McKinsey & Company

FICCI

India's Century:
Sustainable and Inclusive Growth

A FICCI-McKinsey multi-year forum

Transport Infrastructure & Logistics Committee Report

CRISIL
An S&P Global Company

Exec Summary

Backup – Deep-dive & Detailed unlocks

Overall Transport & Logistics

Roadways

- Railways
- Ports & Shipping

Key challenges/What is needed in the Transport Infrastructure & Logistics Sector

- **High freight & logistics costs** – As per the Logistics Performance Index is 13-14 per cent of GDP for India. As compared to developed countries, their costs contribute nine to 10 per cent to GDP.

- **More public-private partnerships (PPPs)** – Given private investment is only about 15 per cent of the total investment in infrastructure.

- Lack of efficient **multimodal coordination**

- **Adoption of new technology** to avoid project delays and, in turn, time and cost overruns in the construction sector. Using newer and modern techniques will help in speedier execution of projects and better management.

- Concerns related to **land and environmental clearances**

- Development of **sustainable and resilient infrastructure**

Key Unlocks for Transport Infrastructure & Logistics Sector

- **Leverage Gati Shakti to optimise infra creation, deploy inter-modal solutions** – Democratize data access via ULIP platform, enabling logistics players to understand freight flow patterns, create platform for freight tracking, exchange, inter-modal transfer etc.

- **Streamline last-mile logistics** – Create hub & spoke network with large WH in city periphery linked to in-city WH / dark stores, complemented with digitization of local stores. Develop end-to-end automation capabilities in delivery planning, cargo tracking, network optimization.

- **Densify MMLP network to increase rail share** – Create framework for prioritizing key MMLPs, delineating traffic composition, and improving utilisation with Government support in terms of shifting freight from IR stations to MMLPs, accelerating development of DFCs.

India's Century Aspiration for Overall Logistics & Transport Infrastructure Sector

8%

Logistics cost (as % of GDP)

Current: 13-14% (2022)

50%

Share of railways in freight

Current: ~27% in 2021

FY30 Target: ~40% (as per NRP)

3 x 500 MTPA - 2047

3 x 300 MTPA - 2030

Mega Bulk Ports

Top 5

Global ranking in ship building and ship repair

50%

Top 30 Cities

Expressways – Population coverage

Current: 15 to 20%[1]

90%+

Major Transport projects monetized / financed via PPP, InVIT, TOT etc.

40k Cr

Rail Exports[2] – Loco, Wagons, metro coaches etc.

3 x 20+ Mn TEUs

Mega Container Ports with 18m drafts; 100% DFC connectivity

500 MTPA

Coastal Shipping Traffic

Current: ~230 MTPA (major + non-major ports) of which ~45 MTPA is non-coal / iron-ore / POL

100 km/day

Highways construction

Current: ~30 km/day in 2022

1. Covering a 50 km band on either side of the expressways
2. in terms of Real / Current Value

Transport Infrastructure & Logistics

The vision for 2047

India has a burgeoning Logistics sector driven by strong economic, consumption and trade growth. India now has the opportunity to transform the Logistics sector via accelerating infrastructure creation, adopting digitized solutions, moving towards economies of scale and thereby **reducing its logistics costs from 13-14% of GDP to 8% of GDP by 2047**. A key imperative for this would be renewed focus on increasing **rail share** from 27% to **40% by 2030 and 50% by 2047,** creation of **Mega Ports (bulk and container)** with DFC connectivity and port-driven industrialization. Further, implementation of ULIP platform under PM Gati Shakti National Masterplan could bring about windfall optimization opportunities across value chain.

Sector specific vision for 2047:

Road: Expressway network to cover 50% population, 90% reduction in fatality rate, market finance for 90% major roads

Railways: Expansion of rail network (route kms - 100k for rail, 10k for high-speed, 10k for DFC), increase in avg. speeds (80 kmph for freight), INR 40k Cr of rail exports (rolling stock, locos)

Shipping: Creation of 3 Mega Bulk Ports (>500 MTPA), 3 Mega Container Ports (>20 Mn TEU p.a.), global top 5 ranking in ship building & repair, 100% monetization of major ports.

Critical unlocks over the next 25 years

Getting the Transport & Logistics sector towards its aspiration would require concerted efforts by all stakeholders. The approach could be phased over three horizons – immediate actions, priorities for the medium term (5 to 10 years) and a longer-term view.

The immediate actions could be towards increasing freight share of rail to optimize modal-mix, improving last-mile logistics and monetizing transportation assets to generate funds for new infrastructure development.

- **Create MMLP network to bring cargo onto rail** – The Industry could implement MMLP projects via PPP framework. Government can support this via undertaking land acquisition, providing moratorium, mandating cargo shift from city-based railways stations to these MMLPs and fast-tracking development of dedicated freight corridors.
- **Streamline Last-mile logistics** – Create hub & spoke network for consumption freight, with large WH in city periphery linked to in-city WH / dark stores, complemented with digitization of local stores mapped to local catchment. Further, this could be supported by developing capabilities in end-to-end automation in delivery planning, cargo tracking, network optimization.
- **Raise Finance by monetizing existing & market financing new transport infra** (road, railway routes, metro, ports etc.) via combination of mechanisms – PPP, INViTs, TOT, IPO etc. and use the same for further infrastructure funding.

The next focus over a 5- to 10-year horizon could be to integrate transport modes via unified digital platform to further bring down logistics time & costs and boost manufacturing in rail, shipping to transform India as global export hub.

- **Leverage Gati Shakti to optimize infra creation, evolve ULIP platform to deploy inter-modal supply chains** – Government could democratize data access, enabling logistics players to develop big data solutions to understand freight flow patterns, plan infra capacity addition, develop inter-modal supply chains
- **Step-up Domestic Ship and Rolling Stock manufacturing to transform India as an export hub** – Industry could setup Center of Excellence for R&D in emerging tech, create library of approved standardized designs, overhaul training & skilling programs to build workforce, and strengthen supply chain partnership to focus on quality & reliability. Government could support this by manufacturing subsidies, exploring bilateral channels for exports, upgrading standards to meet export norms.

Thinking beyond the next decade, critical unlocks could be on logistics-centric industrialization, sustainability transport

- **Promote Electric and Hydrogen-based Sustainability Transport** – Create e-lanes, EV charging and Green H2 ecosystem along highways and expressways; institute green fuel policy for shipping sector with PLI support.
- **Mega Ports-based Industrialization** – Government in collaboration with Industry could integrate major industrial clusters, Free Trade Zones / FTWZ with Mega ports, provide 100% connectivity with dedicated rail freight corridors and expressways, along with manufacturing-based incentives, plug and play infrastructure to attract globally supply chains.

Exec Summary

Backup – Deep-dive & Detailed unlocks

Overall Transport & Logistics

Roadways

- Railways
- Ports & Shipping

Exec Summary

Backup – Deep-dive & Detailed unlocks

- **Overall Transport & Logistics**

  Roadways

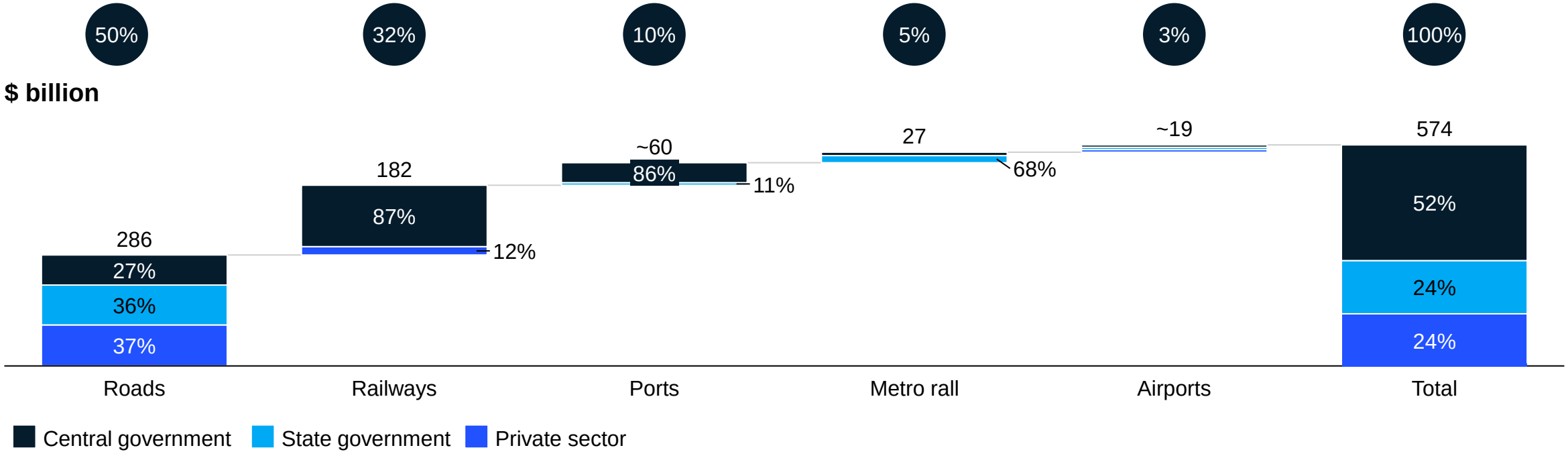
- Railways
- Ports & Shipping

Transport Infra – Investments proposed under NIP

India has earmarked funds to improve the country's transportation infrastructure

Estimated transportation infrastructure investment requirements (2020-2025)

% share of sector



Overall Challenges and opportunities in Transport & Logistics

Key challenges / What is needed

- **High Freight costs –** as per the Logistics Performance Index, logistics cost in India is 13-14 per cent of GDP, as compared to 9-10 percent for developed countries.
- **High Indirect Costs –** 30-40% of India's logistics spending is for indirect components including theft, damages, and inventory carrying costs.
- In 2018, India ranked 44th out of 160 countries on the World Bank's **Logistics Performance Index** – bogged down by inadequate logistics infrastructure, slow customs processes, high fragmentation leading to low competency
- **Slow Speed – Both road and rail,** the two main pillars of domestic freight movement, suffer from conspicuously low average speed – driven by infrastructure inadequacy. Avg. truck speed in India is less than half of more developed economies
- **More Public Private Partnerships (PPPs)** – Currently, private investment account for only ~15 per cent of the total investment in infrastructure in India
- **Lack of efficient multimodal coordination** – The transport modes work in silos with very limited co-ordination / inter-modal transport – driven by systemic delays, lack of network capacity (except road) and highly fragmented market structure.
- **Adoption of new technology** to avoid project delays and, in turn, time and cost overruns in the construction sector. Using newer and modern techniques will help in speedier execution of projects and better management.
- **Development of sustainable and resilient infrastructure** – including focus on lifetime costs (as opposed to initial CAPEX), improving life of assets, addressing concerns relating to environmental clearances & sustainability etc.

Opportunities / Tailwinds

- **Mega Government Initiatives** – Gati Shakti National Masterplan, National Infrastructure Pipeline, Vision 2047, and the Bharatmala Pariyojana, which is catering to about 70% of freight volume and connecting over 550 districts.
- **Sagarmala program** for port-led industrialization presents opportunities like development of freight terminals along national waterways, promotion of coastal shipping and acceleration of port-based industrialization to driven down logistics costs.
- **Digitization of logistics ecosystem**, including documentation, cargo tracking, fleet planning, online cargo booking & aggregation could drive significant efficiencies in logistics sectors. Further creation of **logistics stack (including platformisation, and digital record-keeping via applications like blockchain**) has potential to use promote inter-modal transport and achieve windfall logistics savings.
- Investment in big data analytics to understand traffic of goods flow, network congestion, freight evolution could drive **optimizations in capacity planning**.
- **Logistics industry has been witnessing spate of consolidation** in the post GST era. Easing the clutter of various indirect and state-level taxes has enabled the industry to **focus on scale of economies and modernization.**

Select Key unlocks…(1 of 2)

UNLOCKS **Company** Level **Industry** Level **Policy-maker** Level

Focus on Rail Transport for long haul, heavy weight cargo

- Accelerated development of **dedicated rail freight corridors** along major freight corridors in the country
- Deploy **private sector expertise and capital in railways** – especially for operational of railway assets (railway station, terminals, freight trains, passenger trains). Redefine role of IR as focused asset ownership and track network expansion, O&M. Support the same via rationalization of haulage charges, and institution of an independent regulator.
- Creating dense **network of MMLPs** via PPP implementation framework. Further support MMLP by mandating shifting of cargo current being handling at railways stations / goods sheds within city limits, to these MMLPs.

Intensify Logistics Infra

- **Develop High-Capacity Transport Corridors** – similar to Delhi-Mumbai – comprising of access-controlled expressways and dedicated freight rail corridors. These corridors would serve as the enablers for industrial corridor development as well.
- **Mover towards higher axle-loads –** Acquire technology, via R&D or technology import, across trucks and railway wagons and evolve O&M ecosystem for manufacturing of higher capacity transport units.
- **Digitize and Automate Warehouses for better inventory management, higher throughput** – Implement Warehouse management systems, modern equipment, vertical WH, automated guided vehicles / robots, automated package sorting etc.
- **Set-up Logistics Sectors in periphery of major cities** – with pre-designated land use, easy approvals process, pre-planned integration with rail and highway connectivity, dedicated space for development of MMLP(s). **Complement Hub WH with In-city spokes, Dark stores** to improve last mile delivery.
- **Formulate industry-wide standards across transportation & warehousing** – **address specification**, packaging, truck sizing, RFID-trackers, cargo loading/unloading equipment, DLT based payments etc.

Promote PPP

- Monetize / recycle existing transport infrastructure (road, railway routes, metro, ports etc.) via combination of approacheds – **PPP, INViTs, TOT, IPO etc**. in order to unlock monetization potential and use the same for further infrastructure funding.
- **Implement Policy reform unlocks** through small case examples e.g., creating a regulatory sandbox, running pilots. For instance, a) allowing open access to rail network could be allowed for certain market segment to fine-tune approach b) creating **counter-party risk guarantor organizations** under central govt. etc. c) deploying **airport PPP model (providing traffic / return guarantee) to other sectors** such as Railway Station, Train Operations, DFCs, Cruise Terminals etc.

Select Key unlocks...(2 of 2)

UNLOCKS — **Company** Level | **Industry** Level | **Policy-maker** Level

Integrated Intermodal Logistics Platform

- **Implement ULIP under GatiShakti** – bringing together government functionalities, logistics providers and customers all on the same platform – help to implement universal reference nos. to monitor cargo, optimize inventory levels, enable algorithmic price discovery, streamline tedious documentation process, fast-track approvals, enable IoT based cargo tracking etc.
  - Allow logistics players to **build inter-modal offerings** – through access to timetables, fleet utilizations, price transparency
  - **Democratize data access**, enabling big data solutions to understand freight flow patterns, identify business opportunities, plan future infra capacity addition, develop inter-modal optimizations etc.

Advanced Logistics Models

- **Digitization of Logistics Value Chain supported with advanced analytics** – online marketplace for price discovery & cargo booking (higher transparency, low response time), cargo matching (low empty haulage), route optimization via real-time position tracking & route analytics (reduce pilferage and travel times), freight exchange, fleet sharing (higher utilization), telematics
- **Adopt DLT** to enable generation of smart contract, verification of transaction completion, scheduling automatic payment on delivery. Incubate start-ups centered around DLT and smart contracts, adopt global best practices & advances in DLT, collaborate across industry to develop solutions, tie-up with large clients to pilot DLT-based solutions.[1]
- **Last Mile Delivery** – R&D in new age unmanned delivery options such as drones[2]; accelerated adoption of customized last-mile EV delivery vehicles; create Hyperlocal / inter-city delivery solutions by digitizing local sellers and mapping customers (higher regional fulfillment); adopt AI-driven automation for fulfillment recommendations, scheduling delivery / pick-ups, route planning

Sustainability Initiatives

- **Deploy RE in logistics infra design** – Create e-lanes along expressways & major highways, EV charging infra along highways, adopt net zero goals for railway stations & ports,
- Create **collaborative forums to share sustainable solutions** and best practices in vehicle design & manufacturing. Further the Industry could further OEM partnerships by encouraging shift towards net zero goals
- **Foster Innovation in BEV / FCEV** (trucks, river barges, coastal ships) – via creation of **new Innovation clusters** focused on R&D in new tech, partnerships with **top academic institutes** to set up funded research programs, **PLI scheme** & incentives etc.
- **Promote non-traditional greener fuels in Shipping** – Draft policy for green fuel usage; extend subsidies & PLI scheme for manufacture of vessel based on green fuels

1. Maersk and IBM have piloted a blockchain based system for digitizing trade workflows (including digital bill of landing) and end-to-end shipment tracking
2. Multiple such initiatives such as Amazon's Prime Air Program, Airbus's Skyways Project, Flytrex (drone delivery startup in North Carolina)

Contents

India's Century Aspiration for Roads sector

100 km/day

Highways construction

Current: ~30 km/day in 2022

8 lakh (2047)

2 lakh (2025)

Length of Highways (km)

Current: ~140,000 km

50%

Top 30 Cities

Expressways – Population coverage

Current: 15 to 20%[1]

20,000

Length of Expressways (km)

60%

Public Transport vehicles

Current: ~20%

0.4

Fatalities Rate (per 10,000 vehicles) Current: ~4

100%

Recycled Mix use in Roads

Current: 1 lakh km roads built with 8% plastic in mix

90%

Major Roads financed via PPP, InVIT, TOT etc.

1. Covering a 50 km band on either side of the expressways

Challenges and opportunities in Road sector

Key challenges / What is needed

- **Financing**
  - Limited funding options – heavily reliance on public funds
  - Lender's aversion – poor track record of investments
  - Debt servicing and investment returns for private developers
  - Additional O&M cost due to adverse weather conditions
  - Toll collection pilferage

- **Issue limiting Private Sector Participation**
  - Land acquisition delays leading to time and cost overrun
  - Delays in achieving financial closure of the new projects
  - Delayed approvals and clearances
  - Disputes and claims due to delayed construction and closures
  - Delays in signing and non-adherence to State Support Agreements for expedition of projects

- **Road Performance – design and safety, capacity and speed**
  - High fatalities due to road accidents – driven by speeding of vehicles, weak enforcement and poor road-use behaviour
  - Indian trucks travel an average of 300 km per day, compared with 800 km in China

Opportunities / Tailwinds

- **Improving Connectivity**
  - Launch of Bharatmala Pariyojana – 34,800 km of roads / highways in Phase 1
  - Construction of 23 new highways having combined length of ~7,800 km apart from Bharatmala
  - Revival schemes to accelerate stalled projects

- **Financing**
  - Assets monetization under National Monetisation Pipeline (NMP) to generate funds
  - Permission of 100% FDI in the sector either through automatic or government route
  - India is evolving as an attractive destination for Foreign Institutional Investors (particularly pension funds)
  - Roll out of the NHAI InvITs to monetize existing assets – income generated from InVIT could fund new road projects

- **Co-ordination – GatiShakti Master Plan**
  - On-boarding 21 ministries to optimize, synchronize, prioritize, expedite efforts
  - GIS-based ERP system acting as a single platform for master Plan major projects

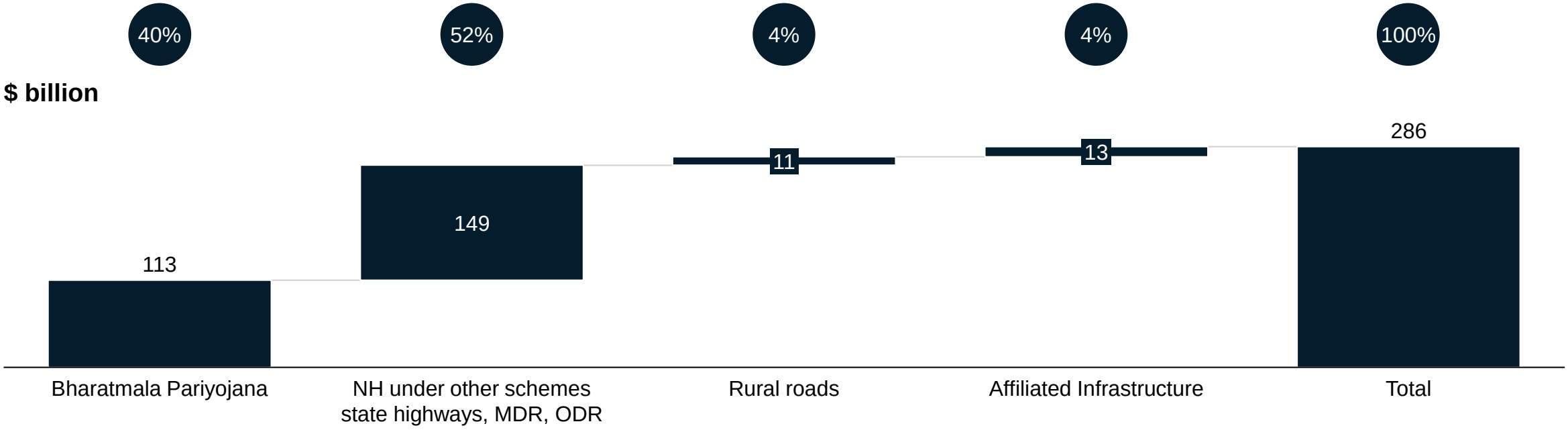
- **Industry Consolidation**
  - Larger players able to better realize economies of scale in post-GST era. Further they are in better position to adopt emerging technology trends.

Road – Investments proposed under NIP

India plans to invest in a variety of road improvements

Estimated investment requirements for India's roads (2020-2025)

% share of sector



Note: MDR is major district roads. ODR is other district roads.

Key unlocks required Now – fix the basics (1 of 2)

UNLOCKS **Company** Level **Industry** Level **Policy-maker** Level

Technology

- **Telematics** – Install vehicle sensor for capturing important driving data - which could be used by emergency services, insurance underwriters, data analytics firms and road planners
- **Online cargo tracking of cargo** – for better planning of cargo movement, cargo security etc

Efficiency

- **Promote start-ups** / capability development in utilizing new age technologies such as
  - **Online marketplace** for cargo aggregation, truck booking, cargo matching, documentation etc.
  - **Advanced Analytics** for creating models for road monitoring such as prediction of pavement performance with traffic, bridge distress diagnostics etc.
  - **Road monitoring** using road sensors, satellite imaging etc.

Financing

- Prepare model frameworks for **large scale private participation** – via multiple vehicles such as PPP / ToT / InVIT / bonds etc.
  - ToT (Toll Operate Transfer) bundles for viable projects
  - InVITs for slightly less viable projects
  - Long term financing from NABFID / 10-year infrastructure bonds for remaining projects
- Tap into **additional sources of infrastructure financing** through setup of National Bank for Financing Infrastructure and Development (**NaBFID**)

Key unlocks required Now – fix the basics (2 of 2)

UNLOCKS **Company** Level **Industry** Level **Policy-maker** Level

Implementation	• Use advanced **Project Monitoring Information Systems –** integrating drones, remote IoT devices for real-time data monitoring and data-driven decision making • NHAI - Segregate a) land acquisition b) road construction c) road monetization & capital churn
Green Construction	• **Adopt recycled materials** and self-healing concrete for improving durability
EV / BEV / FCEV	• Continue focus on Taxation (GST) and direct-subsidy (FAME) benefits for ACC (advanced chemistry cells), automobiles & auto-components, with evolution on focus on net-zero goals and freight specific solutions. • Institute schemes for localisation of key components for EVs (batteries, electronics, fuel cells, etc.) through PLIs and tight localisation roadmaps • Create aggressive benefits for vehicle scrappage in conjunction with EV purchase • Declare timelines for assisted transition for vehicle classes serving these segments (M&HCV/ buses) so that limited disruption is caused • Disincentivize ICE vehicles including fuel taxation, toll cess etc.

Key Next unlocks required – explore adjacencies

UNLOCKS **Company** Level **Industry** Level **Policy-maker** Level

Technology

- Implement **Fast Tag 2.0** in conjunction with Government – as a single card (mobile connected) common across transport modes such as road (inter/intra-city buses), rail, tram, metro, ferries etc.
- GIS mapping of road network. Utilize GIS solutions for operational efficiency, productivity & real time monitoring
- Incorporate **driver alertness mechanisms** such as heart rate monitoring, eye movements using advanced sensors within the vehicles to reduce accidents, especially during night driving

Road Infra

- Shift to **Hot In Place Recycling (HIPR)** in maintenance and maximizing recycling during upgradation
- Create **EV charging and Battery Swapping** infrastructure along the highway / expressways. Government to create **framework for creation of EV infrastructure** along highways / major roads.

Financing

- Shift from a flat toll fee to **Pay as per Use policy** on all access-controlled highways / expressway
- Framework for states listing their own InvITs for project financing

Implementation

- Adopt of automation in road construction by using Lidar, 3D AMG technologies etc.
- Selection of Road Developers on **QCBS rating method**, especially for high-end / specialized road projects[1]
- Setting up an effective and independent arbitral tribunal under MORTH in line with the Environment Appellate Tribunal

1. Instead of on least cost basis

Key New unlocks required – explore frontiers

UNLOCKS **Company** Level **Industry** Level **Policy-maker** Level

Technology

- Accelerate research in **Autonomous Vehicles (especially trucks) to enhance road capacity and safety**
- R&D in road construction technologies by setting up Centres of Excellence at IITs and IIMs– work on novel ideas such as **Glow-in-the–dark lanes, self-healing concrete, construction automation**

Road Infra

- Create **Electrical Lanes** along all major highways and expressways
- Create **Green Hydrogen fueling infrastructure** along major road network
- Revision of Indian Roads Congress Standards such as IRC 002. Evolve expressway standards to European standards.

Implementation

- Institute **Developer ratings** – incorporate focus on green construction practices, speed of construction, and user experience ratings. Enable highly rated developers to preferentially tap capital markets for infrastructure spending with favorable tax norms.

Contents

India's Century Aspiration for Railways sector

50%

Share of railways in freight

Current: ~27% in 2021

FY30 Target: ~40% (as per NRP)

80 – Freight

120 – Passenger

200 – High speed

Average Network-wide Speed

+100k – rail

+10k – HS[1] rail

+10k – DFC[2]

Route km of Railways

Current: ~68,000 Rkms rail in 2022

<.001

Rail Accidents per Mn rail km

Current: .03 per Mn rail-km in FY21

+5k km

RTS – Metro, Light Rail, RRTS

Current: ~1,500 kms

100%

Electrification backed by renewable sources (80% of BG network)

40k Cr

Rail Exports – Loco, Wagons, metro coaches etc.

100%

Make in India by 2030 – rolling stock, traction, S&T[3]

1. High Speed Rail
2. Dedicated Freight Corridor
3. Currently, imports of manufacturing parts consitutes ~1.6% of total value of items

Challenges and opportunities in Railways sector

Key challenges / What is needed

- **Infrastructure & Capacity Constraints**
  - Slow speed of Freight Trains
  - Inability to run passenger/ freight trains as per demand
  - Lower Passenger and freight throughput
  - Low Modal Share of Freight Traffic at 27%
- **Poor Tariff Regulation**
  - Passenger rates are too low due to subsidies
  - Freight charges are considered one of the highest in the world
- **Overburdened HDN & HUN Routes**
  - HDN – 80% of the network has a utilization level above 100%
  - HUN – 46% of HDN network is operating beyond 100% of its capacity
  - Over 1.65 cr passengers were waitlisted in FY22
- **Inadequate Rail-Road-Port Connectivity**
  - 25%- 27% of major port traffic ferried in FY21
  - Out of 69 operational ports, only 29 major and busy ports are connected to the railway network
- **Rail Safety**
  - 54 accidents in FY20, average accidents per year: ~113 for 2015-17
  - Defect in the track or rolling stock, increased congestion and saturated usage of line capacity increasing the chances of collisions

Opportunities / Tailwinds

- **Increasing Demand**
  - Increasing Energy requirements (projected to increase by 50% by2030), driven by Heavy Haul cargo e.g., Coal, Iron Ore
  - Increasing Overall Port traffic: ~1,250 MT (2021) → 2570 MT (2030)[1]
  - Potential for Rail Traffic ~ 2.5x growth over the next decade
- **Capacity Expansion**
  - Railway Share : 27% → 40% by 2030 → 50%+ by 2047
  - Development of Dedicated Freight Corridors (DFCs) – Three DFCS (North-South, East-West, East Coast) in pipeline in addition to two under construction DFCs (Eastern, Western)
  - Upgradation of High-Density Networks: Doubling & Tripling of Track Network to decrease Congestion & increase average speed
  - Focus on Make in India
- **Enabling Logistics Infra**
  - NHAI is implementing 35 MMLP across the country – to service both EXIM and domestic traffic originating from major traffic hubs in the country
  - Execution Port's railway connectivity to improve evacuation (under Sagarmala)
- **Focus on PPP**
  - Passenger: Redevelopment of Railway Station, Private Train Operations
  - Freight: CTO, Wagon ownership schemes, rail terminals

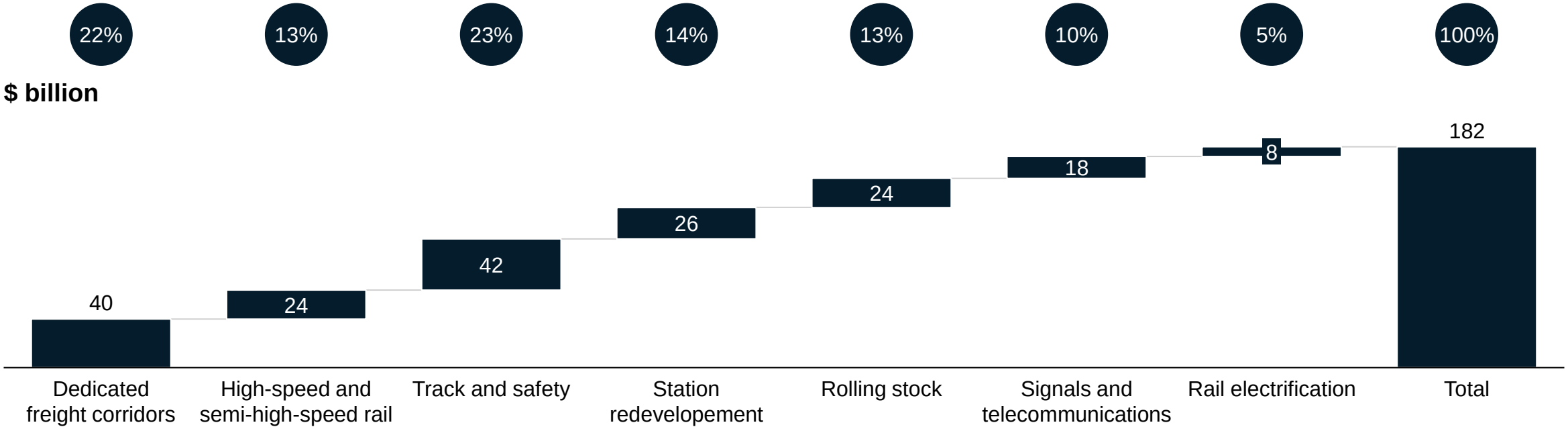
1. As per India Maritime Vision 2030

Rail – Investments proposed under NIP

Railway infrastructure will be developed in seven areas

Estimated transportation infrastructure investment requirements (2020-2025)

% share of sector



Key unlocks required Now – fix the basics (1 of 2)

UNLOCKS **Company** Level **Industry** Level **Policy-maker** Level

Rail-connected MMLPs

- Develop **Private Freight Terminals, Inland Container Depots,** upgrade current terminals – to capture higher share of domestic traffic onto rail
  - — **PPP framework** with balance phased development obligations, initial moratorium for traffic pick-up at the facility, and responsibility for connectivity development with the Authority
  - — Co-locate MMLP / PFT / ICDs along with freight corridors and associated industrial corridors
  - — Adopt **sub-lease models for increasing off-take** of various asset classes within MMLP – such as grain silos, cold storage, steel yards etc.

Digital Logistics Platform

- An **intermodal logistics platform** – created in partnerships with government agencies, and logistics players – to provide end-to-end services – from cargo documentation, booking, tracking, payments, inter-modal transport, customs verification, e-way bill generation etc.
  - — Develop technology enabled digital tools focused on various part of the value chain process
  - — Develop algorithms for price discovery, route / modal-mix optimization
  - — Onboard government agencies / logistics stack data (e-way bills, customs approvals) to streamline overall process and reduce individual touch-points

- Deploy Integrated Digital Solutions – for instance cloud-based Port Optimizer Solution to Rail / Road (deployed at Port of LA), which enables better planning of cargo movement, reduced turnaround times etc.

Key unlocks required Now – fix the basics (2 of 2)

UNLOCKS **Company** Level **Industry** Level **Policy-maker** Level

Private Sector Onboarding

- Rationalize haulage charges; allow private players to independently procure electricity at possibly tariffs than IR – given emergence of renewable sources; Review policy for freight operators to own rolling stock for running time-based train schedules thus outsourcing infrastructure
- Provide scheduling flexibility and enforce fair mechanism for assessing responsibility and penalties for running delays
- Institute attractive lease models – such as rolling stock procurement on lease, phased-out payment schedule, preferential lease terms from IRFC, buy option for pvt. players / buy-back for IR

Regulatory Framework

- Set up Nodal Agencies
  - Railways Planning Authority – to plan out railway network expansion, plan grid systems on unutilised rail land, tender out set-up of the grid systems
  - Independent Regulatory Authority (similar to TRAI) – for contract setting, tariff regulation, performance tracking, dispute resolution etc. – **different for Freight, High-speed rail, Semi-high speed rail**
  - National Board for Rail Safety

GCC

- Establish Global Competency Centre as centers of excellence, innovation and R&D on new technologies
  - Partner with academic to create curriculum centered around new technology
  - Create plug and play incubation centers for driving innovation ecosystems and providing investment opportunities for global players
  - Review transfer pricing and taxation incentives to improve global competitiveness

Key Next unlocks required – explore adjacencies (1 of 2)

UNLOCKS **Company** Level **Industry** Level **Policy-maker** Level

Domestic Manufacturing

Leverage private sector capital, technology to **boost domestic manufacturing capability** (for rolling stock)

- Private Manufacturers should review supply chain partnerships – with focus on reliability and quality
- Focus on training workforce and developing **unique manufacturing skills** required in rail sector
- Set up **Centers of Excellence for R&D** in upcoming smart rail technologies, construction materials etc.
- Deploy **upgraded RDSO standards** (safety, convenience, speed, payload etc.) for coaches / wagon in a phased manner, to enable export quality manufacturing.
- **Review "Make in India" policy** to address challenges in public procurement tender process (entry/exit clauses, risk sharing, roles & responsibilities), TOT expectations etc.

Rail Exports

Capitalize on growing presence of domestic & foreign manufacturers – to export cheaper, modern rolling stock

- **Incentivize manufacturers** to ink international deals by providing lending at preferential rates, income tax incentives for such contracts
- Export Incentives to establish India as a global manufacturing hub for rail parts
- Undertake branding exercise of Indian rolling stock in terms of quality, value for money, modernization etc.
- Explore bilateral channels for rail exports:
  - Standardize FTA scope – include Complete Rolling stock (Locomotives, Wagons) for qualification
  - Extend bilateral financing for development of railway in other emerging economies

Key Next unlocks required – explore adjacencies (2 of 2)

UNLOCKS **Company** Level **Industry** Level **Policy-maker** Level

Promote Rail Freight Traffic

- Develop customized wagon solutions for transportation of wide spectrum of freight commodities such as cars, trucks, fly ash, food grains, steel coils etc.
  - — Collaborate with international counterparts to import technologies for new wagon designs
  - — Allow direct import of international wagon design – to reduce approval and deployment lead-time
  - — Build approval capacity of Committee on Wagon Design (CWD) under New Wagon Design Scheme

Containerization

- Step-up manufacturing of containers – to increase container capacity in the country
- PLI schemes for manufacturing of container handling infrastructure (forklift, reach stacker, gantries etc.)

Financing

- **Monetize** passenger / freight trains, rail assets (tracks, OHE, S&T, DFCs) freight trains **via ToT / InVITs**.
  - — Create framework for monetization of rail assets
  - — Ease regulations around investment restrictions on AIF, Insurance Funds etc.

Track Upgradation

- Implement Automatic Block Signaling on entire railway network[1]
- **Upgrade HUN, HDN track** network for semi-high speed rail operations

1. Automatic Block Signalling has been deployed on 3,447 km, with target to expand it to 15,554 km

Key New unlocks required – explore frontiers

UNLOCKS **Company** Level **Industry** Level **Policy-maker** Level

Dis-incentivize Road for Freight

- **Mandate Rail Transport for freight transport for > 500 Kms**, backed up with adequate rail capacity based on pre-defined list of cargo categories. Gradually expand the list, starting from most impactful categories.
- Levy penalties / cess charges for transport of such commodities via road for longer distances.
- Leverage digital tools for booking inter-modal cargo transfer

Expand Private Sector Role

- Private sector to takeover trains operations, station operations & rolling stock – both passenger and cargo; Indian Railways to morph into fixed asset (track infra) owning entity.
  - — Set up robust regulatory bodies for handling transactions b/w private players and IR, ensuring safety, formulating tariff setting framework etc.
  - — Incentivize private participation on financially unviable routes – by providing assured returns, VGF funding

Contents

India's Century Aspiration for Ports & Shipping sector

3 x 500 MTPA - 2047
3 x 300 MTPA - 2030
Mega Bulk Ports
With >300 MTPA cargo handling capacity to be developed

3 x 20+ Mn TEUs
Major Container Ports with 18m drafts; 100% DFC connectivity

100%
Major Ports to move to landlord model

100%
Monetization of Major Ports via InVITs, bonds, IPO etc.

100% - 2030[1]
Indian transshipment cargo handled by Indian Ports
Current: 25%

500 MTPA
Coastal Shipping Traffic
Current: ~230 MTPA (major + non-major ports) of which ~45 MTPA is non-coal / iron-ore / POL

3 Mn – 2047
1.5 Mn – 2030
Cruise passengers annually
Current: 0.5 Mn

Top 5
Global ranking in ship building and ship repair

60% – 2030
Share of energy through renewable sources
Current: <10%

40%
Indian Seafarers share across globe Current: 10-12%

1. Driven by Vizhinjam, Krishnapatnam, V.O. Chidambaranar Ports

Challenges and opportunities in Port Infrastructure sector

Key challenges / What is needed

- **Development of Inland Waterways** needs to be expedited – through concerted policy efforts and incentivization, to address some major risk element in uptake of IWT traffic.
- Provide fillip to **Coastal Shipping** – to reduce logistics cost, especially for industrial hubs and consumption centers located nearby coastal areas.
- **Port-led industrialization**, including development of Coastal Economic Zones is need to reduce logistics costs (for industries with EXIM traffic dependencies), promote EXIM trade, realize supply chain efficiencies etc.
- **Development of Mega Ports** – with handling capacity of >300 MTPA / 20 Mn TEUs, coupled with 16-18 draft and direct connectivity with dedicated freight corridors for efficient cargo transfer.
- Improving **Ship Building capabilities**
- Improve **Port connectivity (often a bottleneck) to reduce congestion**, improve turnaround times and increase overall capacity
- Some **Major Ports are now operating out of city centers** – they creatin a huge congestion and evacuation bottleneck. Examples include Kolkata, Visakhapatnam port.

Opportunities / Tailwinds

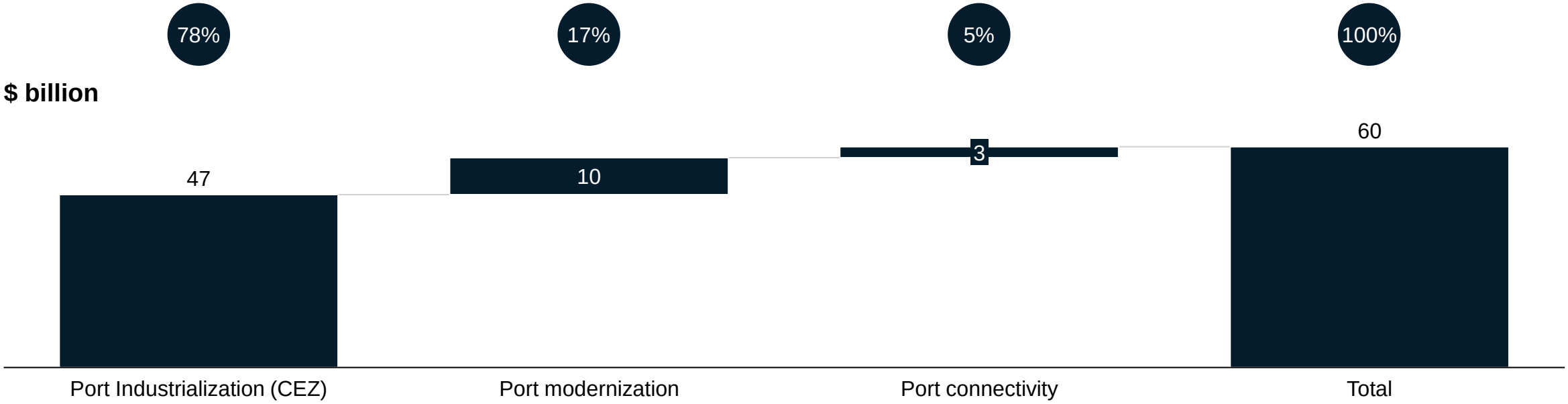
- GoI's thrust on **improving gas share** will drive higher consumption of LNG / LPG and Ports must gear up to handle the increased imports
- Thrust in development of **Port Capacity from private sector** side. The sector has shown high maturity in execution of PPP projects – and is well poised to leverage private finance and expertise in expansion of port capacity.
- Huge latent potential for uptake of inland waterway and coastal traffic, given dense network of waterways and long coastline.
- Potential to become a **global Cruise Tourism hub** – driven by plethora of tourist sites along both west and east coasts.
- Digitization to improve efficiency parameters.
- Move to **port modernization** – including multiple projects under Sagarmala - for unlocking capacity and driving profit margins.
- **Healthy competition amongst neighboring ports** – as more ports gets developed with modern infrastructure. E.g Visakahapatnam and Gangavaram, Chennai and Krishnapatnam, Mundra and Kandla
- India's manufacturing capabilities and export potential to benefit from diversification of global supply chains **(China+1 strategy)**, driven by lessons learnt during pandemic

Ports – Investments proposed under NIP

Port improvements will create a wealth of opportunities

Estimated investment requirements for India's ports (2020-2025)

% share of sector



Key unlocks required Now – fix the basics (1 of 3)

UNLOCKS **Company** Level **Industry** Level **Policy-maker** Level

Port Efficiency Improvement

- **Port Modernization** – transition to modern infrastructure, equipment & machinery with gradual adoption of crane operations automation.
- #**Process Improvement**:
  - Implementation of **Enterprise Business System (EBS)** to simplify and digitize processes
  - Better utilization of **Port Community System** (onboard minor ports, private ports) by having all transactions between various stakeholders including Customs to be through PCS
- #Actively participate in the proposed changes being brought for improving the functioning of the sector example developing in-house software to cater to the new **SCMT Regulations**
- #**Streamlining customs process** by creating digital platform for exchange of information between PGAs, EPCs. Leverage stack framework linked to e-way bills, along with distributed ledger structure to facilitate customs verification.

Port Connectivity

- Leverage **GatiShakti platform** to improve connectivity of new ports, as well as existing ones, via dedicated freight corridors future expressway network to improve evacuation capacity, and turnaround times.

Port-led Industrialization

- #**Partnership-driven model** (Central & State Governments, NICDIT, state industrial development corporations and private players) with SPV comprising NICDIT (for equity / debt) and state government (for land) leading the project implementation and central
- #**Create plug and play infrastructure** – with sector focused industrial parks, competitive commercial terms, dedicated investor outreach and marketing cells

Sourced from Maritime India Vision 2030 – published by Ministry of Ports, Shipping and Waterways in Feb 2021

Key unlocks required Now – fix the basics (2 of 3)

UNLOCKS **Company** Level **Industry** Level **Policy-maker** Level

Promote Cruise Tourism

- Lay-out roadmap for development of 3-4 large cruise terminals (>0.5 Mn pax p.a.) and 5-6 small terminals (>0.25 Mn p.a.) distributed along both east and west coasts.
  - Create **separate PPP framework for Cruise Terminals** – to better capture traffic seasonality, nature of revenue streams and risk elements involved. Given may similarities, can adopt **Airport model (AERA hybrid-till)** for determination of user charges and risk-adjusted returns. **Streamline immigration** (e-Visa, multiple entry visa) process to cut down queue times.
  - Undertake industry-wide global marketing efforts to establish India's brand, develop curated experiences along major terminals, involve best hospitality brands for memorable customer experience.
  - #Capture domestic cruise traffic by developing localized cruise tours – around pilgrimage, history & culture, ayurvedic wellness, nearby destination (Lakshadweep island, Sri Lanka, Mauritius, Myanmar)

Promote River, Inland Cruise Tourism

- #Develop comprehensive river cruise policy to enable private sector participation, create vessel standards for river cruise vessels, set safety and environmental standards,
- #Accelerate development of water-aerodromes on PPP basis – providing incentives (similar to UDAN), risk-balanced PPP structures.

Invest in Port Monetization

- Monetize port assets – using instruments such as InVITs, IPOs, Corporate bonds, ToT etc.
  - Include Port monetization as part of **National Monetization Pipeline**
  - Create **monetization framework specific to Port sector** – with focus on duration of ownership / income rights, buy-back clause, creation of asset pooling agency, future development rights etc.

Sourced from Maritime India Vision 2030 – published by Ministry of Ports, Shipping and Waterways in Feb 2021

Key unlocks required Now – fix the basics (3 of 3)

UNLOCKS **Company** Level **Industry** Level **Policy-maker** Level

Promote Shipping Lines#

- Incentivize setting up of shipping companies, especially container line
  - — Enable growth of existing Indian Shipowners through tax friendly environment (tax incentives to Indian Ship Owners to own more ships of all types, especially container and cruise ships) as well as tax rationalization of shipping lines (to allow them to compete effectively with international lines)
  - — Setting up of **unified ship e-registration portal** for ease of vessel registration
- **Monetize data streams** collected across cargo flow, terminal asset, utilization levels, performance metrics and selling to logistics players / shipping lines for efficiency in planning, inventory management etc.

Incentivize Ship Building#

- Galvanize ship building industry to increase the capacity from 30k GT currently to 500+GT by 2030 driven by access to cheaper materials, higher labor productivity and project management capabilities.
  - — **PLI Scheme** for financing, providing preferred lending rates for ship-building industry
  - — Incubate ship building capabilities / expertise via expanding **navy manufacturing**
  - — Develop common association of **ancillary industry for ship-builders[2] –** Create online marketplace to increase transparency between supply-demand, reduce time to market etc.
  - — Drive **standardization in product design** – to ensure design optimization and achieve economies of scale, create online library of pre-approved designs etc.[1]

Global leader in Ship Recycling#

- — Modify BIS regulations to allow usage of ship scrap for TMT bar production
- — Increase capacity through consolidation and redevelopment of Alang plots, and creation of recycling cluster along East Coast – with focus on Environmental compliance (dry docking ships, zero discharge)

Sourced from Maritime India Vision 2030 – published by Ministry of Ports, Shipping and Waterways in Feb 2021

1. Inspiration can be drawn from Indonesia - where shipping industry took the lead in creating standard designs, followed by Govt. setting up a National standards body
2. Much as the same way as India is a global leader in auto-parts industry

Key Next unlocks required – explore adjacencies (1 of 2)

UNLOCKS **Company** Level **Industry** Level **Policy-maker** Level

Unlock Inland Waterways

- Increase cargo transport via Inland Waterways (currently 2% of total)
  - Develop **integrated waterway terminals** (with road and rail connectivity) – via PPP project – with adequate risk balancing in pick of waterway traffic through waterway subsidies / initial moratorium etc.
  - #Develop **2-3 IWT, rail linked industrial clusters** – focused on heavy cargo movement (like fertilizers, cement, steel etc.), which can benefit from cheaper waterway transport cost.
  - #Develop **Ferry terminals** in partnership with State government on Arth Ganga model
  - Promote R&D, manufacturing of modified vessels for undertaking both coastal and riverine transport.

Set-up Transshipment Hub#

- Setup up transshipment hub to capture larger share of transshipped cargo at India directly (currently <25%; rest being handled in Middle East, Sri Lanka, Singapore).
  - Set up **international bidding** for PPP – with tax incentives, part construction support (land-side) and regulatory support for Port Operator
  - Implement tariff framework to promote domestic transshipment / coastal traffic

Build Seafarers Workforce#

- Establish **Maritime Knowledge Cluster** to drive coordinated and collaborative research – driving collaboration across various domestic maritime institutes, industry players, international academic partners
- Improve job opportunities for Indian seafarers by driving increased **onboard training slots**
- Establish Port Welfare Committee (PWC) across all ports promote mental wellbeing of seafarer

Sourced from Maritime India Vision 2030 – published by Ministry of Ports, Shipping and Waterways in Feb 2021

Key New unlocks required – explore frontiers

UNLOCKS **Company** Level **Industry** Level **Policy-maker** Level

Mega Ports

- Developing world class Mega Ports, including dedicated mega container ports, with minimum 16m draft and full integration with expressways and dedicated rail freight corridors.
  - #Integrate **major industrial clusters**, Free Trade Zones / FTWZ (refer Jebel Ali) along with mega ports – along with manufacturing-based incentives. Attract potential globally supply chain diversification trends (China + 1) by providing plug and play infrastructure, and simplified EoDB[1].

Port's Grid Connectivity

- 100% direct connectivity with freight corridors for all ports with 20+ Mn tons / 2 Mn+ TEUs traffic
  - **Incorporate SPVs with port companies / operators / trust** for development of last-mile rail connectivity
  - Create integrated MMLP capturing traffic from ports, adjoining industrial areas, and for customs (if required)

Green Fuels#

- Draft policy providing subsidies for green fuel usage in port and shipping operations.
- Institute PLI Scheme for manufacturing of vessel based on green fuels (LNG, fuel cells)

1. CIDCO's plans near JNPT, APIIDC near Visakhapatnam port

Sourced from Maritime India Vision 2030 – published by Ministry of Ports, Shipping and Waterways in Feb 2021

Logistics costs are high in India, yet opportunities exist for reduction by improving logistics efficiency

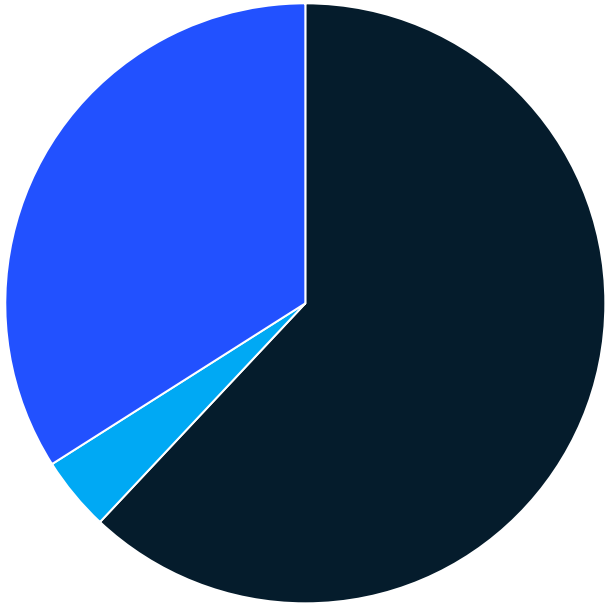
Composition of logistics costs in India[146]

Inventory (34%)

To reduce inventory costs, suppliers can reduce inventory loss and excess inventory holdings. This can be done by improving supply-chain design and management.

Administrative (4%)

Administration costs can be reduced by introducing modern IT and management techniques



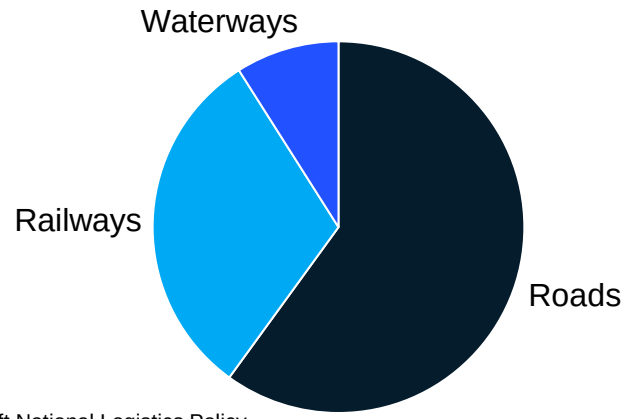
Transportation (62%)

To reduce transportation costs, shippers can optimize mode share and then optimize the efficiency of vehicle use. Optimizing vehicle use includes deploying the right vehicle for a particular use case and then maximizing the productivity of that vehicle through effective routing and loading

India’s logistics costs are currently 14 percent of the GDP—higher than the United States end Europe As shown in Figure 3-14, over 90 percent of logistics costs are attributable to transportation and inventory management (inventory holding and warehousing) To increase logistics efficiency, itis essential to increase transportation «efficiency by optimizing truck use and incorporating inventory management best practices in supply chains.

Modal mix of freight transport

Current Modal Mix of Freight Transport in India



Source: Draft National Logistics Policy

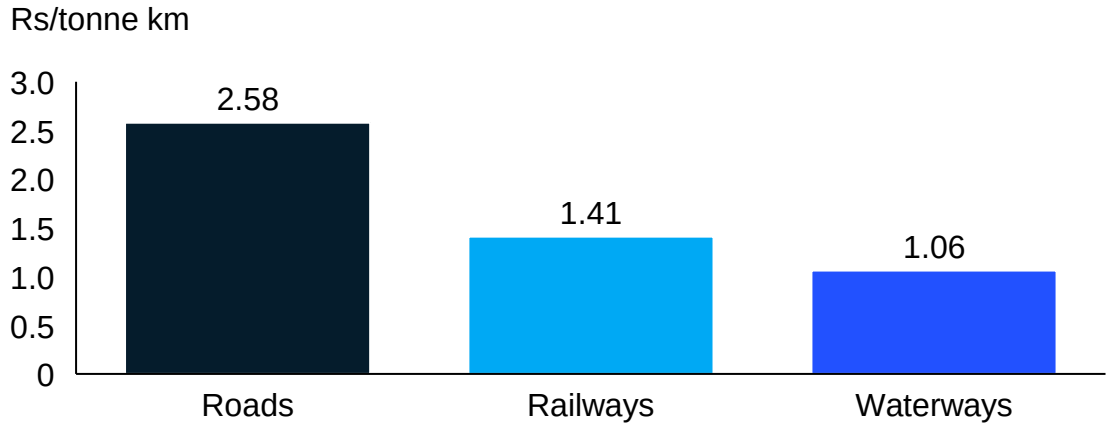
With responsibility to move almost 60% of the country's freight, the road transportation sector serves as the backbone of the India's logistic sector. Despite its dominant share, the segment is considered inefficient.

These inefficiencies are primarily a result of high fragmentation (several small and mid-sized players control over 90% of trucking industry in India), relatively weak core and supply side constraints.

The Draft National Logistics Policy aims to optimize the current modal mix in line with international benchmarks (25-30% share of road, 50-55% share of railways, 20-25% share of waterways).

	Current Share	Optimal Share
Roads	60%	25-30%
Railways	31%	50-55%
Waterways	9%	20-25%

Unit Cost of Freight Transportation in India



Source: Draft National Logistics Policy

Source: India Infrastructure Research