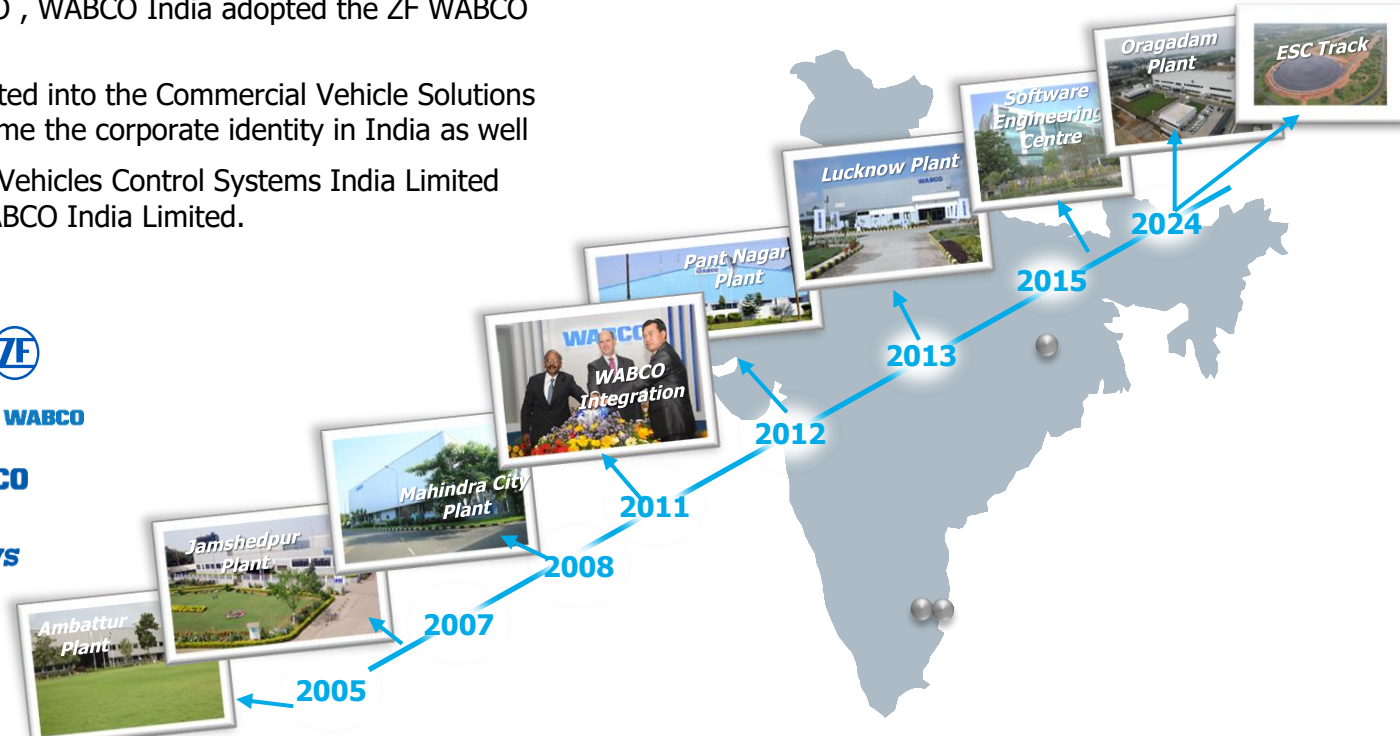
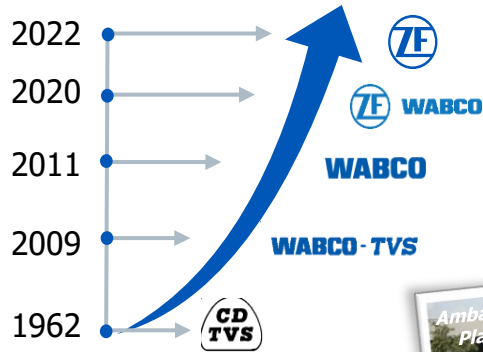


01

About ZF CVCS India

Evolution of ZF CVCS India

- In 2009 WABCO took majority control of the brakes division of Sundaram Clayton Limited to operate as WABCO TVS.
- In 2011, WABCO TVS became WABCO India Limited.
- In 2020, ZF took over WABCO , WABCO India adopted the ZF WABCO brand
- In 2022, WABCO was integrated into the Commercial Vehicle Solutions Division globally and ZF became the corporate identity in India as well
- In Mar 2022, ZF Commercial Vehicles Control Systems India Limited became the new name of WABCO India Limited.



ZF CVCS India : Pan India Manufacturing Footprint

Over 6 Decades as a Market Leader

6

Manufacturing Plants

3

Global Engineering &
Technology /support
Centers

~270

Authorised Service
Partners

1

Test Track

~ 550

Aftermarket Dealers/
Distributors

> 1,000

Engineers, Global center
for Digitalization and
Software development

Over 4500

Employees and operators (as on December 2024)



ZF CVCS India – Product Portfolio

Driveline Technology

Opti drive
Clutch servo & Master Cylinder
Exhaust brake Valve



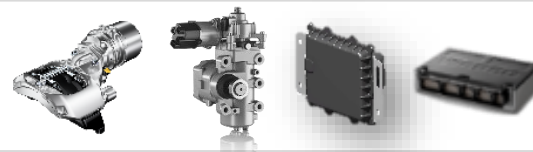
Chassis Structure

Air Supply
e-compressor
Electronically controlled Air suspension



Chassis Control

Brake Controls
Advanced Driver Assistance Systems
Wheel End



Bus & Trailer Solutions

Bus solutions
Trailer Solutions
Off-Highway



02

Manufacturing Facility - Overview

ZF CVCS Ambattur

Current Portfolio



Compressors



Air Processing



Brake Actuation



Driveline Components



Brake Controls



ABS System



Foundation Brake

- Caters to domestic and global customers, contributing over **60% of ZF CVCS India's total capacity**
- **Rich manufacturing expertise** and integrated facilities for surface protection
- Focus on **Advanced and Next Gen Braking Products** for the domestic market
- Established in **2005**, spread over **10 acres**; **12400 sq.m** production area
- Recipient of **TPM Excellence Award, Deming's Prize and Japan Quality Medal**
- Facility powered by **100% renewable energy**; **~20% women employees**

ZF CVCS

Mahindra World City

Current Portfolio



Future Portfolio



- CVS India **growing as an export hub** - best cost supplier with long term relationships
- **Rich commodity experience** and supplier base
- **Contemporary technologies** enabling efficiency and productivity
- **Mahindra World City** – Set up exclusively in **SEZ** to leverage **Indian capabilities to serve global customers.**
- Established in **2008**, spread over **7.5 acres**; **11180 sq.m** production area
- Serves markets across **Europe and Americas** ; **Center of excellence for select products**
- Recipient of **TPM Excellence Award** and **Export Excellence Award**
- Facility powered by **100% renewable energy**; **~16% women employees**



ZF CVCS Jamshedpur

Current Portfolio



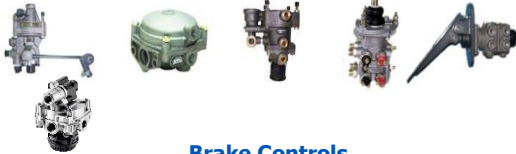
Compressors



Air Processing



Brake Actuation



Brake Controls

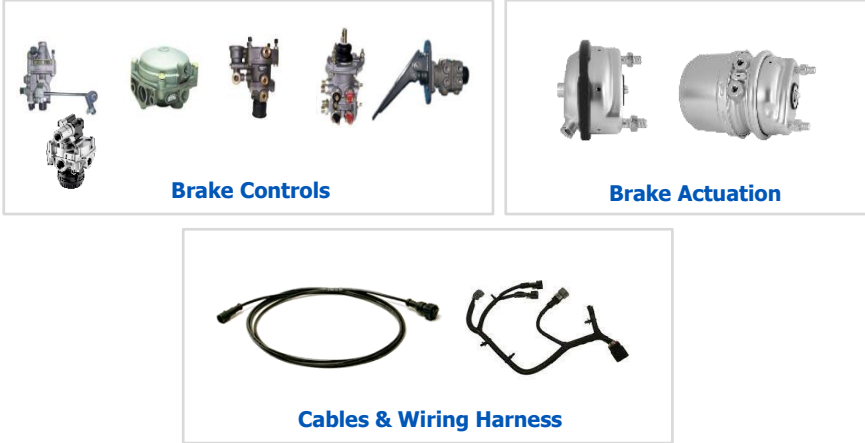


Foundation Brake

- **Fast-growing site with strategic products**, including air compressors, Lift axle control system & actuators
- Equipped with manufacturing capabilities of **assembly, machining, and surface treatment**
- Just in Time (JIT) deliveries to **key OE customers**
- Established in **2007**, spread over **11 acres**; **7200 sq.m** production area
- Recipient of **TPM Excellence Award**

ZF CVCS Lucknow

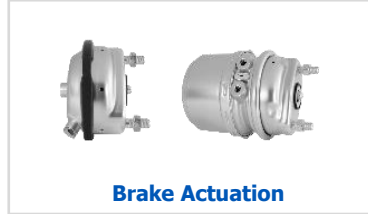
Current Portfolio



- **Low-complexity site with conventional products,** catering to north & central region
- **Centre of Excellence for Wiring Harness** manufacturing
- Just in Time (JIT) deliveries to **leading OE customer in India**
- Established in **2013**, spread over **10 acres;** **2800 sq.m** production area

ZF CVCS Pantnagar

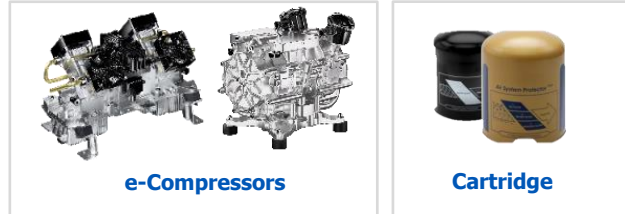
Current Portfolio



- **Last mile customization** assembly capabilities to support Just in Time (JIT) deliveries to leading OEs
- Established in **2012**, spread over **1 acres**; **500 sq.m** production area

ZF Industrial Park, Oragadam

Current Portfolio



e-Compressors

Cartridge

Future Portfolio



RPAS

Wheel End Solutions

Central Drives

ADB

Electronic Braking System

ESC

EPB

- ZF CVCS' **6th manufacturing facility in India**; USGBC **LEED Gold** Certified Facility
- ZF Industrial Park Oragadam inaugurated on February 14, 2024 by **Dr TRB Rajaa, Hon'ble Minister for Industries Govt of Tamil Nadu**
- Cornerstone of ZF's strategic intent for **Make in India, for India and for the World**
- Hub of **advanced manufacturing excellence advanced technology & products** for Global & Indian customers
- Spread over **45 acres; 5500 sq. m** production area
- Facility powered by **100% renewable energy** ; plant operated by **~80% women employees**

ZF Industrial Park, Oragadam

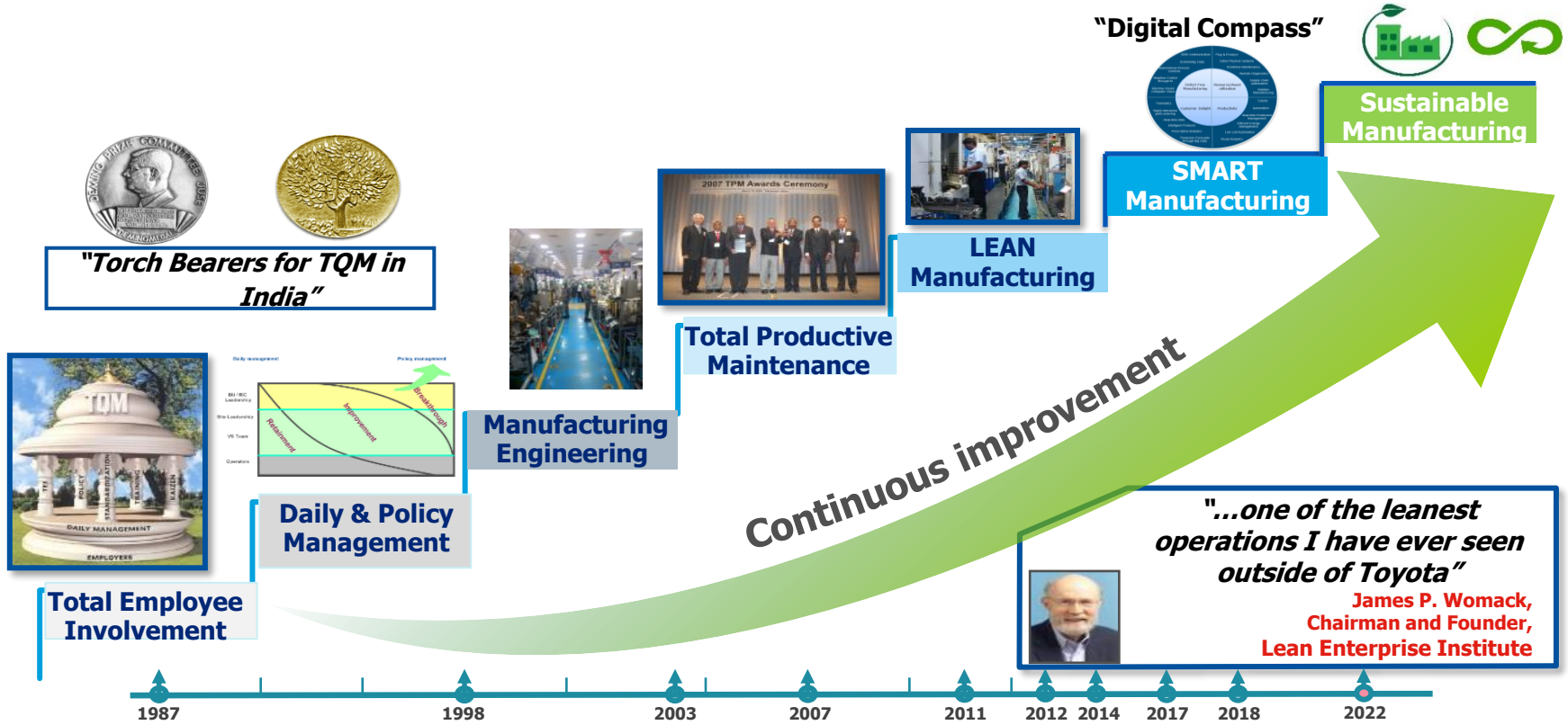
Inaugurated on 14th Feb, 2024 in presence of Dr TRB Rajaa, Hon'ble Minster for Industries Govt of Tamil Nadu



03

DNA of Manufacturing

Journey of Excellence



Total Employee Involvement

- Creating a Sense of purpose through robust communication framework ; Aligning individual's purpose with company's purpose
- Sustained rigor in driving TEI activities over three decades
- Clearly defined engagement scheme for all levels
- Bottom- up approach in identifying and resolving problems with continuous improvement mindset
- 100% participation consistently for the last 10 years
- Engagement through inter-site competitions
- Vehicle to unleash potential of people



Annual TEI Convention - 2024



Annual TEI Convention - 2024



Recognition in international competition, Tokyo



Recognition in international competition, Philippines

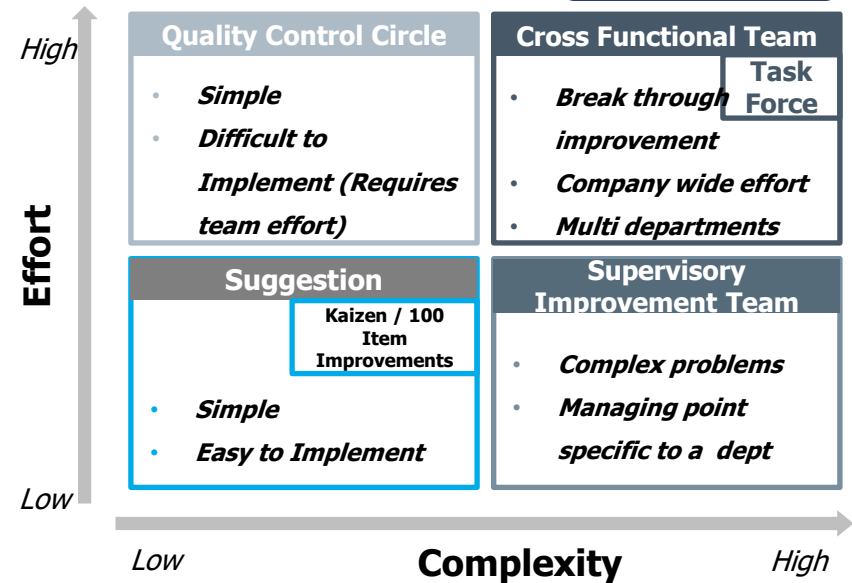
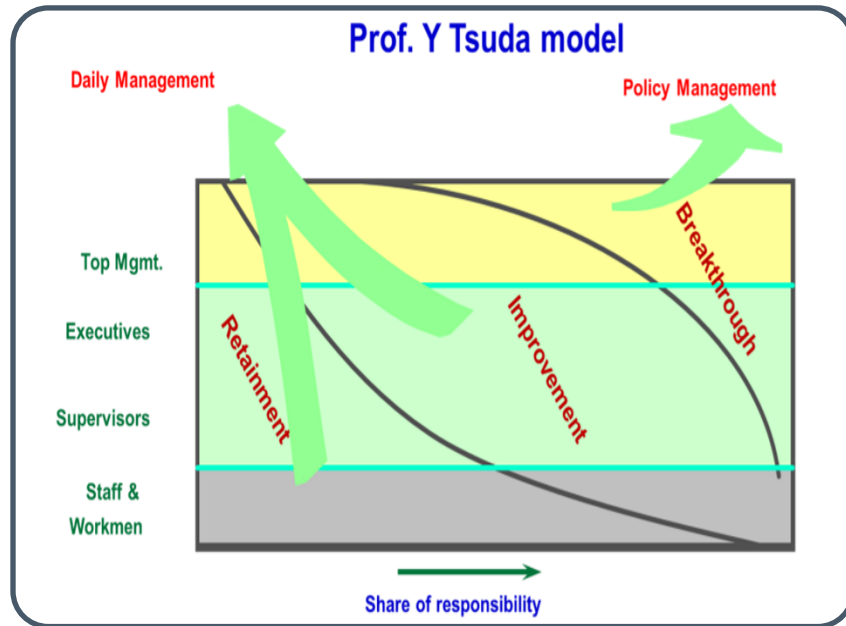


Recognition in townhall meeting



Recognition in townhall meeting

Spirit of Innovation built through TEI



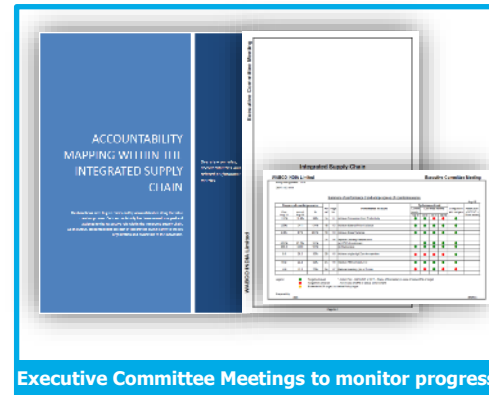
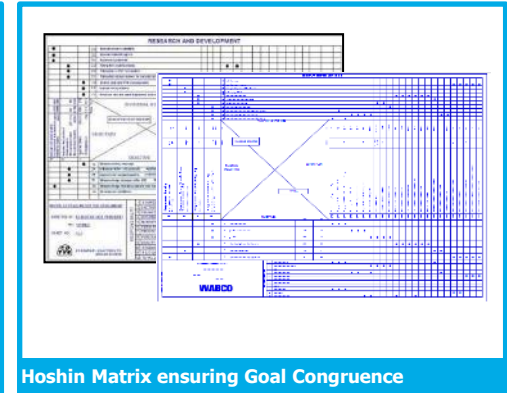
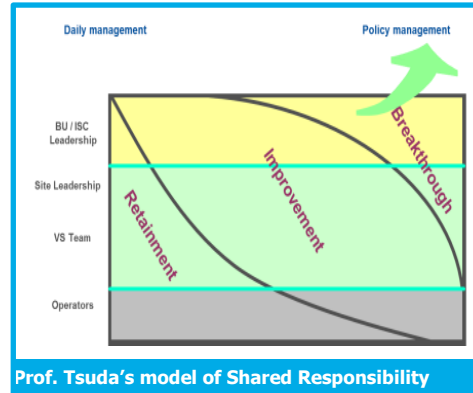
TEI Achievements (last 3 yrs)

280k+ Suggestions (38/Operator) **700+** QC projects (3/Circle) **500+** SIT/CFT Projects (1/Executive)

Daily and Policy Management

Excellence in Execution thro' Hoshin Framework

- Adopting Prof. Tsuda's model of share of responsibility to drive engagement @all levels
- KPIs/Policy initiatives are managed through daily/weekly/monthly reviews – ensures mitigation control for key deviation
- Strategic initiatives are managed through taskforce driven with Six Sigma rigor
- Promoting ZF Way – Collaboration and Accountability being driven to improve organisational efficiency and effectiveness



Manufacturing Engineering – a Key Differentiator

Frugal engineering focused team for in-house process design and development

Agile and flexible manufacturing cells

- See through, U flow - Lean Modular Assembly Lines with built in Safety and Ergonomics
- Continual line upgradation with Smart Automation across all sites
- Application of in-house developed Lean equipment
- Intuitive Controls - Prevention Poka Yokes to eliminate defects
- Traceability system and data acquisition through IoT
- Flexible manufacturing with single takt changeover
- Standardization of processes across sites through Bill of Process (BoP) and Bill of Technology (BoT)



Smart automation - Machining



Smart Automation- Assembly



In-house developed assembly cell



End-to-end traceability with M2M



Differentiation in Cost : Lean Equipment Development Center

Leveraging Indian Expertise

- Team – Design, Assembly, Programming & Proving
- Systematic opportunity check on major investments and frequent creativity workshops

Differentiation

- Lean equipment design guidelines
- Physical mock-up to define best manufacturing system design
- Digital twin as pilot projects
- Standardised design modules – BoP, BoT

Execution

- Global projects : 11# | India projects : 25#

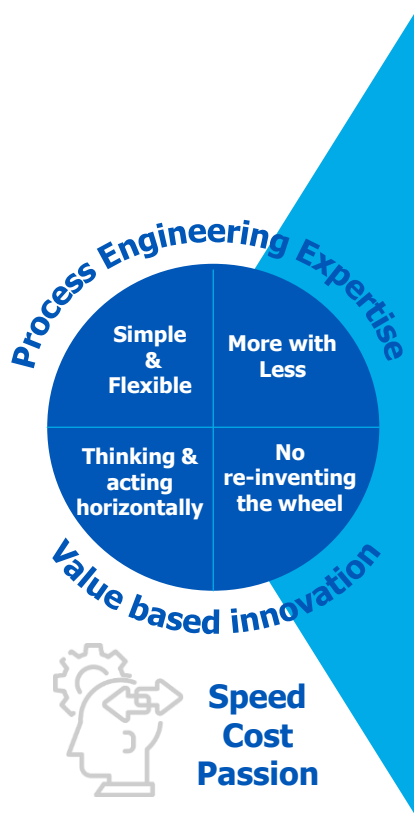


20%-30%
Capex
reduction

APU Assembly line @ JSR

- MTBF : 590 Hrs
- MTTR : 15 Min.
- OLE – 93%

Capacity Management



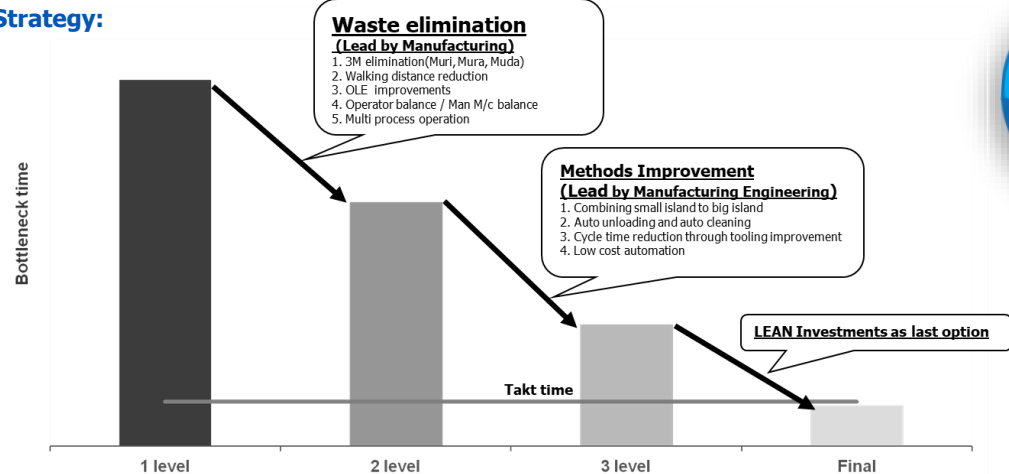
Capacity Re-balancing, Re-engineering, Re-deployment with lean investment

Flexible and Agile capacity management

3 step Methodology

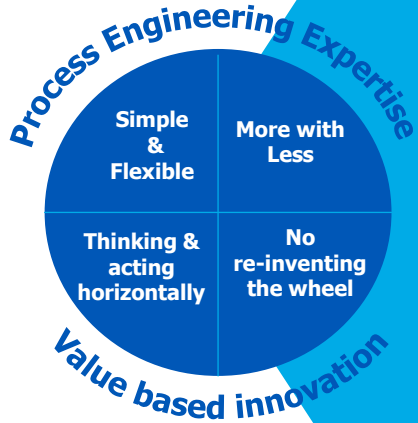
1. Improving the efficiency of the process
2. De-bottlenecking
3. Lean Investment

Strategy:



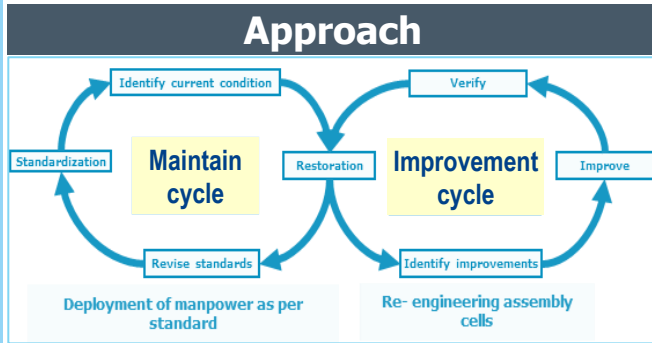
Capacity Re-balancing, Re-engineering, Re-deployment with lean investment

Productivity Improvement



**Speed
Cost
Passion**

Employee/Space/Asset productivity – NVA reduction, Cell re-engineering / LCA / CIS



- ### Methodology
1. Deployment of e-MSD
 2. Re-Engineering manufacturing cells
 3. Smart manufacturing cells
 4. Flow improvements
 5. Shopfloor Layout workshops

Process	Process time reduction thro'	What to automate		Mechanism
Value added	De-skilling Process automation	Loading / unloading Assembly, Tightening Part transfer/Feeding	Performance testing Grease application Packaging	LCA, Robotics, Pick & place, Conveyor, AGVs/AMRs
Non-value added necessary	Combining Re-arranging Process automation	Visual inspection Gauging, PDI Multilevel traceability	Scanning, Cycle start Camera checking Positioning	Vision based inspection, Auto gauging, SCARA robots
Non-value added	Eliminate	Manual unloading Wet leak testing	Duplicate processes Walking, Waiting	Layout / Process improvements

**10 – 15%
year-on-year**

Frugal Engg. + Safety & Ergonomics + CSR + Digitalization

Sustaining Differentiation through Lean and TPM

Improving Equipment Effectiveness...

- TPM – way of life.. deployment across sites
- **My Machine Campaign** encouraging greater involvement – shared responsibility for equipment
- 310 machines > 10 years old available for 90% of the times thro' effective PM and in-house refurbishment
- Leveraging technology for better JH and help autonomous maintenance

MACHINE UPGRDATION (last 5 yrs)

50+ Projects **04** HMCs **09** Grinding Machines

€6M+ CAPEX Avoidance



WINM – TPM Consistency

WINJ – TPM Excellence



LAL machine,
from 1993



Upgraded machine,
last upgrade in Apr'18



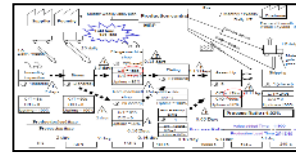
CLIA embedded in Control System;
Checklist to be updated after every restart of the machine

Sustaining Differentiation through Lean and TPM

Resetting the future state every year...

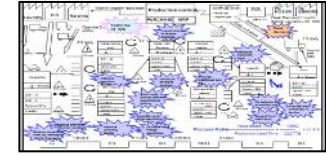
- Inculcating lean mindset – focused workshops and projects
- Challenging status quo through Value stream mapping – reducing no of linkages in supply chain, footprint optimisation, supplier co-location
- Process efficiency improvement thro' Makigami analysis
- Smart Layout with flow optimization reducing NVA
- Space optimization – 645 sq. m released in last 3 years for value addition leveraging supply chain capabilities improving revenue generation per sq.m

Current-SBA (Before)



Process Ratio : 4.03%

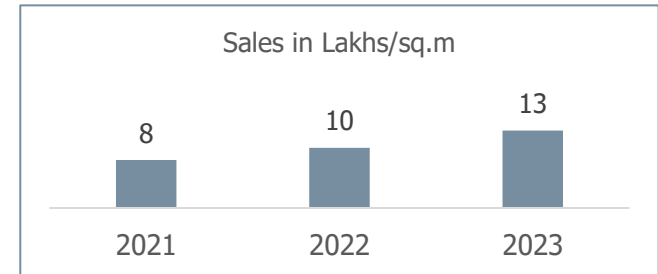
Future – SBA (After)



Process Ratio : 24.5%



Floor Space Optimization



04

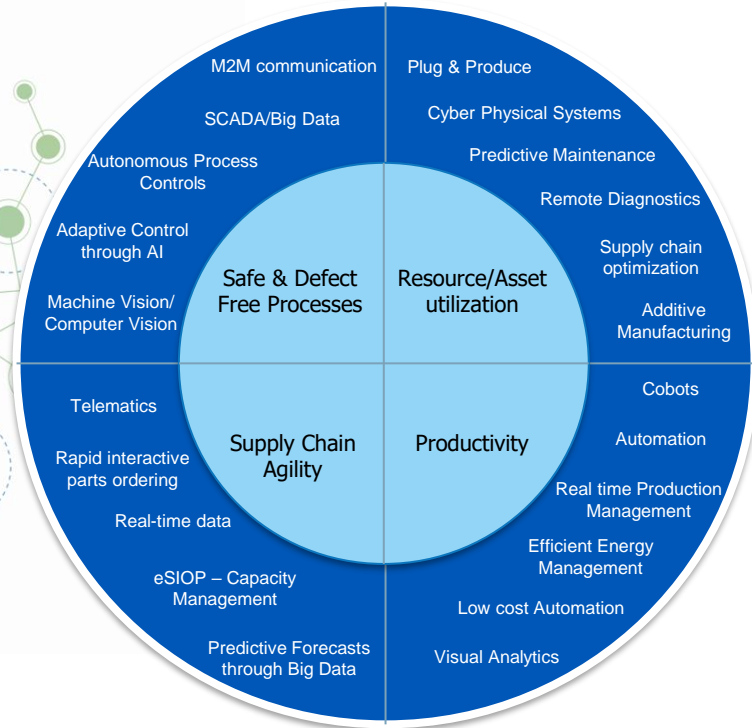
Digitalisation & Sustainability

Building Factory for Next Decade

Mission/Vision

Unify data across the value chain to optimize process and generate more value

Digital Compass



Driving Excellence in Execution leveraging I4.0

Automated Guided Vehicle
reducing manual effort in material movement



AI based Ergonomics Assessment to evaluate risks & potential improvements



AI based Blindspot Detection Assessment for improved material handling safety.

M2M Communication & Process Traceability to prevent defects being passed to next station



AI Based Vision Inspection System for mistake proofing & visual inspection of products



Safety

Delivery

Quality

Productivity



RPA for seamless exchange of information
– reduced delay & missing information

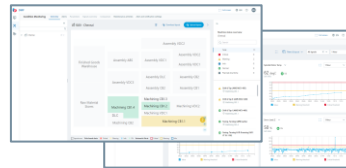


Truck in Truck Out – use of barcoding to reduce vehicle traffic within plant premises

Barcoding Automation – Keyboard less operations in Stores & Warehouse



Digital loss management system – PDCA in real time



Condition Monitoring – prevent critical breakdowns



Energy Monitoring – to improve energy efficiency

Lead Sustainability – “Be Ahead of Targets” – Scope 1&2

Global targets



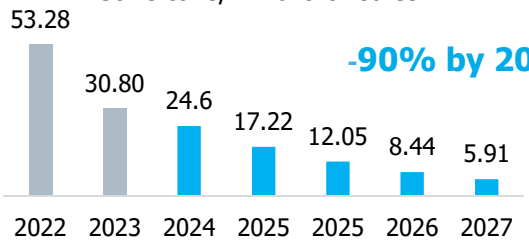
-80%



We will reduce **our own CO₂ emissions** – Scope 1 & 2 – at all ZF plants worldwide by 80% compared to 2019 by 2030

India targets

Co2e tons/M Euro of sales



-90% by 2027



Scope 1 & Scope 2 reduction to 90% by 2027 driven by **100% Renewable Energy**
Till date 3 plants have reached **>95% RE**



Onsite generation – 10%

All sites built with **roof solar** onsite generation, to support **>10% RE**

Long term contract(PPA)

Group captive wind and solar long term PPA signed to support **> 90% RE**

Phasing out of fossil fuel

Phasing out of fossil fuel in kitchen with electrified induction vessel across the sites



Lead Sustainability – “Be Ahead of Targets” – Scope 3

Global targets



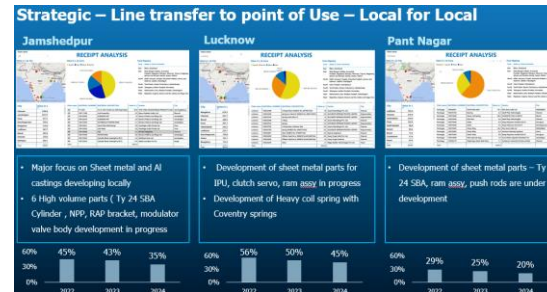
-40%



We will reduce CO₂ emissions from upstream and downstream by 40% compared to 2019 by 2030



Use of EVs in last mile transportation (both upstream, downstream)- initiated in one location

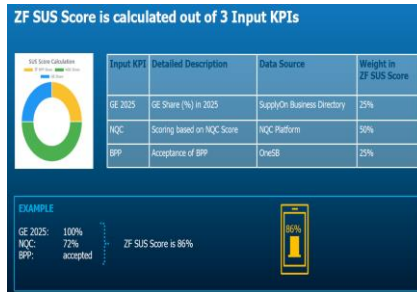
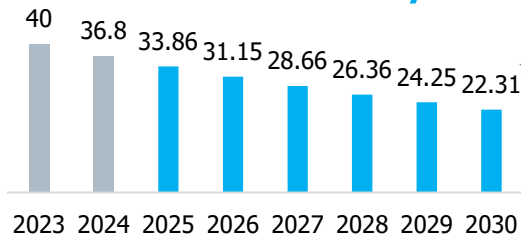


Optimizing supply bases closer to manufacturing locations, 18 line transferred

India targets

Co2e emission in ktons

-50% by 2030

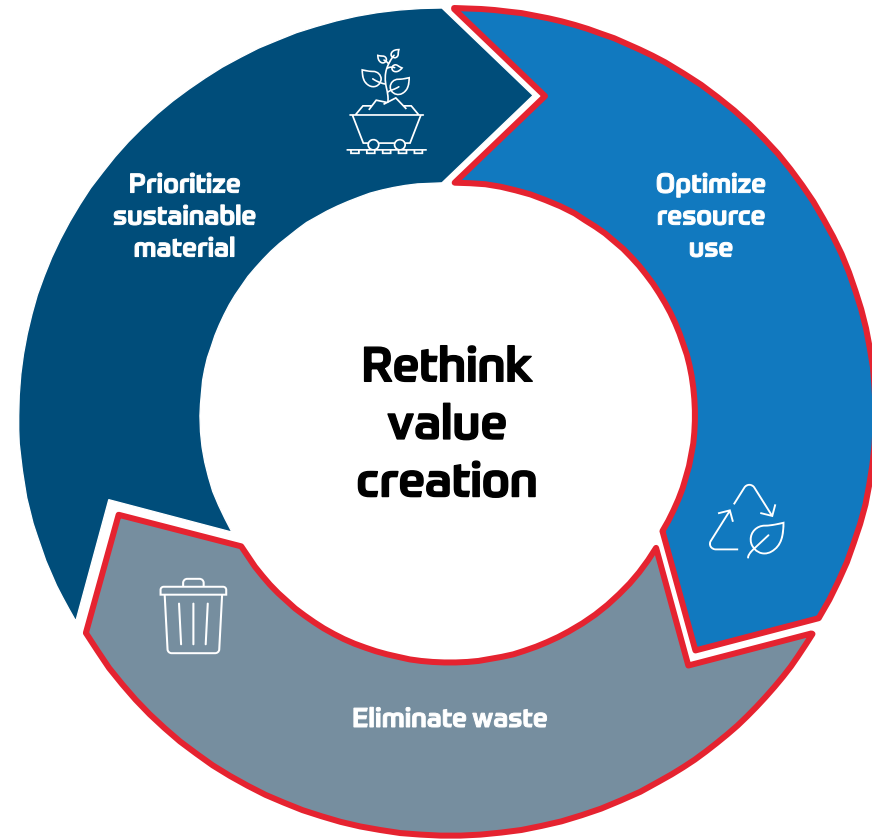


100% RE use in supply chain, one of the KPI on increasing RE



Supply chain workshop organised – TIIC support for investment

Driving Sustainable Manufacturing through Circularity



- Zero Lift/push – **Ergonomics with Advanced AI**
- Driving automation to minimise repetitive task



- Pneumatic free machines – **E Actuators in machineries**
- Switching from HP to LP



- Zero water withdrawal for process
- Water conservation & towards **water positive**



- Factory Efficiency (OEE, FCP)
- Efficiency using Analytics & **Digitalization**



- **Energy Efficiency Improvements**
- Scaling up Renewable energy



- **Fossil fuels zero** – Diesel & LPG
- Heat Recover & reuse



- **Green packing to customer**
- Zero One Way Packaging for supplier parts
- Reuse of scrap – Closed loop
- **Zero waste to landfill & incineration**

DEI

Diversity

- Gender Diversity – 26% Female Workforce (targeting 40% by 2030)
- Geography - People from different districts and regions (25% from Kerala, 15% from Andhra Pradesh, 58% from Tamil Nadu, 2% from Northern States).

Equity

- Focusing on equitable opportunities for all employees, regardless of background (Equal Opportunity, Equal Remuneration)

Inclusion

- Safe and supportive work environment for all employees.
- 13 Differently abled employees in our Ambattur site and targeting around 50 by the end of 2025
- Policies formulated to improve equity and inclusion.



05

Awards & Recognition

TEI Awards & Recognition



ACMA's National Kaizen WINNER in Safety category -2024 (Jamshedpur)



Excellence Award from QCFI National QCC Competition -2024 (Lucknow)



First runner-up Award from ACMA's Regional SMED -2024 (Mahindra City)

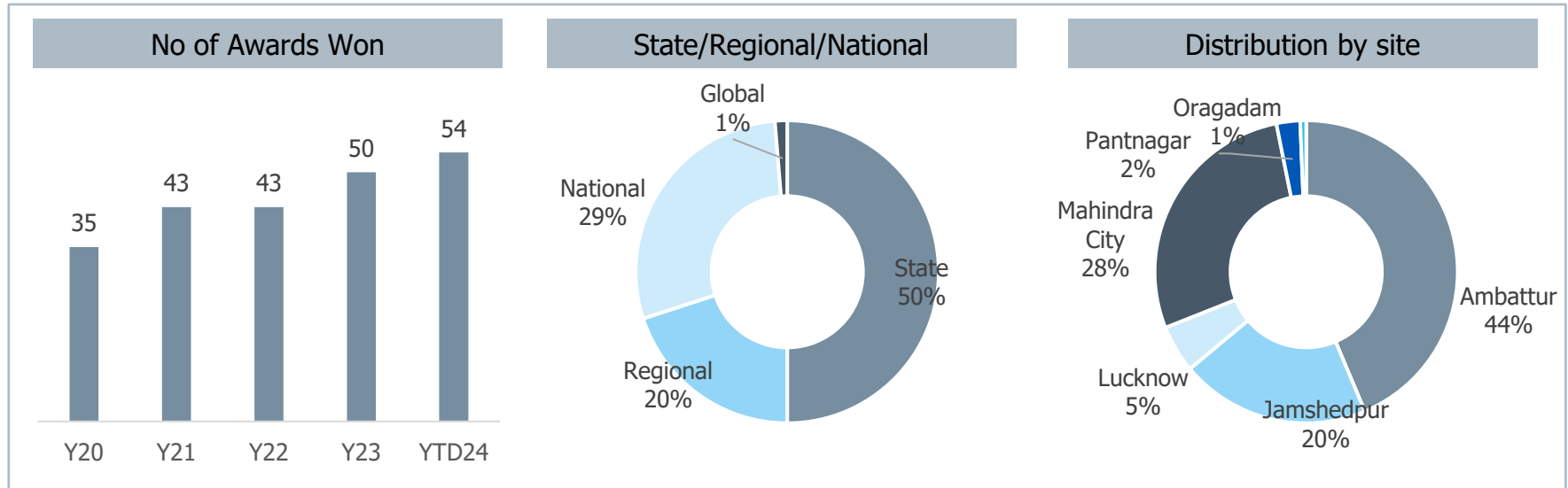


Gold Award in QCFI State level QCC Competition -2024 (Pantnagar)



Platinum Award in CII National Low-Cost Automation -2024 (Ambattur)

TEI Awards & Recognition



TEI Awards (last 5 yrs)

230 Awards

66 National Awards

46 Regional Awards

Customer Awards



**TATA Motors
Technology and Innovation Award**



**Ashok Leyland
Impactful Innovation – Gold Award**



**Mahindra Truck & Bus
Best Technology Partner Award**



**VE Commercial Vehicles
Partnership & Collaboration Award**



**Daimler India
Q-Prime Award**



**TATA Motors
Sustainability Excellence Award**

Thank You

