

ASCELA

ASCELA, in Association with



ESG - A Roadmap for Sustainable Infrastructure

The paper delves into the role of Environment – Social – Governance (ESG) in key Infrastructure Sectors and highlights recent trends in ESG.

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The world has witnessed an unprecedented shift in the global business paradigm in recent years. No longer is profitability solely defined by the books and shareholder value. Business expectations now encompass a broader spectrum of responsibilities towards Society, the Environment, and Corporate Governance. Moreover, building a healthy business environment is in the interest of all stakeholders and demands effort by all.

At Asia Aviation Associates and InfraLOG, knowledge and awareness are powerful catalysts for transformation. Our mission is to provide you with the most insightful and up-to-date information on the contemporary business environment in India, and ESG compliance is at the heart of this transformation. I'm confident that the knowledge shared in this Insight Paper will inspire and empower you to embrace the ESG imperative in India's transport and logistics infrastructure.

”

Dinesh Kumar
Managing Director, MBA, IAP
Asia Aviation Associates
InfraLOG



“

The transport and logistics sector has undergone significant transformation recently, driven by technological innovations and growing recognition of Environmental, Social, and Governance (ESG) considerations. The sector encompasses the intricate web of Supply Chain Management, transportation, and distribution and is now actively embracing ESG principles to address the pressing challenges of maintaining sustainability and responsible business practices.

This paradigm shift towards ESG adoption in logistics positions companies as responsible stewards of the environment and society and fosters resilience, innovation, and long-term value creation in an increasingly interconnected global marketplace.

This paper dwells on the significance of adopting ESG compliance in the transportation and logistics sector. ASCELA, with its deep-rooted expertise in this sector, brings to the forefront a plethora of sector-specific knowledge. We at ASCELA would be pleased to collaborate with government and private clients, emphasising their dedication to advancing industry practices with a focus on ESG considerations.



Nivesh Chaudhary
Managing Director, Infrastructure Advisory,
ASCELA



Embracing sustainability (Environmental), ensuring fair labour practices (Social), and enforcing transparent operations (Governance) are no longer optional.



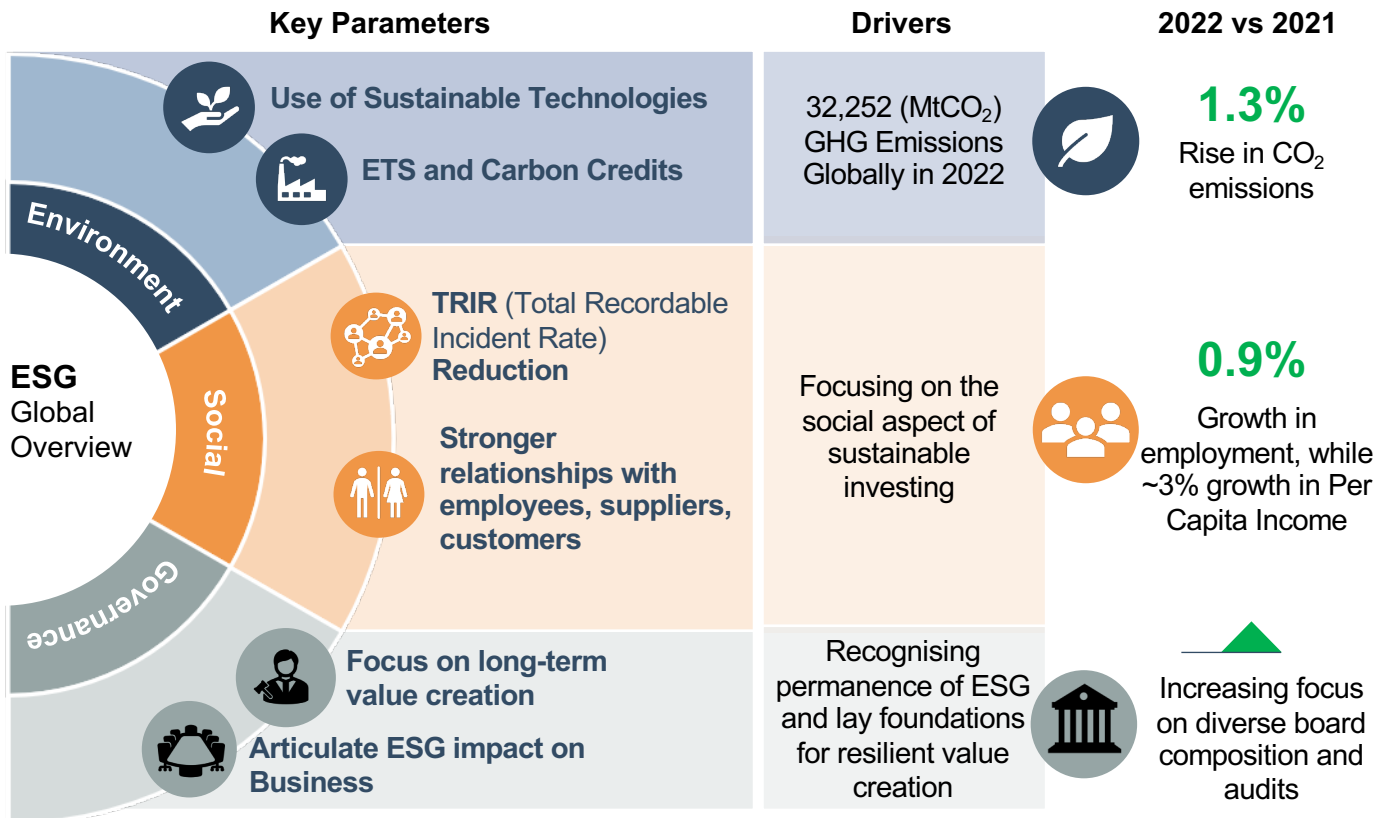
Environment-Social-Governance (ESG)

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Environment – Social – Governance

The BIG Picture

Businesses are incorporating Environment – Social – Governance (ESG) into their plans and projects to drive long-term sustainability. The **COP27** (Conference of the Parties) in Sharm El-Sheikh, Egypt, brought global attention and audience to ESG-related concerns. ESG is to play a bigger role in how companies are assessed by investors, consumers, and stakeholders.

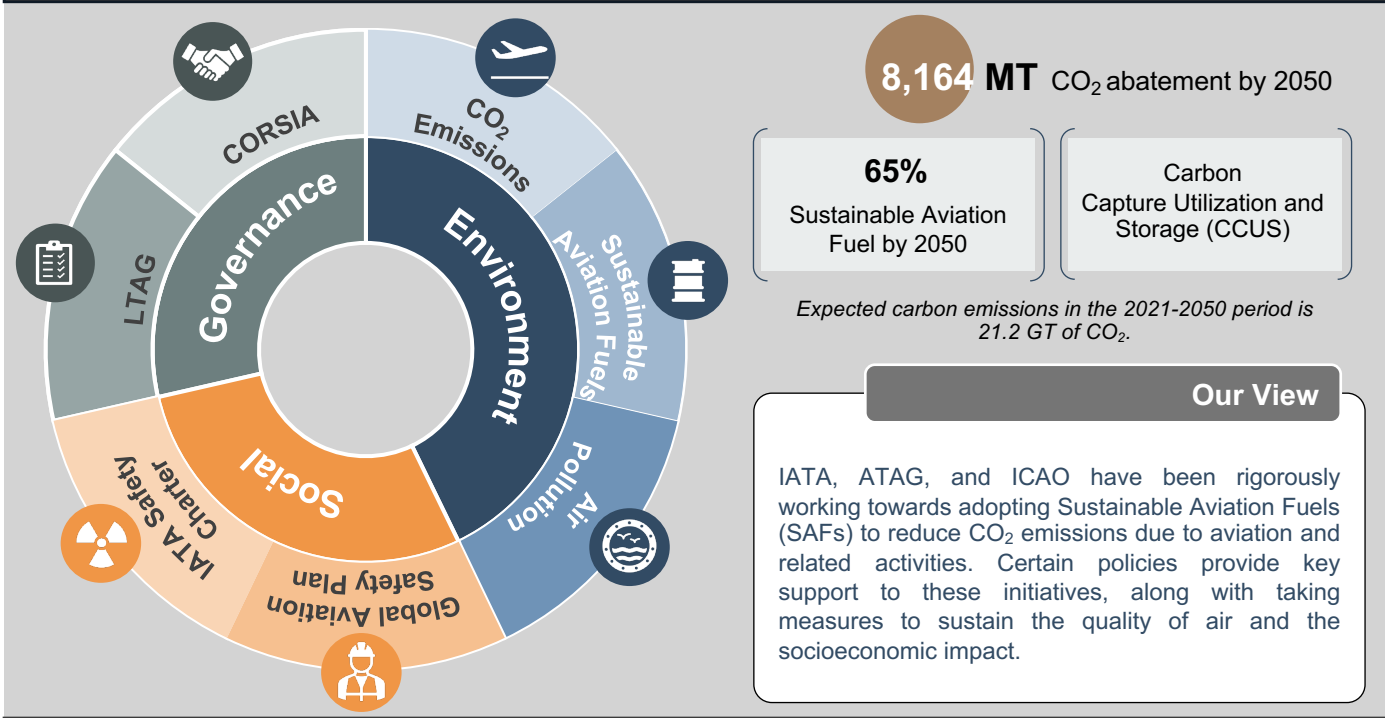


ASCELA's View

Integrating ESG principles into Infrastructure strategy benefits the Environment and Society and drives long-term business value. By incorporating ESG factors into decision-making processes, companies can mitigate risks, enhance their reputation, attract investors, and foster resilience in the face of evolving market dynamics.

ETS- Emission Trading Scheme, TRIR- Total Recordable Incident Rate, SEC- Securities and Exchange Commission

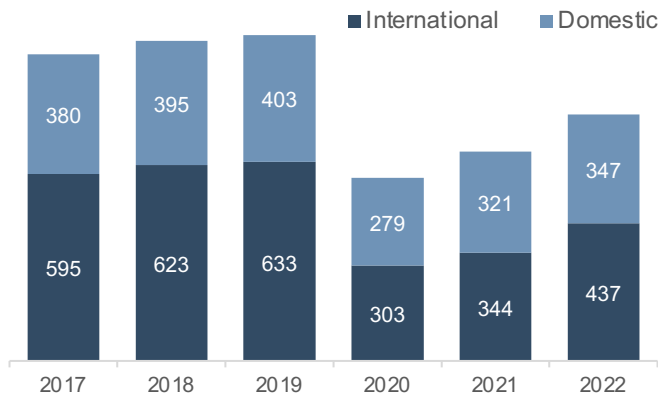
1. Aviation Sector



Environment		Investment Potential	Sector Outlook
CO ₂ Emissions	Science-based targets	Low	<ul style="list-style-type: none"> Use of SAFs to reduce CO₂ emission
Alternate Fuels	Sustainable Aviation Fuels (SAFs)	High	<ul style="list-style-type: none"> Bunkering Infrastructure Aircraft development
Ecological Impact	Air Quality	High	<ul style="list-style-type: none"> Use of SAFs and Biofuel to reduce CO₂

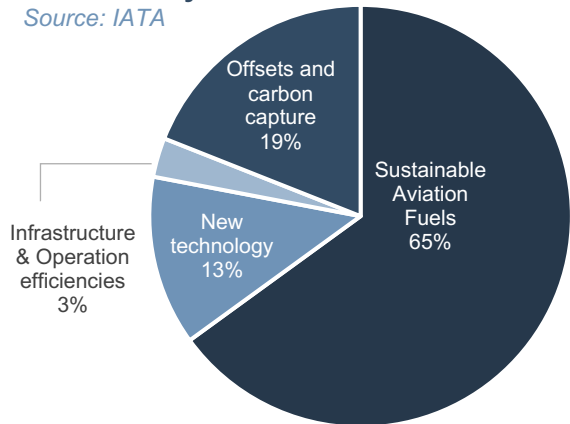
CO₂ emissions in Aviation Industry (in Mt CO₂)

Source: International Energy Agency



Possible factors for reducing Aviation carbon emissions by 2050

Source: IATA



Key Global Insights

25 airlines, primarily based in the US and Europe, have committed to setting targets aligned with climate goals.

Airbus and Ariane Group announced to build first liquid hydrogen refuelling facility for ZEROe aircraft at Blagnac Airport in Toulouse, France.

Oneworld Alliance members announced the yearly purchase of up to 200 million gallons of Sustainable Aviation Fuel from Gevo.

Fuel for net-zero flying path

	2030	2040	2050
Commuter (<60 minutes)	Electric or Hydrogen fuel cell and/or SAF	Electric or Hydrogen fuel cell and/or SAF	Electric or Hydrogen fuel cell and/or SAF
Regional (30-90 minutes)	Electric or Hydrogen fuel cell and/or SAF	Electric or Hydrogen fuel cell and/or SAF	Electric or Hydrogen fuel cell and/or SAF
Short-haul (45-120 minutes)	SAF	Hydrogen and/or SAF	Hydrogen and/or SAF
Medium-haul (60-150 minutes)	SAF	SAF Potentially some Hydrogen	SAF Potentially some Hydrogen
Long-haul (150 minutes)	SAF	SAF	SAF

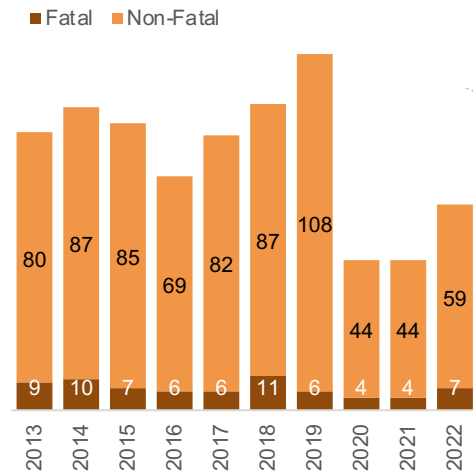
Social

Investment Potential Low High

Accident & Safety	Global Aviation Safety Plan	Reduction in global accident rate along with improvement in air navigation and aerodrome facilities that meet ICAO Standards.	Sector Outlook <ul style="list-style-type: none"> Aerodrome integration with AI to reduce fatalities Well-defined training programs encouraging enhanced Aviation safety
Employee Benefits	IATA Safety Leadership Charter	Strengthens organisational safety culture as a driver for continuous improvement in safety performance.	

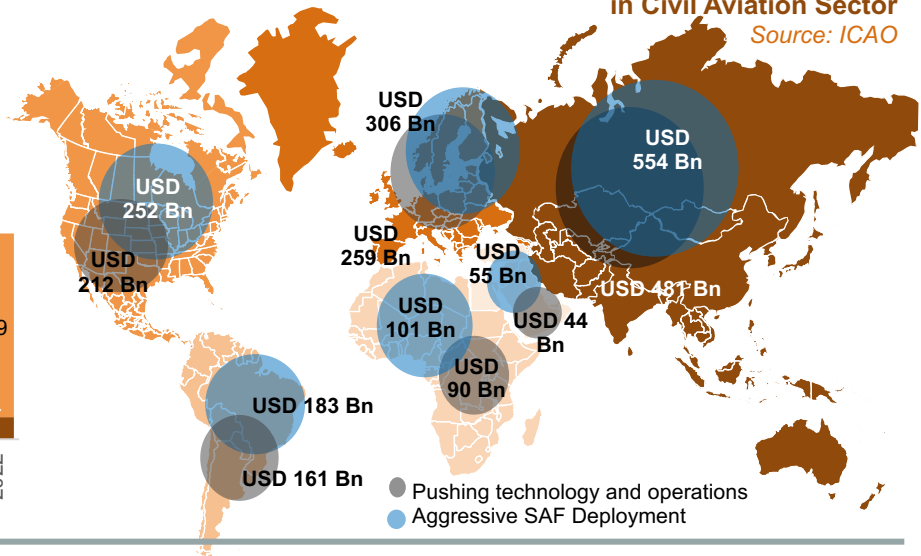
Number of Aviation accidents globally

Source: ICAO



Region-wise Infrastructure investment required as of 2022 in Civil Aviation Sector

Source: ICAO



Governance

Investment Potential Low High

Collaboration / Partnership	Long Term Aspirational Goal (LTAG)	Aims to reduce emissions in the aviation sector (i.e., directly from Aviation activity, as opposed to via offsetting emissions through the purchase of credits)	<ul style="list-style-type: none"> Companies' self-commitment aiming at achieving SDGs.
Policy/ Framework	Carbon Offsetting and Reduction Scheme for International Aviation (CORSA)	Countries agreed on a new baseline for the CORSIA at 85% of the 2019 emissions level of International Aviation, which may only be possible by using Sustainable Aviation Fuel.	<ul style="list-style-type: none"> Robust Governance and Policies should indirectly reduce the overall emissions.

Key Global Insights

McKinsey recently developed 1.5°C scenario that should see reduction in aviation emissions of 18 to 35% compared with the 2030 pathway.

The frequency of climate-related discussions in European earnings calls with investors increased nearly sevenfold since 2017.

Norway has mandated that 0.5% of Aviation fuel in the country must be sustainable in 2023, growing to 30% by 2030.

2. Maritime Sector



70% Reduction in Carbon Emissions by 2050

40%
Reduction target by 2030

2%
Current share in CO2 Emissions

International Maritime Organization (IMO)

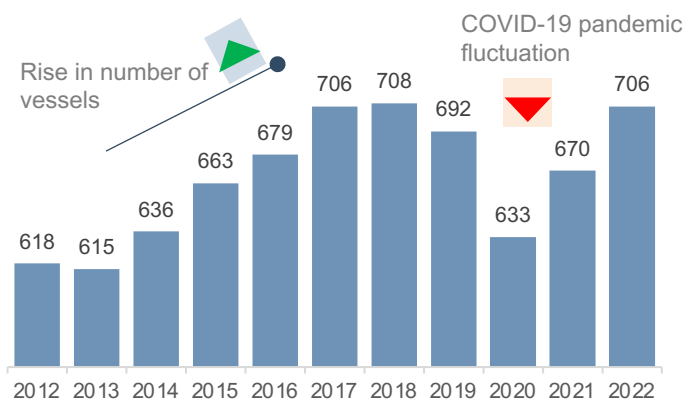
Our View

Emphasis on sustainability practices is growing globally in the Shipping Industry. We believe the industry would likely witness increased focus on sustainability in the ship-building, recycling, and repair sectors. International Maritime Organization (IMO) also has been increasingly focusing on ship-building, recycling, and repair sectors and using alternate fuels in Shipping.

Environment		Investment Potential	Low	High
CO₂ Emissions	ETS and Carbon Trading	Maritime industry is highly dependent on fossil fuels and emitted about 1.2 gigatons of Carbon Dioxide equivalents (CO ₂ e) in 2020		
Alternate Fuels	Cleaner Fuels	According to IEA, alternate fuels to contribute 64% in CO ₂ reduction by 2050		
Ecological Impact	Ballast Water Management	New vessels to install upgraded ballast water treatment systems for continuing sailing from 2024		
		Sector Outlook		
		<ul style="list-style-type: none"> Use of Alternative Vessel Fuels Green Bunkering Shipbuilding for Dual-fuel Vessels Reuse of ballast water Reduction of Oil spills 		

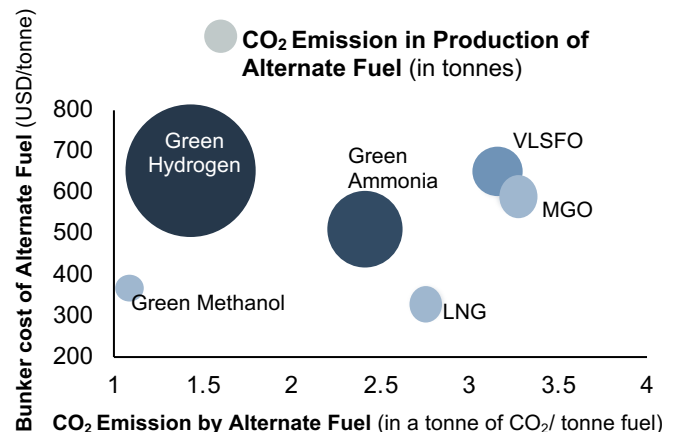
CO₂ Emissions by the International Shipping from 2012-2022 (in MTPA)

Source: International Energy Association



Comparison of Alternate Maritime Fuels

Source: International Energy Association



Key Global Insights

Maersk announced to establish Europe's largest production facility of Green Ammonia. Significant reduction in CO₂ emissions anticipated.

McKinsey collaborated with Maersk (Mærsk Mc-Kinney Møller Center) for Zero Carbon Shipping to create blueprints of Green Corridor projects.

DB Schenker and Volvo Cars partnered to develop 12,000 TEUs vessels using biofuel, reducing CO₂ emissions by around 85% per container.

Social

Investment Potential Low High

Accident and Safety	IMO Regulation	Casualty Investigation Code mandatory for safety investigations into marine casualties.	Sector Outlook <ul style="list-style-type: none"> Aims to standardise safety measures Aim to maintain safety standards as per IMOs regulations
Employee Benefits	UNCTAD, IMO, ILO, and WHO	Issued a Joint Statement to address the crew change crisis, safeguard seafarer health and safety, and avoid supply chain disruptions.	

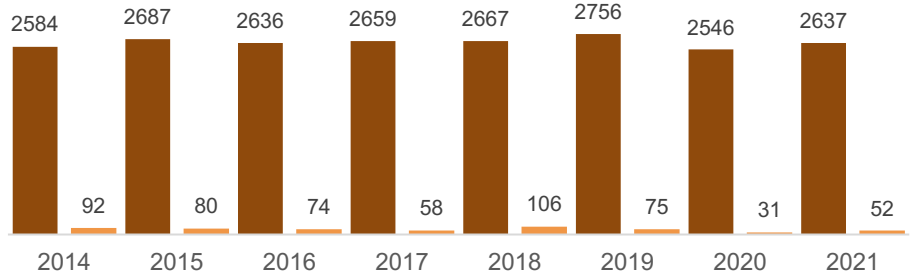
Number of Maritime Casualties between 2014-2021 (EU Member States)

Source: European Maritime Safety Agency

2647

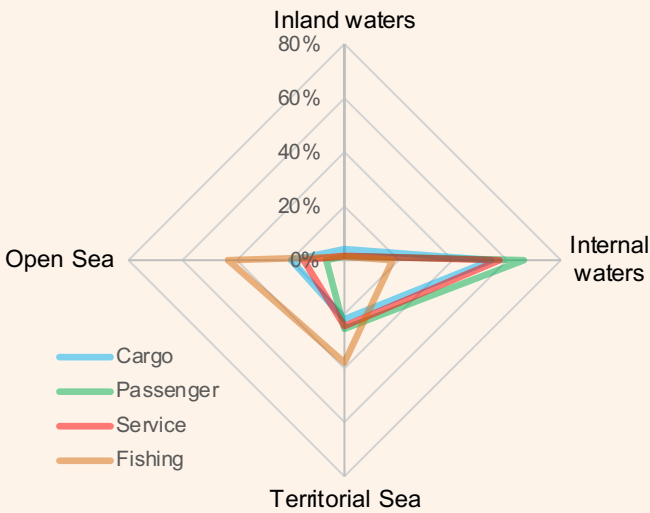
Annually average casualty

From 2014 to 2021, there were 21,173 reported marine casualties in EU Member States.



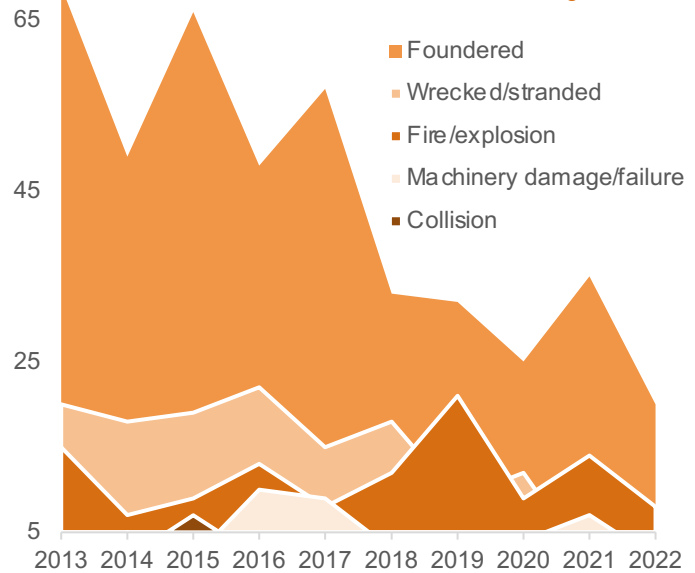
Percentage of marine casualties by Navigational Area and Ship Type

Source: Compiled by Consultant



Total vessel losses by cause 2013-2022

Source: International Maritime Organization



Governance

Investment Potential Low High

Collaboration/ Partnership	Green Voyage 2050	Aims to reduce GHG emissions from Vessels and develop new and innovative solutions to support low-carbon shipping.	<ul style="list-style-type: none"> Benchmarking policy to reduce GHG emissions Aim to find an alternative way to address surrender obligations.
Policy/ Framework	Emission Trading Scheme (ETS)	Shipping companies will face surrender obligations under the ETS, from 40% of verified emissions in 2024 and increasing to 70% in 2025 and 100% in 2026.	

Key Global Insights

Green Shipping Challenge aims to put the Shipping Sector on a pathway commensurate with limiting global temperature rise to 1.5 °C.

Ship Energy Efficiency Management Plan (SEEMP) to rate the Ship's performance.

Clean Energy Marine Hubs (CEM-Hubs) accelerate the production, transport and use of low-emission fuels, transported by Ship, making shipping an enabler of the wider energy transition.

3. Railways Sector



5% Annual reduction in CO₂ reduction by 2030, globally

<100MT CO₂

As per IEA, after 2019, peak direct CO₂ emissions from Rail remained under 100 Mt CO₂,

1%

Rail transport accounts 1% of transport emissions globally

Rail constitutes 7% global-passenger-km and 6% tonne-km

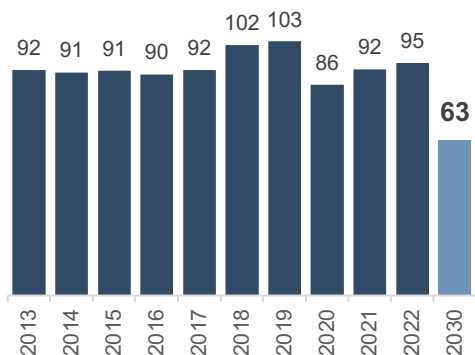
Our View

Globally, the Railway industry is increasingly adopting digital technologies, focusing on sustainability, and reducing its environmental footprint. Many countries recognised the importance of investing in their Railway infrastructure to support economic growth and connectivity. Adopting intermodal transport solutions, where containers could seamlessly move between trains and trucks, would also boost a more efficient supply chain.

Environment		Investment Potential
		Low High
CO₂ Emissions	Electrification	According to IEA, use of Diesel, accounting for 75% of its total energy consumption in 2022, may likely drop to 55% by 2030.
Alternate Fuels	Hydrogen Fuel Cell	Several countries diving into adopting hydrogen trains. Alstom has already built hydrogen train prototypes.
Ecological Impact	Waste Management System in Railways	Waste to energy/compost/biogas plants/Material recovery facilities have been increasingly adopted in many developing economies.
		<ul style="list-style-type: none"> Freight and passenger train electrification Hydrogen trains may replace diesel locomotives for long haulage Develop sustainable and ecologically sensitive measures

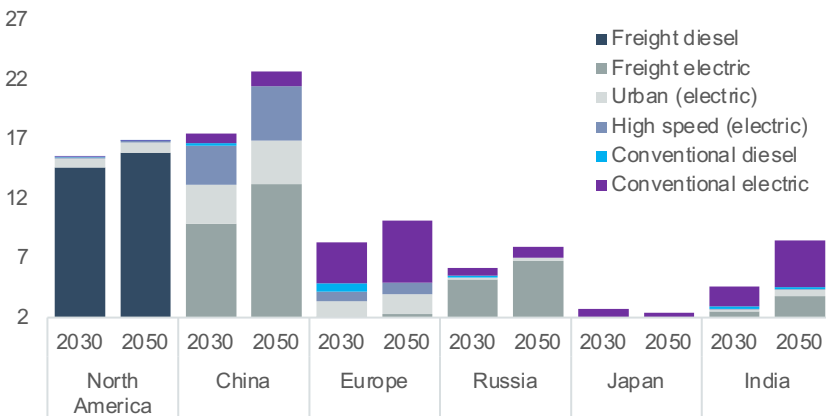
CO₂ Emissions in Rail Sector (in Mt CO₂)

Source: International Energy Agency



Energy demand from Rail in selected Regions (in Mtoe)

Source: International Energy Agency



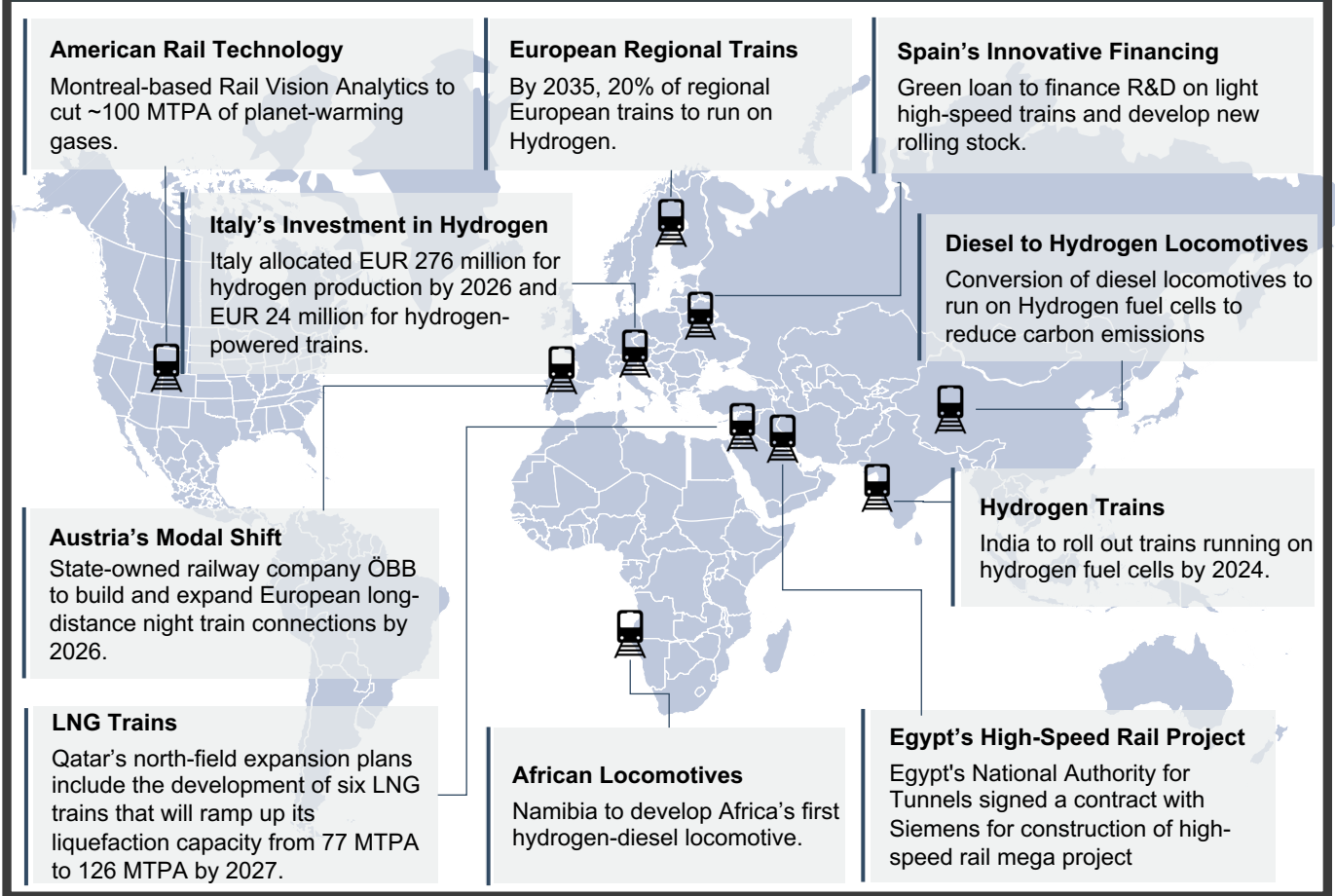
Key Global Insights

India is investing towards 100% rail track electrification and planning to develop the first hydrogen train by 2024.

Japan's Hitachi and Italy's Trenitalia presented a new high-speed Hybrid Train that can switch between battery or diesel.

The Italian Ministry of Infrastructure and Transport to invest EUR 300 million by 2026 in Hydrogen-powered rolling stock and production, storage, and supply of Hydrogen.

Global Trends in Railway Sector



Social

Investment Potential Low High

Socio-Economic Financing	Social Bonds	Equipped investors with the information necessary to evaluate Social Impact of their investments	<ul style="list-style-type: none"> Railway employment relationships are shifting from public sector regulations to private participation.
Employee Safety and Health	Occupational Risks	International Labour Organization (ILO) also addresses the issue of violence and stress at work in the Rail Sector	<ul style="list-style-type: none"> Legislation and implementation, social security and compensation, and training and reporting procedures

Governance

Collaboration/ Partnership	Green Railway Plans	Investment in modernisation and upgradation of Passenger and Freight Rail	<ul style="list-style-type: none"> Integration of Developers and Operators
Policy/ Framework	Infrastructure Investment and Jobs	Development of policies related to increase in Rail share in regional movement of Passenger and Goods	<ul style="list-style-type: none"> Modal shift towards Rail to reduce congestion from roads

Key Global Insights

New Zealand recently invested 1.1Bn NZD in KiwiRail to increase RailRoad usage to reduce overall emissions targets.

Norwegian Government allocated NOK 1,200Bn in 2023 to develop an efficient, eco-friendly and safe Rail transport system.

Once developed, the USD 22.5Bn Riyadh Metro project will be one of the City's largest Public transport network projects.

4. Road and Highways Sector



80% CO₂ reduction by 2060

~17%
CO₂ emissions of Passenger Road transport by 2060,

~80%
CO₂ emissions Freight Road transport by 2060

International Road Federation (IRF)

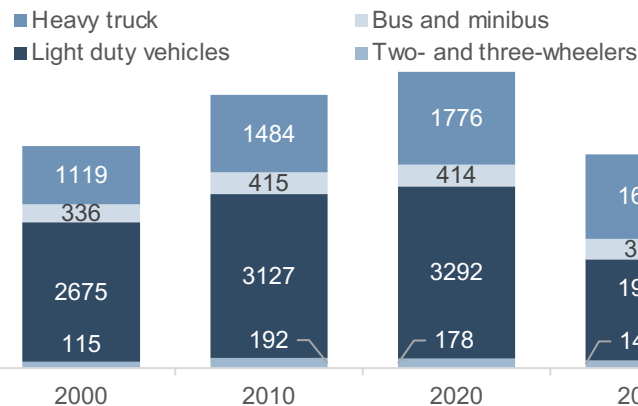
Our View

The road sector is increasingly incorporating technology into infrastructure to create “smart” roads and highways, using recycled materials in road construction, and exploring ways to minimise the environmental impact of road projects. Policy push for adopting electric cars, buses, and trucks should lead to developing charging infrastructure and policies to support EV growth.

Environment		Investment Potential	
		Low	High
GHG Emissions	Carbon Pricing	Road Transport contributes 11.9% of global GHG emissions. Carbon pricing encourages a move away from the most carbon-intensive fleets and makes low-carbon fuels more cost-competitive.	<ul style="list-style-type: none"> Carbon Pricing will likely restrict companies to emit GHGs.
Alternate Fuels	EVs and CNG	Gaining traction to reduce the dependence on fossil fuels while also reducing emissions.	<ul style="list-style-type: none"> EVs to be a preferred choice due to lower carbon footprint
Ecological Impact	Green Highways	Landscaping to remove runoff water. Electrification of road infrastructure.	<ul style="list-style-type: none"> Advanced construction material likely to provide better road quality

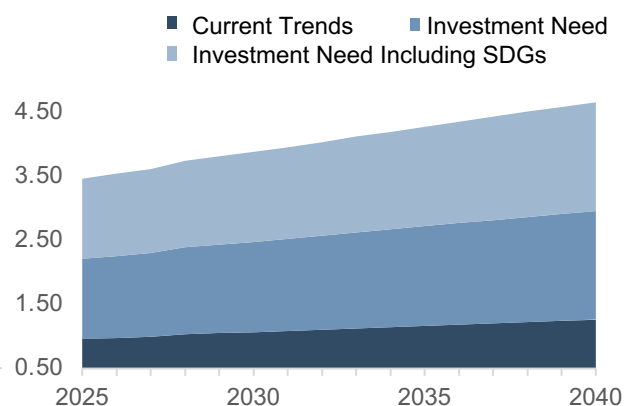
CO₂ Emissions Globally in Road Sector (in Mt CO₂)

Source: International Energy Agency



Global Road Infra Investment (in USD Trillion)

Source: Global Infrastructure Outlook, GIHUB



Key Global Insights

EV charging road to electrify highways in France and Norway. France declared to electrify 5000km of road by 2030.

Government of India and the World Bank to join hands to implement the Green Highway corridor in 4 states in India.

In India, the Zero-Fatality Corridor Solutions for Road Safety discusses environmental sustainability and focuses on reducing speeding through advanced engineering.

Socio-economic	Displacement of Residents	Locals are generally displaced due to the construction of the road. Interruption of existing social relationships.	<ul style="list-style-type: none"> Effective Land allocation policies can mitigate specific risks.
Inhabitants	Land Values	Access to roads increases economic activities, thus leading to increased land values.	<ul style="list-style-type: none"> Increased land values may help boost economic activities in the region.

Global Trends in Road Industry

IRU with the American Government
Regional departments design policies that put buses as the primary public transport, making them more user-friendly and ensuring ample intra-city bus networks.

Europe Athena for Trucks
To advance the integration of Artificial Intelligence (AI) in Connected, Cooperative and Automated Mobility (CCAM) technologies.

Middle East Logistics Institute (MELI) and Saudi Petroleum Services Polytechnic (SPSP)
Provides the oil industry with a service based on standardised norms to assess suppliers of hydrocarbon transport.

Istanbul-Tehran-Istanbul Corridor
Connects Pakistan to Turkey via Iran. Likely reduces the time of transport by up to 80% and the costs by 20% compared to traditional sea routes.

Chabahar Agreement
Connects India to Afghanistan via Chabahar port in Iran. IRU is now working to facilitate transport in the International North-South Transport Corridor (INSTC), which connects India to Russia via Iran.

African Associate Training Institute
Capacity building increases the predictability, professionalism and efficiency of transport operators and delivers improvements in safety.

IRU- International Road Union, IRF- International Road Federation

Collaboration/ Partnership	Accelerating to Zero Coalition	A coalition of countries formed at COP27 to drive forward a transition to climate-neutral transportation.	<ul style="list-style-type: none"> Policies to reduce the cost of alternative fuels.
Policy/ Framework	IRF and UNITAR	Aims to reach road safety targets, improving existing road infrastructure to benefit all road users, especially the most vulnerable.	<ul style="list-style-type: none"> Robust rules and penalties can mitigate the issue of road safety

Key Global Insights

“Bulgaria Vision Zero” aims for no death or serious injury acceptability on roads.

Smart roads are modern-day IoT infrastructures built on Information and Communication Technologies (ICTs) to collect and analyze real-time traffic.

Hydrogen is a future alternative for long-distance transport. As per IEA, Germany has the best hydrogen infrastructure network so far.

ASCELA's Viewpoint

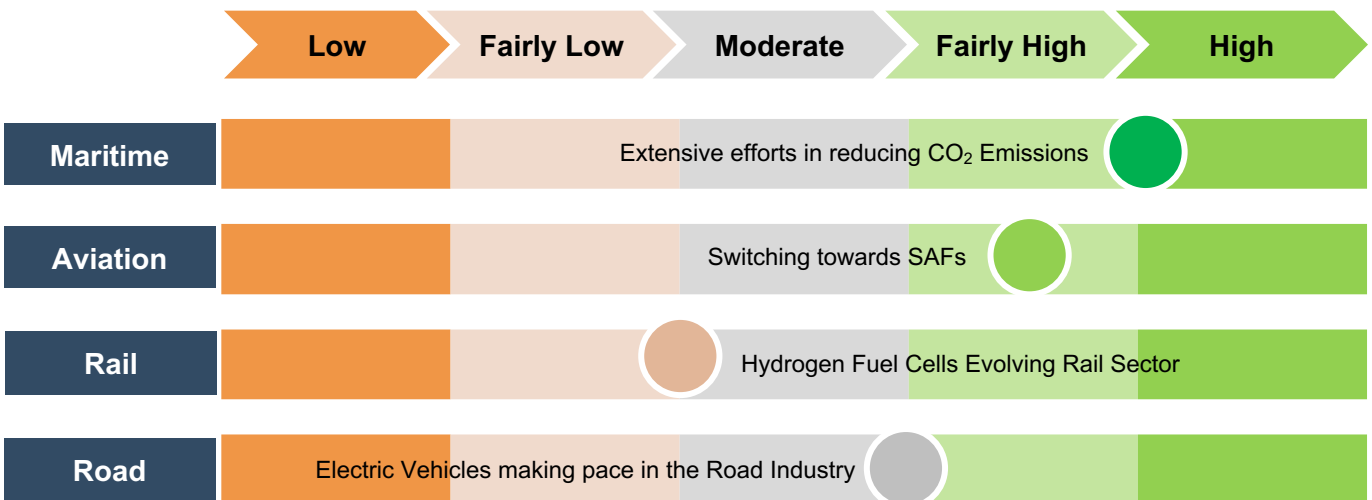
Investment Potential Low High

		Maritime	Aviation	Rail	Road
Environment	CO ₂ Emissions	High	High	Medium	Medium
	Alternate Fuels	High	High	Medium	Low
	Ecological Impact	Medium	Medium	Low	Medium
Social	Accident & Safety	Low	Low	Low	Low
	Employee Benefits	Low	Low	Low	Low
Governance	Collaboration/ Partnership	High	High	Low	Low
	Policy/ Framework	High	High	Low	Low

Our View

Aviation and Maritime sectors are robustly focusing on reducing GHG emissions due to the more significant potential of polluting the environment. At the same time, hydrogen fuel and electric vehicles are shaping the Rail and Road industry. Governance provides a policy push to sustain both social and environmental ecosystems.

Inferences of ESG Disclosure (Sector-wise)



The role of Infrastructure as a catalyst for sustainable growth and as an enabler of the transition to a low-carbon economy has become evident in the wake of the COVID-19 pandemic.

Infrastructure assets and their managers, too, are improving at setting up ESG policies, plans, systems, and disclosure. The assets are improving their ESG scores and becoming more transparent when disclosing the Infrastructure's impact on the environment, which indicates a willingness to improve the sustainability outcomes of the infrastructure, both during its creation and operation.

ESG considerations wield growing influence in the Transport, Logistics, and Supply Chain sectors. Embracing sustainability (Environmental), ensuring fair labour practices (Social), and enforcing transparent operations (Governance) are no longer optional. Adapting is imperative, as companies prioritising ESG resilience today will forge a competitive advantage and navigate a more conscientious, regulated business landscape tomorrow.

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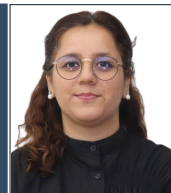
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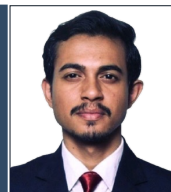
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About Asia Aviation Associates

'Asia Aviation Associates' is a Management Consulting Organization operating since 2014 in the area of providing consultancy, management support, and studies in Aviation Port management and other PPP projects to coveted organisations like AAI, MoCA, E&Y, KHPL –Fujairah Airport, DACAAI, PMC, Government of Andhra Pradesh, Operational support for re-starting Shirdi Airport, Hisar Airport Development, airport operations, aircraft ownership, business aircraft operations, representation to international aircraft manufacturing organisations in India and abroad.

Asia Aviation Associates is partnering with infrastructure projects across sectors in India and abroad in a project preparing DPRs, conducting organisational development Studies, establishing training institutions and academies, capacity building, imparting training and skill development, partnering and providing services in Mergers and acquisitions. With our associates, we provide comprehensive management services.

About InfraLOG

"infraLOG", the niche business publication's objective is to spread awareness of the state of the contemporary business environment in different sectors of India's economy. The publication presents the exact status from the standpoint of an independent observer without any leanings. At infraLOG, we aim to be the "Change Agent" in India's economic development, playing our part as a neutral media house to ensure the futuristic orientation of enterprises. As people and business are inseparable and all constituents form the nation's economic system, infraLOG brings to its readers a holistic view of the infrastructure operating systems with social and economic impact in a globalised world. Media and publishing are vital to assimilate, educate, drive and demonstrate the momentum of ideas and activity to make India one of the Top 3 World Economies by 2030.

As the publication of "infraLOG" enters its 10th Anniversary, this objective has been achieved largely as it has already become a widely read and distributed niche business publication nationwide and internationally. Acknowledgement for content, continuity, coverage and style of presentation with a difference; print and e-version, including social media interaction, has been shown by readers and our patrons across sectors by supporting our effort.

Special mention here is a must: our "Lean Team infraLOG" needs a pat – For Not Stopping churning out issues even at the helm of "Covid Havoc" – and that's the grit of "infraLOG"

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About ASCELA

ASCELA is a professional service company providing advisory services to organisations to help them enhance efficiency by analysing market potential, competitive landscape, and operational, financial, economic, technical, and strategic challenges. The firm was established in 2018 to provide independent strategic insights into Infrastructure and build environments.

ASCELA is headquartered in India and has offices in Gurgaon, India and Dubai, United Arab Emirates (UAE). The firm is registered in India as ASCELA ADVISORS PRIVATE LIMITED (CIN- U74999HR2018PTC072828). ASCELA is recognised by the Department for Promotion of Industry and Internal Trade (erstwhile DIPP), Ministry of Commerce and Industry, Government of India, under the Startup India initiative (Recognition ID - DIPP17959).

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About ASCELA Infrastructure Advisory

ASCELA's Infrastructure Advisory practice helps clients develop and leverage core competencies to deliver sustainable and tangible returns. We define strategies that help clients gain market share, enter new markets, regions, and products, improve the bottom line and reconfigure organisational/ operational structures. ASCELA is well placed to provide strategic inputs and analysis for assessing potential development opportunities in Infrastructure design and development space. Our in-depth knowledge of our focus transportation sectors, backed by intensive research and analysis of our client's specific contexts, helps define superior strategies, frameworks, and implementable action plans.

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