VIDA
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Smart Manufacturing & EVs: Powering the Shift to Net Zero Mobility

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Hero MotoCorp Limited

Be the Future of Mobility

Create | Collaborate | Inspire

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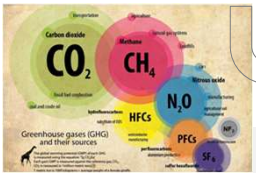
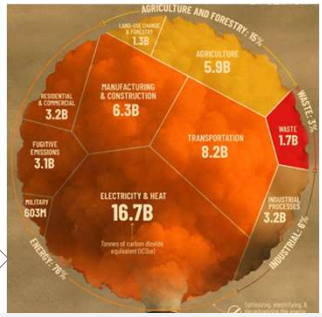
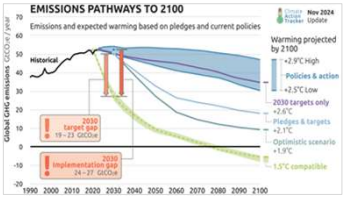
Global Climate change and actions across globe

GHG Emissions Scope 1/2/3 → **Global Warming** & Climate Change → Paris Agreement & Conference of the Parties Meets 2016 **Global Commitments** → Nationally Determined Contributions **(NDCs)** 195 parties are obliged → Temperature Rise to save ~~1.5° Pathway~~ **<2° C Pathway** → ?





For easy calculation & representation, all **GHG gases are converted into equivalent CO_2 with** Unit as **tCO_2e**



India NDC Targets
- 45% Carbon emission reduction by 2030 with baseline year 2005
- 50% electrical energy capacity from non- fossil fuel source by 2030
- 500 GW non-fossil energy capacity by 2030
- Net zero target by year 2070

Goal is to keep the increase in global average temperature to well below 2 °C from pre-industrial levels and **to pursue efforts to limit the increase to 1.5 °C**

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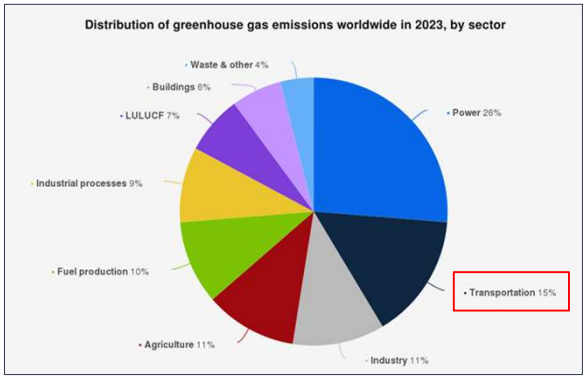
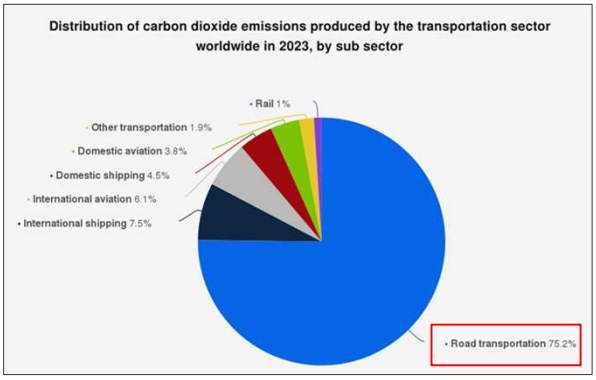
Why Net Zero Mobility Matters?



Transportation sector is second largest contributor to GHG emissions worldwide in 2023.[1]



Road transportation alone accounted for three-quarters of this total.[2]

1. https://www.statista.com/statistics/241756/proportion-of-energy-in-global-greenhouse-gas-emissions/

2. https://www.statista.com/statistics/1185535/transport-carbon-dioxide-emissions-breakdown/#statisticContainer

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EVs: The Key Technology to Decarbonize Road Transport

Key Factors:-

- Eliminating direct emissions by significantly reduce pollutants like CO2, nitrogen oxides, etc.
- Supporting renewable energy integration by serving as a mobile energy storage.
- Decreasing lifecycle carbon footprint due to improvements in battery recycling and sustainable manufacturing processes

India's 2030 Targets:

- 30% all vehicle electrification.
- 80% two/three-wheeler electrification.

EV Statistics:

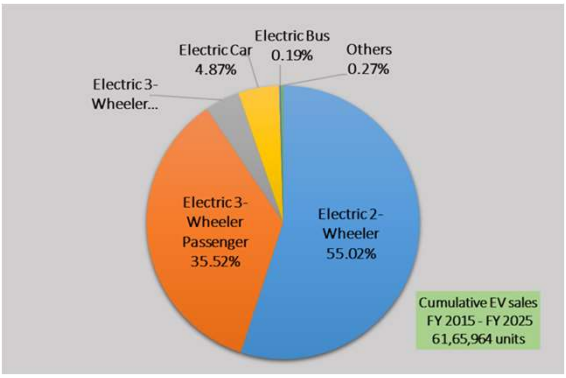
- ~6.2M cumulative EVs on roads.
- 2M+ EVs sold in FY 2025 (record).

Electric two-wheelers:

- ~1.2M electric two-wheelers sold in FY25.
- 20% YoY growth, 42x increase since FY2020.

Source: https://jmkresearch.com/indias-electric-vehicle-sales-crossed-2-million-in-fy2025/

Vehicle Category-Wise Market Share in India (FY 2015 - FY 2025)



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India's Initiatives for Net Zero Mobility in the Auto Sector

- **India's Commitment:** India has an ambitious net-zero target by 2070, with interim goals like reducing GHG emissions by 45% by 2030 (versus 2005 levels) and meeting 50% of electricity capacity from renewable sources by 2030.

- **Key Government Schemes & Policies:**
  - **FAME (Faster Adoption and Manufacturing of Hybrid & Electric Vehicles) Scheme:**
  - **Production Linked Incentive (PLI) Schemes:**
  - **Scheme to Promote Manufacturing of Electric Passenger Cars in India (SPMEPCI):**
  - **PM Electric Drive Revolution in Innovative Vehicle Enhancement (PM E-DRIVE):.**
  - **Corporate Average Fuel Economy (CAFE) Standards:**
  - **Flex Fuel & Bio fuel adoption promotion**

- **Local Manufacturing and Value Addition: "Make in India" initiative's role in the EV sector is paramount.**

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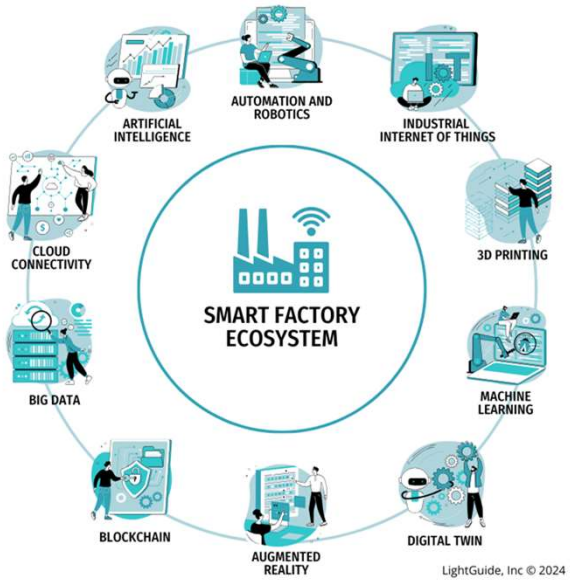
Smart Manufacturing



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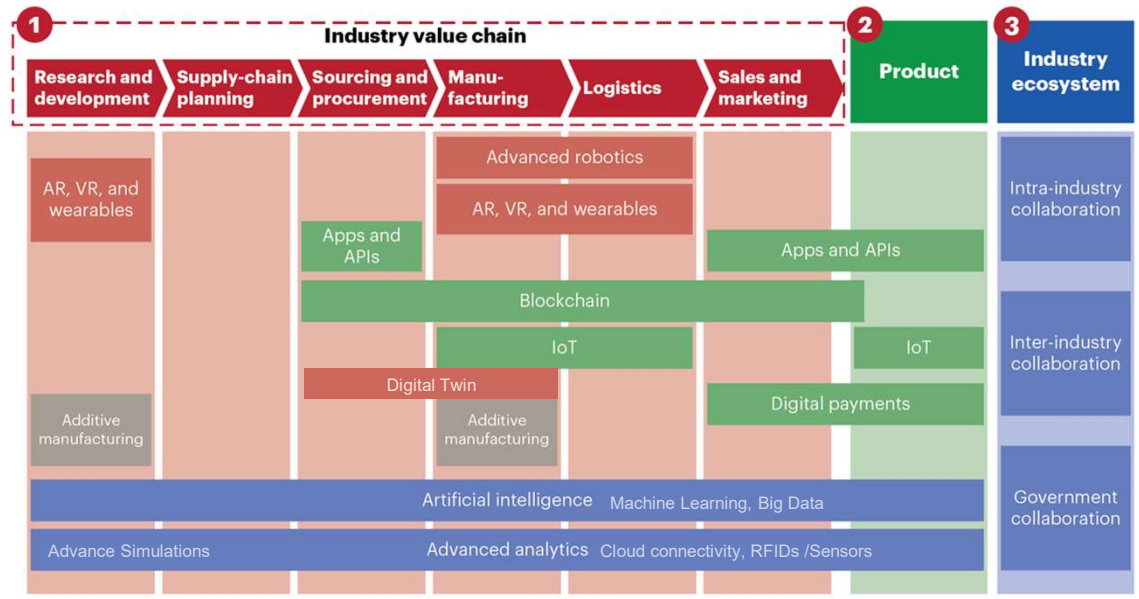
Applicability of key digital technologies in the automotive industry



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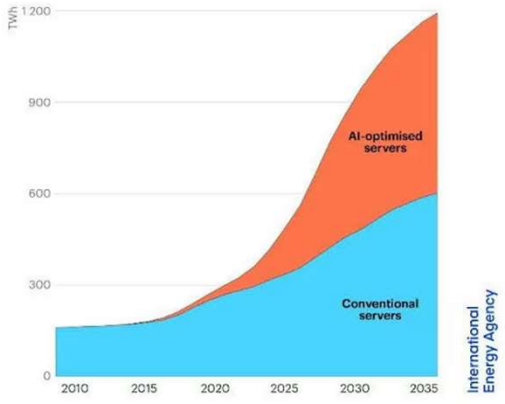
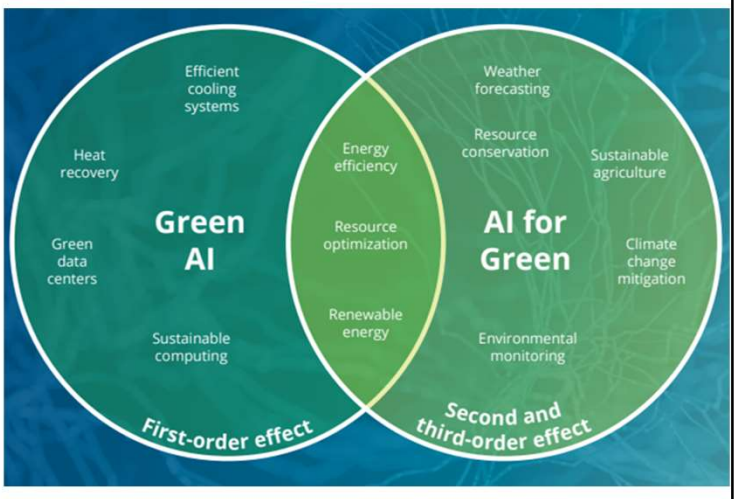
Smart Manufacturing

Is it really Carbon Friendly?

Data centre electricity demand is set to surge in the next decade, driven by AI

Data centre electricity demand, historical & projected through 2035





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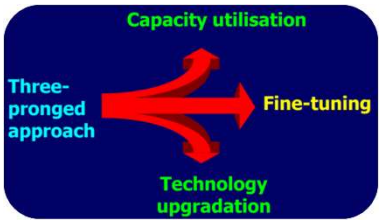
Smart Manufacturing – Designing Smart Factories & Processes

1. Carbon Neutrality

- ❑ Installing Onsite Solar
- ❑ Renewable Energy Wheeling
- ❑ Energy Efficiency Improvement



- ❑ Exploring Green Fuels for generating electricity for Thermal substitution

2. Water Positive

Put back more water into the fresh water sources than it extracts.

3M	7R
Map	Reduce
Monitor	Recycle
Measure	Recover
	Replenish
	Recharge
	Rejuvenate
	Recognize/ Respect

- ❑ Effluent Treatment Plants
- ❑ Zero Liquid Discharge
- ❑ Rainwater Harvesting
- ❑ Water efficiency

3. Waste Neutrality

Bottom up approach for waste management

- ❑ Canteen Waste composting
- ❑ Co-Processing with Cement Industry
- ❑ Zero Waste to Landfill plants

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Smart Manufacturing – Designing Smart Factories & Processes

4. Green dealerships / Suppliers

- ❑ Increase use of Clean Energy
- ❑ Incorporate Green into the Product Strategy
- ❑ Incorporate Green across the entire Value Chain

- ❑ **Energy Conservation:** Star Rated Appliances
- ❑ **Digitization:** E-Shop Virtual Showroom, Digital Payment
- ❑ **Disposing :** Lubes & Wastes

5. Product Recyclability

- ❑ Extended Producer Responsibility (EPR) obligation for End of Life (ELV)
- ❑ Creating a circular economy by 3 R approach and end life treatment

- ❑ RVSF (Registered Vehicle Scrapping Facility) tie-up
- ❑ Exchange Bonus Campaign in DMS with ELV flag.
- ❑ Build logistic ecosystem for ELV

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Hero MotoCorp: Sustainable smart manufacturing

Hero MotoCorp's Sustainability goals

- 100% Carbon Neutral Operations* by 2030
- 100% Green Dealerships by 2030

Already achieved by 2025:

- 500% Water Positivity
- 95% Product Recyclability
- 100% Zero Waste to Landfill Facilities

Sustainable and Smart Manufacturing Facilities

Tirupati Plant - Our EV Manufacturing Facility

- Rated **GreenCo Gold** in accordance with Green Company Rating System (Version-4 guidelines)
- Focuses on producing EVs and offers a comprehensive ecosystem for battery pack manufacturing and testing, vehicle assembly, and end-of-line testing.
- Operates largely on solar power during the day
- Employs zero liquid discharge (ZLD) water systems, and
- Designed to be resource-efficient, incorporating rainwater harvesting and energy-efficient systems to minimize its environmental impact.

*Require collaborative approach with Policy makers, Technological advancement etc,

Road Construction with Recycled Plastic

63,743 sqm road constructed with 21 tonnes of plastic waste.

Waste Collected from local community and effectively used, the waste that would otherwise ended up in landfills.

The shredded plastic has led to an impressive 8% saving in bituminous content

Hero Journey – Product Stewardship

2 Stroke -> 4 Stroke Scooter -> Bike

Best in class product emission levels much ahead to competitors and Govt. Norms

Hero Commitment to EV Journey

1984-> | 2000 | 2001 | 2005 | 2010 | 2017 | 2020 | 2021-22 | 2024

BS1 | BS2 | BS3 | BS4 | BS6 | EV Promotion & Subsidy

Emission	BS 0	BS0	BS 1	BS 2	BS 3	BS4	BS6
CO	12-30	4.5	2	1.5	1.0	1.403	92% Reduction
HC + NOx	-	3.6	2	1.5	1.0	0.59	84% Reduction
NOx	-	-	-	-	-	0.39	88% Reduction 0.060
HC / NMHC	8-12 / -	-	-	-	-	-	99% HC Reduction & NMHC limit addition 0.1 / 0.068

With deterioration factor due to NOx introduction

Pollutants in g/km

Flex Fuel Vehicle

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Future of mobility

Our EV Presence

VIDA V1 Plus model
This model's unique features include two removable batteries, spacious seating, exceptional comfort, and 50+ riding modes.

Launch of VIDA V2
Hero MotoCorp entered the mass market EV segment in India with a new range of VIDA V2 electric scooters ensuring accessibility and affordability –
V2 Lite, V2 Plus and V2 Pro.

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Surge S32 – Mobility through Sustainable Innovations

- Hero MotoCorp-backed Surge S32 stands out for its ability to transform from a nimble electric scooter to a stable three-wheeler.
- Recognized at Global Stage Surge S32 is honored with the Platinum **A' DESIGN Award**, **Red dot: Best of the Best & featured in TIME BEST INVENTIONS OF 2024** which is a highly respected recognition in the field of vehicle design, celebrating exceptional works that showcase innovation and benefit society.

Recent approval from the Ministry of Road Transport and Highways (MoRTH) introducing a **new category of three-wheeled motor vehicles known as "L2-5",** which blends elements from both two-wheeled and three-wheeled vehicles.

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VIDA ACRO

- VIDA Acro is a revolutionary **electric-powered kids' mobility solution** that evolves alongside young riders, adapting seamlessly to their physical development from **ages 4 to 10**.
- **Developed at Hero Tech Center Germany** for the world, Acro's fully modular design transforms a common challenge "outgrowing bikes" into an opportunity for continuous growth and excitement.

VIDA Acro kids motorcycle concept has been awarded the prestigious Red Dot Award: Design Concept 2025, celebrating innovation and design that lasts long.
This recognition places Vida Acro among the world's leading product designs.

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Battery Tech Evolutions & Lifecycle Management

Long-Term (>2030)

Transition phase with high energy density and bigger form factor

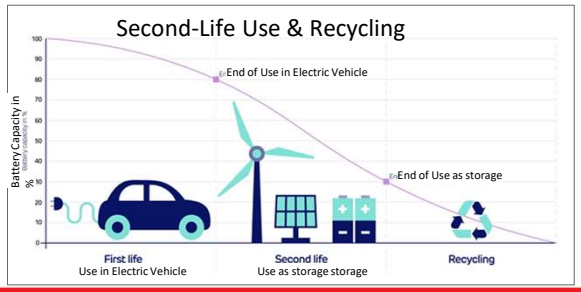
Current tech

- Commercial off the shelf
- Technology – Li –Ion based, NMC & LFP dominant
- Format – 2170 majority
- Major Cell partner – LG chemical, BAK, Samsung, Panasonic, CATL, BYD

- Technology – NMC, LFP, **LMFP, Na-Ion**
- **Format – 2170, 4680, 4695, 46120**
- Cell partner – BYD, BAK, CATL and others

Future Technologies

- Metal-Air
- Li-metal/Si
- Fuel cell tech
- Solid state



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The Net Zero Mobility Ecosystem: A Collaborative Approach

Ultimately, achieving net-zero mobility demands a deeply collaborative ecosystem.

- **Interconnectedness:** Smart manufacturing, EVs, a green grid, and supportive policies are not isolated components but part of a larger, interconnected ecosystem for net-zero mobility.
- **Role of Stakeholders:**
  - **Manufacturers:** Investing in green technologies, sustainable materials, and closed-loop systems.
  - **Energy Providers:** Accelerating the transition to renewable energy sources and developing smart grid solutions.
  - **Policymakers:** Creating enabling regulations, incentives, and infrastructure for both EV adoption and green energy generation.
  - **Consumers:** Making informed choices and embracing sustainable mobility options.
- **Measurement and Reporting:** We must emphasize the importance of comprehensive **lifecycle assessments (LCAs)** to accurately track and reduce Scope 2 and Scope 3 emissions across the entire value chain of EVs

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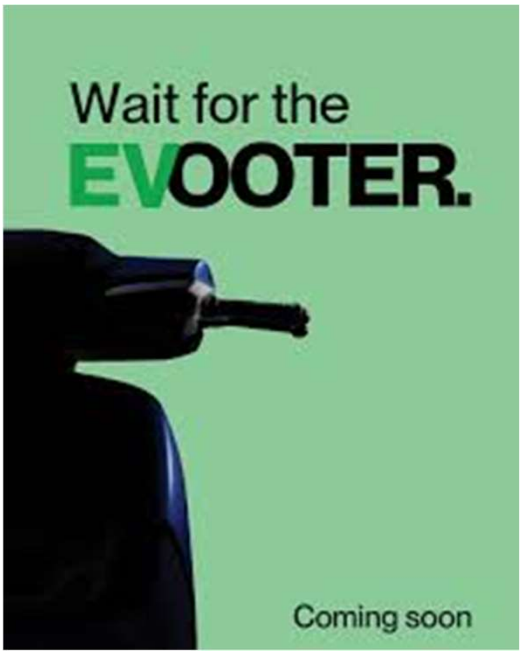
"Renewable. Purposeful. Human."



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