

THE ROAD TO RAIL TRANSITIONING TRANSPORTATION MODES FOR A SUSTAINABLE FUTURE

2nd & 3rd SEPTEMBER 2024



ESTABLISHMENT OF RAC

02



The Railway Ordinance 1948 was repealed; replaced by the Railways Act 1991 (Act 463)

1991

FUNCTIONS

**ASSET & INFRA
MANAGEMENT**

**ASSET & INFRA
DEVELOPMENT**

**OTHER FUNCTIONS AS
INSTRUCTED BY MINISTER**



Establishment of the Railway Assets Corporation (PAK) on 1 August 1992

1992



Assets & Liabilities

Maintenance

Operations



Rebranding from PAK to RAC on 19 November 2015

2015

VISION

Leading the transformation of sustainable railway asset management by 2030

MISSION

Manage and develop railway assets dynamically, efficiently and systematically to drive growth of the national rail industry and generate long-term sustainable income.

MOTTO

EXCELLENT IN NATIONAL RAILWAY ASSET MANAGEMENT

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INTRODUCTION

The transportation sector faces challenges like congestion, environmental concerns, and the need for efficiency. This thesis examines the shift from road to rail transport as a step toward sustainability, analyzing historical developments, economic impacts, and environmental benefits, while highlighting the potential advantages and challenges of this transition.



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RAIL TRANSPORT IN MALAYSIA



A. Network

Two main train lines

- I. Padang Besar to Johor Bharu
- II. Tumpat to Gemas



B. Passenger Services

1. KTM Komuter
 - Batu Caves – Pulau Sebang
 - Tanjung Malim – Pelabuhan Klang
 - Padang Rengas – Bukit Mertajam
 - Butterworth – Padang Besar
2. ETS (Electric Train Service)
 - Gemas - KL Sentral - Padang Besar
 - KL Sentral - Ipoh
 - KL Sentral - Butterworth
 - KL Sentral – Padang Besar
3. Intercity services

C. Freight Services

- Padang Besar - Tanjung Malim
- Port Klang Terminal
 - North Port
 - West Port
 - South Port
- Pasir Gudang Terminal
- Johor Port
- Port Of Tanjong Pelepas
- Inland Ports
 - Ipoh Inland Ports
 - Nilai Inland Ports
 - Segamat Inland Ports

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D. Electrification

Some of Malaysia's rail lines are electrified, using overhead catenary systems. Electrification contributes to the efficiency and sustainability of rail transport.



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E. Infrastructure Development

Malaysia has made investments in railway infrastructure, including track upgrades, station development, and modern rolling stock.

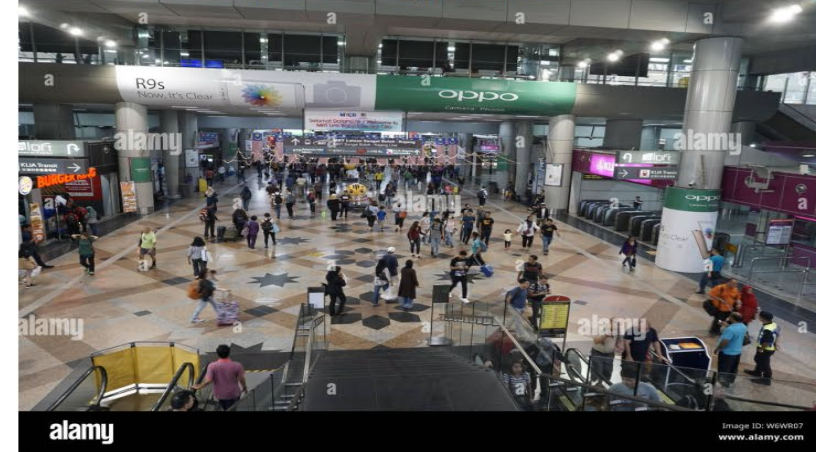
Ex : MRT & Gemas – JB



F. Transport Integration

Rail transport is integrated with other modes of transportation, including buses and taxis, to ensure seamless passenger movement.

Ex : KL Sentral & Sg Buloh



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MALAYSIAN REGISTERED VEHICLES (2010, 2015, & 2021)

Category	Percentage	Number of Vehicles
Total Registered Vehicles (2010)	100%	20.8 million
Cars	42%	8.8 million
Motorcycles	58%	12 million
Goods Vehicles	4%	832,000 thousand
Others (Buses, Taxis, etc.)	3%	624,000 thousand
Small Commercial Vehicles (< 5 tonnes)	3%	624,000 thousand

Category	Percentage	Number of Vehicles
Total Registered Vehicles (2015)	100%	26 million
Cars	43%	11.2 million
Motorcycles	55%	14.3 million
Goods Vehicles	4%	1.04 million
Others (Buses, Taxis, etc.)	2%	520,000 thousand
Small Commercial Vehicles (< 5 tonnes)	3%	780,000 thousand

Category	Percentage	Number of Vehicles (approx.)
Total Registered Vehicles (2021)	100%	33.3 million
Cars	47.3%	15.75 million
Motorcycles	46.6%	15.52 million
Goods Vehicles	4.7%	1.57 million
Others (Buses, Taxis, etc.)	1.4%	460,000 thousand
Small Commercial Vehicles (< 5 tonnes)	65% of goods vehicles	1.02 million

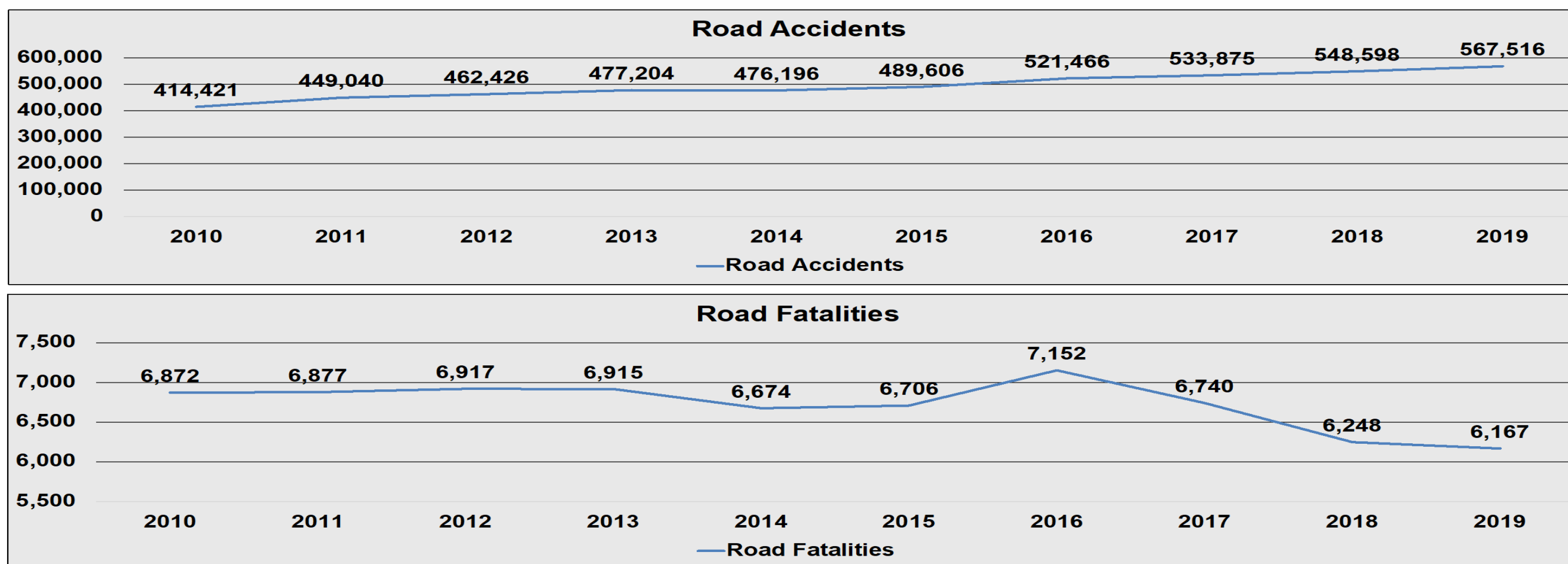
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ROAD ACCIDENTS & ROAD FATALITIES



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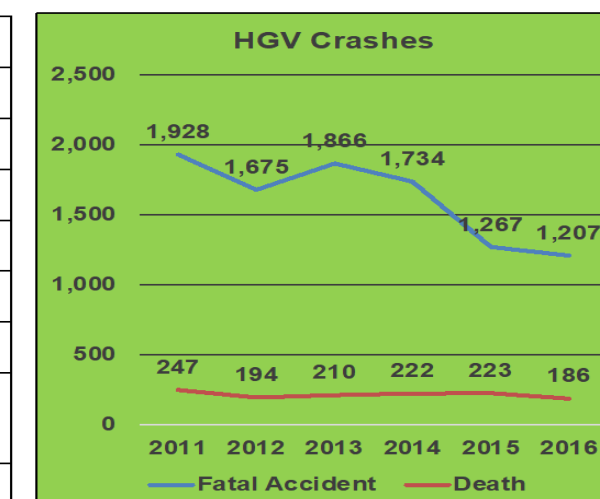


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HEAVY GOODS VEHICLES (HGV) INVOLVEMENT IN CRASHES

Category	Details
Definition of HGV	Large vehicles used for transporting goods by road.
Classification of HGVs	- Trailer (Articulated Lorries): Large vehicles with a trailer.
	- Rigid Lorry: 2+ axles, > 2.5 tons permissible gross weight.
	- Small Lorry: 2 axles, < 2.5 tons permissible gross weight (e.g., pick-up).
Malaysia HGV Fleet (2016)	Approximately 1 million units.
Total Daily Distance	200 kilometers per day per vehicle.
Average Annual VKT (AAKT)	Approximately 70,000 km per year.
HGV Accident Trend	Continuous up-and-down trend over the years.



TOTAL ACTIVE VEHICLE PERMIT FOR GOODS VEHICLE

Class of Permit	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
“A”	142,698	152,557	162,128	170,929	181,554	196,531	211,336	221,076	220,697	263,844
“C”	28,023	30,198	32,415	34,723	37,323	40,427	42,766	43,993	42,880	53,252
Sub Total	170,721	182,755	194,543	205,652	218,877	236,958	254,102	265,069	263,577	317,096

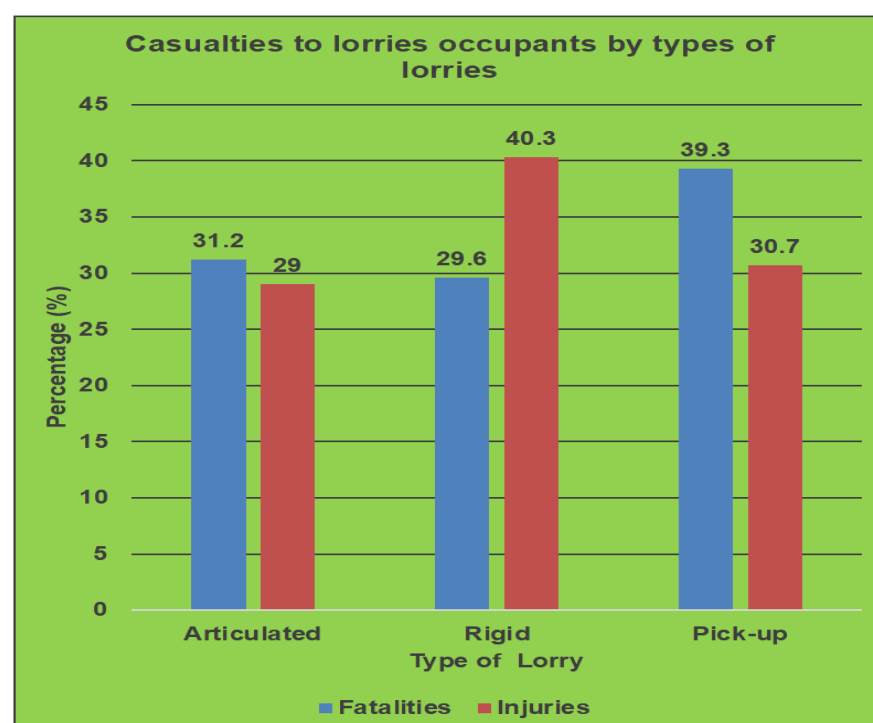
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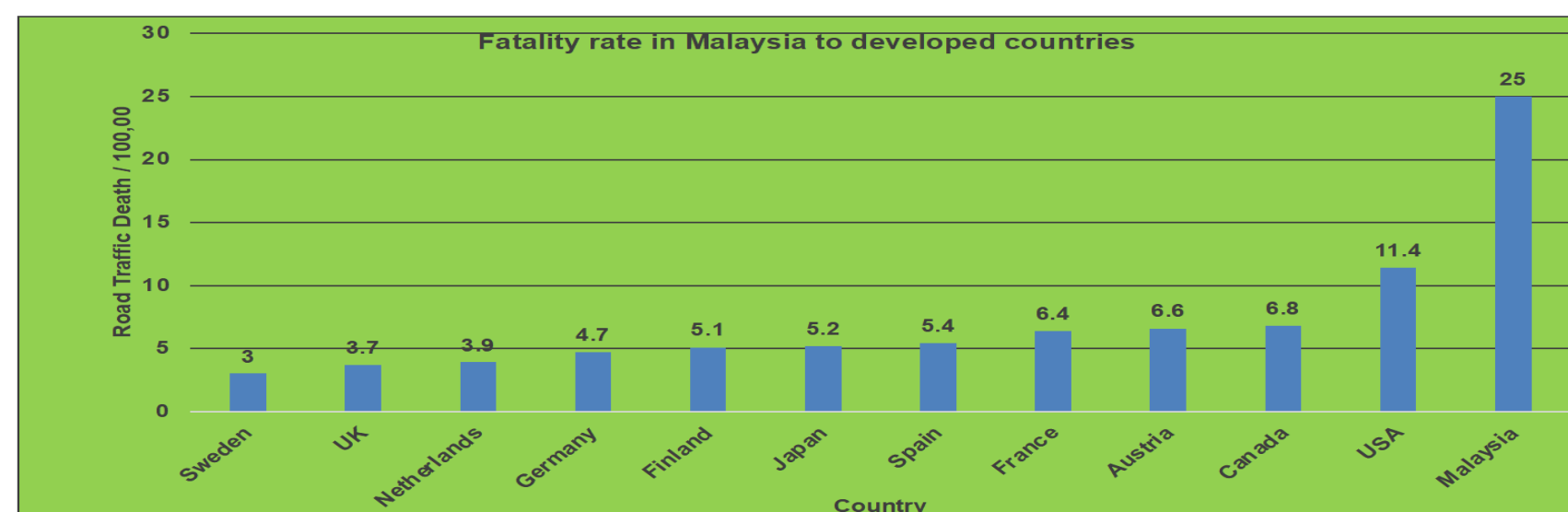
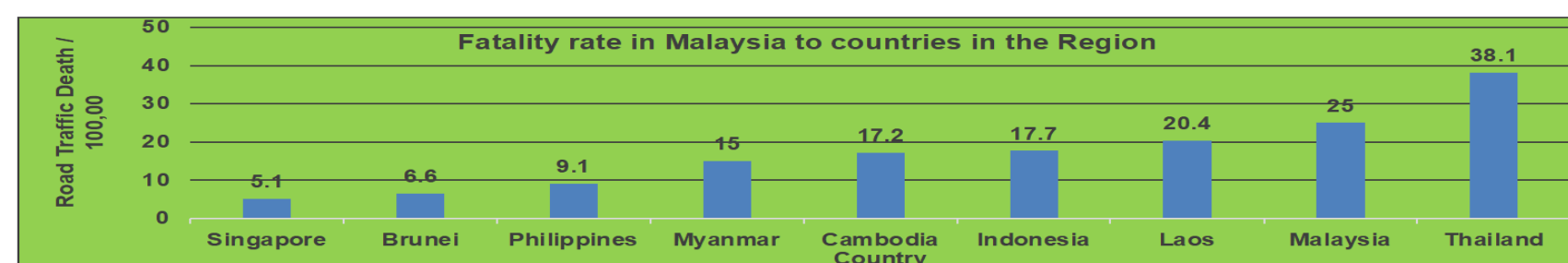
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PROPORTION OF FATALITIES AMONG LORRIES



COMPARISON OF ROAD SAFETY AMONG COUNTRIES



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EXISTING ROAD TRANSPORT

Aspect	Description
Road Network	Extensive road network including highways, federal roads, and state roads facilitating cargo movement nationwide.
Logistics Hubs	Major logistics hubs like Port Klang, Bukit Kayu Hitam, and Johor Bahru serve as key cargo distribution points.
Vehicle Types	Variety of vehicles used including trucks, lorries, trailers, and tankers for different types of cargo.
Highway Connectivity	Highways such as the North-South Expressway (PLUS), East Coast Expressway, and Penang Bridge are vital for cargo.
Cross-Border Transport	Key road links to neighboring countries like Thailand and Singapore, enabling cross-border cargo transport.
Regulation and Compliance	Governed by laws such as the Road Transport Act and monitored by agencies like the Road Transport Department (JPJ).
Freight Companies	Numerous logistics companies providing road freight services, including local and international operators.
Cargo Types	Accommodates a wide range of cargo including consumer goods, industrial products, and hazardous materials.
Challenges	Issues include traffic congestion, road safety, and high maintenance costs due to wear and tear on vehicles.

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EXISTING RAIL TRANSPORT

Aspect	Details
Primary Operator	Keretapi Tanah Melayu Berhad (KTMB) - Cargo
Cargo Services	Transport of bulk goods, containers, vehicles, raw materials, and industrial products across Peninsular Malaysia.
Main Rail Routes	Klang Valley, Port Klang, Padang Besar, Johor Bahru, and Tanjung Pelepas, connecting industrial zones with major ports.
KTM Intermodal Freight	Container transport from ports to inland destinations via rail, reducing road congestion and transport costs.
Double Track Electrification	Project: Double track electrification project has enhanced cargo transport efficiency by increasing rail capacity.
Port Connectivity	Port Klang: Largest port with direct rail links for container and bulk cargo transport.
	Tanjung Pelepas: Supported by rail cargo services, connecting the port with southern and central Malaysia’s industrial zones.

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BENEFITS OF RAIL TRANSPORT

Benefit	Description
Cost Efficiency	Lower transportation costs for bulk and long-distance cargo compared to road transport.
Environmental Impact	Reduced carbon emissions per ton of cargo transported, contributing to sustainability efforts.
Capacity	Ability to transport large volumes of goods in a single trip, ideal for heavy and bulk cargo.
Port Connectivity	Direct rail links to major ports (e.g., Port Klang, Tanjung Pelepas) streamline the movement of cargo between ports and inland destinations.
Traffic Congestion Reduction	Helps alleviate road traffic by diverting heavy cargo loads from highways to railways, reducing wear and tear on road infrastructure.
Reliability	Scheduled services with consistent transit times, less impacted by weather conditions or traffic jams compared to road transport.
Safety	Lower risk of accidents and theft compared to road transport, providing a safer option for transporting valuable goods.
Infrastructure Investment	Ongoing projects like double track electrification and the East Coast Rail Link (ECRL) are expected to further enhance the efficiency of cargo transport.
Intermodal Connectivity	Rail services complement other transport modes, such as sea and road, providing a seamless logistics network across the country.

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RAC INITIATIVES

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Locomotive & Wagon – Sell and Lease Back (Refurbishment)

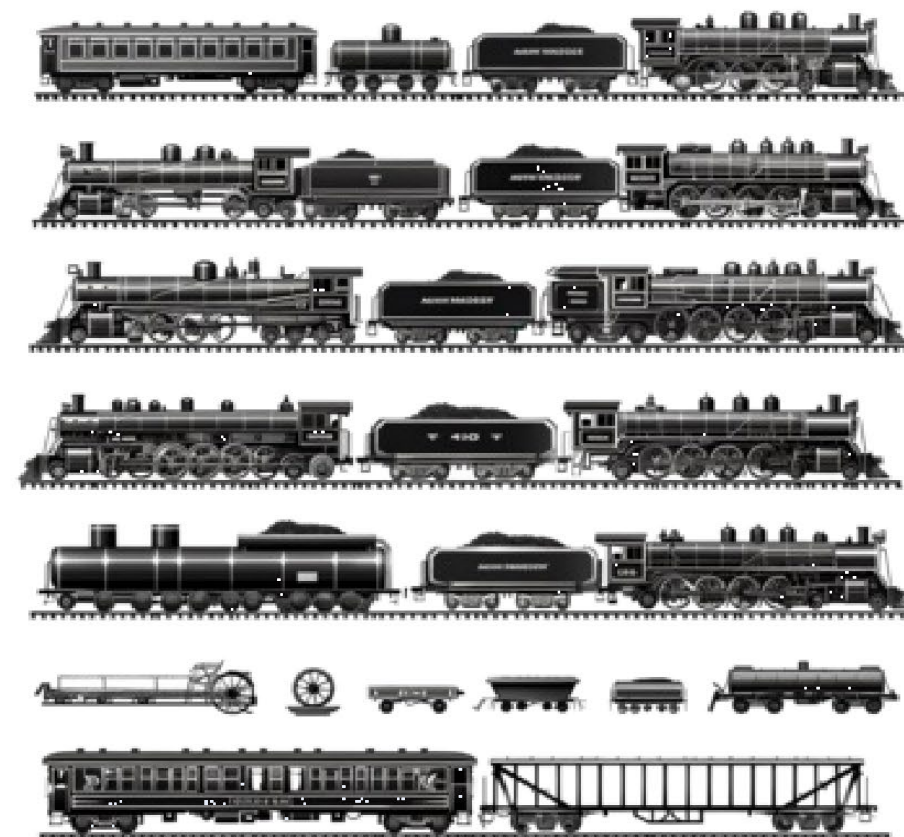
- 44 Locomotives
- 246 New 20-TAL Wagon

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Terminal Hub Cargo (New Infrastructure)

- Behrang, Perak
- Senawang, Negeri Sembilan
- Pulau Sebang, Melaka
- Mengkibol, Johor
- Pasir Gudang, Johor
- Merapoh, Pahang



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ROAD TO RAIL LOCO & WAGON

PURPOSE

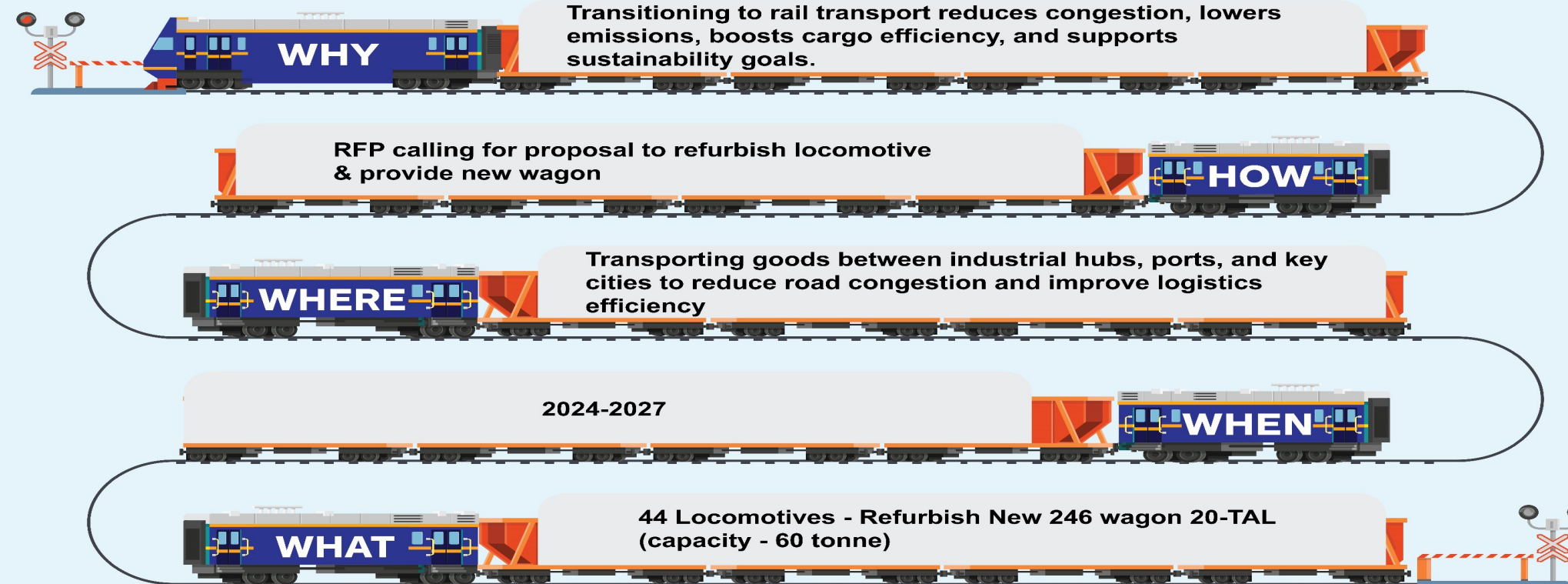
- ✓ Reduce traffic congestion, lower emissions, improve cargo efficiency.


BENEFITS

- ✓ More sustainable transportation method.
- ✓ Can handle larger volumes of goods.
- ✓ Reduces wear and tear on roads.

APPLICATION

- ✓ Transporting goods between industrial hubs, ports, and cities.



 603 8989 0200

 info@rac.gov.my

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ROAD TO RAIL TERMINAL HUB CARGO



PURPOSE

- ✓ Reduce traffic congestion, lower emissions, improve cargo efficiency.



BENEFITS

- ✓ More sustainable transportation method.
- ✓ Can handle larger volumes of goods.
- ✓ Reduces wear and tear on roads.



APPLICATION

- ✓ Transporting goods between industrial hubs, ports, and cities.



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Ipoh
Sentral



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Seremban
Sentral



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ECONOMIC IMPLICATIONS OF THE TRANSITION/ ENVIRONMENTAL BENEFITS AND SUSTAINABILITY

Shifting from road to rail transport in Malaysia offers significant economic benefits by creating a more balanced and efficient transportation system.



Economic Benefit	Description
Reduced Congestion & Time Savings	Less traffic on roads; faster commutes; efficient supply chains
Lower Transportation Costs	Rail is cheaper for long distances; cost savings for businesses
Improved Fuel Efficiency	Trains use less fuel per ton-mile; reduces fuel costs
Environmental & Cost Savings	Lower emissions and pollution; health and environmental savings
Promotion of Export Trade	Better port connectivity; boosts exports; reliable supply chains
Industrial & Logistics Development	Rail attracts investments; supports sustainable business growth
Economic Diversification	Supports industries like manufacturing and construction
Infrastructure Investments	Rail projects drive growth; local business opportunities
Land Use Efficiency	Encourages smart urban development; improves property values
Improved Logistics Efficiency	Fewer truck trips; reliable schedules; bulk cargo capacity
Resilience & Disaster Recovery	Diversified transport enhances recovery from disasters

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COST COMPARISONS BETWEEN ROAD AND RAIL TRANSPORTATION

Aspect	Rail Transportation	Road Transportation
Infrastructure Costs	High upfront costs, less adaptable	High construction/maintenance costs, more adaptable
Operating Costs	Fuel-efficient for long distances, high maintenance	Higher fuel consumption, better for short/medium distances
Labor Costs	Skilled workforce, additional staffing for passengers	Costs for drivers and support staff
Fuel Costs	More fuel-efficient per ton-mile	Higher fuel consumption, especially in LTL operations
Capacity and Volume	Best for large cargo over long distances	Best for smaller shipments and last-mile delivery
Distance	Cost-effective for long distances	Cost-effective for short distances
Route and Terrain	Consistent costs on track, less affected by terrain	Costs vary with route/road conditions
Environmental Costs	Lower greenhouse gas emissions	Higher environmental impact

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THE IMPACT ON JOB CREATION, TRADE, AND REGIONAL DEVELOPMENT

Impact Categories	Rail Transportation	Road Transportation
Job Creation	Employment in train operations, maintenance, and stations.	Jobs for truck drivers, mechanics, and logistics personnel.
	Indirect jobs in industries relying on bulk transportation.	Jobs in sectors like retail and e-commerce with just-in-time delivery.
Trade	Efficient for long-haul, bulk cargo (e.g., palm oil, rubber).	Suited for short-distance, point-to-point delivery.
	Connects key industrial areas, ports, and logistics hubs.	Extensive road network supports domestic and international trade.
Regional Development	Influences growth of towns and cities along rail lines.	Supports development of remote areas by connecting them to urban centers.
	Stimulates industrial and manufacturing zones in connected areas.	Enhances access to tourism destinations, boosting regional tourism.



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THE ROLE OF RAIL TRANSPORT IN REDUCING GREENHOUSE GAS EMISSIONS

Category	Rail Transport
Energy Efficiency	More energy-efficient than road transport; electric trains reduce carbon footprint.
Reduced Emissions per Ton-Mile	Fewer emissions per ton-mile of freight compared to road transport.
Electric and Alternative Energy	Electric trains are more environmentally friendly; potential for hydrogen or battery-electric trains.
Long-Distance Transport	Suited for long-distance and bulk cargo transport; reduces reliance on trucks and road congestion.
Efficient Design and Operations	Lower rolling resistance and fewer stops/starts reduce energy consumption and emissions.
Integration with Public Transit	Urban rail systems reduce greenhouse gas emissions from personal vehicles.
Multimodal Transportation	Complements other transport modes, encouraging multimodal solutions for long-distance and urban travel.
Reduced Road Congestion	Helps reduce road congestion, lowering emissions from idling vehicles.
Lower Air Travel Emissions	High-speed rail can offer a sustainable alternative to short-haul air travel.

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FUTURE PROSPECTS FOR SUSTAINABLE TRANSPORTATION SYSTEMS

Key Points	Description
Expanded Rail Networks	Plans for high-speed and electrified rail systems.
Intermodal Integration	Better road-rail connections for efficient transport.
Public Transit Improvements	Invest in BRT and metro systems to reduce congestion.
Electric Mobility	Promote EVs and charging stations to cut emissions.
Cycling & Walking Infrastructure	Build infrastructure for active urban transport.
Alternative Fuels	Explore hydrogen, biofuels, and natural gas options.
Green Technologies	Use energy-efficient trains and smart systems.
Policy Incentives	Provide tax breaks and subsidies for green transport.
Public Awareness	Educate on sustainable transport benefits.
Environmental Impact Mitigation	Address noise and habitat disruption.
Sustainable Urban Planning	Integrate transit with compact city development.
Multimodal Mobility	Develop systems for smooth mode transfers.
Transportation Electrification	Electrify rail and public transit to reduce emissions.
Environmental Targets	Set goals for sustainable transport progress.
Climate Resilience	Design resilient infrastructure for extreme weather.



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CONCLUSION



In conclusion, transitioning from road to rail is crucial for a sustainable future. It reduces emissions, eases traffic, and improves energy efficiency, making it a key solution to climate change. While challenges like high costs and planning need to be addressed, prioritizing rail development and public awareness can help overcome these hurdles. This shift can lower our carbon footprint, boost efficiency, and lead to a cleaner, safer, and more prosperous future.



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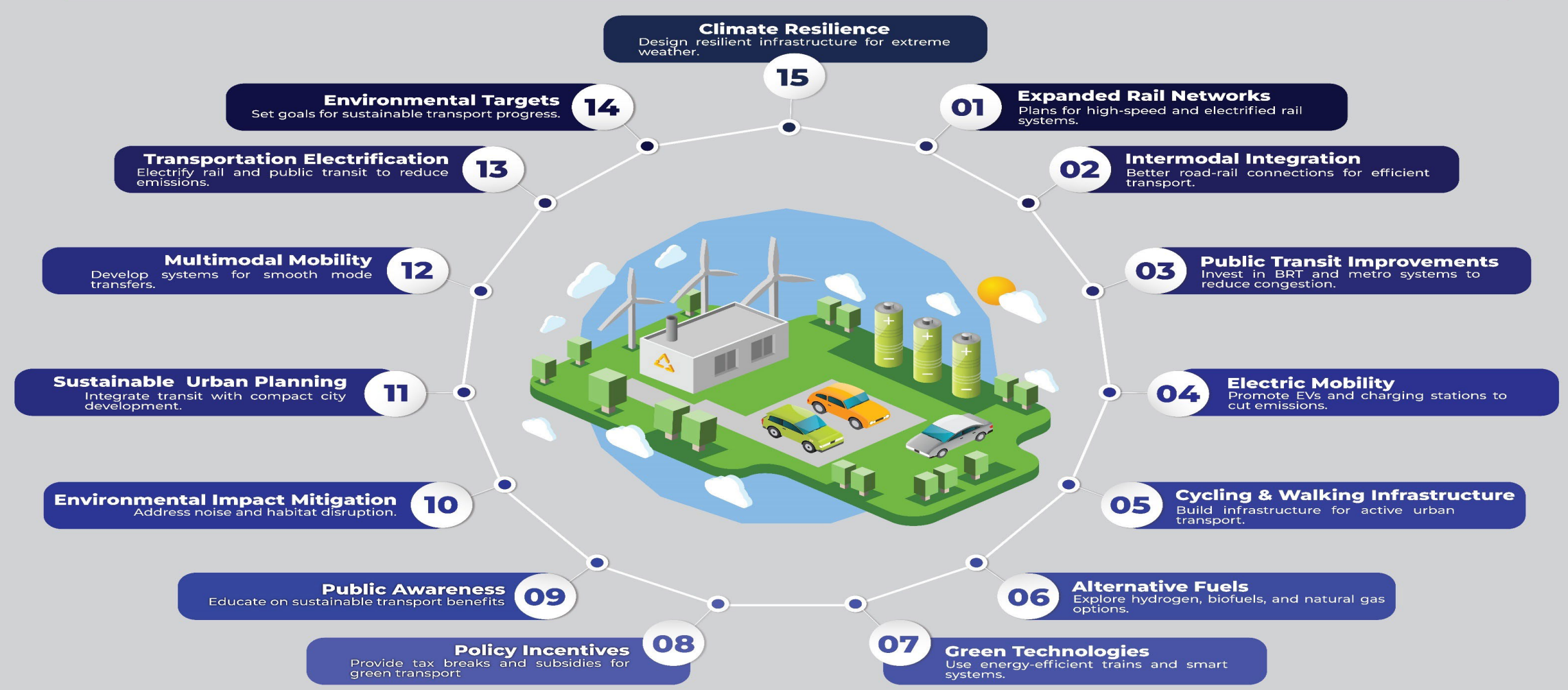


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FUTURE PROSPECTS FOR SUSTAINABLE TRANSPORTATION SYSTEMS



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TERIMA KASIH

HUBUNGI KAMI:



Perbadanan Aset Keretapi
(Railway Assets Corporation)
Tingkat 16, IOI City Menara 2, Lebuhr
IRC, IOI Resort City, 62502 Putrajaya
Sepang, Selangor



No. Tel: 603-8939 0200
No. Faks: 603-8939 0222

Emel: info@rac.gov.my



www.rac.gov.my

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