Enhancing Energy Efficiency of the Freight Transport Sector in Asia and Pacific

René Meeuws – Yerevan, May 29, 2024
Contents

• Background

• Modal shift

• Technologies for greener mobility

• Regulatory measures in driving sustainable and energy-efficient transport in Asia and Pacific

• Roadmap for enhancing energy efficiency of the freight transport sector in Asia and Pacific
# Contents of the study

Figures ........................................................................................................................................... ii
Tables .............................................................................................................................................. iii
Acronyms and Abbreviations ............................................................................................................ iv
Executive Summary ............................................................................................................................ vi
Introduction ........................................................................................................................................ 7
Chapter 1: Modal Shift, Multimodality and Decarbonization of Freight Transport ....................... 9
  1.1 Modal shift and the initiatives for decarbonizing freight transport .......................................... 9
  1.2 Main challenges and influencers for implementing a modal shift ............................................ 17
  1.3 Modal shift and synchronomodal transport systems ................................................................. 20
  1.4 How does modal shift contribute to reducing logistics costs .................................................. 22
Chapter 2: Technologies for Sustainable Mobility ........................................................................... 27
  2.1 EVs and alternative fuel vehicles ............................................................................................... 27
  2.2 Deployment of highly and fully autonomous vehicles ............................................................... 31
  2.3 Deployment of ITS and ICT infrastructure ............................................................................... 33
  2.4 Application of alternative fuels ................................................................................................. 36
  2.5 Renewable and nuclear energy applications ............................................................................ 43
    Definition and main types of renewable energy sources ............................................................... 43
    Potential entry points for renewables to transport sector ........................................................... 44
    Nuclear energy in enhancing freight transport sustainability ................................................... 47
  2.6 Modernization of infrastructure .............................................................................................. 49
Chapter 3: Policy and Regulatory Measures .................................................................................... 52
  3.1 Vehicle emission and fuel economy standards ......................................................................... 52
  3.2 GHG emissions pricing ............................................................................................................. 65
  3.3 Policies to promote modal shift to low-carbon modes .............................................................. 65
  3.4 Sustainable transport in national development policies ........................................................... 71
  3.5 Financial incentives and subsidies ......................................................................................... 74
  3.6 International climate initiatives ................................................................................................ 77
Chapter 4: Design of a Regional Roadmap ....................................................................................... 82
  4.1 The concept of a regional roadmap ........................................................................................... 82
  4.2 Regional approach for enhancing sustainable freight transport ............................................. 84
  4.3 Framework regional road map for promoting energy-efficient freight transport .................. 92
Annexes and Case Studies ............................................................................................................... 96
  Annex 1. Figures and tables from the Handbook on External Costs of Transport (EC 2019) ........ 97
  Annex 2. Decarbonizing transport in North and Central Asia by 2050 ........................................ 101
  Annex 3. A vision toward vehicle electrification in Pakistan ......................................................... 107
  Annex 4. A case on modal shift in China ....................................................................................... 108
  Annex 5. Policies to foster modal shift in Poland and EU ............................................................... 109
  Annex 6. Indonesia’s vehicle efficiency and electrification policies ............................................. 110
  Annex 7. Pathways to zero emission truck deployment in India .................................................. 114
References ......................................................................................................................................... 117
Main objective of the study

- To contribute to enhancing energy efficiency of the freight transport sector in Asia and the Pacific.
Rationale of the study

Implementation of energy efficiency measures in transport in the UNESCAP region are:

• Critical to meet the increasing freight demand;
• While reversing the growth of its contribution to CO₂ emission.

Energy efficiency is recognized as one of the most cost-effective means of reducing emissions.

The ESCAP region has an important role to play in terms of land freight (road and rail) given that the land freight transport in the region accounts for nearly 60 per cent of land freight worldwide.
Rationale for decarbonizing freight transport

• Climate Change Agreement at the 21st UN Conference of Parties (COP21) in Paris in 2015

• Serious intention of keeping the temperature increase of the planet well below 2°C by 2100, while 1.5°C now widely is being advocated as the new limit

• Greenhouse gases (GHG) emissions should be drastically reduced.

• The Intergovernmental Panel on Climate Change (IPCC) calculated that with a reduction GHG emissions of 40-70%, there would be a chance of 50% that the global warming would be less than 2°C in the year 2100.
Freight transport sector needs to reverse the growth in its GHG emissions

The contribution of the transport sector in the GHG emissions grew from 15% in 1990 to 22% in 2013. It is now estimated between 20-25%.

CO₂ emissions constitute the largest share of the GHG emissions.

The International Transport Forum has predicted that the total freight-related CO₂ emissions would increase to 5.7 Gt in 2050, while this was 3.2 Gt in 2015.
Measures needed to bring these fundamental changes

1. Reducing freight movement
2. Shifting to lower carbon transport modes
3. Optimize utilization transport and logistics assets
4. Improve energy efficiency transport and logistics operations
5. Cut carbon content of energy used by transport and logistics
1. Modal shift

- Transport modes vary enormously in the amount of CO$_2$ they emit per unit of freight movement.

- Decarbonization strategy also includes the preference for using those transport modes with the lowest carbon intensity.

- Of the freight-related decarbonization measures for reducing freight-related emissions in the Intended Nationally Determined Contributions (INDCs) made by governments to the COP21 Paris Accord, 48% of the INDC policy initiatives on freight transport refer explicitly to freight modal shift.
Proportion of INDC documents mentioning freight-related decarbonization measures

- Freight mode shift: 48%
- Fuel economy improvement: 15%
- Port decarbonization: 7%
- Electrification of freight rail: 7%
- Decarbonizing fuel: 4%
- Improve vehicle utilization: 4%
- No specific measure: 15%
Calculating carbon intensity

• The challenge is to be able to quantify the carbon savings from modal shift. It is necessary to calculate the carbon intensity of all freight transport modes.

**CO₂ emissions for different transport modes in grams per tonne-kilometre**

<table>
<thead>
<tr>
<th>Truck</th>
<th>Rail</th>
<th>IWT</th>
<th>SSS</th>
<th>Pipeline</th>
<th>Period</th>
<th>Place</th>
<th>Calculation</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>88-256</td>
<td>12</td>
<td>24-38</td>
<td>22</td>
<td></td>
<td>2020</td>
<td>Netherlands</td>
<td>WTW</td>
<td>CE Delft (2021)</td>
</tr>
<tr>
<td>60-190</td>
<td>18-21</td>
<td>17-34</td>
<td></td>
<td>180 (gas), 16 (oil)</td>
<td>2002</td>
<td>United States</td>
<td>WTW</td>
<td>Nealer et al. (2014)</td>
</tr>
<tr>
<td>65</td>
<td>2</td>
<td>29</td>
<td></td>
<td></td>
<td>2017</td>
<td>Sweden</td>
<td>TTW</td>
<td>Johansson, Vierth, and Holmgren (2021)</td>
</tr>
<tr>
<td>55-124</td>
<td></td>
<td>80</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Hjelle 2014</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>101</td>
<td>Leonard and Browne (2010)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>11</td>
<td>IMO (2009)</td>
</tr>
</tbody>
</table>
Calculating carbon intensity

Be very careful in using standard values for transport modes as they may vary depending on many factors such as data sources, load factor assumptions, country specific circumstances, energy sources, etc.

In the calculation of the carbon intensity also the emission intensity of the primary energy source should be included and even can be extended to include emissions from the manufacture and maintenance of vehicles, the construction and maintenance of infrastructure and related IT and administration.

In case of electrified freight services also the energy used for producing electricity for the electrified freight services should be taken into account. Modes should be compared on a well-to-wheel (WTW) basis and not only on a tank-to-wheel (TTW).
Implementation of modal shift is more difficult that it seems

- The ITF Statistics Brief publication from December 1, 2022, bears the title “Modal shift to cleaner transport fails to materialise”.
- It states that there still is a *trend of freight shift to road*. Only a few countries increased the share of rail transport freight, most notably Australia (+8%), Slovenia (+7%) and Italy (+5%), shifting from road transport but also Finland, France, Germany and Hungary. Most countries that experienced modal shift show an increase in the use of road transport. Serbia (+40%), Lithuania (+21%) and Moldova (+13%) are the top three countries with the highest shift towards road transport. The remaining countries have also increased the use of road transport by 4%.
Main challenges for implementing modal shift

The main influencers on modal choice:

- Shippers
- Logistics Service Providers
- Carriers

Other actors that influence modal choice:

- Infrastructure managers
- Policy makers
Main determinants for freight transport mode choice

**Supply:**
- Infrastructure
- Connections
- Service

**Demand:**
- Price
- Transit time
- Reliability
- Frequency

**Shipper, forwarder, carrier**

**Policy-makers:**
- Accessibility
- Sustainability
- Safety
- Resilience
- Economy

**Differentiators:**
- Distance
- Commodity
- Shipment size
- Supply chain strategy

**Mode choice**

**Mode shift**
Criteria for modal choice

• Cost
• Travel time
• Reliability
• Flexibility
• Tracking and tracing of freight
• Use of (handling) infrastructure
• Volume and characteristics of the freight
• Services at terminals
• Legislation including both legal bottlenecks as well as legal advantages
• Safety and security.
Disadvantages rail and waterborn transport

- Lower-carbon modes rail and waterways have much lower density and connectivity than road networks.
- Goods have to be transhipped at least two more times, loading and unloading between road and rail or waterways as only few industrial premises have direct access to rail or waterways.
- Rail and waterborne transport services are in general slower than road transport.
- Flexibility is important, but also reliability and sometimes also the just-in-time principle. In those cases, shippers often choose for road transport, which can be easier planned and controlled and is more flexible.
- Road transport 20-40 tons; rail 1000-2000 tons; and barges or maritime vessels can transport much more cargo depending on their size. Challenging from cost perspective and flexibility.
Policies to promote modal shift

• The rationale for future policies in promoting modal shift may continue to be that modal shift from road transport to other modes of transport such as railways and waterway transport contributes to less carbon emissions in the transport sector.

• Introduce fairer pricing mechanisms and internalize environmental costs of freight transport in all modes of transport on equal basis.

• Challenge is to calculate and estimate the monetary values of transport externalities to be taken into account for the environmental tax calculation.
The EC Handbook on External Costs of Transport from 2019 takes into account for the calculation of transport externalities the costs of accidents, air pollution, climate change, noise, congestion, well-to-tank emissions, habitat damage, soil and water pollution, up- and downstream emissions of vehicles and infrastructure and extra costs in sensitive areas.

Average external costs 2016 for EU28 freight transport by cost category and transport mode

<table>
<thead>
<tr>
<th>Cost category</th>
<th>Road LCV-petrol</th>
<th>Road LCV-diesel</th>
<th>Road HGV - total</th>
<th>Rail Electric freight</th>
<th>Rail Diesel freight</th>
<th>IWT Inland vessel</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>€-cent/vkm</td>
<td>€-cent/vkm</td>
<td>€-cent/tkm</td>
<td>€-cent/tkm</td>
<td>€-cent/tkm</td>
<td>€-cent/tkm</td>
</tr>
<tr>
<td>Accidents</td>
<td>4.1</td>
<td>4.1</td>
<td>1.3</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>Air Pollution</td>
<td>1.2</td>
<td>3.4</td>
<td>0.8</td>
<td>0.0</td>
<td>0.7</td>
<td>1.3</td>
</tr>
<tr>
<td>Climate</td>
<td>2.6</td>
<td>2.8</td>
<td>0.5</td>
<td>0.0</td>
<td>0.2</td>
<td>0.3</td>
</tr>
<tr>
<td>Noise</td>
<td>1.1</td>
<td>1.1</td>
<td>0.5</td>
<td>0.6</td>
<td>0.4</td>
<td>n/a</td>
</tr>
<tr>
<td>Congestion**</td>
<td>11.6</td>
<td>11.6</td>
<td>0.8</td>
<td>0.6</td>
<td>0.4</td>
<td>n/a</td>
</tr>
<tr>
<td>Well-to-Tank</td>
<td>0.8</td>
<td>0.8</td>
<td>0.2</td>
<td>0.2</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>Habitat damage</td>
<td>0.9</td>
<td>0.9</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>22.3</td>
<td>24.7</td>
<td>4.2</td>
<td>1.1</td>
<td>1.8</td>
<td>1.9</td>
</tr>
</tbody>
</table>

** Congestion in terms of delay cost.
The future of modal shift policy

• Modal shift policy will remain on the agenda of most countries in the world. Many governments in cooperation with international organizations and institutions will continue to facilitate and promote the use of intermodal transport services.

• They are doing this often using a corridor framework: the EU with its nine intermodal transport corridors linking most of its member states and their neighbouring countries; the Indian sub-continent with its dedicated rail freight corridors; the Eurasian railway network linking China with Europe; and the UNESCAP Asian Highway, Trans-Asian Railway and Dry Ports.
Can modal shift contribute to a reduction of logistics costs?

• An important question is still whether modal shift can also contribute to reducing transport and logistics costs.

• Many countries are developing policies to reduce national logistics costs and drafting logistics strategies and elaborating national logistics master plans and measure and monitor national logistics performance.

• Modal shift policies always must balance between transport and logistics costs and necessary environmental policy measures. That will always be one of the major challenges.
2. Technologies for greener mobility

- Electric vehicles and alternative fuel vehicles
- Deployment of highly and fully autonomous vehicles
- Deployment of intelligent transport systems and information communications infrastructure
- Application of alternative fuels
- Renewable and nuclear energy applications
- Infrastructure modernization
Electric vehicles and alternative fuel vehicles

• The use of battery electric vehicles along with the other types of hybrid vehicles may reduce substantially the greenhouse gas emissions

• A life-cycle comparison of the greenhouse gas emissions from combustion, electric, and hydrogen trucks and buses in Europe has revealed that battery electric trucks and buses outperform their diesel, hydrogen, and natural gas counterparts in reducing greenhouse gas emissions over their lifetime.

Deployment of highly and fully autonomous vehicles

Highly and fully autonomous vehicles have the potential to improve energy efficiency in various ways, leading to lower energy consumption and reduced greenhouse gas emissions:

- **Optimized driving behaviour**: 5-20 per cent reduction in energy consumption
- **Improved traffic flow**: Autonomous vehicles can communicate with each other and with traffic; 15-20 per cent reduction in energy consumption.
- **Eco-routing and navigation**: can reduce energy use by up to 10 per cent.
- **Platoon driving**: Autonomous vehicles can drive in tightly coordinated groups reduction energy use 4-10 per cent for the lead vehicle and 10-20 per cent for following vehicles.
- **Lightweighting**: 10 per cent reduction in vehicle weight can result in a 6-8 per cent improvement in fuel economy.
- **Electrification and renewable energy integration**: Autonomous vehicles can autonomously recharge during periods of low electricity demand or when renewable energy sources are abundant.
Intelligent transport systems and information and communication technology infrastructure

• Intelligent transport systems harness a multitude of technologies that aim to streamline traffic management and improve the safety, efficiency, and convenience of transport systems.

• Simultaneously, ICT infrastructure provides the backbone that enables the data-driven decisions required in the increasingly interconnected world.

• The interplay of ITS and ICT can lead to remarkable advancements in freight transport.
Intelligent transport systems and reduction in fuel consumption

- Optimized route planning: 10-15%
- Eco-driving assistance: 5-20%
- Vehicle-to-vehicle and vehicle-to-infrastructure communication: up to 10%
- Load optimization: 5-10%
- Fleet management: up to 15%
- Autonomous vehicles: 10-15%
And further we may increase energy efficiency in freight transport by

- Application of alternative fuels
- Renewable and nuclear energy applications
- Infrastructure modernisation
3. Regulatory measures in driving sustainable and energy efficient transport

- Policies affecting the freight transport sector within the ESCAP region are notably diverse, reflecting the distinct social, economic, and environmental factors that characterize different countries.

- These policies encompass a broad spectrum, including international conventions, intergovernmental initiatives, vehicle emission standards, and incentives encouraging the adoption of energy-efficient technologies and transport modes, such as the modal shift.
• This growing awareness is leading countries across the region to integrate transport energy efficiency into their national energy and climate strategies more intentionally.

• Ambitious goals are being set for the deployment of zero-emission vehicles, alternative fuel promotion is on the rise, and significant investments are being made into infrastructure that support more efficient modes of transport such as rail and inland waterways.
Vehicle emission and fuel economy standards

There is still a varied implementation of emission and fuel economy standards across the ESCAP region, which underscores the necessity for heightened collaboration, capacity enhancement, and knowledge exchange.

Bodies such as ESCAP can play pivotal roles in aiding these countries in the development and execution of sustainable transport policies.

By encouraging regional cooperation and disseminating successful strategies, the ESCAP member countries can collectively address disparities in emission standards.
Greenhouse gas emissions pricing

- Greenhouse gas emissions pricing is an effective regulatory measure that governments can implement to reduce emissions, including those from the transport sector.

- Greenhouse gas emissions pricing is based on the "polluter pays" principle, which places a financial cost on the emission of greenhouse gases.

- This can be done through mechanisms such as carbon taxes or emissions trading systems.

- 75 carbon pricing instruments in operation; revenues in 2023 $104 billion; nearly a quarter of global emissions are covered by these instruments. (World Bank, State and Trends of Carbon Pricing; 2024-05-21).
Modal shift

Most governments recognize the need to establish an intermodal transport network for synchronmodality, facilitating seamless mode-switching for consignments in transit.

Some recent developments such as the growing need for integrated synchronmodal systems, collaboration amongst stakeholders in the supply chain and improved interoperability may contribute towards making the modal shift policy more successful.
Financial incentives

• Governments across the globe are effectively implementing incentive schemes aimed at fostering environmentally friendly practices and bolstering energy efficiency within the road freight transport sector.

• They are leveraging a range of fiscal and taxation incentives to catalyse this much-needed transformation.

• Financial incentives play a crucial role in fostering sustainable freight road transport by stimulating businesses to adopt more environmentally friendly practices.
Towards a Regional Roadmap

The United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) is working on a

- Regional strategy and a regional roadmap to deepen sustainability and energy efficiency in freight transport

- This strategy and the road map will give further momentum and coherence to initiatives being undertaken at the region-wide level for Asia-Pacific.
Regional approach to enhancing the sustainability of freight transport in Asia and Pacific

**Guiding vision**

Efficient, connected, safe and clean regional freight transport system to support the achievement of the Sustainable Development Goals.

**Objectives**

1. Providing coherence to sustainable freight initiatives.
2. Creating synergies through partnerships.
3. Ensuring high-level political support.
Priority areas

1. Decarbonizing freight transport.
2. Building the resilience of freight transport to effectively deal with climate challenges and pandemics.
4. Enhancing rural freight transport linkages.
5. Improving urban freight logistics.
6. Reducing accidents related to freight transport.
7. Supporting sustainable freight transport in countries with special needs.
8. Increasing the share of rail freight and other sustainable transport modes.
Conducting Baseline Assessment

- Conduct a baseline assessment.
- Measure and report on corporate transport and logistics emissions annually across modes and transhipment centres (including dry ports).
- Measure and report on national transport and logistics emissions annually across modes and transhipment centres (including dry ports).
- Apply internalization of external costs in transport and logistics operations.
- Support common methodology development within the UNESCAP domain.
- Support data collection and data exchange within the UNESCAP domain.
Development of a Stakeholder Engagement Plan

- Define and involve stakeholders in the transition towards sustainable and energy efficient freight transport.
- Facilitate and promote horizontally and vertically multi-stakeholder collaboration mechanisms.
- Promote the elaboration of ‘Sustainable and Energy Efficient Freight Programs.'
Development of a Stakeholder Engagement Plan

Targets

- Develop national targets for transport and logistics emissions.
- Develop sectoral targets for transport and logistics emissions.
- Develop corporate targets for transport and logistics emissions.
Development of a Stakeholder Engagement Plan

Strategies and action plans

- Integrate transport and logistics in the Nationally Determined Contributions (NDCs).
- Develop national strategies and action plans for the transport and logistics sector including infrastructure, vehicles, trains, vessels and their operation.
- Develop corporate strategies and action plans.
- Develop and implement policies to enforce implementation of the measures.
- Disseminate examples and best practices of implementation of strategies and action plans at system level (corridors, supply chains, regions, cross-border) based on successful results of measures taken at local, company of pilot level.
Sources for funding

Identify sources for funding: national, regional and local government agencies; international organisations; multilateral organisations; banks; business sector; Public Private Partnerships.
Establish uniform national monitoring and evaluation mechanisms in the UNESCAP domain.
Framework for freight transport and logistics decarbonization

### FREIGHT DEMAND GROWTH IS MANAGED
- Supply chain restructuring
- Localization and nearshoring
- Decentralization of production and stockholding
- 3D printing
- Dematerialization
- Consumer behavior

### TRANSPORT MODES ARE SMARTLY USED AND COMBINED
- Increased use of rail
- Increase use of short sea shipping and inland waterways
- Modular road transport
- Cargo bikes
- Multi-modal optimization
- Synchronodality

### FLEETS AND ASSETS ARE SHARED AND USED TO THE MAX
- Load optimization
- Load consolidation and asset sharing
- Reduce empty moves
- Modular packaging and boxes
- Open transport networks and warehouses
- Increase storage density and energy efficiency

### FLEETS AND ASSETS ARE ENERGY EFFICIENT
- Cleaner and efficient technologies
- Efficient vehicles and vessels
- High capacity vehicles / duo trailers
- Driving behavior
- Fleet operation
- Fleet maintenance

### FLEETS AND ASSETS USE LOWEST EMISSIONS ENERGY SOURCE FEASIBLE
- Electric / hybrids
- Solar / Wind
- Biofuels
- Hydrogen
- CNG/bio-LNG
- Cleaner diesel
- Fuel management

© Smart Freight Centre and ALICE-FTP based on A. McKinnon 'Decarbonizing Logistics' (2018)
17 measures to decarbonize transport and logistics

“Avoid” policies
- Measures to minimise transport needs
  1) Develop sustainable metropolitan areas
  2) Avoid unsustainable infrastructure with a long lifespan
- Encourage shared mobility
  3) Establish an intermodality regulatory framework

“Shift” policies
- Shift to walking and cycling
  4) Improve walking infrastructure
  5) Improve cycling infrastructure
- Shift to public transport
  6) Shift away from passenger and delivery service vehicles in cities
  7) Financial incentives (for public transport)
  8) Develop light-rail and bus transit through plans and public investment
- Shift to passenger and freight railways
  9) Develop and support railway infrastructure and services (including high speed railways)
  10) Taxing national and European flights at levels at least equal to that of high speed trains, and international flights even more

“Improve” policies
- Fuel economy improvement
  11) Fuel economy financial incentives and taxes
  12) Vehicle Emission standards/fuel economy standards for new vehicles
- Zero-emission (electric/hydrogen) mobility
  13) Zero-emission vehicles purchase subsidy and other financial incentives
  14) Ban on sale of vehicles with internal combustion engines (ICEs)
  15) Improve EV charging infrastructure
  16) Behavioural incentives for zero-emission vehicles
- Sustainable fuels in transport
  17) Support alternative fuels for aviation and maritime transport
ITF Transport Outlook 2023

Also relevant to take into account for drafting a regional roadmap are the two ambition policy scenarios developed by the ITF Transport Outlook 2023:

• Current Ambition Policy Scenario
• High Ambition Policy Scenario

for

• freight demand and choice
• the transition to cleaner vehicle fleets
### The Current Ambition policy scenario specification for freight demand and mode choice

<table>
<thead>
<tr>
<th></th>
<th>2020s</th>
<th>2030s</th>
<th>2040s</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Decarbonisation measures</strong> for urban freight are slowly introduced. The uptake of pick-up and drop-off locations for parcels, and asset sharing, increase linearly. Restricted access zones also start to become more widely implemented. Meanwhile, the use of electric cargo bikes for last-mile distribution of various commodities grows exponentially.</td>
<td>The uptake of cargo bikes keeps growing exponentially until 2035, when the growth slows but continues to progress linearly. Restricted access zones expand at a linear rate half of what was observed in the 2020s. The use of pick-up and drop-off locations for parcels, and asset sharing, continue to increase at the same rate.</td>
<td>All of the developments from the 2020s and 2030s have cemented their place in the urban logistics system. All measures continue to expand their share at the same rate.</td>
<td></td>
</tr>
<tr>
<td><strong>Incentives for high-capacity vehicles (road tractors)</strong> encourage a transition in interurban freight. By 2025, there is a 10% increase in the average load utilisation (load factor) of road freight.</td>
<td>Road tractors begin to have a larger impact, increasing the truck loads and decreasing the cost per tonne-kilometre.</td>
<td>Load factors continue to increase, ending up 25% higher in 2050, compared to 2019.</td>
<td></td>
</tr>
<tr>
<td><strong>Distance-based charges</strong> are encouraged for road transport and introduced in policy discussions.</td>
<td>Distance-based charges are introduced in 2030 and begin to grow continuously.</td>
<td>Distance-based charges rise further in the 2040s.</td>
<td></td>
</tr>
<tr>
<td><strong>Slow and smart steaming</strong> are incentivised in the shipping sector to reduce emissions.</td>
<td>Vessel speed reductions lead to a 5% improvement in efficiency.</td>
<td>Vessel speed reductions lead to a 10% improvement in efficiency compared to the baseline (2019).</td>
<td></td>
</tr>
<tr>
<td><strong>Digital transformation strategies</strong> leveraging near-real-time data are used to reduce intermodal dwell times in journeys with sections undertaken by rail or on waterways.</td>
<td>Improvements in travel times make intermodal solutions more attractive but do not improve to the same extent as under the High Ambition scenario.</td>
<td>Travel times for intermodal solutions continue to reduce at a slower rate than under the High Ambition scenario.</td>
<td></td>
</tr>
<tr>
<td><strong>Transport network improvement plans</strong> for rail, waterways and port infrastructure begin to be phased in and funded.</td>
<td>Carbon pricing is introduced but with prices set at varying levels in different regions.</td>
<td>Carbon pricing continues to vary by region, and between sea-based transport modes and other modes. The price of carbon ranges between USD 150-250 per tonne of carbon dioxide (CO₂).</td>
<td></td>
</tr>
<tr>
<td><strong>The trade in and consumption of petroleum- and coal-based commodities begins to decrease</strong>, directly impacting freight transport demand for fossil fuels and the freight activity associated with the trade of these commodities.</td>
<td>While the trade in other commodities continues to increase, the trade in oil and coal grows to a lesser extent.</td>
<td>While the trade in other commodities continues to increase, the trade in oil and coal grows to a lesser extent.</td>
<td></td>
</tr>
</tbody>
</table>
The High Ambition policy scenario specification for freight demand and mode choice

<table>
<thead>
<tr>
<th>2020s</th>
<th>2030s</th>
<th>2040s</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sustainable urban logistics measures</strong> are implemented more widely than under the Current Ambition scenario. Cargo bikes and asset-sharing double the growth observed in the Current Ambition scenario. The use of pick-up and drop-off locations for parcels is 60% higher than in the Current Ambition scenario. Restricted access zones are stricter, increasing by a factor of three the likelihood that electric vehicles are used to transport goods in cities.</td>
<td><strong>Incentives for high-capacity vehicles</strong> (road tractors) encourage a transition in interurban freight. By 2025, there is a 10% increase in the average load utilisation (load factor) of road freight.</td>
<td><strong>Load factors continue to increase, ending up 25% higher in 2050, compared to 2019.</strong></td>
</tr>
<tr>
<td><strong>Distance-based charges</strong> are encouraged for road transport and introduced in policy discussions.</td>
<td><strong>Distance-based charges are introduced in 2030 and begin to grow continuously.</strong></td>
<td><strong>Distance-based charges rise further in the 2040s.</strong></td>
</tr>
<tr>
<td><strong>Slow and smart steaming</strong> are incentivised in the shipping sector to reduce emissions.</td>
<td><strong>Vessel speed reductions lead to an average 10% improvement in efficiency which reduces dwell times and environmental impacts.</strong></td>
<td><strong>Vessel speed reductions lead to a 25% improvement in efficiency compared to the baseline (2019).</strong></td>
</tr>
<tr>
<td>By 2025, digital transformation strategies leveraging near-real time data cause truck-to-port and truck-to-rail dwell times to decrease by 20%. Meanwhile, rail-to-port dwell times decrease by 15% by 2025. Inland waterways dwell times decrease by 5%.</td>
<td><strong>Reductions in dwell times across road, rail and inland waterways result in a reduction in travel times associated with intermodal trips, making intermodal solutions more attractive. The improvements continue to increase.</strong></td>
<td><strong>Travel times for intermodal solutions continue to reduce. Truck-to-port and truck-to-rail dwell times decrease by 45% by 2050. Rail-to-port dwell times decrease by 45% by 2050. Inland waterways dwell times decrease by 25%.</strong></td>
</tr>
</tbody>
</table>

The acceleration and expansion of investments in transport network improvement plans is greater than under the Current Ambition scenario.

Carbon pricing is introduced but with prices set at varying levels in different regions.

Carbon pricing continues to vary by region but at higher values than under the Current Ambition scenario. The price of carbon ranges between USD 300-500 per tonne of carbon dioxide (CO₂).

The trade in and consumption of petroleum- and coal-based commodities begins to decrease, directly impacting freight transport demand for fossil fuels and the freight activity associated with the trade of these commodities.

While the trade in other commodities continues to increase, there is a yearly decrease in demand for coal and petroleum.

There is a 50% yearly decrease in demand for coal and petroleum.
## The Current Ambition policy scenario specification for the transition to cleaner vehicle fleets

<table>
<thead>
<tr>
<th></th>
<th>2020s</th>
<th>2030s</th>
<th>2040s</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The turnover of vehicle fleets</strong> continues in line with historical trends. New vehicle efficiency improvements continue, driven by existing fuel economy standards and in line with historical trends.</td>
<td>Mandatory and aspirational zero-emission vehicle (ZEV) sales targets are met. European Union member states and signatories to the COP26 Accelerating to Zero Coalition declaration reach 100% ZEV sales by 2035.</td>
<td>Mandatory and aspirational ZEV sales targets are met in countries and regions with staled targets.</td>
<td></td>
</tr>
<tr>
<td><strong>Biofuel blending targets</strong> for road fuels are met in countries with defined targets, including Finland, India, Indonesia and the United Kingdom.</td>
<td>Signatories to the Global Memorandum of Understanding (MOU) on Zero-Emission Medium- and Heavy-Duty Vehicles reach the target of 30% ZEV sales for heavy-goods vehicles (HGVs) in 2030.</td>
<td>Signatories to the Global MOU on Zero-Emission Medium- and Heavy-Duty Vehicles reach the target of 100% ZEV sales for HGVs in 2040.</td>
<td></td>
</tr>
<tr>
<td><strong>Sustainable aviation fuel (SAF) mandates</strong> are introduced in the EU and the United States according to the ambitions set out in the ReFuel EU and SAF Grand Challenge initiatives, respectively (see note).</td>
<td>Mandates for SAFs increase in Europe and the United States.</td>
<td>By 2050, SAFs make up 85% of aviation fuels in Europe and 100% in the United States.</td>
<td></td>
</tr>
</tbody>
</table>

Note: The carbon intensity of fuels is estimated according to Yoo, Lee and Wang (2022[7]) and Ueckert et al. (2021[8]).
The High Ambition policy scenario specification for the transition to cleaner vehicle fleets

<table>
<thead>
<tr>
<th></th>
<th>2020s</th>
<th>2030s</th>
<th>2040s</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The turnover of vehicle fleets</strong> continues in line with historical trends and to meet travel demand. New vehicle efficiency improvements for road vehicles double from historical trends, driven by more stringent fuel economy standards. Meanwhile, aviation efficiency improvements increase to 3% per year.</td>
<td>By 2035, 100% of sales of new passenger vehicles and vans in East and Northeast Asia (ENEA), Europe, and in the United States, Canada, Australia and New Zealand (UCAN) are zero-emission vehicles (ZEVs). This is in line with the Global Fuel Economy Initiative (GFEI) ZERO Pathway. By 2030, 100% of new bus sales in high-income regions (ENEA, Europe and UCAN) are ZEVs. Meanwhile, by 2035, 100% of new two- and three-wheelers in all regions are ZEVs.</td>
<td>By mid-decade, 100% of sales of new passenger vehicles and vans in emerging markets are ZEVs, in line with the GFEI’s ZERO Pathway. By 2040, 100% of new bus sales in the remaining markets are ZEVs. Also by 2040, 100% of sales of new heavy-duty vehicles in high-income regions are ZEVs. Meanwhile, emerging markets will reach this 100% target by the end of the decade.</td>
<td></td>
</tr>
<tr>
<td><strong>Signatories to the Global Memorandum of Understanding (MOU) on Zero-Emission Medium- and Heavy-Duty Vehicles</strong> reach the target of 30% ZEV sales for heavy-goods vehicles (HGVs) in 2030.</td>
<td>Signatories to the Global MOU on Zero-Emission Medium- and Heavy-Duty Vehicles reach the target of 100% ZEV sales for HGVs in 2040. Non-signatories reach the target of 30% of ZEV sales for HGVs in 2040 and 100% in 2050.</td>
<td>By 2040, all new trains in high-income regions (UCAN, ENEA, and Europe) are zero-emission. The remaining markets reach this target by 2050.</td>
<td></td>
</tr>
<tr>
<td><strong>Sustainable aviation fuel (SAF) mandates</strong> are introduced in the EU and the United States according to the ambitions set out in the ReFuel EU and SAF Grand Challenge initiatives, respectively (see note).</td>
<td>The roll-out of SAF mandates continues and alternatives to conventional fuels begin to come down in price. SAF mandates also expand to other regions. Aircraft with electric powertrains become available and begin to take share for short-haul flights with low passenger capacities.</td>
<td>Commercial applications of electric aircraft emerge in niche sectors. SAFs make up 85% of aviation fuels globally by 2050 (see note).</td>
<td></td>
</tr>
<tr>
<td><strong>Initial deployment of zero-emission shipping fuels</strong> occurs in green corridors.</td>
<td>By 2050, zero-emission fuels make up 100% of shipping fuels. Also by 2050, the electrification of short sea shipping routes occurs (see note).</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: The carbon intensity and lifecycle emissions of biogenic and synthetic pathways are estimated according to Yoo, Lee and Wang (2022a) and Ueckert et al. (2021b). The electrification of short-sea shipping is in line with Kersey et al. (2022b).
<table>
<thead>
<tr>
<th>Directions and Activities</th>
<th>Target indicators</th>
<th>Implementation timing</th>
<th>Responsible entities</th>
<th>Form of deliverables</th>
<th>Data sources for monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- Increase in the adoption of fuel-efficient vehicles</td>
<td>- Year 2-3: Conduct study and finalize standards</td>
<td>- Environmental Protection Agency</td>
<td>- Study report on the potential impact of fuel economy standards</td>
<td>- Fuel consumption data</td>
</tr>
<tr>
<td></td>
<td>- Increase in GHG emissions from the transport sector</td>
<td>- Year 4-10: Implement fuel economy standards through regulation and enforcement</td>
<td>- Customs and Border Protection</td>
<td>- Regulation on fuel economy standards</td>
<td>- GHG emissions data</td>
</tr>
<tr>
<td>2. Promote the use of alternative fuels and renewables</td>
<td>- Increase in the adoption of alternative fuels, such as CNG, LNG, and EVs</td>
<td>- Year 1-2: Develop policies, financial incentives and infrastructure to support alternative fuels</td>
<td>- Ministry of Transportation and Communications</td>
<td>- Financial incentive programs</td>
<td>- Adoption rate of alternative fuels</td>
</tr>
<tr>
<td></td>
<td>- Increase in the availability of infrastructure to support alternative fuels</td>
<td>- Year 3-4: Conduct public awareness campaigns</td>
<td>- Environmental Protection Agency</td>
<td>- Infrastructure development plans</td>
<td>- Availability of infrastructure to support alternative fuels</td>
</tr>
<tr>
<td></td>
<td>- Reduction in GHG emissions from the transport sector</td>
<td>- Year 5-10: Monitor and adjust policies and initiatives as needed</td>
<td>- Local governments</td>
<td>- Public awareness campaign materials</td>
<td>- GHG emissions data</td>
</tr>
<tr>
<td>3. Encourage the use of intermodal transport</td>
<td>- Increase in the use of intermodal transport modes, such as rail and waterway transport</td>
<td>- Year 1-2: Develop policies and regulations to promote intermodal transport</td>
<td>- Ministry of Transportation and Communications</td>
<td>- Use of intermodal transport modes</td>
<td>- Number of unnecessary trips made by freight vehicles</td>
</tr>
<tr>
<td></td>
<td>- Reduction in the number of unnecessary trips</td>
<td>- Year 3-5: Establish logistics centers and freight villages</td>
<td>- Environmental Protection Agency</td>
<td>- Logistics center and freight village plans</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Year 6-10: Develop transportation systems to</td>
<td>- Local governments</td>
<td>- Transportation data</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Use of intermodal transport modes</td>
<td></td>
</tr>
<tr>
<td>Directions and Activities</td>
<td>Target indicators</td>
<td>Implementation timing</td>
<td>Responsible entities</td>
<td>Form of deliverables</td>
<td>Data sources for monitoring</td>
</tr>
<tr>
<td>------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------</td>
<td>-----------------------------------------------------------</td>
<td>-----------------------------------------------------------</td>
</tr>
<tr>
<td>4. Develop and implement policies and regulations to reduce environmental impact</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Air pollution data</td>
</tr>
<tr>
<td>• Develop and implement policies and regulations to reduce air pollution and noise pollution from freight transport, such as emissions standards for vehicles and noise limits for freight operations</td>
<td>• Reduction in air pollution and noise pollution from freight transport</td>
<td>• Year 1-2: Develop policies and regulations to reduce environmental impact</td>
<td>Ministry of Transportation and Communications</td>
<td>Policy and regulation documents</td>
<td>Noise pollution data</td>
</tr>
<tr>
<td>• Implement energy-efficient technologies in the transport sector, such as the use of fuel-efficient engines and energy-efficient driving practices</td>
<td>• Increase in the adoption of energy-efficient technologies in the transport sector</td>
<td>• Year 3-4: Implement policies and regulations</td>
<td>Environmental Protection Agency</td>
<td>Technology adoption reports</td>
<td>Adoption rate of energy-efficient technologies</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Year 5-10: Monitor and adjust policies and initiatives as needed</td>
<td>Local governments</td>
<td>Environmental impact assessments</td>
<td></td>
</tr>
<tr>
<td>5. Establish logistics centers and freight villages</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Air pollution data</td>
</tr>
<tr>
<td>• Identify key transport hubs for logistics centers and freight villages</td>
<td>• Improvement in the efficiency of the logistics system</td>
<td>• Year 1-2: Identify key transport hubs and develop plans</td>
<td>Ministry of Transportation and Communications</td>
<td>Policy and regulation documents</td>
<td>Noise pollution data</td>
</tr>
<tr>
<td>• Develop and implement plans for logistics centers and freight villages, including consolidation and distribution of goods, customs clearance, and warehousing services</td>
<td>• Reduction in the number of unnecessary trips made by freight vehicles</td>
<td>• Year 3-5: Establish logistics centers and freight villages</td>
<td>Environmental Protection Agency</td>
<td>Technology adoption reports</td>
<td>Adoption rate of energy-efficient technologies</td>
</tr>
<tr>
<td>• Develop and implement transportation systems to support logistics centers and freight villages, such as rail and waterway transport</td>
<td>• Year 6-10: Develop transportation systems to support logistics centers and freight villages</td>
<td>• Local governments</td>
<td>Local governments</td>
<td>Environmental impact assessments</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Logistics efficiency data</td>
</tr>
<tr>
<td>6. Encourage the use of low-carbon transport modes</td>
<td>• Increase in the use of low-carbon transport modes</td>
<td>• Year 1-2: Develop policies and regulations to encourage the use of low-carbon transport modes</td>
<td>Ministry of Transportation and Communications</td>
<td>Logistics center and freight village plans</td>
<td>Number of unnecessary trips made by freight vehicles</td>
</tr>
<tr>
<td>• Develop and implement policies and regulations to encourage the use of low-carbon transport modes</td>
<td>• Reduction in GHG emissions from the transport sector</td>
<td>• Year 3-4: Develop infrastructure to support low-carbon transport modes</td>
<td>Environmental Protection Agency</td>
<td>Transportation system development plans</td>
<td></td>
</tr>
<tr>
<td>• Develop infrastructure to support low-carbon transport modes</td>
<td></td>
<td>• Year 5-10: Conduct public awareness campaigns</td>
<td>Local governments</td>
<td>Freight vehicle trip reduction reports</td>
<td></td>
</tr>
<tr>
<td>• Conduct public awareness campaigns to promote the benefits of low-carbon transport modes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Develop and implement freight route optimization strategies</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Use of low-carbon transport modes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>GHG emissions data</td>
</tr>
<tr>
<td>Directions and Activities</td>
<td>Target indicators</td>
<td>Implementation timing</td>
<td>Responsible entities</td>
<td>Form of deliverables</td>
<td>Data sources for monitoring</td>
</tr>
<tr>
<td>---------------------------</td>
<td>------------------</td>
<td>----------------------</td>
<td>---------------------</td>
<td>---------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>Develop and implement technologies and policies to optimize freight routes, such as route planning software and road pricing schemes</td>
<td>Improvement in the efficiency of freight transport</td>
<td>Year 1-2: Develop and test freight route optimization technologies and policies</td>
<td>Ministry of Transportation and Communications</td>
<td>• Route optimization technologies and policies</td>
<td>• Freight transport efficiency data</td>
</tr>
<tr>
<td>• Encourage the use of off-peak delivery times to reduce road congestion</td>
<td>Reduction in road congestion and traffic-related emissions</td>
<td>Year 3-4: Implement freight route optimization measures</td>
<td>Environmental Protection Agency</td>
<td>• Off-peak delivery policies and guidelines</td>
<td>• Road congestion data</td>
</tr>
<tr>
<td>• Implement measures to reduce empty vehicle miles, such as promoting backhauling and load consolidation</td>
<td>Year 5-10: Monitor and adjust policies and initiatives as needed</td>
<td>Local governments</td>
<td>Measures to reduce empty vehicle miles</td>
<td>• Emissions reduction data</td>
<td></td>
</tr>
<tr>
<td>8. Provide Heavy-Duty Vehicle (HDV) scrappage subsidies</td>
<td>• Reduction in emissions from HDVs</td>
<td>Year 1-2: Develop and implement HDV scrappage subsidy program</td>
<td>Ministry of Transportation and Communications</td>
<td>• HDV scrappage subsidy program guidelines</td>
<td>• HDV scrappage and replacement data</td>
</tr>
<tr>
<td>• Increase in the adoption of low-emission HDVs</td>
<td>Year 3-5: Monitor and adjust the program as needed</td>
<td>Environmental Protection Agency</td>
<td>• Eligibility criteria and application process</td>
<td>• Emissions reduction data</td>
<td></td>
</tr>
<tr>
<td>• Conduct public awareness campaigns to promote the benefits of HDV scrappage and replacement</td>
<td>Year 6-10: Increase the subsidy amount and expand the program if necessary</td>
<td>Local governments</td>
<td>• Public awareness campaign materials</td>
<td>• Emissions reduction data</td>
<td></td>
</tr>
<tr>
<td>9. Stimulate modal shift to less emitting modes from road freight</td>
<td>• Increase in the use of less-emitting modes for freight transport</td>
<td>Year 1-2: Develop policies and initiatives to promote modal shift to less-emitting modes</td>
<td>Ministry of Transportation and Communications</td>
<td>• Policy and initiative documents</td>
<td>• Modal shift data</td>
</tr>
<tr>
<td>• Reduction in emissions from the transport sector</td>
<td>Year 3-4: Establish incentive schemes</td>
<td>Environmental Protection Agency</td>
<td>• Incentive scheme guidelines</td>
<td>• Emissions reduction data</td>
<td></td>
</tr>
<tr>
<td>• Establish incentive schemes to encourage shippers and logistics companies to use less-emitting modes</td>
<td>Year 5-10: Develop infrastructure to support less-emitting modes</td>
<td>Local governments</td>
<td>• Infrastructure development plans</td>
<td>• Emissions reduction data</td>
<td></td>
</tr>
<tr>
<td>• Develop infrastructure to support less-emitting modes, such as rail terminals and waterway ports</td>
<td>10. Join international conventions and treaties promoting energy-efficient freight transport</td>
<td>10. Join international conventions and treaties promoting energy-efficient freight transport, such as the Kyoto</td>
<td>Ministry of Transportation and Communications</td>
<td>• International convention and</td>
<td>• Progress towards meeting the goals of international</td>
</tr>
<tr>
<td>• Alignement of national development policies with international</td>
<td>Year 1-2: Join relevant international conventions and treaties</td>
<td>International convention and</td>
<td>• Policy and initiative documents</td>
<td>• Emissions reduction data</td>
<td></td>
</tr>
<tr>
<td>Directions and Activities</td>
<td>Target indicators</td>
<td>Implementation timing</td>
<td>Responsible entities</td>
<td>Form of deliverables</td>
<td>Data sources for monitoring</td>
</tr>
<tr>
<td>------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>Protocol, Paris Agreement, and the International Energy Agency’s Fuel Economy Campaign</td>
<td>conventions and treaties promoting energy-efficient freight transport</td>
<td>• Year 3-4: Align national development policies with the goals and principles of these conventions and treaties</td>
<td>• Environmental Protection Agency • Ministry of Foreign Affairs</td>
<td>treaty membership documents • National development policy alignment documents • Monitoring and evaluation system guidelines</td>
<td>conventions and treaties • Alignment of national development policies</td>
</tr>
<tr>
<td>• Align national development policies with the goals and principles of these conventions and treaties</td>
<td>• Progress towards meeting the goals of international conventions and treaties</td>
<td>• Year 5-10: Establish monitoring and evaluation systems</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Establish monitoring and evaluation systems to track progress towards meeting the goals of these conventions and treaties</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Integrate target indicators for freight transport efficiency in national development policies</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Develop and implement policies and initiatives to integrate target indicators for freight transport efficiency into national development policies</td>
<td>• Improvement in freight transport efficiency</td>
<td>• Year 1-2: Develop policies and initiatives to integrate target indicators for freight transport efficiency</td>
<td>• Ministry of Transportation and Communications • Environmental Protection Agency • National Development Planning Agency</td>
<td>• Policy and initiative documents • Monitoring and evaluation system guidelines • Progress reports</td>
<td>• Freight transport efficiency data • Emissions reduction data</td>
</tr>
<tr>
<td>• Establish a monitoring and evaluation system to track progress towards the target indicators</td>
<td>• Reduction in emissions from the transport sector</td>
<td>• Year 3-4: Establish a monitoring and evaluation system</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Provide regular reports and updates on progress towards the target indicators to stakeholders</td>
<td></td>
<td>• Year 5-10: Provide regular reports and updates on progress towards the target indicators</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Thank you